AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

Improving Health Through Medical Physics

AAPM Newsletter — Volume 43 No. 4 — July | August 2018

Special Interest Group Report

Medical Physics Residencies

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AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

Improving Health Through Medical Physics

MedPhys Match Update 2018

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AAPM Newsletter — Volume 43 No. 4 — July | August 2018

At the end of March, 2018, we completed the fourth edition of the MedPhys Match (MPM). The purpose of this article is to provide a few highlights from this year's MPM and discuss a few other things relevant to the MPM.

Highlights of the 2018 MedPhys Match

As in year's past, National Matching Services Inc, the company that provides the matching services for MPM, provides year by year statistics on their website.[1] Starting this year, they also provide graphs showing how the match has changed over the years. For example, the total number of applicants registering for MPM has been steadily decreasing, from a high of 402 applicants in 2015, to 272 applicants in 2018. The number of applicants that register but withdraw or do not submit a rank list has dropped from 122 (2015 and 2016) to 68 (2018). The number of applicants submitting rank lists dropped from 280 in 2015 to slightly more than 200 in subsequent years.

Referring to the chart labeled Applicant Results on the NMS Statistics page, only about 39% of applicants submitting rank lists in 2015 were matched to a position. For 2016 and 2017, roughly 50% of applicants submitting rank lists were matched to a position. For this year's matching results, about 57% of applicants submitting rank lists were matched to a position. The number of residencies participating in the MPM continues to go up, increasing from 77 in 2015 to 87 in 2018. The number of positions offered is also increasing, from 112 in 2015 to 129 in 2018. From 2017 to 2018, the number of filled positions increased (from 107 to 116), but the number of unfilled positions almost doubled (from 7 to 13). This might be expected since the number of applicants competing for positions did not increase. I heard from some program directors with unfilled positions this year that were able to fill the positions quickly after the match results were announced.

Some of you may recall that in the very first Newsletter article about the 2015 MPM results,[2] we defined an acceptable applicant as an applicant that submitted a rank list who was also ranked by at least one program. Because the MPM was free of charge in the inaugural year, there were many applicants that probably submitted rank lists that did not get any interviews and were likely not qualified. Therefore, we hypothesized that including only acceptable applicants would be a better indicator. Referring to the year

by year statistics, the number of acceptable applicants from 2015 to 2018 was 185, 157, 174, and 176, respectively, for an average of 173 acceptable applicants per year. According to the CAMPEP 2016 graduate survey report,[3] the average size of the incoming graduate student class from 2012 to 2016 was 309 students. Over that same period, the average number of graduates (not including DMP programs) was 271 and not all of those would be expected to enter a clinical career and require a residency. The CAMPEP 2016 residency survey report[4] indicates that 170 applicants were admitted to residency programs in 2016, which is almost approximately the same as the number of acceptable applicants in the MPM. Therefore, the number of acceptable applicants is probably a reasonable indicator of how many qualified applicants there are each year.

In the 2015 Newsletter article, it was noted that most applicants and programs were matched to positions that they ranked highly. Figure 1 shows that this still remains the case for applicants. In all four years, at least 50% of matched applicants were matched to their top-ranked position. Approximately 95% of matched applicants were matched to one of their top 5 ranked positions.

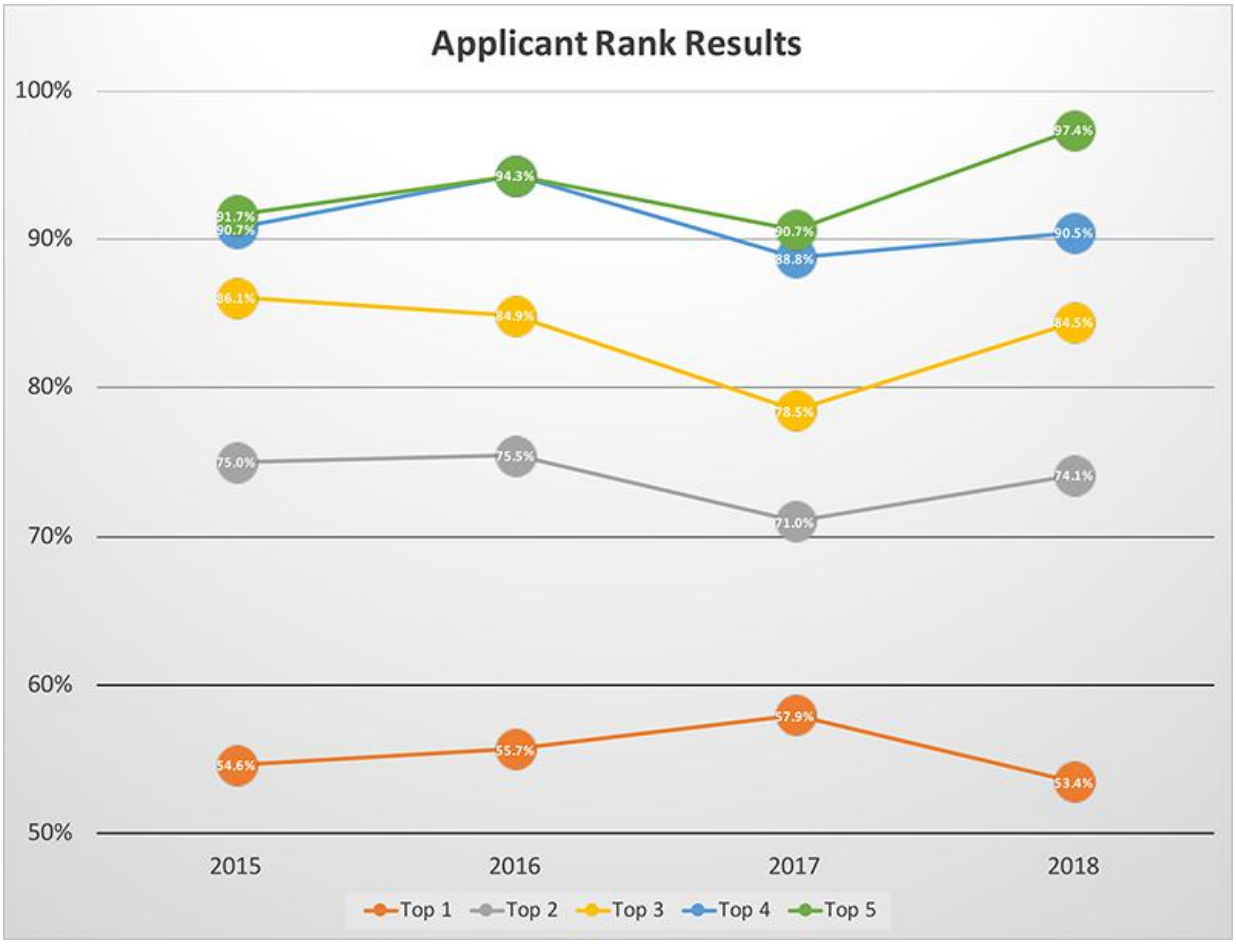

Figure 1. Percentage of matched applicants that matched to their top 1, 2, 3, 4, or 5 rank positions.

Figure 2 shows the similar rank statistics for programs. For standardized ranks less than five, there seems to be more variability for programs compared to applicants. Note that programs are matched to their number one ranked applicant only about 35-40% of the time (compared to more than 50% for applicants). In 2017, programs were matched to higher positions on their rank list, and it looks like applicants might have been a little lower as a result. However, the numbers are relatively small, and this amount of variability is likely normal.

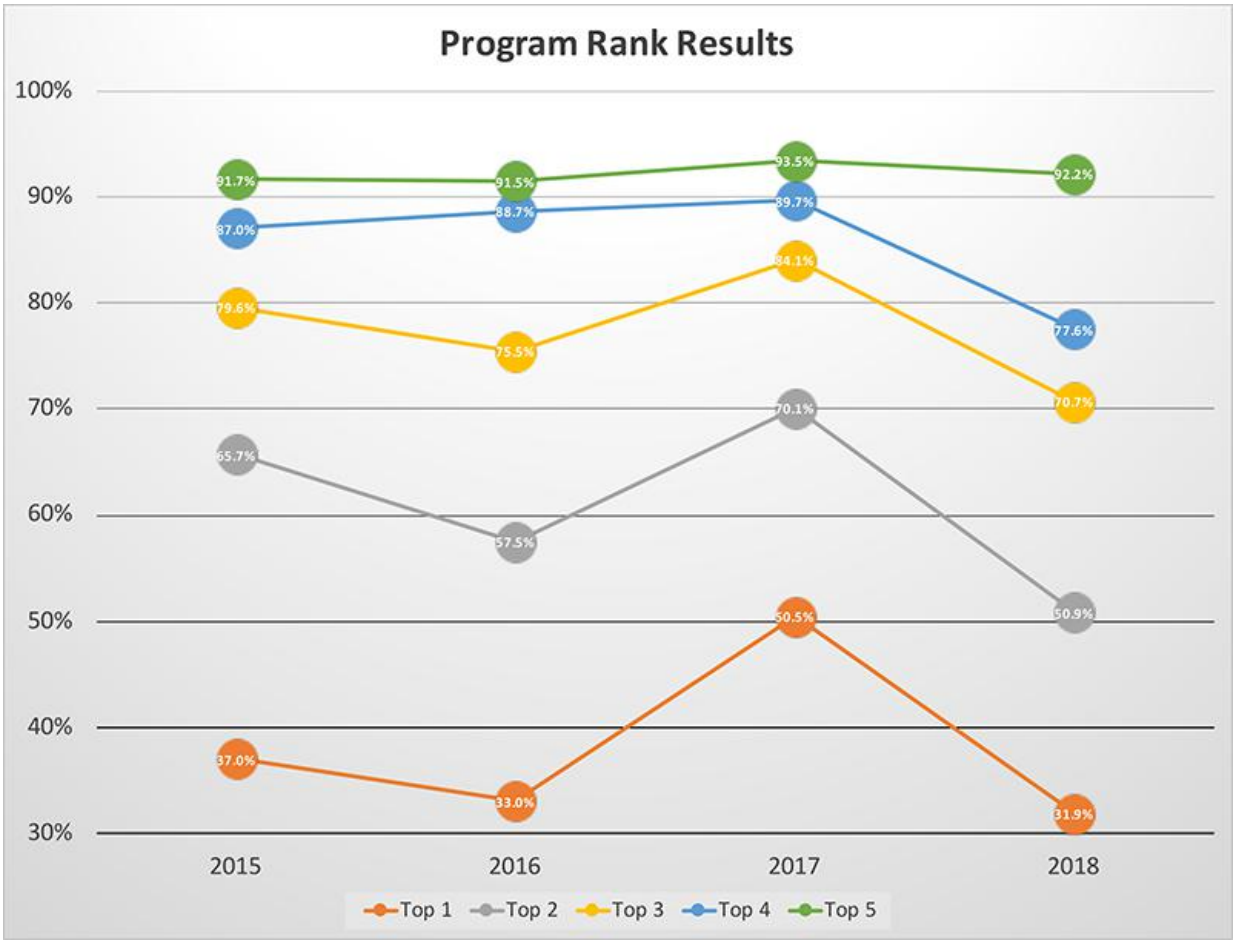

Figure 2. Percentage of matched programs that matched to their top 1, 2, 3, 4, or 5 standardized rank positions. The standardized rank is defined in multiples of the number of program positions. For example, a program with 2 positions has a standardized rank of 1 for their first and second ranked applicants.

Prior newsletter articles about the MPM,[2,5] also had some focus on matching statistics for various applicant subgroups. Figure 3 shows statistics for some of those subgroups. For those with a CAMPEP graduate background (degree or certificate program), about 85-90% were ranked by at least one program. For those that are ranked at least once, CAMPEP PhD graduate have a match rate of 90%, followed by certificate graduates at 76% and CAMPEP MS graduates at 63%. All of these numbers are higher than those reported for the 2015 and 2016 MPM. For applicants without a CAMPEP background (e.g., some or no coursework), only 69% of applicants are ranked by at least one program, and only 39% of those are matched to a position. Compared to 2015, the percentage of non-CAMPEP applicants getting ranked is much higher, but the match rate is much lower. The overall success rate was only slightly higher than in 2015 (27% vs 20%).

If we subdivide the applicants by gender, we see that female applicants are more likely to be ranked (92% vs 78%), to be matched (80% vs 65%), and to be successful in getting a position (74% vs 51%). Compared to 2015 and 2016, the percentage of female applicants being ranked has risen from 74% to 92%, while the percentage of male applicants being ranked has only gone up less dramatically, from 64% to 78%. The match rate for female applicants has also risen significantly (52% in 2015, 83% in 2016), while the match rate for male applicants has stayed about the same (65% in 2015, 72% in 2016).

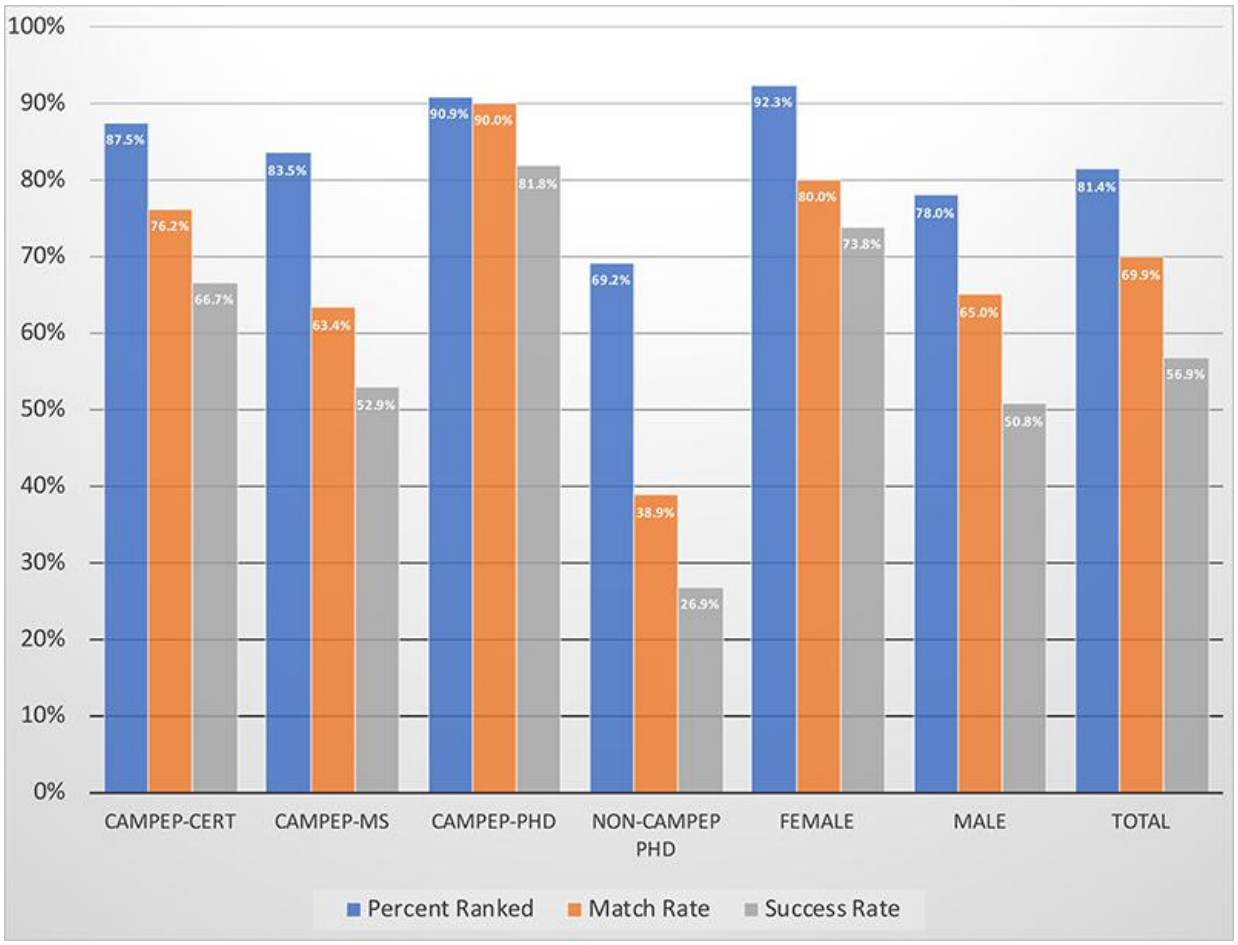

Figure 3. Percent ranked, match rate, and success rate for various subsets of applicants. Percent ranked is the number of applicants ranked at least once by programs relative to the number of applicants submitting rank lists. The match rate is the number of applicants matched relative to the number of ranked applicants. The success rate is the product of the first two quantities, or the number of applicants matched relative to the number of applicants submitting rank lists.

REMINDER ABOUT ETHICAL RECRUITING

In 2017, Hendrickson et al[6] published their analysis of survey results for the MPM in 2015 and 2016. What they found was eye-opening, to say the least. The MPM has rules governing how it works, but recruitment should also be done in accordance with human resources best practices and non-discriminatory behavior. There are many types of behavior that at first glance appear to be very innocuous but can make an applicant feel very uncomfortable and push the boundaries of ethical and legal behavior. The manuscript includes an example form that the authors use to remind the interview team about recruitment best practices and I know of a few programs that have already incorporated something similar into their recruitment practices. I would encourage all programs to read the manuscript and reflect on how their recruitment practices could be improved to ensure that applicants are treated with the respect that they deserve.

ADVANCED MATCHING FEATURES

Last year, we made some advanced features available to meet program recruitment needs, and I would encourage any program with a special recruitment need to look carefully at the signup packet. There is a very nice description of the features that should allow you to determine if they will meet your needs.

Without going into too much detail, these features allow programs to try to steer recruitment in their desired direction, while maintain flexibility to fill positions if required. A relatively simple example might be trying to get the algorithm to match your program to at least one female applicant, with the option of reverting the position to be open to all applicants if the position can't be filled with a female applicant in the first pass. Another feature allows programs to tie one or more positions to a subset of applicants. For example, one program was able to obtain funding for an additional position but the funding was restricted to students from a particular graduate program. The algorithm attempted to fill at least one position with a student from that graduate program and if that was not possible, the position would not be filled.

These features can also be used by so-called hybrid programs (longer than two years) with multiple positions. Each research advisor could have a separate list of acceptable applicants. Some applicants might be on only one list, and some might be on multiple research advisor lists. If the program has more research advisors than positions, the program could also specify which advisors are to get first priority in the matching algorithm. If higher priority positions are not filled in the first pass, the algorithm would attempt to fill other advisor's positions.

The advanced options can handle some very complicated recruitment scenarios, but they require a bit of forethought to ensure that rank lists and options are specified correctly to meet the program's recruitment needs. The simple matching model that we started with was not able to handle some of the scenarios that were being presented. We felt that adding these advanced features was better than having an unintended matching violation or not having the program participate in the MPM at all. If you have any questions about your program's particular needs, feel free to contact National Matching Services. I would also be happy to talk to any program director about these features.

NO GAMES ARE NEEDED

Physicists are clever people, but we can also be clever dumb. I've heard many program directors (physics and radiation oncology) tell me that they know their program is good because they always match near the top of their list. The program could very well be good, but they could also be good at picking applicants that rank them highly. An applicant may also be tempted to rank a program lower because they feel that the program is not going to rank them highly. National Matching Services lists four common misconceptions about the matching algorithm and the four facts about those misconceptions.[7]

1. The Match does not involve an arbitrary or subjective assignment of applicants to programs.
2. The likelihood of being able to obtain a position at a program, or being able to attract an applicant, should not be considered when sequencing the choices on your Rank Order List.
3. Applicants and programs should make out their Rank Order Lists based on true preferences, regardless of how they will be ranked by other participants.
4. The only strategy that will guarantee the best result for you is to rank according to your true preferences.

The algorithm is actually quite simple at its core. If you have not done so already, I would encourage you to look at the algorithm to convince yourself of these facts.

PRICE INCREASE FOR 2018

As mentioned in prior Newsletter articles, the first four years of MPM were subsidized by generous contributions from AAPM and SDAMPP. There are no plans for further subsidies, so costs for programs and applicants will be going up this year by about a factor of 2. This year's costs are now being determined and will be available when the next recruitment season starts this fall. After this year, cost increases should be much smaller and limited to regular cost of living increases.

WHO RUNS MEDPHYS MATCH?

The AAPM Subcommittee on the Oversight of MedPhys Match[8] is currently responsible for administering the MPM. The subcommittee establishes MPM policies and reviews any potential violations of the MedPhys Match Rules of Participation.[9] On behalf of the subcommittee, AAPM, SDAMPP, and residency applicants, we are grateful for the cooperation of participating applicants and programs. We welcome any and all constructive criticism regarding any aspect of the MPM program.

References:

[1] *MedPhys Match Statistics, accessed May 28, 2018*

[2] *AAPM Newsletter, Vol 40, No. 3, pages 20-23, accessed May 29, 2018*

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[5] *AAPM Newsletter, Vol 41, No. 5, pages 15-17, accessed May 29, 2018*

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[7] *Matching Algorithm, Common Misunderstandings, accessed May 28, 2018*

[8] *AAPM SCOMM Committee Page, accessed May 28, 2018*

[9] *MedPhys Match Rules and Eligibility, accessed May 28, 2018*

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

Improving Health Through Medical Physics

Evaluating the MedPhys Match

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AAPM Newsletter — Volume 43 No. 4 — July | August 2018

When the MedPhys Match (MPM) was launched in its inaugural year for the 2015 medical physics residency application cycle, this move toward standardization of the residency application and selection process provided a unique opportunity to survey the participants in order to examine the process for opportunities for improvement.

Following the model of the National Resident Matching Program (NRMP) for medical residencies, the newly created MPM aimed to address challenges in the existing open system by providing the framework for a fair system for pairing medical physics residency applicants with residencies. Matches between applicants and residencies are optimized according to the preferences of both parties as indicated through rank order lists, which are submitted by a single deadline; and binding results are released on a fixed date — designed to eliminate previously noted issues that prevented both applicants and residencies from having equal opportunities to assess their options [1], [2]. However, as with our physician counterparts who participate in the NRMP, the possibility of "gamesmanship" still exists [3]–[6]. Furthermore, once a negative culture has become entrenched, it can become difficult to change [7].

With the intent of both understanding the current state of the medical physics residency application process and using this information to help inform and improve this step in our profession, we set out to study the MPM with annual surveys sent to all applicants and residency program directors registered in the MPM from the first 2015 match cycle onward. The surveys gather information covering multiple aspects of the MPM and residency application and interview process, including respondent demographics, ethical issues, considerations for interview invitation and acceptance, interview experiences, costs, considerations for ranking, and overall perception of the MPM. Surveys from the second year (2016) onward include questions regarding reapplication, preparation, and success. A full list of the survey questions for both residency applicants and residency program directors is available online in the supplemental information for our paper on "Ethical violations and discriminatory behavior in the MedPhys Match" [8], published in JACMP last year.

To date, we have collected data from the first three match cycles from MPM applicants and medical physics residency directors. In addition to our 2017 article focusing on ethical concerns, earlier results from various aspects of the ongoing study have been presented at AAPM and SDAMPP meetings [9]–[11]. This article highlights a few of our findings across all three years.

SURVEY RESPONDENT DEMOGRAPHICS

Applicant surveys were sent to the email addresses of all applicants who registered in the MedPhys Match. The respondent rate (27-31%) was similar across all three years (Figure 1). Our data represented responses from a higher ratio of matched applicants than reported in the entire registered applicant pool (Figure 2).

Roughly half of all residency program directors responded to the survey (Figure 3).

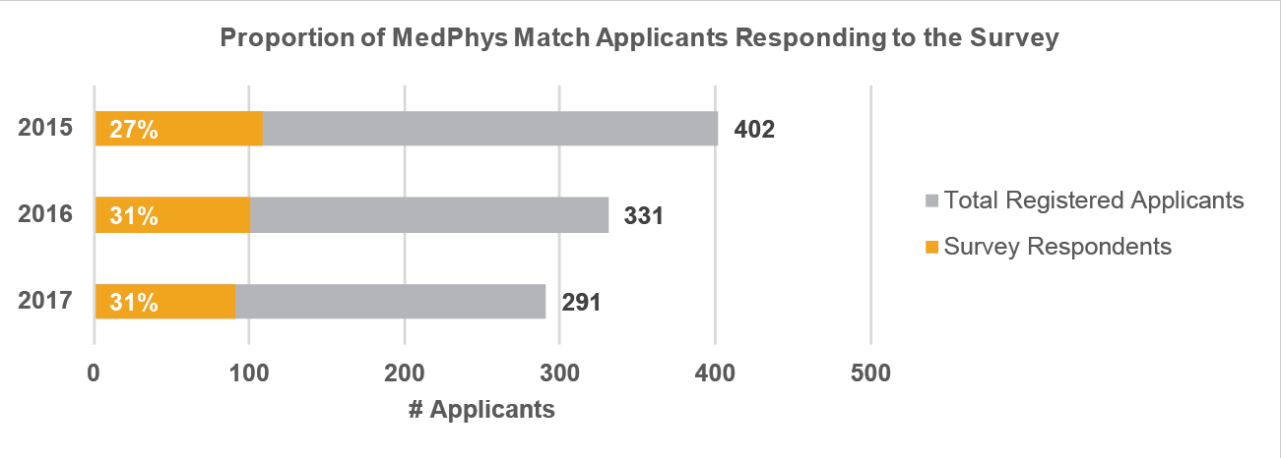

Figure 1. Survey invitations were sent via email to all registered applicants regardless of whether they did or did not successfully match, participate in interviews, submit rank order lists, or withdraw from the match. Respondents included individuals from all of these groups.

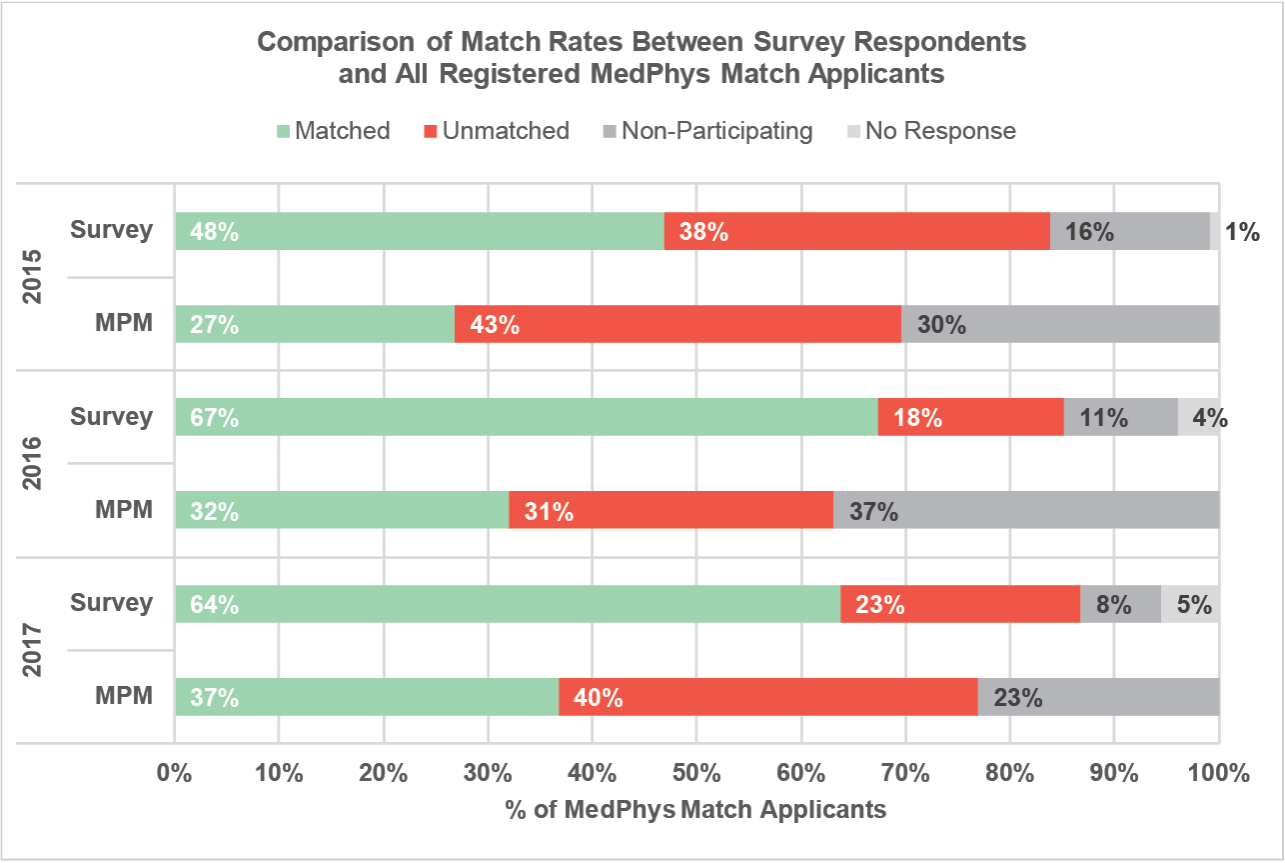

Figure 2. Survey respondents were asked whether they matched, submitted a rank order list, or withdrew from the match. Non-participating applicants are defined as those who either withdrew from the MedPhys Match or did not submit a rank order list. Compared to the overall pool of applicants registered for the MedPhys Match (MPM), our survey respondents (Survey) represent higher percentages of both applicants who participated in the match and applicants who successfully matched to a residency.

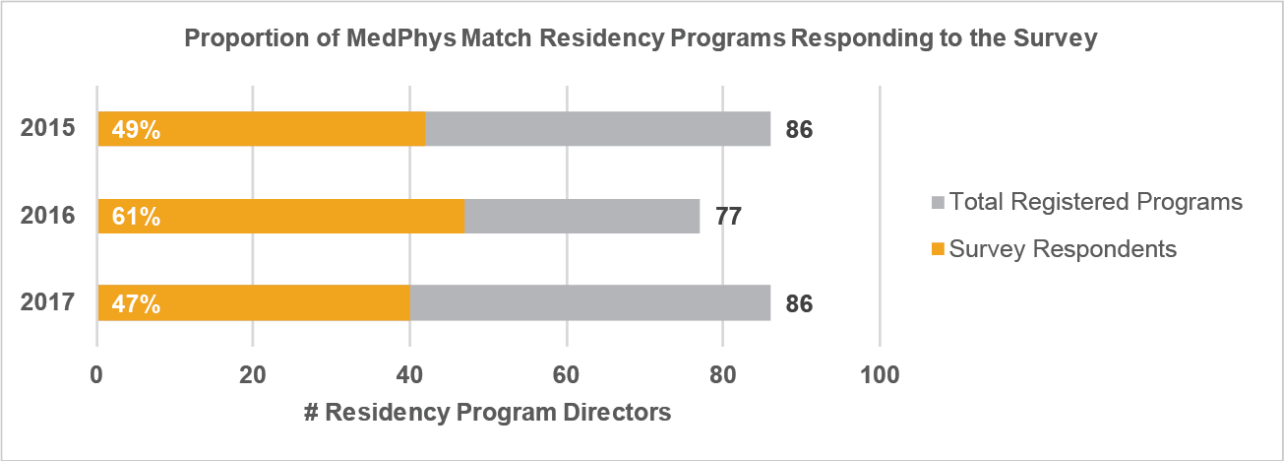

Figure 3. Survey invitations were sent to the program directors listed for each residency program participating in the MPM.

ETHICAL VIOLATIONS

The match system is meant to circumvent or eliminate previously identified problems with the open free-for-all application process by enforcing the single deadline (no race for early commitments); binding agreements to follow through on matches (no reneging on commitments); and the ability to rank all applicants/programs in your order of preference, knowing that you will be matched with your top choice that has an opening (no second guessing whether you should wait for a better offer).

What happens when it doesn't work? When the letter or spirit of the law — as defined by legally prohibited discriminatory questions [12] and the MPM rules [13] — are not followed, ethical violations can erode and diminish the potential of a fair match system. The problematic behaviors include prohibited questioning, potential for discrimination, pressures to commit prior to rank deadline, efforts to game the system, and dishonest communication such as false ranking pledges.

A selection of survey results is shown in the following figures and tables, revealing problematic ethical violations and other dishonest behaviors.

Table 1. Applicants were asked whether any program asked about their marital status, children, or religion—all examples of discriminatory questioning prohibited by the EEOC. The percentage of all survey respondents for each gender that answered in the affirmative are shown for questions regarding marital status and children. An unacceptably high percentage of applicants reported these behaviors.

% Of Respondents Who Were Asked About		2015	2016	2017
Marital status	all respondents	39%	47%	48%
	% of all male respondents	41%	54%	30%
	% of all female respondents	40%	49%	39%
Children or plans to have children	all respondents	23%	28%	17%
	% of all male respondents	19%	22%	15%
	% of all female respondents	33%	36%	20%
Religion	all respondents	1% (1)	3% (2)	3% (2)

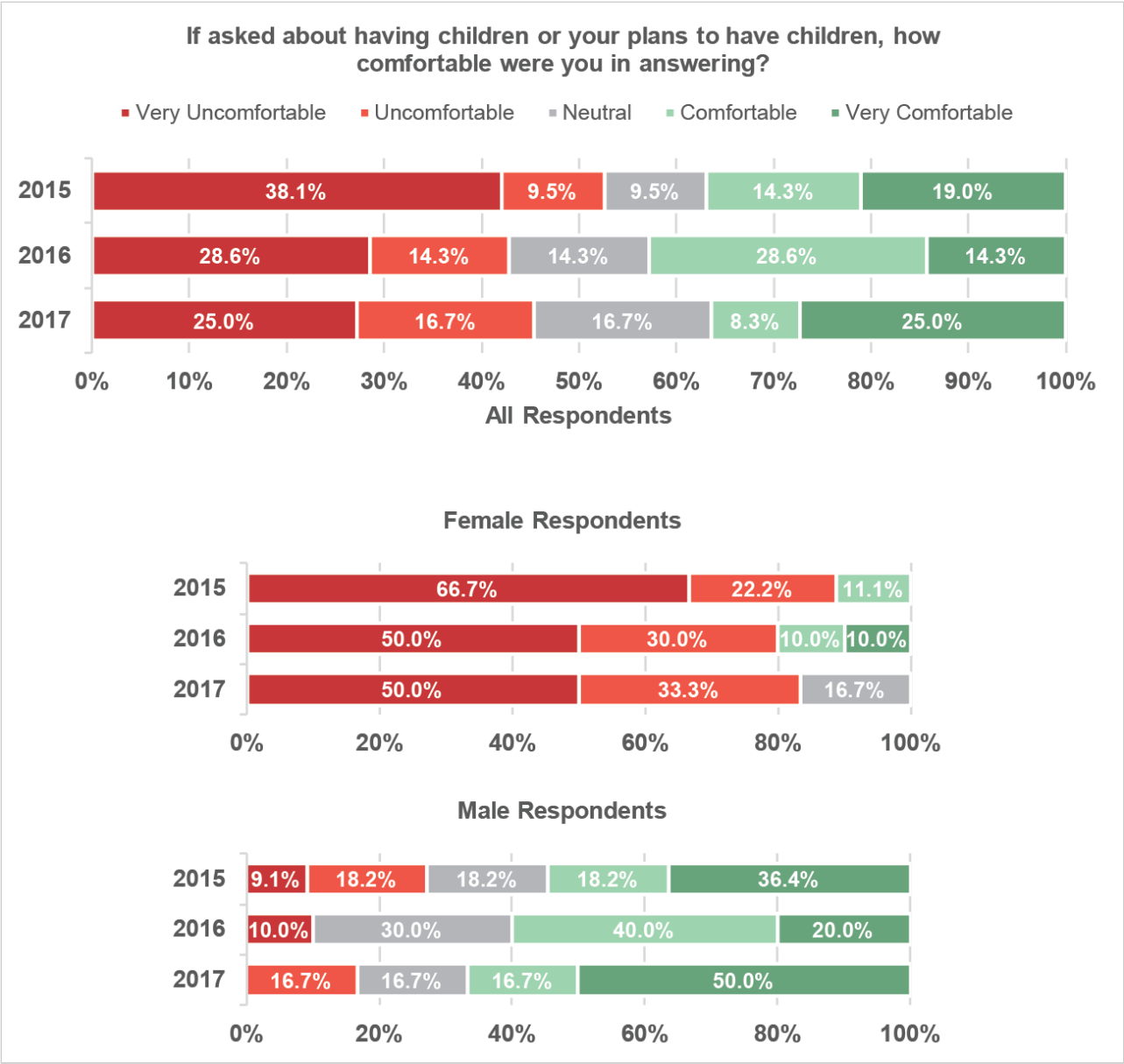

Figure 4. Applicants who reported being asked about children were asked how comfortable they were in answering these questions. Results include all three years of survey responses for all responding applicants and are further broken down by gender. Female applicants are significantly more uncomfortable answering this question, presumably because of increased potential for discriminatory use of the information.

The MPM rules prohibit asking the other party for rank positioning information (i.e., a specific rank number or range). There should be no additional pressure to influence rankings by asking where else the applicant is interviewing or by being offered incentives such as a future position, and yet each of these behaviors were reported by respondents to the surveys (Table 2).

Table 2. Applicant respondents reported the following illegal or pressured questions and communication.

% of respondents who were	2015	2016	2017
Asked where else they were interviewing	69%	79%	65%

% of respondents who were	2015	2016	2017
Told they were "ranked to match" or their rank number	29%	27%	31%
Asked how they would rank a program or which program they were ranking #1	13%	20%	25%
Offered incentives	13%	16%	13%
Offered a residency position outside of the match system	16%	15%	10%

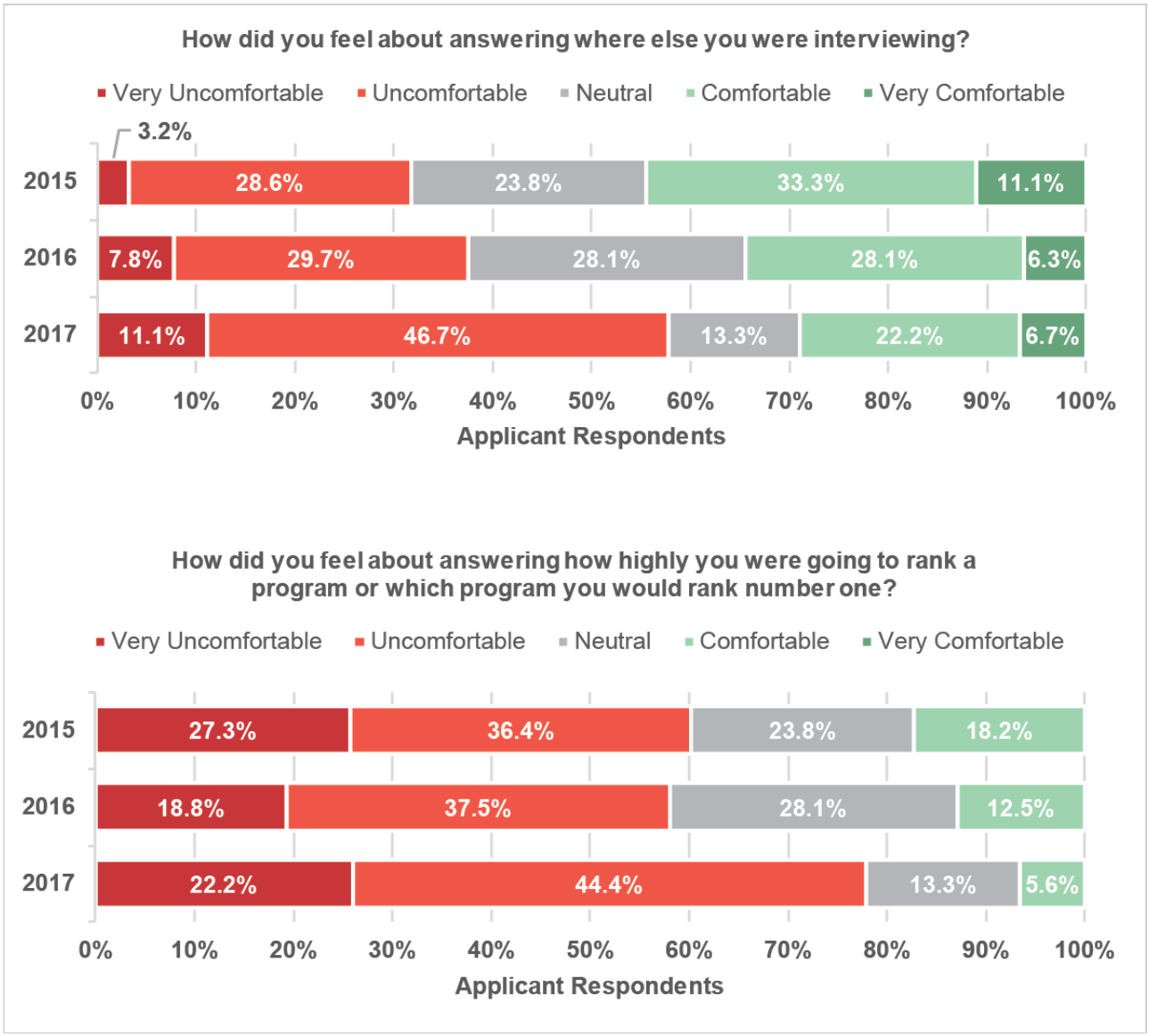

Figure 5. Applicants who reported the interview experiences in Table 2 were then asked how they felt about answering. Respondents were largely uncomfortable or very uncomfortable answering these questions during interviews.

THE COST OF APPLYING FOR RESIDENCY

The cost of application and interviews — both in terms of time commitment and financial investment — represents a significant burden for residency applicants.

Reported interviewing costs from survey respondents is shown in Figure 6. As could be expected, the financial burden of interviewing scales with the number of interviews attended. It is worth nothing, however, that there is an increasing trend in total spending on interviews: in 2017, 76% of respondents reported spending upwards of $1,000 and 38% reported spending upwards of $3,000, up from 59% and 24% in 2015.

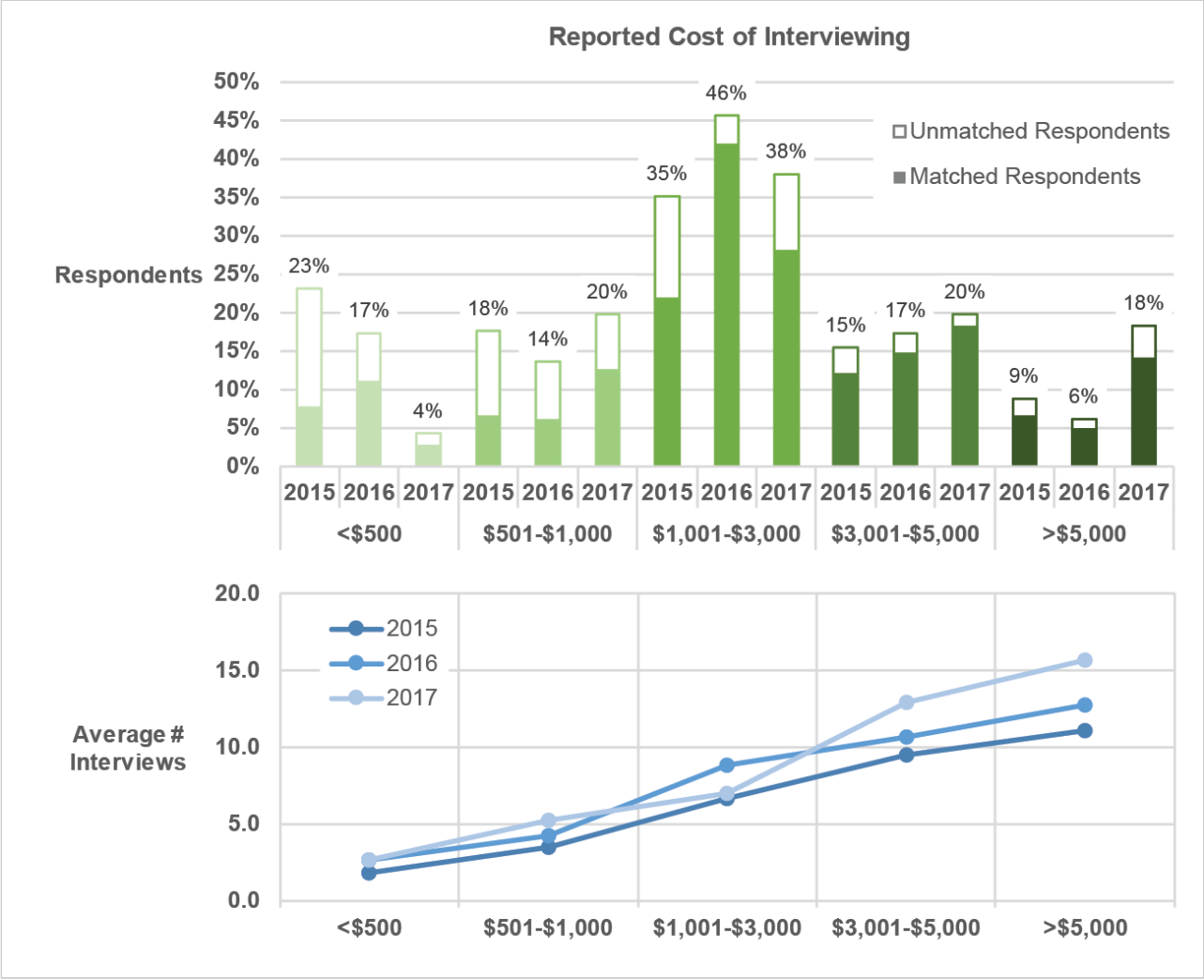

Figure 6. Top: Percentage of applicant respondents from 2015-2017 grouped by their reported costs of interviewing, with proportion of matched and unmatched applicants indicated. Bottom: Average number of interviews attended reported for each cost range by year.

The cost of traveling, scheduling conflicts with other interviews, and time constraints due to other commitments were frequently cited as reasons applicants chose to decline interview invitations (Figure 5). While time limitations may be inevitable, traveling costs and scheduling conflicts can be mitigated through voluntary coordination between residencies to schedule regionally-grouped and nonconflicting interview dates.

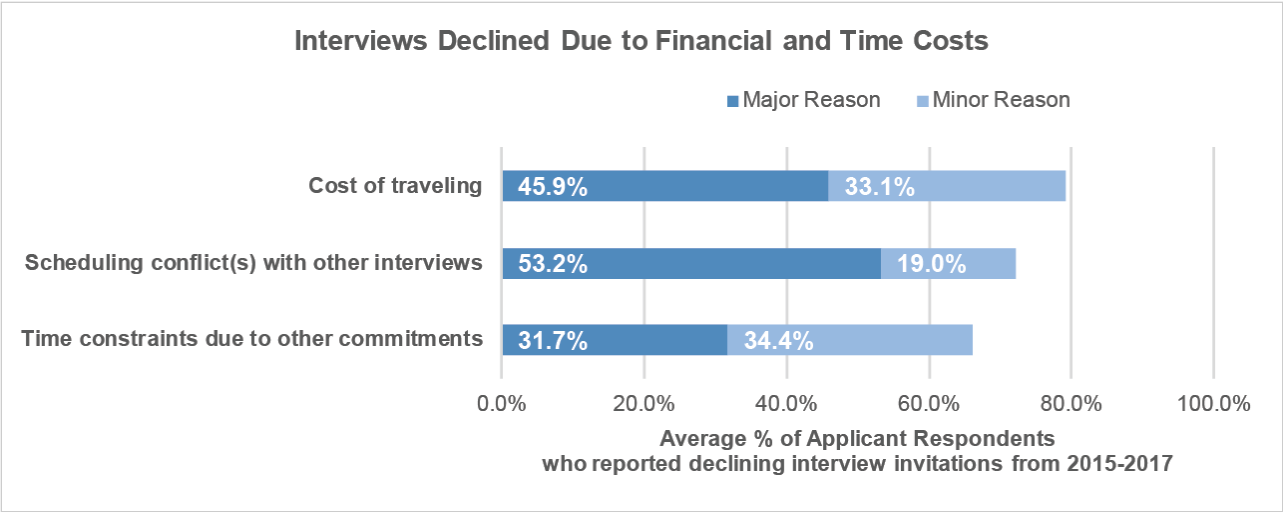

Figure 7. Financial and time limitations were frequently cited by applicants as reasons for declining interview invitations.

ONGOING WORK

In addition to the results highlighted here, the surveys gather data on the primary inclinations and preferences of both applicants and program directors. This should provide valuable guidance for future applicants looking to understand and improve their chances of matching, and for programs to make themselves more appealing to applicants. We have also gathered ongoing data on the satisfaction of both applicants and program directors with the match process as well as their sentiments regarding this aspect of entry into clinical practice in the medical physics profession. The details of these results will be reported in our next journal publication, and we look forward to sharing more of what we have learned with the rest of the community in future reports from this study.

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ACR Reception for Residents and Students at AAPM

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AAPM Newsletter — Volume 43 No. 4 — July | August 2018

The American College of Radiology (ACR) hosted its first reception for medical physics residents and students four years ago to provide an event where the attendees could unwind and meet members of the ACR Commission on Medical Physics in casual surroundings. Last year, **Dennis Stanley** and **Ara Alexandrian** from the AAPM Students and Trainees Subcommittee, and **Karen MacFarland** of AAPM helped advertise the event to students and residents who would be attending the Annual Meeting.

A suggestion from AAPM and the ACR Meetings Department prompted us to move the reception offsite to a nearby restaurant (Pizza Republica next to the Denver convention center) and we had a fabulous turnout. The offsite location was very popular with the attendees, who told us how refreshing it was to get away from the meeting venue and kick back with their colleagues in an informal and convivial atmosphere. This year in Nashville, the ACR will host the reception at a restaurant a couple of blocks from the Nashville convention center (Pancho & Lefty's).

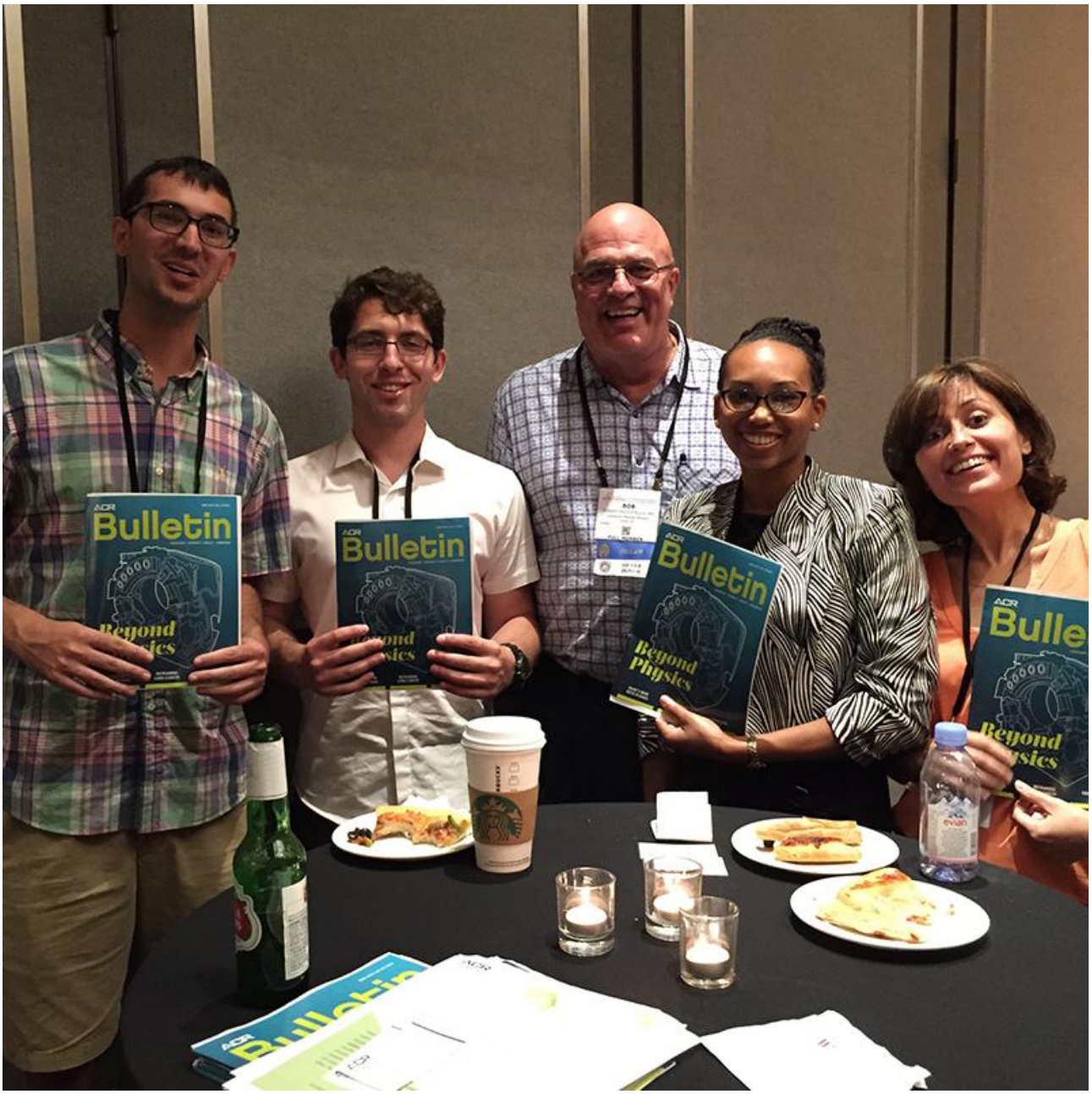
AAPM 2018 RECEPTION

Saturday, July 28 from 5pm - 7pm
Pancho & Lefty's (104 5th Ave. S, Nashville, TN)
Attendees will receive two complimentary beverages and appetizers.

MEMBERSHIP INFO

The chair of the ACR Commission on Medical Physics contacts all CAMPEP residency program directors annually to urge them to let their students know that every medical physicist enrolled in an accredited graduate or residency program is considered a member-in-training by the ACR and is entitled to free membership to the College. Trainees are eligible to join the ACR Residents and Fellows section, a great

opportunity to get involved in professional issues with radiologists and radiation oncologists at the same level in their careers. As members-in-training they will have access to all the same ACR on-line materials as full members such as access to the Journal of American College of Radiology and can apply for ACR fellowship programs in the areas of scholarly publishing, quality and safety, economics and health policy, government relations, education, and leadership. (See "*Medical Physicists Enjoy ACR Member Benefits*" brochure for more information.) ACR hopes that this reception will provide students and residents an opportunity to become aware of the activities of the college and encourage them to participate now as members-in-training then join the college as full members when they begin their practice.



Graduate students and residents learn about American College of Radiology membership and enjoy pizza during the ACR Reception for Residents and Students.

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ABR NEWS

J. Anthony Seibert, PhD, Member, ABR Board of Governors
Jerry Allison, PhD, Kalpana M. Kanal, PhD, and Matthew B. Podgorsak, PhD, ABR Trustees, and G. Donald Frey

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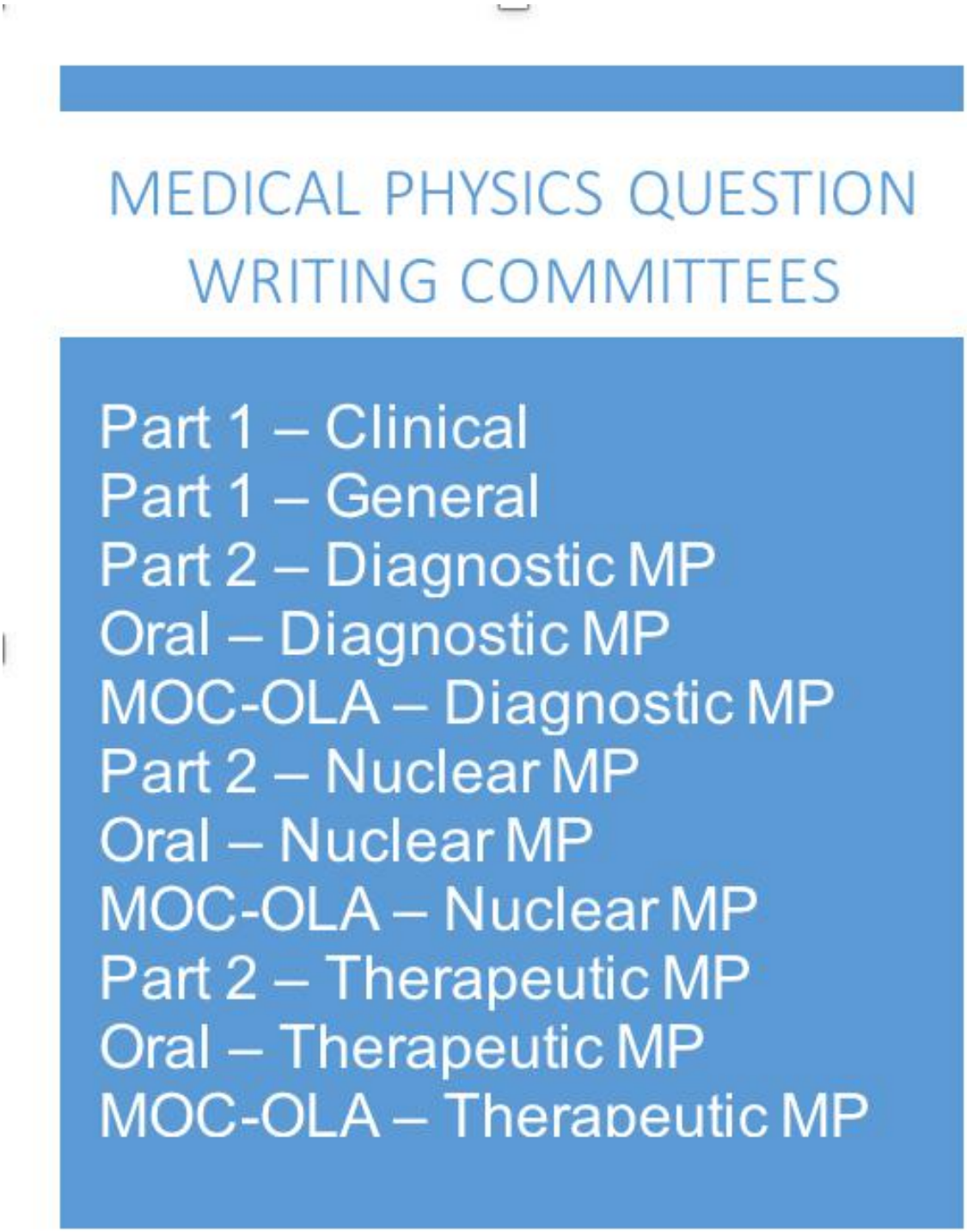
The ABR depends upon volunteers to function. ABR trustees, governors, committee members, and oral examiners are all volunteers who serve without pay. One of the key functions of ABR medical physics volunteers is to write the physics questions for all ABR exams. This includes not only the medical physics certification questions, but also physics questions for diagnostic radiology, interventional radiology/diagnostic radiology, and radiation oncology certification exams. For question writing purposes, volunteers are organized into committees according to their expertise. In this article, we will focus on the Therapeutic Medical Physics (TMP) Oral Exam Committee.



THE THERAPEUTIC MEDICAL PHYSICS ORAL EXAM COMMITTEE

The TMP Oral Exam Committee has six members: **Frank Ascoli, MS**; **John Bayouth, PhD**; **Katja Langen, PhD**; **Moyed Miften, PhD**; and **Richard Popple, PhD**. **Matthew Podgorsak, PhD**, chairs the committee and serves as the ABR Physics Trustee for TMP; **Elena Luevano** is the ABR staff member currently assigned to support the TMP Committee. This committee's charge has five main components:

- Generating oral questions, answers, and references

- Assembling each year's Oral Exam
- Updating the blueprint for the exam by including new material that has entered widespread use and removing older material that is no longer relevant
- Reviewing questions currently in the pool for accuracy and relevance, and
- Analyzing exam question statistics after each year's Oral Exam to ensure that all questions are performing well.

EXAM QUESTION DEVELOPMENT

The members of the committee develop questions throughout the year and formally submit them in the spring. Each question has four parts:

- The main question and images that are presented to the candidates
- A discussion of answer elements that candidates would be expected to know
- Possible topics for follow-up, and
- References.

All questions are reviewed by the TMP Committee during several online sessions, usually held in April and May. After the committee approves a new question, it is sent to the ABR Office for review by a member of the editorial staff, who checks the question for ABR psychometric standards, general clarity, and correct grammar. An imaging editor subsequently reviews the images associate with the question for clarity, adds appropriate annotation, and checks for inadvertent HIPAA violations. The question then goes into a pool of available questions.

ASSEMBLING THE EXAM

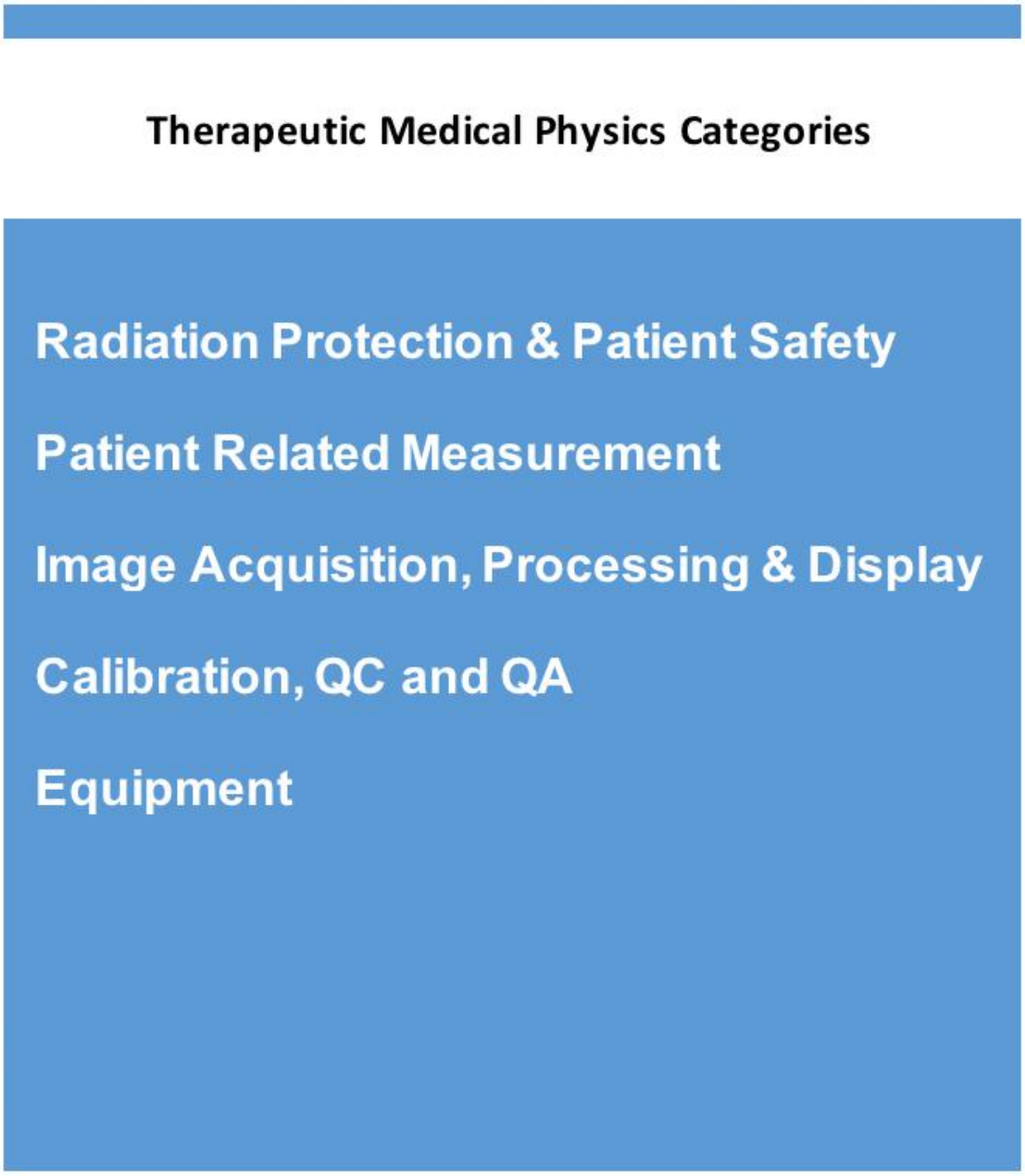
The TMP Committee holds a two-day retreat in late August during which all questions for the next year's Oral Exam are selected and reviewed one last time. Each medical physics specialty has five categories that define the scope of material on its respective Oral Exam. Every candidate is asked five questions in each category, for a total of 25 questions per candidate. There are two exam administrations per day, into which all candidates are grouped; therefore, with a typical four-day exam timeframe, 200 questions are asked each year. Because the same question cannot be used in successive years, a robust pool of questions is needed.

The ABR thanks the volunteers who serve on the Therapeutic Medical Physics Oral Exam Committee for making it possible to deliver a high-quality exam every year.

ABR ONE-YEAR POST-COMPLETION CAMPEP POLICY

In 2012 the ABR announced a temporary policy stating that a candidate would be considered as having completed a CAMPEP-accredited program if the program is accredited within one year of the candidate's graduation from the program. The ABR will rescind this temporary policy as of February 1, 2020. After

that date, the ABR will require candidates for Part 1 to first graduate from a CAMPEP-accredited academic program, diagnostic medical physics (DMP) program, certificate program, or residency that was CAMPEP-accredited prior to the date of matriculation.



To become board eligible, the candidate must complete a CAMPEP-residency program that was accredited for the entire length of the candidate's residency. Note that this does not pertain to individuals in the 36-month clinical experience pathway, which will close on February 1, 2023.

PERFORMANCE METRICS FOR RESIDENTS ON THE ABR EXAMS

Over the last few years the ABR has tracked the behavior of candidates from CAMPEP accredited residencies. During that time, we have noted:

- The CARS performance on Part1 was similar to those who only had training in a CAMPEP accredited graduate program.
- The CARS performance was better than other candidates.
- On the Part 3 (Oral) the CARS are much better than other candidates and the gap is increasing.
- CARS candidates now have a passing rate almost twice that of other candidates.
- The CARS passing rate is approaching that of Radiation Oncology residents.

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

Improving Health Through Medical Physics

Student and Trainee Events at the Annual Meeting

Mallory Glenn, BS, Houston, TX | Rebecca Mahon, PhD, Richmond, VA | Samantha Simiele, PhD, Ann Arbor, MI

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Members of the Students and Trainees Subcommittee at the 2017 Annual Meeting

The AAPM 2018 Annual Meeting is nearly upon us! For new and experienced physicists alike, the AAPM Annual Meeting is an incredible opportunity to network, share scientific and clinical knowledge, and showcase cutting-edge technologies and research that support the field of medical physics. For AAPM's most junior members, the Students and Trainees Subcommittee (STSC) strives to provide opportunities for personal and professional development throughout the conference. This year, the STSC, in conjunction with the Working Group on Student and Trainee Research and the Working Group To Promote Non-Clinical Career Paths for Medical Physicists, has organized an extensive list of sessions and activities. All of these events can be found on the 2018 Annual Meeting website and are summarized below. The program consists of some old favorites, like the **Residency Fair**, **Interview Workshop**, and **Student Night Out**, along with some exciting new additions, like the inaugural **MedPhys Slam**. The majority of the events are scheduled for Sunday, July 29.

The residency fair, supported by SDAMPP, has been a popular event for both programs and students as evidenced by the fair reaching capacity for program enrollment and student registration exceeding 100 participants each year. We expect nothing different this year as more than 50 program spots have already been filled. The fair is open to both imaging and therapy residency programs and all students.

The purpose of the fair is to provide prospective residents an opportunity to meet current residents and program directors and to learn about what each program has to offer. Most programs bring copies of a pamphlet or one-page summary that highlights the attributes of their program. More importantly, the fair provides future applicants and programs an opportunity to make a first impression. Students have reported using their interactions during the residency fair to modify the list of programs they apply to in the MedPhys Match.

The residency fair is intended to provide a relaxed environment for students and programs to meet. We recommend a dress code of business casual to match the recommendations of the Annual Meeting organizers. Students often ask if they should provide programs with copies of business cards, CVs, or resumes. Although it doesn't hurt to have copies of these available, we do not recommend handing them out during the fair. The event is not meant to be a job interview and occurs months prior to the application deadlines for the next round of the MedPhys Match. Programs will receive and review this information during the application process. We recommend students take notes after meeting with each program to help retain important information. The fair is a great time to learn what different programs are looking for in a resident, whether it's prior clinical experience, a plethora of publications, or the right personality.

The fair occurs during a two-hour window just prior to the poster session on Sunday afternoon. The STSC budgets for the residency fair and is able to organize the fair at no cost to programs or students. Prior to the fair, each program is assigned a “cocktail” style table with programs grouped based on their geographical location. Students are provided with a map of the event layout and can navigate the fair at their own pace, visiting as many or as few residency program tables as they wish. Students are also provided with a summary of each program in attendance that includes information such as the length of the program, the number of positions available in the upcoming match, preference for MS or PhD candidates, and whether research is required. This information is collected from programs during registration and serves to help students focus their energy on visiting programs that are a good fit for their background and career goals.

We still have space for a few more programs at this year's fair. Program directors or representatives may reserve a table here and students may register here.

We take this opportunity to thank **RTI Electronics, Inc.** and **ScandiDos, Inc.** for sponsoring the Student Night Out, as well as the members of AAPM that contribute their time and energy to make these events possible. A list of all events geared toward students and trainees during the annual meeting as follows:

Student and Trainees Subcommittee Meeting

When: Saturday, July 28 from 3:00 pm to 5:00 pm
Where: Cumberland 6, Third Floor, Convention Center

The STSC meeting (as well as most association meetings) is open to all AAPM members (per AAPM Rule 3.3.2). If you are interested in getting involved with the STSC or want to learn more about the events and outreach we provide, feel free to join us at our meeting Saturday afternoon. We would love to meet you and hear your input! As a courtesy, please contact the committee chair prior to the meeting.

Annual Student Meeting: The Role of Automation in Clinics of the Future

When: Sunday, July 29 from 8:30 am to 10:00 am
Where: Davidson Ballroom B, Convention Center

Each year, the Annual Student Meeting provides opportunities for student networking and discussion on important medical physics issues, such as education and career development. This year's meeting explores the role of automation in radiation oncology clinics. Automation is heavily relied on in other industries, and is becoming an increasingly important topic for our field as we evolve to maximizing efficiency while maintaining a high standard of quality. **Drs. Steve Jiang** and **Kevin Moore** are leaders in this field, and will each give a 20-minute presentation on automation strategies used at their respective institutions. This will be followed by a 50-minute discussion period facilitated by student moderators and the audience.

Undergraduate Networking Session

When: Sunday, July 29 from 10:00 am to 10:30 am
Where: Davidson Ballroom B, Convention Center

Following the Annual Student Meeting, the Society of Physics Students (SPS) invites undergraduates attending the Annual Meeting to meet others in the field. A short talk on medical physics as a personal endeavor will be given, providing a unique perspective on the field.

WGSTR Student and Trainee Lunch

When: Sunday, July 29 from 11:30 am to 1:00 pm
Where: Davidson Ballroom C, Convention Center

Student and faculty members representing various committees, councils, and task groups within AAPM will be on-hand to facilitate discussion on the many ways to get involved. Lunch tickets are available when you register for the meeting, or you may join the event at no cost (no lunch). *Deadline for registration is July 3rd.*

4th Annual Residency Fair

When: Sunday, July 29 from 1:00 pm to 3:00 pm
Where: Davidson Ballroom Foyer, Convention Center

Finding the perfect residency can be difficult. Thanks to collaboration between STSC and SDAMPP, the Annual Residency Fair at AAPM provides students the opportunity to learn more about individual CAMPEP residency programs across the country. Come meet and interact with program directors and current residents to learn more about your potential fit. This year there will be more than 50 imaging and therapy programs participating in the Residency Fair!

Still not sure where to begin? Check out our Reddit AMA from last year with several medical physics residency program directors to get some inspiration for potential questions you could ask.

Student Night Out at AMCE Feed & Seed

When: Sunday, July 29 from 6:00 pm to 8:30 pm
Where: AMCE Feed & Seed, 101 Broadway, Nashville

Join us for the Annual Students and Trainees Night Out (SNO), sponsored by STSC! This event, crafted specifically for students, trainees, and post-docs, provides attendees with the chance to network with fellow future physicists and enjoy an evening of fun and camaraderie. This year's SNO will occur at the AMCE Feed & Seed, where you can enjoy beer and wine, a dinner buffet, ping pong, giant jenga, and cornhole. If you want a break from the hustle and bustle of the Student Day events, this is the place to be!

Partners for the Future

When: Sunday, July 29 through Wednesday, August 1
Where: Exhibit Hall

There's never a better time than now to start thinking about the future Partners for the Future strives to create lasting connections between corporate affiliates and students at the AAPM Annual Meeting. This event is especially beneficial to students by introducing them to commercial products and potential opportunities for collaboration with various companies. This year we're adding even more excitement with a chance to win a $100 Amazon gift card! You can learn more about how to participate in Partners for the Future here under the Student and Trainees Events tab.

MedPhys Slam

When: Monday, July 30 from 1:45pm to 3:45pm
Where: Karl Dean Ballroom C, Convention Center

New this year is the MedPhys Slam, a research communication competition in which participants prepare a three-minute presentation aimed at sharing the significance of their science in a compelling yet understandable manner. Participants will be judged by a non-physicist panel on three equally

weighted categories: comprehension/content, communication, and engagement. Come cheer on the finalists from the AAPM chapters, the Canadian Organization of Medical Physicists (COMP), and international preliminary competitions.

Interview Workshop

When: Monday, July 30 from 4:30 pm to 6:00 pm
Where: Partners in Solutions Room, Exhibit Hall

The STSC invites students, trainees, and young professionals to attend an interview workshop to practice interviewing skills and receive feedback from real interviewers. This workshop will consist of two parts: first, guidance and examples of how to respond in an interview setting, and second, group interview sessions that will allow students the opportunity to gain experience both listening to responses and receiving feedback for their own answers. For anyone looking to interview in the near future or simply sharpen your communication skills, this is an event you do not want to miss. You can RSVP to the Interview Workshop here: RSVP now

Breaking Out of the Clinic: Non-traditional Medical Physics Careers

When: Wednesday, August 1 from 11:15 am to 12:15 pm
Where: Room 209, Convention Center

This symposium organized by the Working Group to Promote Non-Clinical Career Paths for Medical Physicists will discuss non-clinical career options and how to prepare for them. Three physicists working outside of the clinic will talk briefly on their experience. Don't worry if they didn't answer your question; there will be an open panel at the end of the session. Come learn about opportunities beyond the clinic.

And as always, be sure to follow us on our Facebook and Twitter to stay up-to-date on relevant events and opportunities for medical physics students and trainees. We hope to see you in Nashville!

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

Improving Health Through Medical Physics

PRESIDENT'S REPORT

Bruce Thomadsen, PhD | Madison, WI

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AAPM BOARD AND STRATEGIC PLANNING

Last Newsletter, **Board Chairwoman Melissa Martin** gave the results from the Spring Clinical Board meeting, which was, the approval of AAPM's new Strategic Plan. In this article, I want to draw attention to the process. The Board spent much of the two days of meeting sitting in a committee of the whole to work on the Strategic Plan. While much of the plan was generated by the Strategic Planning Committee of the Board, and then enhanced by each of the councils, there was still work to be done. The Board broke into five tables to discuss the goals in the plan and the strategic objectives that would lead to achievement of the goals. The Board then came back together to discuss the proposed changes, combining some goals and rearranging and refining the objectives. They even added a new goal: Inclusion of Diversity. Immediate Past Chair **Bruce Curran** and our Executive Director, **Angela Keyser**, mostly organized (down to very fine details) and facilitated the meeting to help lead it to a successful conclusion: Thank you both very much. In the end, the 21 chapter representatives, the 12 members-at-large and the executives, along with the various non-voting members, all participated, all spoke and listened, and all worked together — planning, and showing that they are not too numerous to do so.

TWEAKING THE ORGANIZATION

Parts of the proposed reorganization plan that did not pass last year did not have to do with the Board, but addressed some of the ways the councils operate, or could operate better. With the failure of the proposal, there still is work needed in AAPM's organization structure. Some ad-hoc committees have been seated to make proposals to smooth our operations.

- Ad-hoc on indexing AAPM Website Content. Chaired by **Robin Miller**, this committee is proposing the use of standardized indexing keywords shared between our journals, meetings and video library, making searches more productive when looking for content.
- Ad-hoc on Liaisons and Appointments. Chaired by **Bruce Curran**, this committee is addressing the roles of liaisons and how to make them more effective.

- Ad-hoc on the Nomination Procedures. Chaired by **Bhudatt Paliwal**, this committee is to propose procedures for nominations to elected offices that would better represent the diversity in practice and makeup of our membership.
- Ad-hoc on the Integration of Effort. Chaired by **Sonja Dieterich**, this committee has the most challenging of charges. AAPM has many topics that fall into different silos, for example imaging in therapy, international programs and some professional-scientific issues. Our current tree hierarchy inhibits, rather than facilitates, cross-branch cooperation. This committee will make suggestions to break the barriers.

STRATEGIC PLANNING AGAIN

The plan passed by the Board was not really a strategic plan. It was more a tactical plan to guide the expenditure of our resources, certainly funds but mostly volunteer effort, to achieve what we see as our goals. Strategic planning looks beyond these immediate and short-term concerns to plan for the health of the Association ten to fifteen years from now. No, we cannot predict what things will be like then, but we may be able to affect some of the factors that could shape the environment producing our future. This is the meaning of the theme for the Annual Meeting in Nashville: *Beyond the Future*. The President's Symposium, Monday, July 30, will feature our own **Robert Jeraj** talking about subjects into which medical physics may expand, and author and planner of the future **Paul B. Brown** discussing how we can make our future. There will be a workshop after the symposium to generate ideas on how to do all of this. It should be an exciting, and crucial, time.

A lot is happening in your association. Become a part of dynamic activity.

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

Improving Health Through Medical Physics

EXECUTIVE DIRECTOR'S REPORT

Angela R. Keyser | Alexandria, VA

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AAPM HAS AN INDEPENDENT AUDIT PERFORMED YEARLY

AAPM created an Audit Committee that reports to the Board of Directors over 10 years ago to foster a governance structure of accountability. The primary function of this group is to monitor the integrity of AAPM's financial reporting process, the appropriateness of the organization's accounting policies and internal controls and the independence and performance of the independent auditors. AAPM's Audit Committee, chaired by **Jennifer Smilowitz**, met at AAPM HQ on June 5 and will provide a report to the Board at the August 2 Board of Director's meeting in Denver. AAPM audit reports going back to 1992 are available online.

AAPM PROFESSIONAL SURVEY

The 2017 Professional Survey is available online. You can download a PDF from the web or have the document emailed to you. If you have any problems, please contact HQ.

ELECTION PROCESS ONLINE ONLY!

Elections for the 2019 Officers and Board Members-At-Large are now in process and will run through July 11. The election process will be online only so be alert to email announcements.

A NEW AAPM REPORT IS AVAILABLE ONLINE:

Image guidance doses delivered during radiotherapy: Quantification, management, and reduction: Report of the AAPM Therapy Physics Committee Task Group 180 is now available on the AAPM Reports list.

AAPM AND ASTRO LEADERS MEET

Members of AAPM's Executive Committee and ASTRO Board of Directors are scheduled to meet on June 26 to discuss matters of mutual interest. This yearly meeting of AAPM and ASTRO leaders acknowledges the complimentary missions of the organizations, reflecting the close professional relationship between medical physicists and radiation oncologists.

#AAPM2018 – ANNUAL MEETING NEWS

BEYOND THE FUTURE!

Get your attendance approved now with the *Top 5 Reasons the AAPM Annual Meeting Offers a Good ROI!* Find supportive information to give to your supervisor and share our prewritten letter with all the benefits. Print and share with the individual who authorizes your travel.

Tuesday, July 31 from 9:30 AM – 11:00 AM will be dedicated time to Visit the Vendors. An online Buyers Guide is available, with information about the exhibiting companies. Exhibit hours are:

- Sunday, July 29 – 12:30 – 5:00 PM
- Monday, July 30 – 9:00 AM – 5:00 PM
- Tuesday, July 31 – 9:00 AM – 5:00 PM
- Wednesday, August 1 – 9:00 AM – 2:00 PM

Make plans to attend the **2018 Annual Business and Town Hall Meeting** on Wednesday, August 1 from 6:15 pm - 7:30 pm in the Karl Dean Ballroom A1 of the Music City Center. AAPM's President **Bruce Thomadsen** and Treasurer **Mahadevappa Mahesh** will report on the status of the organization. What should AAPM be working on? How can the organization better serve you? Members of the AAPM Board of Directors want to hear directly from the membership. Here's your chance to be heard.

Taking a lesson from the successful format of the 2016 and 2017 Nights Out, the **2018 Night Out** will not be a dinner event. You are encouraged to meet your colleagues at the venue for limited light snacks and then make your way to one of the many restaurants in the area for dinner. Or, dine first and make your way to the event for a bite of something sweet at the end of the evening!

AAPM will take over the entire Country Music Hall of Fame® and Museum, featuring two expansive floors of gallery space, and safeguarding over 2.5 million diverse artifacts. Follow the evolution of country music, within the context of American history. For those who like to dance, **Gary Jenkins & the Thundering Hearts** will be playing upstairs. If you've ever yearned to try line dancing, two instructors will give lessons to those willing to try!

Each adult Night Out ticket will include one drink ticket, good for a beer or a glass of wine. Please make your plans and dine at a restaurant of your choice and favorite cuisine. We encourage you to either make reservations on your own, or with help from the restaurant desk at the Music City Center.

Please note: Trade in your Night Out ticket for a lanyard/event map required for admittance. Stop by the AAPM Registration Desk on Monday or Tuesday for your Ticket/Lanyard trade.

RSNA 2018 TOMORROW'S RADIOLOGY TODAY

Register now for the RSNA 104th Scientific Assembly and Annual Meeting, November 25 – 30. Reminder: AAPM's Headquarters Hotel is the Hyatt Regency Chicago located at 151 E. Wacker Drive.

AAPM'S HQ TEAM . . . AT YOUR SERVICE!

Who does what on the AAPM HQ Team? See a list with contact information and brief descriptions of responsibilities online. An Organization Chart is also provided.

HEADQUARTERS NEWS

Congratulations to AAPM's Office Services Assistant **Aaron Rudd** on receiving his Bachelor's in Business Administration with a concentration in HR Management from Strayer University on June 23.

STAFF RECOGNITION

I firmly believe that part of the success of AAPM HQ operations is our ability to attract and retain an excellent team of high performing association management professionals. The following AAPM team members celebrated an AAPM anniversary in the first half of 2018. I want to publicly thank them and acknowledge their efforts.

Nancy Vazquez	22 years of service	Rachel Smiroldo	7 years of service
Zailu Gao	18 years of service	Shayna Knazik	4 years of service
Jennifer Hudson	17 years of service	Richard Martin	4 years of service
Karen MacFarland	15 years of service	Robert McKoy	4 years of service
Lisa Schober	13 years of service	Jaime Hoza	2 years of service
Laurie Allen	11 years of service	Jill Moton	1 year of service
Viv Dennis	8 years of service	Aaron Rudd	1 year of service
Melissa Liverpool	7 years of service	Ashely Zhu	1 year of service

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

Improving Health Through Medical Physics

TREASURER'S REPORT

Mahadevappa Mahesh, PhD | Baltimore, MD

AAPM Newsletter — Volume 43 No. 4 — July | August 2018

2018 is going as fast as the past few years. This is my 16th column as Treasurer and I want to share with you the progress we have made regarding the Associated Management System (AMS) and Financial Management System (FMS). In the May/June 2017 issue, I wrote about the need for a new AMS and FMS system and I thought it would be appropriate and timely to provide a progress report on the implementation of the two systems. In any professional organization, transitioning from one AMS to a new system is monumental. In fact, it was long overdue that we converted to a new system. Thanks to the Board's approval, we began first by hiring a consultant to assist us in selecting the right product and now implementing it. Below is a progress report regarding the AMS/FMS conversion.

AMS/FMS CONVERSION

The beginning of 2018 marked a new era in the infrastructure of AAPM. AAPM started the conversion process of its Financial Management System (FMS) and Association Management System (AMS).

The Finance and Information System (IS) teams began the process of converting data from APAK to Microsoft – Great Plains (GP). This process involved:

- Modifying the chart of accounts to conform to GP standards.
- Uploading five years of financial information to the new system.
- Converting vendor files to the new system.

After completing this phase of the conversion process, the next step in the process was for finance personnel to verify and confirm the accuracy of the data which was converted over. After this step was completed, the finance team began to use the new software to process transactions for AAPM including the processing of cash receipts and disbursements. The new system contains many enhancements which will improve efficiencies and strengthen controls over these processes.

Phase II of the FMS conversion is currently underway. This involves implementing the reporting software associated with GP. The association selected the platform BI360 which is a robust reporting program. Ultimately this platform will allow for AAPM to build and automate many of the reports which previously

were manually generated in Excel. During the early stages of implementation, AAPM will be able to generate reports created by the team of consultants assisting with the implementation. Beginning in August, staff will receive training on building additional reports to improve efficiencies in the reporting process.

During the Memorial Day weekend, the AMS system conversion took place. In fact, we had planned to do the conversion earlier, however, due to requests from members (especially students taking the board exam) the conversion process was postponed to Memorial Day weekend. Some may have experienced difficulty accessing the AAPM website, however, this was necessary during the switching process to the new AMS system. Data records contained in IMPAK were converted over to Abila NetForum.

Currently the AMS system is accepting payments. The IS team is working diligently to link all pages of the AAPM website to the new database. This process will continue for a period of time. Phase II of the AMS will begin in September when meetings and registration functionality will be added.

I am happy to report that the entire process, starting from the selection of the two systems to the implementation, have gone surprisingly smoothly — thanks to the diligent work of AAPM staff.

Your patience and understanding are greatly appreciated as staff work to roll-out the full features of the AMS and FMS.

I would like to thank **Robert A. McKoy**, AAPM Director of Finance, for his subject matter contribution to this report. Please feel free to reach out to me at mmahesh@jhmi.edu, @mmahesh1, or call me at 410-955-5115, if you have any questions concerning this report.

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

Improving Health Through Medical Physics

EDUCATION COUNCIL REPORT

Nathan Yanasak, PhD | Augusta, GA

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RSNA/AAPM ONLINE PHYSICS MODULES: A PROGRESS REPORT

Many of you are intimately familiar with the many hats that medical physicists wear. One of the privileges of working in a medical school is participation in the education of medical residents. Unfortunately, not every radiology residency program has the benefit of a medical physicist on faculty, to give lectures or to consult on-the-spot with residents about everyday issues (e.g., safety issues, protocol optimization).

Back around 2006, **Dr. Bill Hendee** was instrumental in driving a discussion about revamping the medical physics curriculum and improving educational delivery in resident training programs. One of the objectives of those early AAPM- and RSNA-sponsored education summits was an initiative to develop web-based educational modules covering a broad spectrum of topics in the new curriculum. These were proposed to improve access to medical physics training at residencies without in-house physics educators and to provide a tool for on-demand questions arising in the reading room.

AAPM and RSNA jointly supported the cost of module development. Medical physicists from across the country developed ideas and content, which was then shaped into multi-media lessons by RSNA technical staff. Bill and **Dr. George Bisset** formed what became the Physics Education Task Force Subcommittee—a group co-chaired by one AAPM and one RSNA member—with the first deployment of modules in 2009. **Drs. Eric Gingold** and **Robert Dixon** (at UNC) took over the Co-Chair position in 2012, and I replaced Eric in 2016. Bob and I are passionate about this program and both of us developed past modules in addition to our chair duties.

Today, the "Physics Task Force" oversees a suite of 45 diagnostic physics modules. Each module garners about 400-1000 viewings per year. Roughly 70% of those experiences consist of completed module viewings, consistent with the desired goals of offering "digestible" training experiences and instant

educational feedback for particular questions at the viewstation. Certainly a success in its initial implementation.

An educator's job, however, is never done: technical topics and educational methods both evolve. In the case of Physics Task Force, Bob and I are overseeing an AAPM and RSNA funded, five-year program (2018 is year three) to update all modules to improve educational delivery. Each January we have a submission and selection process for teams that wish to adopt and amend one of nine of the modules up for improvement and updating that year. This insures that, beyond the initial year of module renewal, a team is available for future management of the module as errors are noted or new developments and standards are adopted. The desire for each team is that physicists, radiologists, and residents are represented during the evaluation and development of content.

In the adoption year, we review the plans for revision that each team submits — with some changes being minor and others requiring a thorough reworking. To aid the team with direction and discovery, the RSNA Education Center Staff sends along previous user recommendations and comments from task force members to assist in module revamping.

Normally six months later, the new module content is sent to the co-chairs of the Physics Task Force and they (we) assemble nine separate teams— each with a physicist, radiologist, and resident—to review the content for quality. Most reviews include recommendations for minor changes (typos or clarifications). Occasionally a team is given substantial recommendations for improvement and the co-chairs conduct a second review for these few modules needing more revision. Near the end of each year, the RSNA Education Center staff updates the revised modules and loads them into the RSNA Online Learning Center.

If it sounds like a lot of work for each year, it is! Yet, with all of the tasks broken down into smaller teams, the effort is well worth it. And, everyone is invited to become involved. We can always use your help, whether you want to be part of a module adoption team or a peer reviewer (contact physics@rsna.org for more info).

Thanks to our users, we receive feedback throughout the year, and we are excited to note some system-level changes made at your request. RSNA migrated the modules to a new RSNA Online Learning Center last year, which offers some new features. Each of the new modules has a topical menu for quicker access to specific information, and the modules are now searchable by keyword.

Since the beginning of this program, AAPM and RSNA have been partners in this endeavor, and I'd be remiss without mentioning the many people in both groups who keep this program going. In particular, we thank **Lisa Cohen** from RSNA for keeping Bob and I on organized and on-schedule, along with other staff at AAPM (**Lisa Rose Sullivan** and **Angela Keyser**) and RSNA (**Stephanie Taylor** and **Linda Bresolin**). A special thanks goes to the members of the Physics Education Task Force Subcommittee for their ideas and their help in reviewing and overseeing our module adoption program. Finally, I'd like to acknowledge the many individuals from past years who have helped make the module program a

success today, including **Tarah LeBreton**, **Beth Sartore**, **Bill Hendee**, **Eric Gingold**, and **Ed Pietrzak**. Thank you to everyone who helped us with the module project—it has kept that giant hat rack from becoming too crowded.

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

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LEGISLATIVE & REGULATORY AFFAIRS REPORT

Richard Martin, JD | Alexandria, VA

AAPM Newsletter — Volume 43 No. 4 — July | August 2018

AT GOVERNMENT RELATIONS FORUM STATE INSPECTORS ASK: WHERE ARE THE CT PHANTOMS?

Bette Blankenship, Chair of the Government and Regulatory Affairs Committee (GRAC), and **Richard Martin** updated attendees on AAPM advocacy activities at the Conference of Radiation Control Program Directors (CRCPD) 50th National Conference on Radiation Control held in May. The presentation included a discussion of AAPM's work in support of radiation safety, our advocacy for low dose research legislation, and our efforts to maintain medical access to beneficial isotopes.

The conference provided a forum for professional organizations and state regulators to address radiation safety concerns. One of the concerns raised by state regulators was the availability of Cone Beam Computed Tomography (CBCT) quality assurance phantoms. Under federal performance standard on computed tomography (CT), 21 CFR 1020.33(d), the manufacturer is required to provide a phantom with each CT system. That phantom should be the property of the facility and readily accessed as needed. Under 1020.33(d), the phantom must be *"capable of providing an indication of contrast scale, noise, nominal tomographic section thickness, the spatial resolution capability of the system for low and high contrast objects and measuring the mean CT number of water or a reference material."*

The CRCPD has been addressing this issue with the Food & Drug Administration (FDA). If you are having issues with manufacturers providing phantoms with their CT systems, please advise Laurel Burk, PhD, at the FDA regarding the issues you are addressing. In addition, copy Richard Martin on your correspondence to the FDA so we can follow-up to ensure resolution of any problems.

If you have any questions or would like additional information on this issue, please contact Richard Martin, JD, AAPM Government Relations Program Manager.

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PROFESSIONAL COUNCIL REPORT

Daniel C. Pavord, MS | Pittsburgh, PA

AAPM Newsletter — Volume 43 No. 4 — July | August 2018

Professional Council has established several goals for 2018. Two of these involve the completion of updates to important AAPM documents. The AAPM Professional Policy 17, *Scope of Practice of Clinical Medical Physics*, has undergone a major rewrite. Under the leadership of **Jessica Clements** the writing group looked at other scope of practice documents, researched what a scope of practice should cover, and requested a legal review in addition to the many hours of actual writing. The document is expected to be approved by the board at the Annual Meeting in Nashville. Another major revision has been made to the Code of Ethics. TG-109 led by **Christina Skourou** has completed the document after reviews by councils, EXCOM, and legal. We also expect this to be approved at the Annual Meeting. I want to thank both groups for their efforts and contributions to our profession.

The Medical Physics Practice Guideline process continues to mature. There are currently 9 published MPPG's with two more that will be published by the end of the year. Since our first MPPG was published in 2013 we are now entering the time period where we will need to begin to review the documents for updates. **Per Halvorsen** performed a review of the historical MPPG process and made some recommendations for improvements. These were discussed by PC and then given to the subcommittee on practice guidelines led by **Brent Parker**. SPG considered the recommendations and other possibilities. As a result a formal AAPM policy will be created on the MPPG process.

Another of our goals is to develop and implement a formal mentoring program within AAPM. The Professional Mentorship Working Group is currently working on a proposal that we hope will be complete by the end of the year. Look for details to follow in upcoming newsletters. As part of this effort we are planning to have a New Attendee Orientation at the Annual Meeting. This will be an opportunity for people who are new to the meeting to meet with people who have many years of experience at the meeting and to get some insight on how to get the most value out of the week. There will be a session at 7:30 am on Sunday and another at 9:30 am on Monday. Look for advertisements via Twitter and other social media.

In closing, I hope that you all have a great summer and safe travels in all of your upcoming plans.

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WEBSITE EDITOR'S REPORT

George Kagadis, PhD | Rion, Greece

AAPM Newsletter — Volume 43 No. 4 — July | August 2018

This issue of the Newsletter is being published just before the AAPM 2018 Annual Meeting which takes place July 29 – August 2, 2018 in Nashville, TN. I am sure It's going to be an interesting week, full of presentations and meetings advancing our science, education, and professionalism, and everyone is getting ready for it. As in previous years', the AAPM Information Services (IS) staff has created a channel in Twitter to advertise this event with the hashtag #AAPM2018. The aim of this discrete hashtag is to facilitate searching for all tweets related to the Annual Meeting. It is suggested that you use this hashtag to post any conference-related content to social media sites. IS staff is going to post information about interesting events and talks during the Annual Meeting so please stay tuned for useful updates on our social media pages.

With regard to our social media presence, I am pleased to report that as of June 8, 2018 we have 44,268 images posted to AAPM's Flickr, 7,756 likes on Facebook, 10,168 members on LinkedIn and 6,728 followers on Twitter.

The AAPM IS staff and I are pleased to serve you and advance the web presence of our society. Please, do not hesitate to contact us should you need any further clarification about the policy and the guidelines for posting material on the AAPM social media pages.

I hope you find the AAPM website useful, visit it often, and send me your feedback at george@aapm.org.

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Our Condolences

Libby Brateman • ***Raymond Wery***

Our deepest sympathies go out to their families. We will all feel the loss in the Medical Physics community.

If you have information on the passing of members, please inform HQ ASAP so that these members can be remembered appropriately.

We respectfully request the notification via e-mail to: 2018.aapm@aapm.org

Please include supporting information so that we can take appropriate steps.

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

Improving Health Through Medical Physics

ACR Accreditation: Frequently Asked Questions for Medical Physicists

Priscilla F. Butler, MS | Reston, VA

AAPM Newsletter — Volume 43 No. 4 — July | August 2018

Does your facility need help on applying for accreditation? In each issue of this newsletter, I'll present frequently asked questions (FAQs) of particular importance for medical physicists. You may also check out the ACR's accreditation web site portal for more FAQs, accreditation application information and QC forms.

The Food and Drug Administration (FDA) recently approved the ACR to accredit digital breast tomosynthesis (DBT) units. The following FAQs address the ACR's requirements for DBT accreditation. Please contact us if you have any questions.

Q. I am applying for accreditation for my FFDM unit that also has the capability to perform DBT. May I submit the same set of clinical images for the FFDM unit and the DBT unit?
A. Yes. The ACR recommends that you send different patients. However, you may submit the same fatty examination for both the FFDM and DBT testing, and the same dense examination for both the FFDM and DBT testing. [Note, this is an update from earlier instructions.]

ACR Accreditation Clinical Testing for Digital Breast Tomosynthesis (DBT)

Scenario 1. DBT - 2D Synthesized Images Available (whether or not 2D-Syn is used for interpretation)

Testing to be Submitted by Facility		
Type	2D FFDM Accreditation	DBT Accreditation

Testing to be Submitted by Facility		
Type	2D FFDM Accreditation	DBT Accreditation
Clinical Testing (a clinical set = cc and mlo of 1 fatty and 1 dense case)	Whatever is primarily used clinically: 2D clinical set (cc and mlo), or 2D-Syn clinical set (cc and mlo), or 2D cc and 2D-Syn mlo clinical set, or 2D-Syn cc and 2D mlo clinical set	2D-Syn clinical set (cc and mlo), **or** 2D cc and 2D-Syn mlo clinical set, **or** 2D-Syn cc and 2D mlo clinical set

Scenario 2. DBT - 2D Synthesized Images Not Available on System

Testing to be Submitted by Facility		
Type	2D FFDM Accreditation	DBT Accreditation
Clinical Testing (a clinical set = cc and mlo of 1 fatty and 1 dense case)	2D clinical set	2D clinical set

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IMAGING PRACTICE ACCREDITATION SUBCOMMITTEE REPORT

Tyler Fisher, MS | Costa Mesa, CA

AAPM Newsletter — Volume 43 No. 4 — July | August 2018

THE END OF THE FDA MQSA CERTIFICATION EXTENSION PROGRAM FOR TOMOSYNTHESIS SYSTEMS

On April 6th, FDA announced that it would no longer accept applications for the Digital Breast Tomosynthesis (DBT) Certificate Extension program. On April 9th, 4 mammography accreditation bodies (the American College of Radiology and the states of Arkansas, Iowa, and Texas) began accepting applications for DBT accreditation. This change, while coming as a surprise to many physicists and facilities, has been in progress for some time.

The Mammography Quality Standards Act (MQSA) requires all breast imaging systems to be accredited by an approved organization. In the case of a new technology, the FDA will provide provisional accreditation through the certificate extension program until the accrediting organizations can develop their own programs. This process has been used in the past, including when full-field digital mammography was introduced. While many facilities may have been caught off-guard, it was never the intention of the FDA to manage the certificate extension program in perpetuity.

As the ACR handles the largest number of mammography systems in the country, this article will focus on their accreditation program. State programs are similar, but if you are working in one of those states, it is your responsibility to ensure you meet those state requirements for DBT accreditation. The ACR DBT accreditation program exists under the Mammography Accreditation Program and is very similar with respect to program requirements, submission process, and cost. All DBT systems are required to achieve both FFDM and DBT accreditation. For facilities that may not use the 2D capabilities of their unit, they will still have to accredit the 2D system in order to be in compliance. Overall, the ACR accreditation program will cost facilities an additional $1,500 for each DBT unit at their facility (confirm your fees with the ACR).

For facilities that are within their 2D re-accreditation process, they should have been contacted already by the ACR to include DBT accreditation with their current application. For facilities that will be renewing in the future, they will be required to include the DBT accreditation program with their next renewal. This will allow the ACR to do initial DBT accreditation over the next few years for units that were recently approved and have a valid FDA Certificate Extension program approval.

The ACR provided updated Medical Physicist Summary forms for those manufacturers with FDA approved DBT systems (Hologic, GE, Siemens, and Fuji). The forms use the standard ACR format, but include the additional DBT required tests. In some cases, the test numbers have changed and for GE, there are now separate forms for FFDM and Pristina systems as the tests required for these systems are significantly different. Technologist QC summary pages are also updated to reflect the DBT systems. The updated forms provided by the ACR help to standardize physicist reporting of DBT test results and should be implemented for all DBT systems that will be submitted for accreditation.

Additionally, the ACR has been requiring the FDA Certificate Extension Approval letter that the facility originally received from the FDA and MQSA Mammography Equipment Checklist for all DBT systems going through the DBT accreditation program. For many physicists, the Equipment Checklist is only provided at acceptance testing, but it will now be required during the first ACR application for DBT.

For phantom images, the ACR requires a DBT best slice image of the ACR accreditation phantom. This is the same image that has been submitted to the FDA for the certificate extension program, so it should be familiar to most of us. Most phantom images are now submitted electronically and the acceptable formats for the best slice DBT image are DICOM, JPEG, JPG, PNG, GIF, TIFF, and BMP. FFDM images submitted electronically must be in uncompressed DICOM format. For the 2D FFDM program, a synthesized phantom image will not be accepted: A standard, 2D image must be submitted.

For clinical images, the ACR will not accept 3D image sets. However, there are a number of options for facilities based on how they use the DBT systems clinically. For systems that have 2D synthesized images available, facilities may submit a 2D clinical set, a 2D synthesized clinical set, a 2D cc and a 2D synthesized MLO, or a 2D synthesized CC and a 2D MLO for their FFDM accreditation and a 2D synthesized set, a 2D CC and a 2D synthesized MLO, or a 2D synthesized CC and a 2D MLO for the DBT accreditation program. If a unit does not have the capability to do synthesized 2D images, then that facility will need to submit a complete 2D set of images for both the FFDM and DBT accreditation programs. The ACR recommends that facilities submit images from different patients for the 2D and 3D clinical images, but will accept the same patient if necessary.

For more information on the ACR accreditation program for DBT, please refer to the ACR website.

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Improving Health Through Medical Physics

MEDPHYS 3.0 REPORT : What is it all about?

Ehsan Samei, PhD | Durham, NC

AAPM Newsletter — Volume 43 No. 4 — July | August 2018

WHAT IS MEDPHYS 3.0?

Over the past two years or so you have probably seen or heard something about this thing called Medical Physics 3.0 (MP3.0) and wondered what it is. Up until now, our field, medical physics, has done much to advance medicine. We can be proud of our collective accomplishments. Haven't we achieved enough already? The MP3.0 initiative reflects a conviction that medical physics still has a lot more to offer. Think about the foundational presence of physics in all aspects of nature, including the human body, and in all the technologies used in medicine. In light of this, nearly every medical inquiry or intervention could be informed by the work of physicists. Why then aren't physicists more broadly present in medicine? Wasn't that the origin of the moniker "medical physics" — physics, in medicine — the idea that energized many of us to want to become medical physicists? If physics is so foundational and relevant to the human body and medical technology, isn't it conceivable that every medical school would have a "Medical Physics Department" alongside other core basic biomedical science departments, and biomedical physics would be included in medical school curricula? Is there any reason why medical physics should not be involved outside of its current bedrock practices in radiation medicine?

Medical Physics 3.0 is an initiative to push physics into new territories of scholarship and practice in medicine. MP3.0 in some ways is a return to the aspiration implied in the name of our field, that physics be practiced more holistically across all of medicine. It is primarily based on the conviction that medicine and human health are really better off with this professional contribution than without. Further, in the domains where physics is already well-established (namely radiation oncology and radiology), there is still much room to orient our focus towards the patient, while retaining our expertise in the technologies and processes. Our current professional practices put much emphasis on technological evaluation, commissioning, and conformance, but technology is a tool intended to serve a single purpose: improving human health. We have done physics well, and we are doing physics well, but that doesn't mean we can't work to make our medical physics "more medical," as **Carl Ravin, MD**, the former long-time chair of Radiology at Duke once put it.

But do we need to do any of this? Is all of this really necessary? Absolutely! Why? First, because we call ourselves medical physicists — we are here to serve human health. As medical physicists, we have much to contribute in advancing human well-being. For example, we can enter other areas of medicine such as photonics, dentistry, orthopedics, surgery, cardiology, nanomedicine, and neuromedicine, to name just a few, and can apply our expertise to bring about cutting edge advances in medicine. Second, because of the seismic changes that are sweeping across all healthcare. All allied health professionals are revisiting how their value can be recognized in the new value-based care environment that is increasingly informed by cost, artificial intelligence, and care outcome. We are no exception. We need to figure out, truthfully, meaningfully, and explicitly, what our value is to the medical enterprise, and how to communicate that value effectively. If we cannot determine our value for ourselves, we cannot expect others to do so. As our committee member **Dan Pavord** smartly puts it, "if you are not at the table, you are on the menu!" This reality requires us first to be competent in what we are meant to do for medicine. Next, we must determine how we can make that sustainable from a workflow, technical resource, and financial standpoint. This is sustainable excellence, one of the key objectives of MP3.0. And finally we must determine and provide smart ways to make our value known to peers and superiors throughout healthcare.

You also may be wondering, why "3.0"? Why not "2.0"? Simple. For three years (2013-2015), Medical Physics 2.0 was advocated as an initiative in imaging physics alone. When the AAPM decided to take on the initiative and give it a broader mandate beyond imaging, an upgrade was deemed necessary. So there you have it: Medical Physics 3.0.

WHAT HAS BEEN ACCOMPLISHED THUS FAR?

MP3.0 started as an AAPM ad hoc committee, commissioned by the president outside the AAPM committee structure, from 2016 through 2017. In 2018, the group expanded and became a committee under the Professional Council with a mandate to work across the AAPM councils and committees to advance the cause and vision of MP3.0.

So far, the initiative has led to a web presence (Google "Medical Physics 3.0") offering content including Good Practices, Areas of Growth Opportunities, Inspiring Stories, and two commissioned videos oriented towards medical physicists and prospective students. It has spearheaded six articles in various administrators' magazines and medical physics periodicals, 19 presentations at national and international conferences, and three face-to-face and social media events. A refereed article is also under final consideration. Two additional videos are nearly complete, one oriented towards patients and one towards administrators.

WHAT'S AHEAD?

The ongoing activities of the committee are being orchestrated through sub-committees, each of which is focused on fostering one of the seven "smart" aspirations of MP3.0. The term smart here is used to invoke the character of intentionality, intelligence, effectiveness, and leanness in targeting the objectives of MP3.0. The seven aspirations are towards:

1. *Smart practitioners* – medical physicists who are as competent as possible to fully contribute their unique expertise as scientists and healthcare professionals to medicine,
2. *Smart expansion* – extending the boundaries of medical physics scholarship and practice beyond radiation medicine,
3. *Smart tools* – technological resources that enable the practice of MP3.0 efficiently and consistently,
4. *Smart practice* – working models and practice norms that encourage and facilitate the practice of MP3.0,
5. *Smart regulations* – professional expectations and regulations that require and encourage MP3.0 practice,
6. *Smart communication* – strategies to inform MP3.0 through input from medical physicists and to encourage its adoption, and
7. *Smart advocacy* – effective promotion of the profession to healthcare providers, administrators, and patients.

Concurrent with these advances, the Committee is spearheading the definition of *Key Performance Indicators* relevant to the medical physics profession (i.e., measures to define and quantitatively measure progress toward organizational goals), and seeks synergistic cooperation within the activities of AAPM councils and committees.

MP3.0 PRESENCE AT UPCOMING CONFERENCES

At this year's Annual Meeting, we again will have a "MP3.0 Booth" (Level 3, across from the Exhibit Hall & Member Resources, Sunday, July 29 – Monday, July 30), where you are invited to join us for discussion and feedback. A workshop on "The Vision and Components of Medical Physics 3.0 Practice" (Thursday, August 2, 7:30 am - 9:30 am, Room 209) offers an opportunity for you to engage in "smart communication" as we discuss your concrete ideas to implement MP3.0 in practice. There is also a session planned at RSNA 2018 in Chicago ("Medical Physics 3.0: Re-envisioning Medical Physics in the Era of Value-based and Precision Healthcare," Course RC125, November 25, 2:00pm - 3:30 pm).

In a nutshell, while as medical physicists we have contributed tremendously to medicine, MP3.0 asserts that resting on our laurels is not enough. Through a myriad of activities, MP3.0 seeks to assure that in the future medical physicists will continue to provide and expand their valuable contributions to patient care and not be sidelined as an expensive luxury or, worse, as a mere technical exercise. We invite feedback, criticism, and collaboration from all physicists working in medicine as we continue to devise strategies to ensure the long-term vitality and responsiveness of the profession. Please join us!

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

Improving Health Through Medical Physics

A Report on the 3rd AAPM/AMPR Training Course in Moscow, Russia

Emilie Soisson, PhD, Montreal, QC | Emily Heath, PhD, Ottawa, ON | Joanna E. Cygler, PhD, Ottawa, ON

AAPM Newsletter — Volume 43 No. 4 — July | August 2018

The purpose of this article is to report on the most recent joint training course on "IMRT and Other Conformal Techniques in Radiation Therapy" organized between the Association of Medical Physicists in Russia (AMPR) and AAPM, that was held in Moscow, Russia this past November. AAPM's participation in the course is organized by the International Training and Research Coordination subcommittee, currently chaired by **Dr. Joanna Cygler**, whose charge is to facilitate medical physics training and research opportunities for international medical physicists.

This course was the third such collaborative teaching course with the AMPR over the past five years. As in previous years, the course covered topics in modern radiation therapy with the goal of providing international perspective on a variety of topics. Lectures were given by faculty from both AAPM and AMPR in Russian. (AAPM lectures were given in English with live translation to Russian.) The students, who come from all over Russia and the Commonwealth of Independent States (CIS) region, stay in Moscow for a total of 4 weeks of training at the AMPR's International Training Center (ITC) that is housed in the N.N. Blokhin National Medical Research Centre of Oncology in Moscow, Russia, home of the AMPR and Russia's predominant teaching hospital.

As in previous years, AAPM sent two members to join the faculty, **Dr. Emilie Soisson** from the University of Vermont Medical Center and **Dr. Emily Heath** from Carleton University. This year's topic included the subjects of radiation biology, proton and heavy ion therapy, IMRT QA, Auto-planning, secondary MU calculations, along with several others. The clinic at Blokhin is equipped with all that you might find in a typical North American academic teaching hospital including modern linacs with full IGRT capabilities and a full arsenal of dosimetry equipment.

As we have noted in previous years, this region has gone through a somewhat rapid modernization, from mainly cobalt-dominated therapy to incorporating modern linacs, and even proton therapy, in a relatively short amount of time. Equipment varies widely from region to region and center to center.

Most of this year's students told us that they were working in a center with a mix of cobalt and modern accelerators. However, many reported that they felt they were not capitalizing on all of the clinical potential of newer technologies. We were interested to find that many clinics continue to support cobalt therapy, purchasing new cobalt units when theirs approach end of use, due to the ease of use and continued value in some clinical settings.

One thing that AAPM members might not recognize is that international organizations such at the AMPR see AAPM as a great resource. The medical physics faculty in the AMPR's ITC look not only to AAPM, but also the IAEA and ESTRO to "train the trainers" in Russia. They fly abroad for meetings and are aware of international recommendations, including those made by AAPM. One difficulty the faculty have is finding Russian language training materials for medical physicists so, to that end, they have translated many AAPM task group reports into Russian for use in their country. In addition, as in this course, they make an effort to involve medical physicists from other parts of the world directly into their educational programs.

In summary, this course was once again a rewarding and educational experience for everybody involved, including us. We hope that AAPM will continue to support this collaboration with the AMPR, and other international educational efforts, in the future.

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

Improving Health Through Medical Physics

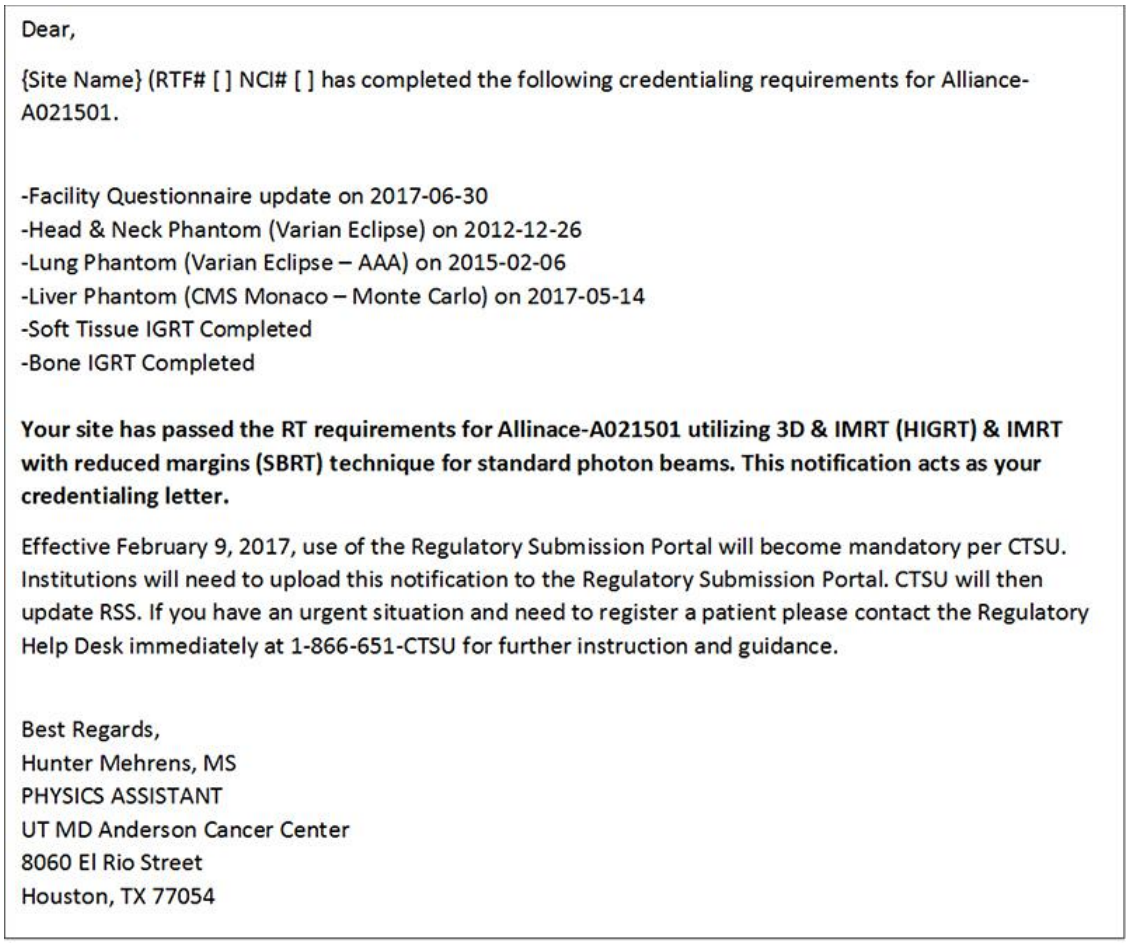
IROC REPORT

David Followill, PhD | Houston, TX

AAPM Newsletter — Volume 43 No. 4 — July | August 2018

IMAGING AND RADIATION ONCOLOGY CORE HOUSTON'S (IROC-H) AUTOMATED PROCESS FOR ISSUING CREDENTIALING LETTERS

The IROC-H QA Center is funded to provide radiation oncology core support and quality audit programs for the National Cancer Institute's (NCI's) clinical trials. These programs include an independent peer review of dosimetry practices at participating institutions that include credentialling for specific trials. IROC-Houston issues credentialing letters for approximately 75 different NCI NCTN clinical trials. The process for credentialing begins with a Credentialing Status Inquiry (CSI) form, which is filled out by a site wanting to be credentialed for a specific protocol. IROC-Houston checks the requirements stated by the protocol and if all are met, the site is issued a credentialing letter. Utilizing Matlab, the new automation software does the above work in less than a second. It uses the site's RTF number to retrieve relevant phantom, Facility Questionnaire, contact and benchmarks and IGRT credentialing information pertaining to protocol. The old timeframe from CSI receipt to letter generation allowed up to seven business days for the official letter to be sent.



Dear,

{Site Name} (RTF# [ ] NCI# [ ] has completed the following credentialing requirements for Alliance-A021501.

-Facility Questionnaire update on 2017-06-30
-Head & Neck Phantom (Varian Eclipse) on 2012-12-26
-Lung Phantom (Varian Eclipse – AAA) on 2015-02-06
-Liver Phantom (CMS Monaco – Monte Carlo) on 2017-05-14
-Soft Tissue IGRT Completed
-Bone IGRT Completed

Your site has passed the RT requirements for Allinace-A021501 utilizing 3D & IMRT (HIGRT) & IMRT with reduced margins (SBRT) technique for standard photon beams. This notification acts as your credentialing letter.

Effective February 9, 2017, use of the Regulatory Submission Portal will become mandatory per CTSU. Institutions will need to upload this notification to the Regulatory Submission Portal. CTSU will then update RSS. If you have an urgent situation and need to register a patient please contact the Regulatory Help Desk immediately at 1-866-651-CTSU for further instruction and guidance.

Best Regards,
Hunter Mehrens, MS
PHYSICS ASSISTANT
UT MD Anderson Cancer Center
8060 El Rio Street
Houston, TX 77054

Figure 1. An example of a new credentialing letter

The automated program organizes information required to issue a credentialing letter and print out a template for the letter to help reduce overall time devoted to credentialing. The new process cuts the time down to two business days from the allowed seven days and simplifies the format of the credentialing letter as seen in Figure 1. In 2016, we received 2,510 CSI forms and issued 2,148 credentialing letters. This new program has been utilized since the beginning of 2017 and in that year we received 2,931 CSI forms and issued 2,446 credentialing letters. The automated process of gathering information to check requirements and creating the credentialing letter is accomplished four times faster relative to the old method. Based on 2016 numbers, this could save approximately 750 man-hours per year of processing CSI forms and generating letters allowing for other activities to be accomplished. With the increasing demand for credentialing, IROC Houston's new automated system has significantly reduced the time required to process CSI forms and issue credentialing letters to a site. It is expected that in 2018, these credentials will be electronically uploaded into CTSU's Regulatory Support System (RSS) from IROC Houston's database negating the need for each institution to upload the letters.

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

Improving Health Through Medical Physics

ICMPROI 2018 REPORT

Karmaker N, Kausar A, Anupama H A | Dhaka, Bangladesh

AAPM Newsletter — Volume 43 No. 4 — July | August 2018

AT A GLANCE: 3RD INTERNATIONAL CONFERENCE ON MEDICAL PHYSICS IN RADIATION ONCOLOGY AND IMAGING - 2018, KIB, DHAKA, BANGLADESH

Bangladesh Medical Physics Society (BMPS) has organized the 3rd International Conference on Medical Physics in Radiation Oncology and Imaging, 2018 (ICMPROI 2018) March 10-12 at Krishibid Institution of Bangladesh, Dhaka, Bangladesh. Co organizers were Department of Medical Physics and Biomedical Engineering (MPBME), Bangladesh Cancer Society (BCS), Bangladesh Society of Radiation Oncologists (BSRO), Bangladesh Society of Radiology and Imaging (BSRI) and Nepalese Association of Medical Physicist (NAMP). This was program endorsed by International Organization for Medical Physics (IOMP), International Center for Theoretical Physics (ICTP), European Federations of Organizations for Medical Physics (EFOMP), Deutsche Gesellschaftfür Medizinische Physik (DGMP), American Association of Physicists in Medicine (AAPM), Middle East Federation of Organizations of Medical Physics (MEFOMP) and Asia-Oceania Federation of Organizations for Medical Physics (AFOMP). This program divided into inaugural programme, vendor presentation, plenary & scientific session, poster session, cultural program, poster award ceremony and valedictory session. A total of 400 participants were in attendance from 22 different countries in Asia, Europe, Middle East and the US. For the first time, participants from Sri Lanka, Vietnam and Nepal (total 26) attended.

the aim of this program was to develop medical physics in South Asia, sharing experiences with scientists and helping the medical physics community by collaborative work.

INAUGURAL CEREMONY

Mr. Zahid Malek, MP (Chief Guest), Honorable State Minister, Ministry of Health and Family Welfare; **Md. Habibur Rahman Khan** (Special Guest), Additional Secretary and Ministry of Health and Family Welfare; **Prof. Dr. Chop Lal Bhusal** (Guest of Honors), Ambassador of Nepal to People's Republic of Bangladesh; **Prof. Dr. Kamrul Hasan Khan**, Vice Chancellor, Bangabandhu Sheikh Mujib Medical

University (BSMMU), **Prof. Dr. Tomas Kron** (International Advisory Member), Director of Physical Sciences, Peter MacCallum Cancer Centre, Melbourne, Australia; **Dr. A. K. Azad** (National Advisory Member), **Prof. Dr. G. A. Zakaria** (Patron), University of Cologne, Germany; **Prof. Dr. H. Anupama Azhari** (Organizing chairperson), **Md. Anwarul Islam** (President of BMPS) delivered valuable speeches on medical physics and biomedical engineering.

Fig 01: Inaugural Ceremony, ICMPROI-2018

SCIENTIFIC SESSION

Invited presentations (26), vendor presentations (03), oral presentations (47), poster presentations (31) in different areas such as radiation oncology, radiation protection, treatment planning system, dosimetry, brachytherapy, radiology, molecular imaging, nuclear medicine, imaging, and advanced biomedical engineering were presented by local and foreign presenters during this program (Fig:02).

Fig 02: Scientific Session, ICMPROI-2018

VENDOR PRESENTATION:

Three vendors presented their paper on modern and updated technology of medical physics from Varian Medical Systems, Team Best and Elekta.

POSTER SESSION

Judges selected three best posters based on the evaluation criteria out of 31 one posters. The title of the poster of the 1st, 2nd and 3rd place winners were "Determination of Effective Dose of Thyroid Gland in Nuclear Diagnostic During Thyroid Scan" by Maryam Mumu, "A New Approach of Semi-3D Computer treatment Planning Using Plaster of Paries for Breast Carcinoma" by Nazrul Islam and "Evaluation of Image Quality in CT Chest by 50% Mass Reduction" by Niranjan Thapa respectively (Fig: 03).

Fig 03: Poster Session, ICMPROI-2018

CULTURAL PROGRAM

On the second day, a cultural function (Fig: 04) was arranged by the conference organizer. This program focused on the traditional cultures and life styles of Bangladesh. The participants enjoyed the program followed by a grand dinner.

Fig 04: Cultural Program, ICMPROI-2018

INTERNATIONAL MEDICAL PHYSICS CERTIFICATION BOARD (IMPCB) EXAMINATION

For the first time in Asia IMPCB examinations (Part I & II) were held in Bangladesh (Fig: 05) after the conference ICMPROI 2018 organized by Bangladesh Medical Physics Society (BMPS).

Fig 05: Participant of IMPCB Examination, ICMPROI-2018

MEETING WITH PARTICIPANTS OF SOUTH ASIAN COUNTRIES

Due to development of medical physics and modern cancer treatment, organizing members have been discussing the formation of a South Asian Federation of Organizations for Medical Physics (SAFOMP) (Fig: 06) with South Asian delegates.

Fig 06: Meeting with participants of South Asian regions, ICMPROI-2018

ICTP AWARD

For the first time ICTP has given travel award for the OEA country's participants through this ICMPROI-2018. The awardees were selected based on educational background, work experience, and age limit of travel award participants (Fig: 07). The Organizing committee selected and distributed this award within eleven participants from different OEA countries.

Fig 07: ICTP Travel Awardees, ICMPROI-2018

CLOSING CEREMONY

BMPS President, former President, Vice President, Secretary and Treasurer shared their experiences about the arrangement of this international program for the inspiring young generation. Local and foreign participants gave their opinions regarding the outcome of the conference (Fig: 08). According to the sequence of BMPS activities, the next 4th International Conference on Medical Physics in Radiation Oncology and Imaging (ICMPROI)-2021", 26-28 February 2021, Bangladesh was announced during the closing ceremony.

Fig 08: Closing Ceremony, ICMPROI-2018

ACKNOWLEDGEMENT

We are thankful to all of our BMPS members, local and foreign participants, colleagues, contributors, organizing committee members, co-organizers, sponsors, scientists, researchers, students, and all others for their support of the ICMPROI-2018.

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

Improving Health Through Medical Physics

WGIMRT Article Watch

Collaboration with the Karmanos Cancer Center Medical Physics Residency Program (Geoff Baran, Claire Coughlin, Rebecca Culcasi, Yair Hillman, Justin Kamp, Marisa Leney, and Brian Loughery) and the University of California San Diego Medical Physics Program (Xenia Fave and Everardo Flores-Martinez)

AAPM Newsletter — Volume 43 No. 4 — July | August 2018

1. A Multi-institutional Comparison of SBRT and IMRT for Definitive Reirradiation of Recurrent or Second Primary Head and Neck Cancer

Vargo et al. retrospectively compared survival and toxicity differences between the use of IMRT (n = 217 patients) and SBRT (n = 197 patients) for the reirradiation of recurrent or second primary squamous cell carcinoma of the head and neck (rSCCHN). When accounting for baseline differences between IMRT and SBRT patient populations, the majority of the statistical tests suggest there are no significant differences in overall survival or cumulative incidence of locoregional failure between IMRT and SBRT. Outside of an increase in incidence of grade ≥ 4 acute toxicity for IMRT, IMRT and SBRT show no significant differences in acute or late toxicity in the treatment of rSCCHN with both regimens performing better than historically expected.

Int J Radiat Oncol Biol Phys. 2018 March 1; 100(3):595-605

2. Correlation between gamma passing rate and complexity of IMRT plan due to MLC position errors.

Wang et al. investigated a correlation between the complexity of an IMRT plan and the gamma passing rate of delivery quality assurance (DQA). Varying systematic MLC leaf bank positioning errors, ranging from 0.3 mm to 1 mm, were introduced into several types of plans in order to see the effect on the gamma passing rate. The plans varied in delivery technique and treatment site. The complexity of each type of plan was assessed using modulation complexity score (MCS), in order to determine if the sensitivity of the gamma passing rate to the MLC errors was dependent on the complexity of the plan. The results show that the susceptibility of DQA results to the MLC leaf bank errors correlates with the

IMRT plan complexity, and suggests that clinically, with all other factors equal, a plan with a lower complexity should be chosen for treatment in order to avoid the effects of potential MLC leaf positioning errors.

Physica Medica, Volume 47, Pages 112-120.

3. Linac-based VMAT radiosurgery for multiple brain lesions: comparison between a conventional multi-isocenter approach and a new dedicated mono-isocenter technique.
Ruggieri et al. compared two VMAT radiosurgery approaches for treating multiple brain lesions. Typical plans involved one isocenter per lesion, translating to multiple time-consuming IGRT setups for each isocenter. As an alternative, HyperArc's mono-isocenter approach with multiple non-coplanar arcs is being utilized for patients with ≤10 brain metastases having only a single IGRT setup. This study included 20 patients with 2-10 brain metastases that were treated with HyperArc (HA) plans, then generated RapidArc (RA) plans using the same optimizer, dose calculation algorithm, and dose grid resolution. HA and RA plans were analyzed by dosimetric plan quality (V12Gy and Dmean to brain-minus-PTV, CI and GI for target dose coverage) and overall treatment time (OTT). HA had significantly improved CI and GI and reduced OTT compared to RA. This early clinical implementation of HyperArc resulted in better plan quality and treatment delivery was safely completed within 20 minutes. Analysis of patient response to treatment is ongoing. Radiation Oncology. 2018 March; 13(38).

Radiation Oncology, Volume 13(38).

4. Retrospective dosimetry study of intensity-modulated radiation therapy for nasopharyngeal carcinoma: measurement-guided dose reconstruction and analysis.
Sun et al. evaluated measurement-guided 3D dose reconstruction (3DVH) as a method for determining dose distribution accuracy, compared to conventional phantom-based planar dosimetry limited by inadequate spatial information and ability to determine clinically relevant dose errors in IMRT. They analyzed 30 nasopharyngeal patients treated with 9-field static IMRT plans. Pre-treatment QA included gamma analysis of 2D diode detector array measurements. Retrospectively, pre-treatment 2D dose distributions were utilized to reconstruct the 3D dose distribution in the patient's CT images using a planned dose perturbation algorithm. Organ-specific and global 3D gamma pass rates and DVH parameters were calculated for the reconstructed dose distribution. A strong correlation was found between organ-specific gamma pass rates and DVH deviation using the 3DVH method, providing a more effective IMRT QA technique.

Radiation Oncology, Volume 13(42).

5. Minimizing dose variation from the interplay effect in stereotactic radiation therapy using volumetric modulated arc therapy for lung cancer
Kubo et al. investigated the risk of developing hot or cold spots from interplay effects in VMAT-SBRT lung cases. Since VMAT-SBRT provides fast treatments with few fractions, there is an increased risk of clinically-relevant interplay effects. To assess this issue, Kubo collected respiratory waveforms of 30 patients using Varian's RPM system and applied these waveforms to a Quasar motion phantom. The patients' VMAT-SBRT plans were delivered to the Quasar phantom and dynamic measurements were

taken with radiochromic film and a pinpoint ion chamber. When comparing the expected and measured doses, the authors considered 4 factors (degree of modulation, amplitude of tumor motion, irradiation time, and number of breaths during treatment) to assess their role in interplay effects. The authors concluded that a combination of these 4 factors can significantly predict the likelihood of having large dose variations due to interplay effects. They also suggested that a plan, which can be completed in fewer than 40 of the patient's breaths, may not be suitable for VMAT-SBRT.

J Applied Clin Med Phys, Volume 19, Issue 2, Pages 121-127.

6. Improving Quality and Consistency in NRG Oncology Radiation Therapy Oncology Group 0631 for Spine Radiosurgery via Knowledge-Based Planning

Younge et. al. designed a knowledge-based planning (KBP) method to create high-quality treatment plans for the NRG Oncology 0631 protocol on spine radiosurgery. Twenty two cases were replanned using KBP and compared to the NRG-provided plan. Using the protocol objectives with a prescription dose of 16 Gy, all KBP plans were protocol compliant. The high-dose spillage (evaluated with 'NonPTV1600' volume) V16.8 average decreased from 2.1 cm3 for the submitted plan to 1.8 cm3 for the KBP plan. The PTV V16 improved with the KBP plan from 93.3%±3.2% to 98.3%±1.4%. The average conformity and gradient indices for the submitted plans were 0.8±0.11 and 4.91±2.0 respectively, compared with 0.84±0.07 and 4.65±1.0 for the KBP plans. Plans that were non-compliant due to high-dose spillage were compliant when using KBP. Some plans prioritized spinal cord sparing over PTV coverage causing a wide range of acceptable plans; however, with KBP, the plans were significantly more consistent. The investigators created a KBP method that can provide high-quality plans on the first optimization which saves time and provides consistency critical to clinical trials.

Int J Radiat Oncol Biol Phys, 100(4), Pages 1067-1074

7. Accuracy of radiotherapy dose calculations based on cone-beam CT: comparison of deformable registration and image correction based methods

Marchant et al investigated CBCT-based dose calculation accuracy for 44 patients receiving IMRT or VMAT treatments to prostate, head-and-neck, or lung. Three CBCT images were used per patient and adjusted each to the planning CT: one using a histogram-matching technique to the patient CT, and two using different deformable image registration techniques. Dose accuracy was evaluated by using a density override technique from previous work (Marchant et al, 2017) and comparing to doses from the density-overridden CBCT. The mean error was less than 1% for all sites, but use of DIR leads to a larger spread of errors in lung sites, possibly due to more complex anatomical changes. Manual adjustment of the registration was required in some cases in which registration failures resulted in obvious non-physical distortions of the deformed CT image.

Phys. Med. Bio., 63 065003

8. Variations in dosimetric distribution and plan complexity with collimator angles in hypofractionated volumetric arc radiotherapy for treating prostate cancer.

Li et al. investigated the impact of collimator angle on dual-arc VMAT prostate plan quality. Volumetric modulated arc therapy (VMAT) is the standard radiation option for these patients, however the specific

parameters for the plans (number of arcs, collimator angle, etc) vary between institutions. They recalculated 10 prostate plans using different collimator angles between 0°-90°. The conformity index (CI), homogeneity index (HI), gradient index (GI), normalized dose contrast (NDC), MUs, and modulation complexity score (MCSv) were used to compare the plans. A collimator angle of 45 resulted in the optimal values for CI, HI, and MCSv while an angle of 0 had the best results for GI and NDC. The authors hope that their results will serve to guide VMAT plan design for hypofractionated prostates.

JACMP. March 2018 Volume 19, Issue 2, Pages 93-102.

9.Technical Note: A planning technique to lower normal tissue toxicity in lung SBRT plans based on two likely dependent RTOG metrics.

Narayanasamy et al. retrospectively evaluated the independence of two RTOG metrics (R50% and D2cm) from each other and determined which planning methods were correlated to high normal tissue dose. Both intermediate and low-dose fall off are correlated to normal tissue toxicity for lung SBRT patients. By examining 105 lung tumor SBRT plans authors observed that R50% and D2cm were not independent. Additionally, while all the plans they examined met objectives for tumor coverage, conformity index, homogeneity index, and critical organ dose tolerance objectives, those with coplanar beam arrangements were more likely to have deviations in both of the RTOG metrics. Thus the authors recommended the use of noncoplanar beams to improve normal tissue sparing in these patients.

Medical Physics. Volume 45, Issue 5, Pages 2325-2328.

10. Electromagnetic-guided MLC tracking radiation therapy for prostate cancer patients: prospective clinical trial results.

Keall et al. analyzed the results of a prospective clinical trial evaluating the feasibility of electromagnetic-guided multileaf collimator (MLC) tracking therapy. With this technology the leaves track the tumor in real-time as it moves and reshape to potentially increase treatment accuracy. For the trial, 28 prostate patients were treated using VMAT with doses per fraction between 2-13.75 Gy. The primary outcome was feasibility of the technique and all 858 planned fractions were successfully delivered. Furthermore the secondary outcomes of improving beam-target geometric alignment, improving dosimetric coverage of the prostate and critical structure avoidance, and observing no acute grade ≥3 genitourinary or gastrointestinal toxicity were all also met.

Int. Journal of Rad Onc Bio Phy. June 2018, Volume 101, Issue 2, Pages 387-395.

11. 4π plan optimization for cortical-sparing brain radiotherapy.

Murzin et al. replanned 13 IMRT plans for brain tumors using 4π to determine if better normal brain sparing could be achieved. Normal brain tissue and irradiation is correlated to cognitive decline and cortical atrophy. Plans were evaluated by comparing the homogeneity index (HI), gradient measure, doses to cortex, white matter, brainstem, optics, and hippocampus, and probability for cortical atrophy. Each measure of plan quality improved when 4π optimization was used. Additionally PTV dose homogeneity improved with the non-coplanar technique. As dose reductions in these tissues is directly linked to reduced probabilities for complications, non-coplanar beams may significantly improve outcomes for patients with brain tumors.

Radiotherapy & Oncology. April 2018, Volume 127, Issue 1, Pages 128-135.

12. Comparison of four techniques for spine stereotactic body radiotherapy: Dosimetric and efficiency analysis

Aljabab et al. replanned 10 spine stereotactic body radiotherapy (SBRT) patient plans using four techniques: CyberKnife (CK), volumetric modulated arc therapy (VMAT), and helical tomotherapy with dynamic jaws (HT-D) and fixed jaws (HT-F). This study was motivated by the fact that SBRT utilization for spine metastases is increasing however evidence for selecting the best delivery technique is not available. The resulting plans for each technique were compared based on their target volume coverage, conformity index (CI), gradient index (GI), homogeneity index (HI), treatment time (TT) per fraction, and monitor units (MU) per fraction. CK and HT plans had the most conformal target coverage without surpassing the cord tolerance value of 17 Gy. VMAT had the shortest treatment times and lowest values for the MU. Improvements in treatment planning algorithms or technology may result in minimizing the differences between techniques.

JACMP. March 2018, Volume 19, Issue 2, Pages 160-167.

13. Tolerance limits and methodologies for IMRT measurement-based verification QA: Recommendations of AAPM Task Group No. 218

Miften et al. investigated methodologies, metrics and tolerances for patient-specific IMRT QA. They analyzed the performance and limitations of the dose difference, distance to agreement and gamma distributions providing recommendations with respect to the normalization and interpretation of the results. A discussion of the advantages and disadvantages of the true composite (TC), perpendicular field by field (PFF) and perpendicular composite (PC) methods is provided. After analysis, the authors recommend the TC delivery method or the PFF if the measurement device is not suitable for TC. The PC method is not recommended as is prone to masking errors. A number of commercial IMRT QA tools were compared as well as gamma analysis software, investigated by providing two tests to the vendors for the evaluation with their software. Results showed differences showing that the vendors are not using a standardized approach for dose comparison. Recommendations for the gamma analysis using global normalization in absolute dose are provided: a gamma passing rate ≥ 95%, with 3%/2 mm with a 10% dose threshold for universal tolerance limits and ≥ 90%, with 3%/2 mm at 10% dose threshold for universal action limits. Tighter tolerances should be considered for SRS and SBRT. A list of actions to check and evaluate when IMRT QA results fail is provided

Med. Phys. 45 (4), April 2018

14. Correcting TG 119 confidence limits

Kearney et al. reviewed the confidence limits (CLs) adopted by TG-119. In TG-119 the CLs were established assuming a dataset Gaussian distribution in which symmetry about the mean was assumed. The authors investigated the moment estimator of the Gamma distribution family and compared the results with the Gaussian families. More than 300 plans were investigated using the 3%/3mm error local criteria. It was found that the Gamma distribution underestimated the 95% CL by 0.09% while the

Gaussian distribution overestimated the 95% CL by 4.12%. The authors concluded that the gamma distribution is superior over the Gaussian formalism to model IMRT failing rates. The proposed mathematical formalism can be applied to different treatment planning and delivery systems.

Med. Phys. 45 (3), March 2018

15. Motion induced interplay effects for VMAT radiotherapy

Edvarsson et al. investigated the interplay effect due to respiratory motion for patients treated with VMAT Rapidarc. Simulations were performed by creating plans on a Delta4 phantom and breathing patterns were simulated for each treatment plan by dividing the plans into smaller sub-arcs with a shifted isocenter using an in-house developed software. Four different diameters for CTVs were investigated ranging from 1 to 8 cm and added an ITV to avoid the dose blurring effects at the edge of the target. Results showed that interplay effects were larger for FFF compared to FF and increased for higher breathing amplitudes, longer period times, lower dose levels and more complex treatment plans. Also, the interplay effects varied considerably with the initial breathing phase and larger variations were observed for smaller CTV sizes. The findings were verified through measurements using a motion platform.

Physics in Medicine & Biology 63 085012

16. Institutional experience with SRS VMAT planning for multiple cranial metastases

Ballangrud et al. report the experience at their institution when treating multiple cranial metastases with VMAT. 40 plans were analyzed with a median number of lesions of 5 and a maximum number of 8. Treatment delivery was performed using a Trubeam STx having an MLC with 2.5 and 5.0 mm leaves. The authors report limitations in the TPS for treating multiple lesions as only one DLG is used for both leave widths. For each lesion, the homogeneity index ranged from 1.2 to 1.5, the conformity index ranged from 1.0 to 2.9 and the gradient index ranged from 2.5 to 8.4.The authors conclude that a significant improvement would come from better dose modelling in the TPS, allowing a customized DLG for an SRS model allowing planning with one isocenter.

J Appl Clin Med Phys 2018; 19:2:176–183

17. Volumetric modulated arc therapy for total body irradiation: A feasibility study using Pinnacle3 treatment planning system and Elekta Agility™ linac

Symons et al. investigated the feasibility of using VMAT for total body irradiation. Five patient plans were created using a 6 MV beam and a dose prescription of 12 Gy in 6 fractions. The PTV was subdivided into four subsections: head, chest, abdomen and pelvis. The final optimization was performed simultaneously for all beams. Setup errors were simulated by shifting the isocenter in every axis, recalculating the plans and evaluating the dosimetric effect. All VMAT arcs were delivered and measured using the ArcCheck diode array. The five plans achieved the prescribed dose to 90% of the PTV and a dose reduction to organs at risk of up to 40%. The authors conclude that total body irradiation is feasible using VMAT.

J Appl Clin Med Phys. 2018 Mar;19(2):103-110