Jens Overgaard: “I didn’t join ESTRO, I made it!”

Tribute to Mary Coffey

Interview with Jesper Eriksen, director of the ESTRO School
Dear colleagues,

This is our first newsletter after ESTRO 36, and I hope you agree with me that our annual conference keeps improving, both in terms of the science delivered and the networking opportunities it provides. We have already begun preparing next year’s meeting in Barcelona, where we will introduce something new. For the first time, our conference will have a theme. In 2018, ESTRO 37 will focus on ‘innovation for value and access’, and the scientific programme committee is doing its best to bring you a high quality meeting once again.

In this editorial, I would like to highlight something else that is new: ESTRO going to Asia. As you might have seen in the announcements at ESTRO 36, next year we will organise a meeting in collaboration with the Federation of Asian Organisations for Radiation Oncology (FARO), which will take place in Singapore in December 2018. This comes as a natural consequence of ESTRO’s evolving collaboration with our...
colleagues in the Asia region, and their existing interest in ESTRO activities. Just as an example, in 2016, 33% of live educational activities organised by ESTRO were in Asia Pacific, and 23% of participants at ESTRO 35 and live educational events came from this region. With this meeting, ESTRO intends to create an additional focus on benefits and services that could be relevant for radiation oncology professionals in Asia and in some Pacific countries. A scientific meeting will also facilitate interaction and networking between regional and international professionals in radiation oncology. Although it is primarily aimed at radiation oncology professionals from this region, the meeting will of course be open to participation from all interested professionals, so we count on all our members to make this new project a success. Vincenzo Valentini, leader of the ESTRO activities in Asia, gives us details on these developments in the Society Life Corner.

As you all know, ESTRO is committed to ensuring that patients can access the radiation therapy (RT) treatments they need and, to do so, we aim to empower professionals to advocate for investments in RT provision, and talk to governments to raise the case for radiotherapy. Thanks to the Health Economics in Radiation Oncology project and the Global Task Force on Radiotherapy for Cancer Control report, we now hold solid information that can be used by governments to make informed choices regarding the organisation of RT services. In this context, the Belgian Healthcare Knowledge Centre requested ESTRO’s contribution to a project commissioned by the Belgian Ministry of Health and Social Affairs with the aim of giving advice about the country’s future hospital landscape. The expected output is a proposal for an actionable reform of the role of hospitals in the healthcare landscape.

In the analysis, radiotherapy has been chosen – among others – as a concrete case study. ESTRO was asked to write the chapter dedicated to radiotherapy, providing a picture of the RT services in Belgium, and giving examples from other countries in Europe. The report includes a description of the current profile of RT infrastructures and activities, the current and expected needs in treatment and resources, and the gap – existing today and projected for the future – between actual and optimal RT needs. For comparison, the structure of RT services in other countries was also provided. Denmark, Ireland, France, England and The Netherlands gave an overview of the main characteristics of their respective radiotherapy services. The full report will be available soon to ESTRO members. I trust you will find it interesting.

A last point I wanted to update you on is the developments in ESTRO Cancer Foundation (ECF) activities. There was a successful ECF programme committee meeting during ESTRO 36, with representatives from industry, patients and health professionals. A concrete implementation plan for two collaboratively designed projects was defined: one on media and advocacy, and another on scientific data translation and dissemination. The first step now is to reach out and engage our community.

I finish by wishing you a great summer. Looking forward to seeing you again in September.

Professor Yolande Lievens
President of ESTRO
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SOCIETY LIFE
It was certainly a delight to meet and catch up with colleagues and friends at our annual congress in Vienna. It always gives us an opportunity to network, discuss our work with others, solve problems, find out what is new in the field, get inspiration from what others are doing, as well as start new collaborations.

Apart from the science, we also got the chance to meet in informal and relaxed social settings. The ESTRO General Assembly (GA) also met to share an overview report on the activities of the Society. This is an occasion where members of the Society exercise their right to vote on issues pertaining to finances. It was pleasing to see quite a number of you at the GA. If you missed attending it, you will find a summary here on matters that were discussed. I hope you find it informative.

As you are aware, ESTRO has been holding a number of courses in the Asia region and some Pacific countries for more than ten years now. This comes out of the needs expressed by our colleagues in that region. ESTRO activities in Asia are in keeping with the ESTRO Vision where, as an educational and scientific society in radiotherapy and oncology, ESTRO views itself as having the responsibility to form unique strategic partnerships with societies in the field of radiation oncology both in Europe and globally. Professor Vincenzo Valentini, the ESTRO representative in Asia activities, gives us an update on the latest developments in our activities in that region.

Last but not the least, Professor Jens Overgaard, who has just retired from being editor-in-chief of the Society’s flagship journal, *Radiotherapy and Oncology*, shares his remarkable experiences, thoughts and ideas over the past 25 years.

I hope you enjoy reading this newsletter, and I wish you a wonderful summer.

*Yolande Lievens*
*ESTRO President*
“I didn’t join ESTRO, I made it!”

Interview with Jens Overgaard – retiring editor-in-chief of Radiotherapy and Oncology

When did you join ESTRO and what are your earliest memories of this period?
I was one of the people who started ESTRO, so I didn’t join ESTRO I made it! Actually, I was a pretty young guy in those days. The idea of ESTRO came out of discussions among different people, of which Klaas Breur was one, and so were Mike Peckham, Jerzy Einhorn, Maurice Tubiana and some other people. They involved a young Belgian radiotherapist, Emmanuel van der Schueren, who had been working in Amsterdam and who they trusted would do some of the work needed. Then they called for a preparatory meeting with different European societies in Milan, and I happened to be the secretary of the Danish society at that time. So that’s why I became involved. At that meeting it was decided to create ESTRO. Subsequently we had a founding meeting of ESTRO in 1981.

What was the Green Journal like 25 years ago?
The Green Journal came a bit later, as a result of other earlier activities. Shortly after the formation of ESTRO and during the ECCO and ESTRO meetings in Stockholm I was asked by Jerzy Einhorn and Emmanuel van der Schueren to set up an educational committee, and at that time...
I got involved in the organisation of ESTRO. We started the Green Journal a bit later in 1983. I was on the editorial board from the beginning and wrote a paper for the first issue, and became editor-in-chief in 1990.

**Overall, how has the journal changed over the past 25 years?**

Things evolve with time and history has had an impact on the journal. In these days of Brexit, you can understand that it is not the 25 years’ duration that matters, but the historic background. The journal was put together in the 1980s around the same time as the early European Union. The eventual involvement of more countries such as the Scandinavian countries and the UK, and the break down of the Iron Curtain resulted in a Europe growing from being a very separated function to one of collaboration. This had never happened before and, indirectly, as a part of all these activities, ESTRO was created.

There was also an idea early on in ESTRO that we needed to have a platform to communicate science. One has to understand that in many countries radiotherapy was marginalised as part of general radiology, a specialty dominated by diagnostics. So there was a need to break away from radiology. There was a also needed for a platform for publishing radiotherapy related articles. There was only one true international journal that had started some years before and that was the Red Journal in the USA, and a few more regional journals in Europe, but there was not a real broad European platform for these journals (some were in languages other than English – remember it was in the days were we could not speak to each other). So a European based international radiotherapy journal was needed and therefore ESTRO was very eager to create it as a tool for communication with its members.

You also have to realise that in those days there was no internet. The fax machine was just invented! If you wanted to connect to the membership you had to do something that came in the mail box every month. So the journal was the key contact between ESTRO and its members. There was no other contact except when you attended a meeting or a course. It had a multipurpose function in those days: it was a scientific tool and a glue to stick the membership together.

**What have you enjoyed the most in your role over the last 25 years?**

I have spent almost every weekend for the past 25 years on the journal. Of course, you do this for a number of reasons – the main reason is that you have a constant finger on the pulse of what
is going on. You are sitting in the centre of all the crossroads of information and consequently you get to know what happens to this enormous amount of knowledge. Then you get in contact with a lot of nice people and not least young enthusiastic people who are at the beginning of their research career.

What has been the biggest challenging?
Working at the evenings and weekends! I think that, over the year, I am probably one of the members of ESTRO who has spent most hours on the Society. It has been an average of about two hours a day for 25 years. It is much more than you actually think it is. And, of course, it is a pain in the neck once in a while when you are behind. So, like any good thing it is a pleasure and it is a curse, but overall I have enjoyed it very much.

So I guess the position has been rewarding?
Oh yes, but this is not the issue, the issue is whether the journal has been rewarding for ESTRO.

Is there one paper that has passed through your hands over the past 25 years, which is more memorable than others?
The very, very first paper in the journal – it was before my time as editor-in-chief. I may be the only one, I think, who spontaneously can remember what the first paper was. It was a paper by Jack Fowler. Jack wrote a review based on the second Klaas Breur lecture: ‘La Ronde – radiation sciences and medical radiology’ (published in Radiotherapy Oncology, 1983, vol 1: 1-22).

La Ronde was about how different things depend upon each other. So, his bottom line was that we all need each other. If you know a little bit about Buddhism you will know that they have ‘the wheel of life’ indicating that if you stand in the same place everything comes back to you, and that is exactly the same with La Ronde. You have ideas and concepts which comes and go, but they depend on each other, and everything is part of a grand network. The paper goes through all these issues and is very interesting for people to read today.

Jack also included two quotations, one from Shakespeare and one from the Bible. The Shakespeare one is from Macbeth and says: “If you can look into the seeds of time, and say which grain will grow and which will not, speak then unto me.” The other one is from the book of Ecclesiastes and says: “To everything there is a season, and a time to every purpose under the heaven.” This is exactly what the whole thing is about. We can predict, we know what takes place at any particular moment, and what is likely to come, but we need to know each other’s activities.

The development of radiotherapy is like a pendulum that swings from one side to another. It swings between technology and biology. So, at a time when you are short on technology you need biology to help you out, but in times when you are strong on technology you don’t care about biology. You have this constantly swinging pendulum between subjects and I can remember at least three or four topics where interest has swung from one side to the other. But when you stand right in it you don’t think like that and you do not think there is a need for other skills or disciplines, but that what you have in the hand is normally enough. This paper by Jack is based upon that scenario. I don’t think many people have read the La Ronde paper recently – but please do.
The Jens Overgaard legacy award was created for ESTRO 36. How does it feel to have an award in your name?

It feels as though you are getting old! Then of course I am honoured and a bit humble about it, so it’s just a nice feeling. I guess it also expresses that you have been part of a community of people who have appreciated you. It is a recognition of the activities that you have been part of, so I am thankful.

Why did you decide to award the work of Jean-Pierre Pignon, Jean Bourhis and Pierre Blanchard for this first award?

Two reasons actually. For many years one of my own papers was the most cited paper from the Green Journal, but then it was overtaken by another paper which was by these three and the MARCH group. Thus, they have written the most cited paper in the Green Journal and the radiotherapy community have used the information. But the main reason is that I think clinical science and clinical trials are what we need to develop. This is especially true these days with Trump and Brexit and the “post truth era”, where I think the need for generating scientific evidence is under pressure. There is this tendency to believe that new knowledge is not needed, a belief that we have everything we need, and that we don’t have to create new knowledge and new evidence, that actually we can just take advantage of our existing knowledge. I strongly disagree. The only way ahead is constantly exploring nature and the world to discover the unknown, to make evidence from it and to improve that evidence constantly.

The awarded group of people have explored and taken advantage of the exploration of clinical knowledge. They are good scientists. They have managed to collaborate worldwide with a lot of colleagues, and have done it in a careful and systematic way. It is also recognition that clinical science is the hallmark of our future – I think it is an excellent choice.

What do you feel that the next five to ten years will bring in terms of the way people publish their research?

That depends very much on the publication patterns, which are moving away from the traditional journals. With the internet, we have a tsunami of new journals or other means of publication. There is developing trend towards digital publishing.
publication of scientific material where peer review is cut short, and publication of much science is communicated uncritically. I still think that scholarly science presented through a peer review journal is a cornerstone in scientific development, but in ESTRO we have developed a very ambivalent and schizophrenic attitude. We would like to have the best scholarly science placed in our journal and we put a lot of quality requirements into the written publications, but at the same time we open up our meetings to presentations with much less quality. I am in favour of the quality publication of good science and I hope that *Radiotherapy and Oncology* will continue to be a tool in that direction. It is not a top ranking medical journal, but it is a top journal in radiation oncology and is part of how we are setting standards for progress in our field. It aims to be a tool that will help radiation scientists to place more quality into their work.

We must also realise that the “marked” for scientific publications has moved from being in the hands the scientific societies and their editors, to being increasingly controlled by large publishing houses and who have a more commercial interest in what happens. In my understanding, scientists need to keep control of the publication of science. Otherwise everybody will use the internet just to express something but without caring about the quality.

This is a very long story and it is close to my heart, but we have arrived at a crossroads where

the old-fashioned society based journal with an independent editor, is under enormous pressure. It might happen or it might not - I don’t know, but I am in favour of the old-fashioned way.

**What would your advice be to young researchers who hope to publish their work?**

I think it is very important that they should find themselves a good mentor who can help them.

**What are the topics or ongoing studies you will continue to follow after you step down?**

Everything. I am personally very keen on the clinical science which I think is in trouble, with clinical trials and the number of patients getting into clinical trials going down and down. Evidence-based research is very important. I don’t think that there will be a follow-up area.

**What will you do during your retirement?**

I will stay on a while as editor-in-chief emeritus, and help keep the journal running.

*Interviewed by Cécile Hardon-Villard and Jill Barnard*
How do you see the present and future role of ESTRO in Asia and some Pacific countries?
The relationship between ESTRO, Asia and some Pacific countries already has quite a consistent history. Over the last five to ten years we have developed a very stable alliance with that part of the world, both with individuals and national societies. This relationship was originally based on educational courses, which ESTRO has been taking to the Asia region since 2005, and some joint scientific activities. But we have noticed over the years a growing participation from this region in European ESTRO activities, for both educational purposes and our scientific meeting. There is also a growing interest in submitting papers and manuscripts of the best quality to our journals. All this history allows us to double-check if it would also be possible to have a collaboration in that part of the world – to co-share and co-manage with them on an equal basis of responsibility further scientific, educational and professional activities. We have welcomed discussions of proposals at the level of national societies and from experts who have been involved in ESTRO activities for a long time. Some of these proposals led to awarding honorary memberships to some experts. Through interaction with all these people and national societies we have created an appetite to embark on joint activities to promote radiation oncology disciplines in that part of the world.

So most of the activities that ESTRO runs are also ones that are needed by that part of the world?
They absolutely want to be endorsed as leaders in societies, as people, and as experts in some way in their daily practice. Actually we need to be very careful because there are cultural and organisational differences which need to be considered, and that is the reason why it is so important to share the exchanges that both ESTRO and the partners in that region want to promote.

Do the EU and Asia have different needs and/or expectations?
The activities to develop in the near future will certainly be in a different format, looking much more at best practice behaviours than at the knowledge needed to drive good practice behaviour in both directions, in the clinical choice direction as well as in the management of the technicalities of our disciplines. Both directions need to be guided by strong expertise, but in Europe there is a greater need for evidence-based practice to understand decisions that drive daily practice. In Asia the immediate need is to learn from the practice of experts. These are the two perspectives. They are quite different. We have knowledge-driven behaviours in Europe and more expert behaviour-driven practice in Asia. Anyway, it is obvious that a liaison between both approaches is unavoidable and that the two perspectives will both be beneficial according to the different needs.
Are there other reasons why ESTRO picked that region, and might ESTRO still decide to go elsewhere?
The ESTRO mission is that we are open to promoting and fostering the growth of our discipline in other parts of the world. It is the last point of our mission statement. We look at Asia requests, taking into account that the requests are coming from a part of the world where huge and very consolidated growth of all aspects of society exists. If we are not able to address requests arising from the most rapidly growing part of the world, we will not accomplish our mission. So, for this reason, even if the mission is global for a while, we need to pay attention to an area where the most evident growth is happening. This does not exclude collaboration with societies from other world regions in the future, always provided that ESTRO’s mission guides our decisions.

Are there any areas of priority that are specific just for that region that ESTRO would like to focus on?
Being a joint project we want to start from their own requests, so their priority will be our priority. What we are learning is that the priority has different targets because we are talking about a very wide geographical region, and the available resources and technology infrastructure are very different from country to country. The target for one country could be very different from the target of other countries. So, for this reason, we absolutely need to give great value to the specific country’s own request and this must also be stratified according to organisational abilities, medical equipment and also the level of assistance they want to offer to their own patients. But that should be country-based.

There was a strategy meeting held in Asia in February. Can you tell us which other organisations participated and, in particular, why this meeting was held?
The meeting in February was in Singapore, and it brought ESTRO representatives together with leaders and national society representatives from the region. We called it the meeting of the Asia advisory board, as indeed it was about getting their advice on how best to develop and deepen our collaboration. It was a meeting that, in some ways, wrapped up all the previous activities that we had performed on an individual basis in terms of key opinion leaders and national societies. Apart from this, we had also met earlier in November 2016 in quite an informal way, in Kyoto, at the Japanese Society for Radiation Oncology/Federation of Asian Organisations for Radiation Oncology meeting, aiming to double-check with them the possible interest in having a common enterprise in managing and promoting our discipline in that area of the world. Singapore was the meeting where we tried to get an in-depth
overview of what was happening there, confirming the individual discussions we had before. The aim of the meeting was to determine and fine-tune the possible directions of the collaboration and, in the meantime, to take a step forward towards a more formal debate.

So what are the next steps?
The next step would be to involve our local partners in an actual project, that is to organise the first ESTRO meeting in Asia. Their engagement in the organisation of such a meeting will be the most concrete action that we have to address in the next two to three years.

And this meeting will be held every year?
No, it would be held once every two years. And we would call it the ESTRO meets Asia meeting.

And, of course, you expect most of the participants would be from that region?
Absolutely. They would be the people from those regions.

How do you see ESTRO and its partners benefitting from this collaboration?
For ESTRO it would mean a couple of things. First of all, there is a different cultural approach to daily practice in the Asia region, and so learning from this different approach will provide feedback, very positive feedback, to us in terms of examining our daily practice in a different way. Second, we will understand changes that will occur, for example, signs in the educational programme. The more you change, the more you will benefit, because we are living in a global society and these changes are the basis for the growth of everybody. So, from a structural point of view, there could be different models to approach daily practice. The societies we will engage with in the organisation of the meeting will also benefit as we will manage the content together. Even for structure and contents alone, a group can benefit from such a broad change.

Vincenzo Valentini
ESTRO representative for Asia activities
Interviewed by Evelyn Chimfwembe
ESTRO 36 in Vienna saw another ESTRO General Assembly (GA) meeting, with good participation from ESTRO members. About 60 members attended the GA, eight members were represented by proxy, and 52 full members voted.

ESTRO President Yolande Lievens announced the recent election results, and thanked all candidates and Board members finishing their terms. Peter Hoskin has been re-elected as GEC-ESTRO representative, Laura Mullaney is the new radiation therapist (RTT) representative, and Håkan Nystrom is the new physics representative.

The President then had the happy task of announcing the names chosen by the Board and the nominating council to receive ESTRO awards in 2018: Gillies McKenna for the Breur award and Christine Verfaillie for the Emmanuel van der Schueren award. For the lifetime achievement awards, Richard Pötter, Erik van Limbergen, David Thwaites, Michael Joiner and Rob Glynne-Jones, have been honoured. The GEC-ESTRO iridium award will be given to Christine Haie-Meder. The 2018 honorary members will be Regina Beets-Tan, Joachim Yahalom and Soehartati Gondhowiardjo. These awards represent ESTRO’s recognition of its wide body of volunteers, and is a way of thanking their commitment. Interviews with the winners of the 2017 awards are included in this issue of the newsletter.

Professor Lievens presented an update on the figures and performance of ESTRO activities: membership, science, education (presented by Jesper Eriksen) and public affairs. She also reported on the ESTRO scientific publications – the Radiotherapy & Oncology journal and the three new open access journals – on the main conferences of 2016, and the ESTRO Cancer Foundation. All information is available in the ESTRO annual report online and on paper (on request).

ESTRO treasurer Dirk Verellen then took the floor to present 2016’s financial report. He reminded the membership that ESTRO performs an internal and an external audit of the accounts annually. The external audit is a legal obligation to analyse the compliance of ESTRO finances with the legal requirements. The auditors have not found any risks in the financial health of the Society. The deficit that occurred in 2008 has now been recovered, based on the restructure of the governance and management, while also growing and renewing activities. Professor Verellen presented the 2016 audited results and there were no comments from the members present. He also asked the assembly to vote on the following motion: the ESTRO Board recommends the
GA to approve the accounts 2015 and discharge the Board, current management and external auditors. There were 60 votes cast and the result of the vote was 98% approval. The ESTRO accounts for 2016 were approved.

The President then updated all members present on the figures for the ESTRO 36 congress, which show an increase in participation and company presence. She also presented the developments in ESTRO’s relations to the world beyond Europe, with the announcement of a conference to be organised in Singapore in December 2018, and the involvement of ESTRO as a leading figure in the Global Impact of Radiation Oncology (GIRO) initiative. Finally, she gave a reminder to all members to save the date for ESTRO 37, which will take place in Barcelona on 20-24 April 2018.

Report by Marta Jayes,
ESTRO Governance Affairs Manager
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BY PHILIPPE LAMBIN, DIRK DE RUYSSCHER AND HANS KAANDERS
**PROSTATE**

**Prediction of overall survival for patients with metastatic castration-resistant prostate cancer: development of a prognostic model through a crowdsourced challenge with open clinical trial data**


**Background**

Improvements to prognostic models in metastatic castration-resistant prostate cancer have the potential to augment clinical trial design and guide treatment strategies. In partnership with Project Data Sphere, a not-for-profit initiative allowing data from cancer clinical trials to be shared broadly with researchers, we designed an open-data, crowdsourced, Dialogue for Reverse Engineering Assessments and Methods (DREAM) challenge to not only identify a better prognostic model for prediction of survival in patients with metastatic castration-resistant prostate cancer, but also engage a community of international data scientists to study this disease.

**Methods**

Data from the comparator arms of four phase 3 clinical trials in first-line metastatic castration-resistant prostate cancer were obtained from Project Data Sphere, comprising 476 patients treated with docetaxel and prednisone from the ASCENT2 trial, 526 patients treated with docetaxel, prednisone, and placebo in the MAINSAIL trial, 598 patients treated with docetaxel, prednisone or prednisolone, and placebo in the VENICE trial, and 470 patients treated with docetaxel and placebo in the ENTHUSE 33 trial. Datasets consisting of more than 150 clinical variables were curated centrally, including demographics, laboratory values, medical history, lesion sites, and previous treatments. Data from ASCENT2, MAINSAIL, and VENICE were released publicly to be used as training data to predict the outcome of interest – namely, overall survival. Clinical data were also released for ENTHUSE 33, but data for outcome variables (overall survival and event status) were hidden from the challenge participants so that ENTHUSE 33 could be used for independent validation. Methods were evaluated using the integrated time-dependent area under the curve (iAUC). The reference model, based on eight clinical variables and a penalised Cox proportional-hazards model, was used to compare method performance. Further validation was done using data from a fifth trial – ENTHUSE M1 – in which 266 patients with metastatic castration-resistant prostate cancer were treated with placebo alone.

**Findings**

Fifty independent methods were developed to predict overall survival and were evaluated through the DREAM challenge. The top performer was based on an ensemble of penalised Cox regression models (ePCR), which uniquely identified predictive interaction effects with immune biomarkers and markers of hepatic and renal function. Overall, ePCR outperformed all other methods (iAUC 0.791; Bayes factor >5) and surpassed the reference model (iAUC 0.743; Bayes factor >20). Both the ePCR model and reference models stratified patients in the ENTHUSE 33 trial into high risk and low risk groups with significantly different overall survival.
survival (ePCR hazard ratio 3.32, 95% CI 2.39-4.62, p<0.0001, reference model 2.56, 1.85-3.53, p<0.0001). The new model was validated further on the ENTHUSE M1 cohort with similarly high performance (iAUC 0.768). Meta-analysis across all methods confirmed previously identified predictive clinical variables and revealed aspartate aminotransferase as an important, albeit previously under reported, prognostic biomarker.

**Interpretation**
Novel prognostic factors were delineated, and the assessment of 50 methods developed by independent international teams establishes a benchmark for development of methods in the future. The results of this effort show that data sharing, when combined with a crowdsourced challenge, is a robust and powerful framework to develop new prognostic models in advanced prostate cancer.
Background
Salvage radiation therapy is often necessary in men who have undergone radical prostatectomy and have evidence of prostate cancer recurrence signalled by a persistently or recurrently elevated prostate specific antigen (PSA) level. Whether anti-androgen therapy with radiation therapy will further improve cancer control and prolong overall survival is unknown.

Methods
In a double blind, placebo controlled trial conducted from 1998 to 2003, we assigned 760 eligible patients who had undergone prostatectomy with a lymphadenectomy and had disease, as assessed on pathological testing, with a tumour stage of T2 (confined to the prostate but with a positive surgical margin) or T3 (with histologic extension beyond the prostatic capsule), no nodal involvement, and a detectable PSA level of 0.2 to 4.0ng per millilitre to undergo radiation therapy and receive either anti-androgen therapy (24 months of bicalutamide at a dose of 150mg daily) or daily placebo tablets during and after radiation therapy. The primary end point was the rate of overall survival.

Results
The median follow-up among the surviving patients was 13 years. The actuarial rate of overall survival at 12 years was 76.3% in the bicalutamide group, as compared with 71.3% in the placebo group (hazard ratio for death, 0.77; 95% confidence interval, 0.59 to 0.99; P=0.04). The 12-year incidence of death from prostate cancer, as assessed by means of central review, was 5.8% in the bicalutamide group, as compared with 13.4% in the placebo group (P<0.001). The cumulative incidence of metastatic prostate cancer at 12 years was 14.5% in the bicalutamide group, as compared with 23.0% in the placebo group (P=0.005). The incidence of late adverse events associated with radiation therapy was similar in the two groups. Gynaecomastia was recorded in 69.7% of the patients in the bicalutamide group, as compared with 10.9% of those in the placebo group (P<0.001).

Conclusions
The addition of 24 months of anti-androgen therapy with daily bicalutamide to salvage radiation therapy resulted in significantly higher rates of long-term overall survival and lower incidences of metastatic prostate cancer and death from prostate cancer than radiation therapy plus placebo.
Summary
Men with localised prostate cancer often are treated with external radiotherapy (RT) over eight to nine weeks. Hypofractionated RT is given over a shorter time with larger doses per treatment than standard RT. We hypothesised that hypofractionation versus conventional fractionation is similar in efficacy without increased toxicity.

Patients and methods
We conducted a multicentre randomised non-inferiority trial in intermediate-risk prostate cancer (T1 to 2a, Gleason score ≤ 6, and prostate specific antigen [PSA] 10.1 to 20ng/mL; T2b to 2c, Gleason ≤ 6, and PSA ≤ 20ng/mL; or T1 to 2, Gleason = 7, and PSA ≤ 20ng/mL). Patients were allocated to conventional RT of 78Gy in 39 fractions over eight weeks or to hypofractionated RT of 60Gy in 20 fractions over four weeks. Androgen deprivation was not permitted with therapy. The primary outcome was biochemical clinical failure (BCF) defined by any of the following: PSA failure (nadir + 2), hormonal intervention, clinical local or distant failure, or death as a result of prostate cancer. The noninferiority margin was 7.5% (hazard ratio, < 1.32).

Results
Median follow up was six years. One hundred and nine of 608 patients in the hypofractionated arm versus 117 of 598 in the standard arm experienced BCF. Most of the events were PSA failures. The five-year BCF disease-free survival was 85% in both arms (hazard ratio [short v standard], 0.96; 90% CI, 0.77 to 1.2). Ten deaths as a result of prostate cancer occurred in the short arm and 12 in the standard arm. No significant differences were detected between arms for grade ≥ 3 late genitourinary and gastrointestinal toxicity.

Conclusion
The hypofractionated RT regimen used in this trial was not inferior to conventional RT and was not associated with increased late toxicity. Hypofractionated RT is more convenient for patients and should be considered for intermediate-risk prostate cancer.
BREAST

Radiation induced angiosarcoma after breast cancer treatment

Jennifer K. Plichta & Kevin Hughes


Summary
A 72-year-old woman presented with skin changes on her left breast; five years earlier, she had undergone lumpectomy and radiation therapy for breast cancer. Physical examination revealed an area of skin 10cm in diameter, medial to the areola, that had an ecchymotic appearance (panel A). The area contained no underlying mass or nodular tissue. Punch biopsy findings were consistent with angiosarcoma. She underwent mastectomy, and final pathological testing revealed a grade 2 angiosarcoma larger than 10cm that involved the dermis and breast parenchyma (panel B). Radiation-induced angiosarcoma is a rare complication after breast cancer treatment. Patients frequently present with asymptomatic skin changes, which can be difficult to differentiate from radiation-induced skin changes. Angiosarcomas may also manifest as cutaneous or subcutaneous, flat or nodular, or localised or multifocal lesions and can have an appearance similar to that of benign angiomas or atypical telangiectasis. Aggressive surgery is the standard of care and usually involves mastectomy to obtain wide margins. Recurrence rates are high, and the benefits of adjuvant therapy are unclear. The patient underwent scanning to stage the cancer, and the results showed no metastatic disease. She then underwent chemotherapy, and at one year follow-up, she had no evidence of disease.
Background
Clinical trials have shown that trastuzumab, a recombinant monoclonal antibody against HER2 receptor, significantly improves overall survival and disease-free survival in women with HER2-positive early breast cancer, but long-term follow-up data are needed. We report the results of comparing observation with two durations of trastuzumab treatment at a median follow-up of 11 years, for patients enrolled in the HERA (HERceptin Adjuvant) trial.

Methods
HERA (BIG 1-01) is an international, multicentre, open label, phase 3 randomised trial of 5,102 women with HER2-positive early breast cancer, who were enrolled from hospitals in 39 countries between 7 December 2001 and 20 June 2005. After completion of all primary therapy (including, surgery, chemotherapy, and radiotherapy as indicated), patients were randomly assigned (1:1:1) to receive trastuzumab for one year (once at 8mg/kg of bodyweight intravenously, then 6mg/kg once every three weeks) or for two years (with the same dose schedule), or to the observation group. Primary endpoint is disease-free survival, and analyses are in the intention-to-treat population. Hazard ratios (HRs) were estimated from Cox models, and survival curves were estimated by the Kaplan-Meier method. Comparison of two years versus one year of trastuzumab is based on 366-day landmark analyses. This study is registered with ClinicalTrials.gov (NCT00045032).

Findings
Of the 5,102 women randomly assigned in the HERA trial, three patients had no evidence of having provided written informed consent to participate. We followed up the intention-to-treat population of 5,099 patients (1,697 in observation, 1,702 in one year trastuzumab, and 1,700 in two years trastuzumab groups). After a median follow-up of 11 years (IQR 10.09-11.53), random assignment to one year of trastuzumab significantly reduced the risk of a disease-free survival event (HR 0.76, 95% CI 0.68-0.86) and death (0.74, 0.64-0.86) compared with observation. Two years of adjuvant trastuzumab did not improve disease-free survival outcomes compared with one year of this drug (HR 1.02, 95% CI 0.89-1.17). Estimates of ten-year disease-free survival were 63% for observation, 69% for one year of trastuzumab, and 69% for two years of trastuzumab. A total of 884 (52%) patients assigned to the observation group selectively crossed over to receive trastuzumab. Cardiac toxicity remained low in all groups and occurred mostly during the treatment phase. The incidence of secondary cardiac endpoints was 122 (7.3%) in the two-years trastuzumab group, 74 (4.4%) in the one-year trastuzumab group, and 15 (0.9%) in the observation group.
**Interpretation**

One year of adjuvant trastuzumab after chemotherapy for patients with HER2-positive early breast cancer significantly improves long-term disease-free survival, compared with observation. Two years of trastuzumab had no additional benefit.
BACKGROUND

Results from a previous phase 3 study suggested that prophylactic cranial irradiation reduces the incidence of symptomatic brain metastases and prolongs overall survival compared with no prophylactic cranial irradiation in patients with extensive-disease small-cell lung cancer. However, because of the absence of brain imaging before enrolment and variations in chemotherapeutic regimens and irradiation doses, concerns have been raised about these findings. We did a phase 3 trial to reassess the efficacy of prophylactic cranial irradiation in the treatment of extensive-disease small-cell lung cancer.

METHODS

We did this randomised, open label, phase 3 study at 47 institutions in Japan. Patients with extensive-disease small-cell lung cancer who had any response to platinum-based doublet chemotherapy and no brain metastases on MRI were randomly assigned (1:1) to receive prophylactic cranial irradiation (25Gy in ten daily fractions of 2.5Gy) or observation. All patients were required to have brain MRI at three-month intervals up to 12 months and at 18 and 24 months after enrolment. Randomisation was done by computer-generated allocation sequence, with age as a stratification factor and minimisation by institution, Eastern Cooperative Oncology Group performance status, and response to initial chemotherapy. The primary endpoint was overall survival, analysed in the intention-to-treat population. This trial is registered with the UMIN Clinical Trials Registry, number UMIN000001755, and is closed to new participants.

FINDINGS

Between 3 April 2009, and 17 July 2013, 224 patients were enrolled and randomly assigned (113 to prophylactic cranial irradiation and 111 to observation). In the planned interim analysis on 18 June 2013, of the first 163 enrolled patients, Bayesian predictive probability of prophylactic cranial irradiation being superior to observation was 0.011%, resulting in early termination of the study because of futility. In the final analysis, median overall survival was 11.6 months (95% CI 9.5-13.3) in the prophylactic cranial irradiation group and 13.7 months (10.2-16.4) in the observation group (hazard ratio 1.27, 95% CI 0.96-1.68; p=0.094). The most frequent grade 3 or worse adverse events at three months were anorexia (six [6%] of 106 in the prophylactic cranial irradiation group vs two [2%] of 111 in the observation group), malaise (three [3%] vs one [<1%]), and muscle weakness in a lower limb (one [<1%] vs six [5%]). No treatment-related deaths occurred in either group.▼
Interpretation
In this Japanese trial, prophylactic cranial irradiation did not result in longer overall survival compared with observation in patients with extensive-disease small-cell lung cancer. Prophylactic cranial irradiation is therefore not essential for patients with extensive-disease small-cell lung cancer with any response to initial chemotherapy and a confirmed absence of brain metastases when patients receive periodic MRI examination during follow-up.
Background
Radiotherapy reduces the risk of local recurrence in rectal cancer. However, the optimal radiotherapy fractionation and interval between radiotherapy and surgery is still under debate. We aimed to study recurrence in patients randomised between three different radiotherapy regimens with respect to fractionation and time to surgery.

Methods
In this multicentre, randomised, non-blinded, phase 3, non-inferiority trial (Stockholm III), all patients with a biopsy-proven adenocarcinoma of the rectum, without signs of non-resectability or distant metastases, without severe cardiovascular comorbidity, and planned for an abdominal resection from 18 Swedish hospitals were eligible. Participants were randomly assigned with permuted blocks, stratified by participating centre, to receive either $5 \times 5\text{Gy}$ radiation dose with surgery within one week (short-course radiotherapy) or after four to eight weeks (short-course radiotherapy with delay) or $25 \times 2\text{Gy}$ radiation dose with surgery after four to eight weeks (long-course radiotherapy with delay). After a protocol amendment, randomisation could include all three treatments or just the two short-course radiotherapy treatments, per hospital preference. The primary endpoint was time to local recurrence calculated from the date of randomisation to the date of local recurrence.

Findings
Between 5 October 1998 and 31 January 2013, 840 patients were recruited and randomised; 385 patients in the three-arm randomisation, of whom 129 patients were randomly assigned to short-course radiotherapy, 128 to short-course radiotherapy with delay, and 128 to long-course radiotherapy with delay, and 455 patients in the two arm randomisation, of whom 228 were randomly assigned to short-course radiotherapy and 227 to short-course radiotherapy with delay. In patients with any local recurrence, median time from date of randomisation to local recurrence in the pooled short-course radiotherapy comparison was 33.4 months (range 18.2-62.2) in the short-course radiotherapy group and 19.3 months (8.5-39.5) in the short-course radiotherapy with delay group. Median time to local recurrence in the long-course radiotherapy with delay group was 33.3 months (range 17.8-114.3). Cumulative incidence of local recurrence in the whole trial was eight of 357 patients who received short-course radiotherapy, ten of 355 who received short-course radiotherapy with delay, and seven of 128 who received long-course radiotherapy with delay.
course radiotherapy (HR vs short-course radiotherapy: short-course radiotherapy with delay 1.44 [95% CI 0.41-5.11]; long-course radiotherapy with delay 2.24 [0.71-7.10]; p=0.48; both deemed non-inferior). Acute radiation-induced toxicity was recorded in one patient (<1%) of 357 after short-course radiotherapy, 23 (7%) of 355 after short-course radiotherapy with delay, and six (5%) of 128 patients after long-course radiotherapy with delay. Frequency of postoperative complications was similar between all arms when the three arm randomisation was analysed (65 [50%] of 129 patients in the short-course radiotherapy group; 48 [38%] of 128 patients in the short-course radiotherapy with delay group; 50 [39%] of 128 patients in the long-course radiotherapy with delay group; odds ratio [OR] vs short-course radiotherapy: short-course radiotherapy with delay 0.59 [95% CI 0.36-0.97], long-course radiotherapy with delay 0.63 [0.38-1.04], p=0.075). However, in a pooled analysis of the two short-course radiotherapy regimens, the risk of postoperative complications was significantly lower after short-course radiotherapy with delay than after short-course radiotherapy (144 [53%] of 355 vs 188 [41%] of 357; OR 0.61 [95% CI 0.45-0.83] p=0.001).

**Interpretation**

Delaying surgery after short-course radiotherapy gives similar oncological results compared with short-course radiotherapy with immediate surgery. Long-course radiotherapy with delay is similar to both short-course radiotherapy regimens, but prolongs the treatment time substantially. Although radiation-induced toxicity was seen after short-course radiotherapy with delay, postoperative complications were significantly reduced compared with short-course radiotherapy. Based on these findings, we suggest that short-course radiotherapy with delay to surgery is a useful alternative to conventional short-course radiotherapy with immediate surgery.
Background
Guidelines for anal cancer recommend assessment of response at 6-12 weeks after starting treatment. Using data from the ACT II trial, we determined the optimum timepoint to assess clinical tumour response after chemoradiotherapy.

Methods
The previously reported ACT II trial was a phase 3 randomised trial of patients of any age with newly diagnosed, histologically confirmed, squamous cell carcinoma of the anus without metastatic disease from 59 centres in the UK. We randomly assigned patients (by minimisation) to receive either intravenous mitomycin (one dose of 12mg/m² on day one) or intravenous cisplatin (one dose of 60 mg/m² on days 1 and 29), with intravenous fluorouracil (one dose of 1000mg/m² per day on days 1-4 and 29-32) and radiotherapy (50.4Gy in 28 daily fractions); and also did a second randomisation after initial therapy to maintenance chemotherapy (fluorouracil and cisplatin) or no maintenance chemotherapy. The primary outcome was complete clinical response (the absence of primary and nodal tumour by clinical examination), in addition to overall survival and progression-free survival from time of randomisation. In this post-hoc analysis, we analysed complete clinical response at three timepoints: 11 weeks from the start of chemoradiotherapy (assessment one), 18 weeks from the start of chemoradiotherapy (assessment two), and 26 weeks from the start of chemoradiotherapy (assessment three) as well as the overall and progression-free survival estimates of patients with complete clinical response or without complete clinical response at each assessment. We analysed both the overall trial population and a subgroup of patients who had attended each of the three assessments by modified intention-to-treat. This study is registered at controlled-trials.com, ISRCTN 26715889.

Findings
We enrolled 940 patients from 4 June 2001 to 16 December 2008. Complete clinical response was achieved in 492 (52%) of 940 patients at assessment one (11 weeks), 665 (71%) of patients at assessment two (18 weeks), and 730 (78%) of patients at assessment three (26 weeks). A total of 691 patients attended all three assessments and in this subgroup, complete clinical response was reported in 441 (64%) patients at assessment one, 556 (80%) at assessment two, and 590 (85%) at assessments three. Of the 209 patients who had not had a complete clinical response at assessment one, 151 (72%) had a complete clinical response by assessment three. In the overall trial population of 940 patients, five-year overall survival in patients who had a clinical response at assessments one, two and three was 83% (95% CI 79-86), 84% (81-87), and 87% (84-89), respectively and was 72% (66-78), 59% (49-67), and 46%

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(37-55) for patients who did not have a complete clinical response at assessments one, two and three, respectively. In the subgroup of 691 patients, five-year overall survival in patients who had a clinical response at assessment one, two, three was 85% (81-88), 86% (82-88), and 87% (84-90), respectively, and was 75% (68-80), 61% (50-70), and 48% (36-58) for patients who did not have a complete clinical response at assessment one, two and three, respectively. Similarly, progression-free survival in both the overall trial population and the subgroup was longer in patients who had a complete clinical response, compared with patients who did not have a complete clinical response, at all three assessments.

**Interpretation**

Many patients who do not have a complete clinical response when assessed at 11 weeks after commencing chemoradiotherapy do in fact respond by 26 weeks, and the earlier assessment could lead to some patients having unnecessary surgery. Our data suggest that the optimum time for assessment of complete clinical response after chemoradiotherapy for patients with squamous cell carcinoma of the anus is 26 weeks from starting chemoradiotherapy. We suggest that guidelines should be revised to indicate that later assessment is acceptable.
Background
Despite its common use in cancer treatment, radiotherapy has not yet entered the era of precision medicine, and there have been no approaches to adjust dose based on biological differences between or within tumours. We aimed to assess whether a patient-specific molecular signature of radiation sensitivity could be used to identify the optimum radiotherapy dose.

Methods
We used the gene-expression-based radiation sensitivity index and the linear quadratic model to derive the genomic-adjusted radiation dose (GARD). A high GARD value predicts for high therapeutic effect for radiotherapy, which we postulate would relate to clinical outcome. Using data from the prospective, observational Total Cancer Care (TCC) protocol, we calculated GARD for primary tumours from 20 disease sites treated using standard radiotherapy doses for each disease type. We also used multivariable Cox modelling to assess whether GARD was independently associated with clinical outcome in five clinical cohorts: Erasmus breast cancer cohort (n=263); Karolinska breast cancer cohort (n=77); Moffitt lung cancer cohort (n=60); Moffitt pancreas cancer cohort (n=40); and the Cancer genome atlas glioblastoma patient cohort (n=98).

Findings
We calculated GARD for 8,271 tissue samples from the TCC cohort. There was a wide range of GARD values (range 1.66-172.4) across the TCC cohort despite assignment of uniform radiotherapy doses within disease types. Median GARD values were lowest for gliomas and sarcomas and highest for cervical cancer and oropharyngeal head and neck cancer. There was a wide range of GARD values within tumour type groups. GARD independently predicted clinical outcome in breast cancer, lung cancer, glioblastoma, and pancreatic cancer. In the Erasmus breast cancer cohort, five-year distant metastasis-free survival was longer in patients with high GARD values than in those with low GARD values (hazard ratio 2.11, 95% 1.13-3.94, p=0.018).

Interpretation
A GARD-based clinical model could allow the individualisation of radiotherapy dose to tumour radiosensitivity and could provide a framework to design genomically-guided clinical trials in radiation oncology.
Background
Glioblastoma is associated with a poor prognosis in the elderly. Survival has been shown to increase among patients 70 years of age or younger when temozolomide chemotherapy is added to standard radiotherapy (60Gy over a period of six weeks). In elderly patients, more convenient shorter courses of radiotherapy are commonly used, but the benefit of adding temozolomide to a shorter course of radiotherapy is unknown.

Methods
We conducted a trial involving patients 65 years of age or older with newly diagnosed glioblastoma. Patients were randomly assigned to receive either radiotherapy alone (40Gy in 15 fractions) or radiotherapy with concomitant and adjuvant temozolomide.

Results
A total of 562 patients underwent randomisation, 281 to each group. The median age was 73 years (range, 65 to 90). The median overall survival was longer with radiotherapy plus temozolomide than with radiotherapy alone (9.3 months vs 7.6 months; hazard ratio for death, 0.67; 95% confidence interval [CI], 0.56 to 0.80; P<0.001). Among 165 patients with methylated O6-methylguanine-DNA methyltransferase (MGMT) status, the median overall survival was 13.5 months with radiotherapy plus temozolomide and 7.7 months with radiotherapy alone (hazard ratio for death, 0.53; 95% CI, 0.38 to 0.73; P<0.001). Among 189 patients with unmethylated MGMT status, the median overall survival was 10 months with radiotherapy plus temozolomide and 7.9 months with radiotherapy alone (hazard ratio for death, 0.75; 95% CI, 0.56 to 1.01; P=0.055; P=0.08 for interaction). Quality of life was similar in the two trial groups.

Conclusions
In elderly patients with glioblastoma, the addition of temozolomide to short-course radiotherapy resulted in longer survival than short-course radiotherapy alone.
COURSE AIM
The course will aim to review the present state-of-the-art of neuro-oncology, from its biological understanding to the implementation of high-tech radiotherapy approaches, modern biologically driven therapy and care. It will not only cover the commonest of brain tumours, but will also review the latest developments in the less common tumours in adults and children.

LEARNING OUTCOMES
By the end of this course participants should be able to:
• Understand the evolving concepts of brain tumour biology
• Interpret more complex brain imaging for the purpose of therapy
• Make judgements regarding multidisciplinary management of tumours including the role of systemic and targeted therapies in both common and rare brain tumours particularly in adults
• Understand the principles and practice of modern radiotherapy
• Understand the design and challenges of brain tumour clinical trials.

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Highlight on retrospective and experimental datasets in radiotherapy toxicity
Mechthild Krause

Report from a participant
Mateusz Spalek

Best poster award, presented to a radiation oncologist at ESTRO 36
Emmanouil Fokas

Winner of the ctRO poster award
Eva Rijkmans
ESTRO 36 offered a high quality programme in clinical radiotherapy with a specific focus on modern treatment approaches, for example combined immunotherapy and radiotherapy and the utilisation of immunogenic effects of radiotherapy, prediction of radiotherapy response for treatment individualisation, treatment results and developments in high precision techniques like proton radiotherapy, adaptive radiotherapy, and image-guided radiotherapy. As pre-congress reports and press releases focused more on prospective clinical trials for improvement of local tumour control and organ preservation, this short report will highlight some of the high quality retrospective and experimental datasets on radiotherapy toxicity, which were presented in the clinical track.

Combined radiotherapy-immunotherapy approaches are increasingly used in clinical trials. But in routine clinical practice, such treatments are often applied in palliative treatment situations where, for example, a local progression under immunotherapy requires radiotherapy. Orit Kaidar-Person from the University of North Carolina, USA, provided data on 58 patients who were treated with stereotactic radiosurgery of a brain metastasis (abstract OC-0513). Of those, 29 also received immunotherapy, mostly with BRAF or MEK inhibitors. Although the intracranial complication rate (radiation necrosis, haemorrhage) was higher in patients with immunotherapy, they had a significant overall survival advantage compared to stereotactic radiotherapy without immunotherapy (15 months versus six months, p = 0.0013).

Several speakers presented data on proton radiotherapy. Here, a specific question is the relative biological efficacy (RBE), which is currently assumed to be 1.1 compared to photon radiotherapy. Preclinical data contradict such homogeneous RBE and support higher RBE values at the distal end of the beam, i.e. behind the Bragg peak or at the distal dose fall-off. This would lead to the risk of higher normal tissue toxicity at these specific areas of the treatment volumes. Semi Harrabi from University Hospital Heidelberg, Germany, showed an analysis of 430 paediatric and adult patients treated with protons or photons for brain tumours (abstract OC-0514). They found a relatively low cumulative incidence of radiation necrosis following proton radiotherapy of 3.3% after a median time of 12 months, which was in the range of the rates observed after photon radiotherapy. In line with the above mentioned inhomogeneous RBE values, the observed radiation necrosis often significantly affected the periventricular border and was almost exclusively at the distal edge of the spread out Bragg peak. In preclinical experiments on rat spinal cord, Maria Saager from the German Cancer Research Centre, Heidelberg, showed data supporting higher RBE at the distal edge.
of the spread out Bragg peak after single dose irradiation (OC-0517). These data need to be further confirmed by fractionated irradiation but may, together with an increasing number of published data and ongoing evaluations, lead to an optimisation of clinical proton treatment planning.

These datasets provide a very good basis for further clinical trials on treatment optimisation using modern radiotherapy and combined treatment approaches, with consideration for normal tissue toxicity.

Mechthild Krause
Chair, scientific advisory group for clinical radiotherapy
People might say that scientific conferences and congresses are a waste of time for clinicians – a medical doctor should only follow his or her knowledge and guidelines. Is it really important for physicians to participate in such events? And, what is more, to be involved in scientific activities that consume time, money and sometimes result in a dead end?

Maria Skłodowska-Curie gave a brilliant lecture where she said that: “We must not forget that when radium was discovered no one knew that it would prove useful in hospitals. The work was one of pure science. And this is a proof that scientific work must not be considered from the point of view of the direct usefulness of it. It must be done for itself, for the beauty of science, and...”
then there is always the chance that a scientific discovery may become, like the radium, a benefit for humanity.” Even a result that is theoretically purely scientific or negative contains important information for a physician. Maybe not directly, but it may stimulate discussion, it might create a small brainstorm inside the skull, it could awaken curiosity and imagination – tools necessary to be a good radiation oncologist.

Many discoveries and breakthroughs are announced during big conferences. Many discussions lead to new clinical trials, methods and concepts. Many people learn new ways to improve old things. As a young clinician and young scientist, I can say that participation in this kind of event is very fruitful. Was it worth participating this time? Let’s see…

ESTRO 36 is the most important event for every single radiation oncologist in Europe. During the congress, which took place in Vienna, physicians from around the world can participate in debates, symposia, discussions, lectures, courses and ceremonies. Radiation oncology is a very ‘geek’ medical discipline, so the whole conference was bound to follow recent trends with all important events, photos and results streamed via social media (such as the ESTRO Facebook page, the Young ESTRO Facebook page and the ESTRO Twitter feed). Every participant had access to online content on the ESTRO website. Also, an ESTRO mobile app was developed to help attendees plan and follow interesting sessions.

Clinical activities began on the first day of the conference with pre-meeting courses. Participants could choose to take part in clinically oriented courses on the topics of patient reported outcome measures (PROMS) in radiotherapy research and clinical practice. These PROMS focus on outcomes of treatment that are important for our patients. Remember that survival is not the only thing that matters. Doctors with a knack for science had an opportunity to go deeper into the demanding topic of conducting trials and other studies. The third option for clinicians was an interdisciplinary pre-meeting course regarding the use of modern multimodality imaging for improving target definition and modified dose prescription. Personally, I participated in the last one. Before the course I had no idea of how powerful our imaging tools are (including those at my institute) and how we might use them to improve our contours. People more interested in practice than theory could benefit from registering for Fellowship in Anatomic DeLineation and CONtouring (FALCON) delineation workshops. This year they were devoted to intraprostatic relapses, anal canal, and liver and spinal stereotactic body radiation therapy (SBRT). ▼
At the heart of the conference were lectures, debates and symposia. The hottest topics of ESTRO 36 were oligometastatic disease, immunotherapy, protons, adaptive radiotherapy and patient oriented treatment. I wish I could have participated in all of these topics, but I had to make some choices and I became a ‘hunter’ looking for oligometastases. The issue of oligometastatic disease (the first problem is how to define it) is extremely important and interesting for every radiation oncologist, due to the potential role of advanced radiotherapy techniques (like SBRT) that might be used in this clinical situation. The ESTRO-Japanese Society for Therapeutic Radiology and Oncology (JASTRO) joint symposium on oligometastatic disease gave me answers to many of the questions I had.

Another interesting topic was combined treatment. Nowadays, immunotherapy is of interest in many cancer sites and research continues on whether it works better with radiotherapy or not. The answer is not clear and speakers were trying to explain that fact during the radiotherapy plus immunotherapy symposium.

Professor Mechthild Krause, chair of the scientific advisory group for clinical radiotherapy, highlighted the presented data relating to proton therapy. This is still an undiscovered area for many radiation oncologists due to the lack of equipment and experience. I was taught that relative biological efficacy (RBE) of protons compared to photons is 1:1. Information suggesting that proton RBE may be inhomogeneous gives a different view on particle therapy – that the higher RBE at the distal edge of the spread-out Bragg peak could increase potential treatment toxicity, but also be beneficial in some clinical situations. That has encouraged me to visit a proton therapy centre in Europe to learn something new (with a ESTRO mobility grant, of course).

Among the best poster awards, radiation oncologists should pay attention to the clinical abstract on ‘Tumour regression grading in the CAO/ARO/AIO-04 randomised phase 3 trial in locally advanced rectal carcinoma’. This study
confirmed the role of tumour regression grading (assessed using the Dworak classification) as a prognostic factor in patients with advanced rectal cancer. It may play an important role in a personalised approach after pre-operative radiochemotherapy.

This year medical students, who are the future of European radiation oncology, had a great opportunity to participate actively in the conference. It is important to show young people that the world of medicine does not consist only of surgery and drugs, and there is a fantastic, rapidly developing discipline called radiation oncology. Together with experienced radiation oncologists, medical students presented selected clinical cases followed by discussion (see more details in the Young Corner).

ESTRO 36 proved that radiation oncology is an extremely rapidly developing discipline. Radiation oncologists who are interested in modern equipment, new gadgets, and hi-tech solutions (like me), were probably in heaven. The exhibition hall was full of technological pearls and fancy machines that might benefit our patients. The meeting also hosted the premieres of totally new linear accelerators, some of which may appear soon in hospitals and institutes where we work.

For the grand finale, all participants could listen to the closing debate between ESTRO’s leaders about the future of radiation oncology and automation, which asked if we were going to be replaced by artificial intelligence and robots. The majority of the audience was convinced by the speakers that this scenario is not very likely. I would like to end with more words of Marie Skłodowska-Curie. She said that: "After all, science is essentially international, and it is only through lack of the historical sense that national qualities have been attributed to it." ESTRO 36 confirmed these words and ESTRO 37 will confirm them again. See you in Barcelona!

Mateusz Spałek
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Despite overuse of the term, surrogate endpoints in rectal cancer are lacking because their statistical validation poses major challenges, including confirmation using reproducible data from phase 3 randomised trials. The response of rectal carcinoma to preoperative chemoradiotherapy (CRT) varies considerably. Based on the CAO/ARO/AIO-94 trial collective, we have demonstrated that tumour regression grading (TRG) could stratify tumour response to CRT and predict prognosis (Rödel et al, *Journal of Clinical Oncology*, 2005; Fokas et al, *Journal of Clinical Oncology*, 2014).

We examined TRG as a prognostic marker and an individual level surrogate for disease-free survival.
survival (DFS) within the CAO/ARO/AIO-04 randomised phase 3 trial. TRG was assessed prospectively using the Dworak classification in 1,179 patients treated with preoperative fluorouracil based CRT with or without oxaliplatin. Individual level surrogacy of TRG for DFS was tested using the four Prentice criteria (PC1-4). First, treatment must have statistically significant impact on DFS (PC1). Second, treatment must have statistically significant impact on TRG (PC2). Third, TRG must have statistically significant effect on DFS (PC3). Fourth, the full effect of treatment on DFS should be captured by TRG (PC4).

With a median follow-up of 50 months, the addition of oxaliplatin to fluorouracil based CRT significantly improved three-year DFS (P=0.04, PC1) and resulted in a shift towards more advanced TRG groups (P<0.001, PC2), compared to CRT with fluorouracil alone. Additionally, higher TRG after preoperative CRT was associated with significantly better DFS (P<0.001, PC3), and constituted an independent prognostic factor for DFS in multivariate analysis (P=0.007). The treatment effect on DFS was captured by TRG, satisfying individual level PC4 (P=0.009).

In the era of personalised medicine, TRG as an early available surrogate endpoint could help to validate molecular biomarkers, to identify the appropriate preoperative treatments within early clinical trials for larger scale testing, and facilitate response guided therapeutic strategies.

Fokas et al, Journal of the National Cancer Institute, 2017, in press

Emmanouil Fokas
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First of all, I would like to thank ESTRO and ctRO for the honour of receiving the ctRO poster award. The poster at ESTRO 36 in Vienna showed the results of a sub analysis of the HERBERT study, concerning factors associated with a clinical complete response after definitive radiotherapy in rectal cancer.

While surgery remains the gold standard for treatment of rectal cancer patients, non-surgical organ preservation treatment options have been explored increasingly in the past decade. For example, in elderly comorbid patients, there are risks associated with major surgery, including considerable postoperative mortality and morbidity.

* Below the age of 36 for men and 40 for women
The HERBERT study was performed to evaluate the feasibility of definitive radiotherapy in elderly patients with rectal cancer, who were not fit for surgery. Patients were treated with external beam radiotherapy (EBRT, 13 x 3Gy) followed by three high dose-rate endorectal brachytherapy (HDREBT) applications six weeks after EBRT. The primary results were promising, with 60% complete and 27% partial clinical response, but approximately one in three patients experienced severe proctitis. Therefore, further research and improvement of the treatment and patient selection is important.

The aim of the current analyses was to evaluate factors associated with a complete clinical response (CR). One of the most important findings was the association of the initial response to EBRT. Of the partial responders after EBRT, 62% achieved a clinical complete response after HDREBT, while none of the patients with stable disease achieved a CR. Other factors were the residual tumour volume, thickness and circumferential involvement after EBRT. The question remains whether patients with a complete response or stable disease after EBRT benefit from a HDREBT boost. It could be argued that in large residual tumours, postponing the HDREBT boost might optimise the chance of downsizing and thereby improve dose coverage and the chance of a complete response. At the same time, dose escalation may be of no added value in patients who already have a CR after EBRT, whereas the increase in morbidity is definitely proven.

Future studies should focus on weighing the risks and benefits of a brachytherapy boost in this elderly and comorbid population. A logical successor study would be to randomise between EBRT with or without a boost. Based on the above results, one might propose incorporating the response to EBRT as a stratifying factor into the trial design.

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Welcome to the Brachytherapy Corner.

In this Corner we have a summary highlighting some interesting papers from the ESTRO36 meeting. You can read the different articles on brachytherapy for prostate, gynaecological, skin and breast cancers, and also physics. In addition, the winner of the junior brachytherapy travel grant, Laura van Heerden, describes her investigations. We hope you enjoy reading the articles.

We remind you that registrations for the 5th GEC-ESTRO workshop: ‘The strength of brachytherapy’, 30 November-1 December 2017 in Rome, are open. Don’t forget to register.

Have a splendid summer.

Peter Hoskin, Bradley Pieters, Åsa Tedgren and Robert Hudej
CONGRESS PAPER HIGHLIGHTS

Prostate brachytherapy
Simon Buus

Gynaecology brachytherapy
Lars Fokdal

Skin brachytherapy
Luca Tagliaferri

Brachytherapy physics
Julia Hofbauer

Breast brachytherapy
Maximilian Schmid

JUNIOR BRACHYTHERAPY TRAVEL GRANT

Interview with the winner
Laura van Heerden
Two major topics in prostate cancer brachytherapy were addressed during ESTRO 36. The first was the use of salvage brachytherapy for locally recurrent prostate cancer. The second topic was the use of high dose-rate (HDR) brachytherapy as a single modality in localised and locally advanced prostate cancer.

Encouraging results from four small series of salvage brachytherapy were presented (OC-0172, OC-0173, OC-0174, OC-0175). Biochemical relapse-free survival was in the range of 45-94%, with a median follow-up of 6-60 months. There were, however, large differences in terms of late morbidity between the four studies. An approach using HDR brachytherapy to the gross tumour volume including a margin – as proposed by Metha Maenhout et al – seems to be favourable in terms of toxicity, as opposed to a strategy with whole prostate gland low dose rate (LDR).
brachytherapy – as proposed by by Stefano Magrini et al. However, focal brachytherapy potentially increases the risk of missing the target and, therefore, high performance imaging is essential, as recognised by Soleakhena Ken et al (OC-0171), who showed their results of multi-parametric MRI for target definition in prostate cancer brachytherapy.

Among the four studies, differences existed in the approach for diagnosing a local recurrence. Stefano Magrini et al relied on prostate specific antigen recurrence by Phoenix definition, and a detectable lesion in the prostate gland on choline PET/CT, whereas pathohistological confirmation of a local recurrence was required in the three other studies. An optimal patient selection for salvage HDR brachytherapy was addressed by Gilmer Valdes et al (OC-0176) who had used machine learning on a patient cohort treated with salvage HDR brachytherapy for identifying predictive factors for a favourable outcome.

In a recent paper from the GEC-ESTRO urology working group, many of the questions raised above have been put forward in a Delphi consensus study [1] – a paper worthwhile reading for radiotherapists planning to perform salvage brachytherapy in a protocol setting.

Mature data from studies of HDR brachytherapy given as monotherapy in low, intermediate and high-risk prostate cancer are emerging. At ESTRO 36, results from three studies were presented. Peter Hoskin et al (OC-0269) reported the results from a cohort of 362 intermediate or high-risk patients treated with 26-36Gy in two to four fractions, or 19-20Gy in a single fraction.

Follow-up for patients treated with a single fraction schedule was 48-54 months, whilst in the group treated with multiple fractions follow-up was 62-121 months. Freedom from biochemical relapse (FFbR) at four years was 89-91% for patients treated with a single fraction, similar to the FFbR of 89-96% for patients treated with multiple fractions. In terms of late toxicity, results were excellent with no severe gastrointestinal toxicity and 0-5% severe genitourinary toxicity at four years.

Alfonso Gomez-Iturriaga et al (OC-0270) reported their early results from a cohort of 45 low and intermediate-risk prostate cancer patients treated with a 19Gy single fraction of HDR brachytherapy, with a median follow-up of 16 months. In terms of quality of life, the need to pass urine urgently declined significantly between the first and sixth month after treatment but returned to normal after a year. There were no significant changes in bowel movements, sexual or hormonal functioning. Sixty percent of patients who had normal sexual functioning before the treatment continued to function normally afterwards. Six months after the radiation therapy, 77% of patients said they were “extremely satisfied” with their treatment and quality of life, and 23% were “very satisfied”. In a third study of HDR brachytherapy monotherapy, Shinji Kariya et al (OC-271) reported the results from a cohort of 83 mainly intermediate and high-risk prostate cancer patients treated with 27Gy in two fractions with a median follow-up of 52 months. FFbR at four year was 89% with no late grade 2 or grade 3 gastrointestinal toxicity, but late grade 2 or grade 3 genitourinary toxicity was at 16.9% and 3.6% respectively. The three studies add to the increasing evidence for single modality HDR brachytherapy as a very attractive treatment modality for prostate cancer patients.

In LDR brachytherapy for prostate cancer, Atsunori Yorozu et al (OC-272) concluded that late rectal toxicity was related to the V100 of rectum and the use of neoadjuvant androgen deprivation. Results were based on data from a large cohort of 1,260 prostate cancer patients treated with LDR brachytherapy during 2003-2013.
Vincent Atallah et al (OC-273) showed that LDR brachytherapy for prostate cancer can be performed with excellent outcomes in an African-Caribbean population, despite socioeconomic disparities when compared with Europe and North America. This is an important finding, as LDR or HDR brachytherapy are also attractive treatments in terms of the cost for establishing and running a brachytherapy facility.

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REFERENCES
During this year’s ESTRO conference, a joint clinical and GEC-ESTRO session on radiotherapy for cervical cancer was held. Since the publication of the GEC-ESTRO guidelines on image-guided adaptive brachytherapy (IGABT) in cervical cancer in 2006, several single institution reports and a large multicentre retrospective study (retroEMBRACE) have been published. In general, IGABT has resulted in improvements in local control and survival, as well as reductions in morbidity in locally advanced cervical cancer (LACC).

During the session, early clinical results on local control and morbidity from the EMBRACE I study were presented in five proffered papers. The EMBRACE I study is a prospective multicentre registration study of IGABT in LACC patients. The study completed accrual in December 2015 after inclusion of 1,416 patients treated with external beam radiotherapy (EBRT) with or without concurrent chemotherapy and MRI-based IGABT according to the GEC-ESTRO guidelines.

The objective of the first proffered paper was to report patterns of local failure after IGABT within the EMBRACE study. The paper was presented by Maximilian Schmid from Vienna, Austria. In the study 1,230 patients were analysed. Local failures were described based on their relation to the clinical target volumes and infiltration into neighbouring organs or compartments. After a median follow up of 25 months, 80 local failures were observed. Synchronous nodal or distant metastases were reported in 42 patients. Median time to local recurrence was 11.5 months, and 86% of all local failures had occurred within 24 months of follow up. Information about the location of local failure was available in 63 patients (79%). The cervix and uterus were involved in 50 patients (80%), the proximal parametria in eight patients (13%), the distal parametria and pelvic wall in 18 patients (29%), the vagina in 18 patients (29%), the urinary bladder in 12 patients (19%) and the rectum in two patients (3%). The study showed that local failures occur only in a limited number of patients after EBRT with or without concurrent chemotherapy and IGABT. The vast majority of all local failures occurred within two years and were found within the high risk clinical target volume and intermediate risk clinical target volume. About half of all local failures were synchronous with nodal or distant disease.

The remaining four proffered papers from the EMBRACE I study focused on different late
morbidity following radiotherapy. In all studies, morbidity was physician assessed as well as patient reported. Physician-assessed morbidity used the common terminology for adverse events (CTCAE), version three. Patient reported outcomes (PROMs) were collected using the EORTC QLQ-C30 and CX24. A total of 1,176 patients with a median follow-up of 27 months were available for the analysis of morbidity. Morbidity assessment was at baseline (BL), every three months in the first year after radiotherapy, every six months in years two and three, and annually thereafter.

Nina Boje Kibsgaard Jensen from Aarhus, Denmark, presented data on bowel morbidity within the EMBRACE I study. Prevalence rates for all bowel symptoms grouped together for mild (G≥1) and moderate (G≥2) morbidity at five years were 32% and 6% respectively. Physician-assessed diarrhoea was reported with a five-year prevalence rate of 24% for G≥1 and 4% for G≥2. When assessed by PROMs, any patient-reported diarrhoea was 37%, while 15% of the patients reported “quite a bit” and “very much” disturbance due to diarrhoea. The five-year prevalence for physician-assessed anal incontinence was 9% for G≥1 and 2% for G≥2 morbidity. For PROMs, any difficulty in bowel control was reported by 29% of the patients, while 15% of the patients reported “quite a bit” and “very much” disturbance due to incontinence. Physician-assessed severe morbidity (G≥3) was reported with crude incidences of 1.5% and 0.4% for diarrhoea and incontinence respectively. Sigmoid, small bowel and colon strictures G≥2 were found in 16 patients with 12 strictures classified as G3 or G4 events. Fistulas G≥2 were present in six patients. Only one treatment-related death due to necrotising enteritis was reported. The study concluded that severe bowel morbidity is limited after IGABT in LACC, while mild and moderate bowel morbidity has an impact on patients. This is especially true when PROMs were analysed in relation to physician-assessed morbidity.

Lars Fokdal from Aarhus, Denmark, presented data on bladder morbidity within the EMBRACE study. The actuarial incidence of severe bladder morbidity (any grade 3 or 4, excluding ureteric stenosis) was 4.7% at five years. Severe morbidity included increased urinary frequency, incontinence and cystitis. Late morbidities such as severe bladder bleeding or bladder fistulas were found in less than 1% of all patients. Actuarial risk for grade 3 or 4 ureteric strictures (19 events) was 3.4% at five year. No treatment-related deaths occurred due to bladder morbidity. Mild to moderate morbidity was more pronounced with actuarial grade 2-4 physician-assessed urinary frequency, incontinence or cystitis in 16.3%, 14.4% and 11.0% of the patients respectively, at five years. Analysis of the corresponding prevalence rates showed maximum values of 4.8%, 5.8% and 4% for frequency, incontinence and cystitis respectively. In general, actuarial incidences were two to three times greater than the prevalence rates. PROMs included increased “urinary frequency” and “leaking of urine”. “Quite a bit” or “very much” distress due to “urine frequency” was reported in 23.3% at BL and fluctuated during follow-up, with prevalence rates ranging from 14%-20.8%. “Leaking of urine” was reported by 4.6% at BL. During follow-up, the prevalence rates gradually increased to 11.5% at five years. In the study, it was concluded that severe bladder morbidity after IGABT was limited. Mild and moderate morbidity is still relatively pronounced especially when assessed by PROMs.

Dina Najjari-Jamal from Vienna, Austria, presented data on lower extremity limb oedema within the EMBRACE I study. The crude incidence rates of physician-assessed limb oedema were 18% for G1, 4% for G2 and <1%
(four patients) for G3. No G4 or G5 morbidity occurred during follow-up. Actuarial analyses revealed a five-year probability of 0.5% for G≥3, 6.6% for G≥2 and 30.7% for G≥1 limb oedema. Laparoscopic lymph node staging increased the risk for the development of G≥1 limb oedema significantly (p≤0.001) with an actuarial risk at five years of 47.1% compared to 23.7% for patients without lymph node staging. This study showed that limb oedema had developed progressively over time. Moderate to severe limb oedema G≥2 was limited after radiotherapy. Mainly mild limb oedema G1 was observed. Nevertheless, 8%-14% of patients report “quite a bit” and “very much” swelling of one or both legs during follow-up.

Stephanie Smet from Vienna, Austria, presented a descriptive analysis of fatigue, insomnia and hot flushes within the EMBRACE I study. The study found that fatigue, insomnia and hot flushes occur in the mild to moderate range, while severe or disabling morbidity is rare. In most patients fatigue and insomnia are already present at baseline, and the risk doubles in the first year after treatment. Younger patients had an increased risk of G≥2 fatigue and insomnia. These findings were contrary to hot flushes. This symptom increased shortly after treatment due to radiation-induced ovarian failure in premenopausal patients. Hot flushes had a small trend to improvement during follow-up.

The study concludes that fatigue, insomnia and hot flushes play a significant role and that more intervention strategies are needed for survivors. These strategies should include oncological rehabilitation and cancer care programmes.

Based on the four proffered papers from the EMBRACE I study, a comprehensive picture of late morbidity after EBRT with or without concurrent chemotherapy and IGABT was presented. In general, severe to life threatening morbidity was low. Mild to moderate morbidity was still relatively pronounced, especially when the patient-reported outcomes were analysed.

The impact of acute morbidity on quality of life in patients undergoing radiotherapy for LACC was covered in a proffered paper presented by Sabrina Heijkoop from Rotterdam, The Netherlands. In this study, 167 patients were irradiated using an online adaptive plan-of-the-day protocol, followed by IGABT. During radiotherapy and the first year after treatment, physician-assessed and patient-reported health-related quality of life was recorded. Comparisons were made with an age-matched normal population. The study showed that most symptoms had a moderate to large increase in magnitude during radiotherapy and reached a maximum at the end of treatment or first week after treatment, with a return to baseline at three months. However, several symptoms persisted during further follow-up. These symptoms included diarrhoea, bowel cramps, dysuria, pain, faecal leakage and insomnia. While most symptoms gradually increased during the first five weeks, diarrhoea and bowel cramps were already markedly increased after the first three weeks, reaching a plateau at the fifth week of treatment. Sexual and vaginal symptoms became apparent after treatment and increased in the first year. The study concluded that radiotherapy had an impact on quality of life. For some symptoms this was temporary, while other symptoms persisted with longer follow-up. It was also concluded that the end of external beam treatment is the most sensitive time point to measure reductions in morbidity in studies on adaptive radiotherapy strategies.

Together, the proffered papers presented during the joint clinical and GEC-ESTRO symposium provide further evidence for IGABT in cervical cancer and showed that the technique is associated with an improved therapeutic outcome in terms of improved local control and reductions.
in morbidity. During the symposium, a future direction for the treatment of LACC was also introduced. This direction includes an adaptive strategy for EBRT with narrow margins to further reduce treatment related morbidity.

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5th GEC-ESTRO workshop  
‘The strength of brachytherapy’  
30 November - 1 December 2017 | Rome, Italy

REGISTRATION IS OPEN

The workshop will cover the following topics:
- Head and neck and eye brachytherapy
- Quality and costs in brachytherapy
- Breast and skin brachytherapy
- Organ volumes, dose and toxicity for brachytherapy in pelvic malignancies

To register or for more information visit: 
estro.org/congresses-meetings/items/5th-gec-estro-workshop
Brachytherapy (BT) for skin tumours is a valid alternative to surgery, particularly when surgery would be extensive and complex or for patients unable to have anaesthesia. With increasing numbers of elderly cancer patients and the rising cost of cancer treatment, the use of BT is likely to increase. In addition, BT could be considered in non-malignant diseases, such as keloids, in order to reduce the risk of recurrence.

ESTRO is very aware of this topic and so, within the GEC-ESTRO standing committee, a dedicated working group is preparing the GEC-ESTRO-ACROP recommendations on skin brachytherapy. To highlight the topic, the committee held a dedicated session for skin BT proffered papers that took place at ESTRO 36 in Vienna.

The session started with two presentations about the results from nine years of using an extensive incident learning system, and on dosimetric analysis of novel Valencia-type skin applicators. These two reports were given by Dr Christopher Deufel from the Mayo Clinic, Rochester, USA, and by Mr Michael Andrassy from Eckert & Ziegler, Berlin, Germany.

The next four presentations reported clinical results, with one lecture on basal cell cancer (BCC) and three on keloids. Dr Piotr Wojcieszek from the MSC Memorial Cancer Centre, Gliwice, Poland, discussed the outcomes for BCC patients treated at the centre with high dose-rate (HDR) surface BT using individual moulds and flaps. The analysis included 112 patients with primary tumours and 43 with post-surgery lesions. The median total dose was 45Gy (30Gy-50Gy) with dose per fraction of 5Gy. Five year local relapse-free survival was 94%.

Bradley Pieters from the Academic Medical Centre, Amsterdam, The Netherlands, reported the results of keloid excision followed by a 13Gy single dose of HDR BT within four hours. Twenty-four patients with 29 keloids were included in this study. Cosmetic assessment was registered according to the patient and observer scar assessment scale (POSAS). Recurrence was reported for seven keloids. This represents a high recurrence rate (24%) compared to favourable reports in the literature. This observation is explained by a longer follow-up (at least 1.5 years), and a more stringent and objective definition of response according to the POSAS as well observer-reported outcomes.
INTRODUCTION

Dr Eveline Bijlard and colleagues from the Erasmus Medical Centre, Rotterdam, and the University Medical Centre, Utrecht, The Netherlands, discussed how to find the optimal HDR BT radiation scheme after excision. They analysed the outcomes of patients treated in three centres with different schedules and concluded that the lowest dose scheme seems to have similar outcomes to higher dose schemes in terms of recurrence, as well as a lower risk of side effects. The authors therefore recommend using a low radiation scheme of 2 x 6Gy.

Professor Frank-André Siebert from the University Clinic Schleswig-Holstein, Kiel, Germany, reported on 37 patients with recurrent keloids that were treated in three fractions, with a single dose of 6Gy within six hours of surgery and the other two fractions on the first postoperative day. Only three keloid recurrences and two hypertrophied scars were observed.

Overall, the results reported in this session suggest that BT plays an interesting role in the management of keloids but the optimal scheme still needs to be determined. A prospective multicentre trial with a uniform scoring system is needed.

In addition to the oral presentations, other contributions were presented as posters. A very interesting poster was presented on the dosimetric influence resulting from the presence of air gaps between the skin and the Freiburg Flap. Based on their results, Dr Fernandez Montes of the Hospital Universitario Marqués de Valdecilla, Santander, Spain et al concluded that several layers of air between the applicator flap and the skin can lead to considerable variations in dosimetry. Therefore, utmost care is required during the placement of the flap.

Finally, a poster from Dr González Ruiz of Infanta Cristina Universitary Hospital, Badajoz, Spain et al reported the outcomes for 48 patients with T1-T2 stage non-melanoma skin cancer treated with HDR BT with a median total dose of 42.6Gy. The overall survival and local control rates were 96%. This analysis confirms that HDR BT treatment is a good alternative for patients not suitable for surgery.

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From patient-tailored treatment planning and the challenge of image fusion, to the vision of MR guidance, it was all about optimisation in brachytherapy (BT) at ESTRO 36.

The physics part of the congress started with a poster session on Saturday 6 May where a variety of contributors from all over the world made presentations. New ideas, such as the concept of microbrachytherapy (Russell Brown), were introduced as well as a retrospective study on evaluation of retina dose (Gerd Heilemann). One special input to this session was awarded the GEC-ESTRO best junior presentation. The award was given to Stef Maree from the Academic Medical Centre, Amsterdam, The Netherlands, who presented evolutionary algorithms that should further improve the optimisation process in BT treatment planning (more in the Conference corner on page 213 >).

The teaching lecture on Sunday morning by Jacco Steenhuijsen, from the Catharina Hospital, Eindhoven, The Netherlands, gave an excellent overview of commissioning of treatment planning systems (TPS) in BT. He highlighted the importance of knowing not only your source and calculation algorithms, but also how your TPS deals with image data and contours attached, routinely and when using new fusion techniques. A quite exciting session on physics treatment verification covered in vivo dosimetry, when inorganic scintillation detectors were proposed as suitable systems for real time measurements in high dose-rate (HDR) BT by Gustavo Kertzsch, from the University of Texas MD Anderson Cancer Center, Houston, USA. The group from University Hospital Erlangen, Germany, with Niklas Pallast presenting, discussed a method to evaluate implant geometry in HDR irradiation using in vivo dosimetry. MR guided BT was most certainly a notable topic and Ellis Beld from University Medical Center Utrecht, The Netherlands, received the ESTRO-ELEKTA brachytherapy award this year for her talk about MR-based source tracking in HDR testing of an MR compatible afterloader (more in the Conference corner on page 212 >).

Opportunities and pitfalls when using different imaging modalities for verification and dose summation were highlighted in the symposium on registration and fusion techniques. Nicole Nesvacil, from the Medical University of Vienna, Austria, focused on rigid registration, stressing the potential of applicator-based methods to improve target delineation and dose plan optimisation. Kari Tanderup, from Aarhus ▼
University Hospital, Denmark, showed that deformable image registration (DIR) might be useful for dose summation, but still faces challenges when it comes to highly deformable organs. Luc Beaulieu, from Université Laval, Quebec, Canada, concentrated on fusing various information for focal BT, including not only ultrasound and MR, but also tissue information such as biopsies, taking fusion techniques beyond imaging alone.

The BT physics track of this year’s ESTRO 36 was closed by a session on physics dosimetry. The implementation of new dose calculation algorithms was shown for low dose-rate (LDR) BT and image-guided intra operative radiotherapy (IORT) and first steps towards dose warping were made, evaluating uncertainties when using DIR.

Julia Hofbauer
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The proffered papers session on breast cancer within the GEC-ESTRO track at ESTRO 36 was an excellent opportunity to get informed on ongoing research activities in the field of breast brachytherapy.

Accelerated partial breast irradiation (APBI) using interstitial catheters, in particular for local recurrences, was in the centre of attention. Elena Villafranca Iturre, from Pamplona in Spain, reported the results from a prospective trial of...
52 patients with an ipsilateral local breast cancer recurrence, who were treated with lumpectomy and APBI with 34Gy in ten twice daily fractions. After a median follow-up time of 49 months, four second local recurrences were observed leading to a five-year local recurrence free rate of 91.6%.

Similarly, Viktor Smanyko, from Budapest in Hungary, reported a retrospective comparison of patients undergoing either re-excision and perioperative high dose-rate (HDR) multicatheter brachytherapy (n=35) or salvage mastectomy (n=57) as treatment for ipsilateral recurrences. The cohorts were well balanced with regard to clinical and tumour-related prognostic parameters. No statistically significant differences for local recurrence-free, disease-free and overall survival were detected. Cosmetic results were acceptable and a low rate of side effects was observed after the second breast conserving treatment.

Fabio Arcidiacono, from Terni in Italy, presented a phase II trial on APBI as postoperative treatment in the primary setting for early breast cancer. A total of 124 patients underwent breast conserving surgery and HDR brachytherapy with 32Gy in eight fractions. After 77 months of follow-up, only one local recurrence was observed. Cosmetic results were excellent in 82%. Mild to moderate later skin toxicity was experienced by 23% of the patients. Overall, these studies confirmed the existing literature on APBI as an excellent adjuvant radiotherapy approach both in the primary and the recurrent setting.

Two presentations focused on innovative approaches integrating electromagnetic tracking (EMT) into breast brachytherapy. Christoph Bert, from Erlangen in Germany, reported the use of EMT to measure the implant geometry in fractioned HDR interstitial brachytherapy of the breast. EMT was performed by manual insertion of a small EMT sensor into each of the catheters. This allowed the detection of dose deviations, which peaked on the second day of treatment. Based on EMT-determined dose calculations, adaptive treatment protocols and tests for possible treatment delivery errors could be further investigated.

Harry Brastianos, from Kingston, Ontario in Canada, presented the use of EMT in combination with ultrasound for needle guidance within a phantom study on multi-catheter interstitial breast brachytherapy. The combination of EMT with ultrasound improved the placement and spacing of the needles in comparison to ultrasound alone. Further studies are necessary to translate these findings into clinical practice.

In addition to breast brachytherapy, Francesco Cellini, from Bologna in Italy, presented – on behalf of Alessio Morganti – a systematic review on palliative brachytherapy for oesophageal cancer. A total of 623 patients from six prospective studies were analysed. Dysphagia-free survival was 86% after one month, 67% after three months and 47% after six months. The total radiation dose and the number of fractions had a significant impact on dysphagia-free survival. Adverse events included stenosis in 12% and fistula in 8%.

Maximilian Schmid
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What was the inspiration for initiating the study?
The total brachytherapy dose to 2cm³ (D2cm³) in the rectum is calculated by simply adding the D2cm³ for each application separately. The implicit assumption is that the high dose volumes are overlapping for each application. To evaluate the true cumulative D2cm³ to the rectum, the 3D dose distributions of each application can be added, voxel by voxel, using deformable image registration methods to take into account rectal deformation. Multiple studies have investigated the cumulative D2cm³ to the rectum with this strategy, but they provide little information on the accuracy of the deformable image registration for dose warping purposes. For this study, therefore, we wanted to quantify the dose warping uncertainty in the rectum using corresponding point pairs in the rectum wall. We did this for ten patients treated with pulsed dose-rate brachytherapy in two applications.

Did you encounter any challenges during the work?
There is a lack of corresponding anatomical landmarks that can be distinguished on the brachytherapy planning MRI. This made it difficult to determine how well the registration had performed at a specific location. Therefore, we localised corresponding point pairs on the rectum wall by using a physically realistic model describing rectal deformation.

Where there any striking results from your study?
Within the D2cm³ volume, the average geometrical error was large (8mm) and the resulting dose error for individual point pairs was, at most, 8GyEQD2. This shows that with the currently available deformable image registration methods, care should be taken when warping doses with steep gradients, such as in brachytherapy.
What could be the consequences of this research?
For the deformable image registration in our study we used a contour-based algorithm, which minimises the distance between closest points on the surface and therefore is very good at obtaining an almost complete surface overlap. Regardless, the error for individual points after registration was very large. Therefore, with the currently available methods, 3D dose addition with deformable image registration should be avoided in the rectum and the simple dose addition method is still the best method to evaluate the cumulative dose. By incorporating biomechanical information of the rectal deformation into the registration, it might be possible to improve the accuracy such that it is possible to investigate the cumulative D2cc. This not only holds for the rectum, but possibly also for the sigmoid.

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Dear colleagues,

Welcome to the summer edition of the Physics Corner. Here you will find an interview with Núria Jornet, the chair of the physics committee. She explains the launching of the first ESTRO physics workshop: science in development. The workshop will be a small format meeting with a strong focus on networking and interaction. Please read the interview and see how you can participate in this workshop.

We are proud to have two young researchers contributing to this edition, who won the best poster awards at the ESTRO 36 meeting. Fatima Cabal presents her work on a fast pencil beam algorithm to calculate dose from proton beams in a magnetic field. Rens van Haveren, who won the phiRO award, explains a novel and fast method to automatically generate high-quality treatment plans. The Corner ends with an interview with Jamie Dean, who presents his PhD research on normal-tissue complication probability modelling in head and neck cancer patients.

We wish you a wonderful summer.

Mischa Hoogeman (m.hoogeman@erasmusmc.nl)
Brendan McClean (Brendan.McClean@slh.ie)
Christian Richter (christian.richter@oncoray.de)
1st ESTRO physics workshop: science in development
17-18 November 2017
Glasgow, UK

Interview with Núria Jornet, chair of the physics committee

Why is the physics committee launching the physics workshop on the theme of science in development?
During the physics committee strategy meeting in 2016, two key issues came forward that should be given high priority amongst the medical physics community in ESTRO in order to fulfil the ESTRO vision: strengthening scientific and professional networking amongst our members with interests in a common area, and promoting “outside the box” thinking by interaction with physicists working in other fields who could contribute to our field.

From our perspective, and also from the analysis of responses to two surveys that the physics committee has conducted, we concluded that the annual ESTRO meeting is an excellent platform for science dissemination and for continuous professional development, but we thought that a smaller, complementary gathering would allow us to go deeper into active networking. Being aware that there are already too many meetings in Europe and beyond, we wanted to develop a unique meeting concept. ▼
It is within this scenario that the idea of a smaller format meeting, with a strong focus on interaction and networking, started to take form. What was a concept, is now a reality, and we are delighted to announce the first physics workshop on science in development in medical physics for radiation oncology.

**What is the concept of the workshop?**

This is a two-day workshop. In order to facilitate attendance, it will run on a Friday starting at 10:00 and end on Saturday at 16:00. We would like to limit attendance to a maximum of 60 participants per topic to keep the spirit of the concept and stimulate discussion. The workshop will start with a plenary lecture on ‘The adaptive medical physicist: new challenges, new needs, new roles’, then break out into six sessions of different topics that will run in parallel. All participants will then meet together at a plenary session at the end of each day to share summaries of what has been happening in the different topic groups. Finally, as with any ESTRO event, we will gather together for a social event on the Friday evening.

**What is the overall aim of the new workshop concept?**

The main aim is to facilitate scientific and professional networking amongst medical physicists and to stimulate joint collaborations amongst members, but also with physicists working in other fields (imaging, detectors, modelling, etc.).

**How will the scientific programme be built?**

For this first meeting, we have selected a number of different topics where there is currently active research, such as automation of treatment planning and quality assurance (QA), in vivo dosimetry, dosimetric audits, Gate Monte Carlo, nanodosimetry, and challenges in treatment planning with particles. Most topics will be led by two experts. They are key medical physicists in the field who will combine invited talks with contributions sent by the participants to stimulate discussion. We have just launched the call for contributions which should be a summary of their on-going work on the topic area. The topic leaders will be in charge of making selections from the submissions, as well as the final organisation of the topic programme. We will focus on projects still in the development phase or, in other words, work in progress.

**So, one of the differences with this workshop is that the programme is proposed by the ESTRO physics members themselves?**

Indeed. This is a meeting for our community, created by our members, and we rely on their active participation because their contribution...
OUTCOME

The main aim of the workshop is to gather medical physicists with a common interest in research and clinical practice. The stimulating exchanges will lead to:

- For those active in the field:
  - Obtaining feedback from colleagues on your project
  - Participating in stimulating discussions
  - Joining existing collaborations
- For those not yet active in the field, but with an interest in the topic:
  - Becoming updated on the topic
  - Getting to know colleagues in the field
  - Participating in discussions
  - Fostering potential future collaborations

will be the key element in making it a success. We aim for a member-driven approach, so for future meetings the topics will be selected by an open call to ESTRO physics members. Any group with an active background in a particular topic can submit a topic proposal that will be evaluated by the physics committee.

Who should attend?
Physicists, researchers, and engineers working in, or with an interest in, any of the proposed topics or related areas who would like to benefit from an experts’ forum with discussion and networking opportunities.

Finally, what would you say in a few words to convince your colleagues to attend?
If you think that interaction with colleagues around Europe and beyond has the potential to benefit your research and clinical practice in multiple ways, you should definitely consider participating in this new concept being launched by the ESTRO physics committee. This, combined with a top programme built by at least two recognised experts on each topic who have enthusiasm for the meeting concept and for stimulating lively and interesting discussions, will create an opportunity not to be missed.

Call for contributions on ongoing research deadline and early registration fee deadline:
4 September 2017

Call for contribution:
estro.org/binaries/content/assets/estro/conferences/1st-estro-physics-workshop/170621-1st-estro-physics-workshop--call-for-registration-and-contributi....pdf >

Registration:
estro.org/congresses-meetings/articles/physicsws2017reg >

More information:
estro.org/congresses-meetings/articles/physicsws2017reg >
A pencil beam algorithm for protons including magnetic fields effects

Fatima P. Cabal, Hermann Fuchs and Dietmar Georg

In recent years, magnetic resonance (MR) online guidance has been considered as the next standard of image guidance in radiation oncology. Promising results have been achieved in the development of hybrid systems combining photon radiation delivery systems with high quality MR imaging. Since the launch of commercial prototypes, the interest of the research community in MR guidance for external beam therapy has increased noticeably. Because of the benefits that MR could bring to ion beam therapy, several different research groups have been addressing the possibility of a MR-guided proton hybrid system.
One of the many challenges that need to be overcome is the modification of dose calculation algorithms to account for beam deflections caused by magnetic fields. So far, only a very limited number of scientific publications focusing on Monte Carlo (MC) simulations have described corrections for beam delivery and dose distributions. But the time required for the simulations is too long to allow this approach to be used for treatment plan optimisation during inverse treatment planning. In our study, we developed a semi-analytical dose calculation algorithm, based on pencil beam kernels, that is fast and accurate enough to allow further implementation in a treatment planning system. The first validation stage, using MC simulations on homogeneous and heterogeneous calibration phantoms, showed encouraging results and envisaged future benchmarking stages on more complex geometries and material compositions, as present in clinical situations. The final goal will be the experimental verification of magnetic field effects on dose distributions from proton beams, starting in 2018. A dedicated research magnet for experimental dosimetry has been ordered for the research beam line at the MedAustron facility.

MR-guided particle beam therapy is an extremely exciting research field with many challenges ahead. In an accompanying project, we aim to tackle MR-based dose calculation for protons.

Fatima Padilla Cabal
Department of radiation oncology and Christian Doppler laboratory for medical radiation research for radiation oncology,
Medical University of Vienna,
Vienna, Austria

ESTRO 36 COVERAGE ON MEDICALPHYSICSWEB

Medicalphysicsweb have published two interesting reports on oral presentations in the ESTRO 36 physics track. The first is on the work of Sunil Krishnan, from the MD Anderson Cancer Center, Houston, USA, describing how gold nanoparticles can help radiosensitisation: medicalphysicsweb.org/cws/article/research/68833.

The second is an interesting report of the debate between Bas Raaymakers from University Medical Centre, Utrecht, The Netherlands, and Tony Lomax from the Paul Scherrer Institute, Villigen, Switzerland, on which is superior, proton-guided photons or photon-guided protons: medicalphysicsweb.org/cws/article/opinion/68759.
Best poster phiRO award, presented to a physicist at ESTRO 36

Towards a time efficient treatment planning workflow for clinicians

ESTRO and Elsevier joined forces at ESTRO 36 to highlight the work of young professionals. The best high scoring poster submitted by a young author* in the field of physics & imaging in radiation oncology received the phiRO award at the poster reception.

The award amounts to €1,000 and is supported by phiRO, ESTRO-Elsevier open access publication.

* Below the age of 36 for men and 40 for women

At Erasmus Medical Centre Cancer Institute in Rotterdam, The Netherlands, we aim to implement a time efficient treatment planning workflow in which clinicians are able to start validating a treatment plan less than five minutes after the delineation is finished. The poster presented at ESTRO 36 showed that our recently developed lexicographic reference point method (LRPM) is able to automatically generate high quality and Pareto optimal volumetric modulated arc therapy-like treatment plans within this time frame for both prostate cancer patients and head and neck cancer patients.
For validation, we compared the plans generated using the LRPM to those generated using the default method of Erasmus-iCycle. The latter automatically generates high quality plans for the studied patient groups, and is in clinical use in our current treatment planning workflow.

For the prostate cancer group, plans were of equal quality and the LRPM reduced the average plan computation time to one minute, 12 times faster than the default method. For the head and neck cancer group, the LRPM generally improved the plan quality. In addition, the LRPM reduced the average plan computation time to three minutes, 33 times faster than the default method. Thus, the LRPM can automatically generate high quality treatment plans in less than five minutes. This substantially improves the time efficiency of our treatment planning workflow. The treating clinician can start validating a treatment plan several minutes after the delineation is finished, still having the patient’s background in mind.

This is also an important step towards applying adaptive radiotherapy strategies while avoiding inferior plan quality.

Rens van Haveren  
Radiation oncology department  
Erasmus Medical Centre Cancer Institute  
Rotterdam, The Netherlands
PHD RESEARCH

Normal tissue complication probability modelling of severe acute mucositis and dysphagia resulting from head and neck radiotherapy

PHD SUMMARY

Severe acute oral mucositis and dysphagia are common toxicities resulting from head and neck radiotherapy (RT). They have a substantial impact on patients’ quality of life and limit dose escalation and accelerated fractionation strategies that are aimed at improving tumour control. Being able to accurately predict which patients will experience severe toxicity prior to treatment would enable personalised patient management. Moreover, determining associations between the RT dose distribution to organs at risk (OARs) and toxicity could inform improved RT planning, reducing the incidence of severe toxicity. Normal tissue complication probability (NTCP) modelling uses statistical methods to generate models capable of estimating the probability of individual patients experiencing toxicity endpoints and measuring dose-response associations.

NTCP modelling of severe acute oral mucositis and dysphagia was performed using data from six clinical trials. Novel applications of spatial descriptors of the RT dose distribution, machine learning and statistical methods were employed. A model of severe acute oral mucositis using a (current standard) oral cavity OAR to describe the dose distribution delivered to the oral mucosa had modest to good discriminative ability. A novel oral mucosal surface OAR was devised in an attempt to improve the model performance through a more accurate description of the dose distribution delivered to the oral mucosa. An assessment of fully automated segmentation of this OAR, using atlas-based segmentation, determined that it could be applied to the entire patient cohort, without the need for manual intervention.

The automated novel segmentation approach was applied to the modelling of severe acute mucositis, but did not improve predictive performance. NTCP models of severe acute dysphagia were generated and externally validated on a patient cohort from the University of Washington, demonstrating good to excellent discriminative ability. Functional data analysis was applied to modelling of both toxicities to overcome the limitations of current methods for dimensionality reduction of the RT dose data, leading to new insights into dose-response associations.

In conclusion, NTCP models for severe acute oral mucositis and dysphagia were generated and evaluated. The models could be used to support clinical decision-making. Associations between the RT dose distribution and severe acute mucositis and dysphagia were determined. These could inform improvements to the RT planning technique that are expected to reduce the incidences of these toxicities.

Jamie Dean
Dana-Farber Cancer Institute & Harvard T.H. Chan School of Public Health
Boston, USA

Jamie Dean
INTERVIEW WITH THE AUTHOR, JAMIE DEAN

What was the motivation for the topic of your PhD work?
Severe acute oral mucositis and dysphagia are common toxicities resulting from head and neck radiotherapy. Being able to accurately predict which patients will experience severe toxicity prior to treatment would enable personalised patient management. Moreover, determining associations between the dose distribution to organs at risk, and toxicity could inform improved radiotherapy planning, reducing the incidence of severe toxicity. The aims of my PhD thesis were to develop models to predict which patients would experience severe acute mucositis and dysphagia and to find associations between metrics describing the 3D dose distribution and severe toxicity that could inform improved treatment planning.

What were the main findings of your PhD thesis?
Functional data analysis could overcome the limitations of previous methods for dimensionality reduction of radiotherapy dose data, leading to improved predictive power and new insights into dose-response associations. Our model of severe acute dysphagia had very good performance when internally validated using the training data, and externally validated using an independent dataset. The volumes of oral and pharyngeal mucosae receiving medium to high doses were associated with severe acute mucositis and dysphagia. The dose objectives for the oral and pharyngeal mucosae used in treatment planning protocols, commonly based on mean doses, could be improved upon by using this knowledge.

Can you comment on the impact of your work on the field?
We developed clinical prediction models that could be used to aid clinical decision-making. Through a fruitful collaboration with Professor Joseph Deasy’s lab at Memorial Sloan Kettering Cancer Center and Dr Hiram Gay at the Washington

Figure 1: An example of 3D dose maps of the oral mucosa for a patient, constructed using oral cavity contours (OCC, top row) and a novel mucosal surfaces contouring approach that we developed (MSC, bottom row). Three orthogonal views are shown: axial (left column), sagittal (centre column) and coronal (right column). We extracted dose-volume and spatial dose metrics from dose maps like these to insert into statistical and machine learning models.
University School of Medicine, we were able to externally validate our dysphagia model. We demonstrated that our model, trained using UK patient data, was able to accurately predict dysphagia severity for an independent cohort of patients treated in the US. We were also able to make recommendations for how to perform improved normal tissue sparing that could be incorporated into treatment planning protocols.

We endeavoured to employ robust statistical modelling and machine learning methods to the training and evaluation of our predictive models that we hope other investigators will use and build upon to improve predictive modelling in radiation oncology.

**What was the most challenging aspect of your PhD?**

Working as part of a multidisciplinary team was challenging, but highly rewarding and fun. Understanding the technical aspects of each discipline and clearly communicating those of my own was not always straightforward. However, I experienced the great value that comes from working in a team with a wide range of expertise. I learned that the entire scientific process, from generating a scientifically and clinically important question to study design, implementation and analysis, benefits hugely from team science.

Kevin Harrington stimulated my enthusiasm for radiobiology and helped me to improve my scientific writing. Professor Jack Fowler and Professor Soren Bentzen are hugely inspirational figures to me. They have successfully applied mathematical and statistical methods to improve outcomes for patients.

**Will you stay in the field? What are your plans for the future?**

I am now a postdoctoral research fellow in Professor Franziska Michor’s lab at Dana-Farber Cancer Institute and the Harvard T.H. Chan School of Public Health, USA, applying mathematical and statistical modelling to the evolutionary dynamics of cancer. Some of my current work involves mathematical modelling of tumour response to radiotherapy.

**Who or what inspired you most during your studies?**

The clinical trial patients who provided their data to enable us to make progress towards improving the treatments of future patients were a great source of inspiration. Academically, my supervisors, Professor Christopher Nutting and Dr Sarah Gulliford, and my colleagues at the Institute of Cancer Research and the Royal Marsden Hospital were very motivating. Professor
ABOUT THE AUTHOR...

Dr Jamie Dean is a postdoctoral research fellow in the laboratory of Professor Franziska Michor at Dana-Farber Cancer Institute and the Harvard T.H. Chan School of Public Health, Boston, USA. His research interests are in the application of mathematical and statistical modelling to inform improved treatment strategies in radiation oncology. He completed his PhD in September 2016 on novel approaches to statistical modelling of toxicity resulting from radiotherapy of head and neck cancer under the supervision of Professor Chris Nutting and Dr Sarah Gulliford at The Institute of Cancer Research, London, UK. Previously, he completed the UK National Health Service clinical science training scheme in medical physics (part 1), specialising in radiotherapy, magnetic resonance imaging and nuclear medicine, as well as a Master’s degrees in physics (first class honours) and medical physics (distinction, Mayneord Prize for best overall performance). He was a member of the British Institute of Radiology Oncology and Radiotherapy Management Group, and Vice Chair of the Young Professionals and Trainees Management Group.

LinkedIn:  
www.linkedin.com/in/jamie-dean-60097268/

ResearchGate:  
www.researchgate.net/profile/Jamie_Dean

Google Scholar:  
scholar.google.com/citations?user=eNywNcYAA
AAI&hl=en

New series on PhD research in the physics section

Have you just completed or are you about to complete an interesting PhD thesis? Then please share it with the ESTRO physics community by contacting Christian at christian.richter@oncoray.de for more details. If your report is accepted by the editors of the Physics Corner, it will be published in a forthcoming issue of the newsletter.
COURSE AIM
• Improve the understanding of the physics principles of MRI, PET and CT
• Explore potential applications of these imaging modalities in clinical practice.

LEARNING OUTCOMES
By the end of this course participants should be able to:
• Understand the basic concepts of MRI and PET physics
• Understand the key technical challenges and solutions unique to the application of MRI, PET and advanced CT in radiotherapy
• Understand the potential and challenges of biological imaging methods in radiotherapy treatment planning and follow-up
• Make judgments on the availability of evidence for treatment recommendations
• Understand the challenges of supportive care
• Understand the principles and practice of modern radiotherapy.

More information: www.estro.org/school >
INTRODUCTION CURRENT ACTIVITIES OF THE ESTRO RTT COMMITTEE

TRIBUTE TO MARY COFFEY REPORTS ON ESTRO 36 NEW OBSERVER OF THE ESTRO RTT COMMITTEE

RTT
Welcome to the RTT Corner of the July-August issue of the ESTRO newsletter, the first issue after a very nice and fruitful ESTRO 36 conference in Vienna, Austria.

We are currently facing a lot of changes in the RTT committee and, following the recent Board elections, the radiation therapist (RTT) representative on the ESTRO Board has changed as well. Therefore, we would like to focus on the committee in this issue. Mary Coffey, the former RTT representative on the ESTRO Board, who received the lifetime achievement award last year, offers us an insight into the history of the RTT committee. She is leaving the RTT committee and on this occasion, she looks back on how a small bunch of active and encouraged RTTs not only raised the recognition and visibility of RTTs in ESTRO and the multi-professional radiotherapy team, but also built up what is now a standing committee in ESTRO. In conjunction with this, current chair Michelle Leech gives you an update on the current RTT committee’s recent activities. On behalf of the RTT committee, its present and past members, Michelle would also like to use this opportunity to thank Mary Coffey for all her enthusiastic work and commitment to raising the profile of the RTT profession.

Yatman Tsang, one of our new observers, introduces himself to you here. For the introduction of our two other new observers, Isabel Pereira Lobato and Ilija Curic, you will have to wait another two months for the next ESTRO newsletter to be published.

Finally, Miriam Mast, the RTT chair of the scientific programme, looks back at the ESTRO conference in Vienna. For further information on this meeting, please go to the Conference Corner.

We hope you enjoy reading our Corner. If you have suggestions for inclusions, or want to contribute something to the RTT Corner yourself, please don't hesitate to contact Esther (ester.bloemen@maastro.nl) or Philipp (p.scherer@salk.at). Your input is always welcomed. The same is true if you are interested in contributing to ESTRO or the RTT committee – we are always happy to hear from you.

*Philipp Scherer and Esther Bloemen-van Gurp*
Mary Coffey - from humble beginnings to the profession of RTT

Michelle Leech

From an enthusiastic trio of RTTs to an ESTRO standing committee

Mary Coffey

Interview with Mary Coffey
Mary Coffey - from humble beginnings to the profession of RTT

When you mention the profession of radiation therapist in conversation anywhere in the world, and then happen to also mention that you are from Ireland, a strange glaze of admiration comes over the eyes of the person you’re talking to and you hear the words “you must know Mary Coffey!”.

I have lost count of how many times this has happened and it is always my privilege to respond that, indeed, I do know Mary Coffey.

I first met Mary in October 1996, as an awkward 18-year old, when I began an undergraduate...
degree in radiation therapy at Trinity College, Dublin. We were a motley crew of ten women in the class, and Mary, with her colleague Jill Byrne, were our main lecturers. Every so often, we would hear that Mary had “gone to Europe” for a few days. We always wondered what she did in Europe, but Mary never elaborated on this, instead focusing on teaching us everything about radiation therapy practice, cancer medicine, counselling and communication, and yes, she even taught molecular oncology, much to the delight of the late Professor Donal Hollywood.

The full realisation of Mary’s achievements in European radiation oncology only became apparent to me when I became a member of her staff in 2007 and, thanks to her, was introduced to the ESTRO community.

I don’t think it is an overstatement to say that Mary Coffey single-handedly made radiation therapy a profession in its own right. She moved the education of our profession in Ireland from skills training through to diploma level, and then to a single discipline with a Bachelor of Science honours degree. In Ireland in the early 1990s, this was quite a feat. She did this through sheer determination, grit and an inordinate amount of hard work.

As you will read from Mary’s own piece in this newsletter, she went to Europe to secure funding for RTT education. Through this, she met Guy Vandevelde and Riet van der Heide Schoon and the seeds were sown for what eventually became the ESTRO RTT committee.

I cannot list all of Mary’s accolades as they are too numerous. But perhaps some of the highlights from an ESTRO perspective are the foundation of the Radiation Oncology Safety Education and Information System (ROSEIS), together with Professor Tommy Knöös and Dr Ola Holmberg; her Train the Trainers project in collaboration with the International Atomic Energy Agency, which is strengthening each year; but above all, the foundation of the RTT committee and the acceptance of our profession as an equal partner in the Society. There is no doubt in my mind that no one else could have achieved this.

Mary’s achievements have always had one endpoint and that is to improve treatment outcomes for patients. So much attention is given to patient-centred care today as if it is a new concept but, through her actions, Mary Coffey has been providing patient-centred care for decades.

I feel very privileged to call Mary my teacher, mentor, colleague and friend. We have had many an adventure together thus far, (trying to find a laptop that was left on a plane after a fire in Fiumucino airport will forever haunt me) and I know that we have many more to come in the years ahead.

On a professional note, I thank her on behalf of all RTTs for her dedication and belief in our profession and, on a personal note, I thank her for her friendship, camaraderie and for the realisation that nothing is impossible when you put your mind to it.

Michelle Leech
Chair, RTT committee
The year 1990 was a momentous one for radiation therapists (RTTs) and it was the beginning of a great adventure for me. It started with a chance remark from a radiation oncologist in Ireland who suggested I approach one of the European organisations to secure funding for educational development.

My first encounter was with the Education Committee of the European Organisation for Research and Treatment of Cancer (EORTC). Emmanuel van der Schueren was at the meeting and went back to his head RTT (Guy Vandevelde) to say that “an Irish woman was looking for funding, so find out what it is all about”. Guy got in touch with me and with Riet van der Heide Schoon, who was then head RTT at The Netherlands Cancer Institute in Amsterdam. Thus, the dream committee was born.

Our first task was to organise a programme for RTTs at the ESTRO conference in Malmo, Sweden, in 1992. The RTT programme was held in a hotel distant from the main conference but it was well attended and was the first step to the now full integration of RTTs as equal ESTRO members.

ESTRO then included us in a successful EU project submission where we were tasked with developing a curriculum specific for RTTs. Thirteen enthusiastic RTTs met in the Irish College in Leuven, Belgium, to begin this work. We were a merry band with little common language and a very varied range of education backgrounds and experience, but we did have one laptop kindly supplied by Eric, our Norwegian colleague. With a spectrum of sign language, much laughter and occasional visits to the local hostelries, we worked late into the nights and left five days later with a draft curriculum.

The major breakthrough came at the 13th ESTRO annual meeting held in Granada in 1996, when we launched the core curriculum and ESTRO accepted us as a supported group within the Society. Our title at that time was the European RT Education Development Group.

During this period, we were supported by ESTRO but not officially members. The group had expanded from three to five, and meetings to work on the curriculum, conferences and the first short course in treatment planning took place in a kitchen in Dublin where we shared the cooking, exchanged recipes and became more friends than colleagues. Funding for our activities was through a series of EU projects under the ESTRO umbrella.
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TRIBUTE TO MARY COFFEY

We worked on a visionary project to establish a network of RTTs across Europe, with my children assisting us in the photocopying, envelope-filling and hand-writing of many hundreds of addresses, and Guy’s daughter inputting data. We were also collaborating with the EORTC group on good practice in clinical trials and preparing the RTT programme of the biannual ESTRO congresses.

The year 2000 saw the culmination of our efforts when we became a formal ESTRO committee. It was ‘onwards and upwards’ for the RTTs and we never looked back! The current ESTRO committee is dynamic, motivated and meeting new challenges every day. We now have official Board membership and are represented in every ESTRO committee. Our participation in congresses has gone from strength to strength and we have gained the respect of all our ESTRO colleagues through the hard work and enthusiasm of our members. Collaboration inside and outside ESTRO is growing and our activities are expanding to cover all aspects of professional practice. It is with pride and great pleasure that I watch and listen to the next generation take our RTT profession to ever increasing heights and I wish you continued success. I hope you have as much fun as we had in the early days and achieve even more.

Mary Coffey
TCD School of Radiation Therapy
St James’s Hospital
Dublin, Ireland

Mary Coffey (right) receives the Lifetime achievement award at ESTRO 36 from Yolande Lievens (left) ESTRO President
Interview with Mary Coffey

We met Mary Coffey at ESTRO 36 in Vienna. It was an opportunity to share some memories and her feelings about a profession that has evolved so much over the years.

When did you join ESTRO?

I first got involved in ESTRO in 1990. At that time, there was a kind of working group of radiation therapists (RTTs). We didn’t have full membership – that didn’t come until later. But we were the group that was recognised as doing work for RTTs as part of ESTRO projects. In the very beginning we started working on the core curriculum of the time, so mainly on education. That was my first experience with ESTRO.

If you look back, what have been the major changes that you’ve seen in the RTT community within ESTRO?

Probably the major change for RTTs was when ESTRO recognised us as a profession in our own right and integrated us fully into the Society with equal status with the other groups in 1996. Until then we were a group called The European Radiation Therapy Education Development Group. So we had a different name. We weren’t full members at that stage.

Your involvement within the Society has been tremendous. That’s no secret. What is your biggest achievement, the one you are most proud of?

It has to be the ‘Train the trainers (TTT)’ project that started in 2008, because of the influence that it had in Eastern Europe and the way it allowed RTTs in those countries to develop and change their professional status, and all the different things that were generated as a result of it. Next year will be our tenth year and we’re contemplating a survey just to document all the changes that have happened. For me, that’s the biggest achievement and the one I think is the closest to my heart.
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Mary Coffey at ESTRO 36 national societies meeting

Does it always take place in Eastern Europe?
No, it’s hosted in Vienna, but then a lot of the countries who participated in the beginning were from Eastern Europe. However, we’ve had various different countries, including Kazakhstan and Israel. There has been a big impact in Eastern Europe where they have set up the South Eastern European Therapeutic Radiation Therapy group, and all the countries from that region come together and have a biennial conference. So that’s a major achievement from the TTTs.

Where have you found the energy to achieve so many things for so many years? What is your motivation?
I am not really sure. I suppose there are two things. I’ve always been passionate that patients should get the very best treatment possible and if you’re going to do that, then you have to be passionate about the profession – people who deliver the treatment. That’s my motivation – to make it better for the patient and better for the professionals. That’s where it really comes from. And the rewards are huge. When you talk to people and you have so many friends, you see where they are and when, and where they are going to. It’s lovely!

What is your best memory at ESTRO?
I suppose there are loads. You have to put the Emmanuel van de Schueren award up there, which was my first award. I would never in a million years have imagined that I would get something like that. Personally that was huge, but so were the Lifetime achievement and Honorary physicist awards. Also in Granada at the annual meeting in 1996, I remember Jan Willem Leer coming down the hall smiling, just coming out from the Board meeting to say that they had agreed to take the RTTs into ESTRO, even though it wasn’t as a full committee. That was really special. The beginning of recognising us and seeing us for what we were. ▼
How do you think that the radiation therapists’ profession will evolve? Has it changed over the years and do you think that it is going to evolve further?

It has changed a lot and in many different ways, in many different countries. I was discussing this with some of my ‘Train the trainer’ colleagues and one of them was wondering whether the technology has led to a loss of patient contact. Another of them said that, actually, with the technology, it’s the oncologists who have less contact and that suddenly the RTTs are becoming the therapists because they keep the contact with the patients. And because everything is so automated now and contouring is done separately, there isn’t the need for oncologists to be at the CT or the simulators.

So basically the responsibility of the RTTs has evolved with the evolution of the technology?

It is at a threshold. In some ways all these changes are taking place and staff are taking on new roles and new responsibilities, but the profession as a whole hasn’t kept pace with it. There isn’t a career structure. In a lot of countries it is very flat, so when RTTs are taking on new roles they are still in the same flat system. They are not being given the recognition or they are not moving on in their career. So, sometimes people are leaving, and we have reached a point now where we need to clearly define a professional career structure that encourages people to stay, and encourages them to expand and move on. Because it is happening randomly and haphazardly in different settings, in different departments, in different countries, and in different ways. There’s a lot of discussion on how that whole system might be put in place in the different countries.

Is there any advice you would give to young RTTs starting in the field now – to improve education, for better daily practice, for networking or for anything else?

So a better daily practice, perhaps with greater involvement. I hear colleagues say it’s very boring walking in and out of the machine. But I think you should always remember that it is actually a privilege to be involved in helping to either cure people or give them a better quality of life. And you should enjoy the individuality of each patient because all patients are different and their stories are different. If you engage with them at that level, and also with your colleagues, your role is much more satisfying. I also think you need to laugh a bit every now and then, just to enjoy it.

From a career perspective, I think you should take every opportunity that is offered to you. Don’t refuse any of them. Some will work and some won’t, but take everything. And do your best to make it as good as you can. Take every opportunity whether it’s educational, networking, joining a committee, or joining a group. With everything you do, you learn something and you get some satisfaction, and you give something back.

When you say you also need to laugh, it can’t always be easy, especially when you see patients who are suffering?

Radiotherapy departments tend to be very happy places because you can’t really walk around with a long face. Sometimes it is very sad because you get to know people and you have a relationship with them, but I think you have to remember how you might be helping them. In what is a very abnormal situation, you try to make it as normal as possible. Chatting to patients is a great thing to do because that puts them at ease as well. Maybe the Irish are good at talking!

Interviewed by Cécile Hardon-Villard
Impressions of ESTRO 36 radiation therapist track
Mirjam Mast

Best poster award for a radiation therapist
Vickie Kong

tipsRO award ESTRO 36
Katrina Woodford
From a participant, Ilse Post

The whole conference felt like a four day long running race from one room to another. With over 5,600 other people getting around ESTRO 36, absorbing the latest results in radiation oncology at various sites. I’m proud of my colleagues who were the winners of the run. It was just a super run! The RTT sessions, which I followed most at the time, were great and they gave me inspiration to reflect on my own work. I heard the latest news about all different kinds of adaptive radiotherapy, improving immobilisation techniques and automatic software, and all with very solid and practical solutions for daily use. There was also a good overview of new and improving techniques in the exhibition hall.

Questions were discussed such as which things should we improve, are we doing things the right way, how far have we progressed with adaptive radiotherapy, and which things do we need to do better?

The last RTT symposium focused on the most important part of our work: the patient. Let’s never forget it is all about them.

ESTRO 36 came to an end with a closing debate on whether we will cope with more or less human input in radiation treatment, and whether we will be overrun by robots. I’m looking forward to how this debate will continue over the coming years.

And with these impressions I want to leave you with a final thought: thank you beautiful Vienna for your hospitality and we will meet again in 2020.

Ilse Post
UMC St Radboud
Nijmegen
The Netherlands
I look back at an inspiring congress, thanks to all the hard working presenters who shared their experiences and research results. It feels like we are at the beginning of a new era, where MR Linacs are going live and several European countries have installed their first proton therapy unit. The radiation therapist (RTT) debate was inspirational this year, putting the goals and philosophy behind the radiotherapy in perspective – should we start thinking more about accuracy instead of precision? Last but not least, among the studies selected for the ESTRO 36 press programme, the RTT paper received strong worldwide media coverage. It was based on a research outcome, presented by RTT Catia Palhetinha Aguas, that reported on using a video system during treatment of children, resulting in less anaesthesia. The title of this investigation is ‘Video launching during irradiation – an alternative to anaesthesia in paediatric patients’.

Read the paper in the abstract book if you haven’t read it in the press!

Mirjam Mast
Haaglander Medical Centre
Den Haag
The Netherlands

Palliative care and radiotherapy - a course on prognosis, symptom control, re-irradiation and oligometastases
7-9 September 2017 | Brussels, Belgium

COURSE AIM
In this course, a comprehensive overview of the applicability and effectiveness of palliative radiotherapy schedules from an evidence based perspective will be provided in a multidisciplinary framework. The focus will be on both clinical-ethical aspects and more technical-physics related issues.

Register on www.estro.org/school >
Radiotherapy has been offered as a multimodality treatment for bladder cancer patients. Due to the significant variation of bladder volume observed throughout the course of treatment, various adaptive strategies have been developed to improve the quality of treatment for this group of patients. Previous comparisons between bladder adaptive strategies have been limited due to the inability to account for the effect of daily motion of the bladder and surrounding organs.
The aim of this study was to use deformable registration (DIR) and dose accumulation processes to compare the dosimetric differences of a population-based planning target volume (popPTV) approach and three proposed adaptive strategies: plan of the day (POD), patient specific planning target volume (PS-PTV) and daily re-optimisation (ReOpt).

Planning CTs and the cone beam CTs (CBCTs) of ten bladder cancer patients were retrieved and imported into a treatment planning system for this retrospective investigation. After simulating the clinical process for the popPTV and each of the proposed adaptive strategies, daily dose was computed on all CBCTs and then the total dose was summed on the planning CT using the output from the CT-CBCT DIR. All adaptive strategies were reported to significantly improve the dosimetric quality of the treatment, with ReOpt being the most superior. When compared to the popPTV, the volume receiving 95% of prescription dose was reduced by 25%, 16% and 12% for ReOpt, PS-PTV and POD respectively. The difference in the magnitude of reduction between ReOpt and the other two reached statistical significance (p = 0.0006).

A reduction in the irradiated volume translates to reduced toxicity, and dose escalation is plausible to improve treatment outcome. Nevertheless, it is important to be aware of the heavy resource burden associated with the ReOpt strategy, and future effort will be focused on developing an automated process to improve efficiency.

Vickie Kong  
Radiation medicine programme  
Princess Margaret Cancer Centre  
Toronto, Canada
Stereotactic ablative radiotherapy (SABR) has enabled a curative treatment for elderly patients or those with significant comorbidities diagnosed with early stage non small cell lung cancer (NSCLC), who would otherwise go untreated. As a result, population-based survival has improved. If SABR could be utilised in the treatment of locally advanced NSCLC in the same way, the public health impact would be greater, as twice as many patients are diagnosed with advanced disease. We assessed the feasibility of SABR for locally advanced NSCLC.
Twenty-three patients with N2 or N3 locally advanced lung cancer were retrospectively re-planned. Three planning approaches were assessed: conventional approach (1cm internal target volume [ITV] to planning target volume [PTV] expansion, prescribed to 100%), SABR approach (0.5cm ITV to PTV expansion, prescribed to 80%) and a hybrid approach (0.5cm ITV to PTV expansion, prescribed to 100%). We assessed the feasibility of three dose regimes, with PTV doses all having a biologic equivalence of 60Gy in 30 fractions (α/β = 10). The planning aim was to determine the least number of fractions to deliver an acceptable plan. We found the hybrid approach generated acceptable plans in 48% of patients, while the conventional and SABR approaches achieved 26% and 4% respectively. Of the 18 patients who had an acceptable plan generated, one was achieved with the eight fraction regime, with the remaining needing the 12 fraction regime.

Our research found SABR was feasible for approximately half of the locally advanced NSCLC patients we assessed, and for these patients a 30 treatment course can be reduced to 12 treatments. Such a reduction may address perceived or actual logistic barriers such that an increasing proportion of locally advanced NSCLC patients are offered curative treatment. If the alternative to SABR is no treatment at all, compromises to tumour coverage or organ-at-risk tolerances may be acceptable, increasing feasibility. This data will inform a phase I study testing the safety of SABR for locally advanced NSCLC.

Katrina Woodford
Alfred Health radiation oncology,
The Alfred Hospital,
Melbourne, Victoria, Australia
Yat Man Tsang

New observer of the ESTRO RTT committee

It gives me great pleasure to introduce myself as a new observer of the ESTRO RTT committee. After obtaining my Bachelor’s degree in radiotherapy at Hong Kong Polytechnic University in 2002, I was really excited to see what the future had in store for me. I kick-started my RTT career as a basic grade therapy radiographer at Mount Vernon Cancer Centre, UK, in order to gain my clinical experience in radiotherapy. In 2006, I earned my Master’s degree in healthcare informatics and technologies at City University London and changed my job to be a trial quality assurance (QA) radiographer under the UK National Cancer Research Institute (NCRI) Radiotherapy Trial Quality Assurance group. This post equipped me with the skills to lead implementation of modern technology applications of radiotherapy treatments, ensuring the safe and timely transition from development to treatment delivery that is required by trial protocols.

After eight years working in QA for national trials, I was looking for new challenges and decided to move my career back to clinical radiotherapy. Since 2014, I have been employed as a consultant radiographer in the department of radiotherapy at Mount Vernon Cancer Centre.

In my current role, I act as both a clinical and technical expert to lead and coordinate our institute’s specialised radiotherapy service. Apart from my routine clinical duties, I lead in clinical audit and research. I encourage and support staff to develop skills in audit and ensure audit outcomes are implemented within the NHS Trust. I also collaborate with local higher education institutes to develop post-registration advanced radiotherapy modules.

My membership of the UK Stereotactic Ablative Body Radiotherapy consortium executive committee and NCRI Clinical and Translational Radiotherapy Research Working Group has enabled evidence practice and research to be introduced into clinical practice. I am also an active member of the Radiotherapy Trials QA group and of several clinical trial management groups working in multidisciplinary team settings. I have designed and implemented QA programmes for clinical trials that require effective introduction of advanced radiotherapy in UK centres.

As a consultant radiographer, I am required to demonstrate my experience and expertise in four core functions: professional leadership and consultancy, research and education. I am confident that my leadership and management skills will enable me to bring unique expertise to the ESTRO RTT committee, and make a positive contribution in promoting excellence in the profession of radiation and oncology.

Yat Man Tsang
Mount Vernon Hospital
Northwood, UK
The ESTRO RTT committee is a dynamic and vibrant committee, dedicated to the representation and support of all RTTs in Europe. As I commence my second three-year term as chairperson, I would like to share an update on the current status of activity within the committee with those of you who were unable to join us at the RTT ‘Meet and greet’ at ESTRO 36 in Vienna.

Our strategic vision (2016-2021) has been published on the ESTRO website and is available at: http://estro.org/binaries/content/assets/estro/about/rtt/estro-rtt-strategic-vision.pdf

In the past year, the RTT committee has worked closely together with the national societies committee, the ESTRO stakeholders’ council and the ESTRO Board to commence the RTT alliance in December 2016. The RTT alliance is an opportunity for individual national societies to come together under the ESTRO umbrella to share in the ESTRO oncopolicy vision, as well as gaining support for RTT’s professional and educational needs in their respective countries. National societies can register their RTT members for a reduced fee (€15 per annum) so that individual members can also obtain the personal benefits of being ESTRO members, such as reduced fees for an educational course or congress, as well as reduced fees for submission to our open access journal Technical Innovations and Patient Support in Radiation Oncology (tipsRO). Since its inception, RTT national societies from nine countries have already joined and enrolled their members, with many more pledging their intention to join in the near future. The next piece of work is to fully integrate the alliance members into the daily work of the RTT committee through the election of two representatives from the societies of the alliance to seats on the RTT committee. I look forward to collaborating with these elected representatives in continuing to work in the interest of the RTT profession.

ESTRO, together with the International Atomic Energy Agency (IAEA), recently made a submission to the International Labour Organisation and the International Standard Classification of Occupations to have the profession of RTT formally recognised. We have been informed that the information we provided on the profession of RTT will be considered in their next revision and that ESTRO and the IAEA together will be asked to participate.

In conjunction with the ESTRO/IAEA ‘Train the trainers’ project, a meeting of ministers of health and education from European nations nominated by the IAEA will be convened in Brussels in November 2017. The aim of the meeting is to illustrate the importance of RTT education in the safe and cost efficient delivery of radiation oncology services in Europe. The voice of European RTTs will be heard at this meeting through presentations by Mary Coffey (Ireland), Philipp Scherer (Austria) and me (Ireland), from the ESTRO ‘Train the trainers’ faculty.

Current Activities of the ESTRO RTT committee

Michelle Leech, chairperson
The ESTRO open access journal *tipsRO* has had a very successful opening quarter since it began publishing online in January 2017, with over 7,500 paper downloads recorded as of mid-April. As co-editor-in-chief, I would like to encourage RTTs especially to consider submitting case reports from their departments on their daily practice, so as to share these interesting experiences with colleagues internationally.

Other current activities of the RTT Alliance include collaboration with the Canadian Association of Medical Radiation Technologists (CAMRT) on the development of guidelines for the management of acute radiation dermatitis in radiation therapy, and the completion of the ESTRO benchmarking document for EQF 7 and 8 (MSc and PhD levels) for RTTs. Look out for this document in an upcoming edition of *tipsRO*. In tandem with this, the committee is also developing an ESTRO paper on advanced practice for RTTs.

As always, members of the ESTRO RTT committee remain extremely active within the ESTRO School, in the organisation and delivery of ESTRO congresses, in the ESTRO mobility grant programme, and, indeed, in all pillars of our interdisciplinary European radiation oncology society.

If you are interested in becoming involved in ESTRO activities, please contact Viviane van Egten at the ESTRO office (vvanegten@estro.org).

**Michelle Leech**  
chairperson of the RTT committee
RADIOBIOLOGY
On returning from ESTRO 36 in Vienna, I prepared the following summary of the radiobiology sessions. This report is not meant to be exhaustive but gives an overview of the information, discussions and exchanges.

PRE-MEETING COURSE
This year’s pre-meeting course was organised by Jan Alsner, from Aarhus University Hospital, Denmark, and myself and it focused on biomarkers for individualised patient care. The morning session was dedicated to tumour response and the afternoon session to normal tissue. In the final session, held in collaboration with European Organisation for Research and Treatment of Cancer (EORTC), the aim was to provide methodological keys to implement biomarkers in clinical trials. Several biomarkers have been identified and used in preclinical trials, but it has not been easy so far to transfer them into the clinic.

In the first talk, Jan defined the terminology and the vision of ESTRO (2020) for optimal patient care.
care based on “integrating, new clinical and preclinical evidence from biology, functional and preclinical imaging” (for more information visit estro.org/about/mission-values/vision). Next, Geoff Higgins, of the University of Oxford, UK, gave the road map for determination of genetic mutation in patients. The historical example of p53 mutation in the regulation of radiation sensitivity was given, but he also explained that p53 was not found to be predictive nor associated with clinical outcome of radiation therapy in head and neck squamous cell carcinoma and non-small cell lung cancer when both sequencing and immunohistochemistry were used. These disappointing results could be due to the small number of patients included, the heterogeneity of the treatment received by the patients, or the mixture between retrospective and prospective studies. In addition, the technology used is different but is mainly based on a single biopsy and the analysis of single gene mutations that does not reflect the complexity of the tumours.

Solutions are also being provided for the future with the development of large and coordinated studies, done to good clinical practice standards, like the SCORT rectal cancer trial in which a panel of mutations will be investigated.

Then, with Monique de Jong from The Netherlands Cancer Institute, Amsterdam, we moved from systematic genetic approaches to functional assays and mRNA signatures. Head and neck cancers were again the focus, as some biological markers, including human papilloma virus status, epidermal growth factor receptor expression, Kras expression and hypoxia fraction, are already available. Monique showed that mRNA analysis is easier to handle than proteomic data and provides us with gene signatures used in patients. The Mammaprint signature involves 70 genes that can predict metastasis development, but cannot currently be used for treatment adaptation. The expression of the integrin CD44 correlates with recurrence in head and neck cancer, as well as the signature of radiation sensitivity published in CCR 2015, expression of which predicted radiation sensitivity before radiation therapy (RT) but not for the response to RT. Cihan Gani, from Tübingen University Hospital, Germany, gave us another option with imaging, and emphasised the use of FDG-PET to investigate the metabolic response, FLT-PET to look at proliferation, and FMisoPET to detect hypoxia in tumours. MRI was also shown to be useful in the prediction of the pathological response and the selection of patients that do not need surgery. Ralph Leijenaar, from Maastricht University Medical Centre, The Netherlands, discussed radiomics
and the basis of software analysis to produce imaging signatures. The last talk reported on circulating cancer cells and circulating DNA. A key feature of these approaches is their non-invasive nature, and both parameters have been validated to predict metastasis development, but their use in the field of radiotherapy is still under investigation.

After the lunch break, functional biomarkers of normal tissue toxicity were presented. Philippe Lambin, from Maastricht University, The Netherlands, showed how mitochondrial DNA could be measured in blood and saliva, and can predict normal tissue toxicity, especially in breast cancer patients. He also discussed the mechanistic relationship between alteration of the mitochondrial DNA and ROS/antioxidant pathway that have been well studied in the context of radiation-induced normal tissue toxicity. Christopher Talbot, from University of Leicester, UK, showed the cross-validation of RILA, a simple lymphocyte apoptosis assay developed more than 15 years ago by Esat Mahmut Ozsahin and David Azria, and today fully validated. The assay allows the detection of patients who are not at risk of developing complications. A question about ATM nucleo-shuttling as a biomarker was asked, and Guillaume Vogin, of Institut de Cancérologie de Lorraine, France, revealed the relevance of this biomarker for identifying patients at risk of normal tissue toxicity during the Sunday morning session.

In the last part of the course, prepared in collaboration with the EORTC, Sandra Collette, of EORTC, Brussels, Belgium, explained the methodology to be used for the application of biomarkers in clinical trials, and emphasised the fact that data from randomised trials are mandatory for discriminating between prognostic and/or predictive markers. The example of hypoxic fraction published by Toustrup et al, in Radiation Oncology in 2012 was given. Brita Sorensen further discussed the hypoxia signature in head and neck cancers where a signature of 15 genes has been identified.

The last session was a summary of the main ideas discussed during the course. New gene signatures and assays are now available to predict both tumour and normal tissue response to radiation therapy, but more research is still needed and ongoing. The fact that the field had initially moved from functional assays to genetic assays, but is now back to functional assays was also discussed in light of technological developments.

ESTRO 36
On Saturday morning, the main ESTRO 36 meeting started. A large space was devoted to education in order to provide professionals with updated knowledge. However, the radiobiology track was also designed to allow interaction and discussion, and to promote innovation and collaborative work. This year the radiobiology track followed a meeting plan which was centred on organs and novel approaches to treat organ specific diseases. Overall, the sessions were well attended with particular interest in the particles/proton oriented sessions, reflecting the overall evolution of radiation therapy. The main message delivered by Yolande Lievens, ESTRO president, from Ghent University Hospital, Belgium, was to think outside the box, and the message was well illustrated in the radiobiology sessions.

Educational lectures encompassed various innovative subjects such as gene editing methods given by Laure Marignol, from Trinity College, Dublin, Ireland, 3D organoid culture systems given by Nils Cordes, from the Centre for Radiation Research in Oncology, Dresden, Germany, histones and epigenetics given by Anne Hansen Ree, from Akershus University Hospital, Oslo, Norway, and extracellular vesicles given by Kathrine Røe Redalen, Akershus University Hospital, Lørenskog, Norway. They were well attended and reflected the evolution of our field toward more integrated, physiological models and functional assays, to answer the challenges of radiation biology applied to radiotherapy.
The session on heart and lung response to irradiation was composed of two overview talks on cardiac toxicity given by myself and Marjan Boerma, University of Leiden, The Netherlands. I presented the current clinical guidelines for the diagnosis and management of cardiac toxicity induced by anti-cancer treatments and proposed a novel therapeutic target (GEF/Epac). The development of novel types of models such as zebrafish was also proposed. Marjan summarised the principal pharmacological strategies that have been used to counteract cardiac toxicity in preclinical trials, and showed that antioxidant agents such as Tocomin and lipoic acid were able to normalise mitochondrial permeability of cardiomyocytes without having an effect on collagen deposition and fibrosis. Additionally, two TGFβ inhibitors Xaliproden and SM16 showed negative results, whereas ACE inhibition using Captopril was positive. Both talks showed that work is still needed to define optimal therapeutic strategies. Oliver Guipaud, from the Institute for Radiological Protection and Nuclear Safety, Paris, France, presented an interesting study on glycans expression in endothelial cells after irradiation, and involved in leukocyte rolling. The choice of 20Gy single dose of irradiation was questioned as it makes extrapolation to clinical conditions unreliable.

The session on gut response to irradiation focused on burning questions dedicated to inflammation, immunomodulation and stem cell therapy. Monica Olcina, from Stanford University, USA, showed that complement inhibition using C5a antagonist and C5AR1 knock out mice reduced radiation induced toxicity. This result is different from a previous publication by Surace et al, Immunity, 2015, as they show that complement inhibition can promote anti-tumour effect. Marc Benderitter, from the Institute for Radiological Protection and Nuclear Safety, France, presented preclinical results obtained with mesenchymal stem cells (MSCs) isolated from adipocytes and embedded in a biomaterial to counteract gut toxicity. A phase II clinical trial using this strategy is also ongoing (PRISME study).

In the afternoon session, Alexander Ruhle also presented the characterisation of MSC radiation sensitivity in combination or not with cisplatin. Interestingly, cisplatin radiosensitisises MSCs, but did not modify their stem cell capability and differentiation potential (adiposis, chondrogenesis). Stephan Gruber,
of the Medical University of Vienna, Austria, showed the benefits of dextran sulfate to reduce inflammation and oral mucositis, in reducing of IL1-beta expressing macrophages. In the prostate session, Claudia Pfeitzsch, from the Centre for Radiation Research in Oncology, Dresden, Germany, discussed the cell of origin for prostate cancer using organoid models. Radiation therapy was shown to be able to enhance stem cell plasticity through metabolic regulation, and the idea was to target this plasticity with the use of epigenetic modulators. In addition, cancer stem cell (CSC) radioresistance was shown to be mediated by the cytokine network. CXCR4 was shown to be a prognostic factor of radiation resistance and enrichment in CXCR4+ cells was shown in hypoxic areas. Rob Bristow highlighted the fact that bringing prognostic assay into predictive assay was required for accurate patient stratification and inclusion in intensive protocols to achieve cure. A multimodal approach was validated with classification of patients by PGA, and study of the genetic instability showed that the majority of patients had a polyclonal disease with alteration of DDR-related genes. This suggested that the patients with polyclonal disease have to be monitored intensively, whereas monoclonal disease was well controlled. Implementation of hypoxia monitoring combined with measurement of genetic instability brings additional clues to predict failure.

### The session on novel approaches in particle biology

was very well attended. Brita Singers Sørensen, from Aarhus University, Denmark, presented the ESTRO initiative on biological effects of particle therapy, and Bleddyn Jones, from the University of Oxford, UK, mentioned that revisiting the relative biological effectiveness definition was mandatory for moving forward and being able to compare particle biology with photon-based treatments. A major challenge is to be able make relevant comparisons between such different types of beam that display very different in-depth deposition of the dose.

Dosimetry is one important issue. Peter van Luijk, from University Medical Centre Groningen, The Netherlands, showed how both microscopic and macroscopic dose distributions are different between proton and photon. He showed how the use of well-defined models such as radiation pneumonitis help to make a comparison. Another question was about the dose rate enhancement. Joerg Pawelke, from Helmholtz-Zentrum Dresden-Rossendorf, Germany, showed data obtained with laser beam irradiation in a specific model of a tumour implanted in the ear of a mouse. No difference in tumour growth delay with laser accelerated electron and conventional linac was observed and he suggested a possible contribution of ultra high dose-rate to normal tissue protection that remains to be investigated. I looked at this question of dose-rate enhancement with a biased view, as the so-called Flash radiation therapy is my primary field of research! But I was really pleased to see that numerous groups are now investigating this question from different points of view and using different kinds of beam. Arnaud Beddok from Vincent Favaudon’s group, Institut Curie, Orsay, France, investigated the occurrence of double strand breaks after conventional and ultra high dose-rate (above 120Gy/s) irradiation and showed no difference at least in vitro. Lloyd Smyth from Peter Rogers’ group, University of Melbourne, Australia, uses synchrotron irradiation with spatial fractionation (microbeam radiation therapy or MRT) to enhance normal tissue tolerance after total body irradiation or abdominal irradiation. However, when using broad beam at 40Gy/s, synchrotron irradiation did not protect normal tissue. Interestingly, in another session dedicated to radiobiological models, Kristoffer Petersson from my group showed that 40Gy/s can be considered a dose-rate threshold for normal tissue protection (publication in press in Radiation Oncology). We showed that dose rates above 100Gy/s are needed for normal tissue tolerance.
In the Regaud lecture, Jean Bourhis, former president of ESTRO and of the Swiss Cancer Centre, Lausanne, Switzerland, showed some of our recent data obtained with Flash RT on tumour control in a clinical trial performed with pet animal patients. More investigations on the mechanisms of Flash RT are clearly needed and this opens a brand new research field in radiation biology.

**A whole session was dedicated to the development of new models.** Anne Kiltie, from the University of Oxford, UK, discussed the necessity of investigating anti-tumour efficacy and normal tissue tolerance in preclinical studies. She gave the examples of the work performed in her group to investigate bladder tumours and intestinal toxicity in mice. Later in the session, Giuseppe Fallara, from Ospedale San Raffaele-Vita-Salute University, Milan, Italy, showed that gonadotropin-releasing hormone receptor blockade reduces radiation-induced bladder toxicity, and Eric Deutsch, from the Institut Gustave Roussy, Paris, France, emphasised the need to optimise preclinical models, to be able to evaluate the possible toxicity of combination before it occurs in patients. He also highlighted the fact that preclinical findings are rarely transferred into the clinic. Some solutions were proposed with implementation of humanised mice models and patient-derived xenografts.

In the lung session, Marc Vooijs also proposed 3D models to investigate normal tissue toxicity and tumour response with lung cells, and focused on regulation of the notch pathway. Michael Orth, from Ludwig-Maximilian University of Munich, Germany, characterised the radiation sensitivity profile of various pancreatic ductal adenocarcinoma cell lines, identified alteration of DDR genes by reverse transcription polymerase chain reaction, and started targeted and fractionated irradiation using a small animal image guided radiation therapy system, which is becoming the gold standard for groups that are performing mice studies in radiotherapy.

My general impression is that the field is moving towards the use of physiologically relevant models, organoids and patients’ tumour samples. Some biomarkers are now available, new radiotherapy modalities are emerging and opening exciting research questions for the near future, and possible clinical applications and improvements.

*Marie-Catherine Vozenin*

*Centre hospitalier universitaire Vaudois*

*Lausanne, Switzerland*
ESTRO SCHOOL
After one year as director, Professor Jesper Grau Eriksen gives his first report of activities in the ESTRO School, and we start this Corner with his interview. As well as a global overview of ESTRO School activities, he highlights that: “The strength of the School is […] that we have an educational offer that reaches across Europe and also outside Europe”. Prof Grau Eriksen explains how new teaching formats, such as blended learning, and new courses such as the positioning and immobilisation course for radiation therapists, lasting six to eight weeks, will help to improve practice and skills in the community.

The European physician core curriculum is currently being revised and will be available in the next few months. All these activities, and the novel teaching tools available, were presented and discussed during the teachers’ retreat that took place in Vienna before ESTRO 36. A summary of the retreat follows the interview.

To conclude, ESTRO School is moving forward and all the team wishes you a wonderful summer.

Jesper Eriksen, Marie-Catherine Vozenin and Christine Verfaillie
One year ago, Jesper Grau Eriksen took over from Professor Richard Pötter and became director of the ESTRO School. At ESTRO 36 in Vienna, he shared with us his feelings on the position, his first achievements and future projects for the ESTRO School.

What have you initiated since you started your position as director of the ESTRO School?

One of the aims of the ESTRO School is to have an educational offer that covers all parts of the ESTRO core curriculum. We have been quite successful in doing this for many years and Richard Pötter was really good at covering these topics. We can also see this in the increasing number of ESTRO courses during the last ten years. What we are trying to do now is to complete the ESTRO portfolio with courses for those areas not previously covered. Over the next year, we will develop a new multimodality course in non-melanoma skin cancer. Next to that we are also planning a course on 'Foundations of Leadership in Radiation Oncology' and will integrate the 'Workshop on Communication in Oncology' that we initiated at ECCO 2017 as a regular course into our regular ESTRO School programme.

Live courses as well as, more recently, online courses with the contouring workshops, have been successful. Are you working on new formats of education?

Indeed, another thing we have worked on is blended learning. Part of the ESTRO strategy is to increase our offer in blended learning, which would be a mix of live activities with online activities and with other IT resources in education. So two of these new courses will be truly blended courses. The one on leadership will take place over a period of around two months and would be a blend of live activities and online activities using Webex, Moodle and other online resources. The same would apply for another new course which would take place in 2018 – the positioning and immobilisation course for radiation therapists (RTTs). This would be a six to eight week course with a mix of activities containing tasks you have to perform in your department with online activities, and a part of the course would also be a true live course.

Six to eight weeks is quite unusual as most of the ESTRO courses last three to five days. This is a fairly new concept.

It’s a very new concept. The three to five day courses have worked perfectly. However, for
some topics you need to do things in a different way, and one of our aims in the School is not just to deliver the knowledge, but also to provide the skills to make the participants more competent, and one of the ways to do so is in a blended way that deserves a few weeks to be optimal.

**What is the added value of blended learning?**
From experience, you pick up more if you learn in a blended way. You somehow spice it up with discussions and practical activities. Our own experience with FALCON is a very good example of that – if you not only teach the knowledge but also practice delineation, as we do for example with online workshops, then you actually pick up more in the end.

**Why do think the ESTRO School has been so successful? What do you think this success is based on?**
The strength and the success of the ESTRO School is based on several aspects. First of all, we have a multidisciplinary and an interdisciplinary approach to education and the treatment of cancer, and that is a very strong asset. The strength of the School is also that we have an educational offer that reaches across Europe and also outside Europe. This means that we have a unique chance to try to cover the gaps in education all over the world. For me, that’s one of the greatest assets. Another strength of the ESTRO School is that we rely on experts in all disciplines. This is a big group of very dedicated teachers who do this on a voluntary basis and who are here because they truly believe in education, in the dissemination of knowledge, because of the good atmosphere and possibilities for networking with peers. And if you do something because you are passionate and because it’s fun, then you also deliver good teaching.

In addition to their renowned scientific skills and their enthusiasm for education, teachers also require specific skills per se. How can you ensure that the ESTRO School teachers have these skills?
One of the first things we did a year ago was to form the committee into a council with six different work packages. We would like to focus more on how teaching is delivered in order to optimise what the participants retain. For that we have created the pedagogical programme that aims to support the teachers and help them to develop their teaching skills further, thanks to various initiatives such as retreats and workshops. Every year at the course directors meeting, we invite educationalists from across Europe to share their input. A couple of years ago the discussion was about the clicker system (turning point). It was brand new at that time and is now implemented in almost all courses. This year’s meeting was about the future of learning, how the coming generations look at education as a ▼
more social and outgoing activity than we used to do with old-fashioned classroom teaching.

*Do you rely a lot on technical trends?*
We have extremely dedicated teachers and we also see that they are really open to new trends. They are quite willing to discuss new initiatives while still being prudent, because there are many new ideas, technologies and trends out there. We have to choose carefully those that fit our School. Not just using new technologies because they are trendy, but because they will actually bring an added value to the School.

*So the key to success is not only what you teach, but how you teach?*
Of course, ESTRO School has to adapt to the new ways that people learn. Here the blended learning is a priority, but we also have to look more into how it should be delivered. It’s not just the same way as you deliver live teaching. You probably have to apply other pedagogical angles in that situation. So what works with live education might not work in the same way with blended online education. For that, the School would like to engage in the future months with leading educationalists in Europe in order to support the teachers and the development of the School in a proper way that is not just based on scientific knowledge.

*Are there any other pedagogical initiatives?*
We want to broaden this knowledge so that it’s not just something which is retained within the daily management of the School. It is something we would like to share with all the teachers, and for that reason we have dedicated three of the mobility grants to going to the international conference for medical education, which is held every year in Europe. We hope to send three teachers, or other people interested in education within the ESTRO School environment, to the annual Association for Medical Education in Europe (AMEE) conference this year. We also hope that the inspiration they get, they will share with the rest of the group who wish to take an active part in the pedagogical development of the School in years to come.

*Where do the current core curricula stand?*
We will initiate a revision of the core curricula in the near future and probably in all disciplines. We have decided for the medical core curriculum. This will more likely be carried out by medical physicists and RTTs. There is a need for revising the European physician core curriculum and that process will be initiated in the coming months. It is extremely important that we, just like last time, involve all stakeholders in this process, meaning representatives from all European national societies, representatives from the UMS, educationalists, and other experts within the ESTRO School. And last, but not least, this time we will also involve the residents and the trainees who are going to use the curriculum, and we are going to invite dedicated young people that have already, at the national level, had experience of revising curricula. We have had three successfully attempts at involving young people with the Danish core curriculum and it has been a tremendous experience that brings a real difference to the final outcome.

*Finally, after one year, is the position of ESTRO School director in line with what you expected?*
No – it’s better! What makes it even better is that I now fully realise that being in a position where I can make a difference is what drives me. It is possible to make a difference, to create a unique opportunity, to make the best education offer, to close the gaps in education and also to raise the standards across Europe. It’s a wonderful opportunity.

*Interviewed by Cécile Hardon-Villard*
4th ESTRO School pedagogics retreat

4 May 2017 | Vienna, Austria
This year saw the 4th ESTRO School pedagogics retreat in May. The first retreat was linked to the ESTRO anniversary meeting in London in 2011. It was designed to bring ESTRO teachers and course directors together and have them think about and brainstorm on the future directions of the School, new approaches and developments, in other words, the ESTRO School strategy.

This first meeting was a success and very much appreciated by the approximately 70 participants. The inclusion of an enjoyable and informal dinner and dance made it a very attractive event, and it was decided to repeat it every other year.

Since that time, the retreats have become more focused on pedagogics and are used to
inspire new teaching and learning methods and/or pedagogical approaches. In 2015, the retreat offered an information session on the methods, tools and benefits of blended learning, and then focused on using a voting tool for more effective and interactive teaching and learning.

For the retreat this year in Vienna, on 4 May, we invited David Price, a world-leading expert on education and creativity. David gave a very inspiring and impressive talk on the current shift towards open, immediate and social learning, and how this is affecting schools and educational institutions. He explained how learning is changing in response to technology, to how we live and to what we now know about learning, and how it is becoming more blended, and more self-determined. Participants were invited to apply his ideas to the ESTRO courses they were leading or teaching on. For instance, how could social learning be included in the design and delivery of the courses, and how could a more blended approach (i.e. using a variety of platforms such as pre-recorded video, real-time voting, wiki-forums, quizzes, webinars, surveys, chat functions, apps etc) make their courses more engaging?

The 65 participants at the retreat greatly appreciated the workshop because of the challenges and inspiration offered for improving their teaching and, at the same time, sharing the learning experience of their fellow participants. From a survey on the workshop, we collected plenty of ideas for innovation in future courses, proposals for different approaches and new tools to be tested out.

The new ESTRO School pedagogy programme will further develop these ideas in order to support the ESTRO School faculties in the delivery of active, effective and innovative teaching. To achieve this, the pedagogy programme is creating a group of people, engaged in excellence in medical education that will function as a think tank to continuously improve the education programme on offer from the School. Therefore, three of the ESTRO mobility grants from the first round in 2017 have been reserved to allow candidates to attend the Association for Medical Education in Europe conference in Helsinki (AMEE, 26-20 August 2017). Claire Poole (Ireland) – radiation therapist, Mateusz Spalek (Poland) – clinician and Oscar Casares-Magaz (Denmark) – physicist have been selected from the 15 applications and will report in a future newsletter on their experience and plans. We will keep you posted.

Christine Verfaillie
ESTRO Managing director education and science
FALCON contouring workshops at ESTRO 36

Mark your calendar
FALCON contouring workshops at ESTRO 36

“Fantastic and powerful opportunities”

I was pleased to be one of the tutors on the live FALCON contouring workshops again, during ESTRO 36. This year, as usual, FALCON contouring workshops were an invaluable opportunity to get to know colleagues from around the world while also learning the latest outlining techniques from global experts in the field. ESTRO 36 workshops included intraprostatic relapses, liver stereotactic body radiation therapy (SBRT), anal canal and spine SBRT. Each workshop structure was a presentation on the latest guidelines from a panel of experts, with at least one hands-on session to put it into practice, followed by a discussion where the outlines were compared between participants and experts.
FALCON workshops are fantastic and powerful opportunities to improve each individual’s delineation skills, which ultimately can contribute to a global improvement in implementing guidelines and reaching consensus in clinical practice. Delineation is still one of the areas in radiation oncology with the largest uncertainty, and FALCON is a fantastic way of disseminating precision in delineation. FALCON workshops are also incredible opportunities to learn the most up-to-date guidelines, and to network.

This year, mini-workshops in lung cancer were also organised at the ESTRO Booth. Mini-workshops were shorter, albeit similar to normal workshops, allowing participants to get to know the FALCON Educase tool during breaks. It was amazing to have a coffee and at the same time to have great discussions on lung outlining.

As a shared platform, FALCON Educase is not only great for organising workshops, it can also be implemented for clinical trials, allowing for case benchmarking and online case reviews.

Additionally, it can be a powerful tool in facilitating multidisciplinary meetings with colleagues around the world, allowing for case discussions without physical country borders or time constraints.

Ana Rita Simões
Radiation therapist
UK radiotherapy trials quality assurance group (RTTQA)

“Joining the spine SBRT workshop helped me to justify our contours and properly apply the contouring guidelines. Finally, we could appreciate an increase in the inter-observer homogeneity and consistency in contouring. It was a successful experience that I would recommend to other colleagues.”

Jon Cacicedo
Consultant
Osakidetza, Barakaldo, Spain
Mark your calendar

ESTRO members can benefit from a discount on the registration fee to attend an online workshop.

2017 ONLINE CONTOURING WORKSHOPS

Each online workshop includes three sessions

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Session 1 Date</th>
<th>Session 2 Date</th>
<th>Session 3 Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rectal cancer</td>
<td>6 September</td>
<td>13 September</td>
<td>20 September</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>4 October</td>
<td>11 October</td>
<td>18 October</td>
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<tr>
<td>Oesophageal cancer</td>
<td>17 October</td>
<td>24 October</td>
<td>31 October</td>
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<tr>
<td>Prostate cancer</td>
<td>7 November</td>
<td>14 November</td>
<td>21 November</td>
</tr>
<tr>
<td>Paediatric oncology</td>
<td>5 December</td>
<td>12 December</td>
<td>19 December</td>
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</tbody>
</table>
Dose modelling and verification for external beam radiotherapy
2-6 April 2017 | Warsaw, Poland

IMRT and other conformal techniques in practice
8-13 April 2017 | Madrid, Spain

ESTRO/ESNM course on molecular imaging and radiation oncology
10-13 April 2017 | Bordeaux, France
Dose modelling and verification for external beam radiotherapy

2-6 April 2017
Warsaw, Poland

COURSE DIRECTORS:
Tommy Knöös
Medical physicist,
Skåne University Hospital, Lund University, Sweden

Brendan McClean
Medical physicist
St Luke’s Radiation Oncology Network,
Dublin, Ireland

“I agree with the course directors that medical physicists should participate in a dose modelling course every seven to eight years”

This year’s edition of ‘Dose modelling and verification for external beam radiotherapy’ was held in Warsaw. To the capital of Poland came seven great teachers and 86 participants from a record-breaking 46 countries. The course directors were Brendan McClean and Tommy Knöös. They were supported by Anders Ahnesjö, Maria Aspradakis, Núria Jornet and Crister Ceberg. The strength of the faculty was built on their wide range of backgrounds in research and
practice. There were specialists in such topics as treatment planning system (TPS) modelling, theory of photon and electron interactions, and dosimetry (including small fields dosimetry and in vivo dosimetry).

To benefit from the course, it is recommended that participants have already completed an elementary radiotherapy physics course. This course started with an important reminder of basic concepts as background for all further topics. The multisource models lecture, given by Anders Ahnesjö, required concentration but gave a broad perspective and contained some of the core course messages. In his lecture on linac head design, Tommy Knöös concluded that medical physicists should attend training courses on machines in order to understand them better. That knowledge would be helpful in modelling machines in TPS, understanding how TPS algorithms work and what their limitations are. The first day ended with presentations on different detectors and discussion of the challenges of small fields dosimetry.

The second day was focused on modelling from different perspectives, starting with patient modelling and CT calibration curve. Afterwards, we had an opportunity to understand point and pencil kernel algorithms, electron modelling, and grid-based approaches used to solve Boltzmann equations.

The third day of training concentrated mainly on monitor unit (MU) calculations. Factor-based models were discussed at first, followed by calculations in some TPSs. We also had a debate on 'Independent MU calculation or patient specific quality assurance (QA) or both'. During that discussion, the idea arose to check different aspects of TPS algorithms performance in different hospitals and exchange results. Modelling and MU calculation theory was followed by some exercises, which gave us the opportunity to learn the material by heart. I think that this practical element plays a key role in the course.

The verification element of the course consisted of talks on methods of data comparison, uncertainties and action levels, phantoms for verification, and TPS commissioning. That was also a very practical part of the course.

I have already taken part in a dose modelling course in 2010 in Seville, and I want to emphasise here that the course changes and that lectures are adapted to the changes in radiotherapy physics.
and its current practice. That is why I really appreciate lectures on Boltzmann equations, small fields dosimetry, out-of-field dose, dose to medium and/or dose to water issues, and probabilistic planning. I agree with the course directors that medical physicists should participate in a dose modelling course every seven to eight years.

In summary, I think that theory and practice were well balanced during the course. That gave participants not only the understanding of things inside the ‘black boxes’, but also some practical guidelines, one of which was: don’t forget about the details during the QA. It’s important to mention that participants not only had the opportunity to attend great lectures, but also to discuss with teachers and one another during breaks and evening activities. We had a well-organised social dinner at the beginning of the course which gave us the chance to get acquainted with medical physicists from different countries. On other evenings, many participants also spent time together, mostly enjoying the beautiful Warsaw old town, including the Maria Skłodowska-Curie museum and Łazienki Park.

Finally, I would like to thank the course faculty for their enthusiasm and their engagement in sharing their knowledge, and strengthening the radiotherapy physics profession. I also would like to give special thanks to project managers, Elena Giusti and Gabriella Axelsson, without whom none of this would be possible.

Marta Giżyńska
Maria Skłodowska-Curie Memorial Cancer Centre and Institute of Oncology
Warsaw, Poland
m.gizynska@zfm.coi.pl
Although it has been in existence for quite a few years, the ESTRO course on intensity-modulated radiation therapy (IMRT) and other conformal techniques retains its appeal. This year it attracted more than a hundred participants from 36 different countries around the globe, and it remains one of the most popular courses offered by ESTRO.

Madrid’s Hospital Sanchinarro clinic, which is part of a private group of clinics (HM hospitales), hosted the opening day of the course. We realised that Madrid and the clinic itself were not coincidental choices as a venue for this course, after Carmen Rubio (head of the radiation oncology department) and her kind colleagues presented their theoretical and practical experience with implementing IMRT back in 2007, and their use of extracranial stereotactic body radiotherapy (SBRT) and image-guided treatment verification. Less is (sometimes) more, seemed to be the lesson from their implementation of hypofractionation regimens (being used for prostate, breast and lung cancer treatments) and SBRT (oligometastases to liver, early stage lung cancer, etc.). These innovative techniques now represent more than a half of current treating modalities in their centres.

In the successive days, the lectures followed in a relaxed setting and pleasant Spanish atmosphere. The teaching faculty, a team of experienced medical physicists and radiation oncologists, helped us to integrate the practical demonstrations we saw on the first day with theoretical knowledge, and provided us with the ability to apply it in daily practice at our home institutions. Their well-prepared lectures reached everyone in the audience, which consisted of radiation oncologists, medical physicists and radiation therapy technologists. Clinical case discussions were an invaluable part of the course, allowing us to discuss different IMRT and image-guided radiation therapy approaches in small groups, so the time spent preparing our homework solutions was definitely well-invested.

No ESTRO course would be complete without a social event, which in this case took place in the old city centre. We took a short walk, guided by three local radiation oncologists, which was a great experience in itself. After visiting some of Madrid’s historical monuments, we were accompanied to a nice dinner at one of the oldest hotels in the city.

The course offered us a comprehensive overview of modern conformal techniques, from ▼

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**IMRT and other conformal techniques in practice**

8-13 April 2017
Madrid, Spain

**COURSE DIRECTOR:**
Marco Schwarz
Medical physicist,
Proton Therapy Centre,
Trento, Italy

**CO-CHAIR:**
Frank Lohr
Radiation oncologist,
Azienda Ospedaliero-Universitaria,
Modena, Italy

**STASA JELENCIC, MARKO KOKALJ AND IVICA RATOSA**
radiation physics to clinical outcomes. We would like to thank the ESTRO teachers for their insightful lectures and willingness to discuss any issues that arose. We are also very grateful for all the practical knowledge that the Hospital Sanchinarro staff were willing to share with us. All our expectations were more than met and we would highly recommend this course to anyone interested in the topic.

Stasa Jelercic, MD,
Radiation oncologist,
Institute of Oncology Ljubljana, Slovenia,
sjelercic@onko-i.si

Marko Kokalj, MD,
Radiation oncology resident,
Institute of Oncology Ljubljana, Slovenia,
mkokalj@onko-i.si

Ivica Ratosa, MD,
Radiation oncologist,
Institute of Oncology Ljubljana, Slovenia,
iratosa@onko-i.si

The course attracted more than a hundred participants from 36 different countries.
ESTRO/ESNM course on molecular imaging and radiation oncology

10-13 April 2017
Bordeaux, France

COURSE DIRECTORS:
Ursula Nestle
Germany

Wouter Vogel
The Netherlands

The challenge of the ESTRO course on molecular imaging, held in Bordeaux in April, was fitting a large overview about functional and molecular imaging into only four days. But the challenge was accepted and successfully met! This was even more remarkable knowing that the weather, the host city, and its local food and wine were so wonderful that it was not easy to remain focused on the task.

Our teachers handled it well, creating a comfortable learning atmosphere with talks

"As we return to work, this course will certainly have an impact on our daily practice"
of high value. These talks covered older topics as well as very recent topics, such as PET and its different tracers, and MRI with its large panel of sequences. They highlighted key issues and current hot topics in many anatomical sites, raising interesting questions that can be discussed further in our own departments, as we all encounter the same difficult issues in our daily practice.

We participated in short workshops as well. As we came from many countries all over Europe and even beyond, we tried to tackle some difficult clinical cases, bringing together the different strengths of each speciality represented (radiology, nuclear medicine, radiobiology, radiation oncology), but also sharing different points of view and practices. In addition, we could apply some of the messages from the lectures to our considerations, resulting in really interesting discussions and comments.

As we return to work, this course will certainly have an impact on our daily practice in one way or another. At the same time, it will make us aware of the many topics we will have to contend with in the future.

Dr Geneviève van Ooteghem, training in radiation oncology Cliniques Universitaires Saint Luc, Brussels, Belgium
COURSE AIM
The aim of this course is to make the attendees better at making model-supported decisions. Radiation oncology probably has the most solid quantitative foundation among the medical specialties. Like in other specialties, results of randomised controlled trials inform evidence-based treatment guidelines, but in addition, prognostic and predictive models provide clinical decision support for individualised management of cases. Radiation bioexact models of Normal Tissue Complication Probability (NTCP) and Tumour Control Probability (TCP) have become much more refined and are increasingly being validated in independent datasets. While integration of quantitative estimates of various treatment outcomes is likely to improve patient care, it is also important to understand the limitations to model estimates and to be able to assess the validity or quality of a statistical data analysis or a mathematical model. Uncritical reliance on model results may compromise patient safety or treatment outcome.

More information: www.estro.org/school >
# POSTGRADUATE COURSES IN EUROPE

<table>
<thead>
<tr>
<th>Course</th>
<th>Dates</th>
<th>Location</th>
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<tbody>
<tr>
<td>Comprehensive and Practical Brachytherapy</td>
<td>5-8 March 2017</td>
<td>Budapest, Hungary</td>
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<tr>
<td>Particle Therapy</td>
<td>6-10 March 2017</td>
<td>Essen, Germany</td>
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<tr>
<td>Lower GI: Technical and Clinical Challenges for Radiation Oncologists</td>
<td>22-24 March 2017</td>
<td>Rome, Italy</td>
</tr>
<tr>
<td>Upper GI: Technical and Clinical Challenges for Radiation Oncologists</td>
<td>25-28 March 2017</td>
<td>Rome, Italy</td>
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<tr>
<td>Dose Modelling and Verification for External Beam Radiotherapy</td>
<td>2-6 April 2017</td>
<td>Warsaw, Poland</td>
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<tr>
<td>IMRT and Other Conformal Techniques in Practice</td>
<td>9-13 April 2017</td>
<td>Madrid, Spain</td>
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<tr>
<td>ESTRO/ESMIT Course on Molecular Imaging and Radiation Oncology</td>
<td>10-13 April 2017</td>
<td>Bordeaux, France</td>
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<tr>
<td>Multidisciplinary Management of Prostate Cancer</td>
<td>21-25 May 2017</td>
<td>Porto, Portugal</td>
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<tr>
<td>Physics for Modern Radiotherapy</td>
<td>4-8 June 2017</td>
<td>Bucharest, Romania</td>
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<tr>
<td>Advanced Skills in Modern Radiotherapy</td>
<td>11-15 June 2017</td>
<td>Prague, Czech Republic</td>
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<tr>
<td>Evidence Based Radiation Oncology</td>
<td>11-16 June 2017</td>
<td>Ljubljana, Slovenia</td>
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<td>Combined Drug-Radiation Treatment: Biological Basis, Current Applications and Perspectives</td>
<td>15-18 June 2017</td>
<td>Brussels, Belgium</td>
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<td>Target Volume determination - From Imaging to Margins</td>
<td>25-28 June 2017</td>
<td>Lisbon, Portugal</td>
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<tr>
<td>Brachytherapy for Prostate Cancer</td>
<td>29 June - 1 July 2017</td>
<td>Brussels, Belgium</td>
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<td>Advanced Treatment Planning</td>
<td>3-7 September 2017</td>
<td>Barcelona, Spain</td>
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<tr>
<td>Clinical Practice and Implementation of Image-Guided Stereotactic Body Radiotherapy</td>
<td>3-7 September 2017</td>
<td>Budapest, Hungary</td>
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<tr>
<td>Palliative Care and Radiotherapy</td>
<td>7-9 September 2017</td>
<td>Brussels, Belgium</td>
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<tr>
<td>Multidisciplinary Management of Breast Cancer</td>
<td>10-13 September 2017</td>
<td>Dublin, Ireland</td>
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<tr>
<td>Research Masterclass in Radiotherapy Physics</td>
<td>10-13 September 2017</td>
<td>Florence, Italy</td>
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<tr>
<td>Basic Clinical Radiobiology</td>
<td>16-20 September 2017</td>
<td>Paris, France</td>
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<tr>
<td>Comprehensive Quality Management in Radiotherapy</td>
<td>2-5 October 2017</td>
<td>Brussels, Belgium</td>
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<tr>
<td>Quantitative Methods in Radiation Oncology: Models, Trials and Clinical Outcomes</td>
<td>8-11 October 2017</td>
<td>Maastricht, The Netherlands</td>
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<td>Best Practice in Radiation Oncology - Train the RTT Trainers</td>
<td>16-18 October 2017</td>
<td>Vienna, Austria</td>
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<tr>
<td>Multidisciplinary Management of Brain Tumours</td>
<td>22-24 October 2017</td>
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<td>Image-Guided Radiotherapy and Chemotherapy in Gynaecological Cancer: Focus on MRI Based Adaptive Brachytherapy</td>
<td>22-26 October 2017</td>
<td>Prague, Czech Republic</td>
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<tr>
<td>Image Guided Radiotherapy in Clinical Practice</td>
<td>29 October - 2 November 2017</td>
<td>Athens, Greece</td>
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<tr>
<td>ESTRO/ESOR Multidisciplinary Approach of Cancer Imaging</td>
<td>2-3 November 2017</td>
<td>Rome, Italy</td>
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<tr>
<td>Imaging for Physicians</td>
<td>5-9 November 2017</td>
<td>Malaga, Spain</td>
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<tr>
<td>Paediatric Radiotherapy</td>
<td>30 November - 2 December 2017</td>
<td>Brussels, Belgium</td>
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# POSTGRADUATE COURSES OUTSIDE EUROPE

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<thead>
<tr>
<th>Course</th>
<th>Dates</th>
<th>Location</th>
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<tbody>
<tr>
<td>Transition from Conventional 2D to 3D Radiotherapy with a special emphasis on Brachytherapy in Cervical Cancers</td>
<td>8-11 March 2017</td>
<td>Bengaluru, India</td>
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<tr>
<td>ESTRO-KOSRO GI: Technical and Clinical Challenges for Radiation Oncologists</td>
<td>2-4 June 2017</td>
<td>Seoul, South Korea</td>
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<tr>
<td>Comprehensive Quality Management in Radiotherapy</td>
<td>5-9 July 2017</td>
<td>Chengdu, China</td>
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# PRE-MEETING COURSES

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<tr>
<th>Course</th>
<th>Dates</th>
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<tbody>
<tr>
<td>Five Pre-Meeting Courses at ESTRO 36</td>
<td>5 May 2017</td>
<td>Vienna, Austria</td>
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# UNDERGRADUATE COURSES

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<tr>
<th>Course</th>
<th>Dates</th>
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<tr>
<td>Medical Science Summer School Oncology for Medical Students (Vienna/Groningen)</td>
<td>10-21 July 2017</td>
<td>Vienna, Austria</td>
</tr>
<tr>
<td>ESO-ESSO-ESTRO Multidisciplinary Course in Oncology for Medical Students</td>
<td>28 August - 8 September 2017</td>
<td>Antwerp, Belgium</td>
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</table>
Stop Cancer Now!
Cancer and Global Health: From Research to Policy
19-21 October 2017 • Lugano, Switzerland

Chair: F. Cavalli

Scientific committee: Alexander M.M. Eggermont • Mary Gospodarowicz
You-Lin Qiao • Richard Sullivan • Edward Trimble • Chris Wild
Paul Workman

www.eso.net
INTRODUCTION

ESTRO TECHNOLOGY TRANSFER GRANT REPORT

THE YOUNG DEGRO TRIAL GROUP OF THE GERMAN SOCIETY OF RADIATION ONCOLOGY

REPORT FROM THE 2017 ECCO MEETING

REPORTS ON ESTRO 36

ESTRO TECHNOLOGY TRANSFER GRANT REPORT
Dear Young Corner readers,

We hope you enjoyed the ESTRO 36 conference in Vienna. In this Young Corner you can read about how Yannick Eller and Stefano Vagge experienced the young track at ESTRO 36. We also have an interview with Maarten Lambrecht who won the quiz at the end of the young track. Congratulations!

In addition, our Corner includes a message from the young DEGRO trial group of the German Society of Radiation Oncology, which is launching a multicentre study and announcing possibilities for more study centres to join, as well as a report from the ECCO meeting held earlier this year.

Our Corner also includes one mobility grant report. Carla Winterhalter from the Paul Scherrer Institute in Viligen, Switzerland, visited the Christie NHS Foundation Trust in Manchester, UK, to learn about different Monte Carlo calculation engines.

We hope you like our Corner and wish you all a nice summer.

Kathrine Roe Redalen and Pierfrancesco Franco
New journals *phiRO, ctRO, tipsRO* – meet the editors ➤

Lunchtime symposium, 8 May 2017

Scientific networking session ➤

Yannick Eller

Interview with Maarten Lambrecht, winner of the young track quiz ➤
New journals phiRO, ctRO, tipsRO – meet the editors

Lunchtime symposium, 8 May 2017

The symposium that I did not expect
With the usual trepidation of making the best choice of a good session in which to spend my lunchtime, I moved from room to room. In the end, as I looked around starving, a panel of speakers from the young track session attracted my attention. Until then I was not aware of this session in the programme. I probably left it out of my first choice because I expected a session with the usual suggestions on the best approach to writing a good paper. Surprisingly, after the first few minutes of listening to the first speaker (Ludvig Muren), I forgot my appetite and my attention was captured by the original perspective given in the presentation.

Daniel Zips (right), co-editor of Clinical and Translational Radiation Oncology (ctRO)
Editors of the new journals gave their recipe for success in an evolving landscape of new scientific journals that is growing very fast. During the session, the editors (Ludvig Muren, Daniel Zips and Sara Faithfull) of the new ESTRO journals, *Physics and Imaging in Radiation Oncology (phiRO)*, *Clinical and Translational Radiation Oncology (ctRO)* and *Technical Innovation and Patient Support in Radiation Oncology (tipsRO)*, did not limit their presentations to a simple introduction to the aims of these journal, but focused their talk on a few key pointers to hit the target, if you want to be an author or a reviewer.

Publication is a step in a continuous process. It is the final stage of the research effort and precedes a new stage. It is an opportunity to influence new researchers in their views or modify clinical practice. Today scientific publishing is becoming a huge industry. On PubMed, up to 30,000 scientific journals are registered, with a massive change from paper versions to online journals. There is also a strong trend towards open access publications, with the aim of making research findings available on a global scale. Scientific research is increasing, but it makes the work of authors, reviewers, and editors more complicated. Authors need to make the right choice to give visibility to their work and to obtain citations, and finding the appropriate journal for your publication is a challenge.

Authors need to publish their results fast, because it may allow them to submit a new research grant or add to their curriculum vitae and apply for a higher position. As an author, you need to reserve part of your research grant for the final publication and make the expensive decision to allow your article to be open access, for greater visibility. Researchers need to be conscious of their target readers, of who might be interested and who might benefit from the research.

They also need to be ambitious and original, and to spend time and effort on proper and timely research. Publishing in a higher impact journal can mean higher funding for future research.
In the growing world of rapid online publication, editors also have to face new challenges. The principal aim for a good editor is to increase or maintain the visibility of the journal. A rapid peer review process is attractive for authors. More research articles submitted to a journal mean a better chance for the editor to select the most noteworthy research. For well-ranked journals, such as *Radiotherapy Oncology*, the number of submitted research articles is constantly high and it is not easy to meet the needs of rapid publication. This means there is a risk of limiting or delaying the visibility of some original but more niche research articles. In order to support dissemination of important insights and limit the loss of originals research submitted to a peer review process, the family of ESTRO Elsevier open access journals has increased with three new companion journals:

- **ctRO** – encompassing all aspects of clinical and translational radiation oncology research, particularly new developments in radiobiology, clinical interventions and treatments, data sciences, epidemiology and oncopolis.
- **phiRO** – focused on medical physics and imaging in radiation oncology.
- **tipsRO** – bringing together technology and patient care in the field of radiation oncology, including treatment planning and workflows, delivery and verification, patient care and supportive care.

Interestingly in this scenario, the reviewer plays a key role. Editors need to find adequate experts in their fields. The work of a reviewer is as complicated as that of the author. A good revision can contribute to implementing the results of clinical research. As with being a gifted author, a reviewer also needs exercise and practice, attention to detail but, at the same time, tremendous honesty. As a reviewer, you must only agree to evaluating the topics that you can judge. A reviewer also has to overcome any conflict of interest, and needs to spend a great effort in this role, making time for revisions even on busy days. We have to remember that we all are authors and our research articles also need peer review.

Finally, I’d like to report a few suggestions, perhaps expected but still relevant for the process of writing and reading an article. A scientific article needs to be built from a starting point – and this is the existing key research in the field – then follows a logical reasoning to explain the gap in the literature that you want to fill. You need to show clearly what you have done, warts and all, then what it is possible to do based on the results. Authors need to be clear in all parts of the text, especially in the abstract (this is usually the only part of your work that will be read). Finally, the underlying message in most of the presentations was obvious, but it is the foundation of our daily practice: be rigorous and honest in all your data reports.

*Stefano Vagge, MD*
*Policlinico San Martino*
*National Institute of Cancer Research*
*Genoa, Italy*
At ESTRO this year, I was fortunate to experience the high quality of the young committee’s ability to ‘think outside the box’. Instead of the young track’s keynote lecture, which had to be cancelled, the group neatly devised a scientific networking session and it is my honour to report on it.

To introduce myself briefly, I was elected workgroup executive board advisor to the German Society of Radiation Oncology in 2013 with a brief to initiate progress in the promotion of our field’s young talent. Currently I work as a junior executive of clinical staff in Switzerland. I work constantly to create international rotation electives, mentorships and coaching. As a former faculty member, I am particularly interested in improving training, innovation for blended learning and a variety of forward-thinking approaches, and so I was invited to co-chair the young track’s scientific symposium at ESTRO 36, which happened to be the first time undergraduate students could contribute as speakers at the annual meeting.

The networking session was conducted in the form of scientific ‘speed dating’, providing five to seven minutes slots to repeatedly introduce yourself and your scientific work, field of expertise and major subjects of interest to your allotted counterparts. For instance, I met a PhD student and resident from the University Medical Centre Utrecht, The Netherlands. I was impressed both by the diversity and accuracy of what she told me about Dutch research, and by her particular area of expertise – exercise oncology, which, as it happens, is a topic I was fascinated with during my training. She is currently performing a clinical study, which I might describe from afar as having the potential for results with outstanding clinical importance, and she invited me to see her work during a visit to Utrecht in due course. I also met a radiobiologist from the University of Cape Town, South Africa. During my undergraduate studies, I collaborated with Cape Town’s Groote Schuur Hospital, so I was delighted to meet a researcher who graduated from the local faculty of science. She delineated the brilliant scientific project of her master’s thesis focusing on molecular biology, which has been accepted but is not in print yet. She also asked me several questions about living and working in Switzerland, as she planned to apply for a PhD position in Zurich.

It was a pleasure to talk to my scientific ‘speed dates’ from various backgrounds. I was amazed and inspired to hear their answers and to reply ▼
to their questions with my own condensed descriptions, and we made sure to exchange details and keep in touch. When it comes down to changing a lecture at short notice, this experience suggests that the biggest risk is not taking a risk at all.

Networking on an international level is essential for both scientific and clinical future leaders. However, not many medical juniors get to spend time in public health services abroad, even though their training could be greatly enhanced by exposure to radiation oncology practised in different cultural, economic, and political systems. To my knowledge, many trainees recognise it can be highly beneficial and are keen to spend time abroad to acquire necessary qualifications. In doing so, they begin with the best possible prerequisites and boost a successful academic career in a way that can have an indelible effect on their life.

As an American working in Switzerland, I consider it important to build international relationships and would absolutely recommend attending networking sessions or similar events any time and, as a matter of fact, would do so again myself.

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"Networking on an international level is essential for both scientific and clinical future leaders"
Interview with Maarten Lambrecht, winner of the young track quiz

**What is your background and where do you work today?**
I work at the University Hospital Gasthuisberg Leuven, Belgium. I studied medicine at the Catholic University in Leuven and obtained my PhD in 2013 on the use of functional MRI in head and neck cancer. I have been a certified radiation oncologist since August 2015 and have been working since then at the department of radiation oncology at Leuven. My clinical focus is currently on respiratory oncology, haematology, neuro-oncology and the start-up of our proton therapy department. Research wise, I am mainly involved in respiratory oncology.

**Have you been to any ESTRO conferences before?**
Since the start of my PhD in 2009, I try to go to the ESTRO conference each year. During my PhD I also went to the International conference on innovative approaches in head and neck oncology (ICHNO).

**Have you been involved in any other activities within ESTRO?**
I went to the Agora meeting in Barcelona in 2016, I have attended several ESTRO courses (rectal cancer, molecular oncology for the radiation oncologist, multidisciplinary management of brain tumours), and I participate in work package five of the European particle therapy network task (EPTN) force on ESTRO.

**What did you like most in the young track this year (other than winning a free course)?**
I thought the sessions on how to write a research proposal followed by the different presentations on the different available grants were very interesting. I wasn’t able to follow the entire young track, and there were so many coinciding presentations that it was hard to make the selection.

**Which course do you think you will choose?**
Honestly, I haven’t decided yet and there are several options. The particle therapy course looks very interesting, as well as the course on quantitative methods in radiation oncology. I am looking forward to seeing the 2018 course schedule.
The young DEGRO working group (yDEGRO) was founded in 2014 by young radiation oncologists, radiobiologists and medical physicists within the German Society of Radiation Oncology (DEGRO). The yDEGRO provides a platform for active participation by young radiation oncology physicians, medical physicists and radiation biologists in committees, working groups, conferences and other relevant activities of the DEGRO. The yDEGRO trial group established a research network to provide the infrastructure for clinical and translational studies in conjunction with the radiologic oncology working group (ARO). Continuous improvement of professional education during medical residency and training of medical physicists and radiation biologists is of major importance for the yDEGRO.

The yDEGRO trial group is currently conducting a multicentre study (NCT03055715 / ARO 2017-01) with 18 study sites in Germany and Switzerland on the prognostic value of the gross tumour volume (GTV) in curative radiation therapy for non small cell lung cancer stage III A and B. In centres which re-contour the GTV after 50Gy for a radiation boost, the volumetric change will be evaluated for its prognostic impact. During a two-year period, treatment plans and clinical data of 700 patients will be integrated into the radio-oncological database RadPlanBio.

The yDEGRO trial group study is still open for new study centres. To participate, please contact info@jdegro.org.

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Multidisciplinary discussion of new data was a unique feature of the 2017 meeting.

**Overall scenario**
Multidisciplinary discussion of new data was a unique feature of the 2017 meeting of the European CanCer Organisation (ECCO), which took place in Amsterdam, The Netherlands, between 27 and 30 January. At the end of every day a critical review session was performed, where new data that had been presented and debated during the day were evaluated by the audience. In order to help the audience in their judgment, the data were discussed from different point of views (e.g. surgeon, medical oncologist, radiation oncologist, pharmacist, policy maker). This multidisciplinary debate focused on the context where the new data would fit, its potential to alter clinical practice, and the possible consequences in terms of cost. Patients were also invited to take part in the discussion and offer their invaluable point of view. This approach could be considered the hallmark of the ECCO congress, and it has enabled a truly multidisciplinary depiction of patients’ and professionals’ needs in treating and curing cancer. There was a particular emphasis on the quality of the data presented, and on the ▼
likelihood that the data would be strong enough to alter daily practice. The availability and affordability of new drugs or procedures were also taken into account during the various congress sessions.

The meeting represented a new beginning for ECCO, as from 2017 the society will have an annual meeting. Currently ECCO is a partnership of 25 different societies. One thing that sets ECCO apart is its focus on primary care and that was in evidence during each session. As stated by the chair of the ECCO2017 congress, Professor Naredi, current professor of surgery and chairman of the department of surgery at the Sahlgrenska Academy, Gothenburg University, Sweden: “We need to involve these professions because we need to diagnose cancer earlier, and primary carers look after the millions of cancer survivors with their potential long term complications”. Furthermore, a significant number of presentations were outcome studies, which are typically relegated to poster sessions but can provide insights that are difficult to acquire from phase 2 and 3 studies. What follows is a short summary of some of the presented data.

**Breast cancer**

Lotte Elshof MD, epidemiologist at the Netherlands Cancer Institute, Amsterdam, presented new data on survival in women diagnosed with ductal carcinoma in situ (DCIS). The analysis showed that women older than 50 years who are diagnosed with DCIS are more likely to be alive ten years after their diagnosis than women in the general population. Overall, these women had a lower risk of dying from all causes, except an increased risk of dying from breast cancer. Nonetheless, this risk was very low and not the principal cause of death in this population. Overall, the absolute risk of dying from breast cancer after ten years was 1.4% in women older than 50 years and slightly higher, at 2.4%, in those younger than 50. The analysis involved around 10,000 women diagnosed with DCIS between 1989 and 2004, who were followed for a median of ten years. Most of the women (80%) were older than 50, and the median age was 57 years. This subject deserved particular attention since the issue of DCIS over-diagnosis has been an important topic of discussion among the scientific community.

Mirelle Lagendijk MD, from the department of surgical oncology, Erasmus Medical Centre Cancer Institute, Rotterdam, The Netherlands, presented a retrospective study that involved approximately 130,000 women and showed that women with breast cancer may survive longer after undergoing breast conserving therapy (BCT) compared to those undergoing mastectomy, particularly if they are older than 50 years, have earlier stage disease, and have more comorbidities. The team focused on cases of T1-2N0-2M0 primary invasive breast carcinoma diagnosed between 1999 and 2012 in patients who did not undergo primary systemic therapy and who were treated with BCT or mastectomy, with or without radiotherapy. This yielded a total of 129,692 patients, who were divided into two time cohorts: 1999-2005 (n = 60,381), which was intended to provide longer term follow-up, and 2006-2012 (n = 69,311), which would reflect the impact of more recent developments in diagnosis and treatment. Between the first and second time cohorts, the proportion of patients who died from all causes decreased substantially.

Among mastectomy patients, the proportion of patients who died fell from 48.2% of the first time cohort to 19.8% of the second cohort. The decrease among BCT patients was from 28.4% to 8.9%. These findings were unaffected by hormonal or HER2 status. The results were similar for overall survival. The researchers found that, in the 1999-2005 cohort, BCT was — [Image] — Peter Naredi, ECCO President and chair of the congress
associated with significantly better breast cancer specific survival compared with mastectomy, with a hazard ratio of 0.72, and better overall survival, with a hazard ratio of 0.74. This significant difference was observed in all T1-2N0-2 stages. In the 2006-2012 cohort, BCT was again associated with significantly better breast cancer specific survival than mastectomy, with a hazard ratio of 0.75, and better overall survival, with a hazard ratio of 0.67. The difference was not significant for the T1-2N2 stages, in which BCT and mastectomy were equivalent.

Further analysis of the T1-2N0-1 subgroups indicated that BCT was superior to mastectomy for breast cancer specific survival among patients older than 50 years, as well as for those who did not undergo chemotherapy and for those who had comorbidities. Among patients younger than 50 years, those who had no comorbidities and those who had undergone chemotherapy, BCT was associated with equivalent breast cancer specific survival and better overall survival than mastectomy.

Dr Icro Meattini, from the radiation oncology unit of the Florence University Hospital, Italy, presented the early and two-year follow-up health-related quality of life (HRQoL) results of the accelerated partial breast irradiation (APBI)-IMRT-Florence phase 3 randomised trial. A total of 520 patients were enrolled in the phase 3 trial. Overall, 205 patients (105 APBI and 100 whole breast irradiation [WBI]) fully completed all the given questionnaires and were therefore included in the present analysis. For the HRQoL assessment, patients were asked to complete the European Organisation for Research and Treatment of Cancer QLQ-C30 and BR23 questionnaires at the beginning (T0), at the end (T1), and after two years following radiation (T2).

No significant difference between the two arms of the QLQ-C30 and BR23 scores emerged at T0. Global health status (GHS, p = 0.0001) and most scores of the functional and symptom scales of QLQ-C30 at T1 showed significant differences in favour of the APBI arm. Concerning the BR23 functional and symptom scales, the body image perception, future perspective, and breast and arm symptoms were significantly better in the APBI group. Similar significant results
emerged at T2; significant differences in favour of APBI emerged for GHS (p = 0.0001), and most functional and symptom QLQ-C30 scales. These results led to the conclusion that early breast cancer patients treated with APBI showed an improved short term, and two-year follow-up HRQoL outcome as compared with WBI; therefore APBI should be strongly considered in the treatment choice for selected low risk patients.

**Skin cancer**

A group led by Philippe Autier, MD, from the International Prevention Research Institute in Lyon, France, showed that the current epidemic of melanoma in light skinned individuals is the result of old fashioned medical beliefs about the health benefits of ultraviolet (UV) light and the practice of ‘heliotherapy’ in the first half of the twentieth century. A statistical analysis clearly demonstrated the correlation between melanoma mortality and heliotherapy, involving exposing young adults and children to intense UV radiation in the hope of preventing rickets and for other supposed health benefits. In fact, an increase in melanoma incidence was observed between the 1950s and the 1980s, while in the 2000s melanoma mortality rates are still increasing in individuals aged 70 years or older, but they are plateauing in the 50 to 69 age group, and they are decreasing in individuals younger than 50 years. Strikingly, most of the exposures associated with deadly melanoma had to have taken place from 1910 to 1950, the era where heliotherapy was popular.

Professor Autier and colleagues reported that death rates from melanoma peaked around 2005 for US men and in 1995 for US women. In Sweden, it peaked around 2010 for both sexes. In Australia, it peaked in 2015 for men and in 1990 for women. Using a statistical model, the researchers predicted that in 2050 the rates of melanoma deaths in the United States would be 2.5-3 times lower than in the peak years, falling back to rates that prevailed before 1960. The age standardised death rate will have fallen from the current 4 per 100,000 men in the United States to around 1.6 per 100,000 in 2050, assuming there is no effective treatment, and will fall to 1.1 per 100,000 in 2050 if there is an effective treatment and everyone has access to it. Although the rate of deaths is decreasing, the number of deaths is continuing to rise because of the aging population.

**Pancreatic cancer**

Another study involving more than 550,000 diabetes patients showed that patients who received glucagon-like peptide-1 (GLP-1) receptor agonists, or incretin mimetics, were at significantly increased risk of developing pancreatic cancer. On the other hand, increased risk diminished rapidly after diagnosis leading to the theory that reverse causation may be at play, with asymptomatic pancreatic cancer initially causing diabetes before progressing to a symptomatic stage. This study was also led by Prof Autier and involved researchers from the International Prevention Research Institute in Lyon, France.

The research sought to investigate the complex interaction between type 2 diabetes and pancreatic cancer and to study the safety of GLP-1 receptor agonists in patients with diabetes. The researchers collated information on all patients with diabetes who had a first prescription of a noninsulin, nonincretin anti-diabetic drug (NIAD), such as metformin, or an incretin mimetic from 2008 onward, and followed them until the end of 2013 in Belgium and the end of 2012 in Lombardy. The mean age of the patients who received incretin mimetics was between 56 years and 58 years; the mean age for those taking NIADs was between 61 years and 65 years. The vast majority of patients were not receiving insulin therapy.

Multivariate analysis indicated that the risk for pancreatic cancer was significantly increased among patients receiving incretin therapy compared with those given NIADs, with an adjusted hazard ratio of 2.12 for the Belgian cohort, 2.17 for the Lombardy cohort, and 2.14 overall. When the researchers analysed the relationship between pancreatic cancer and incretin use by duration of exposure, they found that the risk of developing cancer decreased over time, from a peak 2.3-fold increased risk at three to six months, a two-fold increased risk at 12 months, and a 1.7-fold increased risk after the first year. Following the reverse causation ▼
hypothesis, the team therefore suggested that occult pancreatic cancer may cause disturbances in pancreatic function, which lead to glucose metabolism disorders. These, in turn, may lead to the development of type 2 diabetes, which then rapidly progresses to the point at which insulin therapy is necessary. It is at this stage that the pancreatic cancer often becomes symptomatic and, thus, detectable.

After an intense programme, ECCO2017 ended on 30 January, having hosted roughly 2,500 participants.

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Both the medical physics and engineering departments at The Christie NHS Foundation Trust and the centre for proton therapy at the Paul Scherrer Institute (PSI) have developed Monte Carlo calculation engines to recalculate proton pencil beam scanning therapy plans. The aim of this visit was the comparison of these two systems, which are both based on PSI commissioning data.

Our first goal was to verify that both setups were working correctly by showing that the simulation results are comparable. Second, we planned to assess the remaining differences to quantify the influence of user specific settings and setups on Monte Carlo simulations.

We started by carefully comparing the configuration of the two Monte Carlo engines.

The system developed at the Christie uses the programming interface Gate, whereas the PSI system uses TOPAS, which are both based on the Monte Carlo toolkit Geant4. The physics settings in each software were chosen differently. Additionally, the geometry, which is shown in figure 1, differs as follows. In the Christie system (figure 1 a), the beam is modelled starting at the monitor unit chamber (74.1cm upstream of the isocenter) to model absolute dose. In the PSI system (figure 1 b), the beam starts further downstream, just behind the preabsorber at the nozzle exit (47.8cm upstream of the isocenter). At the Christie, the preabsorber is modelled by modifying the beam optics, whereas in the PSI system, it is included as a physical component.

For a detailed comparison of the simulation results, we first calculated the dose distribution...
resulting from single spots in air, water and bone. Then we used real patient data to recalculate fields (each consisting of 1,800 to 3,300 spots) in water tanks and in the patient CT.

From these simulations, we concluded that the single spots in air match within the expected uncertainties. In water however, small differences in absolute dose could be detected, which were more enhanced if the preabsorber is used. In bone, we found range differences of up to 4mm.

The dose of the fields in water were analysed using a gamma analysis tool developed at the Christie. Relative doses agreed very well. Small differences in absolute dose values were found not to be clinically significant, however they need to be investigated further.

In the patient CT, we implemented the same Hounsfield unit-to-material calibration in both systems. First results (figure 2) show an agreement of over 97% for a 2% 2mm gamma analysis. Small range differences were found that need additional analysis.

In summary, we found a very good agreement between the two simulation setups. This is very reassuring and gives us confidence to use both tools for further studies.

The remaining differences are very interesting. After the visit, these have been investigated further and they have been traced back to ▾

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Figure 2: Simulated dose distributions in a patient CT calculated using the PSI (a) and the Christie (b) system, analysed using gamma analysis (c)
different ionisation potential settings for the water used in the initial tuning of the two Monte Carlo engines. In fact, elemental ionisation potentials reported in the literature vary, and this leads to uncertainty in the calculated proton range in both water and tissue. To investigate these issues two follow-up projects are planned: a sensitivity analysis to evaluate the influence of elemental ionisation potentials on patient calculations, and the development of a standardised geometrical phantom to benchmark Monte Carlo simulations against measurements in non-water materials.

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This article will highlight the health service research and health economics topics that were addressed during ESTRO 36. The diversity of the topics was quite stimulating; talking about affordability, the evaluation of clinical benefit, and quality and choice of optimal treatment. In addition, there were very encouraging updates on progress in international and European projects addressing the bigger picture.

Yolande Lievens, Peter Dunscombe and Madelon Johannesma
Call for more epidemiological and health systems research to improve the efficiency of available interventions, and more technological research to reduce their cost.

Affordability, sustainability and equity - the most serious problems in cancer today

These topics were discussed by Ajay Aggarwal (London School of Hygiene and Tropical Medicine, UK) and Lionel Perrier (Centre Léon Bérard, Lyon, France) during their presentations at the session on ‘Costs and value of radiotherapy innovations’.

The current situation shows an absence of correlation between healthcare expenditures and outcomes of each treatment, hence they suggest reshuffling research priorities to improvements that actually have an impact on the outcomes. While economic evaluation methodology, and more specifically health technology assessment (HTA), is an approach which is far from perfect, it does at least offer a framework for developing robust costing methodologies. Thus a well-performed HTA can help in eliminating inefficient practices of care, designing appropriate end points for relative effectiveness research, for allocating resources, and for de-politicising reimbursement decisions and the impact of marketing. While stressing the importance of committing to the development of ‘level 1’ evidence, Dr Aggarwal invited all researchers to explore these areas.
to begin linking HTA with reimbursement where level 1 evidence or good quality cohort study data exist. Dr Perrier called for more frequent uptake of HTA studies which are of great use in informing purchase decisions in any department. A review of costing study quality in radiation therapy (RT) stresses that the description of the costing assessment material and methods could benefit from greater rigour. A review of the quality of costing studies in RT has shown that they could benefit from greater rigour in describing the costing assessment part of the analysis.

**Optimal choice of treatment and the valuation of clinical benefit of treatment and new technology**

Yvette van der Linden (Leiden University Medical Centre, The Netherlands) discussed the need for modifying goals in palliative radiotherapy during her lecture on ‘High tech or low tech for metastatic disease, how does one decide and what is the cost-benefit?’ It is essential to choose the optimum treatment taking into consideration a collection of non-medical factors such as availability of timeslots on the linac, patient’s treatment time, the comfort of the patient (e.g. whether it is painful to move or to lay still), along with the cost of the different options. She stressed that refining the selection of patients by accounting for these non-medical aspects can be done by using prospective studies and registries to compare toxicity and effectiveness.

Hayeon Kim (University of Pittsburgh, USA) reviewed economic evaluation studies of brachytherapy that employed measures of quality adjusted life years (QALYs). She found out that the topic is addressed by only a limited number of studies and that the QALYs used in cost-effectiveness analyses were based on limited utility values. Hence, she strongly recommended further research on quality of life measures in the field.

The magnitude of clinical benefit scale (ESMO-MCBS), a standardised generic validated approach to stratify the magnitude of clinical benefit that can be anticipated from anti-cancer therapies, was presented by Elisabeth de Vries (University Medical Centre Groningen, The Netherlands). The scale’s objectives are: to highlight treatments which bring substantial improvements to the duration of survival and/or the quality of life (QoL) of cancer patients, and to support the setting up of accelerated reimbursement evaluations in countries.

**Human resources for radiotherapy and the optimal uptake of brachytherapy – update on BrachyHERO project**

Looking specifically at brachytherapy, Jacob Lindegaard (Aarhus University Hospital, Denmark) presented the results of the BrachyHERO project, which conducted a survey on resource availability. The data presented were preliminary and from 12 centres in Europe. The purpose was to identify the challenges to be tackled next in collecting data for the whole of Europe. Such challenges include, amongst others, the inconsistent interpretation of terminology and wide variation of operation workflows. The next step for the BrachyHERO project was introduced by Josep Maria Borras (University of Barcelona, Spain) who presented the existing methodologies for estimating the optimal utilisation need for brachytherapy and the challenges of epidemiology based needs assessment, which has been previously applied to external beam radiation therapy (EBRT) in the HERO project. The data required to estimate the number of patients requiring brachytherapy are data on cancer incidence, the distribution of tumour sites and population-based stage at diagnosis.▼
Expansion of access to radiotherapy

The GIRO project, introduced by Yolande Lievens (ESTRO president and from Ghent University Hospital, Belgium), aims to improve comprehensive cancer control across the world by providing support to countries on scientific dissemination, education, tools and advocacy.

Lack of availability of RT in low and middle income countries (LMICs) contributes to enormous global inequalities. The primary cause of years of life lost due to cancer in the developing world is cervical cancer. By 2035, the universal HPV vaccination will reduce the need for RT to less than ten percent in a modelled context where the maximum vaccine efficacy is achieved. Nonetheless, the need for radiotherapy will persist due to the growing population at risk and the incomplete effects of vaccination and prevention. By conducting this research, Danielle Rodin (University of Toronto, Canada) advocated for improvement of RT access so as to focus on...
pathologies such as cervical cancer, which affects large proportions of the population in LMICs and for which RT is recommended.

Eduardo Zubizarreta (International Atomic Energy Agency, Vienna, Austria) presented recently published results of total costs of RT treatments and the number of EBRT devices required (as the percentage of available equipment) to treat all patients who need it. These are 194%, 65%, 9%, 14% and 0% respectively for Africa, Asia-Pacific, Europe, Latina America and North America.

In addition, Mei Ling Yap (Liverpool Hospital, UK) shared experience of a related project and described the challenges of RT availability at the country level, which include the lack of universal coverage and the limited training.

**Conclusion**
The key take-home message that was repeated across the many health service research presentations, can be summarised by three points. First, we need to begin collecting level 1 evidence and population-based data for epidemiology-based needs assessment. Second, we should develop value frameworks to appraise clinical benefits of new technologies together with setting up more frequent (small) HTAs in order to widen the criteria supporting choice of optimal treatment options along with pain and QALY measures. Last but not least, we must focus on projects that have an impact on global access to RT.

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RESEARCH PROJECTS
Introduction
The aim of the European Particle Therapy Network (EPTN) is to promote clinical and research collaboration between the rapidly increasing numbers of European particle therapy (PT) centres and to ensure that PT becomes integrated in the overall radiation oncology community.

At the last meeting in 2016 it was decided to combine work packages (WPs) 1 and 3 as there was an overlap on tasks. The combined group is now WP1 clinical and is led by Hans Langendijk. The need to include a WP on education was also raised. EPTN’s educational aspects will be covered in WP3.

Since the last meeting in 2016, there has been a change in the organisers of the EPTN. Michael Baumann has stepped down due to other engagements and has been replaced by Cai Grau.

Below are the reports from the work packages discussed at the third meeting in April 2017.

WP1: clinical
The overarching aim of WP1 is to establish a firm basis for evidence-based particle therapy at a European level. Next to this general aim are the following, more specific additional objectives:

1. to identify the methodological issues related to phase 1 and 2 studies as well as to randomised controlled trials comparing photons with particles, and to define general guidelines for the design of clinical trials to overcome these issues;

2. to establish an expert committee to advise and support researchers in Europe in the design of clinical trials in particle therapy;

3. to define the content of uniform prospective data registration programmes on a European level for the most common tumour types treated with particle therapy.

To achieve this, we will establish two tasks: First, all possible methodological problems related to clinical studies on particle therapy will be identified. To this end, an invitational conference has been organised with a number of experts in the field of particle therapy (radiation oncologists and medical physicists), methodology, epidemiology and statistics. Based on the outcome of this conference, a checklist with minimal requirements and quality points will be created that can be used to review future studies and trial protocols. An expert committee (EC) will be founded that can be consulted on the design of future clinical studies on particle therapy. The EC will also be responsible for setting up meetings where future studies can be discussed. It should be noted that ESTRO/EPTN is not going to conduct clinical trials but intends to use existing platforms and organisations, and that external funding is needed to run such trials.

Second, uniform prospective data registration programmes at a European level for the most common tumour types treated with particle therapy will be described. This task is divided into sub-tasks for nine patient groups frequently treated with particle therapy, including central nervous system, head and neck, breast, lung, oesophagus, lymphoma, sarcoma, prostate and...
paediatric cancer. For each tumour type, different levels of assessments are defined:

- Level I: minimal dataset (routine basis, mandatory);
- Level II: extended dataset (routine basis, optional);
- Level III: research dataset (with framework of research project, requiring additional informed consent, optional).

Task leaders and sub-task leaders will be appointed very shortly.

WP2: dose assessment, quality assurance, dummy runs and technology inventory

As of March 2017, 14 centres in eight different countries confirmed their interest in contributing to WP2, with a total of 18 participants.

The first general WP2 workshop was held on the 28 March 2017 in the ESTRO office in Brussels. We had 14 representatives of 13 different institutes at the workshop. During the workshop six working groups (WG) were created to cover the different areas of interest of WP2. The focus of each working group was discussed and redefined. The following main changes have been made:

1. 'Reference dosimetry' WG: as the definition of standards for reference dosimetry and primary beam monitor calibration for particle therapy are currently being addressed by other committees outside EPTN, WP2 will gather primarily the experience from different centres by sharing results on this topic to provide valuable inputs to the existing committees. We are also closely following the update of the Technical Reports Series (TRS), where members of the WG are involved.
2. Reference dosimetry audits and end-to-end audits are now combined in one WG.
3. Two additional working groups were created, one on ocular treatments and one on patient specific verifications.

The new configuration of the working groups is the following:

1. Quality assurance/equipment survey:
   preparation of a questionnaire to be sent to interested centres in Europe with the aim of collecting information regarding the dosimetric quality assurance tests performed on particle machines by the different centres, including the type of test, the frequency, the tolerance and the equipment used.
   Action: to send out the questionnaire in the summer 2017.
2. Reference dosimetry: share results and experience between centres with respect to reference dosimetry and monitor calibration.
   Action: to propose well-defined tests for a better interpretation of the results across institutes and to follow closely the update of TRS.
3. Audits: to create a network of centres interested in participating in reference dosimetry audits and end-to-end audits.
   Action: to propose well-defined end-to-end tests with anthropomorphic phantoms.
4. Patient specific verifications: to look at the equipment needed for patient specific verifications, and at the tools and criteria for the comparison between measured and planned dose.
   Action: to include patient-specific verifications in the survey.
5. Dosimetry tools: to create a database of dosimetry equipment in use in particle therapy. The specific needs for this WG will be addressed only after reviewing the results of the survey.
6. Ocular treatment: dedicated working group to address the topics of WG2-5 specifically for ocular treatments.

WP3: education

Coordinators have been defined after the Brussel’s meeting for this WP (Marco Schwarz, Trento, Italy, and Morten Hoyer, Aarhus, Denmark). They will start working together with a longer list of key people. The initial task of the WP will be to map the need and availability of education in PT in Europe. ESTRO already has an online network of education courses in use. This can be taken advantage of. ESTRO has an annual budget for a certain number of mobility grants, staff needing training in PT can apply for those and if successful can have up to three weeks training in PT at a centre able to offer the training. Commercial companies also offer training on their own equipment. Training of radiation therapists could be a specific focus for ESTRO. Issues that need to be tackled include relations with the European Network for Light Ion Hadron Therapy (ENLIGHT) and potential collaborations with vendors.
WP4: image guidance in particle therapy

WP4 focuses on the importance of imaging and image guidance in advanced particle therapy. Its first aim is to understand and investigate the merits and caveats of the use of image guided particle therapy (IGPT) in current practice within European particle therapy centres. Secondly, WP4 aims to identify current challenges, as well as ongoing and future research activities in this rapidly developing field.

WP4 has identified key people in 19 European PT centres. A questionnaire that has been sent out to these centres has been analysed by the WP4 coordinators (Alessandra Bolsi, PSI Villigen, Switzerland; Aswin Hoffmann, OncoRay, Dresden, Germany). Preliminary results have been communicated to the key people. For a more detailed analysis, assistance was requested from the same group.

On February 17, the WP4 coordinators organised a first workshop at OncoRay, Dresden, Germany, to meet with all interested people from the group. The meeting was attended by 17 participants from 12 different centres around Europe. The following agenda points were discussed:

- specific aims of WP4,
- achievements so far,
- provisional analysis of the questionnaire results,
- organisation of sub-working groups based on interest and expertise.

Based on these discussions, the group agreed to put together a library of clinical practice, describing the current practice of IGPT in European centres. Furthermore, four sub-working groups have been defined based on interests and expertise of the participants. These sub-working groups are primarily categorised by body site:
1. brain, head and neck (Iuliana Toma-Dasu, Stockholm, Sweden; Dante Amelio, Trento, Italy)
2. thorax (Alexandru Dasu, Uppsala, Sweden)
3. abdomen and pelvis (Markus Stock, Wiener Neustadt, Austria)
4. extremities (to be discussed in May meeting)

These are subdivided into imaging workflow steps:
- simulation and planning
- image guidance
- treatment verification
- treatment evaluation and adaptation
- 4D imaging for treatment of moving targets

Coordinators of the sub-working groups will initiate further discussions on each of these steps.

Discussion on future meetings of WP4 took place in May at the ESTRO 36 conference and will continue in early 2018 at the Proton Therapy Centre Czech in Prague.
WP5: treatment planning systems in particle therapy

A meeting of this working group took place once again in Brussels. Attendance was good, with 14 participants from different centres taking part. In the first meeting, a number of different tasks had been identified for this group, and each was reported on in this meeting.

Collective treatment planning system (TPS) specifications (Hakan Nystrom, Uppsala, Sweden)
- Various centres have been contacted to ask if they would provide their TPS specifications.
- The specifications submitted have been collated together into a common structure.
- However, legal issues prevented some institutes from being able to provide these.
- In the first version of the ‘collective specifications’, it has been noticed that the customer requests are often different to the acceptance procedures proposed by the vendor. This is an additional area that this task group could investigate.

Planning standards and case solutions (Tomasz Kajdrowicz, Krakow, Poland)
- A planning comparison has already been organised in collaboration with Italy, Poland, Austria, Czech Republic and Sweden (IPACS group), with different cases having been distributed and planned at different institutes within this consortium.
- A first paper on the results of this is in preparation and will be presented at the next WP5 meeting (to be organised in summer).
- It was stressed that the IPACS group is not closed and anybody can join, so these same cases could be distributed to more groups.
- A next step could be the distribution of common beam data and machine parameters such that differences between optimisation/dose calculation engines could be studied. This, however, needs careful planning.

TPS commissioning and validation (Xavier Vermeren, Essen, Germany)
- A questionnaire is to be distributed to participants in preparation for putting together a recommended procedure for commissioning and validation of proton TPS.
- Existing photon recommendations will be used as a basis.
- The idea is to produce a best practice document, and not a legally binding document.

Alternatives to patient-specific verifications (Tony Lomax, Paul Scherrer Institute, Villigen, Switzerland)
- A questionnaire to be distributed to participants is being prepared with the aim of taking a snap shot of the patient-specific verification procedures in use in European centres at the moment.
- However, it was noted that this should be coordinated with WP2 (dosimetry).
- There is a general consensus within the group that patient-specific verifications are time-consuming and not particularly efficient or useful. As such, log file-based dose reconstructions could be an interesting alternative.
- A job of the WP therefore could be to encourage manufacturers to provide log file data, and this should be included in the standardised TPS specifications being put together as part of this WP.

CT Hounsfield units calibration (Christian Richter, Dresden, Germany)
- This has been a very productive group, with a survey already written, distributed and the results analysed.
- Seven centres replied to the survey.
- Six use SECT for planning and one uses DECT.
- Five use the stoichiometric approach, two base the calibration directly on tissue substitutes.
- Three use a single curve, four centres use multiple curves.
- Metal artefact handling is performed in different ways, and there is room for standardisation here.
- The next step is to plan a calibration audit using a standard ‘ground truth’ phantom sent to different centres.

Robustness analysis (Frank van der Heuvel, Oxford, UK)
- A review of the current robustness metric was presented to the group.
- Six different methods were identified, which have all been implemented in Oxford and tested on a small number of clinical cases.
- The consensus in the group was that robustness should guide planning but should not be a strict goal.

Other points
- Relative biological effectiveness (RBE)/linear energy transfer (LET) evaluation and
optimisation in TPS are not currently covered by the WP.
- The general consensus was that LET is currently more useful than RBE, and should be included in TPS systems. This is to be included as part of robustness analysis task.
- Four-dimensional planning is not presently covered but a new sub-group is to be defined.
- Vendor involvement could be achieved by inviting vendors to meetings on specific topics, but they should not be permanent members of the WP.
- More involvement from medical doctors in this WP would be appreciated.

WP6: radiobiology

The activities of the WP since the last EPTN meeting include reports in the ESTRO newsletter and presentations during recent meetings (ENLIGHT meeting 2016 and ESTRO 35). A dedicated talk on ‘The ESTRO initiative on biological effects of particle therapy’ was presented at the ESTRO 36 conference.

Radiobiology was the main topic of an expert workshop on radiobiology of proton therapy, which was held in November 2016 in Dresden, Germany. Here, the following topics were discussed:
- available RBE data, known RBE variability and dependencies;
- physics and biology for treatment planning;
- combining protons with systemic treatment;
- particularities of clinical trials testing biological effects of protons.

All groups involved in particle radiobiology have been invited to complete a questionnaire to determine the current and detailed status of radiobiological studies. So far, 11 institutions have responded: Aarhus (Denmark), National Centre of Oncological Hadrontherapy (Italy), Dresden (Germany), Essen (Germany), Heidelberg ion-beam therapy centre (Germany), Katholieke Universiteit Leuven (Belgium), Maastro (Belgium), MedAustron (Austria), Paul Scherrer Institute (Switzerland), the Christie (UK) and the University of Gronigen (The Netherlands). The information from the questionnaire will help to guide future collaborative research and will be summarised in a forthcoming publication.

The next steps of the WP will be a face-to-face meeting. There is expectation that WP6 achieves progress on practical research cooperation for the next EPTN meeting in 2018. We are encouraged to organise a face-to-face meeting between coordinators and participating centres/institutions. WP6 also needs to explore how to form a network of distributed facilities for a common approach, sharing data and sufficient beam time as well discussing how to implement standardised research methodologies.

WP7: health economics

Yolande Lievens (ESTRO President and Ghent University Hospital, Belgium) presented the current status of WP7, which is dedicated to health economic aspects of proton therapy. Health economics can contribute to a better understanding of the cost-utility ratio of PT in the context of other commonly used radiation modalities. This is an inevitable exercise as innovations (PT is still an innovation, despite its long history) have to demonstrate not only their clinical superiority but also their economic characteristics. The results generated, for instance in health technology assessments (HTAs), are used to make informed decisions about whether to adopt at all, or reimburse corresponding treatments. Accordingly, HTAs are critical for PT since the decision-makers, such as health insurers and government bodies, rely on the results of these structured evaluations.

The first challenge in this work package is to get some basic economic performance data on PT centres, in order to develop models that would give better insights with regard to overall operating cost. The aim is to align this work to other initiatives within ESTRO, in particular the costing model developed in the ESTRO-HERO project. In order to capture the necessary data, last year we developed and sent out a survey with this intention. However, the response from PT centres was reluctant, as a result of which more detailed modelling efforts are delayed. The conclusion on the first survey was that it might have been too detailed. Accordingly, the WP7 team, which has been enriched by Dr Ulrike Kliebsch who joined from the Paul Scherrer Institute, is working on a more focused survey.

In addition to these efforts aiming at basic economic data, we are working on a connection between clinical outcome (including side effects) and cost data. This will allow us to deploy data in various health economic assessment formats including cost-effectiveness and cost-utility,
or comprehensive formats such as HTA and comparative effectiveness research. Health economic profiles of innovative technologies such as PT are important means to establish them as valuable therapeutic approaches within the global landscape of already established radiation therapy modalities.

General discussions

EPTN and ESTRO

EPTN is now a task force of ESTRO. It falls under the remit of the scientific council of ESTRO and is expected to report annually on its activities to the ESTRO Board. As a task force it will be evaluated at a certain point either to become embedded in the ESTRO structure or to plan an alternative way forward.

EPTN and the Particle Therapy Co-operative Group (PTCOG)

EPTN activities are complementary to those of the PTCOG. Partners in EPTN are free to take part in PTCOG activities, committees or the Board. PTCOG has held its annual 2017 meeting, and discussions have been initiated between PTCOG executive committee and ESTRO/EPTN to have a memorandum of understanding between the parties.

EPTN and the European Organisation for Research and Treatment of Cancer (EORTC)

The participants supported a continued and stronger collaboration with the EORTC, in order to utilise the expertise and infrastructure for conducting radiotherapy trials in a multi-institutional setting. A meeting between key
Research funding
Karen Kirkby (University of Manchester, UK) shared her experience in submitting two proposals on PT – INTREPID and INSPIRE – to the European Commission (EC) for funding. In such applications, it is not possible to include all centres of EPTN. However, she had approached some member institutes depending on the skills needed for the projects. Other would-be partners are from industry, a small business, and international institutes outside the European Union (EU). The two proposals had been submitted and decisions on funding would be known by June 2017.

There is no specific research funding for PT in Europe. The EC, including the Directorate Generals for Health and Research, seem to have either little interest or a negative impression of PT. There is a need to lobby members of the European Parliament to ensure that PT is included in descriptions of calls for funding. ESTRO uses its stakeholder council to lobby EU institutions and promote radiotherapy, and PT can be included. The EORTC is willing to help and be involved in the search for funding. The EPTN organisers, Cai Grau and Damien Weber, together with the ESTRO leadership and WP1 leader, Hans Langendijk, will include this aspect in their discussions with EORTC.

Industry should also be approached via ESTRO, though caution must be exercised to avoid conflict of interest. It is advisable to first publish data before sharing with industry. Private companies are also organising their own PT meetings. EPTN does not endorse such meetings.

Next meeting
The next meeting of the EPTN in 2018 will be organised back-to-back with the ENLIGHT annual meeting in London.

On behalf of EPTN
Damien C. Weber (Villigen, Switzerland)
Cai Grau (Aarhus, Denmark)
EPTN organisers

For more information on EPTN visit: estro.org/about-us/governance-organisation/scientific-council/task-forces/european-particle-therapy-network
Or email Evelyn Chimfwembe at: echimfwembe@estro.org
INSTITUTIONAL MEMBERSHIP
INSTITUTIONAL ESTRO MEMBERSHIP

The institutional membership category has been especially designed for European hospitals, clinics or other institutions that seek to continuously develop and support their radiotherapy and oncology professionals. In this Corner we invite our institutional members to provide us and you with some feedback on their experience and institute. The Istituto del Radio ‘O.Alberti’, Brescia University and Spedali Civili Hospital, Italy, is the guest of the month.

BECOME AN INSTITUTIONAL MEMBER

The opportunity to sign up batch groups of five people, represents good value for money, whilst benefitting from all regular membership advantages, as well as a few extra advantages created just for your institute. The packages include various membership types and a minimum of three disciplines need to be represented.

Detailed information can be found on the website: www.estro.org

Contact: institutional-membership@estro.org
Istituto del Radio ‘O.Alberti’, Brescia University and Spedali Civili Hospital

Brescia, Italy

Spokesperson: Professor Stefano Maria Magrini
Number of ESTRO institutional members: 30
Websites: en.unibs.it - www.asst-spedalicivili.it

The team of Istituto del Radio ‘O. Alberti’ of Brescia

The Spedali Civili Hospital is one of the largest academic hospitals in Italy. It is a tertiary referral centre that covers all the surgical and medical specialties.

How would you describe the radiation oncology department of your institute?

The Istituto del Radio is an academic clinical oncology department including a day hospital (for chemotherapy, supportive care and minor invasive procedures), an inpatient ward with 24 beds, an outpatient area with disease oriented clinics, a brachytherapy section with two beds, high dose-rate and low dose-rate facilities and a dedicated operating theatre. A large treatment area includes different treatment planning systems, each with multiple working stations, a dedicated facility for image fusion/dose calculations from multiple plans, four linacs (two with an onboard CT), a tomotherapy unit, and a big bore CT for simulation. The institute has a dedicated area within a large laboratory, equipped with the facilities needed to study cell cultures and molecular biology, and a machine for next generation sequencing.
This is one of the biggest and oldest radiation oncology departments in our country and the workplace of 14 radiation oncologists, 13 trainees in radiation oncology, a PhD and a PhD student in radiobiology, five medical physicists, biotechnologists, data managers, an engineer specialised in IT, 23 radiation therapists, 28 nurses, 13 auxiliary operators and three administrators.

What are the main areas of specialisation in your department?
All the cancer types are treated in our department. The multidisciplinary approach, with regular weekly multidisciplinary meetings, is routinely practised for the main tumour sites. A particular interest is head and neck malignancies, prostate and breast cancer, lymphomas, brain and lung tumours.

What are the main achievements so far, and the main challenges in your daily work and for the future?
The main achievements in the last decade consisted of the rapid development of research and teaching activities, substantial technical innovations, a significant increase in brachytherapy applications, the establishment of a preclinical research team and the integration of all these activities with a tradition of excellence in the field of clinical oncology. For the future, we would like to develop further the combination of new drugs and biologicals with radiotherapy, in our daily practice and in a research context.

Is your department currently undertaking studies or clinical trials that you would like to share with the ESTRO community?
The institute is currently participating in a dozen national and international clinical trials. Some of them are part of a research programme based at our institution and open to collaborations. For example, we recently launched a large observational trial on the role of nodal pelvic irradiation in prostate cancer and about 80 Italian centres have joined. The institute is project leader for this study (the principal investigator is Dr Michela Buglione, michela.buglione@unibs.it). A phase 2 single institute study on adaptive radiotherapy and functional imaging in oropharynx cancer is currently recruiting, and will be the base for further research projects. A homemade software for the analysis of biologically equivalent dose volume histograms is being tested in prostate cancer, lymphomas, and head and neck cancer series. Analysis of clinical-pathologic and biological correlates in gliomas, and head and neck cancers is another active research area that is open to collaborations.

What attracted you to apply for an institutional membership and why is it important for your institute that its staff members are part of ESTRO?
Our aims are:
- to be more involved in building a European network for the people trained at our institution (which is the site of the radiation oncology school of the Brescia University) and to facilitate exchange of experiences and training opportunities;
- to facilitate international scientific cooperation;
- to contribute to the success of the ESTRO vision in the multidisciplinary arena, also by enriching it with the point of view of Italian radiation oncologists.

In your opinion, what additional benefits would be useful as part of the institutional membership package?
To allow a more individualised composition of the packages, grouping together different professionals, to accommodate the different types of institutions possibly interested in starting institutional membership.

Is there anything particular about your institute that you would like to promote and share with the ESTRO community?
The department organises an annual meeting (usually between September and November)
focusing on one aspect of clinical oncology and radiobiology (the official language is English). Physicians, physicists and radiation therapists are actively involved in the organisation of the meeting and they also actively participate in the event. Pre-meeting courses for younger professionals are usually organised. We also run many other teaching activities and some of them are open to young radiation oncology professions from other countries.

Prof Stefano Maria Magrini
Istituto del Radio ‘O.Alberti’, Brescia University and Spedali Civili Hospital,
Brescia, Italy

FACT FILE

Description of your institution
This is a clinical oncology tertiary referral centre, including an inpatient ward, a day hospital, a large treatment area, outpatient clinics, a brachytherapy section, and access to a laboratory for preclinical studies.

Areas of specialisation
Head and neck cancer, prostate and breast cancer, lymphomas, lung and brain tumours.

Ongoing projects/studies/clinical trials
We participate in a dozen national or international trials and we are running clinical and preclinical research, both for specific disease sites and for the development of software for clinical radiobiology analyses.

Equipment used in the radiation oncology department
Four linacs (two with on board CT) and a tomotherapy unit, different treatment planning systems, a workstation for image fusion and plan sum, a big bore CT for simulation, and a brachytherapy unit with dedicated operating theatre.

BRESCIA MEETINGS IN RADIATION ONCOLOGY, 2017 EDITION

The other side of uro-oncology: the role of the radiation oncologist in the management of bladder, kidney and testis cancer

21-22 September 2017
Brescia, Italy

The national societies meeting was hosted at ESTRO 36 in Vienna, a city known as the heart of Europe. Beyond any shadow of doubt, it is an extraordinary city in which to host the gathering, opened and chaired by Professor Umberto Ricardi, President-elect of ESTRO and current chair of the national societies’ committee. The meeting brought together 60 representatives from 20 European countries: Austria, Belgium, Denmark, Finland, France, Greece, Hungary, Ireland, Italy, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Spain, Switzerland, The Netherlands, Turkey and the United Kingdom.

Panagiotis Papagiannis
Member of the ESTRO national societies committee
Medical School, University of Athens
Athens, Greece

If your national societies would like to share views on topics of common interest, please contact the National Societies Committee via Gabriella Axelsson: gaxelsson@estro.org
This year’s programme gave representatives from the European radiation therapy community the opportunity to familiarise themselves with the latest development in ESTRO activities, as well as some of the latest happenings in partner associations. The programme also included speakers presenting specific topics on radiotherapy under the following categories: call for participation, research projects, new opportunities and updates on activities.

The first session, by Coen Rasch of the Dutch Society for Radiotherapy and Oncology (NVRO), emphasised the importance of attention to the future availability of isotopes. He asked the audience to consider whether ESTRO and the International Atomic Energy Agency (IAEA) should be part of the dialogue, and contact national societies to share basic information on this topic via a short survey.

In the subsequent sessions, the Health Economics in Radiation Oncology (HERO) research...
The HERO research projects were presented by ESTRO President Yolande Lievens and health economist Noémie Defourny. Representatives were provided with the preliminary results from the HERO survey on reimbursement, together with updates on the costing model currently underway. Moreover, the need for clear data underpinning the case for radiotherapy was emphasised, with the aim of harmonising the approach in reimbursement systems across Europe. This initiative was well received with appreciation expressed from the floor. At the end of the year, the national societies will be invited to Brussels for a HERO workshop that will be held together with a short networking event at the European Parliament.

Jointly organised by ESTRO and European Organisation for Research and Treatment of Cancer (EORTC), the oligometastatic cancers project was introduced by Matthias Guckenberger. He outlined the complexity of oligo metastases and oligo progression, with the message that a pragmatic registry of large cohorts of patients is needed to establish evidence on how treatments work over time and in real life. National societies were invited to help to further the evidence through large studies of patterns of care and patterns of outcome.

Colleagues from the IAEA, E. Eduardo and Y. Pynda, showcased the Directory of Radiotherapy Centres (DIRAC), a resource for radiotherapy service planning, investment in care infrastructure and development of business strategies, as well as advocacy for equity of access to cancer treatment.

Expressing the need for increased recognition of the radiation therapist (RTT) community, Mary Coffey spoke on behalf of Michelle Leech, explaining the need to strengthen their voice in order to facilitate improved recognition and professional development.

For this reason, ESTRO launched the RTT Alliance, a platform that all RTT national societies can join. It aims to play a major role in the political arena calling for better representation of RTTs on the oncopolicy scene in Europe, and for improved recognition of the profession in the treatment of cancer patients. Since the end of last year, nine countries have signed up.

Under the remit of the radiation safety and quality committee, chaired by Mary Coffey, the ‘Radiation Oncology Safety Education and Information System’ (ROSEIS) has been established to “enable radiotherapy clinics to address safety issues before an accidental exposure occurs and to create a general culture...”
of safety awareness”, as well as to comply with EU regulations, and provide an additional reference for national societies in their local context.

In addition to current projects, several new initiatives have been launched. A report was given on the three ESTRO journals (*Clinical & Translational Radiation Oncology, Physics & Imaging in Radiation Oncology*, and *Technical Innovations & Patient Support in Radiation*). All are open-access journals that publish original research, review articles, technical notes, case series and reports.

Developments with the European Commission and the European Parliament were presented by Chiara Gasparotto, ESTRO director of partnerships and policy. The ESTRO leadership has begun to meet with some European Union officials and Members of the European Parliament to establish connections with decision-makers and to further dialogue with policy-makers. This programme aims to promote the general interests of the radiotherapy community. More notably, it aims to generate understanding and responses to the radiotherapy situation in Europe, while empowering societies with information and facilitating advocacy at the national level.

Numerous opportunities also exist within the ESTRO School, providing around 35 continued medical education accredited courses per year to advance the exchange of best practices, latest research and techniques.

Providing a promising view on the professional practice of alliances, networks, and partnerships, ESTRO looks forward to continued collaboration to promote and foster safe radiotherapy practice at the European level, and to continue to support the national societies and their needs for the benefit of the wider radiotherapy community. This will have an impact on research, policy and practice, and ultimately deliver the optimal service to patients and their loved ones. Looking ahead, extraordinary accomplishments can be achieved, thanks to the commitment of the community.

Oncology professionals and associations continue to liaise with national societies and the wider radiation oncology community, uniting leaders across an array of important matters to provide improved radiotherapy services. Individually, none can solve the complex challenges faced in radiotherapy on the national or global scale. But together, we can contribute to curing cancers through safe radiotherapy. Prof Ricardi concluded the meeting by thanking everyone for their commitment and invaluable support.

*Gabriella Axelsson*  
*Public Affairs Project Manager, ESTRO office, Brussels, Belgium*
CONFERENCES
FOCUS ON ESTRO 36

ESTRO 36 scientific reports

Awards

Statistics

Super Run

Photo album
The congress report: a selection of the best studies explained by their authors

You can still access the various scientific materials from the congress, such as the abstract book and the programme book. More importantly, do not miss the congress report: the chairs of each track have selected some of the highest-scoring abstracts. We have asked their authors to share the outcome of their work with us. The report also includes summaries of the awarded lectures.

Access the congress report: estro.org/binaries/content/assets/estro/conferences/estro36/170523-estro-36-congress-report_web-final.pdf

The July-August newsletter: a tribute to the congress in all the Corners

In this July-August issue, the editors of the Corners and their teams have prepared some articles reporting on the congress. So jump from one Corner to another and, whether you were a participant or not, find out about the main moments of the congress for all the tracks: brachytherapy, clinical, physics, radiobiology, RTT, health economics, national societies, ESTRO School, Society Life and, of course, the Young Corner.
AWARDS

Lifetime achievement awards
Annette Bøjen >
Alan Effraim Nahum >
Jens Overgaard >
Hans Peter Rodemann >
Paul Van Houtte >

Honorary members
Brian O’Sullivan >
Silvia Formenti >
Joanna Izewska >

ESTRO - ELSEVIER award lecture
Jens Overgaard legacy award >
Jean-Pierre Pignon >
Jean Bourhis >
Pierre Blanchard >

Academic award
Jack Fowler University of Wisconsin award
Hendrik Dapper >

Company awards
ESTRO-Accuray award
Peng Jin >
ESTRO-Varian award
Christopher B. Locke >

ESTRO- Elekta Brachytherapy award
Ellis Beld >

GEC-ESTRO best junior presentation Elekta award
Stef Maree >

ESTRO - Elsevier best poster awards >
Eva Rijkmans
Rens van Haveren
Katrina Woodford

ESTRO award lectures
Emmanuel van der Schueren award
Ben Heijmen >

Iridium award
Jack Venselaar >

Honorary physicist award
Vincenzo Valentini >

Claudius Regaud award
Jean Bourhis >

Klaas Breur award
Claus Rödel >

Donal Hollywood award
Paul Essers >

Poster awards >
Emmanouil Fokas
Fatima Padilla
Vickie Kong
FOCUS ON FORTHCOMING CONGRESSES

Lifetime achievement award

Annette Bøjen
Department of oncology,
Aarhus University Hospital
Aarhus, Denmark

What has been your involvement within ESTRO?
I have participated in the second (2002) and third (2011) revisions of the ESTRO radiation therapists (RTT) core curriculum, and have been on the RTT committee since 2012, and on the scientific committee for the annual meetings for the last three years. I am leading the writing group within ESTRO for skin care guidelines. I am the RTT committee’s representative on the national society committee and am an editorial board member for the journal tipsRO.

What have been the highlights of your career?
My main interest has been education and development of radiation therapists, and I have been involved in establishing several interesting projects in this field. The process from idea to reality might be hard work, but gives a high degree of satisfaction when it succeeds.

I want to highlight two projects, which always will be in my mind. The first is the establishment of radiation therapist education for Western Denmark. When I started in the field of radiation therapy I was peer-to-peer trained, based on a background as nurse. Through the 1990s I participated in a working group aimed at developing a formal national education programme for RTTs, and the Danish Ministry of Health accepted the final programme. I headed the first one-year radiation therapist education for Western Denmark in 2000, and am still engaged in that work.

The second is integrating virtual reality as a learning tool for all professions within radiation therapy. I looked after new learning tools for education and understanding the complexity in radiation therapy. The idea was based on a hypothesis that pilots learn to fly in a simulator, so it must be possible to learn radiation therapy in a simulator too. Luckily, we made contact with a group at the University of Hull, UK. The group was in the progress of developing a 3D virtual reality (VR) accelerator and was looking for collaborators to test the programme. In this way, I got the job as project leader to implement the first 3D VR accelerator in the world (later the firm VERTUAL was established). Today the software is used to educate all professions inside radiation therapy and has also been tested as a very powerful tool for patient education.
What do you think are the next challenges for RTTs?
Patient involvement will be one of the areas in the future; and the RTTs are the group who meet, communicate and observe patients on a daily basis. Radiation therapy (RT) can be a very abstract concept for patients and we need to understand how we can ensure patients are informed to a level where they are able to make a decision regarding their own RT treatment and follow-up.

What does this award mean to you?
I regard the award as a symbol of colleagues’ appreciation of my work in radiation therapy and cooperation within ESTRO. I am very grateful, and want to thank all who nominated me for the award.

To whom would you like to dedicate your award?
I want to dedicate this award to Mary Coffey. Mary is the person who, with ongoing engagement, has been fighting for education, development and acceptance of radiation therapists as an independent profession at an international level. Hopefully she remains a role model for the next generations.
Lifetime achievement award

Alan Effraim Nahum
Clatterbridge Cancer Centre
Liverpool, UK

What have been the highlights of your career?
‘Discovering’ some new science during my PhD work, expertly guided by John Greening; working on codes of (dosimetry) practice with Hans Svensson, David Thwaites, Stan Klevenhagen and others; spending three months at the National Research Council Canada in Ottawa working on the Monte-Carlo simulation of ion-chamber response with Dave Rogers and Alex Bielajew; learning radiobiology from two masters, Gordon Steel and Don Chapman; developing a bio-mathematical model for tumour control probability; working with two highly talented postdocs Beatriz Sanchez-Nieto and Julien Uzan on developing software for radiobiological modelling; teaching radiation dosimetry, Monte-Carlo simulation and radiobiology on the Institute of Cancer Research/ Royal Marsden, EGS, ESTRO, MSc and other courses; collaborating with outstanding scientists – from very young PhD students to senior professors – too numerous to mention by name, many of whom have become close friends; and setting up and running the Clatterbridge radiobiology course for the final ten years of my career. I must also mention the international nature of my work – interacting with colleagues from so many different parts of the world. How wonderful to have been able to work not just in Scotland and England, but also in Sweden, Canada, the US, Italy and Denmark!

What does this award mean to you?
It means a huge amount. Doing research involves a vast amount of hard work, at times agonisingly slow progress with many ‘false dawns’, and receiving – directly or indirectly – criticism from colleagues unconvinced by one’s efforts. An award like this means that the ‘blood, sweat and tears’ haven’t all been in vain.

What started your interest in science?
My physics and mathematics teachers at school in Manchester and the example of my uncle, Effraim Nahum, doing a PhD at Cambridge University on ‘splitting the atom’, supervised by physicists who went on to win the Nobel prize. Tragically he was killed by a stray bomb dropped on Cambridge during the Second World War.
When do you think you will retire, and what would you like to do then?
Formally I retired in October 2015. In practice, I am still working (too much!) – writing books, supervising research and lecturing. But when I really do retire, I intend to get involved in some kind of voluntary work. Also, a former PhD student, Paul Mobit, has built a cancer centre in Cameroon and has asked me to help him get radiotherapy started and help teach some university level courses he has set up. I enjoy the challenge of learning languages – I should like to have a go at Hebrew. And there are still many parts of the world I have never been to – Japan, South East Asia, most of South America.

Left to right: Alan Nahum, Claudio Fiorino and Julien Uzan in the ‘modelling’ office at Clatterbridge
**Lifetime achievement award**

**Jens Overgaard**
Department of Experimental Clinical Oncology, Aarhus University Hospital
Aarhus, Denmark

*What have been the highlights of your career?*
The highlight has yet to come!

*What do you think are the next challenges for radiation oncology?*
It is to find its role in multidisciplinary cancer treatment. The immediate challenge for ESTRO is narcissism. The whole scenario where ESMO has pulled out of ECCO and that ECCO subsequently is about to dissolve itself, I think is a very bad thing. We have to lift our heads up and realise that we are part of a team; this is called multidisciplinarity, it is called collaboration. This concept was introduced in Europe many years ago in a visionary way through ESTRO leadership. But ESTRO unfortunately has sunk into a state of what I call narcissism, where we are very focused on our own navel. There's a risk of becoming too obsessed about our own destiny and situation, and forgetting to be a partner and a player in the wider field. Unfortunately I think that this is the path we are on at the moment, and if we do not change direction we will become an increasingly isolated small minority.

*To whom would you like to dedicate your award?*
I think young people should have a mentor. I have been extremely successful in having very good people who, for one reason or another, have taken good care of me.

Within ESTRO, a couple of people have been very good and supportive - one of them was Jerzy Einhorn, the first acting president of ESTRO (Klaas Breur was elected to be the first president but unfortunately he died before taking office). The first active president was Jerzy Einhorn who was head of the Karolinska Institute in Sweden. Jerzy, together with Michael Peckham, were behind the concept of clinical oncology. Jerzy was the first ESTRO person who “took care of me”, something I welcomed. Later I received a lot of support from Maurice Tubiana. These people were visionary and so was Emmanuel van der Schueren. They distributed their ideas and the seeds they put down were allowed to grow and become strong plants. So I would like to dedicate this award to the visionary people who created ESTRO because they indeed deserve it.
What started your interest in science?
My father. That’s a long story. My father was a general radiologist. As a young doctor in the 1930s he did research on the interaction between hyperthermia and radiation, and when he retired in 1970 he started a renewed research career. So, he went to the Cancer Research Laboratory in Aarhus and resumed his old work which made him pretty famous during the next five to six years of his life.

I was a medical student when he started again, so I ended up working together with my father. As a part of that, he had a visitor coming by named Herman Suit. He is, of course, an honorary member of ESTRO and a former Regaud lecturer. At that time he was the head of Radiation Medicine at Massachusetts General Hospital (MGH) at the Harvard Medical School. He was the person who, with strong dedication, started the era of proton therapy which is currently blooming.

He thought it would be a good idea if I joined him in Boston, and consequently both my wife Marie and I went and got some laboratory and clinical training at probably the best place at that time. The group of people at MGH at that time later ended up as some of the most influential people in radiotherapy (editors of the Red journal and Green journal, several ASTRO and ESTRO presidents, etc.) so we developed networks and friendships that were of immense value. This resulted in a lifelong dedication to radiation oncology for both Marie and I.

What do you do in your spare time?
Many different things. Most of all, I have a nice supportive family. Marie and I have eight grandchildren at the moment, some very lovely sons and daughters-in-law, so they take a lot of our time.
What does this award mean to you?
To have received the ESTRO lifetime achievement award this year is a great honour for me as a radiation biologist working in the field of clinically oriented basic research into membrane receptor signalling and its function in the control of DNA damage responses of tumour as well as normal cells. Likewise, as internationally visible research can only be performed with a motivated group of colleagues, this is also an award for all of my co-workers. Without them, many of my scientific achievements would not have been possible.

What are you proudest of in your career?
Besides having received several other national and international scientific awards, I guess the success of the Wolfsberg meeting series on molecular radiation biology/oncology is the aspect of my career I am proudest of. This meeting series was started in 1997 based on the mutual idea of my Swiss colleague and friend Professor Stephan Bodis and myself. We wanted to create a meeting series that provided a platform for dialogue between basic and clinical scientists to promote translation of basic research results into clinical application. This meeting series would also be a platform for an intensive exchange of scientific knowledge between experienced, international leading scientists, and engaged and motivated young investigators just about to start their scientific career. The Wolfsberg meeting series on molecular radiation biology/oncology, held in the splendid location of Wolfsberg Castle on the Swiss part of Lake Constance, has now been running for 20 years and is still organised mainly by Stephan Bodis and myself. The fact that this meeting, based on its scientific structure and atmosphere, has developed to become the leading international meeting in the field of radiation biology/oncology over the years, is probably an exceptional reason to be proud.

What do you do in your spare time?
Whenever there is some spare time – especially in summer – sailing with my wife Katja is my second love and passion. In my opinion, sailing is the activity that gives you the most recreation per time unit possible; one day of sailing equals two to three days of regular vacation. If I had not studied cell and molecular biology and started an academic career, I probably would have ended up as a professional sailor. When I go into retirement, most likely sailing will be the major topic, alongside some other activities that I have not had enough time for while being active in science.
How does it feel to receive the lifetime achievement award?
When receiving this award, I had several feelings. Is it the end of my activities due to my old age or, like a book, the time to turn a page and write a new one? This is certainly what I will try to do – pursue some activities, especially in teaching, but I will also have free time now to fix the track of my model train for my grandchildren or to cook for friends.

What have been the highlights of your career?
This award is also an opportunity to look back on more than 40 years in radiotherapy and oncology practice. The most important step was my involvement in the development of an education programme for young radiation oncologists in Belgium, but also participating in many teaching courses worldwide. There was a lack of such programmes when I started my own training in radiation oncology in the 1970s, but also a lack of a specific European or national societies. Radiotherapy was a section of the European or national radiological societies. I had the opportunity to watch the great growth over the years of two important societies: ESTRO and the International Association for the Study of Lung Cancer (IASLC) which has been very fruitful for the development of lung cancer treatment – in the 1970s there was no great interest in treating this disease.

What do you think are the next challenges for radiation oncology?
ESTRO has been a great platform to promote and develop radiation oncology, not only through the meetings but by developing a great teaching programme. Education is a great investment and the keystone for having a strong specialty now and in the future. Huge progress has been made in our field over the last decades, making us a very strong specialty, but we should take care not to be considered as only technologists of radiotherapy, but remain oncologists involved in the management of the patients and be part of treatment decisions. The technique is only a means and not the end.

To whom would you like to dedicate your award?
When we turn a page of our life, we are also looking over the road we have taken, and it

Paul Van Houtte and Yolande Lievens, ESTRO President (left)
is a time to remember many colleagues and friends. They have had a great impact in my life, helping me in many professional adventures. Many works and activities would not be possible without their friendship but also without the team back at home taking care of the daily life of the department. I am very lucky to have their support. Finally, I wish to dedicate this award to all of them and to my family who have supported me, especially the two people sharing my daily life over the years, Janina and Patricia.
Emmanuel van der Scheuren award

Substantial and “for free” improvement of radiotherapy practice in high and low income countries
Award lecture

Ben Heijmen
Erasmus MC Cancer Institute
Rotterdam, The Netherlands

What have been the highlights of your career?
It seems better that other people say something on this. However, I feel that winning the Emmanuel van der Schueren award is a big honour. It is also, something that happened completely unexpectedly; it had never come up into my mind that I could be a candidate for this prestigious award. Emmanuel van der Schueren was really a huge name in radiotherapy and fundamental to ESTRO. I guess that, as for most colleagues, not winning this award was never a problem. You don’t even think of it because there are thousands of colleagues who also don’t win. If on the other hand you get it, it feels really special.

What is your next challenge?
In the last few years, I have been heavily involved in research projects related to automated generation of treatment plans. In fact, my award lecture ‘Substantial and for free improvement of radiotherapy practice in high and low income countries’ was largely on this topic.

In many studies, it has been demonstrated that automated treatment planning can lead to higher and more consistent plan quality. The planning workload can also drastically reduce. There are still many challenges in this field. Clinical introduction on a somewhat broader scale has only just started. There are many issues related to the safe and effective use of automated planning. If configuration of algorithms for automated planning is sub-optimal, all patients are at risk of being treated sub-optimally. The configurations request a priori large investments of time and effort, leading to better plans and reduced workload only in a later phase. Departments need to adopt such a priori investments in their organisation.

Managers might think that planning automation can result in personnel reductions. This is a real danger for guaranteed, effective and safe patient treatment. Automated planning is not to be used for cost savings. The right incentive for clinical introduction is quality enhancement. Maintaining quality after clinical introduction requires the continuous effort of highly skilled people.

Another challenge that I hope to be working on in the coming years is expansion of the use of automated planning towards low and middle income countries. There is often a clear need, and I see opportunities to drastically enhance plan quality on a large scale.
To whom would you like to dedicate your award?
The award is not just a recognition of my contributions to the field. In everything I did, I was a member of a team. Therefore, winning the Emmanuel van der Schueren award is also a recognition of the contributions of all who I worked with in Rotterdam and beyond.

What is this award about?
The Emmanuel van der Schueren Award is given in honour of the founding father of ESTRO and in recognition of excellent scientific work, enormous contribution within ESTRO to the field of education and promotion of radiation oncology as a discipline.
**Iridium award**

**Brachytherapy physics developments: look back in anger, grateful, and with hope**

Award lecture

**Jack L. M. Venselaar**

Instituut Verbeeten, Department of Clinical Physics
Tilburg, The Netherlands

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**What have been the highlights of your career?**

At the end of the 1990s I was asked by Harm Meertens to take over his position as the physics teacher on the GEC-ESTRO course on modern brachytherapy techniques, which I accepted after having finalised my PhD thesis and defence at Leiden University in 2000. Almost simultaneously, Richard Pötter, as the new chair (at the time, president) of the GEC-ESTRO committee, asked me to write a proposal on brachytherapy physics that was meant to become part of the ESTRO Esquire project. This project was prepared and submitted for the 6th EU Framework under the leadership of Andrée Dutreix and Hans Svensson. The project was accepted, after which Richard told me that I should be the first chair of a new GEC brachytherapy physics group to develop the goals of the proposal. It was a successful project in many respects. We have kept the group together, and I have been very grateful to have the opportunity to lead it for eight years overall.

Another highlight was the start of a new teaching course on advanced brachytherapy physics. The teaching experience on the other course often proved insufficiently in-depth for the physicists participants. In 2014, together with Dimos Baltas as my co-director of this new course, we were allowed to start a biennial schedule. The students’ ratings proved to be very high and Dimos continued as the sole course director in 2016.

**What do you think are the next challenges for radiation oncologists?**

Radiation oncology has made tremendous progress by applying new technology, including using modern imaging techniques to identify targets and critical organs. Brachytherapy publications, for example from the EMBRACE group on the treatment of cervical cancer, clearly show how consistently applied protocols for imaging, dose prescription and plan-optimisation can lead to significantly better results. My feeling is that too often the protocols are there but not fully followed, or that CT or MR is available but not always used at each procedure. There is still a lot to gain.

Another question that comes to my mind is whether or not further lowering of fractionation in brachytherapy is possible, as the first studies in high dose-rate monotherapy seem to indicate. Can we do the same with other treatment indications? What can radiobiology tell us?
about this? And in brachyphysics, will tissue inhomogeneity correction – not only for iridium-192 sources but also for the lower energy sources – influence our way of treatment planning and eventually dose prescription? Even apart from the more technical issues like in vivo dosimetry and the development of independent record and verify systems, there is still a lot of work to be done out there.

What are you proudest of in your career?
For me it is clear that important steps were made towards further international cooperation during the last two decades. Individuals and societies are now closer together. The world has become smaller by using the power of the internet. The willingness to join forces instead of following parallel tracks is apparent, with joined or mutually endorsed reports as a result. The signing of the memorandum of understanding between the American Association of Physicists in Medicine and ESTRO’s physics committee will be a nice example. If our work has contributed to that evolution, this makes me proud.

What is this award about?
The GEC-ESTRO Iridium 192 Award is presented to the brachytherapist or physicist who, in the opinion of the GEC-ESTRO Committee members, has made a major contribution to the development of the Brachytherapy speciality.

"Brachytherapy publications clearly show how consistently applied protocols for imaging, dose prescription and plan-optimisation can lead to significantly better results"
What does this award mean to you?
It was a great honour for me to receive this award because not only am I happy, but it also deeply touches one of the missing professional parts of my life. Prior to my training, I had to take a decision as to what degree to take. I had to choose between becoming a medical doctor or a physicist. I went for the former and so, in some ways, I found myself compensating for not having become a physicist. Though the award is not academic, it acknowledges my efforts in communicating with physicists in my department as well as in industry, for whom I have respect. I have not only built relationships with physicists but have also come to appreciate and understand their competences. So, receiving this great award is an acknowledgement from physicists of the relationship I have nurtured with them, and is very touching from my point of view.

What do you think are the next challenges for radiation oncology?
I think that one of the next challenges for all our disciplines, but mainly for physicists, is to deal with the automation. More and more things that are done on a routine basis are challenged by new artificial intelligence products, and as some researchers have mentioned, there are many kinds of reactions to this new robot era. Every day we are negotiating how much can be delegated to robots, but, in some ways, in our daily practice we already delegate many activities to some kind of robots when we do planning. There are some optimisation tools which robots can perhaps facilitate, but the physics part of our discipline is based on a matrix and on measurement of numbers, so that would probably be the area where automation will increase.

So, for physicists to deal with this kind of challenge it would absolutely have to be something they have to prioritise, because we know that opposite to artificial intelligence we have this natural stupidity – that means irrationality, unnecessary and ethical variations. Therefore, we have to negotiate and to be ready to say what can really be done by human beings and what can be delegated to robots. There is a lot of routine work that is done by physicists in their daily practice, as well as by doctors, which could be automated and that will be the new challenge that will soon arrive. That will change our lives in the coming ten years. The question will be, what part of the department do you have to automate?
To whom would you like to dedicate your award?
I think that because it is quite easy to say “to my family”, I think that this award is an honour for the whole team in my department. The team that has worked with me during the last three years has triple the number of physicists. My dedication is that there should be a continuous, growing relationship in the team and its spirit.

"This award is an honour for the whole team in my department"

What is this award about?
Recipients have been people who, although not physicists, have made an outstanding contribution to the cause of physics in ESTRO, by raising the profile of physicists in the radiation oncology community or to the development of the field of physics in clinical radiotherapy.
What have been the highlights of your career?
From 2002 to 2012, I was chair of the radiation oncology department at the Institute Gustave Roussy (Villejuif, France), and since 2012 took a similar position at the Swiss Cancer Centre in Lausanne. I had the chance to embrace and to run, in parallel, both a medical career dedicated to my patients, and a scientific career in the laboratory. That has been a unique opportunity to foster innovative translational research in our field. On the clinical side, I would highlight the creation of ‘Evidence-based medicine level 1 in head and neck oncology’, having been the primary investigator for a dozen large scale randomised trials and several meta-analyses, and being co-founder and chair of the Groupe d’Oncologie Radiothérapie Tête et Cou (GORTEC, the head and neck radiation oncology group), which is one of the most prominent cooperative groups in head and neck oncology.

What is your next challenge?
Together with my team at the Lausanne University Hospital, our next challenge will be to foster innovation focusing on the clinical transfer of a new type of radiotherapy, so called Flash radiotherapy. This is derived from an outstanding observation we have made in mice, cats and pigs, showing that Flash radiotherapy appeared less toxic for normal tissues, compared to normal radiotherapy, in turn allowing higher doses to be delivered to the tumours.

What does this award mean to you?
The Regaud award is very special; it is a great honour to receive this prestigious distinction.

What has been your involvement within ESTRO?
ESTRO is an interdisciplinary society developing a fantastic educational and conference programme along with the excellent Radiotherapy & Oncology journal. ESTRO also offers a unique opportunity for networking at the international level. As Jens Overgaard said, just imagine if there was no ESTRO! It has been an enormous privilege for me to serve as the President of this outstanding society in the past.
What started your interest in science?
I always wanted to become a specialist in oncology. After my medical degree, when I started in 1985 in France, the medical oncology specialty did not exist, and the only way to become an oncologist was to embrace the radiation oncology specialty.

What is this award about?
Claudius Regaud was born in Lyon in 1870 and in 1911 he described the principles of fractionation from his work on the testis and in 1927 the need for quality and a multidisciplinary approach in cancer care. With Coutard, he introduced the principles of fractionation in clinical practice, a good example of translational research - "observe and translate" was his message.

"I had the chance to embrace and to run, in parallel, both a medical career dedicated to my patients, and a scientific career in the laboratory"
FOCUS ON FORTHCOMING CONGRESSES

Klaas Breur award

The 5 R(elevant) principles of radiotherapy in multimodal cancer treatment
Award lecture

Claus Rödel
Department of radiotherapy and oncology, University of Frankfurt
Frankfurt, Germany

What started your interest in science?
I did my thesis in the radiobiology lab at the University of Erlangen, Germany, investigating the proliferation kinetics during combined radiation and chemotherapy exposure in vitro. Many effects, for example prolonging exposure time of cells to low dose chemotherapy rather than using a high dose chemotherapy regimen for short periods during fractionated radiotherapy, have since been confirmed in clinical trials and practice. In this way, understanding principles of multimodal cancer care on a more biological or basic level, and translating these to the clinic, started my interest in both basic and clinical science.

What have been the highlights of your career?
I’ve been involved in designing and conducting several phase 1 to 3 prospective clinical trials to establish and optimise chemoradiotherapy for rectal and bladder cancer patients. Learning from the results and experiences of a clinical trial, and testing new ideas and hypotheses in a subsequent trial was exciting to me, even if our hypotheses were proven wrong. Also, to address translational questions around a clinical trial, for examples molecular signatures to predict tumour response, was intriguing. Conveying some of these experiences to younger colleagues, such as during the ESTRO teaching courses on lower GI is also a highlight of my career.

To whom would you like to dedicate your award?
As speaker of the German rectal cancer study group, I would like to acknowledge many colleagues from surgical, radiation and medical oncology. Without their skills and commitment our clinical trials could not have been successfully completed. I also give thanks to the patients and their relatives for participating in our clinical research activities. Vincenzo Valentini from Rome and Bruce D. Minsky from Houston, Texas, have been friends and mentors for my research activities for the last 15 years and I owe them a lot.

What is this award about?
As a tribute to Professor Breur’s pioneering work, ESTRO created this annual “Gold Medal” award lecture in his name. The Breur Award is the highest honour that can be conferred on an ESTRO member and is awarded in recognition of the major contribution made by the winner to European Radiotherapy.
FOCUS ON FORTHCOMING CONGRESSES

Donal Hollywood award

In vitro prediction of DNA repair defects reveals association with poor clinical outcome in HNSCC

Award lecture

Paul Essers
Netherlands Cancer Institute
Amsterdam, The Netherlands

What started your interest in science?
I was already interested in biology from a young age, so I cannot recall when my interest began. As a member of the local nature club, I spent my time collecting mouse bones and press-drying plants. My other hobby was disassembling electronic devices (attempts to reassemble them were usually unsuccessful) and computers, which were just becoming available when I was young in the early 1990s. As a bioinformatician, I am combining these two childhood pursuits.

What do you do in your spare time?
I like to be outside, so I spend a lot of time on my racing bicycle, especially during the summer months. With a group of friends, we tour the countryside at weekends, typically ending up in the bar at the end to have some drinks. This year, we are training to climb the famous Mont Ventoux in the French Alps.

When do you think you will retire, and what would you like to do then?
As I am only 34 years old now, it will probably be another 40 years or more, if retirement plans even still exist in the 2050s. If anti-ageing therapies have proven to be safe and effective, I should still be physically fit, and able to go on some nice long distance hiking and cycling tours. If not, I could probably do the same thing in virtual reality, or maybe even hook my brain up directly to a matrix-like computer simulation.

What is this award about?
The Hollywood Award is given in the memory of ESTRO President-elect Donal Hollywood, who passed away from cancer before taking on the duties of President. This annual award is given to the best abstract selected for presentation at an ESTRO congress.
What have been the highlights of your career?
I have been fortunate to have had a number of highlights. One was as principal investigator on the SR-2 randomised clinical trial for soft tissue sarcoma (STS), which established the benefit of pre-operative versus post-operative radiotherapy (RT) for this rare disease. This trial changed practice worldwide, wherein pre-operative RT became a standard of care, with consequent reduced toxicity.

I created and implemented the Princess Margaret Hospital prospective ‘Bio-clinical anthology of outcomes system’ that collects data at point-of-care linking it to bio-specimens from radiotherapy patients. Another highlight was to describe unique risk stratification to optimise the therapeutic ratio for HPV-related oropharyngeal cancer (HPV+ OPC). Using the anthology data, we were able to identify a subset of HPV+ OPC with low risk of distant metastasis and suitable for de-intensification trials.

I have also been involved with numerous international agencies such as the Union for International Cancer Control (UICC), the American Joint Committee on Cancer (AJCC), the International Commission on Radiation Units, and the International Atomic Energy Agency. Working with the AJCC and UICC, I introduced three new stage classification systems into the AJCC/UICC tumour node and metastasis (TNM) classification, including nasopharyngeal cancer in the 5th edition (1997), and HPV+ OPC and Head and Neck STS in the 8th edition (2016). I have also devoted effort to developing models, frameworks and terminology to incorporate non-anatomic prognostic factors within traditional anatomic classifications of the UICC and AJCC.

What is your next challenge?
As a clinician and researcher for over 30 years, I have dedicated knowledge and experience to improving the lives of cancer patients through high quality care in radiation oncology, especially in the management of head and neck cancer and STS. Achieving an uncomplicated cancer cure has been my primary career objective. I have been a resolute advocate for high standards in oncology care, and continue to strive to fulfil such goals to advance radiation medicine.

What do you think are the next challenges for radiation?
We live in an era of information explosion. Our clinicians should keep their critical eyes open.
to be able to digest and process available data. They need to maintain fidelity with the essentials of the specialty, and especially focus on their clinical skills in understanding oncology, the importance of multidisciplinary team work, and caring for their patients. Developing a framework to integrate relevant knowledge that can be applied to individual patients is going to be ever more challenging in the future. Furthermore, robust translational programmes that include accessing tissue combined with correlative data, including prospective outcome collection, will be essential to harness the new biology. These will be important to optimise treatment outcomes from radiotherapy, surgery and systemic approaches, and especially when these are combined. An additional challenge will be research into approaches to ameliorate RT tissue injury.

**What does this award mean to you?**

Although I have received a number of awards, this one means a lot because of the symbol of collaboration and friendship that is represents from my European colleagues, who I respect greatly. I have many friends at ESTRO and we have exchanged many ideas formally and informally over the years. This relationship and this award are big honours for me.

**To whom would you like to dedicate your award?**

I would like to dedicate my award to my wife Carol and my two daughters, Bernadette and Charlotte, who have put up with me throughout everything and have provided unfailing support for my career.

**Did your parents encourage you in your career, or would they rather you had done something else?**

Yes, especially my mother who, like my wife today, looked after the family affairs. I grew up in a situation where my family moved around quite often depending on my father’s assignment. I attended numerous schools in different places and countries but it was my mother who recognised the aptitude and encouraged me to pursue a career in medicine. She kept reminding me at the time, including alerting me to a change in application deadlines posted in the Irish newspapers, well before the internet was available for that purpose. This proved to be invaluable for a dumb teenager!

**When do you think you will retire, and what would you like to do then?**

Although I have been practising radiation oncology for over 30 years, I do not intend to retire for some time yet. I recently changed my work pattern to do less in the clinic and create more time for international work and outreach, and to address teaching and research.

**What is this award about?**

Honorary Membership is awarded to people who have made a significant contribution to the achievement of the goals of the Society particularly in the field of interdisciplinary or international co-operation.

In the past, ESTRO has given this award to specialists from other disciplines in recognition of their significant contribution to:

- Promotion of radiotherapy as part of the multidisciplinary treatment of cancer
- Building bridges between radiotherapy and stimulation of multidisciplinary co-operation
- Integration of new knowledge from their discipline in radiotherapy, thus stimulating the development of the speciality.
What have been the highlights of your career?
I have devoted my career to translating novel preclinical information to the clinic. Key to my development was a year spent in Malcolm Mitchell’s laboratory at the University of Southern California, studying human monoclonal antibodies. After I became a radiation oncologist, the lab experience and my background in medical oncology and haematology directed me to study how best to combine radiation and systemic therapy, both pre-clinically and clinically. This evolved into focusing on the systemic effects of radiotherapy, particularly on the immune system.

Our original demonstration that the abscopal effect of radiotherapy is immune-mediated has opened a fertile field of research to understand the immune stimulatory and immune suppressive effects of ionising radiation, and to develop strategies directed at harnessing anti-tumour immunity in irradiated subjects.

Pre-clinically we were first to demonstrate that when standard local radiotherapy is coupled with immune modifiers, it induces an abscopal effect – a response outside the radiation field – that is mediated by the immune system. We translated this evidence into the first proof of principle clinical trial, combining GM-CSF and radiation, and more recently anti-CTLA-4 and radiation. Our work has then evolved to optimise the use of radiotherapy as an adjuvant to modern immunotherapy strategies. Our recent findings on the role of dose and fractionation of radiotherapy when combined with immune checkpoint blockade, is potentially practice-changing.

An important component of my career has been the successful interaction with outstanding radiation and cancer biologists and physicists. It was by creating exceptional teams of investigators that we were able to make new discoveries.

Finally, working with exceptional role models has convinced me that optimal patient care, and enhancement of their survival, are the constant drivers for preclinical and clinical research.

What is your next challenge?
A challenge to enhancing the success of immunotherapy in established cancers is the understanding and refining of pro-immunogenic effects of ionising radiation, as well as the

Honorary member award

Potential of radiation therapy to convert the tumour into an in situ vaccine
Award lecture

Silvia C. Formenti
NYP/Weill Cornell Medicine
New York, USA
mitigation of its immune suppressive effects. Our group is focusing on both preclinical and clinical investigations to foster progress in these areas.

What do you think are the next challenges for radiation oncologists?
Since reducing cancer mortality depends on systemic control of the disease, and radiation has systemic effects, I believe radiation oncologists should focus more on these effects. While optimising ‘in field control’ remains our first mission and a constant area of investigation, appreciating and exploiting the systemic effects of localised ionising radiation should become a rapidly expanding area of investigation and learning, particularly at a time of widespread promise and success of cancer immunotherapy. It also offers our discipline a novel entrance door in the management of metastatic or recurrent disease, beyond our traditional role in harnessing radiotherapy for palliation.
What started your interest in science?
I was inspired by the life and work of Maria Sklodowska-Curie, and as a teenager wanted to learn about radiation and its use for peaceful purposes. Consequently, my high school and university studies followed this direction. Later, it happened that I worked at the same dosimetry laboratory that was established on the initiative of Maria Sklodowska-Curie at the Radium Institute in Warsaw, Poland, and which is now a part of the Cancer Centre and Institute of Oncology in Warsaw.

Did your parents encourage you in your career, or would they rather you had done something else?
My parents were fully supportive of the direction of my education and respected my choices for the career pathway.

What does this award mean to you?
This award is a great honour for me. I consider it not only the recognition of my personal contributions to quality improvements in radiation oncology, but also recognition by ESTRO of the significance and impact of International Atomic Energy Agency (IAEA) projects on quality audits in dosimetry and comprehensive audits in radiotherapy.

To whom would you like to dedicate your award?
I would like to dedicate this award to past and present IAEA staff and consultants who helped to develop and operate the IAEA projects on quality audits in radiotherapy.

What do you think are the next challenges for radiation physicists?
Medical physicists face challenges with the introduction of new technologies in radiotherapy clinics which, on one hand, drive research but, on the other hand, give them additional responsibilities. Examples are small field dosimetry and the introduction of new MR linacs, where intensive research work has been, and is being, conducted so that clinical dosimetry is accurate and patients’ treatments are safe.

Also, with developments in technology, there are new requirements for radiotherapy physicist knowledge and skills; for example, the use of...
various imaging modalities in radiotherapy requires additional training and building new experiences so that the use of imaging is optimised. At the European level, there are differences in education and training schemes in different countries. The medical physics profession is still not recognised as a healthcare profession at the national level in several countries, which makes it difficult for physicists working in these countries to develop specialist careers.
First Jens Overgaard legacy award goes to three distinguished leaders of a single project: head and neck cancer meta-analysis

After more than 25 years at the helm, Professor Jens Overgaard stepped down at ESTRO 36 as editor-in-chief of the Green Journal. To mark the occasion, an award in his name was created: the Jens Overgaard legacy award. Prof Overgaard decided to give the award to three colleagues – Jean-Pierre Pignon MD PhD, Jean Bourhis MD PhD and Pierre Blanchard MD PhD – to reward their work on head and neck cancers over the past 25 years at the Institut Gustave Roussy, Villejuif, France.

The head and neck cancer meta-analysis initiative started in the 1990s with the aim of gathering individual patient data from all randomised trials conducted so far that had assessed the efficacy of the addition of chemotherapy to local treatment (mostly radiotherapy, but sometimes surgery and radiotherapy) in non-metastatic head and neck cancers. This initiative led to the demonstration that concurrent cisplatin-based chemoradiation was the standard of care in this clinical situation. Later on, they focused on many other aspects of head and neck cancer treatments, such as radiotherapy fractionation, the role of taxane-based induction chemotherapy, or the safety of amifostine as a radioprotectant. They also worked on the role of chemotherapy in nasopharyngeal carcinoma.

Their work was the result of an important international cooperation between clinicians, statisticians and cooperative groups, with the common goal of creating high level evidence and disseminating best practices. This team has also made significant methodological advances using the datasets collected initially, and their conclusions have led to the design and conduct of subsequent clinical trials. In their most recent updates, the meta-analysis team has also collected toxicity data to try to explain the impact of intensified treatments on acute tolerance profile and late side-effects.

The future of meta-analyses will be directed toward targeted therapy, biomarkers, and a potential redefinition of diseases according to their molecular profile and not their anatomical site. But the collection, quality checking and pooling of data will retain a major role in the advancement of scientific and medical knowledge.

From left to right: Jean-Pierre Pignon, Jean Bourhis and Pierre Blanchard
What does this award mean to you?
The Jens Overgaard legacy award is, for me, an acknowledgment of long term clinical, international and multidisciplinary work, but also of the spirit that contributed to such work: trust, respect and friendship. This high quality of collaboration happened with several people during this project, in particular with Jens Overgaard. As a statistician with a medical background, to receive a prize from a European association of clinicians implies that the results of our project were useful for clinical practice. So this award has a very special value for me.

To whom would you like to dedicate your award?
I wish to dedicate this prize to the numerous people who contributed to it: first of all, to the 33,000 patients that agreed to participate in the 130 trials in 37 countries included in our meta-analyses, and to the thousands of clinicians and statisticians that performed these trials, in particular those collaborating in the meta-analysis projects. I wish also to dedicate this award to my colleagues from Gustave Roussy who participated in the projects, in particular the 15 junior statisticians who spent so many hours collecting, checking and analysing the data. Finally, I dedicate it to my family for their support, especially my wife Chantal. The long term support of the French charities, in particular the Ligue National Contre le Cancer and the French health authorities (Institut National du Cancer, health ministry) through PHRC and PHRC-K grants should be acknowledged.

If you hadn’t been a scientist, what would you like to have been?
When I was teenager, I was hoping to become an historian. My grandfather taught history in high school. But because of my dyslexia, I moved to the scientific field, medicine and biostatistics. Meta-analysis based on individual patient data is a way to contribute to international exchanges. Retrospective meta-analyses over a long period of time have something to do with medical history. None of my children are historians, but they all are interested in history.

What do you do in your spare time?
My favourite activity during my spare time is reading historical books or magazines. My favourite topics are the early part of the
Middle Ages, religious history and the history of countries. The evolution of countries and international relations over time tells you about the importance of respect and tolerance for people with different backgrounds, as well as being useful in international exchanges. Most countries have had their periods of glory and their periods of darkness. To say that one country is superior to another one is debatable when considering all the history of the two countries compared.

"The Jens Overgaard legacy award is, for me, an acknowledgment of long term clinical, international and multidisciplinary work"
What do you think are the next challenges for radiation oncologists?
No doubt there is a bright future ahead for radiation oncology, where we will learn how to integrate and take advantage of molecular imaging, and how to develop innovative combinatorial strategies with immunotherapy and other molecular targeted agents. We also need to drive more financial support toward innovative developments in our field, such as ultra rapid computation, dose accumulation in 3D for treatment adaptation, high performance image-guided radiation therapy systems, or high performance compact and cheap particle therapies.

To whom would you like to dedicate your award?
We initiated the meta-analysis of chemotherapy in head and neck cancer programme about 23 years ago together with Jean Pierre Pignon, and we would like to dedicate this award to all the teams, all the investigators and cooperative groups who participated in this fantastic international collaborative venture. Their precious contributions made it successful.

If you hadn’t been a scientist, what would you like to have been?
Perhaps an economist.

What does this award mean to you?
It is a great honour to receive this first Jens Overgaard legacy award, associated with one of the most cited publications in the Green Journal. This is also the opportunity to acknowledge Jens Overgaard’s outstanding contribution to our Green Journal.

What do you do in your spare time?
All sort of sports, in and outdoor, on water, on the ground and climbing the mountains.
FOCUS ON FORTHCOMING CONGRESSES

**Jens Overgaard legacy award**

Pierre Blanchard
Institut Gustave Roussy
Villejuif, France

**What started your interest in science?**
When I was in high school, I was fascinated by two topics, neuroscience and the evolution of species. So naturally I started studying biology, especially neurobiology. After a few years, I realised that I missed the human interaction and the contact with patients. I went back to medicine and was very happy with the dual focus of a clinician scientist career where you have time with patients and also time for research. Cancer and radiation oncology are perfect specialties as they are vivid areas of research, they investigate systemic disease that can have an impact on the entire organism, they are strongly linked to technological advances and are profoundly human, with intense moments shared with patients.

**What does this award mean to you?**
This award is the recognition of the work of the meta-analysis team led by Dr Jean-Pierre Pignon. Under his guidance, a major effort was undertaken to provide the highest level of evidence for clinicians in multiple clinical fields, such as lung or head and neck cancers. With Jean Bourhis, he launched the head and neck initiative almost 25 years ago, and this group has since been considered as one of the pillars of evidence-based head and neck oncology. I feel fortunate that they accepted me as one of them ten years ago. The work we have accomplished together has helped better define standards of care for nasopharyngeal cancers and squamous cell head and neck cancers. I am very proud to have been nominated for this award, and I receive it on behalf of a group of people – statisticians, clinicians and cooperative groups – without whom this research would never have been possible.

**What is your next challenge?**
As a young clinician scientist (relatively – I’m still 38), my challenge is to conduct high level research on my own. I am currently the co-coordinator of a European randomised trial, investigating the role of pelvic radiotherapy in prostate cancer (NCT01952223), and will soon be launching a randomised trial on the role of metastasis-directed treatment in hormone sensitive prostate cancer. I also have projects in the field of head and neck cancer. My other major current challenge is my position as editor-in-chief of one of ESTRO’s new open access journals, *Clinical and Translational Radiation Oncology*, along with Daniel Zips, my co-editor-in-chief. This is a wonderful and very exciting adventure. I encourage everyone to visit our website (ctro.science) and submit their research for peer review and publication.
Jack Fowler University of Wisconsin award

Dosimetric quantification of the incidental irradiation of the “true” (deep) ano-inguinal lymphatic drainage of anal cancer patients not described in conventional contouring guidelines

Awarded paper

Hendrik Dapper
Department of Radiation Oncology,
Klinikum rechts der Isar,
Technical University of Munich, Public Law Institution
Munich, Germany

What does this award mean to you?
I am really thankful for such an honour and it’s definitely a huge motivation to continue with valuable scientific work.

What have been the highlights of your career?
I am very sure that it is an honest answer if I say: winning the Jack Fowler award at ESTRO 36.

To whom would you like to dedicate your award?
First of all, I must mention Associate Professor Daniel Habermehl, who is always there for me offering a helping hand and pushing me in a positive way. I am happy to work with such a competent senior physician. Our chair of the department, Professor Stephanie Combs, who provides a perfect working environment and stimulates innovative research. Then there is Dr Gregor Habl who was the first to come up with the idea that there has to be a connection between the PTR and inguinal side. Furthermore Dr Christoph Hirche supplies the fluorescence-imaging via the indocyanine-green-method.

Did your parents encourage you in your career, or would they rather you had done something else?
Of course, my parents supported my decision to work in the field of radiation oncology. They are always present when I need them. In addition, my mother always helped me to refine my texts. I am really grateful to them.

What are you proudest of in your career?
I am proudest of being part of the help that patients need in really difficult situations.

What do you do in your spare time?
I love to do outside sports. I play for a tennis club and for a soccer club. Moreover, I am the bassist and singer of a rock band. During weekends I go out with friends or do some scientific work.

When do you think you will retire, and what would you like to do then?
Depending on German politics, it could be in 38 years’ time. More realistic is 45 years! Let’s see what my health allows. I would like to continue to travel the world by motorcycle.
What does this award mean to you?
I feel so honoured to win this award among so many successful young researchers who have also done tremendous work in the field of radiation therapy. This award means a lot to me. It validates what I have done in the past three years and confirms my contribution to oesophageal cancer radiation therapy. In addition, it gives me confidence to continue my research to reciprocate more to the research community, with a keen eye for translation of research to the clinic.

What is your next challenge?
In our current work, my colleagues and I have demonstrated that the amplitude of respiration-induced tumour motion is much larger than the interfractional variability of the respiration-induced tumour motion. This raises the question of how to integrate the respiration-induced tumour motion into the treatment planning process to achieve sufficient target coverage, but minimise dose to the organs at risk. Accordingly, the next challenge with investigating the dosimetrical influences induced by the respiration-induced motion lies in how to correctly calculate the accumulated dose in the target, and the organs at risk, throughout the whole breathing cycle. I plan to use deformable image registration between the different breathing phases of 4D CT scans to aid the calculation of the accumulated dose.

To whom would you like to dedicate your award?
I would like to dedicate my award to my colleagues in the department of radiation oncology at the Academic medical centre for their support and help. Especially to Dr Tanja Alderliesten, my supervisor, who introduced me to this research field. Without her encouragement and supervision, this research could not be conducted properly.
What started your interest in science?
I have always loved thinking about and learning how things in the world work. One obvious sign that I would grow up to be a scientist was the countless hours that I would spend reading a set of children’s encyclopaedias that my parents had bought. It was captivating to read about dinosaurs and the cosmos, and that feeling of wonder when thinking about deep problems in science is something I have been able to hold onto ever since.

What are you proudest of in your career?
My current research project, ‘Trajectory optimisation in radiotherapy using sectioning (TORUS)’, for which I have received this award, is what I am most proud of. The incorporation of many interesting and novel mathematical and physical ideas into such a large piece of computer software is the culmination of my strengths in maths, physics, and programming. Furthermore, the potential this project has for improving the quality of treatment for cancer patients around the world is an exciting and humbling prospect.

To whom would you like to dedicate your award?
I would like to dedicate this award to my loving wife. I was offered my current postdoctoral position at Stanford, USA, in the last year of my PhD at the Tokyo Institute of Technology. It was an amazing opportunity to work on a very interesting and significant project in radiation oncology, and to further my scientific career. Even though it meant that we would have to live in different countries for a couple years, she was nothing but supportive of my choice to work at Stanford.
**To whom would you like to dedicate your award?**
I would like to dedicate the award to everyone we are cooperating with in this project. This is a project in which a lot of people were involved, mainly my supervisors working at the University Medical Center Utrecht, The Netherlands – Rien Moerland and Peter Seevinck – and several employees of Elekta Veenendaal – Jeroen Schuurman and his colleagues. The prototype MR compatible afterloader was developed at Elekta and, without this work, our experiments wouldn’t have been possible. So, I would like to thank everyone who contributed to the project.

**What has been your involvement in ESTRO?**
This is the first time that I have visited the ESTRO conference. In the past, I have attended several MRI focused conferences, but I was also very interested in visiting and contributing to a radiotherapy focused conference, such as ESTRO. It was a big surprise and very exciting to win this award. Moreover, the fact that this was my first contribution to the ESTRO conference made it an even bigger surprise.

**What do you think are the next challenges for radiation oncologists?**
I think it will be a big but important challenge to bring MRI-guided brachytherapy into the clinic. I think MRI guidance is becoming very important for radiotherapy, not only for external beam radiotherapy, but also for brachytherapy. At the University Medical Center Utrecht, we have a high dose-rate (HDR) brachytherapy MRI suite, so we have the facilities for MRI-guided brachytherapy. But before we can bring it into the clinic, the prototype MRI compatible afterloader that we tested should be transformed to a final clinical design, and then tests should be performed on both the afterloader safety and the MRI safety. In addition, I think the challenge will be to bring MRI-guided brachytherapy into the clinic at other radiotherapy centres, since not a lot of centres have MRI facilities at the moment.
What does this award mean to you?
I finished my Master’s in applied mathematics about two years ago, in the field of computational finance. Banking, at first glance, might seem a completely unrelated field to where I am now working, in brachytherapy. When I graduated, I realised that I enjoy working on software; getting the most out of that computer! In practice, what I do now is not that different from what I did before. Banks want the best price for their goods. Physicists want the best treatment for their patients. It is just a matter of interpretation for the computer, but also for me. There was a lot of theory, jargon and patience needed to get a grasp of what is going on in the constantly-moving field of radiotherapy. After a year as a PhD researcher, the Best junior presentation award by Elekta Brachytherapy gives me the confidence that I am on the right track. It also gives me the confidence that this work and my future studies will increase knowledge, but also add practical value to the clinic.

What do you do in your spare time?
Inherent to developing software, I spend most of my time behind the computer. To compensate for this, I take part in sport whenever I have some time off. If the weather is as it is usually in The Netherlands, you can find me in the gym or boulder hall. But whenever possible, I go for a run, go out on my bike or play field hockey.

What is your next big challenge?
The next big challenge in our work is to introduce knowledge elicitation in brachytherapy to determine what makes a good treatment plan,
Poster awards

**RADIATION ONCOLOGIST**
Emmanouil Fokas

*Tumor regression grading in the CAO/ARO/AIO-04 phase 3 trial in locally advanced rectal carcinoma*

*The awardee receives a prize of €1,000 from ESTRO.*

**PHYSICIST**
Fatima Padilla

*A pencil beam algorithm for protons including magnetic fields effects*

*The awardee receives a prize of €1,000 from ESTRO.*

**RADIATION THERAPIST (RTT)**
Vickie Kong

*Comparison of 3 image-guided adaptive strategies for bladder radiotherapy*

*The awardee receives a prize of €1,000 from ESTRO.*
ESTRO and Elsevier joined forces at ESTRO 36 to highlight the work of young professionals. The best high scoring posters submitted by a young author* were awarded at the poster reception. The awards amount to €1,000 each and are supported by ctRO, phiRO and tipsRO, ESTRO-Elsevier open access publications.

* Below the age of 36 for men and 40 for women

**ctRO**
clinical and translational Radiation Oncology

**ctRO AWARD**
Eva Rijkmans

Factors associated with complete response after brachytherapy for rectal cancer; the HERBERT study

**phiRO**
physics and imaging in Radiation Oncology

**phiRO AWARD**
Rens van Haveren

LRPM for fast automated high quality treatment planning – towards a novel workflow for clinicians

**tipsRO**
technical innovations and patient support in Radiation Oncology

**tipsRO AWARD**
Katrina Woodford

Feasibility of stereotactic ablative radiotherapy for locally advanced non-small cell lung cancer

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Read the summary of each of the awarded posters in the:

Clinical corner on page 49 >

Physics corner on page 46 >

RTT corner on page 98 >
**FOCUS ON FORTHCOMING CONGRESSES**

### Statistics

**PARTICIPANTS OVERVIEW**

Total: 5,860

- 4,178 Participants
- 155 Visitors
- 1,527 Exhibitors

**GEOGRAPHIC OVERVIEW**

- Europe: 77.18%
- Asia: 8.37%
- America: 6.60%
- Middle East: 3.54%
- Australia and West Pacific: 3.31%
- South America: 0.71%
- Africa: 0.29%

**PARTICIPANTS PER COUNTRY TOP 10**

1. The Netherlands: 373
2. Germany: 272
3. UK: 269
4. Switzerland: 262
5. Italy: 221
6. Spain: 184
7. Austria: 146
8. France: 146
9. Denmark: 140
10. Belgium: 139

**PARTICIPANTS PER SPECIALTY**

- 39.02% Radiation oncologists
- 30.52% Medical physicists
- 11.61% RTTs, RT nurses
- 5.62% Clinical oncologists
- 2.61% Other non-medical specialities
- 1.85% Radiobiologists
- 1.39% Other medical specialities
- 1.29% Dosimetrists
- 0.93% Computer scientists
- 0.50% RO industry - corporate
CONFERENCES

ESTRO 36 app

TOP TEN VIEWED SESSIONS
(Unique user)

2,909
The optimal approach to treat oligometastatic disease: different ways to handle an indication quickly gaining acceptance

2,622
Brain metastases

2,578
Presidential symposium

2,549
Response adapted treatment

2,444
MR guided radiotherapy: the new standard of care in 10 years time

2,323
New developments in Personalised Radiotherapy Oncology (PRO)

2,309
Highlights ofaproffered papers

2,260
Improvements in positioning and motion management

2,242
Radiotherapy plus immunotherapy combination: rationale and results so far

2,223
Jens Overgaard Legacy Award

TOP TEN FAVORITE SESSIONS
(Unique user)

483
MR guided radiotherapy: the new standard of care in 10 years time

467
The optimal approach to treat oligometastatic disease: different ways to handle an indication quickly gaining acceptance

447
This house believes that proton guided photons (online MR guided therapy) will be superior to photon guided protons (CBCT proton therapy)

411
Radiotherapy plus immunotherapy combination: rationale and results so far

398
SBRT for spine and non-spine bone metastases: what role in routine practice?

385
Automated planning, knowledge-based planning and other novel developments in treatment planning - how do they work and perform?

375
Presidential symposium

371
Response adapted treatment

364
Adaptive radiotherapy (both anatomical and ‘functional’ changes)

351
Ultra fast online therapy adaptation (replanning, dose accumulation QA)
3rd Super Run  
*Actioned by the ESTRO Cancer Foundation*

7 May 2017  
Prater Parc, Vienna

Over 400 ESTRO 36 delegates participated to the 5km relay for the benefit of the ESTRO Cancer Foundation.

Congratulations to the winners, the 'Immer Nimma! RadboudUMC Nijmegen' team!

- **17'44"** time taken by the *Immer Nima! RadboudUMC Nijmegen* team to complete the 5km
- **3** runners per team
- **122** teams
- **610 km** cumulated distance
- **over 700,000** total steps
Photo album
See more pictures on estro36.wordpress.com >
13th ‘Meet the Professor’ advanced international breast cancer course
21-23 September 2017
Padua, Italy

17th annual teaching course of the International Cancer Imaging Society (ICIS)
2-4 October 2017
Berlin, Germany
Breast cancer represents the front runner in cancer research in many aspects. First, this is a common, chronic and lethal disease, for which new and better medical interventions are successfully contributing to a steady decline in mortality, despite increasing incidence. Second, biology drives the entire diagnostic and therapeutic planning process for these patients. This is why a multidisciplinary breast cancer team should also include pathologists, molecular biologists and oncogeneticists. Third, many highly effective interventions are available for each step of the diagnostic and therapeutic process for these patients.

With this in mind, the programme of the 13th Advanced international breast cancer course (AIBCC), directed by Professor Pier Franco Conte (Padua, Italy) and Professor Gabriel Hortobagyi (Houston, USA), will include lectures on molecular characterisation, updated treatments of early and advanced disease, management of difficult cases, and hereditary syndromes. A qualified international faculty will be involved in this year’s meeting, which will maintain its reputation as a friendly forum. The main aim is to promote a continuous exchange of experiences and opinions, and share the most exiting advances.

In order to reward scientific excellence and foster international cooperation, the international scientific committee of the AIBCC will award the 7th International prize for breast cancer research to a scientist who has published a breakthrough paper in the previous year.

Registration deadline: 10 September 2017

Email: info.bologna@accmed.org.
The meeting and 17th annual teaching course of the International Cancer Imaging Society (ICIS) will be held in Berlin, Germany from 2-4 October 2017.

With ESTRO endorsement of this multidisciplinary meeting, expect a comprehensive overview of all aspects of imaging in oncology.

An internationally renowned faculty – from diagnostic and interventional radiology, radiation oncology, and medical and surgical oncology – will cover aspects including staging common and rare tumours, assessment of therapy response after radiation, chemo and immune therapies, diagnosis of complications, and follow-up.

The multidisciplinary conference will include plenary sessions, refresher courses on state-of-the-art and innovative imaging techniques, and interpretation.

Hands-on workshops will provide participants with practical experience of image interpretation in various clinical settings. Radiological interventions in cancer patients, such as percutaneous and intravascular procedures, will be covered with both state-of-the-art lectures and as live-case demonstrations in small groups.

The meeting venue – Langenbeck-Virchow house – is in the centre of Berlin, within walking distance of the main attractions such as the museum island, Brandenburg Gate, Reichstag building and many others.

There will be scientific presentations and a poster exhibition.

The social programme includes a welcome reception in the historic foyer and gallery of Langenbeck-Virchow house on Monday night. On Tuesday night, dinner will be held on a barge that will take us on the river Spree, past the main attractions of Berlin, while we enjoy a hot buffet and live music.
<table>
<thead>
<tr>
<th>EVENTS</th>
<th>SAVE THE DATE</th>
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| EBCC11         | 21 – 23 March 2018  
*Barcelona, Spain*  
EBCC11  
| EACR25         | 30 June – 3 July 2018  
*Amsterdam, Netherlands*  
EACR25  
25th Biennial Congress of the European Association for Cancer Research |
| ECCO2018       | 7-9 September 2018  
*Vienna, Austria*  
ECCO 2018: European Cancer Summit  
From Science to Real-Life Oncology |
| ESSO38         | 10 - 12 October 2018  
*Budapest, Hungary*  
ESSO38  
38th Congress of the European Society of Surgical Oncology |

To discover more about ECCO, visit: [www.ecco-org.eu](http://www.ecco-org.eu)
CALENDAR OF EVENTS
<table>
<thead>
<tr>
<th>EVENT</th>
<th>LOCATION</th>
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<th>WEBSITE/DETAILS</th>
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<tbody>
<tr>
<td><strong>AUGUST 2017</strong></td>
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<tr>
<td>The First International Conference on Head and Neck Cancer</td>
<td>TEHRAN, IRAN</td>
<td>1-3 AUGUST 2017</td>
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<td><strong>SEPTEMBER 2017</strong></td>
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<td>SFPM 2017 seminar</td>
<td>OPAL COAST, FRANCE</td>
<td>10-13 SEPTEMBER 2017</td>
<td>seminarsfpm2017.sciencesconf.org</td>
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<td>CARO Annual Scientific Meeting</td>
<td>TORONTO, CANADA</td>
<td>13-16 SEPTEMBER 2017</td>
<td><a href="http://www.caro-acro.ca/annual-scientific-meeting/30th-caro-annual-scientific-meeting/">www.caro-acro.ca/annual-scientific-meeting/30th-caro-annual-scientific-meeting/</a></td>
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<tr>
<td>ICTP-IAEA Workshop on Monte Carlo Radiation</td>
<td>TRIESTE, ITALY</td>
<td>18-29 SEPTEMBER 2017</td>
<td>indico.ictp.it/event/7992/</td>
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<td>Workshop on the Monte Carlo radiotherapy system PRIMO</td>
<td>ESSEN, GERMANY</td>
<td>20-22 SEPTEMBER 2017</td>
<td>primoproject.net/workshop/</td>
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<td>13th Meet the Professor Advanced International Breast Cancer Course</td>
<td>PADUA, ITALY</td>
<td>21-23 SEPTEMBER 2017</td>
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<tr>
<td>2-4 OCTOBER 2017</td>
<td>BERLIN, GERMANY</td>
<td><strong>ICIS Annual Meeting</strong></td>
<td><a href="http://www.icimagingsoceity.org.uk/index.cfm?task=meetings&amp;meetingid=111">www.icimagingsoceity.org.uk/index.cfm?task=meetings&amp;meetingid=111</a></td>
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<tr>
<td>5 OCTOBER 2017</td>
<td>BARCELONA, SPAIN</td>
<td><strong>Implementation of new techniques and technologies: the role of the RTTs course</strong></td>
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<td>5-6 OCTOBER 2017</td>
<td>BUENOS AIRES, ARGENTINA</td>
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<td><a href="http://www.oncologyconferences.com.ar">www.oncologyconferences.com.ar</a></td>
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<td>5-6 OCTOBER 2017</td>
<td>EDINBURGH, UK</td>
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<td>9-11 OCTOBER 2017</td>
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<td><strong>27th Residential Course on Multidisciplinary Oncology and metastatic patients in the era of high tech radiotherapy</strong></td>
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<td>12-13 OCTOBER 2017</td>
<td>ROME, ITALY</td>
<td><strong>Fifth Annual UPMC International Symposium on SRS/SBRT</strong></td>
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<td>15-18 OCTOBER 2017</td>
<td>NAPLES, ITALY</td>
<td><strong>International conference on Monte Carlo techniques for medical applications MCMA</strong></td>
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<td>2-4 NOVEMBER 2017</td>
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<td><strong>ABC4</strong></td>
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<td>9th European Multidisciplinary Meeting on Urological Cancers (EMUC)</td>
<td>16-19 November 2017</td>
<td>Barcelona, Spain</td>
<td>Joint ESTRO, ESMO, EAU</td>
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<td>1st ESTRO Physics Workshop: Science in Development</td>
<td>17-18 November 2017</td>
<td>Glasgow, UK</td>
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<td>Young Scientists’ Forum</td>
<td>23 November 2017</td>
<td>Poznan, Poland</td>
<td>ESTRO Endorsed Event</td>
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<td>5th GEC-ESTRO Workshop: The Strength of Brachytherapy</td>
<td>30 November - 1 December 2017</td>
<td>Rome, Italy</td>
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<td>ESHO 2018</td>
<td>16-19 May 2018</td>
<td>Berlin, Germany</td>
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<td>ECCO</td>
<td>7-9 September 2018</td>
<td>Vienna, Austria</td>
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<td>ESTRO meets Asia</td>
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ESTRO
Bimonthly newsletter
N° 113  |  July - August 2017
European Society for
Radiotherapy & Oncology

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Published every two months and distributed
by the European Society for Radiotherapy
& Oncology.

DEADLINES FOR SUBMISSION
OF ARTICLES IN 2017
September / October 2017 > 3 July 2017
November / December 2017 > 4 September 2017

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