Handbook for setting up ESTRO courses

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INTRODUCTION

The European School of Radiotherapy and Oncology is an international school that aims to improve, professionalise and standardise knowledge and practice in radiation oncology and associated professions in Europe and beyond.

To accomplish this mission the ESTRO School promotes a large range of education tools, in particular high-quality teaching courses. The courses are designed to meet the needs of practicing radiation/clinical oncologists, radiation/clinical oncology residents, radiation biologists, radiation physicists, radiation technologists, oncology nurses and oncology administrators, as well as oncologists working in related specialties

To facilitate the task of the people involved in the set-up and organisation of ESTRO courses, a set of guidelines have been developed and are compiled in this manual.

The manual contains 4 sections designed for

1. Course directors and teaching faculty
2. Local organisers
3. Liaison persons
4. Project managers (ESTRO office)
5. Companies

GUIDELINES FOR COURSE DIRECTORS AND TEACHING FACULTIES

Defining the course aims

The aims of the course should be clearly defined in terms of what the candidate will be able to understand and/or do when the course is finished.

Defining the target group

The target population should be defined clearly. Most ESTRO courses are designed to meet the needs of the radiotherapy team including physicists, clinicians, biologists and RTTs. The more recent multidisciplinary and some imaging courses, often supported by sister organisations, could attract other (oncological) professionals as well.

The audience of ESTRO courses may vary from about 20-200 participants, depending on the topic and the set-up of the course. This inevitably influences the financial viability of the courses; however, sustainability of each individual course is not an objective in itself but rather a break-even result for the overall programme of ESTRO live courses.

Defining the course content

The relationship of the course content to ESTRO's core curriculum must be defined and the course director should consider what knowledge, skills, and competencies are to be acquired. Please consult the core curricula 2012 available on the ESTRO website at http://www.estro.org/school/articles/european-training/european-curricula

The programme of new courses should be submitted for review and discussion to the chairperson of the Education Council and the liaison person that will follow up on this course.

If the course director wants to involve companies in the educational programme, then he should provide ESTRO with information on the material that has to be prepared by the companies 3 months before the starting date of the course. The course director is not responsible for the discussions with the companies and should therefore not directly be in contact with them except under special conditions agreed by ESTRO.

Faculty

Course directors are appointed by the Education Council through its chair. The position of the course director is reviewed after 3-4 years; replacement is discussed after 5-7 years. In case of any major problems the Education Council chair will, in cooperation with ESTRO EDC liaison person(s), the course director and the teaching faculty, look for and decide on appropriate solutions.

There should be one course director unless there are overriding reasons for sharing this job, eg:
-duplication of the course in regions outside Europe
-interdisciplinary courses with specific requirements for the different subspecialties.

For new course directors, advice on setting up a new course and choice of teachers can be obtained through the Education Council of ESTRO.

Teachers are appointed by the course director. Selection criteria are:
- expertise in the field (based on publications, references etc)
- pedagogical & communication skills
- enthusiasm for teaching
Consideration should be given to geographical spread and gender balancing.

Faculties usually consist of 6-8 teachers although well-founded exceptions are possible. The EDC advises a phased turnover of teachers, who should preferably be on the course for 5 – 7 years. To ensure the stability of the course, ex-teachers can be reappointed. For new courses it is preferable to keep the same faculty for at least 3 years before starting turnover.

For multidisciplinary courses, the faculty should be multidisciplinary although the participants are expected to be primarily from radiation oncology. It is recognized that multidisciplinary courses may require more teachers but economic considerations must always be taken into account. For this reason, more local teachers (from outside the core faculty) could be invited.

For courses that include delineation exercises in the programme, the faculty is extended with a contouring administrator that supports the teachers and the participants in the case delineation before, during and after the course

All teachers are expected to attend the course at all times in order to contribute to discussion after lectures and case presentations as well as for personal development and team integration.

There is no sponsorship available for the faculty but they are entitled to the following per diem allowance (150€/day for course directors, 100€/day for teachers) and their travel and accommodation is covered by ESTRO at economy rates. For pre-conference courses (1 day) the allowance is of 250€ for course directors, 125 € for teachers and travel and accommodation is only applicable for teachers outside the field of Radiation Oncology. The registration fee for the conference itself is not included in this package, but the teachers of pre-conference courses are entitled to the early registration rate.

All directors, teachers and contouring administrators are moreover entitled to participate for free to one ESTRO teaching course per year. Course directors are also entitled to appoint one person of their choice to participate for free to one ESTRO teaching course per year.

Defining the Course format

Courses should be as interactive as possible and will consist of a mixture of lectures, case presentations, small group and general discussion sessions, ev hands-on exercises and practical demonstrations

Course Material

The course material should include a list of contents and contain copies of the slides of all lectures that will be given during the presentation. The presentation of each lecture should start with a narrative description of the learning objectives of the lecture, followed by a list of essential references recommended for further reading. In addition, an abstract for each lecture is very useful for participants. Details of case presentations and exercises such as volume delineation can also be included within the course book.

The course material from the previous year will be made available online to the participants as background information. All presentations should be provided to the ESTRO project manager **at the latest before the start of the course.** The latest version of all presentations is uploaded at the end of the course and remains available online for all participants and for all the teachers for 1 year.

Templates are available for preparing the presentation slides and case studies (see attached

IP and copyright

When preparing course presentations the teachers should respect the intellectual property (IP) and copyright legislation. They mainly concern the integration of material from third parties in one's presentation:

- in principle one should obtain consent from third parties to use their material
- **BUT** it is legally acceptable to quote from published work for the purpose of education or in the frame of scientific activities, when these quotes are made conform fair professional practice and serve the intended target. These quotations should obviously always mention the source and the name of the author(s).

ESTRO thoroughly investigated the legislation applicable to IP and copyright in order to avoid possible problems and protect faculties from possible conflicts regarding IP and copyright. The legal advice can be found on the ESTRO website and is complemented with some practical examples (see attached)

All faculty members are asked to sign a teacher's agreement form explaining these regulations (see attached). By signing they agree to follow these rules and agree to have their presentations made available online in the ESTRO library DOVE (Dynamic Oncology Virtual Environment) to the participants of their specific course, to all ESTRO faculty members and to the ESTRO Ambassador members. Each teacher has the right to refuse this online communication of his/her presentations or to exclude specific slides from their presentation.

Delineation exercises

For delineation exercises at ESTRO courses, the ESTRO/FALCON platform is available, using the EduCase software. The number of cases used in a teaching course will be decided beforehand for each specific course. It is advisable to try to limit the number of cases. Contouring exercises may be planned as homework before the course, live at the course or ev both pre-during and ev past course.

The course directors are fully responsible for the collection of the cases and providing the minimum clinical information needed to perform the contouring. The cases should be transmitted at the latest 8 weeks before the course to the contouring administrator who is responsible for uploading the cases on the FALCON platform (a guide to upload CT-scan, MRI, US and PET-scan images is available from the ESTRO office (see attached).

The contouring administrator informs the course director when he/she can check the cases on the platform. For courses where contouring before the course (homework) is planned, the ESTRO Project Manager will send an email to the participants with all information needed to contour at the latest 1 month before the course date. The project manager supports the participants for access problems to the platform. For delineation and case related questions, the participants get support from the contouring administrator that is also onsite at the course for support to the delineation exercises and discussions.

Polling

If the faculty wants to use polling to stimulate the interactivity or evaluate the course and/or learning curve of the participants, it is recommended that all teachers install the latest version of polling software ESTRO is using (Turning Point) www.turningtechnologies.com on their laptops and integrate the questions within their presentations. Onsite, ideally one faculty member should be appointed to coordinate the voting tool activity during the course.

Accreditation and certification

Accreditation from any relevant bodies should always be sought for these courses. Most ESTRO courses are accredited by UEMS (European Union of Medical Specialists), the reviewing process is conducted by ACOE (Accreditation Council of Oncology in Europe). UEMS accreditation is endorsed by EACCME, the European Accreditation Council for Continuous Medical Education and by the American Medical Association (AMA). For courses aimed at physicists only accreditation is sought through EBAMP (European Board for Accreditation and Medical Physics).

Where there is a relevant national scheme, teachers can also count this activity as part of their own continuing professional development (CPD).

A certificate of completion of the course will be given to participants who have attended all sessions. This is awarded following completion of an evaluation form. The teachers will receive a similar certificate.

Evaluation tools

A standard evaluation questionnaire (see attached) is used for all courses with a rating score of one to five for a number of items and the possibility to add comments. The ESTRO project manager collects these evaluations, compiles the data and provides them to the course director. The course director informs the teachers about the results of the evaluation and discusses with the faculty if changes/adaptations should be made to the course format, content, faculty etc.

Usually this evaluation is undertaken online, using “Survey monkey”. This makes collection and compilation of results quicker and easier. However, it is also possible to use the paper version of the evaluations, in case participants cannot access the online questionnaire.

Course tests

Tests containing approximately 40-50 questions should be made available to all course participants to assess the learning outcome of the course. The test can be completed
• on an electronic form via internet within a defined time period following the course or
• on site during the course using the voting tool.

In most teaching courses, MCQs are undertaken online, using Class marker (www.classmarker.com) or by using the voting system Turning Point. If this option is taken, the number of questions should be reduced to 20-25 as the teachers comment the right answer after each question.

Multiple Choice Questions (guidelines from F Stewart and H Nystrom)

BASIC RULES:

1. The exams should be easy to correct
2. The questions should be clear and unambiguous.
3. The exams should reflect the content of the course and correspond to the learning objectives as indicated at the beginning of each lecture.
4. The exam should not be too difficult to construct in order to make up-dates possible and new questions easy to introduce.
5. The format should either be true/false answers (preferred) or only one correct from 4/5 possible. If this format is chosen, take extra care with wrong answers; these must be plausible but incorrect, not "Mickey mouse".
6. Suggest a total of 100 questions if T/F, or 40-50 if 1/4.
7. All questions should be circulated to all teachers in advance of exam and checked for ambiguities. Teachers should also ensure that this material is covered in the course.
8. Course director should evaluate % correct answer for each question and give feedback to teachers. Questions with unrealistically high or low correct scores should be modified.

CONSEQUENCES:

- Point 1 in practice rules out everything but MCQs.
- To fulfil point 2, only one alternative should be correct. With a standard format, that many courses use, this means that for every question there is one correct answer and maybe 3 or 4 false suggestions. For the constructor of the exam, false answers are much more difficult to come up with than correct answers! The false alternatives often becomes “Mickey Mouse” answers, i.e. obviously incorrect suggestions.
- Point 5: At present, 3 of the 12 course exams use only T/F; 5 use only 1 of 3-5; 4 courses use a mixture (sometimes with more than one correct answer).
- Only True/False options? This minimizes the need to suggest false answers. It is obvious that one and only one alternative is correct. It is easy to correct.
  Several possible alternatives with only a single correct answer? Maybe more ambiguous, but for some of the courses, especially where clinical information is given in a case history, it could be valuable.

- Since 50% is expected to be correct just by chance (guessing), there is a need for a larger number of questions compared to traditional MCQs. If a certificate should be given upon passed exam (50% of the answers correct), the number of questions should be increased for the above reason.
- Point 6: A suggestion would be to have around 100 questions if all questions are T/F; if questions are multiple choice, 1 from 4 or 5, then the number could be reduced to 40-50. This should be reasonable both in terms of efforts for the exam constructor, the time for making the exam and to reduce the effects of randomly correct answers.At the moment this varies between 12 questions (treatment planning:1 correct answer from 4 possibilities per question), to 155 questions (BT: true/false).
- Point 7: Although it is the responsibility of the course director to construct the exam, he/she should encourage each member of the faculty to contribute.
  Each question should "belong" to a specific teacher and be replaced with the teacher, alternatively be approved by the new teacher.
  Each course should aim at building up a bank of questions so that a course does not give exactly the same exam from year to year. Questions can, however, be recycled.
  Point 8: The results from the exams should be monitored and used as a tool for improving the content of the course. Feed-back should be given to each teacher in order for him/her to improve either the lectures or the questions. Yes, feedback both from other teachers prior to the exam and from participants after the exam (or knowledge on how each question fared in terms of 100% correct answers) is essential to improve the quality of the exams over the years. Presumable any questions scoring less than about 50% correct, if true multiple choice, or 70% correct (T/F), is either an ambiguous question or the material was inadequately covered in the course. Any question that scores 100% correct is probably too easy.

Post course work

Course directors receive the results of the MCQ tests as well as a compilation of the evaluation forms from the ESTRO office. An evaluation form for faculties is available to structure the evaluation of the course by the teachers (see attached). The results of all these evaluation tools allow the course director to analyse and discuss -together with the faculty- whether amendments need to be made to the programme, the content of specific lectures, the teaching staff etc... An evaluation meeting of the course can be held at the end of the course on site or by teleconference after the course

These compiled evaluations are also provided to the ESTRO liaison persons who can as such follow up on the course and liaise with the course directors to jointly prepare a continuous analysis for these courses.

Ultimately, the Course Director remains responsible to ensure that the faculty and course development meet the standards of the above mentioned criteria.

GUIDELINES FOR LOCAL ORGANISERS

The local organiser/organising committee has an important role in facilitating local arrangements and arranging the social programme with appropriate fund raising activities.

To recognize this effort,

-free registrations are offered to the department of the local organiser, 1 per 25 participants.

- the name of the local organiser/organising committee is included in the ESTRO guide and in the course book.

Depending on the subject of the course, members of the local staff might be invited to participate as invited teachers to the programme. Participation of local teachers and the topic to be covered by these speakers is to be discussed and agreed upon with the course director.

The tasks and responsibilities of local organizers (Department head or a person delegated by the department head) include

1. Finding a venue for the course (if necessary)

2. Finding a hotel for the participants and teachers (room rates from 80-130€)
   Finding a location for a welcome reception for all the participants (20€p/p)
   Finding a restaurant for the teachers dinner (60€p/p)
   Suggesting a place/restaurant for the social dinner (50€p/p)

   OR

   Putting the appropriate ESTRO project manager in contact with a travel agency to deal with hotel reservations and/or facilitating social activities

3. Promoting the course nationally

4. Finding possible local sponsorship for the course

5. If appropriate getting local accreditation with the help and support of the project manager with regard to the requested documentation

GUIDELINES FOR ESTRO LIAISON PERSONS

Assignment of the liaison persons

The liaison persons are members of the ESTRO Education and Training Committee (ETC) who liaise with the course directors/faculties of a number of courses to jointly prepare a continuous analysis (eg SWOT) for these courses.
To that end they can discuss a.o. the following topics with the course directors:

- How useful the ESTRO Manual is for setting up courses, if the course directors implemented any changes to be compliant with the Manual and if they have suggestions for changing/updating the Manual
- Which parts of the ESTRO CC are covered by their course – What is missing and what could be improved
- If there is overlap with other ESTRO courses
- How the faculty is composed and if any rotation is planned
- What the expectations from the faculty are towards ESTRO and the ESTRO ETC
- How the course progamme and material is prepared and adapted
- What their experience is with the online MCQ is and if they plan any changes/ improvements
- If the aims formulated for the course have been reached
- What the major strengths and weaknesses of the courses are, as shown by the evaluations from the course participants and the faculties

To facilitate the work of the liaison persons, they can dispose of the following means:

- the ESTRO CC and course manual
- the compiled course programmes
- access to course material
- the compiled evaluations by participants
- the evaluations from the faculties, based on the ESTRO template for reporting on courses
- the MCQ's and results of the MCQ's
- the possibility to participate for free to these courses

The liaison persons report to the EDC on a regular basis which allows the EDC to keep an overview on its educational events and ev come up with specific recommendations or amend the School programme

GUIDELINES FOR ESTRO PROJECT MANAGERS

Defining date and place for the course:

To define the date the project manager should check the calendar of important oncology events, the national calendar of events of the country where the course is planned, the calendar of (bank) holidays and the availability of the teachers.

To define the country and city where the course will take place the rotation of the course over time in Europe is taken into account as well as political/society issues and the accessibility of the city.

Dates and locations for courses should be fixed at the latest at the end of July of the year before the courses take place.

Promotion of the course

The project manage is responsible for the preparation of the announcement of the course in a course specific flyer, the annual ESTRO Guide and the web site of the School. The project manager should therefore contact the course director to obtain the information on the faculty, course aims, target group and educational content.

The project manager should furthermore ensure that the course is included in the monthly ESTRO email flashes at appropriate times and contact the National Society of the country where the course takes place to have the course announced on their web site. The project manager should also contact collaborating societies in case of joint courses in order to promote the course to other disciplines

To launch extra promotional actions for the course, the project manager can ask for support from the ESTRO marketing manager

Accreditation of the course

For most of the courses the project manager should apply for UEMS accreditation for the course through the EACCME website and compile the appropriate documents for this application 12 weeks before the course at the latest.

For the courses aimed at physicists only the project manager should apply for EBAMP accreditation using the EBAMP application form for CPD accreditation.

The project manager should include the accreditation points in the certificates of attendants for the course participants and faculty and prepare them for distribution at the end of the course

Choosing the venue for the course

Consideration should be given to the size of the main lecture theatre to accommodate the whole group and the availability of space for breakout groups – as often needed for interactive case discussions and exercises. Enough space must be allowed to install materials, including computers, for the interactive exercises.

The project manager will also make sure that the venue offers a suitable location for the exhibition, considering the number of companies that could take part in the exhibition. The size of this location will be chosen bearing in mind that this area will hold:

- the booths of all companies (ideally all in the same area)
- coffee breaks and eventually also lunches for participants, teachers and exhibitors

Financial constraints might influence the choice of venue for a hotel, university, institute or association but the main constraint is the suitability and flexibility of the venue.

Ordering audio visual equipment and AV support:

The project manager should arrange for all AV equipment needed for the course such as beamer(s), a screen, laptop(s), amplifier & microphones, internet connection, an overhead projector, a flip chart.

Wifi should be available in the meeting room, at least for the faculty and wherever possible for all course participants

Arranging accommodation for the participants:

The project manager should select a travel agent that will deal with the accommodation or select a number of hotels, negotiate a good deal with them and block a sufficient number of rooms (room rate from 80-130€). The project manager should prepare an accommodation booking form and make it available to the participants of the course on the web site of the School when appropriate.

The project manager should prepare travel information for the participants and faculty and make them available on the web site of the School.

Arranging the catering and social activities:

The project manager should arrange the coffee breaks and lunches in collaboration with the local organisers or the relevant person in the course venue.

The project manager should arrange for the teachers' dinner (60€/p), the welcome reception (20€/p) and social dinner (50€/p) in collaboration with the local organiser. For courses of 3 days, only 1 social activity should be organised for the participants.

Liaising with the faculty

The project manager should inform the faculty about the venue and dates of the course and keep them informed about possible changes.

The project manager should liaise with the course director to obtain the final programme of the course and make it available on the web site of the School at the latest 4 months before the course (else a draft programme should be available online).

The project manager should arrange travel and accommodation for the faculty and inform them about all practicalities. Travel should be arranged according to the ESTRO travel policy (see attached).

The ESTRO School can on demand provide worldwide travel insurance (unlimited medical and repatriation expenses) for all faculty members for the time spent on an ESTRO course.

The project manager is responsible for the payment of the per diem allowance to the faculty (150€/day for course directors, 100€/day for teachers) and extra costs of the faculty (of which the original receipts should be received at the ESTRO office 1 month after each course at the latest).

Preparing the course book

The Project Manager should send the teacher's agreement form to all the faculty members asking them to sign it in order to accept or reject the fact that their presentations will be accessible online in the ESTRO online service library DOVE (Dynamic Oncology Virtual Environment) to the specific course participants, to all ESTRO faculty members and to the ESTRO Ambassador members.

The course material from the previous year will be made available online to the participants as background information. All presentations should be provided to the ESTRO project manager **at the latest before the start of the course.** The latest version of all presentations is uploaded at the end of the course and remains available online for all participants and for all the teachers for 1 year.

The presentations online should be made available in secured, low resolution pdf format.

Follow up of registrations

The project manager should regularly check the registrations and payments for the course and take action if registrations are coming too slowly.

The project manager is also responsible for replying to all possible questions of course participants and should send a final confirmation letter to all participants at the latest 2 weeks before the start of the course.

Homework

If the participants to the course are required to prepare some homework for the course, the project manager should inform them in time about the content, the way it should be prepared and the deadlines.

To that end the project manager must liaise with the course director to obtain the (updated) homework and the guidelines.

For courses with delineation exercises, the project manager should inform the course directors that they are fully responsible for the collection of the cases and providing the minimum clinical information needed to perform the contouring. The course director should transmitted the cases at the latest 8 weeks before the course to the contouring administrator who is responsible for uploading the cases on the FALCON platform

For courses where contouring before the course (homework) is planned, the ESTRO Project Manager will send an email to the participants with all information needed to contour at the latest 1 month before the course date. The project manager supports the participants for access problems to the platform. For delineation and case related questions, the participants get support from the contouring administrator that is also onsite at the course for support to the delineation exercises and discussions.

Organizing shipment of course material to venue

The project manager should prepare the shipment for the course in time and follow up personally if to ensure that it arrives in time. A checklist for shipments is available to that end (see attached)

Management of the budget

The project manager should prepare a budget for the course including costs and income for meeting room rental, AV equipment, honoraria, catering & social activities, accommodation, transportation, promotion, educational material, educational tools, sponsorship, registration fees.

The project manager should check all payments and invoices for the course and allocate them to the budget of the course.
The project manager should closely follow up this budget and report on a monthly basis to the ESTRO financial manager. In case of problems the project manager should liaise with the manager of the School or the ESTRO COO in case of problems.

Exhibition and sponsoring

The project manager should provide the ESTRO exhibitions coordinator with all information required for the participation of companies in the course or for possible sponsorship for the whole year.
The project manager directly contacts possible companies for participation in the course as exhibitor or through a satellite symposium

The project manager prepares for them a information package including general information for company delegates, the course announcement, info on the course venue, the course accommodation form and the educational programme, the appropriate ftp link (in case companies need to prepare cases)
The project manager informs the course director if a company wishes to organise a satellite symposium, plans the symposium outside the programme and makes sure the companies submit an abstract for approval at least 1 month before the course

Assisting in the preparation of the evaluation of the course

The project manager should compile the questions for the course test and prepare the evaluation forms for the course. Course tests for the participants can be held on paper, online via http://www.classmarker.com/online-test/ or live at the course with the turning point voting system.
When the results are compiled, the project manager should inform the faculty about the results of both the test and the evaluation and the participants individually about their results for the test.
The project manager also liaises with the ESTRO School liaison persons and provides them with the course material, homework and results of the test and the evaluations.

Voting System

The project manager should ask the course directors well in advance of the course if the voting system tool 'Turning Point' will be used during the course (according to it's availability), either as pre-MCQ and/or post-MCQ and/or during presentations. If this tool is being used for the MCQs, these should be provided to the project manager at least 2 weeks prior to the course. If this tool is being used during the presentations, it is recommended that all teachers upload the latest version of Turning Point onto their respective laptops and prepare their own questions within their presentations. Onsite, ideally one faculty member should be appointed to coordinate the voting tool activity during the course.

Management courses outside Europe in collaboration with regional RO Societies

The project manager is responsible for course planning, promotion and accreditation; for liaising with LOC to instruct them on the practical needs (venue and AV) and for exhibition and sponsoring; for liaising with the faculty and ordering their flights; for the preparation of the course book, FU of the registrations, preparation and FU of the homework, budget management, preparation & FU of the evaluation/test (if organised)

GUIDELINES FOR COMPANIES PARTICIPATING IN ESTRO COURSES

Course director

The course director will send all communications addressed to companies to the project manager who will then liaise with the ESTRO contact for companies. Communications will then be forwarded to the companies by their ESTRO contact

If companies are actively participating in the scientific programme, the course director will provide ESTRO with information on the material that has to be prepared by the companies 3 months before the starting date of the course.

The course director is not responsible for the discussions with the companies and should therefore not directly be in contact with them except under special conditions agreed by ESTRO.

Project manager

If there is an **exhibition** during the teaching course, the following must be considered:

- Venue for companies:
  The project manager will make sure that the venue offers a suitable location for the exhibition, considering the number of companies that could take part in the exhibition. The size of this location will be chosen bearing in mind that this area will hold:
  - the booths of all companies (ideally all in the same area)
  - coffee breaks and lunches for participants, teachers and exhibitors

- The project manager will prepare an information package for the companies including:
  - General information for company delegates
  - Announcement given to the participants
  - Information on the course venue
  - Accommodation form
  - Scientific program

- The project manager will send this package to the companies 2 months before the course, including the:
  - space application form
  - advertising and sponsoring forms
  However, in case of satellite symposia or educational grants, the project manager will liaise with the ESTRO contact for companies.

- Companies symposium:
  - should be held outside the programme schedule, in the morning before the start of the course or at the end of the day
  - the presentation cannot be made by a faculty member
  - the course director should receive an abstract of the presentation 1 month before the course and be entitled to suggest changes and give comments
  - the course director can evaluate these satellites on an annual basis

- If there is **no exhibition or intervention of companies** during a teaching course, the following documents will be sent to companies by their ESTRO contact 2 months before the course:
  - Announcement of the course
  - Scientific program
  - Sponsoring form

- Feedback :
  The project manager will provide the list of companies participating in his/her teaching courses and feedback from the company delegates (via company feedback form) to the ESTRO contact for companies.

Local organiser

- The local organiser may help in attracting companies to the course but all accounting matters must go directly to ESTRO, with no exceptions.

Companies

- All companies taking part in the exhibition will be requested to pay:
- the cost of the floor space (included 1 table + 2 chairs)
- the company delegate's full registration

- If companies' presentations are included in the scientific programme (plenary or in parallel), the company will be required to provide ESTRO with the corresponding abstract 1 month before the starting date of the course. The abstract will be sent by the project manager to the course director who will/will not approve it. The same rule applies for satellite symposia from companies held outside the course

- If an advertisement is booked, the company will be requested to send the artwork to the project manager at the latest 3 weeks before the starting date of the course.

TEACHING COURSES INDUSTRY PARTICIPATION OPTIONS 2018	PRICE
(1) BOOTH AT COURSES INSIDE EUROPE: Companies wishing to promote their products and/or services to the course participants can book a booth for commercial representation during the whole duration of the course. Company delegates for this booth should register for the course and have access to the complete educational programme.	Booth: 3500€ Delegate: 600€ for ESTRO members 750€ for non members
(2) EDUCATIONAL CONTRIBUTION: Companies can be invited by the course director to provide an educational contribution to the course programme in the format of a demo or hands-on session or contribution to a forum. Companies can accept this invitation unindependently of their participation to the course as exhibitors . Companies will not be charged for this non-commercial contribution that should be provided by a user (the name of the user should be confirmed to the course director 1 months before the start of the course). The people providing these contributions for companies do not need to register for the course unless they want to attend the course as complete participants . Their travel and accommodation should be supported by the company.	Educational contribution only: 0€ Educational contribution + attendance to the course: 600€ for ESTRO members 750€ for non members
(3) PARALLEL SATELLITE SYMPOSIUM: Companies wishing to present their products and/or services to the course participants can book a slot for a non-exclusive, non-commercial educational symposium that will be held outside the programme schedule, in the morning before the start of the course or at the end of the day. Such satellite presentations cannot be made by a course faculty member. The course director should receive an abstract of the presentation 1 month before the course and is entitled to suggest changes and give comments if necessary. The number of satellite symposium per course is limited and subject to the decision of ESTRO and the time schedule will depend on the course program. Participants to the course are free to attend the presentation as this is not part of the educational programme.	3.000 €
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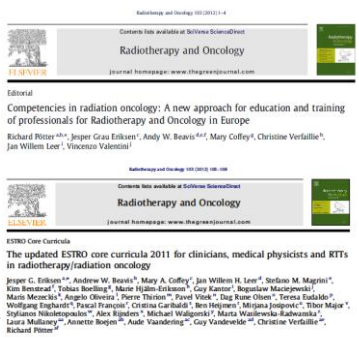
Brussels, July 2013
Legal Advice SimontBrown Lawyers (Av Louise 149/box 20, 1050 Brussels - Belgium -www.simontbraun.eu)

PUBLICATION OF THE UPDATED CC



Radiotherapy and Oncology

journal homepage: www.thegreenjournal.com

Editorial

Competencies in radiation oncology: A new approach for education and training of professionals for Radiotherapy and Oncology in Europe

Richard Pötter, Jesper Grau Eriksen, Andy W. Beavis, Mary Coffey, Christine Verfaillie, Jan Willem Leer, Vincenzo Valentini

Radiotherapy and Oncology

journal homepage: www.thegreenjournal.com

ESTRO Core Curricula

The updated ESTRO core curricula 2011 for clinicians, medical physicists and RTTs in radiotherapy/radiation oncology

Jesper G. Eriksen, Andrew W. Beavis, Mary A. Coffey, Jan Willem H. Leer, Stefano M. Magrini, Kim Renstrøm, Tobias Boelling, Marie Hjälm-Eriksson, Guy Kantor, Bogusław Maciejewski, Maris Mezeckis, Angelo Oliveira, Pierre Thirion, Pavel Vitek, Dag Rune Olsen, Teresa Eudaldo, Wolfgang Enghardt, Pascal François, Cristina Garibaldi, Ben Heijmen, Mirjana Josipovic, Tibor Major, Stylianos Nikoletopoulos, Alex Rijnders, Michael Waligorski, Marta Wasilewska-Radwanska, Laura Mullaney, Annette Boejen, Aude Vaandering, Guy Vandevelde, Christine Verfaillie, Richard Pötter

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'Adaptive RT': How it all started

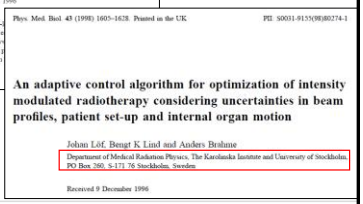
Phys. Med. Biol. 42 (1997) 123–132. Printed in the UK

Adaptive radiation therapy

Di Yan†, Frank Vicini, John Wong and Alvaro Martinez

Department of Radiation Oncology, William Beaumont Hospital, Royal Oak, MI 48073, USA

Received 11 August 1995, in final form 29 August 1996



Phys. Med. Biol. 43 (1998) 1603–1628. Printed in the UK

An adaptive control algorithm for optimization of intensity modulated radiotherapy considering uncertainties in beam profiles, patient set-up and internal organ motion

Johan Löf, Bengt K Lind and Anders Brahme

Department of Medical Radiation Physics, The Karolinska Institute and University of Stockholm, PO Box 260, S-171 76 Stockholm, Sweden

Received 9 December 1996

…and follow-up papers

-2-

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Publication of the updated CC:
ACCEPTABLE
Reason: quote of the Title and Authors of the article only and source mentioned

Adaptive RT:
ACCEPTABLE
Reason: quote of text is limited; authors and source are mentioned

Local Therapy and Survival in Breast Cancer

Reductions in LRR with systemic therapy are reported in studies with and those without RT, but the magnitude of the reduction appears to be **greater with the combination** of systemic therapy and RT than with systemic therapy alone.

The survival benefits of achieving local control documented in the EBCTCG meta-analysis are of similar magnitude or greater than those accepted by patients for systemic therapy, yet they **received considerably less attention.**

Punglia R.S. et al., NEJM 2007;356:2399-2405.

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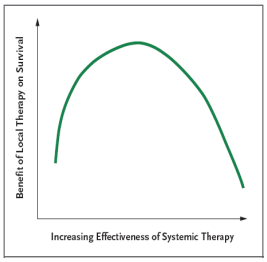
Local Therapy and Survival in Breast Cancer



Punglia R.S. et al., NEJM 2007;356:2399-2405.

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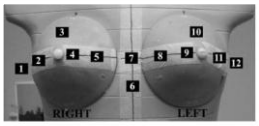
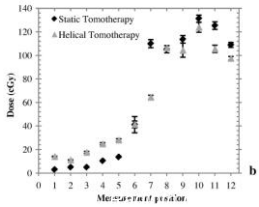
Local Therapy and Survival in Breast Cancer:
ACCEPTABLE
Reason: quote of text is limited and only one table included; authors and source are mentioned

Normal tissue dose and second risk due to megavoltage fan-beam CT, static tomotherapy and helical tomotherapy in breast RT



a



b

Skin measurement locations in the breast region.

Skin dose measured from a single static and helical tomotherapy treatment fraction

Quin A. et al, Radioth Oncology (2013) in press

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Normal tissue dose and second risk due to megavoltage fan-beam CT, static tomotherapy and helical tomotherapy in breast RT

Second cancer risk

The following includes further details on how the BEIR VII lifetime attributable risk (LAR) [1] was calculated for this study.

$$LAR(D,e,a) = \sum^{85} M(D,e,a)\frac{S(a)}{S(e)}$$

where e is the age at exposure, a is attained age, for lung $M(D,e,a)$ is the logarithmic weighted average of excess relative risk (ERR) and excess absolute risk (EAR) and for breast $M(D,e,a)$ is EAR, and $S(a)/S(e)$ is the probability of surviving from age at exposure to attained age (derived from the Anderson and DeTurk tables [2]).

$$ERR(D,e,a) = \beta \exp(\gamma e^*)\left(\frac{a}{60}\right)^{\eta}\lambda^{C}(a)$$

$$EAR(D,e,a) = \beta \exp(\gamma e^*)\left(\frac{a}{60}\right)^{\eta}$$

where β is the ERR/Sv and EAR per 10^4 WY-Sv for age at exposure 30+ at attained age 60, γ is a constant dependent on age at exposure, for lung $e^*=(e-30)/10$ for age at exposure less than 30 and $e^*=0$ for age at exposure greater than 30, and for breast $e^*=e-30$ for all age at exposure, η is a constant dependent on attained age, and λ^C is the attained age baseline risk of developing the cancer [3]. For lung risk estimates the BEIR VII recommends the logarithmic weights 0.3 and 0.7 for ERR and EAR respectively. A 5-year latency period was used and a dose-rate-effectiveness-factor of 1.5 was applied to correct for dose fractionation, as suggested by BEIR VII [1].

Quin A. et al, Radioth Oncology (2013) in press

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Normal tissue dose and second risk in breast RT: ACCEPTABLE

Reason: quote of text & formulas is limited as well as other material (1 image, 1 table); authors and source are mentioned

PROSTATE CANCER

Table 4. Impact of treatment on pain (n = 30)

Level of relief	n*	(%)
Minimal relief	8	(27)
Partial relief	8	(27)
Complete relief	6	(20)
No improvement	6	(20)
Worsening of pain	2	(6)

Table 3. Ambulatory status following treatment (n = 32)

	Post-treatment status	
	Ambulant	Non-ambulant
Pre-treatment status		
Ambulant n* = 16	13 (81%)	3 (19%)
Non-ambulant n* = 16	2 (12.5%)	14 (87.5%)

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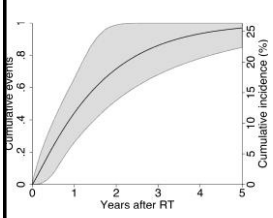
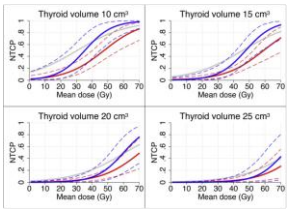
Prostate Ca: NOT ACCEPTABLE

Reason: No mention of source and author of quoted tables; the fact that the tables have been 'edited' do not justify the use without mentioning author and source

Hypothyroidism after primary RT for H&N squamous cell ca: NTCP modeling with latent time correction





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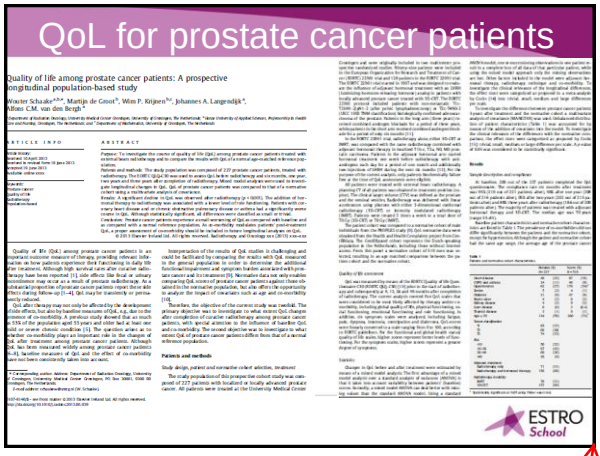
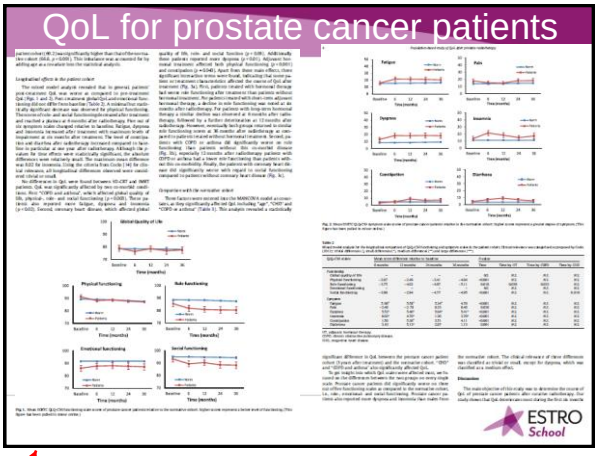
Hypothyroidism after primary RT: NOT ACCEPTABLE

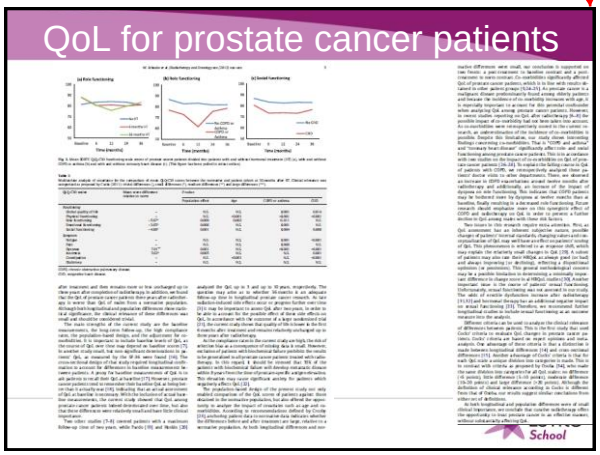
Reason: No mention of the source and authors of the quoted graphs

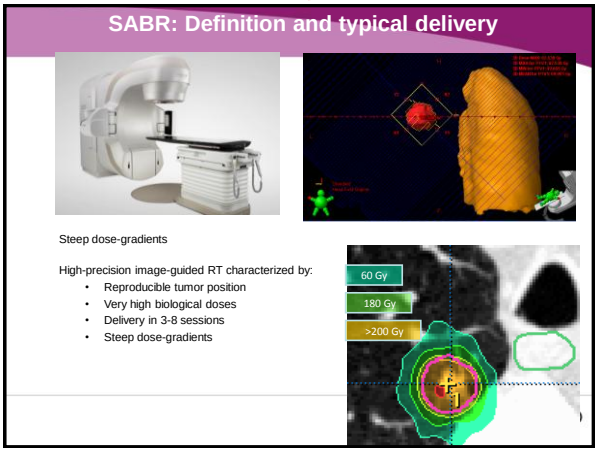




QoL FOR PROSTATE CA PTS (3 slides): NOT ACCEPTABLE
Reason: full article is included which is much more than a brief quotation; therefore it is not acceptable, even if author and source are mentioned

SABR: NOT ACCEPTABLE
Reason: source of the pictures not mentioned





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BE- 1050 BRUSSELS
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T +32 2 649 51 64
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A Guide to Successfully Writing Multiple Choice Questions (MCQs)

Peter G. Mills, Mark A. Westwood, Alfred Tenore

"Examinations are formidable even to the best prepared, for the greatest fool may ask more than the wisest man can answer"

Charles Caleb Colton (1780 – 1832)

The purpose of this review is to provide guidelines that can be used by the UEMS community to assist them in a challenging task of writing effective and high quality MCQs.

In 1956, Benjamin Bloom published a taxonomy of cognitive learning as a hierarchy of *knowledge*, *comprehension*, *application*, *analysis*, *synthesis* and *evaluation*. Through the years, educators have adopted Bloom's taxonomy for test development and simplified and organized it to include the following three categories:

1) **knowledge** (recall or recognition of specific information),

2) combined **comprehension** and **application** (understanding or being able to explain in one's own words previously learned information and using new information, rules, methods, concepts, principles, laws and theories), and

3) **problem solving** (transferring existing knowledge and skills to new situations).

Since the desired outcome of an educational program requires that "learners" do more than recall facts, MCQs should be carefully designed to assess, as much as possible, problem-solving capabilities which increase the validity of the examination.

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Introduction:

Before considering the particular subject of MCQs we should consider the context in which we believe that MCQs have a long term important role.

1) Assessment drives learning, thus making it a critical component of the educational process.

2) There is no single type of assessment that can be considered as being "perfect".

The purpose of an examination process is to permit inferences to be drawn concerning the knowledge of an examinee in order to assess his/her competence to practice selected functions in an effective and efficient manner. It follows that there are valid questions about the usefulness of MCQs along the lines of :

"What types of questions are better, multiple-choice, true or false, essay questions, oral examinations,……etc?"

Although all question types may be useful for assessing a variety of levels of thinking, it is important to realize that the role and value of knowledge assessment in the postgraduate medical education setting is clearly limited. It might be considered self evident that the expectation of patients being treated by a physician is that any technical procedure will be performed or interpreted with an appropriate level of knowledge and skill. In practice however patients want their Doctor to be kind, to be up-to-date, to show respect for the principles of consent, to provide an accurate description of the range of possible treatments available in a cost-effective and risk minimising way, to provide appropriate information to their close relatives, and to behave in the many other different ways which are summarised by the concept of "professionalism". It can be persuasively argued from the patient's perspective that skills and attitudes or professionalism are as important if not more important than pure factual knowledge. Thus the role of MCQs and Assessment of Knowledge, are of limited importance in the context of defining what is a "Good doctor."

In an age of rapid electronic access to knowledge, the ability of the doctor to **use** this knowledge in a wise and humane manner is as important, if not more so, than the possession of that knowledge. Therefore, to maintain overall competence and expertise, Knowledge Based Assessments (KBAs) must be complemented by methods to assess Skills and Professionalism. An examination aimed only at assessing knowledge and how it is used is insufficient in itself, to address the expectations of patients.

Returning to MCQs, critics of this form of examination argue that this methodological format is unable to test higher level learning/thinking. In fact, it is a common belief, albeit erroneous, that MCQs represent an overly simplistic methodology which is most appropriately used to effectively evaluate only superficial learning or low-order cognitive capacities such as "recall" (widely considered as demonstrating a low level of mastery of a subject according to Bloom's taxonomy of

the cognitive domain). Because of this, it is often argued that the complexity of day-to-day clinical medicine cannot be reflected in such an apparently "simple" assessment tool. Nevertheless, although MCQs are typically better at detecting recall of facts rather than understanding of concepts, it is possible to write conceptually based items to test higher levels of understanding such as ***evaluation*** and ***synthesis*** through careful writing of creative questions. Therefore, the criticisms voiced against the concept of MCQs should be directed towards the flaws in the construction of the items rather than to their inherent weakness.

It is common knowledge that the "multiple choice question" is the most common type of written test item used in undergraduate, graduate and post-graduate medical education. The principles of writing effective MCQs are well documented in test-item construction manuals, educational measurement textbooks and the research literature. Despite this a study from the National Board of Medical Examiners showed that violations of the most basic item-writing principles are very common in medical education examinations.

There is no doubt that it is harder to write a concept-based MCQ rather than a knowledge-based one and it is also harder to write a good MCQ than a bad one.

One approach to overcome flaws in construction is to write questions where the participant is asked to make a (multiple-choice) decision whilst providing some evidence/data upon which to base the decision. The MCQ options presented should all represent plausible decision options, the correct selection of which, requires the interpretation of the evidence and the application of appropriate decision making methodologies. In this way the questions seek to test clinical reasoning and judgement rather than logic or an ability to pass exams.

After reviewing the extensive literature concerning the best and most appropriate methods to assess factual/conceptual knowledge it is clear that MCQs have become accepted as the "least flawed" method of the current forms of assessment, especially compared to the "traditional" oral examinations. The highly subjective nature of the multiple components of oral examinations leaves this method of assessment potentially wide open to legal challenges. In contrast to oral examinations, MCQs are by their nature objective, easy to grade, efficient in time and allow some degree of comparison between learners, information which is highly regarded and most constructive both in a "formative" as well as a "summative" examination. In summary, although MCQs have obvious limitations, in terms of objectivity and efficiency, because alternative methods are unsatisfactory, they will in future provide one component of the assessment of doctors.

The intellectual context for the use of MCQs

The intellectual content of MCQs must always relate back to a published curriculum. Good test question writing begins with identifying the most important information or skill that is to be learned; therefore a direct relationship between objectives and test items must exist.

The MCQs should be seen as a mechanism for ensuring that the candidate possesses an appropriate depth of knowledge across the entire Curriculum. Therefore, the test items should come directly from the objectives embedded within that curriculum. They should focus on important and relevant content with some topics deemed to have greater relevance and importance than others. It is the responsibility of the exam-setting group to commission appropriate numbers of questions dependent on the predetermined importance of each topic.

Strengths and Limitations of MCQs

As pointed out at the beginning of this introduction, "no single type of assessment can be considered as being perfect". It therefore becomes important to review what are the strengths and limitations of MCQs, the most popular methodological form of assessment currently used by the majority of educational communities.

Strengths:

1) Scoring is easy, objective and reliable. Marking the exam can be undertaken by computer methods rather than the introduction of costly and potentially erratic human factors.

    a) Scores are more reliable than subjectively scored items (e.g essays)

    b) Scores are less influenced by guessing than true-false items (avoids the absolute judgments found in True-False question formats).

2) Can cover a lot of material very efficiently (about one item/minute of testing), allowing the assessment of a broad sample of achievement.

3) Capable of assessing learning outcomes that cover different cognitive learning levels.

4) Provides highly structured and clear tasks where the "correct" answers are predetermined and therefore, do not involve subjective judgments.

5) Incorrect alternatives provide diagnostic information.

6) Items can be written to allow the examinee to discriminate among options that vary in degree of correctness.

7) Achievement and progress (formative tests) can be compared from person to person, class to class and year to year.

8) As the bank of MCQs is progressively built up, the costs of assessment of knowledge become predictable and contained.

9) Electronic manipulation to vary the order in which questions are presented to the candidates reduces the chance of cheating.

Limitations:

1) Constructing good questions is time consuming.

2) Frequently difficult to find plausible distractors (sometimes there is more than one defendable "correct" answer.)

3) Often the focus is on testing factual information (failing to test higher levels of cognitive thinking.)

4) Can be ineffective in assessing some types of problem solving situations.

5) Scores can be influenced by reading (and/or language) ability.

6) Structure may lead students to read more into the question than was intended.

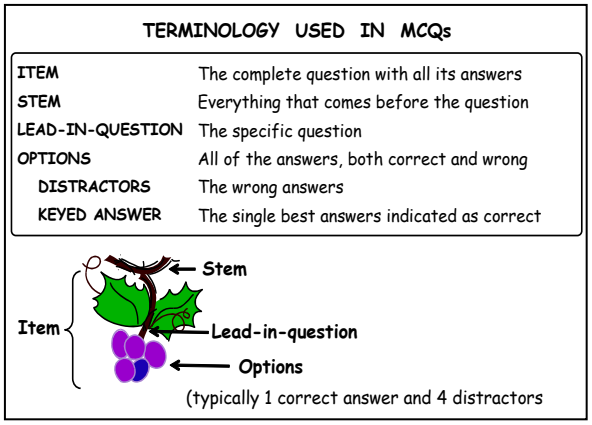
7) Construction of high quality items places a high degree of dependence on the writing ability of the author of that question.

8) May encourage guessing.

9) Do not allow the student to create their own answer (no information concerning individual thought processes on how an answer was arrived at.)

10) The examining body needs to own and keep electronically secure the questions and the correct answers (The hardware used in the exams must also be secure to maintain exam security).

"Anatomical" Parts of a MCQ



The figure to the right depicts the components of a typical multiple choice question (or item). The traditional MCQ is one in which a student chooses one answer from a number of choices (options) supplied. Typically the item presents a set amount of factual information, called the "stem," followed by a lead in question and usually 4-5 options as possible answers. Too few options means guessing is rewarded more frequently and too many options means the student wastes time. The multiple choice item is unique in that the standard by which the best answer is selected is contained in the ***stem***. It is important to realize that the best answer does NOT have to be the one and only indisputably correct response to the question, as long as the subject matter experts who reviewed the question agree it is the best answer of those presented.

Features of MCQs

The following sections outline techniques for writing and evaluating multiple choice items by considering first the ***stem*** and then the ***responses***. A well constructed MCQ consists of a positively worded leading statement or "stem", followed by a clearly expressed question. The stem will have a clear relationship to a specific item within the curriculum. The ***stem*** is followed by five possible ***responses*** consisting of one agreed correct answer and four wrong answers or "distractors"

Stem (and lead-in-question):

1) Usually written first and is best written as a **complete** sentence or question.
   Examples:
   Complete sentence/question: *"Which of the following is a diagnostic feature of inflammatory bowel disease?"*
   Incomplete sentence/question: *"Inflammatory bowel disease….*
   a) Research has shown that the use of incomplete stems tends to lower a student's correct response rate by 10 to 15%.
2) Should be kept as short as possible and include only the necessary information needed in order to select the correct option.
   a) Clinical vignettes do not have to be long to be effective (avoid verbosity, irrelevant material and "red herrings")
3) Should NOT be tricky or misleading.
   a) Trick questions which might lead the knowledgeable examinee to give the wrong answer should be avoided.

4) The language used should be simple so that the level of reading difficulty is kept low.
   a) The stem should not be a test of the examinee's reading ability. As the language of choice is often English it should be borne in mind that many apparent everyday phrases, which are simple to understand for the native English speaker, can be confusing for other speakers of English.
5) Should test concepts of understanding or data evaluation and should avoid simple tasks such as recall or pattern recognition.
6) The content of the stem focuses on a central theme or problem, using clear and precise language, without excessive length which can confuse or distract test takers.
7) As a general principle, the stem should be stated in a **POSITIVE** form, structured to ask for a correct answer and not a "wrong" answer.
   a) Negative statements are not characteristic of normal thought processes, and consequently may place the candidate who is attempting to decipher the item at a disadvantage.
   b) Negatively posed questions (e.g. "all of the following, except") are less effective and more difficult to understand.
   c) If considered important to be used in particular situations the negative term (e.g. "not", "except", etc) should be **bolded**, CAPITALIZED, underlined, etc to make sure that it is noticed.
8) Specific terms must be avoided (both in the stem and/or distractors):
   a) ***Absolute terms*** ("all", "always", "none", "never", etc) since there are very limited situations where things are absolute or universally true.
   b) ***Relative terms*** ("may", "can", "could", etc) may be cues for the correct answer.
   c) **Imprecise terms** ("few", "many", "sometimes", "occasionally", "rarely" "seldom", etc) are not uniformly understood.
9) Do not use abbreviations, acronyms, eponyms, etc. without an explanation of the term in simple understandable language.
   a) The question should not become a test of whether the examinee understands the meaning of the term!
   b) There should be a clearly defined lexicon of commonly used abbreviations which will be universally understood and which are not open to misinterpretation.
10) Sentence structure in the stem should be grammatically accurate and logically related to the responses. It should present all relevant information to ensure clarity and understanding.

11) Although the multiple choice item format is brief, sufficient information to make an interpretation, answer the question, or solve a problem must be included.

    a) Avoid superfluous information, but be certain that all necessary details are included.

    b) Avoid the use of personal pronouns such as "you" which are inappropriate and perhaps confusing.

12) Each question should be self-contained and not refer directly to another question.
    a) It should not be possible to deduce the answer of one question from the information presented in a previous or subsequent question.
13) Within a European context, questions should not relate to specific national requirements (e.g. legal regulations for flying or driving licenses.)

Responses:

1) Each multiple choice item should have five mutually exclusive responses

2) The best answer should be the one agreed upon by the experts; however, the other four distractors should also seem plausible to the candidates who have partial, incomplete or inappropriate knowledge.

   a) There should be an evidence base for determining which of the answers are correct and which are incorrect.
   b) The location of that evidence - whether in international guidelines, textbooks or the scientific literature - should be available to the question writer, the question-writing group and to the candidates themselves.
   c) The evidence must be cited within the curriculum that is being assessed.

3) The position of the "correct" response should vary from the A, B, C, D and E positions

   a) Research shows that the B and C positions are overused.

   b) "Testwise" candidates may key in on this fact and choose the B or C positions to increase their chance of getting the answer right when forced to guess.

   c) Keep correct answers in random positions (avoid any pattern formation that could potentially be detected by candidates)

   d) If necessary after the test is written, reorder the sequence where the correct answers are placed

   e) Another method is to have all responses to all questions listed alphabetically. However, care must be taken with this approach as this can alter the correct response to certain types of questions.

4) The "distractors" may be considered logical misconceptions of the best answer.

5) The grammatical structure of all the responses should be a logical conclusion to the question (or statement) presented in the stem.

   a) Because the author of a question tends to pay more attention to the correct option than the distractors, grammatical errors (cueing the answer) are more likely to occur in the distractors.

6) Repetitive language within the responses should be avoided.

   a) Words which are repeated in every response may be placed in the stem so that the candidate has less to read and is less likely to be confused by the structure.

7) The responses should be parallel in structure or category of information (e.g. all related to "treatments", or "diagnoses", etc).

8) The responses should be similar in length.

   a) There is a tendency among item writers to make the correct answer the longest answer.

   b) Astute candidates in examination technique may therefore be able to correctly guess the correct answer on a disproportionate number of occasions.

9) When writing distractors, it is wise to avoid the use of superlatives such as "**always**" and "**never**"

   a) Statements containing these items are highly likely to be incorrect and candidates will discard these options thereby increasing the chances of correctly guessing the correct answer.

10) Each distractor should be mutually exclusive and not overlapping.

   a) *Example*: if a series of percentages is to be used for the responses, each range must be unique to the response.

      A. 5 - 20

      B. 25 - 40

      C. 45 - 60

      D. 65 - 80

      E. 85 - 100

   b) If responses are overlapping, the candidate may not be able to determine the best answer not because they do not know the answer, but because the answer is incorporated into more than one response.

   c) This may also lead to challenges of validity of the exam result by unsuccessful candidiates who will argue more than one response is correct due to this overlap.

11) Avoid using "**none of the above**", "**all of the above**", as a response.

   a) The "***none of the above***" response does not test what the candidate knows, but only that he/she can recognize that the correct answer is **not** present.

   b) The "***all of the above***" response is essentially an overlapping response, because it requires the candidate to consider the responses in combination

   c) Knowing that two are correct leads the astute candidate to "*all of the above* " by default without knowing the importance or correctness of the remaining responses.

12) To make distractors more plausible, use words that should be familiar to the examinee.

Students' strategies in taking MCQ exams

Just as guidelines are written to help educators construct good multiple choice questions, numerous publications can also be found that are oriented towards helping the student maximize his/her guessing capabilities in order to correctly respond to MCQs.

In the preceding pages we have covered most if not all the so-called test-wise strategies used by students to answer MCQs. However, it would seem appropriate at this point, to list what is typically considered as the student's guide to improving their guessing strategies and to some extent subverting the purpose of the examination.

1) Pick the longest answer
2) When in doubt pick the answer "C"
3) Never pick an answer which includes the word "***always***" or "***never***" in it.
4) If there are two answers which express opposites, pick one or the other and ignore other alternatives
5) Pick the more scientific-sounding answer
6) Don't pick an answer which is too simple or obvious
7) Pick an answer that contains a word which you remember was related to the topic
8) Choose an answer that contains a word, phrase or meaning that is found in the stem
9) Choose the answer that includes the majority of the elements in common with the other options ("convergence strategy")
10) Eliminate wrong answers and see (guess between) what is left!
11) A common multiple choice item strategy is to place the most tempting wrong answer before the right answer
12) If all else fails, guess!

Setting up a successful high-quality Exam

Since the hope of the UEMS is that the rigorous quality and standards imposed on the overall organization of these exams may persuade European National governments to recognize and accept these exams, it must be borne in mind that the basic structure of the exam process in question must be transparent to National or International regulators who are contemplating possible local recognition of the exam.

It is apparent that writing good MCQs is both a science and an art. Item writing is an arduous task which requires not only mastery of the subject matter but also command of verbal communication skills and an understanding of the examination population.

The necessary requirements for a well-structured examination process based on MCQs include the following sections:

1) **Developing** new items on a continual basis (as assigned based on the needs of the examination and previously contributed material).

   a) Professional item writers plan on one hour or more to write one good question.

   b) When starting to write questions it is highly likely that the first few questions will require substantial modification by more experienced question writers in order to become good questions.

2) **Reviewing** and selecting items for inclusion in the written examination.

   a) A review group (small in number) should be set up with the specific task of selecting questions which will cover, in number and content, the specific discipline of the exam.

   b) The specific objective of the group is to select from the MCQ bank a range of questions appropriately distributed throughout the curriculum, with a range of perceived difficulty, and where available the use of “marker questions” known to perform well.

   c) The use of "old" questions that have been validated provides a longitudinal standard and further validates the exam process.

   d) The goal of the group is to draw upon a pool of examination items which are appropriate to measure the knowledge and skills necessary for safe and effective performance in the field of practice.

   e) The recommended number of MCQs in an exam should not be less than 100 (for any specific specialty discipline) in order to achieve sufficient reliability and validity of the exam.

3) **Monitoring:**

a) The content, task, and cognitive skill distributions of items.

b) The content quality to avoid duplicate items on the same knowledge/skill.

4) **Analysing** the performance of each item to ascertain the quality of the content and structure of each item in terms of:

a) **Item difficulty:**

The percentage of students that answered each item correctly.

1) The goal is to construct a test that contains only a few items that more than 90% or less than 30% of students answer correctly.
2) Difficult items are those that about 50% to 75% of students answer correctly.
3) Items are considered easy to moderately difficult if 70% to 85% of students answer correctly.

b) **Index of discriminiation:**

The percentage difference in correct responses between 2 groups of students (generally the top 25% and the bottom 25%)

1) The discrimination ratio for an item will fall between +1.0 and -1.0. The closer the ratio is to +1.0, the more effectively that item distinguishes students who know the material (the top group) from those who don't (the bottom group).
2) Ideally each item will have a ratio of at least +0.5. An item with a discrimination ratio of +0.60 or greater is considered a very good item, while a discrimination of less than +0.19 indicates a low discrimination item that needs to be revised.
3) Items with a negative index of discrimination indicates that the poor students answer correctly more often than do the good students and such items should be avoided.
4) Questions that appear to be too difficult should be further reviewed to determine if the question is faulty or if the questions needs further revision to improve the clarity of the correct response.

c) **Reliability:**

This is the extent to which a test yields the same results on a repeated basis.

1) Items in a test represent a small sample of all the possible MCQs that could be asked, and the test score should be indicative of the score of the same student on any other set of relevant items.
2) A good way to assess this is with the use of "marker questions" which have previously performed well in discriminating candidates.

d) **Validity:**

The extent that a test measures what it claims to measure.

e) **Resource intensiveness:**

The costs of constructing and grading items. MCQs are relatively easy to grade, especially with computer assistance, but are difficult and time-consuming to construct.

There are the following additional points to consider:

f) No one truly knows how well a question is going to perform until data have been analyzed after learners have taken the test on at least one occasion.
g) Sophisticated analysis is not necessary, but as a minimum the tally of how many times each choice was selected and what proportion of the respondents correctly answered the question should be obtained.
h) Analyses of these simple data can reveal if questions are too easy or too difficult, and if distractors are working according to the way they were intended to work.

5) **Providing** expert input into the criterion standard against which candidates are measured.

a) This refers to setting the "pass mark", a special score that serves as a boundary between those who are considered to have performed well and those who have not.
    1) Remember, the purpose of the examination is to select the group of candidates that perform well enough and to eliminate those who do not perform well.
b) The issue of candidates successfully "**guessing"** the correct answer:
    1) The answer to a multiple choice question can always be guessed with a 20-25% chance of getting the correct answer (depending on the number of options and also the number of obvious distractors).
    2) Theoretically, this means that an examinee will be able to score an overall mark of around this percentage in an assessment made up of MCQs, without knowing anything about the subject matter. Items with a negative index of discrimination indicates that the poor students answer correctly more often than the good students do. Such items should be avoided.
    3) Approaches for dealing with this include:
        a. Adjusting the overall pass mark to take this into account,
        b. The use of negative marking on each incorrect answer thereby discouraging guessing
    4) "Negative marking" is almost unknown outside the UK and even in the UK public examination boards do not currently use it.
        a. Although it may be considered to discourage guessing, candidates who do guess are statistically likely to guess wrongly as this is the function of the distractors.
        b. "Negative marking" penalises candidates who lack confidence even though they may have an equal knowledge and understanding of the subject matter compared to more confident individuals. This in particular can disadvantages female test takers who are as a population less likely to guess an answer.
c) Once the test has been appropriately validated, "pass marks" need to be set which can be thought in terms of:

1) The "**absolute**" pass mark (expressed as a number or percentage of questions needed to be answered correctly, e.g. 70%)
    a. This is criterion reference based and therefore it is possible for all candidates to pass or fail
2) The **"relative**" pass mark (expressed in relation to a number or percentage of individuals taking the exam, e.g. top 33%)
    a. This is norm-reference based therefore the grade of the examinee is determined by both his/her own achievement compared against the achievement of all other candidates.
3) The "**Angoff**" pass mark. The Angoff score is determined after the question has been written, reviewed and accepted as appropriate for the examination.
    a. It is determined before the examination by a set of experts (who may or may not be the part of the question writing group).
    b. It is the likelihood of borderline competent candidate whose knowledge, skills and abilities are considered just sufficient to pass the examination overall of correctly answering that individual question.
    c. A good examination will consist of a series of questions with a wide distribution of Angoff scores.
    d. "**Modified Angoff**" scores are determined in a similar way but are determined **after** the examination has been sat by the test takers and the performance of each question is known and taken into account by those determining the modified Angoff score.
    e. A combination of Angoff and modified Angoff scores can be used to determine the passmark for a particular diet of an examination.
    f. Questions where the Angoff or score is significantly at odds with the actual performance of the question in the exam should be reviewed to determine if the question is faulty or requires further revision.

Finally:

Whilst the generation of new questions is essentially a task for the individual, the process of maximising the quality of MCQs is a task for a group of motivated and experienced MCQs writers who will, at times, need to meet face-to-face.

Experience suggests that the face-to-face format, although more costly, facilitates an international atmosphere and understanding. It encourages individual contributors and is considered irreplaceable, not only to motivate individual writers but to maximise the intellectual benefit from each newly developed MCQ. Discussion of individual topics should be encouraged and the contribution of all individuals valued. In particular those who are inexperienced questions writers should be facilitated in a constructive manner to enhance their individual contribution to the joint

task of developing high-quality European MCQs. The face-to-face format is also educational to the individual MCQ writers and usually enhances the quality of subsequent MCQs. In general, the quality of questions produced by any individual writer tends to increase with time and collaborative experiences. In the context of a European exam, writers from different countries, different cultures and different languages must be sourced. This will ultimately ensure the highest validity of any examination at a European level.

If well chaired these sessions are much more productive than the more impersonal communication methods such as e-mails or tele-conferences. Each session needs to have a time limit for discussion for each individual question with the conclusions of "accepted", "rejected", or "back to the author for reworking". Once a question has been accepted it needs to be categorised in terms of its length, its difficulty and the section of the curriculum to which it refers. All MCQs writers must have access to current versions of the relevant curriculum and should be encouraged to index their questions as they construct them. Ideally, an electronic template should be employed for writing and then discussing new MCQs. This helps to facilitate uniformity of MCQs writing style, transmission of the questions to other members of the writing group and to facilitate discussion. Questions which contain images or movies should generally be classified as long as the data contained in the image or movie will take time for the candidate to digest.

Conclusion:

The formation of the EU has had many political and economic consequences such as disappearing borders**,** free trade of goods and labour between countries and the use of a single currency. However, in addition to these many advantages, there are also many problems, particularly in the field of medicine. One such problem relates to the regulation which refers to national recognition of training programs as valid in all member states, and free movement of doctors to work wherever they like without taking an examination to prove their quality.

We are all well aware of the fact that quality of training is one of the most important factors in the domain of Quality of Health Care. Unfortunately, there are numerous indications, throughout the world and within Europe that currently training programs between EU member states are not comparable in quality or content. Because of this lack of harmonization or standardization European agencies are need to guarantee to their citizens that a professional who will be taking care of them has been exposed to the best high quality training there is to offer. This training should additionally have been evaluated and shown to objectively demonstrate competence of that individual for his or her current domain of medical practice throughout Europe. For this reason there is a move towards the European Accreditation of Medical Specialties through standardised and equitable assessment tools to evaluate physicians who practice any given specialty.

The UEMS, through its publications has realized and addressed the importance of these problems. "The UEMS Charter on Visitation of Training Centres (UEMS 1997)" recommends **minimal standards** to which the training centres should conform. Its "Policy Statement on Assessment during Specialist Postgraduate Medical Training (UEMS 2006/19)" is aimed at assessing the **content** and **quality** of **training** in the EU countries and other countries who are full members of UEMS.

With the advent of the Council for European Specialist Medical Assessment (CESMA-UEMS), UEMS has come to realize that the medical care of European citizens must be held in the highest regard to ensure all patients across Europe are cared for by competent, skilled and professional physicians.

Since increasingly UEMS recognized medical specialties will choose to evaluate trained professionals with exams covering both basic knowledge coupled with skills and tests of competency, the UEMS has compiled this guide to help the various subspecialty boards with successfully writing and structuring one of the most common and frequently used methods of assessment, the Multiple Choice Question.

Example MCQ's:

As a simple exercise, examine the examples below and think about the tips you have reviewed in the preceding text. As you look at each of the 5 questions, think about whether or not the item was written correctly, whether it needs improvement and if so what improvements would you make.

1) A 32 year old woman presents to the emergency department with a 3 day history of cough and increasing shortness of breath. On examination she has a respiratory rate of 30 breaths per minute and there is an audible expiratory wheeze.

Which of the following is the most likely diagnosis?

A) Acute exacerbation of asthma

B) Diabetic ketoacidosis

C) Hypothyroidism

D) Myocardial infarction

E) Uncontrolled hypertension

The correct answer is "A".

This would appear to be a good question because it fulfils many of the criteria that have been reviewed in the text, such as: a) there is a clear, concise history followed by salient examination findings, b) there is a positively worded question and c) there are 5 distinct answers, listed in alphabetical order and all of similar length. The question is of course extremely easy with the stem including only information related to the respiratory system. Therefore based on guessing the most likely diagnosis is A as this is the response that most closely relates to the respiratory system. This means the Angoff score is likely to be very high (greater than +0.95) so the question will not adequately discriminate. The Angoff score will be improved with the use of more difficult distractors such as other respiratory diagnoses.

2) A 78 year old man presents to the emergency department with sudden onset chest pain of 2 hours duration with associated nausea. On examination he is cold and sweaty. His pulse rate is 65 beats per minute and his blood pressure is 125/80 mmHg. A resting electrocardiogram shows ST segment elevation across the anterior chest leads (V1-V5).

What is the most likely diagnosis?

A) Acute exacerbation of asthma

B) Diabetic ketoacidosis

C) Hypothyroidism

D) Myocardial infarction

E) Uncontrolled hypertension

The correct answer here is "D." Again, this would appear to be a good question for the same reasons indicated in the first question, a) there is a clear history followed by salient examination findings, b) there are no abbreviations contained within the text and units are included for all measured parameters, c) there is a positively worded question and d) there are 5 distinct answers listed in alphabetical order and all of similar length.

Again this is a very easy question and the Angoff score will be very high and therefore the question will not adequately discriminate. The use of other cardiac diagnoses as distractors would improve the question further.

3) A 65 year old man presents to the A/E with sudden onset chest pain of 2 hours duration. O/E pulse 65 and BP 110/75. An ECG shows a STEMI.

Which of the following is **NOT** appropriate?

A) Aspirin and heparin

B) Aspirin, heparin, hydrocortisone and antibiotics

C) Oxygen

D) Plavix

E) Thrombolysis

The correct answer is “B”.

This is a poorly structured question. There are several abbreviations which may not be universally understood (A/E, O/E and STEMI). Observations have no units. The question is negatively worded. The correct answer is much longer than the others. It also contains 4 drugs whereas other answers contain 2 drugs or 1 drug only. Trade names have been used for some of the drugs which may not be universally understood. Answer “A” is contained within “B” and therefore is clearly not the correct answer to the question.

4. Which of the following is true in severe AS?

A) It is always associated with a bicuspid aortic valve

B) TAVI is never a treatment

C) The incidence in Smith et al (1997) is 1.36%

D) May present as angina

E) All of the above

The correct answer is “D”.

This is a poorly structured question. There is no clinical stem and again abbreviations have been used. The question is not testing a single idea or learning objective about aortic stenosis. The way the question is presented it is more a “multiple true/false” type question, than a MCQ because different answers ask about pathology, epidemiology, symptoms and treatments. Answer “E” can be excluded by any candidate who can work out that any 2 of the other choices “A”, “B” and “C” are incorrect. One answer refers to a single paper and reference to individual studies should not be included in the distractors.

5. Lara weighs 4 kg. She has an order for Ampicillin sodium 580 mg every 6 hours. What is her daily dose of ampicillin as ordered?

A) 580 mg

B) 1160 mg

C) 1740 mg

D) 2320 mg

E) 2900 mg

The correct answer is “D”.

Overall this is a good question. Although there is one piece of information which has no bearing in selecting the answer (the weight of Lara), the example is well written and structured. The stem is clear and the question being asked is straightforward and positively worded. There are no abbreviations contained within the text. The units are included for all measured parameters. There are 5 distinct responses listed in increasing numerical order. All the numbers are somehow related to the question. For example 580 not only is the single dose but it also could represent the mg/kg daily dose that Lara is receiving (580 x 4 = 2320, divided by 4kg = 580 mg/kg). Answers “B”, “C”, “D” and “E” are 580 mg increments. The 5 numerical answers are sufficiently different. The Angoff score for this question will be high but lower than in questions 1 and 2. To further improve the question a slightly longer clinical stem with the age of Lara and the reason antibiotics are to be prescribed could be included.

Definitions:

MCQs: A form of assessment in which respondents students are asked to answer a question by selecting the correct or best possible answer (or answers) from a list of options, whose purpose is to sample medical knowledge and understanding of a defined body of knowledge, preferably not just factual or easily recalled information

Learning Objective: An intended educational outcome for an activity held by an event provider, relating to skills, knowledge and/or attitude/ behavior gained by participants at the event. These should clearly describe what the learner will know or be able to do after participating in the CPD activity.

Assessment is the measurement of the performance of an individual at a particular point in time, usually against pre-determined standards. Assessments measure progress based on relevant *curricula*, and the results of assessment may feed into *appraisal* if appropriate.

A process consisting in collecting, synthesizing, interpreting obtained information for the purpose of "decision making"

The results of an assessment should allow sound inferences about what learners know, believe and can do in defined contexts

Appraisal is an ongoing, two-way process involving reflection on an individual's performance, identification of education needs, and planning for personal development. The focus is on the appraisee and his or her professional development needs

Evaluation: Process designed to provide information that will help us make a judgment about a given situation