

# Education alternatives for imaging techniques in clinical trials

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Clinical trials with imaging components or end points, have become more routine in recent years [1, 3], particularly in oncology, CNS, cardiovascular and muscular-skeletal fields. These four areas in particular utilise medical imaging as primary or secondary endpoints in the majority of Phase II and Phase III trials [2], eg time to progression in oncology, brain volume in Alzheimer's Disease, Magnetic Resonance Angiography in cardiovascular and x-rays for assessment of vertebral deformity or fracture in musculo-skeletal disease.

For many trials the image acquisition is close to or actual standard of practice, but this is not always the case. Even with a so-called "standard practice" there are many nuances and minor variations that have to be standardised between investigator sites. This can usually be accomplished by providing each radiology group with "Imaging Guidelines" which document the expectations and requirements. In fact, regardless of any further training, these guidelines should be issued to each site to fulfil GCP guidelines for documentation of requirements [4]. These will also need to be translated by experts into all the languages for countries where the study will be conducted. It should be appreciated that while

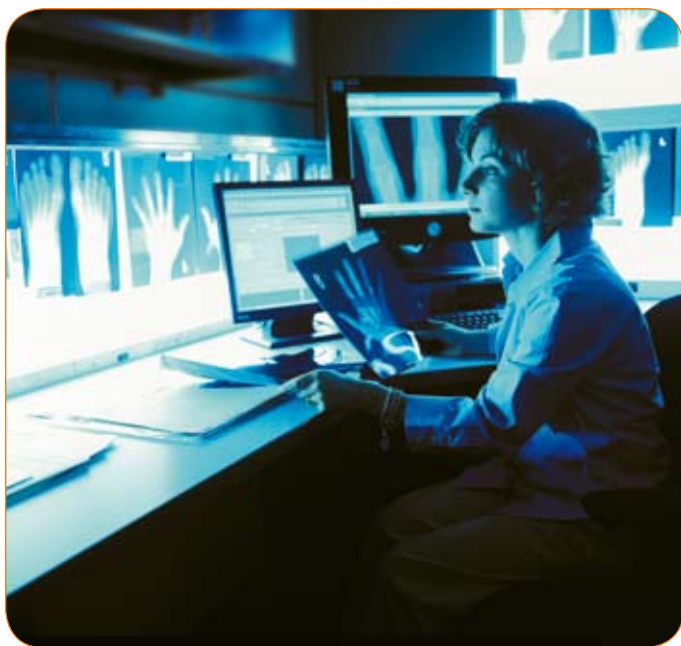
the international language for medicine is English, many technologists do not speak more than their mother tongue. This is an issue that therefore has to be dealt with for all the alternatives that are presented here.

With more complex imaging requirements, and new imaging methodologies that extend beyond the standards of routine practice, further training may be required for the site. Examples may be as complex as Dynamic Contrast Enhanced MRI (DCE-MRI), which is being utilised more frequently in oncology studies, or as "simple" as hand radiographs for studies in rheumatoid arthritis. Taking the latter as an example, normally both hands and feet have to be imaged in a very standardised format, with standard placement of the hands. Each hand has to be filmed separately with the x-ray beam centered over the mid digit to avoid too much parallax at the extremities. Therefore, standardisation is required to ensure blinding to the central reader for both inter and intra-site variations and each of the time points must be imaged similarly. It should be noted that to ensure total inter-site blinding and equal quality of images, many studies require the sites that still use the analogue systems, rather than the more modern digital x-ray, to use the film and cassettes provided by the imaging core lab (ICL).

Training of the technologists at the sites is therefore critical with any study requiring imaging unless the techniques being employed are extremely basic and standard. There are several methods that can be employed to provide training for the sites in the radiological requirements for the clinical trial:

## INVESTIGATOR MEETINGS

Investigator Meetings are usually designed around the Principal Investigator (PI) and Study Site Co-ordinator (SSC). However, in many studies, particularly in the field of osteoporosis, these meetings include having the DXA technologists present. The technologists are part of the team from each site and attend the first part of the meeting but have their own breakout session to cover the DXA specific issues. While it is expensive to fly all the radiologists and technologists to a central location, the extra benefit that is obtained is investigator site team building. For many trials, the technologists are obtaining either the primary, secondary, or safety endpoints in the trial and do not get included in the off-site meetings. It helps to bring the PI, SSC and technologists together and appreciate they are critical parts of the team in getting the patients through the trial. Rarely do the technologists get invited to an off-site meeting and most investigator meetings are in a great location, so this is



a real bonus to the technologist which translates, into a very supportive imaging specialist. This translates into greater co-operation and better imaging in the trial, perhaps beyond the direct learning in the breakout sessions.

#### ON-SITE TRAINING

If it is not possible to fly the technologists to the investigator meeting, then a visit to the technologists by a member of the ICL may be another excellent alternative. This is a particularly good strategy with a Phase II study with a limited number of sites. Some Phase III studies may utilise this strategy if cross calibration of the equipment is also required. This becomes a very economic strategy; not only does the visit provide one on one training, but it can ensure that more than one technologist is trained at each site. It also offers all the technologists time to ask all their questions in a non-threatening environment since they are not one person in a large group.

#### WEB-X TRAINING

A less expensive alternative is to provide a web-x or group telephone conference call. These are modern technologies which provide an economic option for providing a base level of training with a PowerPoint presentation and a question and answer session. A number of sessions can be offered to allow flexibility in technologist training and different time zones. The downside to this kind of event can be that it becomes very impersonal.

#### TRAINING ON CD/INTERNET

Providing a complete training programme on CD or via the internet is an option that can be used in conjunction with all the above options or can be used as a stand alone methodology. The training programme can be made to be totally interactive with video clips and more than just a "talking head" against a background of PowerPoint slides. An exam can be built into the training package, which ensures the training has been completed and understood. It also then provides documentation and

certification to the sites that the necessary training has been completed.

The authors have seen the advantage in this kind of training where it was introduced to a trial six to 12 months after the trial start (depending on the site) and reduced the error rate by 50% in the first three months after its introduction.

A CD is arguably the preferable method since many technologists do not have direct access to the internet at work. A CD has a further enhancement since it can be passed around to other technologists and also contains copies of all the study documentation, which can be printed off when required. Finally, the CDs can be translated into many languages for both the written and oral components. This ensures standardisation of the communication to many nationalities in the one trial. The language barrier is one of the toughest challenges in multiculture and multi-country training, and this CD methodology is the only one with a proven track record of providing the same standard communication (other than the base standard of Imaging Guidelines).

#### CONCLUSIONS

With the increased role of medical imaging in clinical trials [2], a well documented training programme needs to be developed. There are a number of techniques or methods that can be employed as discussed in this paper. The challenge is to find the optimum methodology for each trial. Perhaps the most flexible methodology presented is the training CD. Certainly this should be strongly considered where multiple languages need to be considered.

#### References

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