

## Report on the meeting on the 17<sup>th</sup> of October 2005 regarding the process of registration of medical engineers under the framework of 'Clinical Technologists'

By K.R. Haylett PhD,CEng,MIEE

### Address for communications:

Contract & IT Manager / Honorary Research Fellow  
Medical Engineering,  
Central Manchester and Manchester Children's University Hospitals NHS Trust,  
Manchester Royal Infirmary,  
Oxford Road, Manchester, M13 9WL

Tel:0161 276 4539 email: kevin.haylett@cmmc.nhs.uk

### **Introduction**

This report is based on my understanding of what was said at this meeting. It is not intended to be an official record of the minutes. It is based on my pre and post meeting notes and includes comments based on reflection of the meeting. The meeting was opened by Professor Sue Hill, Chief Scientific Officer of the DoH, and notes were taken by Patricia Saunders. Approximately thirty people attended from a range of interested parties. This included, I believe, three representatives of the panel that currently makes up the Voluntary Register for Clinical Technologists. My main goal was to listen to the agenda presented and contribute in a positive manner and represent the interests of my Trust which has one of the largest Medical Engineering Departments in the UK.

Professor Hill gave a clear account of the process and current position regarding registration of 'clinical technologists'. The goal of the meeting was identified as clearing up remaining issues prior to the public consultation, which forms part of the final process of registration of a professional group by the HPC. The main points highlighted that:

- There was a clear case for registration of the proposed sub groups of 'Clinical Technologists' with exception of the Medical/EBME/Clinical Engineering group.
- That the intent was to push forward with the registration for the non Medical Engineering groups and leave Medical Engineering to a later stage if the current proposals were not practical at the moment.
- That although all the criteria required by the HPC had not been met at the time of the application there was intent to register group of workers who carry out maintenance, servicing and management of medical devices.
- The purpose of the registration was to ensure the 'safety of the patient'.
- The registration was the registration of the **name** of the professional group i.e. only registered professionals can use the agreed final registered title.

- The registration was not a registration of the **functions** of the professional group.
- Other countries did register **function** but this was currently not the case in the UK but was being looked at by the Government.
- The intended time line for the process, following consultation, is to have the plans approved by June/July next year with an envisaged period of grandfathering for a further three years while the education details are finalised.

Professor Hill, then proceeded to outline a series of points where she felt that there were some difficulties remaining. These included the fundamental question: Would the registration of Medical Engineers be of benefit to the NHS?

*The floor generally considered that there may be a benefit to the NHS in having Medical Engineering staff registered.*

### **Comment**

Medical Engineering brings many ideas from industry and engineering in the commercial sector together with a different way of thinking. As a result we have well defined managerial documents to work from and systems including well established international standards, national guidelines and work protocols etc. Many Departments are already registered to the international quality standard ISO9000. This standard **does** include process control and staff competency. Few people outside these departments appreciate the efforts that Medical Engineering services have been making to provide a good quality service. In my mind the quality of a system is the key to patient safety. A person can be competent but if the underlying systems fail, then this competency may be compromised. Where as, a good quality system which includes competency control and assessment will capture and prevent problems of incompetence. In industry where equivalent services are provided, quality systems are the recognised route for performance control. In addition, devices are manufactured to and follow well defined engineering production standards. Engineering registration within industry is voluntary and more importance is placed on quality systems.

I feel that, if not implemented very carefully, the proposals will add another layer of bureaucracy that will not be required by industry, and impose considerable cost without any guaranteed improvement in performance, or critically, patient safety. This registration may therefore limit The NHS Medical Engineering Departments ability to compete with industry. I still feel that there is a need for an impact study on the financial implications of the proposed registration and the effect on service provision and recruitment etc.

**Main points for discussion**

Following an introduction Professor Hill opened the floor to discuss the points below.

The points included:

- The scope of the application – what we do
- The qualifications required and route to registration
- The name to be registered
- The assessment of competence

Each of these is covered in the following sections:

### **The scope of the application**

The scope describes the main competencies that are associated with the name of the professional group that is to be registered.

This scope of a medical engineer was found to be vague and wide ranging when compared to that of a nuclear medicine technologist or other technologists. As it stood the main clause in the scope described the maintenance, repair and servicing as a single line. When considering the vast range of equipment and medical devices to be considered from simple nebulizer compressors to complex surgical lasers and imaging and patient monitoring and the range of processes involved in this work, it was felt that this line was not suitable and would not stand up to scrutiny.

*The floor discussed this from two general directions. The initial direction felt that the scope should be device specific (Professor Hill felt that mentioning specific devices would be impractical). The floor discussed the possibility of defining and incorporating the different types of technologies within the scope. Professor Hill suggested that the VRCT panel review and revise the scope in consultation with some of the attendees of the meeting. It was suggested that this was required as soon as possible i.e. by the middle/end of November.*

### **Comment**

Scope is a major issue that may be difficult to overcome. Workers in the Medical Engineering sector understand the wide range of technologies and equipment that has to be worked on and the range of different levels that different organisations work to. Many non engineers find it difficult to understand the depth and breadth of knowledge that is required. Alternatively, there are many engineers who have a very narrow focus. Both breadth and narrow focus can be required depending on the organisation structure and devices maintained. Both are acceptable and may be using the same level of skills. In my mind it is the skills that need to be addressed in the scope, not necessarily the technologies. I am not clear that we had enough time in the meeting to really consider the issues of the scope. It may be useful to use the skills and definitions that are used in the UK Standard for Professional Engineering Competence (UKSPEC) [1,2] used by the Engineering Council (copies enclosed). This concentrates on skills, not specific technologies. I think this is a very useful document that has taken considerable time and effort by the Engineering Council to write and should be made the most of. I do not feel we should be re-inventing some new way of defining the competencies and skills of an Engineer.

This challenge of specifying the name, scope and function of an engineer has been carried out extensively by the Engineering Council. They have three main descriptions for their registration scheme:

- Chartered Engineer, Incorporated Engineer, Technician Engineer

These are three titles for engineers recognised by the IEE and IIE (both the IEE, the IIE, IPEM and a very wide range of other organisations are licensed by the Engineering Council to confer these registrations and are fully described in the Engineering Council in the UKSPEC documents [1,2 (Annex A Licensed Professional Engineering Institutions)])

### **Relationship between historical grades, scope and function**

I feel that Medical Engineers (MTO) and Clinical Engineers (Clinical Scientists) actually belong to the same structure as is the case identified by the Engineering Council.

### **Suggestion**

The scope is developed along the lines used by the Engineering Council (a copy of this document is enclosed) and this scope is related to the levels of engineering skills and competencies developed by the Engineering Council.

### **The qualification and educational route to registration**

It had previously been decided that the **level** of entry for a skilled Medical Engineer must be of a degree. This appears to have been formerly interpreted as a prescribed degree in 'Clinical Technology'. However, Professor Hill had recognised that in regard to Medical Engineering there was significant intake from the commercial sector and that the current most common route was from a required wide range of engineering HNC/D and degrees with post qualification in-house training.

Professor Hill focussed on the fact that this could mean vocational HNC/D could be used as an entry into the 3<sup>rd</sup> year of a part time degree programme.

*The floor widely recognised that the education route must enable access by staff with range of engineering based HNC/D's and that this was the main route to entry to the profession. Other vocational and academic routes were currently used including employing staff with a range of degrees in engineering/or electronics' etc. The floor discussed the need of wider training. However, no details of this training were discussed and many accepted the benefit of some non engineering education with a medical bias. I specifically highlighted from the floor that other flexible options may need to be considered and that there may be room for a top up qualification or training that can be at degree level but does not have to be a specific degree. An academic representative highlighted that there was less support for HNC/D and that these may disappear in the future. However, the floor pointed out that even if this is the case we may be employing staff who currently have an HNC/HND in the following decades.*

### **Comment**

In most Medical Engineering departments where devices are fully maintained, members of staff are continually attending a wide range of courses provided by the manufacturer. These courses are fundamental to a medical engineer's training and the main way that competency to work on devices is attained, especially for complex, high risk devices. These courses often give the essential physiology and background to the device. These courses are expensive. It would be very disappointing if these essential courses could not be taken into account as post degree/HNC/D education. When discussing this with colleagues, it is these courses that are identified as the **prime** educational requirement for practical engineers and all feel that these courses should be acceptable in lieu of an academic top up. The Engineering Council clearly expects that post experience and training is equivalent to academic training. This is identified in the UKSPEC in the qualification requirements for Incorporated Engineer and Chartered Engineers. Whatever the final educational and experiential routes available to registration, there needs to be a high degree of flexibility.

### **The name to be registered**

Professor Hill highlighted that there were still concerns with the name to be-registered. Professor Hill highlighted that the name should have some meaning which the public could understand. She asked the VRCT to come up with a series of options to be presented for the public consultation.

*There was wide discussion on the floor and there was a general consensus that the 'Clinical Technologist' or 'Technologist' did not describe the role of Medical or EBME Engineers. Most understood the need for a name that represented the work they did. The VRCT felt that they had been over this many times and seemed unhappy that this was being discussed again.*

### **Comment**

As the main purpose of the registration is to arrive and to protect a **name**, it is vital that this name reflects the function of the profession and it is understood by the public as far as possible. It also needs to be accepted and recognised by the staff that it applies to. For many, judging by public web sites, the proposed name of technologist for those in Medical Engineering has caused considerable upset.

Traditionally names have been used to define a role and personal status. This has been especially true in the NHS. Throughout the NHS there has been considerable concern with status probably because within a large Institution personal recognition can be difficult to achieve.

### **Technologist or Engineer?**

The word 'Technologist' generally refers to a user of Technology. Whereas an Engineer is somebody who maintains, services, designs, understands and develops technology. There is completely different set of skills and levels of understanding of technology which engineers use and are duly proud of, and why they become engineers. The current name of the register (Voluntary Register of Clinical Technologists - VRCT) is possibly one of the reasons Medical Engineering staff are currently reluctant to join i.e. the name does not represent the function of the staff, namely, Engineering. I feel it would *not be* useful to impose a new (and invented) name that would simply not be used and have no prior meaning to the staff or the public and therefore could not help to protect them.

## **Proposal**

The name of the registered group should be changed to 'The Voluntary Register of Clinical Technologists and Medical Engineers'

**I would suggest that changing the VRCT name to this will encourage membership once the scope has been better defined to include Engineering Council type definitions of competency. I also think this will recognise that the Medical Engineers are the biggest members of this group.**

## **The assessment of competence**

Throughout the discussion on the floor there were several comments made about competence. Professor Hill highlighted that the model was that an engineer who is assessed at being competent should be able to move from Trust to Trust and carry out their duties in a competent manner and that this was an essential requisite for the registration of the name.

*The floor discussed this broadly, but in little depth. There were some members including myself that felt competence, to an extent, was device specific. This is to say that a device made by a specific manufacturer required specific training to carry out different types of functions (repair, servicing, calibration etc). **This training is usually supplied by the manufacturer and not academia.** Although this was accepted, others felt that there was still **base** competence and that was what was being registered with the name.*

### **Comment**

Assessment of competency poses a difficult question. If it is the case that competence is gained by specific training, although registration could guarantee general engineering competence, it could not guarantee device specific competence for an Engineer and therefore patient safety! This would require competence to be ensured through another mechanism such as a quality system as the specific education requirements may be difficult to be assessed by the HPC.

### **Remaining issues**

There were some remaining issues that were not addressed. I was only aware of one external manufacturer at the discussion and am still concerned that external manufacturers, who I estimate provide at least 50% of maintenance in the NHS, have not been consulted sufficiently at this stage. I still feel there has not been sufficient discussion with the wider engineering community including the Institute of Electrical Engineers (IEE), the Engineering Council and industry, especially manufacturers, as they provide the essential device specific training that is required to ensure that staff can both do the job and be judged competent. For example, many companies will not supply parts to NHS departments unless the engineers have been through a company device specific training course. I am still unconvinced that the VRCT can represent Medical Engineers. My own estimate is that there are approximately 10,000 engineers maintaining and servicing medical equipment in the NHS and commercial sector (See estimate at end of report). How many of these were on the register at the time of the vote? How many have been involved with the process so far? Without confidence in this process, there are sure to be many future problems.

### **Summary and conclusions**

- **Scope:** There already exists a set of standards to define levels of engineering skills and competencies that is nationally accepted and has been developed by the Engineering Council. A proposal has been made within this document to integrate the skills and competencies standards already defined by the Engineering Council into the proposed scope for the registration of Medical Engineers.
- **Name:** There appears to be confusion between names, function and recognition of status in Clinical/Medical Engineering. For a name to be registered it must be useful and recognisable and should incorporate the word engineer and relate to the functions of the employee.
- **Register:** The importance and value of the name has been highlighted and it has been suggested that the name of the VRCT be changed to explicitly identify the largest group of staff e.g. 'The Voluntary Register of Clinical Technologists and Medical Engineers'. It is suggested that this will aid acceptance of the Register and communicate more effectively to the public and staff concerned their role and competencies etc.
- **Education:** The system must be flexible and capable of recognising experience in lieu of education. Ideally, it should be able to recognise vocationally based device specific education in lieu of academic qualifications in line with the Engineering Council.
- **Career development:** The current model proposed by the VRCT means that Incorporated Clinical/Medical Engineers would be regulated as 'Technologists' while Chartered Clinical/Medical Engineers are regulated as 'Clinical Scientists'. As both groups often do the same and similar functions there would need to be a route of movement from Incorporated to the Chartered level as described by the Engineering Council. Without a route to move from Incorporated Level ('Clinical Technologist') to Chartered Level (Clinical Scientists/Engineer), the proposed system will create a 'glass ceiling'. Those registered at the Incorporated Engineer level will be unable to develop their career further and aspire to senior positions, which demand the Chartered Level.

### **Reference Documents**

[1] UK Standard for Professional Engineering Competence (UKSPEC): Chartered Engineer and Incorporated Engineer Standard: regulating the Engineering profession, Engineering Council, 2004

[2] UK Standard for Professional Engineering Competence (UKSPEC): Engineering Technician Standard: regulating the Engineering profession, Engineering Council, 2004

Copies of these documents are available from the Engineering Council web site.

<http://www.engc.org.uk/> and <http://www.engc.org.uk/Publications/default.aspx>

### **Estimate of number of medical engineers involved directly in maintenance of medical equipment.**

The Central Manchester and Manchester Children's University Hospitals NHS Trust have an annual budget of £275 million (Information from finance Department). This is approximately 1/200 of total NHS budget. Thirty engineers maintain approximately half of the asset base by value i.e. half of the assets base is maintained by the commercial sector. Assuming a similar number of engineers required this gives a total requirement of sixty engineers for this Trust. Scaling this up for the whole of the NHS (Multiply by 200) gives 12,000 engineers. In all benchmarking exercises the Central Manchester Trust has sat roughly in the middle. In my opinion this seem a reasonable estimate and even if out by 20% would mean the number lies in the range 12,000+/- 2400 (9600-14400).