

Workforce Summary – Electron Microscopy

May 2008 – England only

Summary of findings

WRT analysis indicates that the size of the electron microscopy workforce is currently sufficient to meet demand. However, it is difficult to estimate how the demand for staff in this specialty may change in future years. As an overall service, the demand for electron microscopy will diminish due to superseding technologies. It is therefore advisable that the workforce is somewhat reduced, which can be done naturally through retirements. However, it is very possible the need for renal biopsy procedures will grow (due to an aging and increasingly obese population), electron microscopy may need to become an even more specialised service concentrating in renal services (as there is no superior method in this area).

If the staffing profile of the service remains the same, there will be a need to replace the skills of the clinical scientist workforce, many of whom are reaching retirement. This could be achieved by offering additional Higher Specialist Training to clinical scientists and biomedical scientists in related specialties. Another option is to regionalise the service around renal services.

There is a danger that if there is not significant investment and/or service re-design in this area in the short to medium term, this essential service will quickly become unsustainable. New training routes need defining as a priority. One solution to this problem may be to offer flexible retirement and return to practice initiatives to staff who would be able to deliver training. Modernising Scientific Careers will provide structured higher specialist training routes, possibly allowing more healthcare scientists to fill these roles.

Analysis

1. Brief discipline description and pattern of training

Electron microscopy (EM) is an important medical diagnostic method, particularly in the fields of kidney disease, muscle pathology, tumour pathology, neuropathology, paediatric pathology, studies of ciliary structure, parasitic protozoan infections in AIDS, viral gastroenteritis and viral infections of the skin.

Diagnostic EM requires skilled interpretation of the images seen under the electron microscope. The microscopist must be familiar with normal cell structure (ultrastructure) and the organisation of cells that make up tissues and body organs. The ability to recognise abnormalities within cells is an essential requirement of the diagnostic process.

Electron microscopes are able to discern fine detail (often called resolving power or resolution) in specimens. The fineness of detail resolved can be many hundreds of times smaller than that achieved by the best light microscopes. In addition, this fine detail can be magnified many thousands of times.

The specialty of electron microscopy was set up in the 1970s around a technology rather than a profession. Many of the clinical scientists that work in the area originally came from a research background.

Pattern of training

There are currently no specific training courses for electron microscopists. The clinical scientists who work in the field are registered in their 'parent modality' (usually microbiology or genetics). biomedical scientists (BMSs) are registered with the Institute of Biomedical Science (IBMS).

Modernising Scientific Careers (MSC), led by the Chief Scientific Officer at the Department of Health, is designed to ensure flexibility, sustainability and modern career pathways for healthcare scientists. It will lead to very substantial changes to the training of healthcare scientist and is expected to deliver

- UK wide common training framework with flexibility to accommodate different scientific disciplines.
- A rotational training programme in each of the three divisions leading to registration as a healthcare scientist.
- A training and development program for technical and support staff.
- An explicit higher specialist scientific training and academic career structure.

2. Current workforce

The Association of Clinical Electron Microscopists (ACEM) membership indicates that there are currently 13 clinical scientists (CS) and 66 BMSs that work within electron microscopy in the NHS (includes England, Scotland and Wales).

The age profile of the EM staff is varied, ranging from 29 years of age to 67. Comparing the age profile of scientists working in EM with scientists working elsewhere in the NHS shows that the EM workforce is, on average, much older (as shown in Figures 1 and 2).

The age profile of BMSs in the whole NHS (shown by the pink line in Figure 1) shows a relatively even spread of ages across the age range. This is in contrast to the age profile of BMS in EM which shows that there are relatively fewer younger staff, and the majority are over 45 (68%) compared with 44% of all BMSs. Of immediate concern is that 29% of BMSs in EM are over 55 and therefore due to retire in the next 10 years.

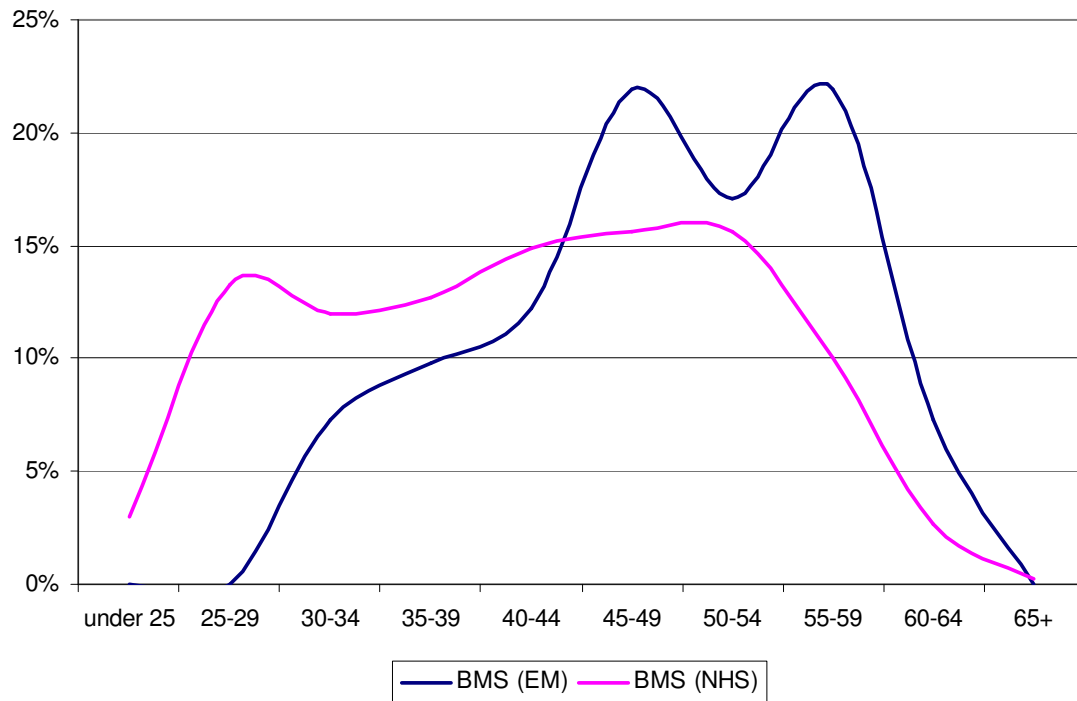


Figure 1: Comparison of the age profile of BMSs in EM with the age profile of BMSs in other areas of the NHS (Source: EM staff survey, Royal College of Pathology (RCPATH) 2007)

The clinical scientist age (Figure 2) profile graph shows an even greater contrast between the EM workforce and the clinical scientists in the wider NHS. 77% of clinical scientists in EM are over 55. If the staffing profile of the service remains the same or demand increases, there will be a need to replace the skills of the clinical scientist workforce who are reaching retirement. This could be achieved by offering additional Higher Specialist Training (HST) to CS and BMS in related specialties.

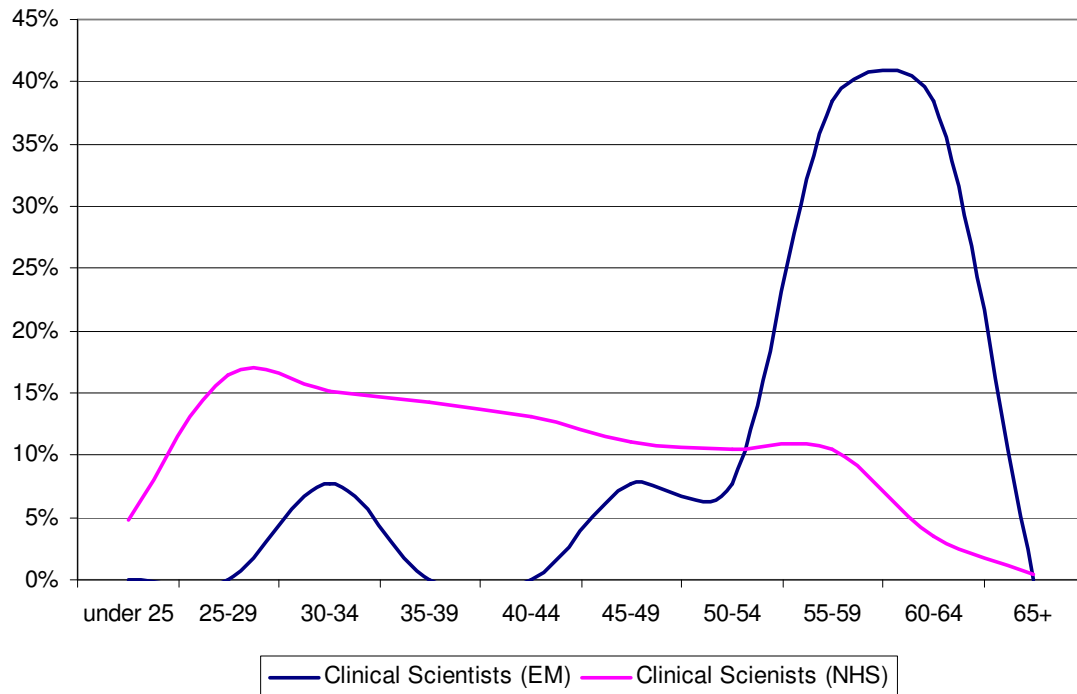


Figure 2: Comparison of the age profile of CSs in EM with the age profile of CSs in other areas of the NHS. (Source:EM staff survey, RCPATH 2007)

Figure 3 shows the distribution of the EM workforce across the agenda for change (AfC) bandings (split into under and over 50s). This highlights that the more senior positions (Band 8) are generally held by those over 50.

When these individuals retire, it leaves gaps in the workforce at the more senior levels. Generally, senior positions are more difficult to fill than junior positions as more experience is required.

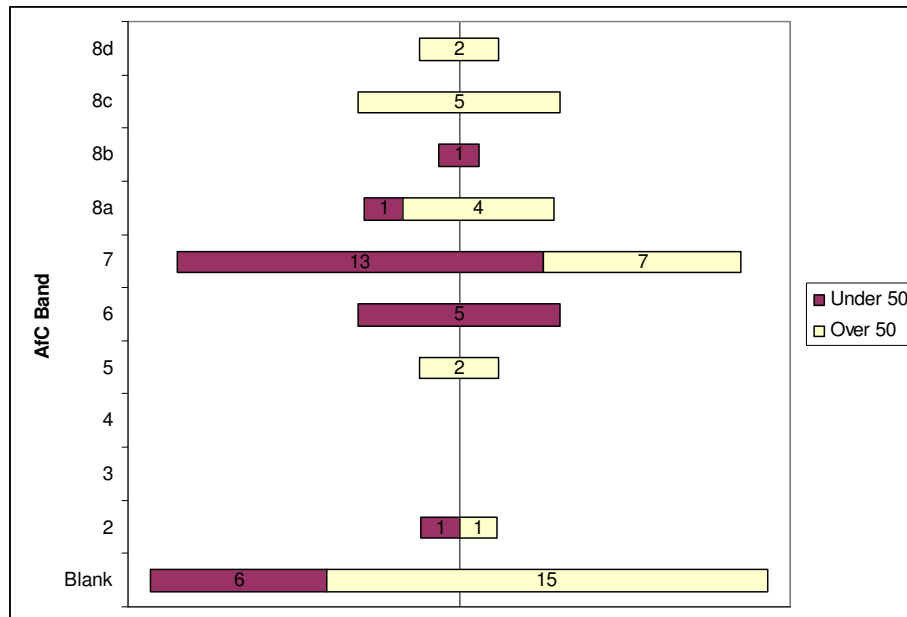


Figure 3: Headcount of under and over 50's against AfC band (Source: EM staff survey, RCPATH 2007).

3. Demand drivers and estimates

The Association of Clinical Electron Microscopists (AECM) reports that in some applications, other technologies have replaced electron microscopy as a diagnostic tool. This has led to a reduction in the number of centres, and a consequent reduction in the demand for staff. It is possible that the service may contract even more and there will be only a requirement for a very few scientific staff at senior level (agenda for change bands 8 & 9). Main factors driving demand are:

- **Skill mix**

This has changed little in the past 20 years. EM remains a profession delivered by a mixture of clinical scientists and BMS grades.

It is hard to predict how demand for future skill mix will develop, but it is possible that the service may move away from a research and development role (principally involving clinical scientists), to a service role mainly staffed by BMS advanced practitioners. ACEM is constructing a business plan for the future organisation of the EM workforce, including a reconfiguration of skill mix and relocation of workforce to large tertiary 'centres of excellence', located near renal centres. The plan is due later in 2008.

- **Technological changes**

Some applications of EM have been replaced by other technologies (for example immunocytochemistry).

However, in renal biopsies there is currently no alternative diagnostic technique to provide a definitive diagnoses. Alternative diagnostics techniques are complementary to EM, but not a replacement.

There are currently no quantifiable estimates of demand available. The direction of a future workforce strategy for Electron Microscopy is largely dependant on future demand for the service. In order to quantify this demand ACEM has undertaken a survey of renal pathology who are one of the largest users of EMs services. In addition to this, ACEM is collaborating with the Royal College of Pathology to survey the current staffing and skill mix of diagnostic EM units, with results expected later in 2008.

4. Workforce supply

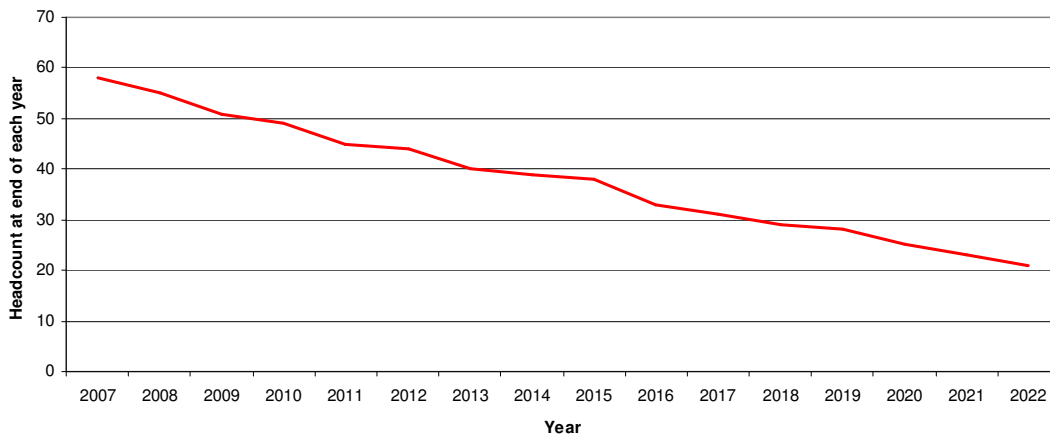


Figure 4: forecast of the total EM workforce over the next 15 years (Source: RCPATH EM workforce survey 2006).

As can be seen in Figure 4, numbers in the EM workforce are forecast to steadily decline over the next 15 years. Although the excel data model for electron microscopy is only based on partial data, it supports the anecdotal evidence that due to a large number of pending retirements, in a few years the electron microscopy workforce will be significantly depleted. The assumptions behind this model are laid out in Appendix 1.

The main factors affecting supply are as follows:

Retirements

The majority of the clinical scientist workforce are over 50 and due to retire in the next 10 years (54% within 5 years, 84% within 10).

Training

On-site training is expensive and time consuming, as it often requires one-to-one supervision and it can take between two and five years to pass on key interpretation skills. An alleviation option could be E-learning to teach some of the basics of EM (if there are enough trainees to make this economically viable). Unfortunately, as much of the EM workforce is reaching retirement age, there is a danger that by the time new training routes have been implemented, staff experienced enough to be trainers will have retired.

Many experienced EMs work in universities, yet cannot transfer to work for the NHS as they lack the appropriate qualifications.

5. Summary of key issues

WRT analysis indicates that the electron microscopy workforce is broadly in balance, with some caveats. It is difficult to estimate how the demand for staff in this specialty may change in future years. If the staffing profile of the service remains the same, there will be a need to replace the skills of the clinical scientist workforce who are reaching retirement. This could be achieved by offering additional Higher Specialist Training (HST) to CS and BMS in related specialties.

In October 2006, WRT held a workshop to review the future workforce requirements of the Electron Microscopy service. It was attended by stakeholders interested in the future of the service including, users of the service, providers of the service, WRT and SHA representation. The event successfully identified a number of issues and started to identify solutions. One option suggested was to regionalise the service. Whilst this solution is not without its difficulties, if they can be overcome, it may be one option of ensuring continuity for the service.

As an overall service the need for electron microscopy will diminish due to superseding technologies. Therefore it is advisable that the workforce be reduced, which can be done naturally through retirements. However, as it is very possible the need for renal biopsy procedures will grow (due to an aging and increasingly obese population) electron microscopy may need to become an even more specialised service concentrating in renal services (as there are currently no superior methods in this area).

There is a danger that if there is not significant investment and/or service re-design in this area in the short to medium term, this essential service will quickly become unsustainable. New training routes need defining as a priority. One solution to this problem may be to offer flexible retirement and return to practice initiatives to staff who would be able to deliver training. New training routes could potentially also allow members of the academic workforce to transfer into the NHS more readily, providing another option to increase numbers in the NHS EM workforce.

6. Bibliography

Association of Clinical Electron Microscopists website. Available at <http://www.acem.org.uk/www/amedical.php> [Accessed 29th May 2008]

Workforce Review Team, 2007. *Findings of the Electron Microscopy Survey*. November 2007 [Unpublished report]. Winchester: Workforce Review Team.

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A. Appendix 1 – Supply assumptions

No new joiners.
Retirement age: 62