# Partial review of the Shortage Occupation Lists for the UK and for Scotland

Migration Advisory Committee

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## Migration Advisory Committee

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# Chairman's Foreword

## Introduction

In the year ending September 2014, 46,000 Certificates of Sponsorship (CoS) applications were made for out-of-country, non-EU citizens to permit them to work in the UK. There are three main routes:

| Routes for skilled non-EU workers to work in UK | |
|---|---|
| **Route** | **CoS issued y/e Sept 2014** |
| Tier 2 General | |
| 1. Shortage occupation route | 1,395 |
| 2. Resident labour market test (RLMT) route | 12,251 |
| 3. Intra-company transfer (ICT) route | 32,575 |
| *a. Short term (<12 months)* | *20,751* |
| *b. Long term (up to 5 years)* | *10,824* |
| **TOTAL** | **45,221** |

Thus, the shortage occupation route accounts for only a small fraction (3.0 per cent) of the total annual inflow of non-EU work migrants.

In September 2014, the Government asked the Migration Advisory Committee (MAC) to undertake a partial review of the shortage occupation list (SOL). The relevant occupations under review are:

- graduate occupations in the health sector, including consultant roles, nurses and training grades;
- graduate occupations in digital technology; and
- linesworkers in the energy industry.

### Health

When analysing the health sector, we paid special attention to the evidence from the Centre for Workforce Intelligence (CfWI), which essentially distilled evidence from many disparate sources into a coherent whole. CfWI recommendations, coupled with MAC analysis, yield the following examples of occupations recommended for:

- **Retention on SOL**: emergency medicine consultants; old age psychiatry consultants; nuclear medicine scientist; sonographers.

- **Inclusion on SOL**: clinical radiology consultants; non-consultant, non-training roles in paediatrics; core trainees in psychiatry.

- **Removal from the SOL**: haematology consultants; non-consultant non-training roles in anaesthetics, therapeutic radiographers.

- **Not recommended for inclusion on SOL**: geriatric medicine consultants; non-consultant, non-training roles in ophthalmology; sleep physiologists; nurses.

The evidence on the above occupations and others set out in Chapter 3 is reasonably straightforward. However, there are two occupations where we found it particularly difficult to determine whether or not to include them on the SOL: general practitioners (GP) and paramedics.

For GPs, there is a long term issue caused by three separate factors. First, a failure to attract sufficient trainees: the Department of Health (DH) told us that medical graduates seek more exciting roles in the healthcare system. Second, difficulties attracting GPs to some geographic areas of the UK, specially as the present stock retire. Third, work-life balance issues caused by the increased feminisation of the workforce and the shift towards salaried rather than partner GP positions.

DH has identified a desired target ratio of doctors to population (0.7 per 1000). This was almost achieved in 2009 but has fallen somewhat since then. DH have identified a requirement of 3,280 GP trainees per year. Presently they are falling short by some 400.

We were not told of any overall shortage of students flowing through our medical schools. Therefore any shortage of GPs can be addressed by changing the incentive structure such that the GP route becomes more attractive relative to the hospital consultant route. The DH has initiated such a plan. **Therefore, rather than immediately putting GPs on the SOL, we suggest waiting and evaluating the success of this DH initiative. In the meantime, non-EU GPs can continue to be recruited via the RLMT route.**

For paramedics, because of changes made to the healthcare system in recent years (for instance the shift in focus to treat people at home rather than in A&E), the nature and volume of job opportunities for paramedics have expanded, resulting in a nationwide shortage of paramedics working in the ambulance service.

Currently, paramedics do not meet our skill threshold as they are not a degree-level occupation (but paramedic practitioner and advanced paramedic practitioner are degree level, and together they account for about 20 per cent of all paramedics). From next year, all trainee paramedics will be required to attain a degree, such that newer cohorts will be qualified for NQF6+.

We have been told that vacancy rates are currently running at around 10 per cent (that is, 1,250 vacancies out of a total 12,500 ambulance workforce) and that this could grow in the coming years.

Although there has been an expansion of training places to boost labour supply in this occupation, we are told that they will experience a severe shortage for the next four years before the trainees graduate. In the meantime, ambulance services are looking to recruit from overseas (for instance, from Australia) using the Tier 5 Youth Mobility route as not all paramedics would qualify under Tier 2 General. Apparently, this recruiting approach has been successful both in terms of numbers and quality (they are all degree-qualified).

The issues the MAC considered are, first, whether to allow this occupation on the list in terms of skill and, second, whether it is sensible to use SOL to do so. We are convinced that there exists a shortage.

On skill, it could be argued that, because of the upgrade in training, from this point forward all paramedics would be considered as degree-qualified (the MAC agreed something similar for nurses in the past).

On use of SOL, we examined a number of issues. What are the alternatives to SOL? The Tier 5 option seems to be working and, as admitted by representatives from the health sector, the EEA market remains largely unexplored. Also, if the MAC were to recommend inclusion on SOL, would this be time-limited – that is, use a sunset clause? The MAC is also aware that, at the extreme, adding over 1,000 paramedics to the list would increase the size of SOL by two-thirds – a substantial impact. **On balance, the MAC recommend adding paramedics to the SOL subject to a thorough review once the British trainees come on - stream.**

**Overhead linesworkers**

The evidence we received from, and the visits we had with, partners in this sector were very good. The issues with overhead linesworkers relate to skill level and a distinction made in a previous review of SOL between high and low voltage linesworkers.

Linesworkers were included on the first SOL in 2008. Following the increase in required skill level to NQF4 in 2011, the MAC recommended that only high-voltage linesworkers met this criteria and that only this group should be retained on the list. This distinction was maintained as a legacy occupation following the increase in required skill threshold to NQF6+ in subsequent reports.

Evidence we have received during this review suggests that the high/low voltage distinction was incorrect, and that low voltage linesworkers should not be differentiated from high voltage for the purpose of the SOL. It seems reasonable, therefore, to remove the distinction and restore low voltage linesworkers to the

list to correct this. But we link this recommendation with a substantial hike in the required minimum pay threshold. **There is a strong case to suggest that it would be sensible to include them: electricity supply is a vital infrastructure which underpins the success or otherwise of UK plc. At the same time though, we recommend raising the minimum salary threshold to £32,000 to ensure SOL is targeted at the level of skilled linesworkers the industry states it needs the most.**

**Digital technology**

The written evidence submitted in response to the call for evidence was partially helpful, but we gained most insight from our visits to employers and representative bodies.

**Defining the digital technology sector.** We are not alone in having difficulty with this definition (for instance, ONS carried out a review of how it measures the digital economy last year). It is not our role to solve this matter. We are clear the focus needs to be on specific IT skills in shortage.

A key consideration is whether there are certain parts of the IT sector currently in greater need than others. The driver for reviewing digital technology came from Tech London Advocates and the needs of the smaller companies. By contrast, we received very little evidence from the larger IT organisations such as Google or Microsoft or major companies with IT needs in other sectors such as banking, retail, gambling and gaming.

Our focus, therefore, has been very much on the smaller start-up/scale-up digital technology companies. From what we have been told, because of the required speed of production and delivery (for instance, for apps), the market place is very competitive, and investor funding is often dependent on the companies having the skills close at hand. Also, given the nature of the industry, remuneration is often determined differently in start-ups: a lower basic wage will be offered but with a share of equity (in the hope of future success). Start-ups have therefore been losing out to bigger IT companies who can compete on basic salary.

Therefore, when the evidence supports the case to target smaller companies only, it is vital that the SOL directs these workers to such companies, rather than the larger IT companies sweeping up the available supply.

In addition to the above, three further issues required our careful consideration:

**1. Identifying clearly whether there is shortage and where.** This sector is moving fast both in terms of technologies but also job titles. If we are to propose job titles for inclusion, we need to balance out flexibility (to help the sector) with certainty (to help the immigration case workers). Having trawled the evidence we think we have arrived at a set of job titles that merit inclusion.

**2. The implications for existing IT users across Tier 2.** We are acutely aware that the IT sector is a major user of Tier 2, mainly via the intra-company transfer route. One risk of opening up SOL to certain IT job titles is that users divert their non-EEA recruits through SOL purely because its terms make it more attractive to do so. Volumes coming through SOL could therefore soar. Our suggested

solution is to limit the sponsors who can make use of the digital SOL job titles based on a set of criteria around the size of the business. Targeting smaller digital technology companies only could be achieved via one or more of the following: thresholds for tax exemptions, total number of employees in the organisation or turnover.

**3. How well the visa system meets the needs of this sector.** Start-up and scale-up companies in this sector seem to be disadvantaged (e.g. in time and cost) in terms of becoming a Tier 2 sponsor. Improvements could be made to facilitate access for those employers in genuine need of non-EEA skilled migrant workers. For instance, could the admin arrangements be handled by an umbrella organisation in the digital technology sector? Might there be an argument to resurrect – though in more targeted form – a Tier 1 route and shift the balance back toward supply-led skilled migration? Tech City are endorsing agents for the Tier 1 (exceptional talent), but due to the strict criteria, it is not easy for small employers to use this route.

**Recommendation** - our extensive consultations with the digital technology sector yield the following recommendations:

- **job titles to be included on the SOL**: product manager; data scientist; senior developer; cyber security specialist. Each of these quite broad titles incorporate more tightly defined tasks as set out in this report;

- the job titles identified are only in relation to **persons with a minimum of five years relevant experience** and who have demonstrable experience of having led a team;

- we suggest that the Home Office also **restrict the category of sponsor to start-ups and scale-ups** along the lines identified in the report.

**Professor Sir David Metcalf CBE**

# The Migration Advisory Committee and Secretariat

The Migration Advisory Committee (MAC) is a non-statutory, non-time limited, non-departmental public body (NDPB) which was established in 2007 and is funded by the Home Office. The MAC is comprised of economists and migration experts who are publicly appointed in line with guidance published by the Office of the Commissioner for Public Appointments; along with ex-officio representatives of the UK Commission for Employment and Skills and the Home Office.

## Chair

Professor Sir David Metcalf CBE
from August 2007

## Members

Professor Jackline Wahba
from November 2012

Dr Jennifer Smith
from November 2012

Professor Jonathan Wadsworth
from December 2007

## UK Commission for Employment and Skills representative

Lesley Giles

## Home Office representative

John Thompson

**The secretariat**

Henna Akram; Cordella Dawson; Ciaran Devlin; Stephen Earl; Paul Garner; Tim Harrison; Christopher Haynes; Bethan Hunt; Anna Lacey; Aashya Patel; Christine Stone; Josephine Thomas.

# Chapter 1 Introduction

## 1.1 Scope of the report

1.1 We last conducted a comprehensive review of all occupations and job titles on the shortage occupation list in 2012/2013. Since then, the Government has been made aware of a small number of occupations and job titles, where there may be a case for inclusion on or removal from the list.

1.2 On 22 September 2014, therefore, the Minister for Immigration wrote to us asking that we undertake a partial review of the Tier 2 shortage occupation list. The Government's commission said:

> *"Following the MAC's comprehensive review of the SOL, published in February 2013, the Government has been made aware of a small number of occupations where there may be a case for inclusion on or removal from the SOL. These occupations are:*
>
> - *graduate occupations within the health sector including consultant roles, nurses and training grades;*
> - *graduate occupations in the digital technology sector; and*
> - *linesworkers in the energy industry.*
>
> *The MAC is asked to review the above occupations to determine whether there is a shortage of labour in the occupation, or in relation to specific jobs within that occupation, that it would be sensible to fill using labour from outside the EEA, and which therefore merits inclusion on the SOL for the UK or the additional SOL for Scotland.*
>
> *In doing so, the MAC is asked to have regard to the Government's policy that Tier 2 is now reserved for occupations skilled to at least NQF level 6 and in general the SOL should be aligned with that policy.*
>
> *If there are further occupations (or job titles) where the MAC considers the labour market has changed since 2013, such that those roles now merit inclusion on or removal from the SOL, the Government would welcome the MAC's advice on those occupations also."*

1.3 The Government asked for our advice by 30 January 2015.

## 1.2 What we did

### Call for evidence

1.4 We carried out a call for evidence to collect the views and opinions of interested partners. In this report "corporate partners" or just "partners" refers to all parties with an interest in our work or our outcome, so private and public sector employers, trade unions, government departments, representative bodies and private individuals are included within this term.

1.5 We launched the call for evidence on 29 September 2014 and closed it on 5 December 2014. We published a call for evidence document on the MAC website and sent it direct to those partners in the health, digital technology and electricity generating sectors whose contact details were recorded on our stakeholder database. We also encouraged recipients to circulate the document further to any interested partners.

1.6 Our call for evidence document set out the Government's commission and identified those sub-questions on which we wished to receive corporate partners' views. We asked partners for evidence relevant to our skill, shortage and sensible criteria for any occupation or job title they wished to see included on the shortage occupation list. A detailed explanation of these criteria can be found in Chapter 2 of this report.

1.7 We did not seek evidence in relation to skill levels for those occupations that our top-down analysis had already identified as being skilled at National Qualifications Framework level 6 or above (NQF6+). We only sought evidence in relation to occupations not skilled to NQF6+ but partners considered that a job title within that occupation is skilled to that level (and is in shortage). We asked partners to provide information on:

- typical earnings, or ranges of earnings, in the job title;
- the proportion of individuals qualified at various levels (particularly at NQF6+);
- minimum qualifications required (either informally or on a regulatory basis) to be a skilled practitioner in a particular job title;
- any required or compulsory level or duration of on the job training or experience required to become a skilled practitioner;
- any required innate ability, of a level or rarity which exceeds such requirements in a typical NQF6+ job title; and
- opinion on the applicability of our skilled indicators to particular job titles.

1.8 We also asked for evidence of labour shortages in support of all proposals for occupations and job titles to be included on our recommended shortage occupation list. In particular, we asked for information on:

- vacancy numbers, rates and typical durations;
- typical earnings growth over recent months or years;
- the extent to which newly qualified workers are being recruited and how this has changed over time;
- the normal hours worked and how this has changed over time;
- any growth in expenditure on training and recruitment by employers;
- past or projected future trends in the demand for, and supply of, workers within an occupation;
- opinion on the applicability of our shortage indicators to particular occupations or job titles; and
- suggested additional shortage indicators for particular occupations or job titles, with an explanation of their relevance.

1.9 Partners were asked to provide evidence on whether it is sensible to employ migrants from outside the European Economic Area (EEA) as opposed to whatever alternative courses of action there may be. We asked partners to provide information on:

- the use of alternatives to non-EEA migrant labour, including investment in technology and machinery, and efforts to recruit from within the EEA;
- current activity to train and up-skill the resident labour force, including timings, projected volumes of those who will exit such schemes and enter the occupation, and estimates of how this is likely to help meet demand;
- whether migrants are likely to take jobs that would otherwise have been filled by resident workers or, conversely, whether employment of migrants will help to create employment conditions that allow the additional recruitment of resident workers; and
- suggested additional sensible indicators for particular occupations or job titles, with an explanation of their relevance.

1.10 In addition, we sought information on minimum pay thresholds for those job titles skilled at NQF6+, but which fell within occupations not skilled to this level. We asked:

- How different is the pay of the job title from the parent occupation?

- Why is this?
- What are the levels of pay within this job title for:
  - new entrants; and
  - experienced workers?

### Meetings and events

1.11 During the course of October and November 2014, we hosted or attended a number of meetings with partners to discuss our commission. We hosted three open forum meetings as follows with representatives from the following sectors:

- Linesworkers on 14 October;
- Digital technology on 17 October; and
- Health on 7 November.

1.12 We attended meetings in London, Manchester, and Scotland and met with employers, trade unions, representative bodies and government departments. In total, we met with representatives from over 50 different organisations. A full list of those we met with, and who have not requested anonymity, is provided in Annex A to this report.

1.13 We received 109 written submissions of evidence from organisations and individuals. All of the written and verbal evidence from partners was considered alongside our own data analysis. A list of those who supplied evidence, and who have not requested anonymity, is provided in Annex A of this report.

## 1.3 Structure of the report

1.14 This report is structured as follows:

- Chapter 2 of this report presents the relevant policy context including an overview of the PBS and Tier 2 in particular and sets out the data context summarising available background data.
- Chapter 3 discusses health sector occupations.
- Chapter 4 discusses the overhead linesworker job title.
- Chapter 5 discusses digital technology sector occupations.
- Chapter 6 discusses the evidence we received about occupations outside the areas of health, digital technology and overhead linesworkers.

- Chapter 7 discusses those occupations and job titles considered in relation to the Scotland shortage occupation list.

- Chapter 8 presents the recommended changes to the UK and Scotland shortage occupation lists.

1.15 Annex A provides a list of organisations who responded to the call for evidence and those we met. Annex B provides a list of the occupations skilled at NQF6+ and Annex C presents the top-down methodology. Annex D presents a detailed list of other job titles submitted by partners.

## 1.4 Thank you

1.16 We are grateful to all our partners who responded to our call for evidence and to those who engaged with us at meetings and events. We are particularly grateful to those partners who organised or hosted events on our behalf.

# Chapter 2 Policy and Data Context

## 2.1 Introduction

2.1 This chapter presents a brief overview of the UK Points Based System (PBS) for immigration along with a more detailed look at the main elements of Tier 2 and in particular the shortage occupation list route.

## 2.2 Overview of the Points Based System and Tier 2

2.2 The PBS for migration to the UK from outside the European Economic Area (EEA) was introduced in 2008 and consists of five tiers as set out in Table 2.1.

**Table 2.1: The five tiers of the Points Based System (PBS)**

| Name of tier | Immigrant groups covered by tier |
|---|---|
| Tier 1 | Investors, entrepreneurs, graduate entrepreneurs and exceptionally talented migrants. |
| Tier 2 | Skilled workers with a job offer in the UK. |
| Tier 3 | Low-skilled workers needed to fill specific temporary labour shortages. Tier 3 has never been opened. |
| Tier 4 | Students. |
| Tier 5 | Youth mobility and temporary workers. This route is for those allowed to work in the UK for a limited period of time to satisfy primarily non-economic objectives. |

Source: Migration Advisory Committee, 2012

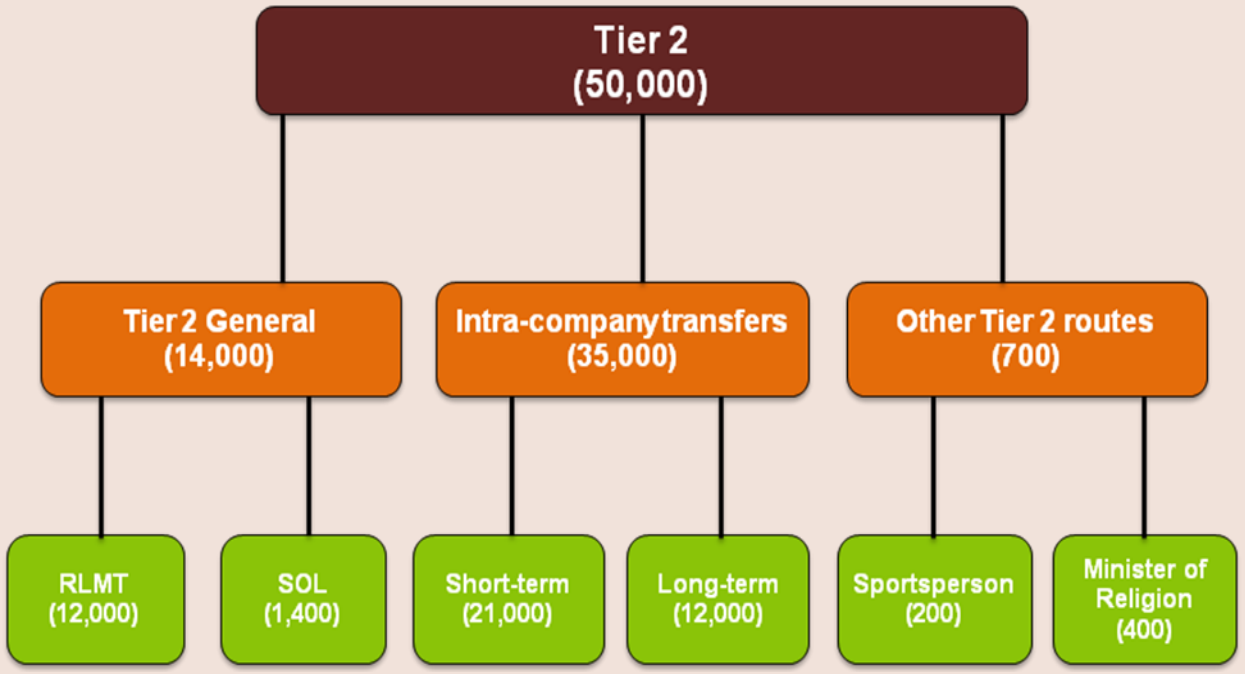
2.3 Tier 2 (General) applies to two categories of skilled workers: those coming to fill jobs that have been advertised under the Resident Labour Market Test (RLMT), and those coming to take up jobs on the Government's shortage occupation list (see Figure 2.1). The focus of this report is the shortage occupation list route.

2.4 Tier 2 requires that a migrant worker be sponsored by an employer. The employer is required to register as a sponsor with UK Visas and Immigration. Should the employer wish to recruit a migrant worker, they are required to apply for a Certificate of Sponsorship (CoS). Once the CoS is issued, the migrant can then apply for a visa.

2.5 The RLMT route enables an employer to bring in a worker from outside the EEA if there is no suitably qualified worker within the UK or the EEA

available to fill the specific skilled vacancy. Employers are required to advertise the relevant vacancy through Jobcentre Plus and at least one other medium for 28 calendar days or, for new graduate posts, by visiting at least three UK universities and advertising on a listed graduate recruitment website and at least one other medium. Additionally, following Government acceptance and implementation of our recommendations in Migration Advisory Committee (2012), jobs that are paid more than £71,600 and specified PhD-level occupations do not have to be advertised through Jobcentre Plus.

**Figure 2.1: Out of country visa allocation breakdown within the Tier 2 route of the Points Based System, year ending September 2014.**




Notes: Most data for entry clearance are sourced from the Home Office UK Visas and Immigration Proviso-Central Reference System (CRS) visa case working system. Proviso-CRS is an administrative database and as such a small number of cases may be subject to recording errors. The breakdown of Tier 2 General entry clearance into RLMT and SOL routes uses the Certificates of Sponsorship from Management Information data over the same period. There are also some minor sub-categories not represented here. Therefore figures in the bottom row may not sum to the totals in the rows above.

Source: Home Office (2014)

2.6 Employers can apply to bring in workers from outside of the EEA without going through the RLMT if the vacancy to be filled is for a job title on the Tier 2 shortage occupation list. This details the occupations and job titles presently held to be experiencing a labour shortage that would be sensibly filled using non-EEA labour either across the UK as a whole or in Scotland only. The content of the list is recommended by the Migration Advisory Committee and those recommendations are revised periodically, most recently in February 2013 (Migration Advisory Committee, 2013). The

current Tier 2 shortage occupation list has been operational since **6 April 2013**.

2.7 For an occupation or job title to be recommended for inclusion on the shortage occupation list it must be:

- **Skilled** to the required skill level for Tier 2 (currently NQF6+, which is broadly equivalent to degree level, with some exceptions);
- Experiencing a national **shortage** of labour; and
- Demonstrably **sensible** to fill these shortages using labour from outside the EEA.

2.8 Tier 2 is subject to a minimum pay threshold of £20,500 in the General route; the one exception to this being nurses and midwives that are undergoing a period of learning or supervised practice to gain Nursing and Midwifery Council registration. For many occupations and job titles the minimum pay threshold is substantially higher than £20,500. Since 2011, Tier 2 (General) has been subject to an annual limit of 20,700.

2.9 Tier 2 also contains three other routes which are not subject to a limit: the intra-company transfer, ministers of religion, sportsperson. Additionally, those applying for Tier 2 (General) who are already in the UK, for example students transferring from Tier 4, are exempt from the limit.

2.10 The **intra-company transfer** route is for employees of multi-national companies transferred to a UK-based branch of the same organisation either on a long-term or short-term basis. Additionally, organisations may use the intra-company transfer route for third-party contracting, bringing in labour from their own company to deliver a business outcome to a third party often in the form of a one-off project. The transferees may work at the third party's premises providing the multi-national organisation remains responsible for their work. Long-term staff brought in under the intra-company transfer route must be paid £41,000 or above or the rate specified in the relevant codes of practice, whichever is higher. They are given permission to stay for up to a maximum of five years. Short-term staff must be paid £24,500 or above or the rate specified in the relevant codes of practice, whichever is higher, and are allowed to work in the UK for a maximum of 12 months.

2.11 In November 2012, the then UK Border Agency increased the maximum period of leave - from five to nine years - for senior staff brought in under the intra-company transfer route earning £153,500 or more.

2.12 The **ministers of religion** route is for those who are offered employment or posts or roles within their faith community in the UK to undertake preaching and/or pastoral work, are missionaries or members of religious orders.

2.13 The **sportsperson** route is for elite sportspersons or coaches whose employment will make a significant contribution to the development of the relevant sport at the highest level. It is the responsibility of the recognised governing body of the sport in question to agree and maintain the requirements under which they will consider and issue an endorsement to an organisation who wish to obtain a licence to become a sponsor, and consider and endorse, where appropriate, the issue of a certificate of sponsorship by a sponsor for each individual sportsperson applicant.

## 2.3 Recent changes to Tier 2

2.14 Since 6 April 2011, Tier 2 (General) has been subject to an annual limit of 20,700 places for main out-of-country applicants. In 2011/12 the Tier 2 limit was undersubscribed by 52 per cent. We were commissioned to assess this in early 2012 (Migration Advisory Committee, 2012) and the Government accepted our recommendation to keep the limit at this level. The limit was undersubscribed by 33 per cent in 2013/14. However, the allocation for the current year (since April 2014) is only undersubscribed by 4 per cent to date.

2.15 In June 2012 the Government raised the skill level required to qualify under Tier 2 to NQF6+, broadly corresponding to bachelor's degree level occupations and job titles which were already on the shortage occupation list but which are not skilled at NQF6+, including overhead linesworker working on high voltage lines, do not have to comply with the NQF6+ requirement but must be skilled at NQF4

## 2.4 Data context

2.16 This section provides the data context to our analysis of the recommended shortage occupation lists for the UK.

2.17 It sets out:

- the current state of the economy and the labour market for the UK as a whole;
- overall migration trends to the UK; and
- trends in visa and employer certificate of sponsorship statistics for the main Tier 2 routes.

2.18 The data context for Scotland is set out in Chapter 7.

## 2.5 The UK Economy and Labour Market

### Economy

2.19 2014 Q4 marks the eighth successive quarter of growth in the UK economy, representing the longest sustained run of quarterly growth in the aftermath of the 2008 downturn (Office for National Statistics (ONS),

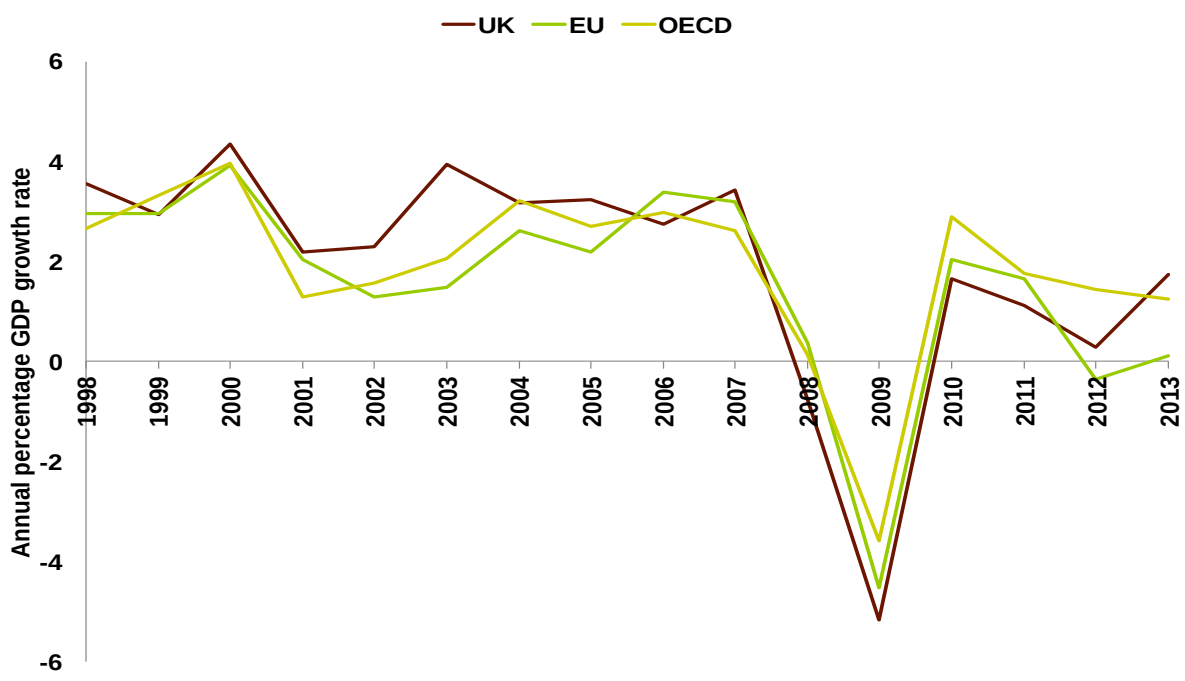
2015a). This progress has helped to return the UK economy to its pre-downturn trend rate of growth in annual terms.

2.20 In 2014, the UK economy grew by 2.6 per cent (ONS, 2015b). The Office for Budget Responsibility expects similar growth in the near term – their central forecast is that the UK economy will grow by 2.4 per cent in 2015, and by 2.2 per cent in 2016 (Office for Budget Responsibility, 2014).

2.21 The level of GDP depends, in part, on the size of the population, as does growth of GDP. Although UK GDP has grown above its pre-downturn level, GDP per capita remains below pre-downturn levels, as the growth in GDP has not kept pace with population growth. According to ONS population projections, the UK population grew by around 400,000, or by 0.63 per cent in 2013. This population increase is almost evenly split between net migration (+183,000) and natural change (births minus deaths, +212,100). Sustained growth in GDP per capita mainly depends on an improvement in labour productivity, which remains below pre-downturn levels (ONS, 2014a).

2.22 Figure 2.2 presents data from the World Bank comparing the annual percentage GDP growth rate for the UK, the European Union (EU), and the Organisation for Economic Co-operation and Development (OECD) countries over the last fifteen years. The OECD countries as a whole have experienced a steady decline in their rate of growth since the peak in 2010. The EU has returned to a positive growth rate after a dip in 2012. While the UK's recession was slightly deeper, and the initial recovery slightly shallower, than in the EU and the OECD, the UK's current growth rate is comparatively high. In 2013, the GDP growth rate for the UK was higher than the EU and the OECD average by 1.6 percentage points and 0.5 percentage points respectively.

**Figure 2.2: Annual percentage change in GDP for the UK, EU, and OECD, 1998-2013**




Notes: World Bank data uses annual percentage growth rate of GDP at market prices based on constant local currency, with aggregates based on constant 2005 US dollars. It should be noted that this is not comparable to the Office for National Statistics data, which measures gross value added in seasonally adjusted, chained indices.

Source: World Bank (2014)

2.23 The current outlook for the UK economy suggests that UK economic growth will continue to outpace growth in the Euro zone in the short term. The OECD, in its November 2014 Economic Outlook (OECD, 2014), forecast growth in the Euro zone of 0.8 per cent in 2014, 1.1 per cent in 2015 and 1.7 per cent in 2016. The OECD also expects growth in the UK economy to exceed growth across the OECD as a whole in 2014 and 2015. In this economic context, in the near term where there are shortages in the UK labour market, UK employers may find a larger pool of skilled labour available to draw from in the EU than would be the case if the Euro area countries were growing at a similar rate to the UK. Migration flows are in large part determined by more long term structural factors such as differences in the level of average wages, and current economic context may therefore only matter at the margin.

## Labour Market

2.24 In contrast to GDP, UK employment held up well in the 2008/09 recession, with unemployment rising by less than many commentators expected, given the magnitude of the fall in output (Gregg and Wadsworth, 2010). More recently, the changes in the labour market in the last couple of years

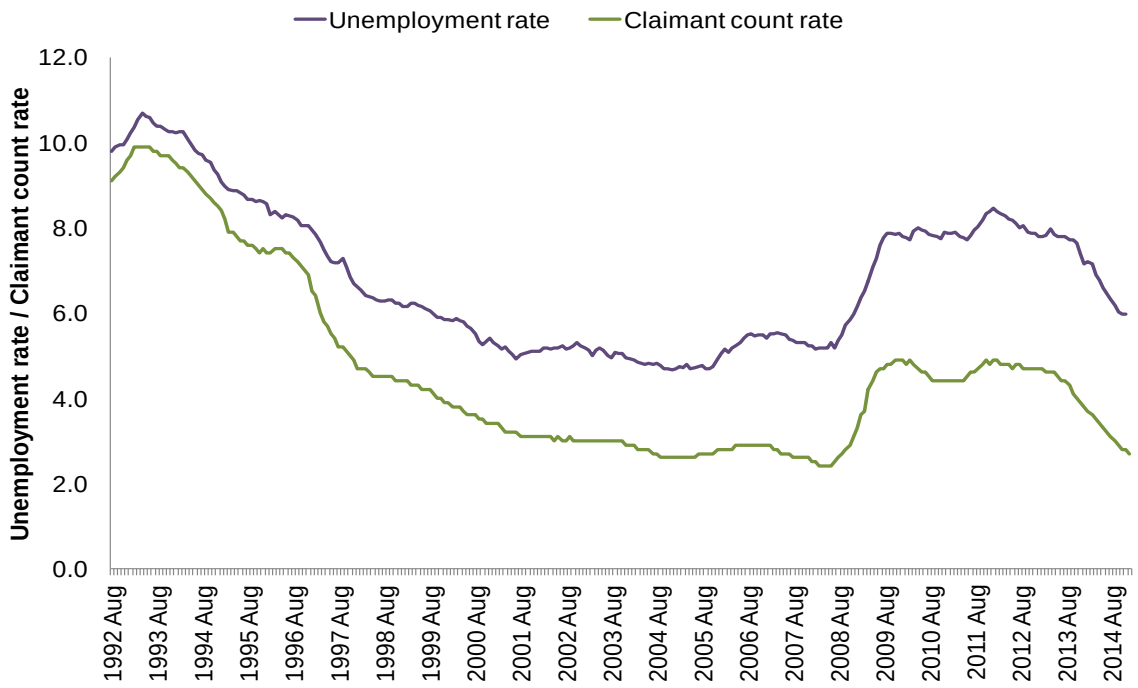
have been particularly striking with employment growing strongly and unemployment falling rapidly.

2.25 The number of people in employment is at a record level - over the past year alone employment has increased by 512,000 to reach 30.8 million. This growth in employment partly reflects the growth in the population. However, the proportion of working-age people in work is also close to its highest ever rate, having increased by 1 percentage point over the past year to 73 per cent.

2.26 Since its peak of 8.5 per cent in November 2011, the unemployment rate has fallen back to 5.8 per cent in the three months to November 2014 (Figure 2.3). The Office for Budget Responsibility has forecast that unemployment will continue to decrease steadily. The claimant count measure of unemployment has also fallen sharply, down by 371,000 in the past twelve months to reach 868,000 in December 2014, and is now close to pre-recession levels.

2.27 Eurostat data show that the unemployment rate in the Euro-zone remains high in comparison. By Q3 2014 it was 11.5 per cent, having declined slightly from the 2013 peak of 12.0 per cent. The variation in unemployment rates across the Euro-zone remains large (5 per cent in Germany to 26 per cent in Greece). These differentials may help generate incentives to move across Europe. In our report on migrants in low-skilled work (Migration Advisory Committee, 2014) we showed that the composition of the UK labour market by world region of birth has remained relatively stable. Approximately 55 per cent of employment in the UK is high-skilled and 86 per cent of this is accounted for by those born in the UK. Of the rest, five per cent are EU-born, while nine per cent were born outside of the EU.

**Figure 2.3: UK unemployment and claimant count rates, Aug - Oct 1992 – Aug - Oct 2014**




Notes: Seasonally adjusted. The unemployment rates are those calculated in the three months to the date shown (inclusive). The claimant count rate is the number of claimants expressed as a percentage of the sum of claimants and workforce jobs (mid-year estimates are used).
Source: Office for National Statistics (2014b)

2.28 The number of vacancies relative to unemployment (the V/U ratio) is a measure of the state of the labour market that is of particular relevance to our work to assess shortages. A high, or rising, V/U ratio may suggest that it is difficult, or becoming more so, to fill vacancies as the number of vacancies to every unemployed person rises.

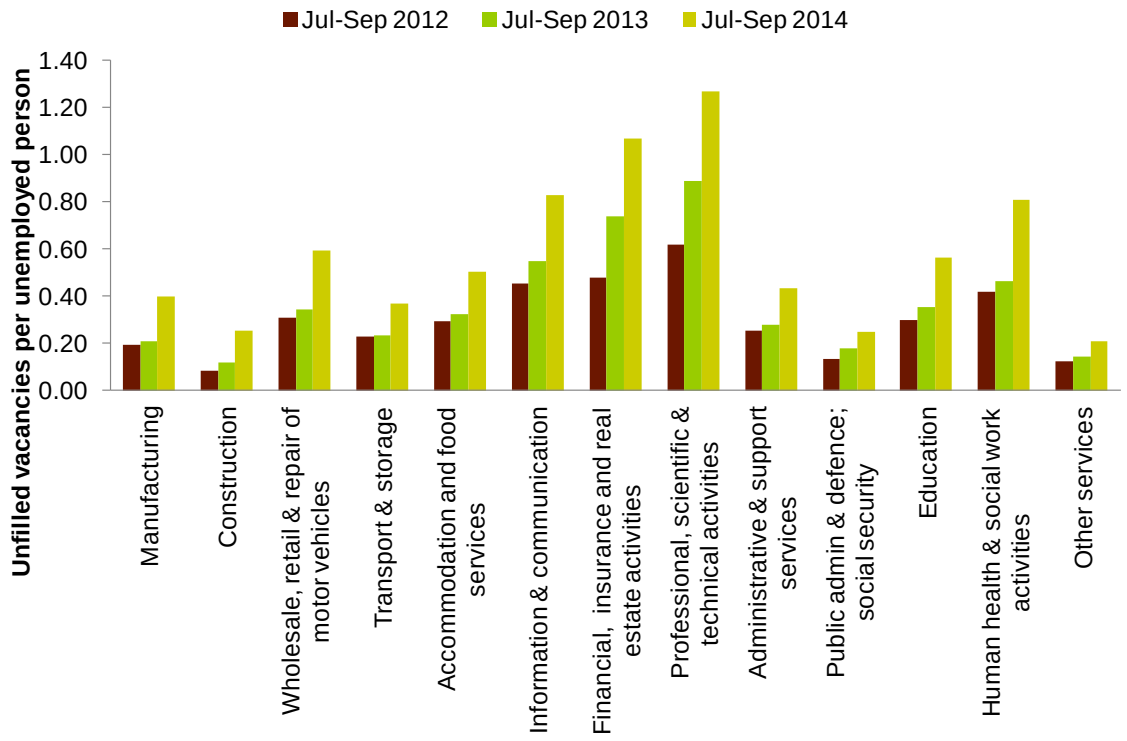
2.29 As illustrated in Figure 2.4, the V/U ratio increased for every 1 digit SIC 2007 industry between October 2012 and October 2014 but the rate of increase varied considerably. This suggests that any labour market slack is unevenly distributed across the sectors. As the data for unfilled vacancies per claimant by occupation are no longer produced by the Department for Work and Pensions (DWP), industry data have been used here as a substitute.

2.30 Although the UK's recent labour market performance in terms of employment has been strong, average earnings growth has been modest and generally below the rate of inflation. This partly reflects the lack of productivity growth since 2008. However, average weekly earnings growth has increased in recent months, in real as well as nominal terms (Figure 2.5).

2.31 It is worth noting that average earnings growth is affected by the composition of employment in the labour market. The Bank of England's November 2014 Inflation Report (Bank of England, 2014) highlights that from Q3 2013 to Q2 2014, employment growth was concentrated amongst

the young and the low-skilled. This may have partly contributed to recent low average earnings growth.

**Figure 2.4: Unfilled vacancies per unemployed person by broad sector in the UK, 2012-2014**



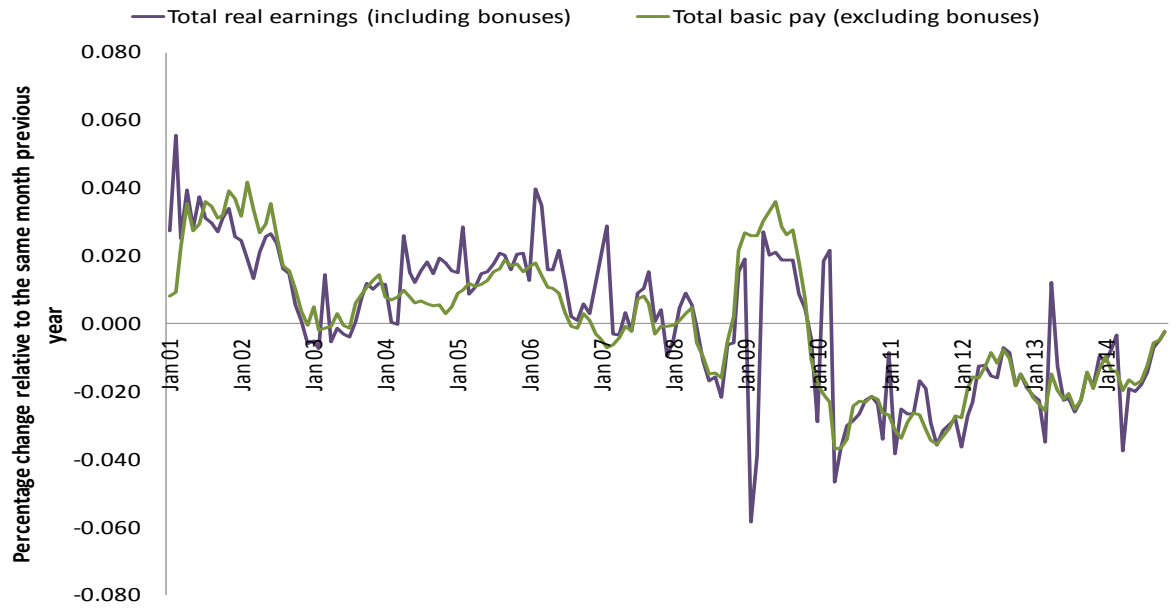

Notes: The vacancy data is not seasonally adjusted as this series does not display seasonality. Therefore the unadjusted series is the best estimate of a seasonally adjusted series. The V/U ratio has been calculated by dividing the number of vacancies in an industry by the level of unemployment in that industry. Total vacancies are estimated from the monthly Vacancy Survey, which asks employers how many vacancies they have in total for which they are actively seeking recruits from outside their organisation. The unemployment levels used here consist of all people between the age of 18 and State Pension age that are unemployed. These figures are then sorted by industry of last job as percentage of economically active by industry (Standard Industrial Classification SIC 2007). Industries omitted from this analysis include, but are not limited to, agriculture, forestry and fishing.
Source: Office for National Statistics (2014c) and Office for National Statistics (2015c)

2.32 The latest Annual Survey of Hours and Earnings (ASHE) data also suggest that compositional effects have been important. ASHE 2014 data shows that in the year to April 2014, while growth in median nominal earnings for all full-time employees was just 0.1 per cent, median earnings for those employees who had been with their employer for at least 12 months (thereby stripping out any compositional effects on earnings) grew by 4.1 per cent, significantly higher than inflation over this period.

2.33 Therefore the earnings context is more nuanced than that suggested by the aggregate statistics. Changes in the composition of the labour market (both in skill level and age profile) mean that in recent quarters the aggregate earnings statistics may not have provided a good indication of earnings growth experienced by individuals in the labour market. Taking this into account, there may be less slack in the labour market and

therefore an increased likelihood of shortage in general, compared to that suggested by the growth in average weekly earnings.

**Figure 2.5 Year on year growth in real total (including bonuses) and regular (excluding bonuses) earnings, Great Britain, Jan 2001 – November 2014**




Notes: Real earnings have been estimated using data from the retail price index, which is not seasonally adjusted.
Source: Office for National Statistics (2014c) and Office for National Statistics (2014d)

2.34 The Employer Skills Survey, carried out by the UK Commission for Employment and Skills, asks employers for information about the vacancies that they hold. Hard-to-fill vacancies are defined as those persistent vacancies that employers are struggling to fill. Skill shortage vacancies are those which are proving difficult to fill due to the establishment not being able to find applicants with the appropriate skills, qualifications or experience. Table 2.2 presents vacancy data from the 2013 Employer Skills Survey (UKCES, 2014) for the 9 broad occupation groups (1-digit SOC level). This allows comparison among the broad occupation groups to determine which are experiencing larger proportions of each type of vacancy in terms of national employment and overall vacancy levels.

2.35 Vacancies as a proportion of employment are broadly similar across most of the main occupational groups (as measured at the 1-digit SOC level), although the vacancy rate for associate professionals stands out at six per cent. This occupational group exceeds all others in both hard-to-fill and skilled shortage vacancies as a proportion of employment. However, the percentage of skilled shortage vacancies as a proportion of vacancies is highest for skilled trades and professionals

**Table 2.2: Hard-to-fill and skill shortage vacancy rates as a proportion of either employment or vacancies in the UK in 2013**

| | | Percentage of employment | | | Percentage of vacancies | |
|---|---|---|---|---|---|---|
| | Employment (thousands) | Vacancies | Hard-to-fill vacancies | Skill shortage vacancies | Hard-to-fill vacancies | Skill shortage vacancies |
| Managers | 4,939 | *% | *% | *% | 24% | 20% |
| Professionals | 3,158 | 3% | 1% | 1% | 34% | 30% |
| Associate professionals | 1,574 | 6% | 2% | 2% | 31% | 26% |
| Administrative/ clerical staff | 3,411 | 2% | *% | *% | 17% | 13% |
| Skilled trades | 1,916 | 3% | 1% | 1% | 47% | 39% |
| Caring, leisure and other services staff | 2,772 | 4% | 1% | 1% | 36% | 27% |
| Sales/customer service staff | 3,623 | 2% | *% | *% | 19% | 13% |
| Machine operatives | 1,855 | 2% | 1% | *% | 26% | 25% |
| Elementary staff | 3,710 | 2% | 1% | *% | 23% | 13% |

Notes: *% refers to when the rate is negligible, or does not round to 1 per cent
Source: UKCES Employer Skills Survey (2014)

## 2.6 Migration Stocks and Flows

### *a) Overall migration trends*

2.36 Net migration has risen from 44,000 in 1991 to a peak of 320,000 in June 2005. Net migration in 2013 was 209,000 and rose to 260,000 in the 12 months to June 2014. For an in-depth analysis of the factors underpinning these changes in net migration, please see Chapter 3 of the 2014 MAC report *Migrants in low-skilled work: the growth of EU and non-EU labour in low-skilled jobs and its impact on the UK* (Migration Advisory Committee, 2014). Figure 2.6 presents migrant flows from 1991-2014, defining migrants as those intending to change their place of residence for one year or more according to the international United Nations (UN) definition (UN, 1998).

2.37 Net migration of EU migrants to the UK was modest until the expansion of the EU in 2004, rising to a peak of 127,000 in 2007. Although it fell sharply with the onset of the financial crisis in 2008, by the end of 2013 it had almost returned to the 2007 level.

2.38 Net emigration of British nationals doubled from around 50,000 in the late 1990s to around 100,000 in 2006/07. It has since declined again to 57,000 in 2013. Prior to 2012 net emigration of British nationals effectively

cancelled out net immigration from the EU. However, the constant rate of British net migration alongside the continued rise of EU net migration has meant that total net migration can now be attributed to both EU and non-EU nationals. Non-EU migration, despite having fallen in recent years, has risen to 143,000 in 2013 and still accounts for a greater share of net immigration.

### *b) Visas for non-EEA skilled workers*

2.39 In the last year the number of visas granted under Tier 2 has increased significantly – by around six thousand – or 14 per cent. This was due in almost equal measure to increases under the Intra-company transfer route and Tier 2 (General). The number of visas granted under Tier 2 (General) rose by 2,989 to a peak of 14,064 over the year ending September 2014. This is a significant rise historically as 28 per cent of all granted Tier 2 visas now come under this route, compared to 25 per cent in the previous year. The Intra-company transfer route also experienced a rise over the same period from 32,252 to 35,438. This represents an increase of 3,186.

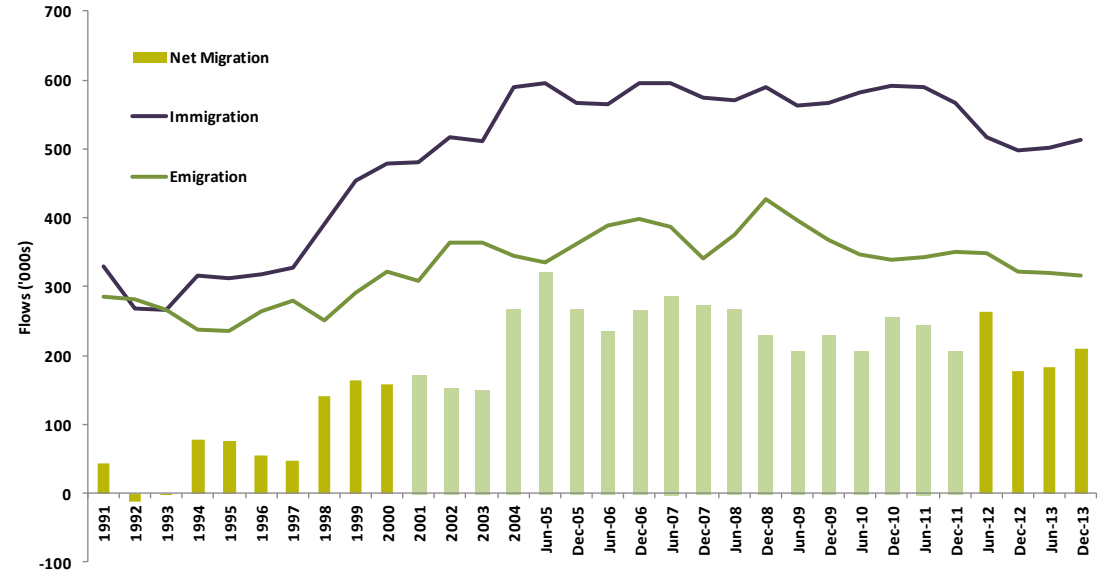
2.40 As discussed in paragraph 2.8, Tier 2 (General) – that is RLMT plus SOL – is subject to an annual limit of 20,700 visas issued to main applicants from outside of the UK. Since its introduction, this limit has been consistently undersubscribed. However, there are indications this limit may soon be reached; the 4,833 visas granted in the most recent quarter (Q3 2014) only just fall short of the quarterly allocation of this limit, equal to 5,175.[1]

2.41 The total number of visas granted tends to follow a seasonal pattern and as such, when comparing Q3 2014 with Q3 2013, the total number of visas issued has risen to an all time high of 14,944 for that quarter.

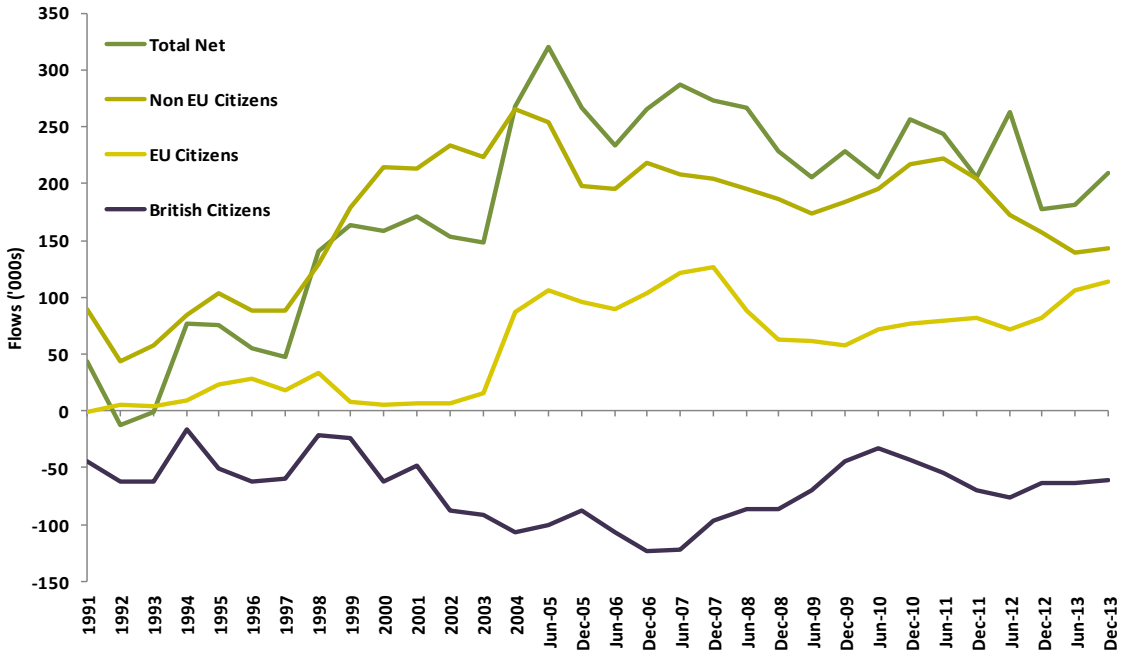
[1] In fact visas are allocated on a monthly basis. We have aggregated to a quarterly basis to compare with the published data.

**Figure 2.6: Flows of long-term migrants to and from the UK and net long-term migration by citizenship, 1991 – 2013**

**Inflows, outflows and balance of long-term migrants to and from the UK, 1991 – 2013**

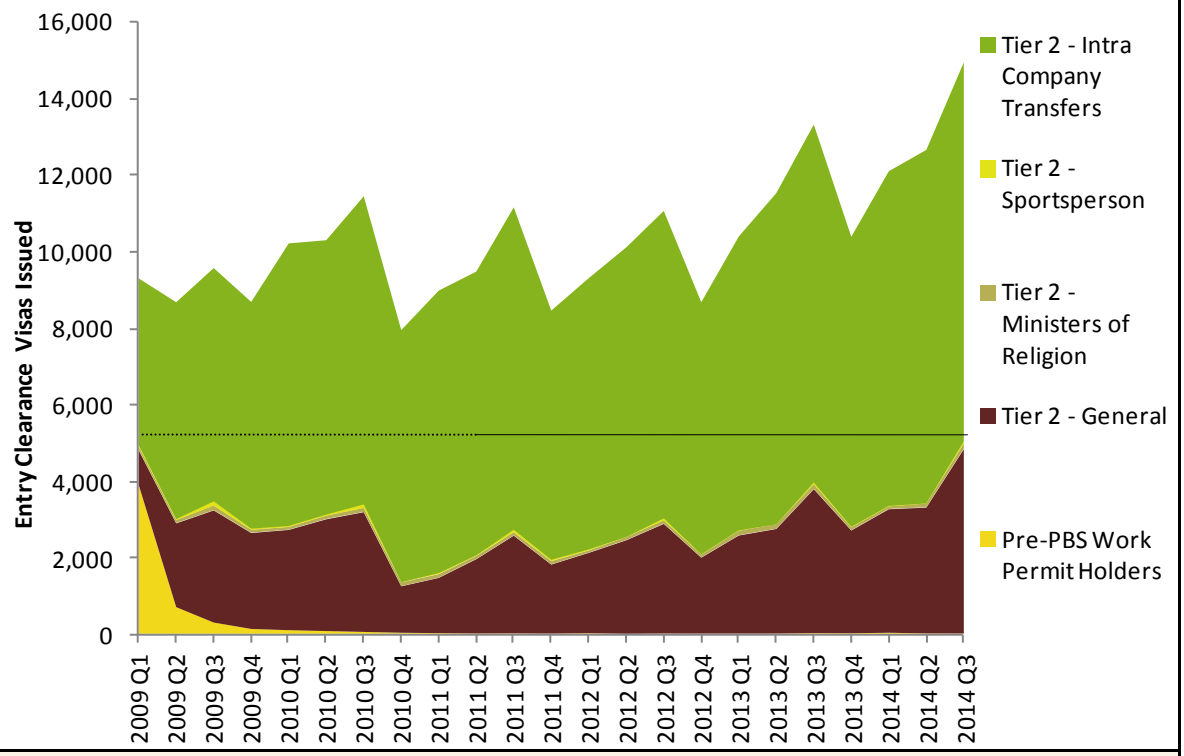



**Net long-term migration by citizenship, 1991 – 2013**




Notes: The ONS have released revised headline net migration figures for 2001 to 2011 in light of the results of the 2011 Census. However, none of the sub-components of the net migration statistics were revised (e.g. emigration/immigration, breakdowns by region or by reason for migration). As a result, over this period, in the charts above, the sub-components may not sum to the total net migration measure presented on the charts.
Long-term migrants are defined in the International Passenger Survey as those individuals who intend to change their place of residence for a year or more. This definition includes all nationalities, including British nationals. EU includes EU15, A8, A2, Malta, Cyprus and, from 2013, Croatia.
Source: Office for National Statistics (2014e)

**Figure 2.7: Entry clearance visas issued to Tier 2 and work permit main applicants by route by quarter, 2009 Q1 - 2014 Q3**




Notes: "Tier 2 – Intra Company Transfers" includes both long-term and short-term transfers.
Tier 2 was launched on 28 November 2008. The work permit system was the predecessor to Tier 2. Tier 2 (General) includes the Resident Labour Market Test and shortage occupation routes. Operational procedures before and after the introduction of the Points Based System (PBS) were different, which may distort any comparison before and after this date. In particular, previously migrants would have had to apply first under the highly skilled migrant programme or for a work permit and then for a visa. In the PBS these processes take place at the same time.
The horizontal trend represents the quarterly allocation of the 20,700 annual limit on Tier 2: General visas equal to 5,175. The trend is represented as dashed to denote the period before the introduction of this limit beginning April 2011.
Entry clearance visas issued are limited solely to the main applicant and do not include dependants
Source: Home Office (2014) ("before entry" visa tables)

2.42 In contrast to visas issued, certificates of sponsorship (CoS) allow us to break Tier 2 down into its main component routes – RLMT, shortage occupation and intra-company transfer – by occupation and by whether the CoS was granted for an in or out-of-country applicant. In-country certificates are issued for applicants already in the UK and covers extensions of stay and applicants who are switching into the route from another route. Out-of-country certificates are issued to applicants who are not yet in the UK and are a proxy for inflows. Table 2.3 below presents the top five SOC 2010 occupations by CoS used for all routes. The table reports data for SOC 2010 occupations, as eligible occupations under Tier 2 are currently defined using this classification.

**Table 2.3: Top five SOC 2010 occupations by used Certificates of Sponsorship (CoS) for the shortage occupation, RLMT, short tem intra-company transfer and long term intra-company transfer routes, year ending September 30 2014**

| Shortage occupation route | | | | | | |
|---|---|---|---|---|---|---|
| Occupation | | CoS used | In country | Out of country | Percentage of total CoS used | Median annual pay (£) |
| 2211 | Medical practitioners | 709 | 413 | 296 | 22 | 59,000 |
| 2126 | Design and development engineers | 267 | 160 | 107 | 8 | 35,000 |
| 2121 | Civil engineers | 242 | 124 | 118 | 7 | 57,000 |
| 5434 | Chefs | 226 | 159 | 67 | 7 | 30,000 |
| 2314 | Secondary education teaching professionals | 183 | 77 | 106 | 6 | 30,000 |
| Total for all occupations | | 3221 | 1833 | 1388 | 100 | 37,000 |
| **Resident labour market test route** | | | | | | |
| Occupation | | CoS used | In country | Out of country | Percentage of total CoS used | Median annual pay (£) |
| 2119 | Natural and social science professionals n.e.c. | 3456 | 2092 | 1364 | 10 | 32,000 |
| 3545 | Sales accounts and business development managers | 2675 | 2125 | 550 | 8 | 24,000 |
| 2211 | Medical practitioners | 2603 | 1817 | 786 | 8 | 51,000 |
| 2136 | Programmers and software development professionals | 2505 | 1428 | 1077 | 7 | 35,000 |
| 2231 | Nurses | 2387 | 1252 | 1135 | 7 | 25,000 |
| Total for all occupations | | 34,324 | 21,910 | 12,414 | 100 | 33,000 |
| **Short term intra-company transfer route** | | | | | | |
| Occupation | | CoS used | In country | Out of country | Percentage of total CoS used | Median annual pay (£) |
| 2136 | Programmers and software development professionals | 7173 | 255 | 6918 | 33 | 33,000 |
| 2135 | IT business analysts, architects and systems designers | 4724 | 171 | 4553 | 22 | 36,000 |
| 2139 | Information technology and telecommunications professionals | 3574 | 101 | 3473 | 17 | 32,000 |
| 2423 | Management consultants and business analysts | 966 | 53 | 913 | 4 | 64,000 |
| 2134 | IT project and programme managers | 595 | 38 | 557 | 3 | 62,000 |
| Total for all occupations | | 21,587 | 827 | 20,760 | 100 | 36,000 |

| Long term intra-company transfer route | | | | | | |
|---|---|---|---|---|---|---|
| Occupation | | CoS used | In country | Out of country | Percentage of total CoS used | Median annual pay (£) |
| 2135 | IT business analysts, architects and systems designers | 2837 | 1020 | 1817 | 17 | 49,000 |
| 2136 | Programmers and software development professionals | 1728 | 679 | 1049 | 10 | 50,000 |
| 2134 | IT project and programme managers | 1709 | 559 | 1150 | 10 | 52,000 |
| 2423 | Management consultants and business analysts | 1050 | 315 | 735 | 6 | 70,000 |
| 3545 | Sales accounts and business development managers | 845 | 198 | 647 | 5 | 70,000 |
| 2139 | Information technology and telecommunications professionals | 845 | 314 | 531 | 5 | 48,000 |
| Total for all occupations | | 17,035 | 5878 | 11,157 | 100 | 66,000 |

Note: Applicants are required to meet the criteria for Tier 2 at the point of being allocated a certificate of sponsorship. Therefore, these data have been filtered to exclude those individuals who would not meet the current visa rules.
First, a main applicant to the RLMT route has been excluded if the occupation is not skilled to National Qualifications Framework level 6 or above (NQF6+) (unless the occupation is one of the creative occupations exempt from this: 3411, 3412, 3413, 3414 and 3422) and/or earnings on the job are less than £20,500 per year and/or they are clergy (who would use the Tier 2 minister of religion route).
Second, a main applicant to the shortage occupation route has been excluded if the occupation is not on the shortage occupation list as at 12 December 2014 and/or earnings in the job are less than £20,500 per year and/or they are chefs earning less than £29,570 per year.
Third, a main applicant to the long-term intra-company transfer route has been excluded if their occupation is not skilled to NQF6+ (or is one of the creative occupations) and/or earnings in the job are less than £41,000 per year.
Finally, a main applicant to the short-term intra-company route has been excluded if their occupation is not skilled to NQF6+ (or is one of the creative occupations) and/or earnings in the job are less than £24,500 per year. Further, data is excluded if the salary reported is not annual or we were unable to distinguish between in/out of country applicants. Not all the individuals using CoS may be granted visas since some may have their visa applications rejected. Furthermore, even when a visa is granted, a person might not travel to the UK and on arrival they might also not be admitted.
All of the figures quoted are management information which have been subject to internal quality checks, but have not been quality assured to the same standard as National Statistics. As much of the input data (for example, salary levels) is self declared by the sponsor, it is not possible to validate the quality of the source information, and we are advised by that data quality anomalies could impact on the findings. These data are provisional and subject to change. Median annual pay rounded to the nearest thousand. Median annual pay includes salaries and allowances and are calculated using both in and out-of-country CoS used and as such may double count some individuals.
Source: Home Office management information, year ending September 30 2014

2.43 In the year ending September 2014, the total number of applications for Certificates of Sponsorship (CoS), both in and out-of-country, made under the following Tier 2 sub-routes, Shortage Occupation List (SOL), Resident Labour Market Test (RLMT), short-term intra-company transfers (ICT) and

long-term ICT over the year ending September 2014 were 3,200, 34,300, 21,600 and 17.000 respectively[2].

2.44 Of the 3,200 applications for CoS made under the shortage occupation route, a third was accounted for by medical practitioners and design and development engineers. The top 5 applications under the RLMT route accounted for 40 per cent of applications and included occupations such as social science professionals, software and business development mangers, medical practitioners and nurses. Around 80 per cent of CoS applications under the short-term intra-company transfer route was accounted for by the top 5 occupations, which were predominately IT related as shown in Table 2.3. Similarly, under the long-term intra-company transfer route, over 40 per cent of jobs were accounted for by four IT related occupations.

2.45 One notable contrast from the equivalent table presented in Migration Advisory Committee (2013) is that SOC code 5243 for lines repairers and cable jointers no longer features in the top 5 occupations utilising the shortage occupation route where it once accounted for 8 per cent of CoS issued. It is instead replaced by SOC code 2126 for design and development engineers. The move from SOC 2000 to SOC 2010 in this report also means that the previous top occupation under all three other routes - software professionals - now features under more varied and specific SOC codes.

## 2.7 Conclusion

2.46 The economic and labour market context presented above, together with visa data showing recent increases in uptake of Tier 2 visas points, in the short term towards increased demand in general for non-EEA skilled workers from UK businesses. It also suggests a greater probability of shortage in any given occupation, compared to our previous review of the shortage occupation list (Migration Advisory Committee, 2013). Whilst difficult economic conditions in many of the Euro-zone area countries may at the margin increase the likelihood of employers being able to source their skilled labour needs from within the EU, the overall trend is likely to be for increased demand for Tier 2 migrants from outside the EEA in the short term.

2.47 It is with this overall context in mind that we review the evidence of shortage in specific occupations and job titles in the remainder of this report.

[2] Subject to restrictions outlined in the notes in Table 2.3

# Chapter 3 Health

## 3.1 Introduction

3.1 This chapter discusses the evidence we received in relation to occupations within the health sector. We contacted parties with an interest in the sector and sent them our call for evidence. We then held an open forum with representatives from the sector on 7 November 2014. We received evidence from the Centre for Workforce Intelligence (CfWI), a number of health service employers and representative bodies from across the UK, the Scottish Government, and the care sector. The care sector evidence is discussed separately in this chapter. The evidence from the Scottish Government is discussed in Chapter 7.

3.2 This chapter looks first at the sources of the evidence we received. It then provides a short introductory explanation of the various health sector roles and grades that are discussed in the other parts of the chapter. We then discuss each of the nominated job titles in turn.

## 3.2 Sources of evidence

3.3 The CfWI is an organisation that is commissioned by the Department of Health, as well as Health Education England and Public Health England, to look at specific workforce groups, and also to provide materials, tools and resources to inform workforce planning policy decisions at a national and local level. The CfWI was jointly commissioned by the Department of Health and Health Education England to prepare the healthcare submission to the MAC's call for evidence. The response from the CfWI covers England only.

3.4 In order to respond to our call for evidence, the CfWI collated evidence on possible shortage occupations in the healthcare sector from relevant bodies across England. The CfWI analysed the responses it received along with its own secondary research to inform its response to the MAC. The CfWI nominates some occupations for inclusion on the shortage occupation list and also suggests others that may come off the list.

3.5 In considering whether to submit a job title for inclusion on the shortage occupation list, the CfWI have considered whether an occupation could provide evidence of structural supply-side issues resulting in an absolute

national shortage within each skilled occupation or job title sufficient to merit inclusion or retention on the list. Only where there is evidence of structural supply-side issues has a recommendation for inclusion been made, providing that there is also evidence to indicate that it would be sensible to fill these posts using labour from outside the EEA. For example, an occupation with recruitment difficulties in a number of geographies in the UK does not necessarily constitute a structural supply-side shortage, as there can be a variety of other reasons for a shortage, such as regional variations in supply, or competition from other career paths or between sectors of employment.

3.6 The CfWI sent out a survey in June 2014 to health sector bodies asking for evidence of skill shortages. The CfWI received 77 responses that highlighted specialties and professions in which there was believed to be a national shortage. The CfWI analysed the responses to the call for evidence, along with its own secondary research, and used them to inform its response to us.

3.7 Because of its collation of responses from health sector employers across England and because it provides good quality data to support its nominations, we pay particular attention to the evidence from the CfWI. Using their data, the CfWI estimated the size of any shortage for each job title that they reviewed. In this report, we have used these estimates only if they were sufficiently set in context, otherwise it did not seem appropriate to include these figures.

3.8 We compare this with evidence received by the MAC from other parties such as the British Medical Association, the Royal Colleges, NHS Foundation Trusts, health trade unions and other health and care providers. In addition to the evidence we received from Scotland (which we consider in Chapter 7), we also considered responses in relation to Wales and Northern Ireland.

3.9 Since the last iteration of this MAC report, the government has outlined a number of wider reforms to the health sector. Notably, the introduction of the Health and Social Care Act, which gives more responsibility to GPs and other clinicians for spending the health budget in England, whilst also promoting increased competition between the public and private sectors.

## 3.3 Job titles, occupations and grades within the National Health Service

3.10 The evidence that we received from partners across the health service relates to a wide variety of job titles and occupations, but also to grades within these jobs and occupations. This level of granularity in the evidence is necessary for our assessment of shortage, but requires further explanation.

3.11 In this section, therefore, we briefly describe what we understand as meant by the various categories that we were asked to consider. We are

not health professionals and our description should not be taken as definitive but rather as a helpful illustration for the general reader.

## Consultants and doctors

3.12 Consultants lead teams of doctors and specialise in particular areas of medicine such as radiology or paediatrics. It takes at least 8 years from starting foundation training to become a consultant. The training grades that lead to a consultant post are in Table 3.1.

| Table 3.1: Medical specialty grades |
|---|
| Medical undergraduate |
| Foundation year 1 (previously known as House Officer) |
| Foundation year 2 (previously known as Senior House Officer) |
| Specialty Registrar (StR) 1 |
| StR 2 |
| StR 3 |
| StR 4 |
| StR 5 |
| StR 6 |
| Consultant |

3.13 Doctors who are training to become consultants undergo specialist training in the relevant specialty where they are known as Specialty Registrars (StR). Each level they attain is that of a different specialist training (ST) grade. Thus, the evidence from CfWI may discuss consultants in obstetrics at ST 4 level. These are doctors being trained in obstetrics who have reached level 4 (out of 6) of their training. Those doctors who successfully complete their specialist training are awarded a Certificate of Completion Training (CCT) to allow them to become consultants.

3.14 Some specialities, such as medicine or surgery, will begin with core training (CT) lasting for two years, or three years in certain areas, such as emergency medicine, paediatrics and psychiatry (although in the latter, they are referred to as psychiatry core trainees (CPT)). Progression through the ST grades is based on the achievement of competencies and will, on average, take approximately three years of training for general practice, and five to seven years for other specialties. The exact length of training will therefore depend upon the career area or specialty in which a doctor wishes to work and the rate of achievement of competencies.

3.15 We also received evidence pertaining to non-consultant, non-training specialty (NCNT) roles. These are doctors who are not fully-qualified consultants or GPs in posts within specialties that are outside of a specialty training programme. These roles may be known under the title of Specialty and Associate Specialist (SAS) Doctors and they comprise: staff grade doctors, specialty doctors and associate specialists. A doctor who has not completed a specialist training programme in the UK or equivalent in another country can apply to enter the specialist register on the basis of previous clinical experience.

3.16 In this chapter we also make reference to something called fill rates in relation to some job titles and occupations. Fill rates are the ratio of actual shifts or hours by staff to the number of planned shifts or hours. They therefore provide a measure of whether there are sufficient staff available.

3.17 We have focussed here on those jobs for which we received evidence, and we do not describe other medical professions and grades. In section 3.5 we discuss the occupations for which we received evidence, linking each occupation and job title with the most appropriate Standard Occupational Classification (SOC) 2010 code. Unless otherwise stated, all of the occupations and job titles discussed pass our skilled criterion. We therefore focus mainly on the evidence in relation to our shortage and sensible criteria.

## 3.4 Current use of Tier 2

3.18 In considering the addition and removal of certain job titles in the health sector to the shortage occupation list, it is helpful to consider the current use of the Tier 2 route.

3.19 Table 3.2 below shows that the majority of applicants in the health sector are applying through the Tier 2 Resident Labour Marker Test (RLMT) route. The main occupations coming in are medical practitioners (47 per cent) and nurses (34 per cent). There is very low usage of the intra-company transfer (ICT) route in the health sector.

**Table 3.2: Certificate of sponsorship applications in health-related occupations, Year ending September 2014**

| SOC | Occupation | SOL | RLMT | ICT ST | ICT LT | *Total* | *%* |
|---|---|---|---|---|---|---|---|
| 2112 | Biological scientists and biochemists | 8 | 220 | 7 | 4 | *239* | *3* |
| 2211 | Medical practitioners | 709 | 2603 | 7 | 2 | *3321* | *47* |
| 2212 | Psychologists | - | 19 | 7 | 2 | *28* | *0* |
| 2213 | Pharmacists | - | 378 | - | - | *378* | *5* |
| 2214 | Ophthalmic opticians | - | 36 | - | - | *36* | *1* |
| 2215 | Dental practitioners | - | 34 | - | - | *34* | *0* |
| 2216 | Veterinarians | - | 36 | - | - | *36* | *1* |
| 2217 | Medical radiographers | 143 | 10 | - | - | *153* | *2* |
| 2218 | Podiatrists | - | 1 | - | - | *1* | *0* |
| 2219 | Health professionals n.e.c | - | 131 | - | 1 | *132* | *2* |
| 2221 | Physiotherapists | - | 123 | - | - | *123* | *2* |
| 2222 | Occupational therapists | - | 53 | - | - | *53* | *1* |
| 2223 | Speech and language therapists | - | 9 | - | - | *9* | *0* |
| 2229 | Therapy professionals n.e.c. | - | 102 | - | 2 | *104* | *1* |
| 2231 | Nurses | 54 | 2387 | - | 1 | *2442* | *34* |
| 2232 | Midwives | | 2 | - | - | *2* | 0 |
| 3213 | Paramedics | - | - | - | - | *0* | 0 |
| 3216 | Dispensing opticians | - | - | - | - | *0* | *0* |
| 3217 | Pharmaceutical technicians | - | - | - | - | *0* | *0* |
| 3218 | Medical and dental technicians | 9 | - | - | - | *9* | *0* |
| 3219 | Health associate professionals n.e.c. | - | - | - | - | *0* | *0* |
| | Total | 923 | 6144 | 21 | 12 | *7100* | *100* |

Source: UK Visas and Immigration Management Information, 2015 (Please see Annex B for caveats and detailed methodology).

3.20 Annex B provides a breakdown of the average age, salary and allowance as well as main nationalities under each route for health-related occupations.

## 3.5 Occupations we considered

3.21 We now examine all the jobs and occupations for which we received evidence and subsequently were asked to review. Each has been considered within its relevant SOC code.

## Medical Practitioners

### Box 3.1: Medical practitioners

**4-digit SOC 2010 Occupation: 2211 Medical practitioners**

**Only the following job titles within this occupation are presently included on the shortage occupation list:**

Consultants within the following specialities: emergency medicine, haematology and old age psychiatry.

Non-consultant, non-training, medical staff posts in the following specialities: anaesthetics, general medicine specialities delivering acute care services (intensive care medicine, general internal medicine (acute)), emergency medicine (including specialist doctors working in accident and emergency), rehabilitation medicine and psychiatry.

**Top-down data**

| **Shortage** | **Occupation passes 4 out of 10 available indicators** | | |
|---|---|---|---|
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | -1.04 | **V2:** Percentage change of employment level (over 1 year) | -2.97 |
| **P2:** Percentage change of median real pay (over 3 years) | -5.73 | **V3:** Percentage change of median paid hours worked (over 3 years) | 0.00 |
| **P3:** Return to occupation | 0.53 | **V4:** Change in new hires (over 1 year) | 0.52 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | 32.32 |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | 89.61 |
| **V1:** Percentage change of claimant count (over 1 year) | -50.15 | **E3:** Skill-shortage vacancies / employment | 0.30 |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 31.4% | Percentage of workforce trained in past 13 weeks | 63.0% |

**Total employment in this 4-digit occupation is approximately 237000 (average, LFS, 2013Q4-2014Q3)**

Partner evidence received from: CfWI, General Medical Council, College of Emergency Medicine, Health Education England, South Tees Hospitals NHS Foundation Trust, Hampshire Hospitals Foundation Trust, Guys and St Thomas NHS Trust, Royal College of Psychiatry, the Department for Health, Social Services and Public Safety Northern Ireland, British Medical Association

3.22 The occupation of medical practitioner passes 4 out of 10 top-down shortage indicators. However, this occupation covers a wide range of medical job titles and, therefore, the top down data will not be highly relevant to any particular job title.

3.23 For each of the specialties that we considered for the shortage occupation list, we received evidence relating to most of our indicators. This included information on, where available, headcount numbers, vacancy rates, retirement predictions and levels of trainees.

3.24 We were asked to consider the following medical practitioner roles for inclusion on the shortage occupation list.

## Consultant Roles

3.25 Consultants in the specialties discussed below were recommended by the CfWI for inclusion on the shortage occupation list.

3.26 **Clinical radiology**: this consultant specialty is not currently on the shortage occupation list. Based on recruitment and vacancy data from the Royal College of Radiologists (RCR) and discussion in a stakeholder workshop, the CfWI supplied an estimate of the current size of the shortage in consultants in clinical radiology in England. Available RCR data indicated that approximately 8 per cent of the 3,500 posts in the UK were unfilled in 2012, with some regional variation.

3.27 The number of consultant clinical radiologist vacancies in England far exceeds the number of relevant CCT holders and this gap is increasing. This shortfall means that vacancies cannot be filled by individuals from within the UK workforce. Some consultants in clinical radiology have been recruited from within the European Union (EU) but the available supply is limited. The General Medical Council (GMC) provided evidence of a viable source of such consultants from outside the European Economic Area (EEA).

3.28 We were told that the expanding choice of available imaging techniques and the increasing inherent intricacy of the examinations meant that the workload for clinical radiologists was growing not only in volume but also complexity. Mechanisms are in place to relieve pressure on the workforce but the lengthy training period necessary for this specialty occupation prevents any of them from providing a quick source of relief. CfWI estimate that it will take at least six years to generate sufficient consultants. **We therefore recommend adding clinical radiology consultants to the shortage occupation list** until these mechanisms begin to take effect.

3.29 **Emergency medicine:** consultant in emergency medicine is currently on the shortage occupation list along with non-consultant, non-training roles in this specialty. The CfWI are suggesting the retention of these roles on the list plus the addition of CT3 and ST4 to ST7 trainee roles. The CfWI, in consultation with the College of Emergency Medicine (CEM), provided an estimate of the size of the shortage in trainee emergency medicine specialists. Further evidence supporting shortage was provided by South Tees Hospitals NHS Foundation Trust, Hampshire Hospitals Foundation Trust, and Guys and St Thomas NHS Trust.

3.30 Recruitment into the initial training grades for this specialty was good with all CT1 places taken up and a national average ratio of 2.5 for the number of applications received to the number of available places. However, a high attrition rate means that trainees can encounter a drastic increase in workload as fill rates (see paragraph 3.16) decrease. We had evidence that by the time trainees were at ST4 level, the fill rate was only 40 per cent. Health Education England (HEE) outlined a number of proposals to counteract these high attrition rates but it was too early to determine the effectiveness of these. The CfWI again anticipated a shortage for five to six years. **We therefore recommend retaining consultant in emergency medicine and non-consultant, non-training roles in this specialty on the shortage occupation list and adding CT3 and ST4 to ST7 training roles to the list.**

3.31 **Old age psychiatry:** this consultant specialty is currently on the shortage occupation list. We were asked to consider retaining it on the list and adding non-consultant, non-training roles in this specialty.

3.32 The CfWI provided an estimate of the size of the national shortage of consultants and non-consultant, non-training roles in old age psychiatry. The proportion of the UK population aged 65 and older grew by almost 18 per cent between 2003 and 2013, three times faster than that of the general population in the same period. This demographic change has increased the demand for specialists in old age psychiatry and put increased pressure on the existing workforce.

3.33 Royal College of Psychiatry data from 2013 estimated a vacancy rate amongst old age psychiatry consultants of 7.6 per cent, with a significant increase in the proportion of the workforce retiring. Work by the Royal College aimed at increasing recruitment in core psychiatry training had proven effective at CPT1 level. However, this increase in recruitment had yet to filter through to the higher training grades and to consultants.

3.34 On the basis of the evidence received, **we recommend retaining consultant in old age psychiatry on the shortage occupation list and adding non-consultant, non-training roles in this specialty**. Although over 10 per cent of NHS psychiatrists were trained overseas, evidence from both the GMC and from Home Office management information data indicated that there is very little recruitment into this specialty from outside the EEA. Therefore, when we next review the full list we will consider whether the limited usage justifies the continued inclusion of this specialty on the list.

## Non-consultant, non-training medical roles

3.35 We were asked to consider a non-consultant, non-training role in **paediatrics** for inclusion on the shortage occupation list. As identified earlier, these are doctors who are not fully-qualified consultants or GPs in posts within specialties that are outside of a specialty training programme.

3.36 The paediatric specialty is not currently on the shortage occupation list. The CfWI used vacancy data from a 2013 census by the Royal College of Paediatrics and Child Health to estimate the size of the shortage.

3.37 Between 2003 and 2013, the number of SAS paediatric doctors in England fell by 38 per cent. This was stated to be due in part to an ageing workforce. We also received evidence from the Department for Health, Social Services and Public Safety Northern Ireland stating that there was a shortage in this specialty in Northern Ireland, along with similar comments from Hampshire Hospitals Foundation Trust and South Tees Hospitals NHS Foundation Trust.

3.38 The Royal College estimated that 45 per cent of the paediatric SAS workforce gained their primary medical qualification in a non-EEA country, corroborated by evidence from the GMC and the Home Office. The Royal

College is engaged in reconfiguring this specialty to address shortage issues. In the meanwhile, **we recommend the inclusion of non-consultant, non-training roles in paediatrics on the shortage occupation list** to help mitigate pressures in the short run.

### Other Medical Practitioner Roles

3.39 **Psychiatry core trainees:** this is not currently on the shortage occupation list, although non-consultant, non-training roles in psychiatry are. There are insufficient numbers of graduates choosing to specialise in this area. The CfWI conducted an in-depth review of this specialty in 2014 and recommended an increase in training numbers and incentives to boost graduate intake. Certificate of Sponsorship (CoS) data from the Home Office shows over 120 CoS issued from 2009 to 2014 with about 22 being issued in 2014 so far. But only five of the 120 CoS issued utilised the shortage occupation route. Therefore, the CfWI noted that it must be made clear that employers need to actively recruit core trainees from outside the EEA and use the SOL to do so. If this does not happen, then it would be sensible to remove this. On this basis, **we recommend the inclusion of psychiatry core trainees on the shortage occupation list at this time.**

### Medical Practitioner Roles recommended for removal from the shortage occupation list

3.40 We also received evidence from health sector partners in relation to a number of jobs presently on the shortage occupation list suggesting that these jobs should be removed from the list. Each is discussed in turn below.

3.41 **Haematology consultants:** in 2012, evidence provided to us suggested that the shortage in this specialty would only last another two years. In 2014, the Royal College of Pathology confirmed that there was no longer a national shortage of this occupation. South Tees Hospitals NHS Foundation Trust provided evidence indicating a regional shortage in this specialty. Overall, we were satisfied that there was insufficient evidence of a national shortage to support retaining this specialty on the shortage occupation list and **we therefore recommend that consultant in haematology be removed from the shortage occupation list**.

3.42 **Non-consultant, non-training medical roles in anaesthetics:** the CfWI stated that the fill rate for this occupation was around 99 per cent between 2011 and 2013 and that there was no evidence of a national shortage of this occupation. Data from the Health and Social Care Information Centre and from CfWI showed an increase in recruitment into this specialty. Against this, NHS trusts in both South Tees and Hampshire said they had experienced difficulty in recruiting anaesthetists. The Royal College of Anaesthetists stated that this specialty should remain on the shortage occupation list and queried the information about the high fill rates supplied to us. On the basis of the information we received, we consider that shortages in this specialty are occurring only at the local level, and not at the national level. **We therefore recommend removing non-**

**consultant, non-training roles in anaesthetics from the shortage occupation list**

3.43 **Non-consultant, non-training medical roles in psychiatry (excluding old age psychiatry):** this occupation is currently on the shortage occupation list. The CfWI stated that there was no conclusive evidence to indicate a national shortage in this occupation. We did receive evidence of regional shortages in North East England and Lincolnshire.

3.44 In 2011, the Royal College of Psychiatry set up a task force with the express aim of increasing recruitment into CT1 grades in psychiatry. The CfWI reported to us on the success of this initiative.

3.45 Home Office management information data showed that no CoS were issued between 2009 and 2014 under the shortage occupation list route for any of the psychiatry specialties. **We therefore recommend removing non-consultant, non-training medical roles in psychiatry (excluding old age psychiatry) from the shortage occupation list**.

3.46 **Non-consultant, non-training medical roles in rehabilitation medicine:** this occupation is currently on the shortage occupation list. We did not receive evidence of a national shortage within this specialty. Some partners did express concerns about difficulties in recruiting staff but these were again just from the North East of England. CfWI suggested that improving the attractiveness of this specialty would help to improve recruitment.

3.47 Data from the GMC indicated that the shortage route had been used to acquire on average one CoS per annum between 2011 and 2014. **We therefore recommend the removal of non-consultant, non-training medical roles in rehabilitation medicine from the shortage occupation list.**

3.48 **Non-consultant, non-training medical roles in general medical specialties delivering acute care services (general internal medicine (acute)):** this occupation is currently on the shortage occupation list. The CfWI stated that there is no conclusive evidence to suggest that there is a national shortage of this occupation. However, they did recognise a regional shortage problem in the North East, East Midlands, and in North West London. CfWI suggested that again this is a specialty which has a low attraction for recruits. **We recommend removing non-consultant, non-training medical roles in general medical specialties delivering acute care services (general internal medicine (acute)) from the shortage occupation list.**

## Medical Practitioner Roles not recommended for inclusion on the shortage occupation list

3.49 **General practitioner:** this job is not currently on the shortage occupation list. In terms of numbers employed, this is a large job title with some 60,000 licensed doctors on the GP register, not all of whom are

necessarily practising. CfWI provided evidence of estimated shortages of GPs from their stakeholder engagement with key partners such as the Royal College of General Practitioners. But the estimated annual shortage of 450 – 550 GPs supplied to us by the CfWI, while relatively large, represents only a small proportion of the total GP workforce.

3.50 We were told that the shortage of GPs was UK-wide but that there were particular regional difficulties in the North and East of England, where the shortage was said to be acute, and Wales, where target recruitment numbers are failing to be reached year on year. Moreover, the British Medical Association told us of the increasing number of vacancies at trainee level in Scotland over the last five years.

3.51 CfWI stated that the growth rate of the GP workforce had fallen below the national rate of population growth, making it impossible to keep up with the growing demand for GP services. Moreover, the high growth rate of the older population exceeded that of the GP workforce growth rate and it is this demographic factor which was exacerbating shortages.

3.52 In meetings with representatives from the health sector, we were told that the UK presently had a ratio of GPs per 1000 population (weighted for age) below the target 0.7 that is recommended by NHS England. These representatives noted that this shortfall has persisted for some time. The ratio peaked at 0.68 in 2009 but fell back to 0.64 by 2013. Furthermore, the CfWI notes that the gender balance in general practice has shifted due to a significant increase in the number of women becoming GPs. This so-called feminisation of the GP workforce necessitates an increase in the number of trainees in order to maintain the current full-time equivalent workforce, as women are more likely to work part-time, at least for some periods of their career

3.53 However, fill rates are high and there has been a modest increase in applications for GP training in the last two years. A number of partners told us that some 3,250 trainees per year were needed over the next five years just to maintain the workforce at present levels, a figure which is supported by the CfWI's recommendation of a 20 per cent increase in the number of accepted training offers for 2013-2014. However, other evidence we received indicated that these training places were available, but that there was not enough demand from graduates for these training programmes, as evidenced by the annual shortfall described in paragraph 3.49 above.

3.54 Partners told us that graduates were choosing to enrol on training programmes for surgery or hospital specialties rather than continuing down the path to general practice. We did see evidence of attempts to make general practice a more attractive option such as through positive marketing in conjunction with the Royal College of General Practitioners. An example of this is the recruitment drive films that address outdated views of the career, and community based placements. However, the effects of these initiatives are unlikely to come to fruition in the short run.

3.55 The General Medical Council estimated that there are approximately 20 workers per year joining the GP register from within the EEA. The CfWI reported that the absence of general practice as a specialty in many countries, combined with the requirement to meet language and NHS competency requirements reduced the impact of foreign recruitment on shortages.

3.56 We did not see any evidence suggesting that there is a shortage of medical students who could continue into general practice. Therefore, any shortage of GPs could potentially be overcome by changing the incentive structure of GPs compared with other medical roles, in order to encourage more take up on GP training programmes. Should the sector find that it continued to require additional GPs, these could be sourced from outside the EEA using the RLMT route. It seemed that the health service could do more to source recruits from within the EU not withstanding what was said about problems with language and competency requirements. We also had concerns about including on the shortage occupation list a job title covering such a large workforce without further means of restricting the numbers that could take advantage of this route. **We therefore do not recommend adding GPs to the shortage occupation list.**

3.57 **Acute medicine consultants:** we were told that while there are pockets of shortages within this specialty, these are regional rather than indicative of a national shortage. CfWI told us that between 2011 and 2012, the number of acute medicine consultants increased by 33 per cent, which was the fastest workforce expansion rate of all physician specialties and was in line with the rate of growth in demand for this specialty. **We therefore do not recommend adding acute medicine consultant to the shortage occupation list**.

3.58 **Dermatology consultants:** we received evidence from the North East of England and from Northern Ireland of shortages in this specialty. However, CfWI told us that there was not evidence of a national shortage. We saw evidence from other partners which indicated increases in the numbers of consultants coming into this specialty. **We therefore do not recommend adding consultants in dermatology to the shortage occupation list**.

3.59 **Gastroenterology (consultants and locum appointments for training):** three Trusts contacted us to state that they were experiencing a shortage of consultants in gastroenterology and also of locum appointments for training in this specialty. This latter group are comprised of doctors who are completing their foundation training and are looking to gain some experience before deciding in which area to specialise. The locum appointments for training are temporary posts where a trainee is assigned a supervisor to help plan for training opportunities within the post and also receives appropriate clinical supervision.

3.60 CfWI told us that there is insufficient evidence of a national shortage of this occupation. CfWI considered that if the average training time did not deviate from six years, there are sufficient trainees already in place to meet stated expansion targets for this specialty. The CfWI believe that this

workforce expansion will lead to a reduction in regional shortages. Initiatives were in place to increase the attractiveness of this specialty and the CfWI suggested re-examining this specialty once these initiatives had had time to have an impact. **Therefore, we do not recommend adding Gastroenterology (consultants and locum appointments for training) to the shortage occupation list**.

3.61 **Geriatric medicine consultants:** again, we received evidence which indicated a regional shortage in this specialty including the West and the North of England and in Northern Ireland. CfWI did not support the view that there was national shortage citing evidence of a national vacancy rate of just 1 per cent.

3.62 Data from the GMC indicated that only two non-EEA doctors had entered the UK and taken up this specialty. Similarly, Home Office management information showed 20 CoS issued for trainee and non-consultant, non-training roles in this specialty between 2011 and 2014, and no CoS issued for consultants in this same time period. **We therefore do not recommend adding geriatric medicine consultant to the shortage occupation list**.

3.63 **Ophthalmology non-consultant, non-training role:** one Trust responded to our call for evidence and stated that they were experiencing difficulties in recruiting middle grade doctors in this specialty. But we did not receive evidence of a wider shortage. We were told that the number of new CCT holders exceeded the number of available consultant posts in the UK and that we were currently a net exporter of consultants in this specialty. CfWI did not support the view that there was national shortage in the non-consultant, non-training role and we did not see evidence that countered this. **We therefore do not recommend adding non-consultant, non-training role in ophthalmology to the shortage occupation list.**

3.64 **Paediatric pathology consultant:** The Royal College of Pathology told us they considered that there was evidence of a national shortage in this specialty. In contrast, the CfWI said that data on the broader specialties of histopathology (the tissue diagnosis of disease) or pathology in general were not sufficient to provide conclusive evidence of a national shortage of paediatric pathology consultants.

3.65 One NHS Trust did state that they were experiencing difficulty in recruiting histopathology consultants, and modelling by CfWI indicated only a modest increase in the number of CCT holders in this specialty, resulting in a growth rate likely to be insufficient to match increasing patient demand. The Royal College of Pathologists told us they were looking at ways to increase the attractiveness of this specialty to address this low growth combined with an anticipated rise in retirements. CfWI suggested that this specialty be looked at again when the effectiveness of measures to improve recruitment can be considered. **We therefore do not recommend adding paediatric pathology consultant to the shortage occupation list.**

## Biological scientists and biochemists

| Box 3.2: Biological scientists and biochemists | | | |
|---|---|---|---|
| **4-digit SOC 2010 Occupation:** | **2112 Biological scientists and biochemists** | | |
| **Only the following job titles within this occupation are presently included on the shortage occupation list:** | | | |
| Clinical neurophysiologist | | | |
| **Top-down data** | | | |
| **Shortage** | **Occupation passes 2 out of 7 available indicators** | | |
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | -1.14 | **V2:** Percentage change of employment level (over 1 year) | 36.50 |
| **P2:** Percentage change of median real pay (over 3 years) | -7.22 | **V3:** Percentage change of median paid hours worked (over 3 years) | 0.00 |
| **P3:** Return to occupation | 0.19 | **V4:** Change in new hires (over 1 year) | -1.29 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | - |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | - |
| **V1:** Percentage change of claimant count (over 1 year) | -17.13 | **E3:** Skill-shortage vacancies / employment | - |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 16.6% | Percentage of workforce trained in past 13 weeks | 32.8% |
| **Total employment in this 4-digit occupation is approximately 98000 (average, LFS, 2013Q4-2014Q3)** | | | |
| Partner evidence received from: CfWI | | | |
| Notes: (-) for some indicators, values are not reported due to small sample sizes. | | | |

3.66 The occupation of biological scientist and biochemist passes 2 out of 7 top-down shortage indicators. However, this occupation covers a wide range of medical job titles and, therefore, the top down data will not be highly relevant to any particular job title. **Biological scientists and biochemists are <u>not</u> recommended for inclusion on the shortage occupation list**

3.67 **Cardiac physiologists:** we received evidence that the numbers of cardiac physiologists due to retire was outweighed by the number of trainees due to complete their courses and that overall there was a low vacancy rate within this job title. We receive evidence from one NHS Trust in London reporting difficulties in recruiting cardiac physiologists but CfWI said that this was evidence of a regional rather than a national shortage. **We therefore do not recommend adding cardiac physiologist to the shortage occupation list.**

3.68 **Sleep physiologists:** this job title was taken off the shortage occupation list in 2013 as there was insufficient evidence of a national shortage. CfWI said that they had not received any evidence to indicate that there was a national shortage in this job title.

3.69 CfWI did receive evidence from the British Sleep Society (BSS), which stated that vacancies were not being filled due to insufficient sleep physiologists being trained in the UK. CfWI did not receive further evidence of shortage but did receive evidence that the number of sleep physiologists entering the profession would match the number of expected retirements until 2016. **Therefore, we do not recommend adding sleep physiologist to the shortage occupation list**.

## Health Professionals n.e.c.

**Box 3.3: Health professionals n.e.c.**

| | | | |
|---|---|---|---|
| **4-digit SOC 2010 Occupation:** | **2219 Health professionals n.e.c.** | | |
| **Only the following job titles within this occupation are presently included on the recommended shortage occupation list:** | | | |
| This occupation is not included on the shortage occupation list. | | | |
| **Top-down data** | | | |
| **Shortage** | **Occupation passes 2 out of 7 available indicators** | | |
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | -2.33 | **V2:** Percentage change of employment level (over 1 year) | 3.14 |
| **P2:** Percentage change of median real pay (over 3 years) | -3.72 | **V3:** Percentage change of median paid hours worked (over 3 years) | 0.00 |
| **P3:** Return to occupation | 0.12 | **V4:** Change in new hires (over 1 year) | -0.52 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | - |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | - |
| **V1:** Percentage change of claimant count (over 1 year) | -55.13 | **E3:** Skill-shortage vacancies / employment | - |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 6.8% | Percentage of workforce trained in past 13 weeks | 47.2% |
| **Total employment in this 4-digit occupation is approximately 46000 (average, LFS, 2013Q4-2014Q3)** | | | |
| Partner evidence received from: CfWI | | | |
| Notes: see box 3.2 notes | | | |

## Healthcare science staff working in nuclear medicine and in radiotherapy physics

3.70 We were asked to look at a number of related roles in the fields of nuclear medicine and radiotherapy physics. In nuclear medicine we were asked to look at two grades of healthcare science staff working in the field of nuclear medicine, namely nuclear medicine scientist and nuclear medicine practitioner. In radiotherapy physics, we were asked to look at radiotherapy physics scientist and radiotherapy physics practitioner. The nuclear medicine scientist role is considered here and the other roles are considered under SOC 2217.

3.71 **Nuclear medicine scientist:** nuclear medicine is the use of radioactive substances to help diagnose and treat patients. Healthcare science staff working in the field of nuclear medicine are engaged in administering radio-labelled pharmaceuticals to patients and then taking images and measurements using highly sophisticated equipment. They are responsible for ensuring the safety of the patient and staff during all aspects of the process and are involved in interpreting results, working as part of a team which will include other healthcare science staff working in physical science and biomedical engineering, doctors specialising in nuclear medicine and radiology and specialist nurses.

3.72 There is currently one entry point into the area of healthcare science which is by beginning as a healthcare science practitioner on the NHS Practitioner Training Programme (PTP) taking an accredited BSc degree in Healthcare Science (Nuclear Medicine) or a Graduate Diploma in Healthcare Science for those with a first degree in physics. Many healthcare science roles require registration with the Health and Care Professions Council. For registration as a clinical scientist, individuals must hold an Academy for Healthcare Science (AHCS) Certificate of Attainment granted upon completion of the MSC Scientist Training Programme or AHCS Certificate of Equivalence.

3.73 AHCS describe healthcare science as a broad term encompassing a highly diverse, highly trained scientific workforce practising alongside doctors, nurses, and other health and social care professionals in the delivery of healthcare. Healthcare science falls into four broad and overlapping areas, or divisions in AHCS' terminology. These are:

- Life sciences – an understanding of the processes and components of life;
- Physical sciences and biomedical engineering – an understanding of physics (including radiation) and engineering;
- Physiological sciences – an understanding of the human body's structure, systems, and functions;
- Bioinformatics – data, analysis and information management.

3.74 Healthcare science staff working in the area of nuclear medicine fall into the physical sciences division. As a result of this, the job title of nuclear scientist has been included on the shortage occupation list under SOC 2113 Physical scientist. It seems to us that this SOC coding is incorrect as SOC 2113 mostly consists of job titles in the field of geology.

## Box 3.4: Physical scientists

**4-digit SOC 2010 Occupation: 2113 Physical scientists**

**Only the following job titles within this occupation are presently included on the shortage occupation list:**

the following jobs in the construction-related ground engineering industry:

- engineering geologist
- hydrogeologist
- geophysicist

the following jobs in the oil and gas industry:

- geophysicist
- geoscientist
- geologist
- geochemist

technical services manager in the decommissioning and waste areas of the nuclear industry
nuclear medicine scientist, radiotherapy physicist.
senior resource geologist and staff geologist in the mining sector

### Top-down data

| **Shortage** | **Occupation passes 1 out of 7 available indicators** | | |
|---|---|---|---|
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | -4.65 | **V2:** Percentage change of employment level (over 1 year) | 2.08 |
| **P2:** Percentage change of median real pay (over 3 years) | -6.94 | **V3:** Percentage change of median paid hours worked (over 3 years) | 0.00 |
| **P3:** Return to occupation | 0.18 | **V4:** Change in new hires (over 1 year) | -13.31 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | - |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | - |
| **V1:** Percentage change of claimant count (over 1 year) | 36.90 | **E3:** Skill-shortage vacancies / employment | - |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 10.3% | Percentage of workforce trained in past 13 weeks | 38.0% |

**Total employment in this 4-digit occupation is approximately 26000 (average, LFS, 2013Q4-2014Q3)**

Partner evidence received from: CfWI

Notes: see box 3.2 notes

3.75 For the sake of completeness, we have included here the top-down data for the 2113 SOC code. We did not receive any advice from partners suggesting which SOC codes might be a better fit for these job titles and the field of nuclear medicine is not covered by SOC 2010. The Office for National Statistics (ONS) stated that in their view nuclear medicine scientist should sit within SOC 2219 Health Professionals n.e.c.

3.76 We now move on to consider the evidence we received in relation to the nuclear medicine scientist job. CfWI drew on evidence from partners such as the Institute of Physics and Engineering in Medicine to show that courses in this specialty had been experiencing a low take-up rate and this

trend was continuing. Stakeholders reported to CfWI a distinct difficulty in the recruitment of scientists in medical physics. Based on stakeholder engagement with key partners such as the Institute of Physics and Engineering in Medicine, the CfWI estimated that there was a shortage of approximately 100 nuclear medicine scientists and practitioners combined. There were only 5 admissions on to courses for this specialty in 2014, down from 11 in 2012. Health Education England indicated that the low attractiveness of these courses had still not been addressed. Furthermore, evidence collated by the CfWI from the Institute of Physics and Engineering in Medicine and from healthcare providers indicated that there was a distinct difficulty in the recruitment of scientists in medical physics. The CfWI reported that the factors cited as impacting on this included changes in funding, new national programmes and the existing national shortage. **We therefore recommend retaining nuclear medicine scientist on the shortage occupation list but under SOC 2219**.

3.77 **Neurophysiology practitioners:** this job is currently on the shortage occupation list as clinical neurophysiologist under SOC 2112. ONS stated that they think it should be coded under SOC 2219.

3.78 CfWI told us that there was a gap in student intake to train as neurophysiology practitioners of 3 years up to 2012 as a result of the introduction of the Modernising Scientific Careers programme. This programme was a UK-wide education and training strategy for the whole healthcare science workforce in the NHS and associated bodies intended to introduce a clear and coherent career pathway and structure for the healthcare science workforce. This gap in the intake had resulted in a shortage of neurophysiology practitioners across all geographical regions. We received evidence which indicated that the predicted number of graduates will not be sufficient to maintain the current workforce. **Therefore, we recommend that neurophysiology practitioner be retained on the shortage occupation list under 2219**.

3.79 **Neurophysiology healthcare scientists:** this job is presently on the shortage occupation list as clinical neurophysiologist under SOC 2112. Again, ONS stated that they think it should be coded under SOC 2219.

3.80 CfWI expressed concerns to us that the level of this workforce cannot be maintained. Although there was evidence of a recent growth in the size of the workforce, the current level of students coming through the relevant courses indicated that there would continue to be a shortfall. The evidence indicated that the numbers entering onto courses will not reach an optimum level until this year and that it will take a further three years before they become qualified. **We therefore recommend retaining neurophysiology healthcare scientists on the shortage occupation list under 2219.**

## Medical Radiographer

| Box 3.5: Medical radiographer | | | |
|---|---|---|---|
| **4-digit SOC 2010 Occupation:** | **2217 Medical radiographer** | | |
| **Only the following job titles within this occupation are presently included on the shortage occupation list:** | | | |
| HPC registered diagnostic radiographer, HPC registered therapeutic radiographer and sonographer. | | | |
| **Top-down data** | | | |
| **Shortage** | **Occupation passes 3 out of 7 available indicators** | | |
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | -2.87 | **V2:** Percentage change of employment level (over 1 year) | -12.39 |
| **P2:** Percentage change of median real pay (over 3 years) | -14.56 | **V3:** Percentage change of median paid hours worked (over 3 years) | 1.08 |
| **P3:** Return to occupation | 0.24 | **V4:** Change in new hires (over 1 year) | 0.38 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | - |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | - |
| **V1:** Percentage change of claimant count (over 1 year) | -61.54 | **E3:** Skill-shortage vacancies / employment | - |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 11.5% | Percentage of workforce trained in past 13 weeks | 47.1% |
| **Total employment in this 4-digit occupation is approximately 22000 (average, LFS, 2013Q4-2014Q3)** | | | |
| Partner evidence received from: CfWI, Guys and St Thomas NHS Trust, Society and College of Radiographers | | | |
| Notes: see box 3.2 notes | | | |

3.81 The occupation of medical radiographers passes 3 out of 7 top-down shortage indicators. However, this occupation covers a range of medical job titles and, therefore, the top down data will not be highly relevant to any particular job title.

## Healthcare science staff in nuclear medicine and in radiotherapy physics

3.82 **Nuclear medicine practitioner:** the job title of nuclear medicine practitioner is a renaming of nuclear medicine technologist which appears on the shortage occupation list under SOC 3218 Medical and Dental Technician. However, we are not content with its present allocation to SOC 3218 because entry to the job requires a bachelors degree would therefore belong in a higher skill grouping than the technicians. We suspect that this rests on a category mistake of assuming that the term technologist means the same as technician. ONS said that a better fit for this job would be SOC 2217 Medical Radiographers.

| Box 3.6: Medical and Dental Technicians | | | |
|---|---|---|---|
| **4-digit SOC 2010 Occupation:** | **3218 Medical and dental technicians** | | |
| **Only the following job titles within this occupation are included on our recommended shortage occupation list:** | | | |
| #N/A | | | |
| **Top-down data** | | | |
| **Shortage** | **Occupation passes 5 out of 6 available indicators** | | |
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | 2.75 | **V2:** Percentage change of employment level (over 1 year) | 18.01 |
| **P2:** Percentage change of median real pay (over 3 years) | 4.23 | **V3:** Percentage change of median paid hours worked (over 3 years) | 0.00 |
| **P3:** Return to occupation | | **V4:** Change in new hires (over 1 year) | -0.75 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | - |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | - |
| **V1:** Percentage change of claimant count (over 1 year) | -60.00 | **E3:** Skill-shortage vacancies / employment | - |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 11.3% | Percentage of workforce trained in past 13 weeks | 39.6% |
| **Total employment in this 4-digit occupation is approximately 47000 (average, LFS, 2013Q4-2014Q3)** | | | |
| Partner evidence received from: CfWI | | | |
| Notes: see box 3.2 notes | | | |

3.83 For completeness, the top-down data in relation to the 3218 SOC that this job title previously featured under is set out in Box 3.3 above.

3.84 CfWI estimated that there is a shortage of approximately 100 nuclear medicine scientists and practitioners combined, which is a figure based on stakeholder engagement with key partners such as the Institute of Physics and Engineering in Medicine.

*"Advances in drug radio-labelling and delivery systems have extended the range of conditions that can be treated by nuclear medicine. This, together with the expanding role of nuclear cardiology studies in coronary heart disease, the rising importance of positron emission tomography scans in cancer staging, and the delivery of sentinel node imaging in patients with breast cancer and melanoma, will increase demand for nuclear medicine scientists."*

CfWI response to the MAC call for evidence

3.85 Health Education England data showed that there were expected to be 21 graduates between 2014 and 2018, but that this was insufficient to maintain the current workforce when 95 people are expected to retire from the occupation between 2012 and 2016. This shortage of nuclear medicine practitioners could potentially impact on the nuclear medicine scientist workforce if the latter are forced to pick up the slack caused by this shortage. To mitigate this problem, Health Education England had introduced a fast-track diploma to produce practitioners, which aimed to bring an additional 15 graduates to the workforce each year from 2014. However, the effectiveness of this scheme has yet to be determined.

3.86 The Institute of Physics and Engineering in Medicine evidence indicated that recruitment in both the UK and the EU has been ineffective at mitigating the shortage, which leads to recruitment mainly from Australia and the Philippines. Home Office data does not distinguish between this occupation and that of nuclear medicine scientists. However, between these two occupations, 35 non-EEA workers gained CoS between 2009 and 2013. 80 per cent of these have come through the SOL route, indicating that inclusion on the SOL has been, and would likely continue to be, beneficial to this workforce. **Therefore, we recommend retaining nuclear medicine practitioner on the shortage occupation list under SOC 2217 and removing nuclear medicine technologist from the list**.

3.87 **Radiotherapy physics scientists:** the position of radiotherapy physics scientist is similar to that of nuclear medicine scientist in that it is currently on the shortage occupation list, under the job title radiotherapy physicist, but under the 2113 Physical Scientist SOC code. This SOC does contain the job title of physicist but we consider that this is again a category mistake as this seems a different type of job to that of a radiotherapy physics scientist. The ONS consider that this should be placed under SOC 2217. Again, the evidence we received discussed the job titles of radiotherapy physics scientist and radiotherapy physics practitioner as different grades within radiotherapy physics.

3.88 Radiotherapy is the treatment of cancer with high-energy radiation such as X-rays. Staff working in radiotherapy physics are responsible for the precision and accuracy of treatments using advanced computer calculations to develop individual patient treatment plans. They are responsible for ensuring that equipment used in radiotherapy is calibrated precisely and used safely and ensuring the imaging equipment used during treatment allows the Radiotherapy team to update the treatment plan during a course of treatment.

3.89 There are three entry points into radiotherapy physics. Staff can start as a healthcare science practitioner through the NHS Practitioner Training Programme by taking an accredited BSc degree in Healthcare Science (Radiotherapy Physics). Persons with a first degree in physics can also enter the Practitioner Training Programme through the Graduate Diploma in Healthcare Science.

3.90 Entry into this profession is possible as a healthcare scientist, after a relevant degree, through the graduate-entry NHS Scientist Training Programme. Alternatively, entry is possible as a consultant healthcare scientist, after gaining postgraduate qualifications and/or considerable relevant experience through Higher Specialist Scientific Training.

3.91 CfWI estimated that the size of the shortage for radiotherapy physics scientist was 60, a figure they estimated in consultation with the Institute of Physics and Engineering in Medicine during stakeholder engagement. CfWI said that the demand for imaging services was being driven by national strategies introduced by the Department for Health, with particular emphasis on the strategies for strokes and cancer.

*"The development and improvement of new radiotherapy technologies, such as intensity modulated radiotherapy (IMRT) and proton therapy, will shape future radiotherapy provision."*

CfWI response to MAC call for evidence

3.92 The increased pressure on the workforce that could be caused by the introduction of new technologies and techniques was unlikely to be alleviated by graduates entering the occupation. Until 2016 there will be no graduates from Practitioner Training Programme courses and the fast track graduate diploma initiative was unlikely to produce sufficient numbers of graduates to maintain the current workforce. **Therefore, we recommend retaining radiotherapy physics scientists on the shortage occupation list under SOC 2217**.

3.93 **Radiotherapy physics practitioner:** we also received evidence in relation to radiotherapy physics practitioners. This is a renaming of radiotherapy technologist which appears on the shortage occupation list under SOC 3218 Medical and Dental Technician. However, as with nuclear medicine practitioners, we are not content with its present allocation to SOC 3218 because entry to the job requires a bachelors degree and would therefore belong in a higher skill grouping than the technicians. We suspect that this rests on a category mistake of assuming that the term technologist means the same as technician. ONS said that a better fit for this job would be SOC 2217 Medical Radiographers.

3.94 Box 3.6 above shows the top-data for SOC 2219 and Box 3.3 does the same for SOC 3218, and is included here for completeness. CfWI estimated that the shortage was approximately 50, and assessed with the Institute of Physics and Engineering in Medicine during stakeholder engagement. South Tees Hospitals NHS Foundation Trust provided evidence to the effect that they were experiencing difficulties in recruiting radiotherapy technologists and dosimetrists (who determine how to deliver the prescribed radiation dose).

3.95 As previously mentioned, innovation in health technologies, especially in radiotherapy techniques, is changing the nature of the workforce. The increased pressure on the workforce that could be caused by the introduction of new technologies and techniques is unlikely to be alleviated by graduates entering the occupation. Until 2016, there will be no graduates from PTP courses, and the fast track graduate diploma initiative is unlikely to produce sufficient numbers of graduates to maintain the current workforce. Unlike the relevant courses for scientists, radiotherapy physics practitioner courses seem to be less attractive than other courses, which Health Education England believed was holding back national recruitment.

3.96 Home Office data showed that between 2009 and 2013, there were 20 CoS issued for radiotherapy scientists and practitioners combined, the majority of which came from India. 86 per cent of these CoS are issued through the shortage route, indicating that there is a small viable non-EEA supply that is more readily accessible due to inclusion on the shortage occupation list. **We therefore recommend retaining radiotherapy physics practitioner on the shortage occupation list under SOC 2217 and removing radiotherapy technologist from the list.**

### Medical radiographers recommended for retention on the shortage occupation list

3.97 **HPC registered diagnostic radiographers:** this job title is currently on the shortage occupation list. We saw evidence from the Society and College of Radiographers and other partners of the current average vacancy rate for this workforce, along with concerns that some partners expressed about the increased demand for qualified radiographers to match the needs of the national breast screening programme. Partners expressed their fear that this could cause a significant shortage of registered diagnostic radiographers over the next few years.

3.98 Home Office management information showed a regular number of CoS issued each year to non-EEA diagnostic radiographers, and CfWI stated that there was a surplus of diagnostic radiographers in Canada and Australia. **We therefore recommend that HPC registered diagnostic radiographer be retained on the shortage occupation list.**

3.99 **Sonographer:** this job title is currently on the shortage occupation list. We were told that the shortage of diagnostic radiographers described in the previous section impacted directly on the sonographer workforce. Most sonographers first train as diagnostic radiographers, an occupation that has its own inherent shortage. CfWI told us that the stretched diagnostic radiography workforce resulted in a knock-on effect of fewer staff available to become sonographers. The Society and College of Radiographers conducted a workforce survey analysis in 2014, which showed a 7 percentage point rise in the vacancy rate since 2011 to reach 18 per cent. We also received evidence from a NHS Trust which supported there being a shortage within this job title and evidence of an increase of almost 14 per cent in the number of patients waiting for non-obstetric ultrasound

diagnostic tests between August 2013 and August 2014. The suggestion that this was caused by the use of sonography in newer areas of medicine, and has served to increase the pressures on this workforce.

3.100 Home Office management information showed that between 2009 and 2013 there was a steady annual number of CoS issued for sonographers under the shortage occupation list route. **We therefore recommend retaining sonographer on the shortage occupation list.**

### Medical Radiographer roles recommended for removal from the shortage occupation list

3.101 **HPC registered therapeutic radiographer:** data from the Society and College of Radiographers indicated that the therapeutic radiography workforce of the UK increased by 3.7 per cent between 2011 and 2013. Moreover, the Society stated that the predicted training output for 2015 exceeds the predicted workforce attrition including retirements.

3.102 We were told that the most important reason for having therapeutic radiographer on the shortage occupation list was that this helped to mitigate the shortage of clinical technologists with radiotherapy. However, we have recommended having radiotherapy physics scientists and practitioners on the list, which will alleviate that problem directly. **We therefore recommend removing HPC registered therapeutic radiographer from the shortage occupation list.**

### Paramedics

3.103 The occupation of paramedics passes 1 out of 6 top-down shortage indicators which is not indicative of shortage. In this analysis, the total employment of paramedics is estimated at 22,000 by the Labour Force Survey, as shown in the table above. However, representatives from the health sector told the MAC that this figure was actually significantly lower than this, and they suggested that the size of the ambulance service paramedic workforce is closer to 12,500 for England.

3.104 Previously the occupation of paramedic was not skilled to level NQF6. However, as a result of their research and review of the paramedic workforce, Health Education England is introducing a Bachelor of Science degree qualification for paramedics along with a requirement that new entrants to this occupation hold this qualification. We therefore consider that paramedics now meet the NQF6 and above skill threshold, and consequently recommend that this occupation be added to the list of NQF6 occupations for the purposes of the Points Based System.

## Box 3.7: Paramedics

| | |
|---|---|
| **4-digit SOC 2010 Occupation:** | **3213 Paramedic** |
| **Only the following job titles within this occupation are presently included on the shortage occupation list:** | |
| This occupation is not included on the current shortage occupation list. | |

**Top-down data**

| **Shortage** | **Occupation passes 1 out of 6 available indicators** | | |
|---|---|---|---|
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | -3.79 | **V2:** Percentage change of employment level (over 1 year) | -21.90 |
| **P2:** Percentage change of median real pay (over 3 years) | -7.72 | **V3:** Percentage change of median paid hours worked (over 3 years) | -1.54 |
| **P3:** Return to occupation | 0.05 | **V4:** Change in new hires (over 1 year) | - |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | - |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | - |
| **V1:** Percentage change of claimant count (over 1 year) | -50.00 | **E3:** Skill-shortage vacancies / employment | - |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 0.0% | Percentage of workforce trained in past 13 weeks | 52.1% |
| **Total employment in this 4-digit occupation is approximately 22000 (average, LFS, 2013Q4-2014Q3)** | | | |
| Partner evidence received from: CfWI, London Ambulance Service, Health Education England, Department of Health | | | |
| Notes: see box 3.2 notes | | | |

3.105 Our top-down data did not indicate a shortage of paramedics. However, given the current public sector pay restraints and other factors affecting the paramedics as outlined below, we do not believe that the figures provided by the top-down indicators are representative of the paramedic workforce. As such, in this iteration of the report, we do not attach significant weight to the top-down indicators. We received evidence from CfWI which stated that there was a national level shortage of this occupation. CfWI identified a number of factors which were driving this, namely:

- significant increases in demand for ambulance services;
- high staff attrition due to work pressures, stress and poor management;
- attractiveness of the role within Trusts;
- paramedics being lost to other areas, such as the 111 service, GP practices, walk-in centres, and DWP assessment work.

3.106 CfWI cited evidence that they had received from the London Ambulance Service, Health Education England and South Central Ambulance NHS

Foundation Trust. The London Ambulance Service provided data showing 1,251 paramedic vacancies in England in 2014, around ten per cent of the total workforce. Significant vacancy levels were recorded in Yorkshire (30), South East Coast (205), North East (131), West Midlands (100), North West (45), South Central (250), South Western (60) and London (430). These shortages of staff were relatively recent and were predicted to last for up to four years. The TUC also provided evidence to support the view that there exists a shortage of paramedics. They stated that NHS trade unions found that 85 per cent of ambulance staff reported shortages occurring on a frequent basis over the previous 12 months.

3.107 CfWI said that data from the College of Paramedics showed that whilst training posts on courses have been consistently filled, the demand for paramedics has been increasing and the supply has not kept pace with this. This was in part due to a reduction in the number of training posts between 2008 and 2010.

3.108 We were told that the workload of existing paramedic staff had been increasing. Attendances to accident and emergency departments, minor injury units and walk-in centres (where paramedics are now also employed) combined rose by over 50 per cent from 2001 to 2011. The CfWI reported that overall the workload for paramedics had increased by 7 per cent each year since 2000, and they expected this to continue. An ageing demographic in the wider population accounted for a large proportion of call-outs. For instance, the Office for National Statistics predicted an increase in the number of people aged over 65 and over 85 by 25 per cent and 42 per cent respectively over the next 10 years.

3.109 We were not wholly convinced by the written evidence we received on skill levels and shortages within this occupation and sought a meeting with the Department of Health, CfWI, Health Education England and representatives from the London Ambulance Service to further discuss the available evidence. At this meeting we were told that paramedics in London were currently operating at a 95 per cent utilisation rate compared with a recommended utilisation rate of no more than 75 per cent. This meant that paramedics had far less time for turnaround in-between call outs with potential repercussions on their effectiveness, and had insufficient slack in the system to deal comprehensively with major incidents.

3.110 Combined with an increase in the volume of work, there is evidence to show that the nature of the work itself is changing. Representatives of the London Ambulance Service, Health Education England and CfWI all pointed to an increased demand for what were termed hear-and-treat skills. This involved paramedics taking telephone calls from potential patients, considering a diagnosis, and then providing recommendations for further action (e.g. suggesting that the patient see a GP, or seek admission to a hospital). This new addition to the paramedic skill set had made them desirable outside of the ambulance service. We were told that some paramedics are leaving the ambulance service to take up posts with the 111 service and in GP practices, where they go out on house calls on

behalf of GPs. We were told that this had more to do with work tasks and hours than pay. Working hours at a GP practice were typically more stable and required less physical labour than in the ambulance service and that this was of particular attraction to older paramedics.

3.111 Initiatives are in place to increase the supply of paramedics within the UK while the ambulance service waits for the new NQF6 qualified cohort to graduate, as discussed in paragraph 3.102. For example, the Workforce Plan for England produced by Health Education England led to a 30 per cent increase in the number of training places to 853 available in 2014-2015 over those available in the 2013-2014 period, which will include a number of two-year foundation training programmes. However, the effect of this will not be seen until at least 2017, and those that complete this type of training would be skilled to a level below NQF6.

3.112 Representatives of the London Ambulance Service told us that they had produced targeted advertising campaigns to recruit paramedics in the capital and had developed career and further education pathways through their own academy, but noted that these were not always effective. The increase in required skill level for this occupation may also have an impact in reducing applicant numbers. Furthermore, these representatives of the London Ambulance Service told us that the Service was implementing an intensive training course with a duration of as little as 17 weeks in order to increase the throughput of recruits into the service. However, these programmes that produce paramedics below NQF6 all require additional supervision and on-the-job training through clinical placements. There appears to be insufficient availability of these clinical placements due in part to the apparent shortage of experienced paramedics that can act in the supervisory role, especially during the recent periods of reportedly intense workloads. Thus, there is a risk of shortages becoming self-perpetuating across the service.

3.113 Because the occupation of paramedic had been regarded as not skilled to level NQF6, it had not been possible, with one exception discussed below, to bring in paramedics from outside the EEA to address shortages. The addition of paramedics to the list of NQF6 occupations could help in this regard. London Ambulance Service told us that they had recruited some paramedics from Australia using the Tier 5 youth mobility route. They said that those they recruited were all graduates. Health sector representatives told us very few EU countries had qualifications and training for paramedics that were demonstrably compatible with those required by the UK health sector.

3.114 Taking all of the evidence into account, we consider that on balance we saw sufficient evidence of a national shortage of paramedics. Moreover, current efforts to increase the supply are unlikely to be fully effective at filling this shortage in the short-term. **We recommend adding paramedic to the list of NQF6 occupations and we also recommend adding it to the shortage occupation list** while the transition to graduate recruits runs its course. Representatives from the health sector told us that this should

take no longer than four years and we look forward to finding out that this has been the case.

## Occupational therapists

**Box 3.8: Occupational therapist**

**4-digit SOC 2010 Occupation: 2222 Occupational therapist**

**Only the following job titles within this occupation are presently included on the shortage occupation list:**

This occupation is not included on the current shortage occupation list.

**Top-down data**

| **Shortage** | **Occupation passes 1 out of 7 available indicators** | | |
|---|---|---|---|
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | -6.36 | **V2:** Percentage change of employment level (over 1 year) | 3.13 |
| **P2:** Percentage change of median real pay (over 3 years) | -11.24 | **V3:** Percentage change of median paid hours worked (over 3 years) | -0.27 |
| **P3:** Return to occupation | 0.21 | **V4:** Change in new hires (over 1 year) | -3.25 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | - |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | - |
| **V1:** Percentage change of claimant count (over 1 year) | -75.86 | **E3:** Skill-shortage vacancies / employment | - |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 4.4% | Percentage of workforce trained in past 13 weeks | 56.8% |

**Total employment in this 4-digit occupation is approximately 40000 (average, LFS, 2013Q4-2014Q3)**

Partner evidence received from: CfWI, College of Occupational Therapists, University College London Hospitals NHS Foundation Trust, UNISON

Notes: see box 3.2 notes

3.115 Occupational therapists pass 1 out of 7 top-down shortage indicators and is therefore not indicative of shortage. CfWI presented evidence which showed a low national vacancy rate for this occupation. CfWI stated that available data indicated that there were sufficient recruits to cope with the number of expected retirements and did not recommend adding this occupation to the shortage occupation list. We did get evidence from the TUC and the British Medical Association stating that there were shortages within this occupation and that this was causing strain on the service.

3.116 CfWI pointed to evidence that they had received from the British Association of Occupational Therapists and Health Education East of England, which indicated shortages of occupational therapists in London and the East of England. Supporting the case for a shortage in London we also received evidence from the College of Occupational Therapists, University College London Hospitals NHS Foundation Trust and UNISON. However, we considered that these were all evidence of a regional, rather

than a national, shortage. **We therefore recommend that occupational therapist is not added to the shortage occupation list**.

## Therapy professionals not elsewhere classified

| **Box 3.9: Therapy professionals n.e.c.** | | | |
|---|---|---|---|
| **4-digit SOC 2010 Occupation:** | **2229 Therapy professionals n.e.c.** | | |
| **Only the following job titles within this occupation are presently included on the shortage occupation list:** | | | |
| This occupation is not included on the current shortage occupation list. | | | |
| **Top-down data** | | | |
| **Shortage** | **Occupation passes 3 out of 7 available indicators** | | |
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | 2.60 | **V2:** Percentage change of employment level (over 1 year) | 11.75 |
| **P2:** Percentage change of median real pay (over 3 years) | -0.76 | **V3:** Percentage change of median paid hours worked (over 3 years) | -0.33 |
| **P3:** Return to occupation | -0.01 | **V4:** Change in new hires (over 1 year) | -4.18 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | - |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | - |
| **V1:** Percentage change of claimant count (over 1 year) | -64.79 | **E3:** Skill-shortage vacancies / employment | - |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 11.0% | Percentage of workforce trained in past 13 weeks | 51.5% |
| **Total employment in this 4-digit occupation is approximately 41000 (average, LFS, 2013Q4-2014Q3)** | | | |
| Partner evidence received from: CfWI, British Association of Prosthetists and Orthotists | | | |
| Notes: see box 3.2 notes | | | |

3.117 The occupation passes 3 out of 7 top-down shortage indicators. However, this occupation covers a wide range of medical job titles and, therefore, the top down data will not be highly relevant to any particular job title.

3.118 **Prosthetists and orthotists:** these job titles are not currently on the shortage occupation list. CfWI stated that there was evidence of a national shortage of prosthetists and orthotists. They, together with the British Association of Prosthetists and Orthotists, said that the increase in the incidence of Type 2 diabetes, and the subsequent risk of necessary lower limb amputation, had led to a higher demand for these jobs. This was compounded by insufficient numbers of new graduates being produced, an ageing workforce, and high levels of workforce attrition.

3.119 CfWI reported a general lack of data surrounding these job titles as prosthetists and orthotists are not generally directly employed by the NHS. Data on those that do work in the NHS was not accurately recorded, as the workforce does not have a unique occupation code for use in electronic staff records. CfWI said that this results in a disparity when

comparing vacancy rates. We received some data regarding shortages experienced by Opcare, which is the largest provider of prosthetic services to the NHS in the UK. Opcare vacancies were reported as being 6 per cent of their 100 person workforce across a variety of locations, overall indicating a national shortage. We also saw evidence from Chas A Blatchford & Sons who also provide prosthetic and orthotic services to the NHS, and from NHS Jobs, which were indicative of shortages in these job titles.

3.120 We note the points made about the present lack of available data on these job titles but we hope that future consideration will be supported by better data. For now, however, **we recommend that prosthetist and orthotist be added to the shortage occupation list**.

## Nurses

**Box 3.10: Nurses**

**4-digit SOC 2010 Occupation: 2231 Nurses**

**Only the following job titles within this occupation are presently included on the shortage occupation list:**

Specialist nurse working in neonatal intensive care units.

**Top-down data**

| **Shortage** | **Occupation passes 4 out of 10 available indicators** | | |
|---|---|---|---|
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | -3.97 | **V2:** Percentage change of employment level (over 1 year) | 0.73 |
| **P2:** Percentage change of median real pay (over 3 years) | -6.91 | **V3:** Percentage change of median paid hours worked (over 3 years) | 0.00 |
| **P3:** Return to occupation | 0.08 | **V4:** Change in new hires (over 1 year) | 1.75 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | 29.88 |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | 68.77 |
| **V1:** Percentage change of claimant count (over 1 year) | -63.83 | **E3:** Skill-shortage vacancies / employment | 0.63 |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 18.2% | Percentage of workforce trained in past 13 weeks | 55.8% |

**Total employment in this 4-digit occupation is approximately 596000 (average, LFS, 2013Q4-2014Q3)**

Partner evidence received from: CfWI, Guys and St Thomas NHS Trust, Newcastle-upon-Tyne NHS Trust, North Tees and Hartlepool NHS Trust, UNISON

3.121 The occupation of nurses passes 4 out of 10 top-down shortage indicators. However, this occupation covers a wide range of sub-specialty job titles and, therefore, the top down data will not be highly relevant to any particular job title.

## Nurses recommended for removal from the shortage occupation list

3.122 **Specialist nurses working in neonatal or paediatric intensive care units:** nurses in neonatal intensive care units are currently on the

shortage occupation list. However, CfWI stated that there is now a lack of robust evidence to confirm a national shortage of nurses in either neonatal or paediatric intensive care units. There has been a rise in the numbers of nurses working in these areas and indications were that the supply has matched the increase in demand. Some NHS Trusts contacted us to say that they were experiencing difficulty in recruiting these specialist nurses. However, CfWI referred to data from NHS Jobs which showed a low national vacancy rate.

3.123 Our previous consideration of specialist nurses in this area has indicated a shortage. However, it appeared that mechanisms put in place by the relevant authorities combined with these nurses on the shortage occupation list have resulted in the successful mitigation of a national shortage. Therefore, **we do not recommend retaining specialist nurses working in neonatal or paediatric intensive care units on the shortage occupation list.**

3.124 In addition to specialist nurses working in neonatal or paediatric intensive care units we also received evidence in relation a number of other nursing job titles. These are discussed in turn below.

### Nurses not recommended for inclusion on the shortage occupation list

### Adult nurses

3.125 Adult nurses work with adult patients of all ages with a range of health conditions. CfWI reported that a large number of stakeholders said they were experiencing difficulties in filling vacancies for adult nurses. Data from NHS Jobs and the Royal College of Nursing indicated to CfWI a national nursing vacancy rate of less than one per cent of the 310,000 person workforce. However, some of the vacancies listed were for multiple posts and adult nurses are not counted separately from other nurses meaning that the actual vacancy rate for nurses may be higher than this. UNISON refers to the NHS Qualified Nurse Supply and Demand Survey, a report produced for the Health Education England Nursing Supply Steering Group in May 2014, which showed that 10 per cent of permanent nursing roles in the UK were vacant. Of these, 60 per cent were filled by temporary or agency staff, which UNISON considered risked reducing the quality of care. UNISON said they regarded adding nurses to the shortage occupation list as essential. However, the Royal College of Nursing provided evidence that suggested that vacancies were employer-driven rather than a structural problem in the UK. It was stated that vacancies were largely caused by recruitment freezes and redundancies due to budgetary pressures, with employers keeping some posts unfilled to keep costs down. CfWI said that this suggested that including adult nurses on the shortage occupation list would not be effective at reducing the number of vacancies.

3.126 CfWI said that better use should be made of existing mechanisms to fill nursing vacancies, such as the Health Education England *'return to practice'* campaign which aims to incentivise nurses that have left the

profession to re-enter the workforce. Additionally, evidence from NHS Employers indicated that 96 per cent of campaigns aimed at recruiting nurses from outside of the UK were focussed on countries within the EEA, particularly Spain, Ireland and Portugal with evidence from the Home Office and the Nursing and Midwifery Council indicating that the numbers of nurses entering the UK from outside the EEA were a very small proportion of the nursing workforce. **Therefore, we do not recommend adding adult nurses to the shortage occupation list.**

### Specialist nurses working in operating theatres

3.127 CfWI told us that theatre nurses working in the NHS were currently not specifically counted and recorded, instead being counted alongside operating department practitioners and other nurses working in acute settings. They said it was difficult to estimate how many currently work in theatre nursing, and it may therefore not be sensible to recommend a return to the SOL until both better recording and a better understanding of this workforce and of issues affecting this workforce are in place. Overall, there had been a growth in the nursing workforce growth between 2009 and 2013 including an increase in the number of nurses working in acute, elderly and general settings.

3.128 CfWI had received indications of a shortage of theatre nurses but considered that these were evidence of local rather than national shortage. We also received correspondence from one NHS Trust stating they were experiencing difficulties in recruiting theatre nurses, but without supporting evidence. **We therefore do not recommend adding specialist nurses working in operating theatres to the shortage occupation list.**

3.129 **Non-medical nurse endoscopists:** CfWI stated that there was no substantial evidence to suggest that there was currently a national shortage of non-medical nurse endoscopists. The NHS Qualified Nurse Supply and Demand Survey in 2014 reported only one vacancy for this job title in the UK. One NHS Trusts stated that they were experiencing difficulties in recruiting band 5 nurses in endoscopy but did not provide further evidence of this. **We therefore do not recommend adding non-medical nurse endoscopists to the shortage occupation list.**

### Other Occupations

3.130 **Care nurses:** we received evidence from a number of care homes and representative bodies regarding a shortage of care nurses. Several correspondents cited the findings from a survey by the Registered Nursing Home Association in 2014 which took data from 120 respondents quoting an average vacancy rate of 2.56 vacancies per care home and consequently suggested a national level of more than 10,000 vacancies for care nurses in England.

3.131 Data from NHS Employers, the Nursing and Midwifery Council and the Home Office all indicate that overseas recruitment for nurses is

overwhelmingly undertaken within the EEA. However, Care England reported to us that a short survey of their members had found that the quality of nurses from the EEA was held to be diminishing with English language skills being specifically poorer among EEA care nurse than those from outside the EEA.

3.132 It was suggested to us by a number of respondents that the language requirements for overseas nurses to practice in the UK be relaxed. Currently, the Nursing and Midwifery Council require that nurses take tests in reading, writing, listening, and speaking through the International English Language Testing System (IELTS), and gain at least a score of 7 in each subject. It was put to us that there was a viable supply of overseas qualified care nurses currently working in the UK as care assistants who are capable of filling the vacant qualified nurse posts in the UK, but are unable to attain the language standard set by the Council.

3.133 The Nursing and Midwifery Council had increased the minimum language requirement from an IELTS Band score of 6.5 up to 7 for those applicants for registration applying from 2007 onwards. The rationale for this change was to ensure greater public protection. The Royal College of Nursing said that it supported the use of this test and the current minimum requirement, but did suggest that a review of the way in which language skills are tested after the implementation of new competency tests.

3.134 Health Education England's Shape of Caring Review is conducting an examination of the education and training of nurses and care assistants in the UK, and in 2015 will provide recommendations for reform to the system with the aim of producing higher quality care. Health Education England has also set up a *'return to practice'* campaign which aims to incentivise nurses that have left the profession to re-enter the workforce. Our commission from the Government asked that we review occupations within the health service and we have not conducted a wider examination of shortages across the care sector. **We therefore do not recommend adding care nurses to the shortage occupation list.** We do however suggest that the Department for Health and the Nursing and Midwifery Council consider whether it would be appropriate to relax the IELTS score requirements in respect of care nurses. For example, they may wish to consider changing the requirement to simply an average of 7 over the examinations, rather than requiring 7 or higher in each of the four examination areas.

## 3.6 Summary of our recommendations

3.135 An exhaustive list of the recommendations being put forward by the MAC can be found in Chapter 8. With regards to the health sector, a summary of the job titles being recommended for addition to or removal from the shortage occupation list can be found in Table 3.3

| Table 3.3: Summary of those job titles in the health sector recommended for addition to or removal from the shortage occupation list in February 2015 | | |
|---|---|---|
| | **For addition to the SOL** | **For removal from the SOL** |
| **2211 – medical practitioners** | Consultants in clinical radiology;<br>Non-consultant, non-training medical roles in paediatrics;<br>Core trainees in psychiatry (CPT1);<br>CT3 and ST4 to ST7 training roles in emergency medicine; | Consultants in haematology;<br>Non-consultant, non-training medical roles in anaesthetics, rehabilitation medicine, psychiatry (excluding old age psychiatry), and general medical specialties delivering acute care services (general internal medicine (acute)) |
| **2217 – medical radiographers** | | HPC registered therapeutic radiographers |
| **2229 – therapy professionals not elsewhere classified** | Prosthetists and orthotists | |
| **2231 - nurses** | | Specialist nurses working in neonatal or paediatric intensive care units |
| **3213 - paramedics** | Paramedics at NQF6+ level skill | |

3.136 Other health service occupations were put forward to us as candidates for inclusion on the shortage occupation list but they were not matched with evidence from CfWI and overall we did not see sufficient evidence of shortage to make a recommendation for inclusion on the list. The occupations nominated can be seen in Annex D.

3.137 During informal discussions with policy officials in the Home Office, we were asked to give particular attention to reports of shortage in health service occupations from the devolved administrations. We discuss health service shortages in Scotland in Chapter 7. We have mentioned in this chapter some shortages reported from Wales and Northern Ireland. Unless these were matched with reports of similar shortages from within England we have not regarded them as national level shortages and do not make recommendations to include the relevant job titles and occupations on the UK shortage occupation list. Further to those occupations already discussed, the Department of Health, Social Services and Public Safety Northen Ireland also asked that some additional job titles be added to the shortage occupation list. Because we did not see evidence that these were also in shortage across England and Wales we do not make a recommendation in relation to these jobs. However, policy officials may wish to consider the impact of shortages in the devolved administrations that are not matched across England. The nominated job titles in Northern Ireland were:

- Consultants in
    - Oral and maxillofacial surgery

  - Urology
  - Respiratory medicine
- NCNTs in
  - Urology
  - Paediatric surgery
  - Community paediatrics

# Chapter 4 Overhead Linesworkers

## 4.1 Introduction

4.1 Overhead linesworker is a job title within the SOC code 5249 for electrical and electronic trades not elsewhere classified. It relates to electrical professionals who work with power lines that transmit electricity from power stations to customer properties.

4.2 For this review, the Government has asked us to consider whether there is a continued shortage of labour under this job title that would be sensible to fill using labour from outside the European Economic Area (EEA).

4.3 We also revisit the distinction, created in 2011, which recommended the removal from the Shortage Occupation List of overhead linesworkers who work on low voltage lines that carry below 275,000 volts.

4.4 To better understand the industry and its concerns, on 3 October 2014 we held an open forum attended by representatives from the Sector Skills Council, (Energy & Utility Skills (EU Skills); and by employers of linesworkers including Voltcom, Balfour Beatty, Advantage NRG and AMEC Foster Wheeler.

4.5 We visited Balfour Beatty's training centre in Derby to get a first-hand look at the level of skill required to maintain high-voltage lattice towers; and to discuss the industry as a whole and where their company structure and training programmes fit in to it. We also visited the BTS Group Ltd near Ipswich to discuss low-voltage wood pole linesworkers and why their exclusion might not be warranted under the criteria we set out in 2011.

4.6 In addition, we met the Department of Energy and Climate Change (DECC) to understand the scale of the major projects which the UK's electricity transmission and distribution industry is responsible for delivering.

4.7 Finally, in response to our call for evidence, we received written evidence from a number of partners including: Voltcom Group, Balfour Beatty, Advantage NRG Ltd, The Convention of Scottish Local Authorities

(COSLA), AMEC Foster Wheeler, and EU Skills and the National Skills Academy for Power (the Skills Academy).

## 4.2 MAC's previous reviews of overhead linesworkers

4.8 When we first reviewed the UK shortage occupation list in 2008, we found that there was sufficient evidence that overhead linesworkers were skilled at the required level (NQF3+). We received convincing evidence that there was a shortage of labour in the industry and that it would be sensible to fill this using labour from outside the EEA. Therefore, we recommended that overhead linesworkers be included on the shortage occupation list.

4.9 In 2009, the UK's electricity transmission and distribution industry presented us with evidence about specific job titles, including overhead linesworkers, which it believed were in shortage. We concluded that there was still sufficient evidence of a shortage of labour within the industry and recommended that overhead linesworkers be retained on the shortage occupation list.

4.10 In December 2010, the Government asked the MAC to provide advice in relation to the minimum skill requirement for occupations and job titles under Tier 2 of the Points Based System. Specifically, the Government has asked that we answer the following two questions:

1. *"What Standard Occupational Classification (SOC) codes should be considered as graduate level occupations for the purposes of Tier 2 of the Points Based System?"*; and

2. *"How should the current shortage occupation lists for the UK and Scotland be revised to remove jobs below graduate level?*"

4.11 We responded to the first question in Migration Advisory Committee (2011a) and reported on the second question in Migration Advisory Committee (2011b).

4.12 At that time, it was the Government's intention that the minimum skill level for Tier 2 of the Points Based System be raised to National Qualifications Framework Level 4 or above (NQF4+). As such, our task in Migration Advisory Committee 2011b was to examine certain job titles, including overhead linesworkers, in order to establish whether they, or subsets therein, were skilled at NQF4+.

4.13 Although timescales did not allow for us to issue a formal call for evidence for the work in Migration Advisory Committee (2011b), we took steps to ensure that our partners were aware that we were undertaking this work and we considered any written submissions we received. In particular, we also approached partners who we believed were likely to have an interest in job titles that were most at risk of not meeting the NQF4+ criteria for inclusion on an amended shortage occupation list. In response, we received evidence from Balfour Beatty Utility Solutions Limited, as well as from EU Skills and the Skills Academy on behalf of the UK's electricity

transmission and distribution industry, about the skill level for overhead linesworkers.

4.14 We were told by EU Skills and the Skills Academy that overhead linesworkers either work on high voltage lines that carry 275,000 or 400,000 volts, or low voltage lines that carry below 275,000 volts. They also told us that overhead linesworkers who work on high voltage lines require a City and Guilds qualification in electrical supply, which is equivalent to NQF level 3; a minimum of two years' experience of working with 275,000 or 400,000 volts systems; and four years' site experience in a contracting company.

4.15 EU Skills told us that the salary range for high voltage overhead linesworkers was typically £28,000 to £35,000 p.a., which is in line with the median salary for the SOC code which, as a whole, was not skilled to NQF 4+ (see Table 4.1 below). However, we saw that the range was still above the top-down hourly salary threshold for NQF4+ occupations of £13.40 and, as such, the job title could be considered skilled to NQF4+ on the basis of pay.

4.16 In addition, EU Skills said that a high voltage overhead linesworker was often required to perform a supervisory role and therefore had responsibility for the work and supervision of junior linesworkers and trainees, and may have also been required to lead earthing parties and authorise safety documentation. On the basis of evidence received from EU Skills and Balfour Beatty Utility Solutions Limited on pay, on-the-job training and experience required, we concluded that overhead linesworkers working on high voltage lines carrying at least 275,000 volts were skilled at NQF4+. Therefore, we recommended that this subset of the job title should remain on the shortage occupation list.

4.17 The evidence we received with respect to low voltage overhead linesworkers was limited. EU Skills told us this group worked on lines that carry up to 132,000 volts. We were also informed that the role requires a NVQ level 3 qualification in electricity distribution and transmission engineering, plus two years' post-training experience. In addition, we received information that the salary range for a low voltage overhead linesworker was typically £19,000 to £25,000 p.a., which was both equivalent to a salary below our NQF4+ occupation threshold of £13.40 per hour, and below the average for SOC code as a whole. We did not consider this evidence from the Sector Skills Council to be sufficient to conclude that low voltage overhead linesworkers were skilled at the required level to remain on the shortage occupation list, and therefore recommended that they be removed.

4.18 We considered whether there was a shortage of high voltage overhead lineworkers again in 2013 as part of our full review of the shortage occupation list. This review took into consideration the adjustment made by the Government to only include job titles skilled at NQF6+. However, occupations and job titles which were skilled at NQF4+ but not at NQF6+ were, exceptionally, permitted to remain on the list if they passed our

shortage and sensible tests. Since we received sufficient evidence of a continuing shortage of high voltage overhead linesworkers, we recommended that they be retained on the list.

4.19 For this review, we have been told by employers that not only is the current distinction of using voltage levels to define skill unhelpful but that the pay differentiation highlighted earlier may have been misleading. We discuss this in detail in section 4.5.

*"… the distinction by voltage level currently used to define the role on the SOL is arbitrary and unhelpful and we believe the MAC should strongly consider its removal. It is not an indicator of skill, and imposing a distinction limits opportunities for flexibility in the workforce."*

Energy & Utility Skills and the National Skills Academy for Power response to MAC call for evidence

## 4.3 Industry background

4.20 The electricity transmission and distribution industry covers the activities associated with the delivery of electricity from generation facilities to customer properties. Electricity is generated by a relatively small number of large power stations and is then transported around the UK on a high voltage transmission network. It is then reduced in voltage and transported around regions and local areas on distribution networks.

4.21 High voltage transmission lines are typically carried along steel lattice towers while low voltage distribution lines are often carried along wood pole towers. In urban areas, low voltage lines may also be carried underground. Whilst different sets of skills are required to operate across the two mediums, evidence suggests these skills are mostly transferable.

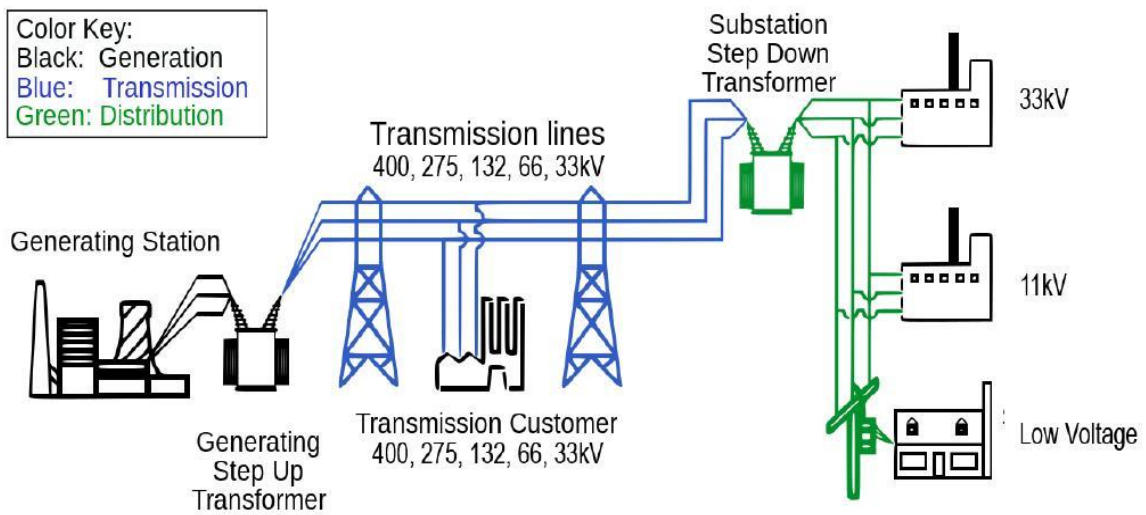
4.22 The UK, like many other countries around the world, is moving towards a more sophisticated energy system that is able to accommodate an increasing amount of generated power from a greater number of smaller plants (e.g. wind farms, waste-to-energy plants, factories, offices, households, etc.). Energy & Utility Skills argued that this increase in the number of generating plants has resulted in the need for the current transmission and distribution network infrastructure to be substantially expanded and upgraded over coming years.

4.23 There are four transmission systems in the UK. In England and Wales, the system is owned and operated by National Grid. In Scotland, the network is owned by Scottish Power in the south and Scottish & Southern Energy in the north, although the network is operated by National Grid. In Northern Ireland, the network is owned and operated by Northern Ireland Electricity. All these companies operate under a transmission licence granted by Ofgem.

4.24 There are seven licensed Distribution Network Operators (DNOs) in England and Wales and two in Scotland. Each DNO owns and operates the local electricity distribution system within its own authorised area. Over half of the DNOs cover more than one authorised area. The distribution system of each DNO reflects the size of the region it serves, as well as the density of the regional population and the terrain.

4.25 Figure 4.1 represents the entire electricity transmission and distribution network. Transmission lines are categorised based on the maximum voltage that the line can carry under safe conditions. These fall under two categories: high voltage transmission lines which can be 400kV, 275kV, 132kV, 66kV & 33kV; and low voltage or distribution lines which can be 132kV, 33kV, 11kV & 240V. The changes in voltage occur through the use of a substation transformer, either to step-up to transmission voltage or step-down to distribution voltage.

**Figure 4.1: Transmission and distribution network**




Source: Voltcom Group response to MAC call for evidence

4.26 National Grid issue high voltage framework contracts to contractors who can undertake the work between the months of February and October. Work outside of these months is limited to only low voltage distribution lines. This leads to a seasonal demand for labour in this industry.

4.27 As noted above, currently, and on the basis of evidence received in our previous reviews of this job title, the MAC recommendation sets the criteria for operating as a high voltage overhead linesworker as 275,000 volts and above.

## 4.4 Data analysis

4.28 Overhead linesworkers fall under SOC code 5249 for electrical and electronic trades not elsewhere classified. This occupation passes 3 of the 10 available shortage indicators. However, this occupation covers a wide

range of job titles and, therefore, the top down data will not be highly relevant to the job title of overhead linesworkers.

| Table 4.1: Electrical and electronic trades n.e.c. | | | |
|---|---|---|---|
| **4-digit SOC 2010 occupation:** | **5249 Electrical and electronic trades n.e.c.** | | |
| **Only the following job titles within this occupation are included on the current shortage occupation list:** | | | |
| Overhead Linesworkers (High voltage) | | | |
| **Top-down data** | | | |
| **shortage** | **occupation passes 3 out of 10 available indicators** | | |
| _ | **Spring 2015** | _ | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | -1.94 | **V2:** Percentage change of employment level (over 1 year) | 2.39 |
| **P2:** Percentage change of median real pay (over 3 years) | -1.89 | **V3:** Percentage change of median paid hours worked (over 3 years) | 0.00 |
| **P3:** Return to occupation | 0.04 | **V4:** Change in new hires (over 1 year) | -1.88 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | 31.96 |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | 87.77 |
| **V1:** Percentage change of claimant count (over 1 year) | -54.89 | **E3:** Skill-shortage vacancies / employment | 0.48 |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 4.5% | Percentage of workforce trained in past 13 weeks | 26.5% |
| **Total employment in this 4-digit occupation is approximately 74000 (average, LFS, 2013Q4-2014Q3)** | | | |
| Partner evidence received from: Voltcom Group, Balfour Beatty, Advantage NRG Ltd, Convention of Scottish Local Authorities (COSLA), AMEC Foster Wheeler, EU Skills and the National Skills Academy for Power (the Skills Academy). | | | |

4.29 In 2007, the total number of workers employed in electrical and electronic trades was 86,000, of which 91 per cent were UK-born and 9 per cent were non-UK born. Between 2007 and 2014, employment levels in this occupation fell by 13,000 to 74,000 in 2014. Compared with 2007, when migrants accounted for 9 per cent of total employment in this occupation, the migrant share of this occupation has now fallen, with migrants now accounting for only 5 per cent of total employment in this occupation. This relates to the entire occupation, however, and may not reflect the composition of the overhead linesworkers workforce.

4.30 There were 60 applications for certificates of sponsorship made for overhead linesworkers under SOL in the year ending September 2014. All applications were for workers from the Philippines with an average age of 42. In terms of salary offered, the median was £32,000 p.a. with an additional allowance of £10,000.

4.31 All of the salaries offered below this median of £32,000 were £25,000 and below. As such, even taking into consideration possible allowances being offered, the salaries at the lower end of the distribution are notably less

than the evidence we received concerning pay suggests is typical for a native Linesman Erector 2 (LE2) level linesworker in the UK. These salaries could therefore be considered as being offered either to less skilled trainee linesmen or used to undercut the native labour market.

4.32 Just over 60 per cent of applications for certificates of sponsorship under the shortage occupation route were made by two companies, namely, Power Networks (GB) Limited and Advantage-NRG Ltd.

## 4.5 Skilled

4.33 Overhead linesworkers are not skilled at NQF6+. The minimum qualification required to become a trainee linesworker is equivalent to that of NQF level 2 or 3. We were told that the skill level of an overhead linesworker can vary from low grade trainees through to the higher skilled (LE2) then Linesman Erector 1 (LE1) classes and the most experienced supervisory grades Linesman Foreman 2 and 1.

4.34 Balfour Beatty told us that migrant workers are normally recruited at either LE2 or Foreman 2 level, to provide skills that complement both experienced UK workers and UK workers who are currently being developed. However, we were told that these workers still require substantial additional training and on-the-job experience.

4.35 We discussed earlier that currently only overhead linesworkers who work on high voltage lines carrying at least 275,000 volts are featured on the shortage occupation list. The decision (made in Migration Advisory Committee 2011b) to recommend the removal of overhead linesworkers who work on low voltage lines was based solely on evidence received at the time. This evidence suggested that only overhead linesworkers who work on high voltage lines carrying at least 275,000 volts were skilled to the level required at that time to remain on the shortage occupation list (NQF4+).

4.36 When we met representatives of the sector in November 2014, we were told that there is no distinction in the skill levels of high and low voltage workers. They confirmed that the manner of employment of the workers is the same for all voltages, including method of work and equipment used. Balfour Beatty suggested that the use of voltage level as a skill indicator is not meaningful.

*"With specific regards to Linesworkers, the use of voltage level, such as 275kV and above, as a Skill indicator is not a particularly meaningful assessment. The Skills developed and required for working on Lattice Steel Towers are very largely common for all voltages from 132kV and upwards. It would be more relevant to consider the type of structure, Steel Towers, which is being worked on in conjunction with high voltages (in theory high voltage can be considered to start at 33kV). Woodpole Linesworkers represents a parallel high skill activity, equivalent to, but different to Steel Tower Linesworkers."*

Balfour Beatty response to MAC call for evidence

4.37 Energy & Utility Skills and the Skills Academy told us that employers believe that distinction by high and low voltage is arbitrary, is not a helpful indicator of skill level and only limits flexibility in the workforce.

*"In fact, this artificial distinction on the SOL actually limits flexibility in the workforce, who are required to work cross a range of voltages, project by project."*

Energy & Utility Skills and the National Skills Academy for Power response to MAC call for evidence

4.38 Voltcom Group argued that it is unhelpful to distinguish between high and low voltage overhead linesworkers at voltage level because this can differ within the industry.

*"Contractors under framework agreements have to deliver the refurbishment works in line with interconnectors and main line projects. These can consist of anything up to and including 33kV, 66kV and 132kV woodpole, to compliment 33kV, 132kV and 275kV lattice tower works."*

Voltcom Group response to MAC call for evidence

4.39 Further, a number of partners told us that overhead linesworkers who work on low voltages in fact require a greater level of training and experience.

*"… the linesmen who work on lower voltages, at the level that bring electricity to home and businesses often carried on wood poles, require greater levels of experience and training often brought about through live line working and fault finding which demand complex and varied tasks to be carefully executed if safety and continuity of supply are to be maintained."*

Advantage NRG response to MAC call for evidence

4.40 Partners also strongly argued that the voltage distinction currently in place on the shortage occupation list is not only incorrect but is adversely affecting the industry. For example, we were told by one employer that it restricts the ability for migrant high voltage linesworkers to transfer from high voltage work to low voltage work during seasonal off periods, which means that contracts have to be terminated because zero hours contracts will not be sanctioned under Tier 2. This results in new migrants having to be recruited and trained. However, another employer contradicted this view when they told us that high voltage linesworkers' skills are non-transferable and as such they would need to be retrained to undertake work on low voltage lines.

4.41 We received evidence that whilst skill levels are increasing in the industry and necessary training and on-the-job experience is substantial, the skill level for overhead linesworkers still does not reach the required NQF6+ standard. EU Skills and the Skills Academy have also confirmed this view.

> *"In summary, the role of OHL [overhead linesworker] – at any voltage – although technically qualified below NQF Level 6, requires a specific combination of skills with substantial industry experience for individuals to become fully competent in the role."*
>
> Energy & Utility Skills and the National Skills Academy for Power response to MAC call for evidence

4.42 The evidence from partners gave different timelines for overhead linesworkers reaching a necessary level of training and experience. This varied from over 2 years (Balfour Beatty) to 4 years (Advantage NRG).

4.43 As well as meeting the required experience level, qualified LE2 linesmen must pass examinations to demonstrate a sufficient level of knowledge of electrical engineering, as well as being granted DNO authorisation from a number of the nine different authorities.

4.44 The evidence we received about pay showed that the wages offered to those employed in low voltage work and those in high voltage work were broadly similar. One employer operating solely in the low voltage market quoted an average wage of around £40,900 p.a. for LE2 linesmen while an employer operating almost exclusively in the high voltage market quoted an average wage of around £40,500 p.a.

4.45 Wages in the industry vary between £37,000 p.a. for a trainee linesman to £55,000 p.a. for a fully qualified and experienced LE1 field manager, and a majority of grades receive above £40,000 p.a. Whilst this appears higher than the wages offered to migrants, the management information data in relation to migrant salaries do not capture the overtime and other pay related benefits, which have been used to calculate these industry-wide figures. Therefore, this information does not necessarily imply migrants

being offered the median salary undercut the wages being offered to native workers.

4.46 Evidence presented to us from several partners stated that pay was not a suitable measure of skill due to the highly regulated nature of the industry. Pay is partly aligned to the Construction Industry Joint Council recommendations and as such does not offer much flexibility. However, there is flexibility in terms of allowances and other pay related benefits.

4.47 We accept that the wage differential presented to us for previous reviews does not accurately capture the market as it is now.

4.48 We are content that the evidence we received confirms that this job title is not skilled to NQF6+. However, because of its legacy status on the shortage occupation list we, as per our remit, continue this review by considering whether or not there is a shortage of labour within the job title that would be sensible to fill using labour from outside the EEA.

## 4.6 Shortage

4.49 We received evidence which explained that the shortage of labour in the industry is a global one. There are permanently vacancies on offer for qualified overhead linesworkers, while the demand for labour via new infrastructure projects is also rising. As in previous reviews, the UK's electricity transmission and distribution industry has argued that its ageing workforce and the substantial churn to more attractive locations is causing a drastic shortage of labour in the potential workforce.

*"Around the world, demand for OHLs is increasing. This is caused by much of the infrastructure in developed countries being of a similar age to that of the UK's. The United States of America, for example, which has a similar transmission and distribution system to that of the UK, is also approaching a phase of infrastructure renewal and repair and has a similar ageing workforce. Consequently, there is strong global demand for skilled workers with relevant experience, and it is likely to increase considerably in the coming years."*

Energy & Utility Skills and the National Skills Academy for Power response to MAC call for evidence

4.50 EU skills and the Skills Academy provided evidence of the significant investment over the next five to ten years in the energy sector. This investment reflects the increasing drive towards renewable energies and the need to connect them up to the grid. It is also due to the repair and maintenance of an existing grid that is coming toward the end of its lifecycle.

4.51 EU skills and the Skills Academy told us that the industry needs up to 50 new qualified linesworkers per year. In addition, we heard from a major employer that it will need 100 new qualified linesworkers in 2015. Balfour

Beatty estimated that 35,000 new employees will be needed across the power sector by 2024.

4.52 All of the evidence received points to permanent vacancies that simply cannot be filled. A major employer found that of the 100 linesworkers they needed to recruit in 2014, only 22 were successfully hired. This is despite constant recruitment attempts across traditional mediums and recruitment websites, alongside new social media approaches such as LinkedIn.

4.53 AMEC Foster Wheeler claim there has been a 13 per cent increase in salary between 2012 and 2014. By contrast, one major employer found that average wages for linesworkers in fact fell between 2009 and 2014, though this was due to the firm being forced to hire less qualified linesworkers since they could not find the experienced staff they were seeking.

4.54 Overtime is already very prevalent in this industry. Balfour Beatty indicated that over the summer months, when demand is at its highest, workers can work 69-hour weeks, with over a third of those hours being accounted for as overtime. As such, there does not appear to be much scope for increasing the overtime worked.

4.55 Partners provided evidence that other remuneration is being offered in an attempt to entice workers to the industry. Balfour Beatty introduced a 6 per cent retention bonus and a 20 per cent daily bonus element during critical seasonal times to counter high attrition rates (equivalent to £3,000 p.a.), whilst some employers offer an allowance for working away from home.

4.56 It is acknowledged that inexperienced linesmen are relatively easy to recruit. However, several partners pointed out that overhead linesworkers operate in gangs of 5 or 6. As each gang can only contain one trainee, this does not help mitigate the problem of the shortage of qualified workers.

4.57 Alongside the inability to recruit, evidence pointed to the churn that is so prevalent in the industry. Voltcom claim that by 2023, half of overhead linesworkers will have left the industry. Balfour Beatty stated that over 10 per cent of its workforce leaves every year, predominantly to countries such as Australia and Canada. Advantage NRG confirmed this attrition evidence. They told us that the UK shortage is exacerbated by the demands of other developed countries where linesworkers, at all voltages, are in shortage.

*"Ironically as more young linesmen are trained, these are the ones who actively seek out new opportunities in other countries whilst the workforce in the UK ages and reaches retirement."*

Advantage NRG Ltd response to MAC call for evidence

4.58 With respect to the evidence about the ageing nature of the electricity transmission and distribution workforce one employer stated that 50 per cent of their workforce is aged over 40. EU Skills and the Skills Academy stated that workers tend to move on as early as age 45 due to the physically demanding nature of the work. Balfour Beatty highlighted research conducted by EU Skills which suggested that as much as 80 per cent of the entire industry's workforce is due to retire by 2025.

## 4.7 Sensible

4.59 The overhead lines industry in the UK has among the highest worldwide standards in qualification and safety requirements. Voltcom point out that this means trained UK linesworkers quickly get poached from abroad.

> *"Many of the linesmen who succeed in training and site based experience within the UK will quickly move abroad to more lucrative assignments"*
>
> Energy & Utility Skills and the National Skills Academy for Power response to MAC call for evidence

4.60 The evidence provided suggests that substantial on-the-job and off-the-job training is occurring in the UK. EU Skills and the Skills Academy told us that the industry is investing significant time, effort and resources into ensuring that it will attract and develop the skilled individuals it needs from the UK workforce. However, we were also told that long lead-times to competency mean that this cannot be achieved in the short run.

> *"While employers are keen to bring in new trainees, for safe and efficient operating it is experience rather than qualification level that is the key indicator of safe levels of competence, and this can only be achieved through time in the role."*
>
> Energy & Utility Skills and the National Skills Academy for Power response to MAC call for evidence

4.61 Balfour Beatty has run a training school since 1985 with a regular intake of UK residents. The school also provides development and refresher training for former trainees. However, they state that despite this ongoing investment, they still struggle to achieve the numbers required. MAC members visited this training school and were very impressed with the investment in British human capital.

4.62 We were told that the lack of a defined competency level for lineworkers was causing problems. Balfour Beatty, working with EU Skills and others, developed an NVQ (accredited by City and Guilds) in the UK for overhead lines roles. This qualification is delivered to Balfour Beatty UK operatives through its training facilities continuous development and assessment by observation and coaching.

4.63 Balfour Beatty also introduced the International Vocational Qualification (IVQ), which is accredited by City and Guilds and has become accredited to deliver the Level 3 Diploma in Electrical Power Engineering - Overhead Lines. In addition, Balfour Beatty is in the process of transforming its training programmes into apprenticeships.

*"Balfour Beatty delivers to NVQ levels 2 and 3. At this time in recognition of the technical dimensions of the Overhead Line work carried out and to add greater creditability to the role of Linesworker Balfour Beatty is in the process of transforming its operative development programmes to Apprenticeships."*

Balfour Beatty response to MAC call for evidence

4.64 We also received evidence that Balfour Beatty's in-house training and partner schemes have produced 81 overhead linesmen in the 2013-2014 period. AMEC Foster Wheeler also told us that it utilises purpose-built training centres to develop native workers.

4.65 When we met Balfour Beatty at their training centre in Derby, they told us that between 2012 and 2014, 98 UK trainees have progressed through their training facilities at a cost of £1.1m. However, these trainees will need to be placed in gangs with more experienced linesworkers in order to become fully qualified.

4.66 Both Balfour Beatty and EU Skills and the Skills Academy provided evidence to suggest that there is no alternative to the use of labour in this industry. New technologies are being implemented alongside new tower designs to increase productivity of existing labour. But for the foreseeable future, capital equipment embodying new technology will require skilled labour for installation and maintenance.

*"If there isn't sufficient labour to undertake the required activities the implications are that (i) the work may not be completed within agreed timescales, (ii) investment plans are pushed back and/or (iii) in the case of contractors it is common for additional hours to be worked in order to deliver contractual outputs which are not charged for (effectively additional hours worked for free). Also, some work is now being extended into the "off-season" (i.e. into the autumn when normal working patterns would have ceased)."*

*Energy & Utility Skills and the National Skills Academy for Power response to MAC call for evidence*

4.67 Balfour Beatty acknowledged the substantial gender gap in terms of employment in the industry. They stated that they have put in place programmes similar to those in the army to facilitate an increase in the number of female employees.

4.68 Evidence was provided demonstrating that strong attempts have been made to hire those who do have the required knowledge and skills from within the EU. Balfour Beatty claim that the use of a number of European job websites such as 'jobs.ie' yielded negligible results despite staying permanently open. Balfour Beatty told us that it employed the global talent advisory firm, Avancos, to identify potential linesworkers across the UK and Europe, but that uptake was poor from outside the UK.

*"Avancos, a specialist agency in identifying targeted groups of workers were commissioned in early 2014 with a remit to identify Lineworkers in the UK, Ireland, Spain and Portugal. They provided good data on potential candidates. Candidates were approached directly following their identification. The yield from this exercise was very low outside the UK."*

Balfour Beatty response to MAC call for evidence

4.69 EU Skills told us that the electricity transmission and distribution industry does not believe that Europe offers a sufficient pool of ready-trained linesworkers. They said that the continent has its own investment plans in energy infrastructure expansion and renewal and, as such, the demand for skilled labour is as high across the continent as it is in the UK. EU Skills also said that the transmission system in much of Europe, especially in the old eastern bloc, operate to different standards than the UK.

4.70 We were told that it is former Central Electricity Generating Board (CEGB) countries, such as Australia, USA and the Philippines, that adhere to the same standards and have similar technology as the UK. As such, their workforces have skills that are more transferable to the UK. Balfour Beatty said that they run a specialist training centre in the Philippines to take advantage of this similarity.

4.71 Several partners also emphasised that to employ a linesworker with limited knowledge of the English language would have implications for both efficiency and safety in the workforce. Whilst this may be an issue for potential migrants across several EU countries, the level of spoken English in some countries outside the EEA, specifically in the Philippines, is at a suitably high level.

*"The other and most important aspect is one of language. EU workers are not required to have a level of English language (spoken, written or comprehension) prior to working in the UK, this can and does cause problems for safety and integration with the resident workforce."*

Advantage NRG Ltd response to MAC call for evidence

4.72 AMEC Foster Wheeler suggested that due to the global shortage of labour, opening the market up to migrant employment will not hamper the ability of qualified UK born linesworkers to find employment. Indeed, EU

Skills pointed out that having an increased pool of qualified linesworkers will allow the training and up-skilling of more native workers.

4.73 The clear picture provided throughout the evidence is the long term consequence of a lack of skilled overhead linesworkers. A key limitation in the distribution of electric power is that, with minor exceptions, electrical energy cannot be stored, and therefore must be generated as needed. If electricity demand is greater than supply due to a fault in the transmission lines, generation plants and transmission equipment could be shut down. This could lead to major regional blackouts, such as the UK Northeast blackouts of 1965, 1977 and 2003 and other regional blackouts in 1996 and 2011. To reduce the risk of such failures, electric transmission networks are interconnected into regional and national networks thereby providing multiple alternative routes for power to flow should failures occur. Evidence provided suggests avoiding future blackouts could be conditional on allowing all highly skilled linesworkers onto the shortage occupation list.

*"There are very realistic risks of power outages in the medium-term due to the failure of any one of the 22,000 electricity towers and/or thousands of miles of transmission lines"*

Balfour Beatty response to MAC call for evidence

## 4.8 Conclusion

4.74 Based on the evidence received for this review, we conclude the following:

- The job title overhead linesworker as a whole is not skilled at NQF6+. However, because of its legacy status on the shortage occupation list, it is within our remit to consider whether there is a shortage of labour within the job title that would be sensible to fill using labour from outside the EEA.

- The evidence does demonstrate a continuing shortage of labour for overhead linesworkers and that it is sensible to address this using non-EEA migrant labour.

- There is a need to set a minimum pay threshold for overhead linesworkers on the shortage occupation list. Restricting applications to only include those earning at least the median migrant wage of £32,000 will ensure that all applicants within the job title will be at, or equivalent to, the Linesman Erector 2 level that the electricity transmission and distribution industry confirm are being sought. Applying such a salary threshold should also prevent migrant linesworkers at this level from undercutting the domestic market.

- The strength of the evidence is compelling enough for us to accept that the information presented to us in 2011 did not accurately portray

the industry as a whole, particularly with regard to pay. Therefore, we believe that had it not been for that evidence, we would not have recommended the removal of overhead linesworkers who work on low voltage lines that carry below 275,000 volts from the shortage occupation list.

4.75 Therefore, we recommend that:

- **the entire job title of overhead linesworkers be restored to the shortage occupation list.**
- **only migrant workers who are recruited at Linesman Erector 2 (LE2) level and above and who earn at least £32,000 be included in the job title; and**
- **the legacy status for overhead linesworkers be maintained.**

# Chapter 5 Graduate occupations in the digital technology sector

## 5.1 Introduction

5.1 The Government's commission asked that we review graduate occupations in the digital technology sector to determine whether there is a shortage of labour that it would be sensible to fill using labour from outside the European Economic Area (EEA) and therefore merit inclusion on the Government's shortage occupation list (SOL). The commission set no limit on the extent of our consideration other than that we have regard to the Government's policy that Tier 2 is now reserved for occupations skilled to at least NQF level 6 and in general the SOL should be aligned with that policy.

5.2 This chapter is structured as follows. Section 5.2 summarises the engagement we had with representatives from the digital technology sector. Section 5.3 sets out recent broader initiatives and key reports in this area by way of providing context, while section 5.4 considers the scope of the digital technology sector for the purposes of the shortage occupation list. We then in section 5.5 summarise the evidence presented to the MAC by partners before focusing on those job titles considered to be in shortage in section 5.6. Section 5.7 looks at how the shortage occupation list might best be used in the context of existing demand for IT workers under Tier 2 more generally. We conclude the chapter by raising broader issues in section 5.8 around how well the existing visa routes work for employers in this sector and summarise our recommendations in section 5.9.

## 5.2 Engagement with the digital technology sector

5.3 Our approach was to:

- contact relevant parts of government working with the digital technology sector;
- host an open forum meeting with partners from the sector; and
- visit key employers in the sector.

5.4 We made initial contact with parts of central government looking into the digital technology sector such as the Digital Economy Unit within the Department for Business, Innovation and Skills (BIS). We followed up with

partners who had been in touch with the Home Office about shortages within this sector, such as Tech London Advocates (TLA) (a coalition of individuals from the digital technology sector and broader community championing London as a world-class hub for tech and digital businesses) and techUK, a representative body for the digital technology sector. We held early meetings with colleagues from BIS, TLA's Talent and Immigration Working Group, and techUK's Skills, Talent and Migration Group.

5.5 We held an open forum with the digital technology sector on 17 October 2014 attended by a number of representatives from the sector. We visited Skills Matter and had a discussion with Wendy Devolder, the founder and CEO of Skills Matter, together with Russ Shaw, the founder of Tech London Advocates, plus others.

5.6 We were hosted by ScotlandIS and Tech London Advocates on a number of visits to digital employers. We discuss the Scotland visit in Chapter 7 of this report. In London, we were hosted by Tech London Advocates on a visit to Level39 at Canary Wharf. This is Europe's largest technology accelerator space for finance, retail and future cities technology companies. Start-up companies who are accepted as members are put in touch with experienced entrepreneurs, technology investors and industry experts to accelerate the growth of these companies and improve their access to markets. We met Eric Van der Kleij, the Head of Level39 and Managing Director of Pivotal Innovations, a company that designs and delivers customised innovation programmes to help businesses accelerate growth, along with the Head of Level39's eco-system development. We were given a tour of Level39's facilities and had a round table discussion with investors and representatives from scale-up companies and sector representative bodies.

5.7 We visited Unruly Media, a marketing technology company. We were given a tour of Unruly's premises by Sarah Wood, Unruly's co-founder, and talked with some of their developers and saw the work they were doing. We then had a meeting in Unruly's offices with representatives from a dozen small companies operating in the digital technology sector.

5.8 We also visited Passion Capital, an early-stage technology and internet venture capitalist firm, and again met with representatives from across the sector. A full list of those we met with is at Annex A to this report.

5.9 We had an informative joint presentation from Tata Consultancy Services and techUK, looking at what the digital technology sector means and then drilling down into more specific jobs and roles in shortage, followed by a question and answer session. We also had a conference call with representatives from Prospect (the trade union for professionals), PCG (an association for independent professionals), the Recruitment and Employment Confederation, the TUC and e-skills (the former sector skills council for the information technology and communications sector).

5.10 We also looked at a number of recent reports into the digital technology sector, including:

- *Technology and Skills in the Digital Industries* by the UK Commission for Employment and Skills (UKCES, 2013);
- *Information Economy Strategy* by HM Government (Department for Business Innovation and Skills, 2013);
- *Digital Skills for Tomorrow's World* by the UK Digital Skills Taskforce (UK Digital Skills Taskforce, 2014);
- *Big Data Analytics: Assessment of Demand for Labour and Skills 2013 – 2020* by the Tech Partnership and SAS (Tech Partnership, 2014);
- *Securing our Digital Future: the Tech UK Manifesto for Growth and Jobs 2015-2020* by techUK (techUK 2014);
- *The Startup Manifesto* by Coadec (Coadec 2014); and the
- *Skills Investment Plan for Scotland's ICT and Digital Technologies Sector* by ScotlandIS and Skills Development Scotland (Skills Development Scotland, 2014) (this last is discussed in Chapter 7).

5.11 We also had access to all the evidence presented to the House of Lords Digital Skills Committee who were conducting an inquiry into digital skills in the UK contemporaneous with our own consideration of this issue. The Lords Committee are due to report by March 2015.

5.12 Finally, we considered data around more detailed job titles in the digital technology sector mainly through IT Jobs Watch, a web site which tracks permanent and contract IT job vacancies. Although this presents detailed information on job titles, their salary levels and trends over time, our subsequent discussions with partners in the sector suggested a degree of caution over use of these data. We were told by representatives from the area of the digital technology sector that we focused on that recruitment was often done by more informal means (such as by word-of-mouth, social media and direct headhunting) rather than by formal advertising channels.

## 5.3 Context

5.13 Our immediate challenge was to try to understand and define the digital technology sector. This was a sector that we had not looked at before and with which we had had no prior dealings. Defining it was not an easy task and we do not claim to have been wholly successful.

> *"There is no consensus on how to define the digital sector".*
>
> BIS response to MAC call for evidence

5.14 We became aware in the course of our consideration of a number of other bodies and organisations also engaged in thinking about the digital technology sector. For instance, the Office for National Statistics (ONS) published a consultation on measuring the digital economy (ONS,2014f) and its response to the consultation identified some action to obtain more data around internet access and smaller companies as well as setting up a measuring the digital economy user group (ONS, 2014g). We have drawn on the information in these reports in our consideration of the evidence we received from partners.

5.15 The terms of reference for the previously mentioned inquiry led by the House of Lords Digital Skills Committee are to consider information and communications technology, competitiveness and skills in the UK. The Committee has set its inquiry within the policy framework of rapidly changing technology and to examine what this means for the labour market. The inquiry therefore focuses on the changes that are likely to occur as a consequence, and whether the UK's workforce has the necessary digital skills to deal with this change.

5.16 The UK Commission for Employment and Skills (UKCES) produced, in 2013, a report which aimed to provide new insights on the role of four emerging technologies (Cyber Security; Mobile technologies; Green IT and Cloud Computing) in driving high level skills needs in the digital sector (UKCES, 2013). The report combined data analysis, literature reviews and qualitative interviews to provide an assessment of the nature of skills needs, job roles and career pathways for these technologies. The report did not make recommendations but did look to provide future insights for higher level skills. UKCES suggested that the digital sector will be a major driver of the economy over the next ten years and that future trends and forecasts all predict sustained increased demand for high level skills in the sector. It was estimated that the sector requires nearly 300,000 recruits at Professional, Manager and Associate Professional level to fulfil growth potential and replacement needs to 2020. The priority themes across technologies emerged as cost reduction through technology; consumerisation through businesses and individuals driving uptake; and security, an increasing requirement across technologies.

5.17 In particular, UKCES reported a recurring finding across the technologies of a need for high level IT architects, big data and security specialists. The growing need for IT staff with the ability to analyse and interpret big data was widely reported. Such data is becoming increasingly valuable to organisations as they seek to gain a competitive advantage using the knowledge that can be unlocked from this resource. Similarly, a common skills theme emerging from employers across all four technologies investigated was the need for specialist cyber security staff, the concern being that as technology connects more and more devices the risk of security breaches becomes more and more of an issue. Interestingly, UKCES singled out up-skilling existing IT specialists with broader, deeper skills and more new specialisms as critical for continued growth and innovation in the new technology areas.

5.18 As examples of the sorts of skills sought, UKCES reported that business skills manifest themselves in the demand for high level sales and technical presales skills and techniques that are currently hard to source together with the need for IT specialists to communicate with their customers more proficiently and extensively. There were indications of increasing competition for higher level skills across these new technologies, with recruitment difficulties in higher value roles and in occupations with specialist skill sets such as IT architects, user experience designers, analysts and developers.

5.19 Finding suitably skilled staff was recognised by UKCES as a key challenge for employers in the sector in order to realise business growth and capitalise on the opportunities that these emerging technologies offer. Employers raised serious concerns with UKCES about the future supply of talented IT people that will be needed to fill the growing number of roles created by these emerging technologies.

5.20 The UK Digital Skills Taskforce published a report in July 2014 looking at what needs to be done to nurture home-grown talent to meet the needs of the UK's modern economy (UK Digital Skills Taskforce, 2014). The report made a number of recommendations including increasing diversity in the technology workforce, increasing support for computing studies in schools and universities, making increased use of digital apprenticeships, and increasing the basic digital skills of the UK population.

5.21 The sector skills council for the IT sector (e-skills) is transitioning into the Tech Partnership, a network of employers collaborating to grow the digital economy. The Partnership, which was launched on 26 November 2014, describes its priorities as accelerating the flow of talented people into technology careers (through increasing the uptake of apprenticeships, increasing the intake of new graduates, and promoting a broad range of pathways into the sector) and helping employers develop the digital skills for growth (by, for example, making it easier to find relevant training, establishing technology skills hubs, and providing access to government funding for training for employers willing to co-invest in skills of strategic importance to the economy). The Partnership aims to grow a million new jobs in the digital technology sector by 2025.

5.22 In September 2014, techUK published its manifesto for growth and jobs 2015 - 2020 (techUK, 2014) calling for, amongst other things:

- the appointment of dedicated Digital Ministers in every department;
- government to set a clear objective to double UK technology exports by 2020;
- a smart migration policy that allows high growth companies to tap into the world's best talent alongside measures to strengthen the pipeline of home grown skills;

- the UK to become a world-leading domain in data protection and strengthening public confidence in the use of data; and

- for government to ensure that the whole of the UK benefits, ensuring jobs and growth beyond the South East of England and doubling digital participation across all industries.

5.23 The Government's information economy strategy (Department for Business Innovation and Skills, 2013) sets out a vision for a thriving UK information economy with:

- a strong, innovative, information economy sector exporting UK excellence to the world;

- UK businesses and organisations, especially small and medium enterprises (SMEs), confidently using technology, able to trade online, seizing technological opportunities and increasing revenues in domestic and international markets;

- citizens with the capability and confidence to make the most of the digital age and benefiting from excellent digital services.

5.24 The strategy will work to deliver this by driving growth through data science by building the UK's analytic capabilities, improving the skills of the UK workforce, and supporting innovation and growth, amongst other things.

5.25 The theme of building the UK's analytic capabilities was echoed by the Tech Partnership and SAS (a firm dealing in business analytics software and services) report on big data analytics (Tech Partnership, 2014). This report looked at the demand for big data specialists, and how easy or difficult it was to recruit such specialists.

5.26 Coadec (the Coalition for a Digital Economy) was founded by digital entrepreneurs to campaign for policies to support new digital enterprises. They published their manifesto (Coadec, 2014) calling for government to support new enterprises in the digital technology sector. The manifesto wanted government to do this by improving access to finance and to talent and infrastructure, updating laws and regulations and using digital government to unlock innovation.

5.27 We also heard about some initiatives being pursued by the Home Office to help employers. These include Home Office Hours whereby members of the digital technology community can meet the Home Office, in conjunction with Tech London Advocates and Tech City UK, and learn about immigration legislation. A pilot online support service for small and medium sized businesses needing to recruit skilled overseas workers was launched by UK Visas and Immigration in partnership with the Greater London Authority aiming to provide a step by step guide to sponsoring an overseas worker. Although not an initiative aimed solely at the digital technology sector, this service has extended to some specifically digital

technology sessions. For example, UK Visas and Immigration taking part in a Google hangout event chaired by Tech London Advocates including a question and answer session covering information on how to employ skilled workers from overseas.

## 5.4 Scope of digital technology sector

5.28 The commission from the government suggested to us that the digital technology sector was limited to relatively small-scale start-up firms based in and around hubs of similar enterprises. However, we found quite early into our consideration that a number of partners thought that the digital technology sector was much larger than small-scale start-up businesses. It was put to us that all kinds of businesses now have a heavy digital component to them and that the need to be digitally proficient is an issue for many occupations. The report by the UK Digital Skills Taskforce quotes a participant in their consultation as saying *"every company is a digital company and almost every job is a digital job"* (UK Digital Skills Taskforce, 2014). Similarly, the Director of Technology and Innovation for the Technology Strategy Board in his evidence to the House of Lords Digital Skills Committee said *"One of the key characteristics that is changing is really the fact that digital is embedding itself into almost every sector we work with. Whether it is agriculture, transport or manufacturing, all of those now have a digital dimension".*

*"New technologies are also driving skills changes across the whole economy. Indeed, more IT specialists are employed outside the digital sector than within it. Of the total 1.1 million IT specialists, just 41 per cent are in the digital sector (467,000 equating to 57 per cent of the sector workforce). IT specialists working outside of the digital sector are most likely to be employed in finance and professional services, manufacturing and the public sector."*

UKCES, 2013

5.29 There was no agreement as to the terminology being used and the descriptive terms used often varied. The reports we looked at, and the partners we met with, referred to the digital economy, some to the tech sector and some to the information economy.

*"The information economy is a recognisable new dynamic force. At its core, it spans the familiar sectors of software, IT services and telecommunications services...However, the reach of the information economy is broader than this as it is constantly evolving and pushing into new areas."*

Department for Business Innovation and Skills, 2013

5.30 We were wary of considering job titles proposed by partners that were so broad as to open up Tier 2 to potentially large numbers of IT professionals other than those who would work in the designated sector, overloading the Certificate of Sponsorship (CoS) allocation system. However, we were cognisant of the fact that the commission was to consider shortages across the whole digital technology sector and so this is what has been done.

5.31 At a meeting with representatives from Skills Matter and Tech London Advocates we were again told that the sector is broader than just start-up firms and includes both large and small firms whose primary business may not be in technology but can encompass investment banking, betting, retail and gaming. This led us to wonder to what extent a digital technology sector can be meaningfully defined. If increasing numbers of modern jobs have a digital element to them, to what extent does it make sense to try and separate off a small segment of this for particular attention? Tech London Advocates define the digital technology sector as, broadly, businesses using digital resources to find, gather, create, communicate and use information. Within this sector, there are sub-categories (e.g. fintech, medtech, adtech), which are comprised of businesses using technology to manage, gather, create, communicate and use information in a way that is relevant to specific industries (e.g. finance, the medical profession, marketing and media).

5.32 Similarly, Tata Consultancy Services expressed to us their view that the digital technology sector is the business of enabling other parts of industry. The sector's function is to provide agility, to enable other industries to detect changes and reconfigure processes. For instance, Tata cited the fact that lots of the work that used to be handled by call centres is now dealt with by online self-help systems.

5.33 However, there did seem to be a distinction between, as Professor Philip Brown and Professor Alan Manning put it in their separate evidence to the House of Lords Digital Skills Committee, digital skills and skills for the digital economy. The former implies a certain facility with operating purely digital equipment (the ability to programme in a certain language, for instance) while the latter implies somewhat broader skills (such as entrepreneurial ability) over and above purely digital skills. This point was also made to us by employers who said that they could recruit staff with the necessary technical skills and knowledge but it was the broader skill-set of people who can work in interdisciplinary and cross-cultural teams that was held to be in shortage.

*"The main skills gaps in the digital sector were reported as job specific skills; planning and organisation skills; problem solving skills; written communication skills; and customer handling skills."*

UKCES, 2013

5.34 We observed that partners across the sector frequently described the growth cycle of digital technology businesses as comprising three stages of existence, characterised as start-ups, scale-ups and large employers. There is no agreed definition of these terms. Start-ups were described as new companies in the early stages of life and engaged in a search to identify a repeatable and scalable business model. They will normally be small, sometimes comprising just their founders and sometimes with a number of staff. *The Scale-up Report on UK Economic Growth* by Sherry Coutu defines scale-ups as being *"enterprises with average annualized growth in employees (or in turnover) greater than 20 per cent a year over a three-year period, and with 10 or more employees at the beginning of the observation period"*. Large employers are not defined but for the purposes of this report are characterised by recognised names such as Google and Microsoft.

5.35 Tech London Advocates in their evidence to us identified that often there are different immigration needs affecting start-ups, in comparison to scale-ups and larger more established companies. Start-ups for example often find that the time, cost and requirements to obtain a Tier 2 Sponsor licence are particularly burdensome. This point is also made in Coadec's manifesto (Coadec, 2014).

*"The process of getting licensed to sponsor Tier 2 visas is not cheap, can be exceptionally complex and bureaucratic, and is time consuming".*

Coadec, 2014

5.36 Because our commission asked that we consider the digital technology sector, this is the term we use throughout the rest of this chapter. We did not consider it necessary to further determine the scope of the sector but are content that the evidence we received and discussed here does relate to occupations that fall within the terms of our commission from the government.

5.37 We note that almost all of the engagement we had as regards job shortages in the digital technology sector came from, or were made on behalf of, businesses in the start-up and scale-up categories. The only evidence we had directly pertaining to larger employers in the digital technology sector came from Tata Consultancy Services and from Infosys. It may be that the lack of evidence from larger employers indicates that such employers were unaware of our call for evidence or it might be that

they are able to source all the employees they need. Either way, the majority of our engagement was concerned with smaller-scale employers and this is where our focus falls in this report. We stand ready to return and look again at the position of larger employers should we be commissioned to do so.

## 5.5 The evidence we received

5.38 On the whole, the written evidence we received from partners, while helpful, did not itself offer convincing evidence of job shortages. The number of responses to surveys from representative bodies tended to be on the low side and in some cases the responses asserted shortage rather than providing evidence of shortage. However, we did receive very good evidence from the sector in the meetings and visits that they were able to host for us. We are conscious of the time pressures on many of these employers and understand that they may not have the time to complete a survey but those we met were very giving of their time and knowledge to help us gain a much better understanding of the sector and the impacts of skill shortages.

5.39 There were a number of recurring points made in our discussions with employers and we have drawn these points together from their different sources to present what we took away as the prevailing view. First, however, we will summarise some of the written responses we received before going on to look at the common points raised both in these responses and in our discussions with employers. We include at Annex D a more detailed list of the job titles suggested to us by these partners for inclusion on the shortage occupation list. These include jobs in mobile development using iOS and Android operating systems; front end development putting together those elements of a website that customers interact with directly; and dev ops, a software development method that brings together a range of techniques from software developers and IT professionals.

5.40 Tech London Advocates circulated a survey through their Tech London Advocate network and the replies to this survey informed their response to our call for evidence. The evidence provided to us identified a number of detailed specific roles that were held to be in shortage and that fell into various groups. The groups identified were:

- native mobile application development requiring experience of the technologies used to develop applications which work directly on mobile devices, such as tablets and smartphones;
- web applications development jobs relating to the development of browser based web applications;
- chief technology officer jobs for persons who will lead teams on web applications development;

- product manager jobs whose role is to supervise the functionality of the end product i.e. whether and how it satisfies the end user's requirements, what features it has, and how it is to be sold; and

- quality control and testing jobs.

5.41 techUK also conducted a survey of its members as part of their response to our call for evidence. The three most regularly cited and most pronounced shortages were in the following specialisms:

- Senior developers

- Big data specialists

- Cyber security specialists

5.42 More than half of those who completed the survey stated that they had a shortage of specialised developers. Again a detailed list of the job titles they supplied is given in Annex D.

5.43 We also had an informative presentation from Tata Consultancy Services (TCS) and techUK looking at the digital economy and its wider implications. TCS gave examples of the areas of most severe shortage they were experiencing in emerging technologies. These were mainly in big data (such as Hadoop, Python, NoSQL, ElasticSearch) and mobile platform technologies (iOS, Android and Windows). The job titles in which they were looking for these skills were those of:

- Business analyst

- IT project/programme manager

- Software developer

- Software tester

- Systems designer

- Systems analyst

- Technical architect

5.44 TCS said that although they brought large numbers of employees to the UK via the intra-company transfer route, they would prefer to use the shortage occupation route for at least some of these people. Under the shortage route, employees could stay in the UK for longer ensuring that the same staff saw projects of greater duration through to completion. It also meant that they could bring over staff without them having to have worked for TCS for twelve months first. We consider the TCS response in the next section of this chapter.

5.45 Another large user of the intra-company transfer route is Infosys Limited who asked that the following job titles in the digital technology sector be added to the shortage occupation list:

- Technology lead
- Technology architect
- Senior technology architect
- Consultant

5.46 Infosys said that while primarily they provide offshore-based software services, where their UK-based roles require a longer-term exposure in the UK or for senior or more specialised positions they seek to hire staff in the UK. They told us that they found several roles very difficult to source from the UK labour market partly because the number of graduates with IT and engineering backgrounds in Europe is low compared to what is available in non-EEA countries and that this gap is increasing. In addition, demand for these skills is rising following the economic recovery and demand and competitiveness within the IT industry is increasing. As with the evidence from TCS, we consider Infosys' response in the next section.

5.47 BIS said that employers had reported the need for programme and software developers and staff with web development skills. Gaps were being identified in specialist technical skill areas such as cyber security, big data, mobile, e-commerce and cloud computing.

5.48 Rolls Royce wrote to us in respect of two IT data management roles that they were having trouble filling. They said that the roles required knowledge and management of big data solutions and that while organisations are moving into big data solutions, the candidate market has not developed at the same rate.

*"From a STEM perspective, current candidates in the employment market have not had the same exposure to this type of technology solution".*

Rolls Royce response to MAC call for evidence

5.49 Rolls Royce gave the example of a basic search of LinkedIn around this skill-set (i.e. with no specific technical criteria included such as CRM or MDM) yielding just over 2,000 professionals working in the UK in this field. Filtering this by adding just one criterion of relevance to Rolls Royce's requirements reduces this number to just over 200. Adding a second relevant criterion reduces the number to less than 100. Rolls Royce said that the US has five times more people working in this area than any other country, with the next top countries being the UK, India, Canada and Australia. They say that this indicates that more than 90 per cent of those with relevant skills work in countries that are outside of the EEA.

5.50 We were also asked by NMI, a representative body for the electronics industry, to consider a number of jobs which seemed to us to belong in the field of electronic engineering rather than digital technology. Two of these roles, however, did seem relevant to this present chapter, namely embedded software engineer and compiler developer. We consider all of NMI's nominations in more detail in Chapter 6, but we did not feel there was sufficient evidence of shortage (only NMI mentioned these roles) to warrant further consideration of these jobs. But we would like to have a better understanding of these roles and to give more consideration to their assignment under the digital technology or electronic engineering fields. We hope that partners will help provide this to us at our next review of the shortage occupation list.

5.51 We have set out in Annex D the lists of job titles that we were asked to consider for inclusion on the shortage occupation list. These lists are long and contain quite specific roles. Although we recognise that the sector is saying these roles are in shortage now, we have concerns as to how long this may be the case. The digital technology area is fast moving and demand for skills can change at very short notice. **Paradoxically, having an extensive list of specific job titles may serve to restrict the sector more than having a shorter list of broader roles as the latter option will give employers more flexibility over recruitment. Indeed, this concern was stated by employers within the sector who said that they did not need a list of jobs that sat there for twelve months without being used.**

5.52 Our discussions with employers helped us identify the broader roles that we feel will help employers address those areas of shortage that arise most frequently. These wider job titles were felt to encompass many of the smaller roles nominated by employers. The next section considers what job titles should fall under these broader roles.

5.53 It is worth noting that the evidence we received on digital technology was almost entirely from employers in London (and Edinburgh in the case of the Scotland evidence). We did ask to see employers outside of London but no-one took us up on this. We are, however, aware of other parts of the UK with an interest in the digital technology sector and have taken the evidence from representative bodies as speaking on their behalf. We stand ready to hear more from employers outside of London should we be asked to look at this sector in the future.

*"Information economy businesses are highly clustered across the country, with very high counts in the Greater South East, notably London (especially central and east London), as well as big cities such as Manchester, Birmingham and Bristol. Looking at local clusters, we find hotspots in Middlesbrough, Aberdeen, Brighton, Cambridge and Coventry, among others."*

NESTA, 2014

## 5.6 Consideration of job titles

5.54 Before looking in detail at each of the jobs we recommend for inclusion on the shortage occupation list, we make some general points in relation to all of these jobs.

5.55 We were told that start-ups and scale-ups do not have the same resources as large employers. Smaller operations often offer a share in the business to attract high quality senior staff who are willing to take a risk by joining a less established venture. Employers told us that while this may mean having to give up a lot of equity, the right person can increase a firm's users by figures in the millions. If they are unable to offer a competitive salary, this makes it harder to recruit key staff. Just when a company is taking its first steps to grow, it can face a key barrier to growth in the form of the talent available. Such businesses may turn to the skills of what is termed a growth hacker. This can be a short-term position for perhaps six months or so, to help make their product, and hence their company, grow exponentially. The job title of growth hacker was suggested to us as a candidate for the shortage occupation list but we could not easily assign a SOC code to it and we felt it was perhaps too new an occupation, with skills that were too fluid (or ill-defined), to be a good candidate at this stage.

5.56 But this consideration leads us to a more salient point that was made to us. Employers told us time and again that what they were looking for were experienced people. Companies that were starting to grow needed to bring in staff with knowledge and experience of taking firms through this growth process, whether they were growth hackers or had other skills outlined below. Employers were particularly looking for experienced workers with knowledge of product development and design and who could teach and lead teams from realisation of an idea through to coming on stream and then successful launch to market. They were people who could make the difference between success and failure and as such were in high demand. We were told that, for each of the jobs we considered, the most pressing need was to recruit persons with experience of working at a senior, responsible level. These were the persons who would help a scale-up company to grow into the next stage of its development. It was stated that in many, though not all, instances these people would come from the United States where digital technology companies were held to be five years or more ahead of the UK in terms of their experience.

*"The experience of business accelerators in the digital tech environment is that, because the tech scene is still relatively young in the UK, the involvement/mentorship of experienced people who have been through growth cycles overseas is essential to the UK's burgeoning start-ups. In the highly collaborative world of tech, UPSKILLING resident workers is an explicit goal; and one that can have a huge positive impact on the UK, overall, but only if the key roles are actually filled. Newly qualified resident graduates need the support and management of more skilled/experienced mentors. At the moment, these mentoring roles require migrant workers."*

Tech London Advocates response to MAC call for evidence

5.57 Partners told us that it was most productive to bring in people with at least five years' experience. Such staff would have skills that they would then transfer to UK staff. We explicitly asked employers how we could ensure that they get the right people and their response was that we should require proof that the person being recruited had led a team of more than five people. We consider this an important part of our proposal in that it helps identify those staff specifically in shortage rather than opening the door too widely to staff in generic IT roles.

5.58 We did ask employers why they could not make more use of technology to enable staff to work from a different location. We were told that off-shoring and outsourcing some elements of a digital technology company's work had been tried in the US and found not to be successful. Employers recognised that automated, routine work that could be separated off from other tasks could be outsourced to countries like India. But companies that were looking to grow needed to have their growth team on-site. One employer told us that having all developers co-located meant a minimum 10 per cent jump in success due to the employer's ability to deploy more agile methodologies. Newer businesses need to be much more flexible in the speed of their response; the way in which they take and use customer feedback can determine whether they will succeed or not. Fast and effective communication is essential in developing a project in response to customer needs. At Unruly Media we saw how developers were all working jointly on the same project in order to generate ideas off each other and improve problem solving. Level39 told us that they would be unlikely to accept applications from companies that did not have all their developers on-site and investors made similar comments.

5.59 Employers estimated that it would take five to ten years to develop enough UK workers with sufficient experience to fill these roles. If having relevant experience is the key factor in all these jobs then there is no short cut to the acquisition of this. **What would speed up the development of UK staff would be bringing in senior figures with the experience that they could impart to the existing team.**

*"We also see the emergence of non-traditional working models and an increased emphasis on collaboration in the workplace. This reliance on collaboration makes it all the more essential that the key shortage roles are filled as it is only through filling these roles that businesses are able to upskill their existing staff."*

Tech London Advocates response to MAC call for evidence

## Job titles recommended for inclusion on the shortage occupation list

5.60 The list of job titles, and their respective SOC codes, in the digital technology sector that we are recommending for inclusion on the shortage occupation list is set out below. The list also includes illustrative examples of some of the roles that these broader job categories can encompass.

- Product manager (someone who has oversight of the design and delivery of the product) – SOC 2133 IT specialist managers
- Data scientist (someone who carries out analysis of big data sources: this encompasses other roles such as data engineer, big data specialist, data analyst, big data consultant) – SOC 2135 IT business analysts, architects and systems designers
- Senior developer (someone who can lead a team of developers: this encompasses other developers with skills in areas such as iOS, Andoid, Java, Drupal etc as well as front end and back end developers) – SOC 2136 Programmers and software development professionals
- Cyber security specialist (someone who applies security measures to ensure the confidentiality, integrity and availability of data: this encompasses other roles such as security architect, information assurance consultant, security operational analyst and cyber security consultant) - SOC 2139 Information technology and telecommunications professionals n.e.c.

5.61 We now look at the top-down data followed by the bottom-up evidence for each of these jobs in turn and then look at the evidence in relation to skill, shortage and sensible for all of them.

## Product manager

5.62 Box 5.1 below presents the top-down data for SOC 2133 IT specialist managers and shows that this occupation passes only three out of our ten available indicators. However, we are not considering the whole of this occupation, only the single job title of product manager. The role of product manager appears in some form under a number of different SOC codes, mostly in relation to sales and manufacturing. We have chosen here to locate it within SOC 2133 IT specialist managers which contains a

couple of job titles – manager, production (computing) and manager, product (computer services) – which seem most relevant.

**Box 5.1: IT specialist managers**

**4-digit SOC 2010 Occupation: 2133 IT specialist managers**

**Only the following job titles within this occupation are presently included on the shortage occupation list:**

This occupation is not included on the shortage occupation list.

**Top-down data**

| **Shortage** | **Occupation passes 3 out of 10 available indicators** | | |
|---|---|---|---|
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | -0.05 | **V2:** Percentage change of employment level (over 1 year) | -1.07 |
| **P2:** Percentage change of median real pay (over 3 years) | -4.37 | **V3:** Percentage change of median paid hours worked (over 3 years) | -0.27 |
| **P3:** Return to occupation | 0.41 | **V4:** Change in new hires (over 1 year) | 0.45 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | 12.05 |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | 93.70 |
| **V1:** Percentage change of claimant count (over 1 year) | -59.59 | **E3:** Skill-shortage vacancies / employment | 0.05 |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 13.2% | Percentage of workforce trained in past 13 weeks | 25.1% |

**Total employment in this 4-digit occupation is approximately 180000 (average, LFS, 2013Q4-2014Q3)**

Partner evidence received from: Tech London Advocates; techUK; digital technology employers at meetings with MAC

5.63 Product managers were described as being at the centre of everything, articulating strategy, defining requirements and deeply involved in on-going delivery. A product manager immerses themselves in the customer journey and advises on the design of the product; someone who shifts an idea into actuality. They should be able to work with and understand software engineers but also have a flair for design. One employer told us of how they were looking to expand into new markets in France and Germany and wished to recruit someone who could lead development in these new territories.

5.64 Such a role was crucial to companies on the cusp of expanding as more often than not, it is the model for start-up companies to go to market with a product that is not ready and then develop that product in conjunction with users rather than spend years in research and development themselves. The absence of someone with these skills was said to slow progress in the development of companies as the Chief Executive most often ended up taking this role on.

5.65 The US was described as being five to ten years, or more, ahead of the UK on product development. Some institutions in the US now teach product manager skills. There are product managers working in the UK but mostly, we were told, for large employers. Scale-up companies need to bring in experienced product managers who could help them grow. Employers told us that they were looking for persons with five or more years experience and who could demonstrate having previously led a team through this growth process. The team they would be leading would benefit from skills and knowledge transference from an experienced leader.

## Data Scientist

**Box 5.2: IT business analysts, architects and systems designers**

| | |
|---|---|
| **4-digit SOC 2010 Occupation:** | **2135 IT business analysts, architects and systems designers** |

**Only the following job titles within this occupation are presently included on the shortage occupation list:**

The following job title within visual effects and 2D/3D computer animation for film, television or video games sectors: systems engineer.

**Top-down data**

| **Shortage** | **Occupation passes 3 out of 10 available indicators** | | |
|---|---|---|---|
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | -1.40 | **V2:** Percentage change of employment level (over 1 year) | -1.70 |
| **P2:** Percentage change of median real pay (over 3 years) | -2.42 | **V3:** Percentage change of median paid hours worked (over 3 years) | -0.27 |
| **P3:** Return to occupation | 0.45 | **V4:** Change in new hires (over 1 year) | 1.53 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | 23.92 |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | 77.68 |
| **V1:** Percentage change of claimant count (over 1 year) | -53.56 | **E3:** Skill-shortage vacancies / employment | 0.28 |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 12.1% | Percentage of workforce trained in past 13 weeks | 28.1% |

**Total employment in this 4-digit occupation is approximately 104000 (average, LFS, 2013Q4-2014Q3)**

Partner evidence received from: techUK; Rolls Royce; digital technology employers at meetings with MAC

5.66 Box 5.2 above presents the top-down data for SOC 2135 IT business analysts, architects and systems designers and shows that this occupation passes only three out of our ten available indicators. However, we are not considering the whole of this occupation, only the single job title of data scientist. We have chosen to include the job title of data scientist under this SOC as the SOC already includes the jobs of analyst (data) and scientist (computer), and because it was also nominated as the relevant SOC code by techUK in their evidence to us, albeit under the slightly different job title of big data specialist. They also suggested it could sit under 2136 (Programmers and software development professionals) and it is worth noting that data analyst job roles could also relate to the non-ICT

related SOC of 3539 (Business and related associate professionals n.e.c.).

5.67 Data scientists carry out analysis of big data sources. A report by SAS, a company delivering business analytics software and services, defined big data as "the vast amounts of information collected through systems and monitors; automated business processes; the increased use of smart devices such as mobile phones and tablets; social media and GPS tracking" (SAS, 2014).

5.68 A number of the employers we met were in agreement over the need to bring in some experienced big data scientists. This role combines a formal knowledge of computer science and applications, modeling, statistics, analytics and mathematics together with a strong sense of business and the ability to communicate with and influence business and IT leaders to improve the way in which a company tackles a business challenge. Employers gave examples of where they had received ten job applications over the last three months, none of which had the right combination of highly developed statistical skills and business knowledge.

5.69 An employer cited a case where they had brought in a chief scientist under the Tier 2 route and this had led to the recruitment of an additional four or five graduates who were learning the work from this experienced person. Time and again, the sector stressed to us the keenness for and the necessity of staff teaching each other new skills.

5.70 A report by the Tech Partnership and SAS in October 2014 (Tech Partnership, 2014) assessed the demand for big data labour and skills in the UK and found that the majority of demand was for developers with other big data staff being in demand including architects, consultants, analysts and administrators. Data scientists were described as accounting for a small proportion of big data jobs overall but it was noted that demand for this role had doubled over the past year. Companies responding to the Tech Partnership's survey that informed this report said that big data positions were found harder to fill in 2013 than any other groups of managerial or professional staff. Respondents highlighted data scientists as having been the most difficult to fill during the previous year, almost one half (47 per cent) stating that it had been very difficult to recruit for such positions.

5.71 TCS told us that big data differs from traditional data management in terms of scale and the unstructured variety of the types of data. They predicted that the big data technology and services market would be worth $32.4 billion by 2017, a 27 per cent compound annual growth rate. TCS identified staff with big data skills as being extremely difficult and highly expensive to recruit and said that big data is not something that can be up-skilled from traditional data management roles as it requires a totally different skill-set. It requires strategic rather than tactical skills.

5.72 techUK's evidence cited returns from employers saying that earnings have been increasing for big data specialists. Half of those employers reported

having had vacancies for this specialty of longer than 6 weeks, and most expect this level of shortages to continue over the next 12 months. University degree equivalent skills were required by all relevant employers and most required relevant work experience also. Evidence on advertising outside the UK and the training offer to staff was inconclusive on whether indicating a shortage or not. A joint techUK and e-skills survey from October 2014, at the request of the Government's Digital Ministerial Taskforce, received 66 responses from a variety of small, large and medium companies across the UK. The survey found that big data analysis and big data development were the two most needed skills for the respondents over the next five years.

## Senior Developer

**Box 5.3: Programmers and software development professionals**

| | |
|---|---|
| **4-digit SOC 2010 Occupation:** | **2136 Programmers and software development professionals** |

**Only the following job titles within this occupation are presently included on the shortage occupation list:**

The following job titles within visual effects and 2D/3D computer animation for film, television or video games sectors: software developer, shader writer and games designer.

The following job titles within the electronics system industry: driver developer, embedded communications engineers.

**Top-down data**

| **Shortage** | **Occupation passes 6 out of 10 available indicators** | | |
|---|---|---|---|
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | 0.15 | **V2:** Percentage change of employment level (over 1 year) | 7.43 |
| **P2:** Percentage change of median real pay (over 3 years) | 0.32 | **V3:** Percentage change of median paid hours worked (over 3 years) | 0.00 |
| **P3:** Return to occupation | 0.34 | **V4:** Change in new hires (over 1 year) | 5.04 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | 48.51 |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | 96.74 |
| **V1:** Percentage change of claimant count (over 1 year) | -53.00 | **E3:** Skill-shortage vacancies / employment | 1.47 |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 21.9% | Percentage of workforce trained in past 13 weeks | 23.2% |

**Total employment in this 4-digit occupation is approximately 262000 (average, LFS, 2013Q4-2014Q3)**

Partner evidence received from: techUK; digital technology employers at meetings with MAC

5.73 Box 5.3 above presents the top-down data for SOC 2136 Programmers and software development professionals and shows that this occupation passes six out of our ten available indicators and is therefore viewed as being in shortage. This is of relevance to the job title of senior developer which has been placed under this SOC with the closest job titles being developer (computing). This was also the SOC identified by techUK in their evidence to us in relation to the senior developer job title.

5.74 Although we received evidence asking that we include detailed developer skills on the shortage occupation list, the key factor which linked these skills was for the recruit to have significant levels of experience of using these skills and of leading teams. Employers told us that the new recruits from university did not have the specific skills to develop teams and often people from a technology background did not want the additional responsibility of taking such a role on. Again, we were told it was experience that was most sought after along with the proven ability to show leadership of a team of other staff.

5.75 Large employers were increasing the salaries of such developers. This had the effect of making experienced developers increasingly scarce for smaller employers who can find it difficult to match the salaries on offer. One small employer did tell us that they had just taken on a senior developer from New Zealand on a salary of £70,000. Employers told us that having the right senior developers in place did lead to a knock-on increase in the numbers of junior developers being taken on. For these reasons, employers wanted to see senior developers added to the shortage occupation list.

5.76 techUK did provide some quantitative data on senior developers to support their findings on shortage. They said that the majority of survey respondents (12 out of the 19 that responded to this question) reported that earnings for senior developer roles had increased by more than 10 per cent over the previous year. One survey respondent said, that for Java development in the past twelve months, the salaries have risen from a range of £35,000 - £40,000 to £45,000 - £55,000 and that this was due in part to individuals choosing careers as contractors to benefit from rising rates of contractor pay. This latter point, that salaries were rising as employees were choosing to work as contractors, was also made to us by a number of other respondents. It does beg the question to what extent are shortages actually the result of employers' reluctance to pay the higher wages commanded by contractors; and the extent to which they wish to avoid paying this by recruiting more directly employed staff. Alternatively, it could be the case that contractors earn more because of a shortage of permanent staff, which leads to more staff leaving to become contractors. Either way, there is evidence of increased pay for permanent staff across the sector.

5.77 Out of the 19 techUK respondents, 16 also reported having had senior developer job vacancies open for longer than 6 weeks over the previous 12 months, and that the developers they needed had to have skills equivalent to university degree level and specific work experience. Respondents were divided as to whether vacancies were advertised outside of the UK. It was said that companies working within the defence industry required UK citizenship or specific UK security clearance for their employees. A majority of employers reported increasing their training offer to staff in order to source more senior developers internally.

## Cyber Security Specialist

| Box 5.4: Information technology and telecommunications professionals n.e.c. | | | |
|---|---|---|---|
| **4-digit SOC 2010 Occupation:** | **2139 Information technology and telecommunications professionals n.e.c.** | | |
| **Only the following job titles within this occupation are presently included on the shortage occupation list:** | | | |
| This occupation is not included on the shortage occupation list. | | | |
| **Top-down data** | | | |
| **Shortage** | **Occupation passes 6 out of 10 available indicators** | | |
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | -1.23 | **V2:** Percentage change of employment level (over 1 year) | -2.62 |
| **P2:** Percentage change of median real pay (over 3 years) | -8.30 | **V3:** Percentage change of median paid hours worked (over 3 years) | 0.00 |
| **P3:** Return to occupation | 0.47 | **V4:** Change in new hires (over 1 year) | 1.55 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | 39.80 |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | 90.49 |
| **V1:** Percentage change of claimant count (over 1 year) | -55.36 | **E3:** Skill-shortage vacancies / employment | 0.64 |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 15.0% | Percentage of workforce trained in past 13 weeks | 24.4% |
| **Total employment in this 4-digit occupation is approximately 163000 (average, LFS, 2013Q4-2014Q3)** | | | |
| Partner evidence received from: techUK; digital technology employers at meetings with MAC | | | |

5.78 Box 5.4 above presents the top-down data for SOC 2139 Information technology and telecommunications professionals n.e.c. and shows that this occupation passes six out of our ten available indicators and is therefore viewed as being in shortage. This is of relevance to the job titles of cyber security specialist. We placed cyber security specialist under this SOC with the closest job title being analyst, security, IT and because it was nominated under this SOC by techUK.

5.79 As with the other job titles, respondents reported an increase in wages, by more than 10 per cent according to techUK; having vacancies persist for longer than six months; expecting to see shortages continue over the next 12 months; and requiring university level skills and relevant experience. Respondents also reported tending not to advertise outside of the UK and some have offered training to upskill their own staff while others have not.

5.80 Cyber security skills were held to be in demand across digital technology disciplines including architects, engineers, and consultants. In relation to the cyber security specialist job title, respondents mentioned shortages in nine roles:

- Cyber security consultant/engineer

- Security architect
- Information assurance consultant
- Senior cyber researchers
- Security operational analyst
- Information assurance (i.e. cyber) specialist
- Information security
- Sales consultant security
- Sales consultant cloud security

### Skilled

5.81 We measured the evidence in relation to each of these jobs against our skilled, shortage, sensible criteria. We are content that they are at the requisite NQF6 and above skill level. Employers confirmed that although there is not a requirement to be a graduate in any specific subject to be employed in one of these roles, the people they took on were invariably graduates, usually, though not always, from a numerate discipline. Equally, if not more important than IT knowledge, was the ability to think laterally, to problem solve, to be curious and to be entrepreneurial.

> *"Transformational leaders with good interpersonal skills, able to communicate with directors and support corporate objectives are in increasing demand."*
>
> Tech London Advocates response to MAC call for evidence

5.82 It is in this regard that skills around working in the digital technology field are more sought after than solely digital technology skills. Evidence to the House of Lords Digital Skills Committee from respondents such as Prospect, the trade union for managers, specialists and professionals, said that the need for digital skills divides into two distinct pathways: the need for a general workforce able to work in an increasingly digital environment and the need for specialists to build and maintain that environment.

*"Digital Skills, for me, conjure the idea of a high-tech toolbox. How do you use the internet? How do you use wi-fi?...The skills for the digital economy or the knowledge economy or whatever you want to call it, have to be much broader. I have interviewed many multinational companies' HR but also operations directors and what always strikes me anywhere in the world is the same thing. They say there is no real shortage of technical skills...But the problem they always state is the problem of mindsets: the problem of people who are proactive, who can work in interdisciplinary and cross-cultural teams and who have international experience of that."*

Professor Philip Brown oral evidence to House of Lords Digital Skills Committee, 8 July 2014

5.83 The SOC codes within which these jobs fall have all been previously assessed as being at level NQF6 and above. The salary levels quoted for these jobs also indicated that they are skilled according to our criteria.

## Shortage

5.84 We were told of vacancies which had remained unfilled for a number of weeks and we did take into account the fact that in a very fast moving sector like digital technology the delay of a few days in recruiting staff could make the difference between success and failure for an enterprise. We were also told and saw evidence that salaries are rising. However, we note that permanent staff were sometimes leaving employers to return as consultants as this commanded a higher rate of pay. The rising cost of staff may in part be due to previous employees working as consultants rather than because of problems in recruiting the relevant staff. Though this itself may be a symptom of a pre-existing shortage of skilled workers. It is also important to note that often smaller employers could not afford to match the high salaries paid by larger, more established employers. Instead, some smaller companies offered such staff equity. This meant that skills may not be directly reflected in the salary paid.

5.85 We did not get evidence direct from Prospect but we have seen their evidence to the House of Lords Digital Skills Committee where they state that there are generic skills shortages within the digital technology sector and reference data from UKCES pointing to 22 per cent of vacancies being the result of skill shortages.

5.86 We note that we did not receive much evidence directly from larger employers and therefore conclude that most such employers are able to recruit the staff they need. Any significant shortages within the sector, on the basis of the evidence we received, seem presently to mainly be confined to firms at the start-up/scale-up end.

5.87 The exception to this is the evidence we received from TCS and from Infosys. Both TCS and Infosys are large users of the intra-company transfer route and between them acquired over 7,000 certificates of

sponsorship for migrant workers in IT related jobs in the year ending September 2014. TCS were open about their preference for using the shortage route for at least some of these people. But these were in relation to people with generally less experience, often who had not been working for TCS for twelve months. This runs against the evidence we got from other employers whose preference was to bring in experienced staff.

5.88 Infosys said that they were finding jobs difficult to fill because the number of graduates with IT and engineering backgrounds in Europe is comparatively small compared to that of graduates in these subjects from non-EEA countries. We did not find that many partners expressed views in support of this. Some said that there were lots of graduates available with relevant degrees but what they lacked were wider skills and experience. We were also aware of the commitment of groups like the Tech Partnership to create new jobs in the sector and to upskill the workers to fill them.

5.89 It is probable that the four wider roles we have decided to recommend for inclusion on the shortage list encompass at the more senior level some or all of the jobs identified by TCS and Infosys. In which case, the Home Office will wish to think carefully about whether or not allowing two such heavy users of the intra-company transfer route access to the shortage route might have a high impact on the numbers of CoS available. We discuss the implications of this in the next section.

5.90 We did receive evidence from one source to the effect that there were not large-scale shortages across the digital technology sector. This came from IPSE, the Association of Independent Professionals and the Self-Employed. IPSE said that they believed that the majority of occupations in the digital technology sector were not in acute shortage as many occupations in the sector utilise skills which are transferable, and that many jobs can be filled by workers on a contract basis rather than by permanent employees. They considered that employers were not making full use of the existing Resident Labour Market test (RLMT) route to recruit from outside the EEA, nor were they drawing on existing skills.

5.91 We took note of the points made by IPSE. We agree that the digital technology sector can make use of transferable skills. But the point made to us by scale-up employers was that they needed to bring in staff from outside the EEA who had those initial skills that were not available in the UK in order to be able to teach them to UK staff. The fact that employers could make use of contractors was also made to us by employers themselves. However, they stated that they would far rather recruit permanent members of staff. We agree that employers should make more use of the RLMT route, subject to what we say in paragraphs 5.101 and 5.102 about the cost to smaller employers of using the visa application process. We would also like to see employers, where possible, drawing on existing skills. It is our consideration of the points made by IPSE which have, in part, determined the final form of our shortage list recommendations in respect of the digital technology sector.

### Sensible

5.92 We saw evidence of employers training and reskilling their staff in some areas where they said they had shortage. On several occasions, we were told that more of such training would occur but for a lack of experienced people to do the training. Respondents told us that the recruitment of skilled, experienced people would enable the company to grow and recruit more staff and would also enable existing staff to learn new skills.

5.93 We asked partners whether they could not make greater use of teams of staff based outside Europe and we were told of some examples where employers had done this. The key determinant was whether there were tasks that could neatly be separated off from the rest of the organisation's body of work. In such cases, basing staff elsewhere was a possibility. In all other circumstances, however, employers made a reasonable case that the collaborative nature of their work combined with the synergies generated by proximity working meant that distance working was a model that would not generate the best possible outcomes.

5.94 We conclude that, on balance, we saw sufficient evidence to lead us to recommend the addition of the product manager, data scientist, senior developer and cyber security specialist jobs to the shortage occupation list. Employers told us that these job titles best delivered the wider variety of skills that were being sought. We took note of TCS' and Infosys' desire to bring in more junior staff in these roles but the majority view of the scale-up employers was that it was most productive to bring in people with at least five years' experience. This seems to us to be right as it is such people who will be best placed to upskill the UK workforce in this sector. We also explicitly asked employers how we could ensure that they get the right people and their response was to require proof that the person being recruited had led a team of more than five people.

## 5.7 Identifying areas of greatest need

5.95 In considering the addition of certain job titles in the digital technology sector to the shortage list, we were highly conscious of the scale of IT workers already entering the UK under Tier 2.

5.96 In the year to the end of September 2014, around 30,000 non-EEA migrant CoS were allocated for graduate level IT-related occupations (Table 5.1 below). Presently, fewer than 200 come under the shortage list, though nearly 6,000 do so under the Resident Labour Market Test. The vast majority of IT workers come into the UK under the intra-company transfer route, where different, and arguably less favourable, conditions apply pre- and post-entry, and where there is no route to settlement in the UK. Annex B provides a breakdown of the average age, salary and allowance as well as main nationalities under each route for IT-related occupations.

5.97 Additional Management Information from Home Office set out in Table 5.2 shows that the employers that make the most use of these routes in the IT sector are all established names.

**Table 5.1: Certificate of sponsorship applications, Year ending September 2014**

| SOC | Title | SOL | RLMT | ICT short-term | ICT long-term |
|---|---|---|---|---|---|
| 2133 | IT specialist managers | - | 222 | 200 | 714 |
| 2134 | IT project and programme managers | - | 263 | 595 | 1709 |
| 2135 | IT business analysts, architects and systems designers | 26 | 1379 | 4724 | 2837 |
| 2136 | Programmers and software development professionals | 157 | 2505 | 7173 | 1728 |
| 2137 | Web design and development professionals | - | 494 | 212 | 26 |
| 2139 | Information technology and telecommunications professionals n.e.c. | - | 1079 | 3574 | 845 |
| **Total** | | **183** | **5942** | **16,478** | **7859** |

Source: UK Visas and Immigration Management Information, 2015 (Please see Annex B for necessary caveats and detailed methodology).

5.98 Our concern is that too liberal a description of the roles that are held to be in shortage could encourage large employers to switch staff presently being brought in under the intra-company transfer route to staff using the shortage route. Indeed some partners readily admitted the attractiveness of doing so. As can be seen from the numbers involved, this would have a major impact on the availability of CoS to other occupations under both the shortage and RLMT routes, which between them are subject to an annual cap of 20,700 and of which the shortage route currently uses around 1,400 CoS only.

5.99 As noted above we only received evidence from two of these major users of the intra-company transfer route stating that they were experiencing a shortage of digital technology staff. We recommend, therefore, that the Government consider the best way to help the sector from which we did hear evidence about experiencing a shortage of skilled occupations, namely start-up and scale-up firms in the digital technology sector.

**Table 5.2: Digital Technology - Top 10 Tier 2 Certificates of Sponsorship by Job titles and Organisations based on all Tier 2 Certificates of Sponsorship, year ending Sept 2014**

| SOC code | Job Title | Total number of CoS | Organisation Name | No. of CoS by sponsor |
|---|---|---|---|---|
| 2133 | Manager | 170 | Infosys Limited | 161 |
| | Service Delivery Manager | 102 | Cognizant Technology Solutions UK Limited | 151 |
| | IT Manager | 89 | Accenture (UK) Limited | 97 |
| | Principal Consultant | 35 | IBM UK Ltd | 72 |
| | Senior Manager | 29 | Tata Consultancy Services | 48 |
| | Technology Architect | 28 | HCL Great Britain Limited | 40 |
| | Lead Consultant | 27 | Capgemini PLC | 23 |
| | Operations Manager | 27 | Tech Mahindra Limited | 15 |
| | IT support manager | 26 | CSC Computer Sciences Ltd | 14 |
| | Senior Technology Architect | 25 | Steria Ltd | 12 |
| | | | Huawei Technologies (UK) Co., Ltd | 12 |
| 2134 | IT Project manager | 449 | Tata Consultancy Services | 425 |
| | Project manager | 360 | Accenture (UK) Limited | 290 |
| | Associate Manager | 285 | Cognizant Technology Solutions UK Limited | 194 |
| | Programme Manager | 207 | Infosys Limited | 145 |
| | Projects Manager | 165 | HCL Great Britain Limited | 116 |
| | Project Leader | 137 | Wipro Technologies | 101 |
| | Senior Project Manager | 102 | IBM UK Ltd | 100 |
| | Manager | 34 | Tech Mahindra Limited | 94 |
| | Project Lead | 28 | Sapient Limited | 57 |
| | Business Relationship Manager | 27 | Capgemini Financial Services UK Ltd | 46 |
| | | | Syntel Europe Limited | 46 |
| 2135 | Systems Analyst | 1239 | Tata Consultancy Services | 1741 |
| | Business Analyst | 1030 | Cognizant Technology Solutions UK Limited | 868 |
| | Technical Analyst | 643 | Wipro Technologies | 680 |
| | Technical Architect | 599 | Infosys Limited | 603 |
| | Systems consultant | 566 | Accenture (UK) Limited | 562 |
| | Team Lead | 449 | IBM UK Ltd | 510 |
| | Senior Systems Analyst | 299 | HCL Great Britain Limited | 387 |
| | Technology Lead | 262 | Tech Mahindra Limited | 240 |
| | Consultant | 136 | HSBC Holdings plc | 136 |
| | Senior Business Analyst | 136 | Capgemini PLC | 132 |
| 2136 | Programmer | 2583 | Tata Consultancy Services | 2295 |

**Table 5.2: Digital Technology - Top 10 Tier 2 Certificates of Sponsorship by Job titles and Organisations based on all Tier 2 Certificates of Sponsorship, year ending Sept 2014**

| SOC code | Job Title | Total number of CoS | Organisation Name | No. of CoS by sponsor |
|---|---|---|---|---|
| | Analyst Programmer | 1440 | Cognizant Technology Solutions UK Limited | 785 |
| | Software Engineer | 1415 | Accenture (UK) Limited | 579 |
| | Senior Analyst | 307 | Infosys Limited | 546 |
| | Analyst | 301 | Wipro Technologies | 498 |
| | Software Developer | 259 | HCL Great Britain Limited | 495 |
| | Senior Systems Engineer | 244 | IBM UK Ltd | 424 |
| | Technology Analyst | 243 | Tech Mahindra Limited | 347 |
| | Senior Software Engineer | 228 | Sapient Limited | 152 |
| | Systems Developer | 186 | HSBC Holdings plc | 130 |
| | Senior Systems Developer | 186 | | |
| 2137 | Web designer | 262 | Tata Consultancy Services | 182 |
| | Web Developer | 64 | Sapient Limited | 16 |
| | Web Design Consultant | 14 | | |
| | Internet Developer | 11 | | |
| | Senior Web Developer | 11 | | |
| | Web Designer and Developer | 10 | | |
| 2139 | IT Consultant | 1432 | Tata Consultancy Services | 1114 |
| | Test Analyst | 725 | Cognizant Technology Solutions UK Limited | 668 |
| | Software tester | 651 | Tech Mahindra Limited | 523 |
| | Quality Analyst | 316 | IBM UK Ltd | 274 |
| | Senior Test Analyst | 237 | Accenture (UK) Limited | 228 |
| | Systems Tester | 169 | Wipro Technologies | 192 |
| | Test Programmer | 104 | Capgemini Financial Services UK Ltd | 161 |
| | Analyst | 95 | Capgemini PLC | 99 |
| | Senior Analyst | 70 | HCL Great Britain Limited | 87 |
| | Test Engineer | 68 | Infosys Limited | 62 |

Source: UK Visas and Immigration Management Information, 2015. Companies/Job titles not listed where there are less than 10 applicants. Please see Annex B for necessary caveats and detailed methodology.

5.100 We have already mentioned a definition of scale-ups as enterprises that experience over 20 per cent more growth in employees or in turnover each year over a three year period starting from 10 or more employees. However, we recognise the challenges involved for case workers in making such an assessment, so instead we suggest that the Home Office consider simpler restrictions based on employment and/or turnover. There

are some precedents in other areas of government policy that may provide a template to follow. For example, the criteria used by BIS to determine eligibility for the Growth Vouchers Programme include upper limits on the number of employees (less than 249) and turnover (less than £45m per annum) and questions aimed at assessing whether the business is independent (as opposed to a subsidiary of a larger entity). Eligibility for growth vouchers is determined by answering five simple questions – so this set of criteria could be easily applied by caseworkers and businesses alike. Alternatively, the Enterprise Investment Scheme run by HM Revenue and Customs (HMRC) provides relief for investors in qualifying companies. The criteria that apply to such companies are varied but do include the provisions that companies must have gross assets of less than £15 million and fewer than 250 employees. The Home Office could assess whether using the HMRC assessment would help determine that the relevant sponsor is in a position to grow its team.

## 5.8 Other issues raised

### *a) Costs of visa application process*

5.101 We did receive evidence from partners during our visits to Codebase, a technology incubator in Edinburgh, and Level39, a technology accelerator in London, of the difficulties encountered by smaller employers in making use of Tier 2 of the Points Based System to recruit staff from outside the EEA. Such employers said they found navigating the immigration rules and procedures difficult and taxing, especially in terms of applying to become an employer sponsor. They felt they needed to resort to professional legal assistance and this was expensive. In some instances they decided to forego recruiting such staff owing to the expense and time involved. The MAC recognises that the Home Office has already established some initiatives to try and help the sector, outlined elsewhere in this chapter, but considers that the Home Office could think about doing more such as establishing a bespoke support facility for such employers to further assist with CoS and visa applications.

5.102 One specific suggestion put to us was the idea of umbrella sponsorship whereby a nominated party or parties, such as the accelerators that we visited or a wider organisation such as Tech UK or Tech City UK, could be allowed to obtain or to administer sponsor status on behalf of smaller employers.

### *b) Improving visa design*

5.103 We also discussed with partners whether a revision to Tier 1 of the PBS would allow for a number of highly skilled digital technology persons to come to the UK without having to first find an employer. The present Tier 1 route does contain a Tier 1 (Exceptional Talent) route for persons endorsed as a leader or emerging leader in a number of fields including digital technology. Tech City UK are the endorsing agents for this route.

5.104 The requirements for this route are that successful applicants are currently engaged professionally as practitioners in their field and are able to evidence a substantial track record at a high level in at least one country other than their country of residence. They must be established as a world-leading recognised expert in their field within the digital and tech industry and be able to demonstrate that they are professionally engaged in producing work of outstanding quality. Successful applicants will have been either entrepreneurs or employees who have published (other than exclusively in newspapers or magazines), distributed, exhibited internationally or established businesses.

5.105 Many partners felt that the criteria for this route set the bar very high and may preclude many exceptional candidates in digital technology from using this route and that a more flexible set of criteria might enable the key talent in an emerging sector to choose to come to the UK.

*"The route is currently out of reach for almost all start-ups because so few people appear to qualify – meeting the test of being "established as a world-leading recognised expert in your field within the digital and tech industry"".*

Coadec, 2014

5.106 Increasing the number of slots available for experienced digital technology staff, say to 500, would provide the sector with the resource to deliver an agile response to its staffing needs. We suggest having more places available and lowering the bar. Bigger employers already have the resources available to organise themselves in such a way that they can respond quickly to their business needs; this suggestion will enable scale-up companies to do likewise.

5.107 This need to have an agile response was something the sector frequently stressed to us. Tech London Advocates, for instance, cite the fact that in order to get funding, scale-ups must be able to demonstrate to potential investors that they can grow quickly if they are to get the investment they require. This means demonstrating that they can access the talent they require and that they can get that talent in and working straight away. Digital technology companies must be able to demonstrate that they are rapidly scalable and responsive to the market's demands on them.

*"The demonstrable talent shortage in the UK in certain roles within the digital tech sector, combined with this unique need for rapid growth creates an (at times insurmountable) obstacle for UK tech sector businesses. Very often the only solution available to a fast growth UK business is the hiring of an experienced/skilled migrant to fill the relevant shortage role, but because of the absence of digital tech roles on the Shortage Occupation List, this means undertaking an inevitably fruitless Resident Labour Market Test prior to offering them the role. Our research has made clear that for both start-ups and scale-ups, a wait time of four to six weeks to undertake the RLMT is simply too long (particularly as the exercise has been proven not to throw out any viable resident workers as candidates) and the consequences for tech sector businesses are dire."*

Tech London Advocates response to MAC call for evidence

## 5.9 Recommendations

5.108 We recommend the following job titles be added to the shortage occupation list (N.B. it is only the job title that we are recommending for addition to the shortage list, not the whole 4-digit SOC occupation):

- SOC 2133 Product manager
- SOC 2135 Data scientist
- SOC 2136 Senior developer
- SOC 2139 Cyber security specialist

5.109 The job titles identified are only in relation to persons with a minimum of five years' relevant experience and who have demonstrable experience of having led a team.

5.110 We suggest that the Home Office also restrict the category of sponsor able to use this route along the lines we have identified.

# Chapter 6 Other Occupations

## 6.1 Introduction

6.1 This chapter summarises the evidence we received in relation to occupations that were outside the scope of this partial review of the shortage occupation list. We set out the evidence we received but, as we anticipated in our call for evidence, we do not make recommendations about adding any of the jobs to the shortage occupation list.

> *"Although the Government has asked that the MAC focus on a limited number of occupations, the **MAC will consider information about other occupations and/or job titles that it may receive during the course of this review**. The timescale may mean that the MAC is unable to fully consider this additional evidence during this review but will reflect on this in its report and may suggest jobs and occupations to the Government for future review."*
>
> MAC call for evidence document

6.2 We suggest that the Government consider asking us to look in more detail at all of these jobs when next commissioning us to review the shortage occupation list.

6.3 We received evidence in relation to:

- Chefs;
- Vent chick sexers;
- Engineering occupations in the following areas:
    - mining;
    - aerospace;
    - nuclear plant design, development and construction; and
    - electronics;

- Teachers; and
- Occupations in the video games industry.

6.4 Currently, there are job titles on the shortage occupation list, which relate to some, though not all, of the sectors above.

## 6.2 Chefs

**Box 6.1: Chefs**

**4-digit SOC 2010 Occupation:** **5434 Chefs**

**Only the following job titles within this occupation are presently included on the shortage occupation list:**

- skilled chef where:
  - the pay is at least £29,570 per year after deductions for accommodation, meals etc; and
  - the job requires five or more years relevant experience in a role of at least equivalent status to the one they are entering; and
  - the job is not in either a fast food outlet, a standard fare outlet, or an establishment which provides a take-away service; and
  - the job is in one of the following roles:
    - executive chef – limited to one per establishment
    - head chef – limited to one per establishment
    - sous chef – limited to one for every four kitchen staff per establishment
    - specialist chef – limited to one per speciality per establishment

A fast food outlet is one where food is prepared in bulk for speed of service, rather than to individual order. A standard fare outlet is one where the menu is designed centrally for outlets in a chain / franchise, rather than by a chef or chefs in the individual restaurant.

Standard fare outlets also include those where dishes and / or cooking sauces are bought in ready-made, rather than prepared from fresh / raw ingredients.

**Top-down data**

| **Shortage** | **Occupation passes 6 out of 9 available indicators** | | |
|---|---|---|---|
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | -0.92 | **V2:** Percentage change of employment level (over 1 year) | 12.43 |
| **P2:** Percentage change of median real pay (over 3 years) | -5.88 | **V3:** Percentage change of median paid hours worked (over 3 years) | 0.00 |
| **P3:** Return to occupation | - | **V4:** Change in new hires (over 1 year) | 2.93 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | 46.74 |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | 80.68 |
| **V1:** Percentage change of claimant count (over 1 year) | -54.23 | **E3:** Skill-shortage vacancies / employment | 1.95 |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 28.4% | Percentage of workforce trained in past 13 weeks | 17.4% |
| Total employment in this 4-digit occupation is approximately 237000 (average, LFS, 2013Q4-2014Q3) | | | |
| Partner evidence received from: Goldstar Chefs, British Hospitality Association | | | |
| Notes: (-) for some indicators, values are not reported due to small sample sizes. | | | |

6.5 The job title of skilled chef is currently on the shortage occupation list. We received evidence from Goldstar Chefs and the British Hospitality Association (BHA) outlining the concerns of the industry regarding the current criteria for determining a skilled chef for the purposes of the shortage occupation list route. They told us that since the criteria in Box 6.1 were introduced, it has been very difficult for employers to find any suitable candidates who are currently either not already on Tier 2 in the UK, or who are from outside of the EEA. Employers had tried to recruit from Greece, Romania and Spain but with little success.

6.6 Goldstar Chefs told that us that there was an issue with existing Tier 2 migrant chefs who came to the UK before 6 April 2011 being refused extensions to their stay because they do not match the criteria set out above. In particular, they state that the criteria that excludes establishments that provide a take-away service causes problems.

6.7 The BHA told us that the chefs recruited from outside the EEA from 2002 to 2010 have been a major factor in the hospitality sector's growth and expansion in the UK. Non-EEA chefs were qualified, experienced and had the skills required and several had progressed up the ranks to Area Chef roles.

*"Prior to April 2011...recruiting a good quality chef was a lot less challenging."*

British Hospitality Association response to MAC call for evidence

6.8 We did not receive any evidence from other employers in this sector and the evidence we did receive did not provide any data about the extent of shortages across this occupation. We note that skilled chefs are presently on the shortage list and leave it to the Government to decide whether it wishes to ask us to review the skilled chef criteria in a future report.

## 6.3 Vent Chick Sexers

**Box 6.2: Vent Chick Sexer**

**4-digit SOC 2010 Occupation:** 9119 Fishing and other elementary agriculture occupations not elsewhere classified

This occupation is not presently included on the shortage occupation list.

**Top-down data**

The top-down data relating to this SOC code are not relevant as we are only dealing here with the skilled subset of an occupation that, as a whole, does not meet our skill criteria.

Partner evidence received from: the British Poultry Council and National Farmers Union

6.9 The job title of vent chick sexer falls within the occupation of fishing and other elementary agriculture occupations (SOC code 9119). We reviewed vent chick sexers in 2012 as part of our previous review of the shortage occupation list (Migration Advisory Committee, 2013), and we concluded

that there was insufficient evidence of skill at a level equivalent to NQF6 and above.

6.10 We received evidence from the British Poultry Council, supported by five employers, and the National Farmers Union asking that the job title of vent chick sexer be added to the shortage occupation list.

6.11 We were told by the British Poultry Council that the training required to become a vent chick sexer can take up to three years, with a further period of three to five years post-training to become fully skilled in the role. Vent chick sexers are expected to be able to process between 800 and 1200 chicks per hour, at a 98 per cent accuracy rate, and to be able to sustain this for 12 hour shifts, until the work is completed and without compromising the welfare of the chick. They told us the role requires considerable innate ability, which includes excellent eyesight and manual dexterity. Moreover, skilled sexers need to have unusually high levels of focus and concentration to maintain speed and accuracy over a long shift.

6.12 The salary is an average of £38,500 per annum across the industry. Wage increases in the last three years have been of the order of two to four per cent per annum. According to the respondents to a British Poultry Council survey of its membership, the vacancy rate for vent chick sexers is 26 per cent with vacancies remaining unfilled for up to five years. A single vent chick sexer was recruited into employment in 2014.

6.13 Partners told us that there are no alternatives to the manual vent sexing of day old chicks. Vent sexing cannot be done by machine, both for chick welfare reasons and because no machine can approach the speed or accuracy that is required. Alternative sexing methods, such as feather sexing, is not applicable in some cases or with some poultry breeds.

6.14 We were told that there have been efforts made to establish increased training of vent chick sexers in the UK. The results have only been partially successful due to a number of reasons, which include the lack of a National Occupational Standard for the role, experienced workers being needed to work rather than teach, high attrition rates, and a lack of the requisite innate skills among the UK workforce.

6.15 Attempts have been made to recruit vent chick sexers from other countries in the EU. These have not been successful as demand for vent chick sexers is extremely high across the EU and responses to vacancies are rare. The British Poultry Council submitted that the shortage of vent chick sexers is creating serious economic risks for a substantial UK export sector, that of live day old poultry chicks.

6.16 We were struck by the evidence regarding the salaries paid to vent chick sexers both as a proxy for skill and as an indicator of shortage. We suggest the government should ask us to look at this job in more detail when we are next commissioned to review the shortage occupation list.

## 6.4 Engineering

6.17 We have considered the engineering sector in previous reviews of the shortage occupation list, most recently in 2013 (Migration Advisory Committee, 2013). This time, we received evidence from:

- the Airbus Group and the Department for Business, Innovation and Skills (BIS) in relation to the aerospace industry;
- SRK Consulting in relation to jobs in the mining sector;
- GPP Global Project Partners regarding the design, development and construction of nuclear power stations; and
- techUK's Electronics Network and NMI in relation to electronics engineers.

6.18 In the past, as the engineering sector is large and complex, we have looked at all engineering roles together as a group and would prefer to continue to do this rather than look at some roles in isolation. We will not be making any recommendations regarding engineering in this review, but the sector evidence received will be looked at sympathetically in the next iteration.

### Aerospace Sector

6.19 Airbus group told us they have been unsuccessful for the past five years in recruiting engineers within the materials/composite and stress disciplines from within the EEA, through either their website or Jobcentre Plus. They are proactive in attempting to up-skill their UK workforce by providing schemes and collaborating with local educational institutions.

*"…. currently there is a genuine lack of people within the resident labour market capable of filling these positions and recruitment from overseas is absolutely essential if Airbus is to both retain a competitive edge and to be able to recruit the best qualified people in this field."*

Airbus Group response to MAC call for evidence

6.20 BIS also told us that there is a historic need to recruit skilled labour from outside of the EEA within the materials/composite and stress disciplines which is still ongoing. Engineers in the materials/composite and stress discipline are vital to the aerospace industry as they analyse the mechanical behaviour of composite materials and lightweight structures and utilize this understanding in the design and manufacture of aerostructures.

6.21 Both BIS and Airbus Group have asked to include new job titles on the shortage occupation list within the mechanical engineer and design and development engineer SOC codes as follows:

- Safety and reliability (2122);
- Systems engineering, landing gear and fuel systems (2122/2126);
- Metallic and composite technologies (2126); and
- Structure and mechanism design (2126).

6.22 The occupations of both mechanical and design and development engineers pass 5 out of 10 top-down indicators as set out in Box 6.3 and Box 6.4. However, these occupations cover a wide range of job titles across the sector and, therefore, the top down data will not be highly relevant to any particular job title.

## Box 6.3: Mechanical engineers

**4-digit SOC 2010 Occupation: 2122 Mechanical engineers**

**Only the following job titles within this occupation are presently included on the shortage occupation list:**

The following job titles within the oil and gas industry: all mechanical engineers.

### Top-down data

| **Shortage** | **Occupation passes 5 out of 10 available indicators** | | |
|---|---|---|---|
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | -4.30 | **V2:** Percentage change of employment level (over 1 year) | -9.37 |
| **P2:** Percentage change of median real pay (over 3 years) | -4.92 | **V3:** Percentage change of median paid hours worked (over 3 years) | 0.00 |
| **P3:** Return to occupation | 0.35 | **V4:** Change in new hires (over 1 year) | -0.88 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | 68.91 |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | 99.07 |
| **V1:** Percentage change of claimant count (over 1 year) | -61.57 | **E3:** Skill-shortage vacancies / employment | 1.73 |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 5.8% | Percentage of workforce trained in past 13 weeks | 30.6% |

**Total employment in this 4-digit occupation is approximately 78000 (average, LFS, 2013Q4-2014Q3)**

Partner evidence received from: Airbus Group and Department for Business, Innovation and Skills (BIS)

6.23 The Airbus Group told us they provide 6 scholarships, each worth £5,000 per year, dedicated to supporting students in the UK studying for a Master's degree in aerospace-related areas. They also provide graduate

and post-graduate schemes, in addition to work experience schemes and apprenticeships.

## Box 6.4: Design and development engineers

**4-digit SOC 2010 Occupation: 2126 Design and development engineers**

**Only the following job titles within this occupation are presently included on the shortage occupation list:**

The following job title within the electricity transmission and distribution industry: design engineer.

The following job titles within the automotive manufacturing and design industry: product development engineers; product design engineers.

The following job title within the electronics system industry: integrated circuit design engineer; integrated circuit test engineer.

### Top-down data

| **Shortage** | **Occupation passes 5 out of 10 available indicators** | | |
|---|---|---|---|
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | -1.41 | **V2:** Percentage change of employment level (over 1 year) | 8.45 |
| **P2:** Percentage change of median real pay (over 3 years) | -2.15 | **V3:** Percentage change of median paid hours worked (over 3 years) | 0.00 |
| **P3:** Return to occupation | 0.26 | **V4:** Change in new hires (over 1 year) | -2.26 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | 51.41 |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | 97.98 |
| **V1:** Percentage change of claimant count (over 1 year) | -63.53 | **E3:** Skill-shortage vacancies / employment | 1.50 |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 12.1% | Percentage of workforce trained in past 13 weeks | 27.4% |

Total employment in this 4-digit occupation is approximately 69000 (average, LFS, 2013Q4-2014Q3)

Partner evidence received from: Airbus Group and Department for Business, Innovation and Skills (BIS)

6.24 Despite these efforts, Airbus have reported struggles in recruiting in materials/composite and stress roles. There is a strong view within the aerospace sector that there is a lack of people within the resident labour market capable of filling positions of this type and that recruitment from overseas is essential if UK based aerospace companies are to retain a competitive edge and to be able to recruit the best qualified people in this field.

### Mining Sector

6.25 In our 2013 shortage report (Migration Advisory Committee, 2013), based on evidence received, we recommended the inclusion on the shortage list

of the following job titles relating to the UK mining industry: senior mining engineer; senior resource geologist; and staff geologist (see Box 6.5).

## Box 6.5: Civil engineers

**4-digit SOC 2010 Occupation: 2121 Civil engineers**

**Only the following job titles within this occupation are presently included on the shortage occupation list:**

The following geotechnical engineers within the construction-related ground engineering industry: tunnelling engineer; geotechnical design engineer; geotechnical specialist; reservoir panel engineer; rock mechanics engineer; soil mechanics engineer; geomechanics engineer.
The following job titles within the oil and gas industry: petroleum engineer; drilling engineer; completions engineer; fluids engineer; reservoir engineer; offshore and subsea engineer; control and instrument engineer; process safety engineer; wells engineer.
The following job title within the mining sector: senior mining engineer.

**Top-down data**

| **Shortage** | **Occupation passes 3 out of 10 available indicators** | | |
|---|---|---|---|
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | -0.69 | **V2:** Percentage change of employment level (over 1 year) | 23.31 |
| **P2:** Percentage change of median real pay (over 3 years) | 2.48 | **V3:** Percentage change of median paid hours worked (over 3 years) | -0.27 |
| **P3:** Return to occupation | 0.28 | **V4:** Change in new hires (over 1 year) | -3.40 |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | 35.15 |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | 94.00 |
| **V1:** Percentage change of claimant count (over 1 year) | -58.40 | **E3:** Skill-shortage vacancies / employment | 1.00 |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 11.5% | Percentage of workforce trained in past 13 weeks | 35.0% |

**Total employment in this 4-digit occupation is approximately 81000 (average, LFS, 2013Q4-2014Q3)**

Partner evidence received from: SRK consulting

6.26 SRK consulting, an independent international consulting practice which provides advice and solutions to clients mainly in the mineral and water resource industries, are looking to amalgamate and register their international offices into the UK. This would require employees from outside of the EEA to spend a minimum of one year in the UK to undergo on the job training. The limited nature of the UK mining industry and decline in universities offering the relevant courses has led to difficulty in finding experienced EEA nationals with the required level of skill.

6.27 SRK told us they have invested in encouraging UK graduates and workers into the mining sector providing scholarships, internships and work experience programmes. The shortage is caused by graduates seeking careers overseas to gain operational experience and by losing experience due to retirement among the expert workforce. These factors will be a concern in the next five years.

6.28 SRK said it was essential for the UK industry to recruit skilled workers from Australia, North and South America, Russia, Kazakhstan and Africa due to their practical and operational experience in the mining industry. It generally takes up to six months to fill a vacancy. SRK are looking for skilled and experienced workers in the specialist fields of: geology (resource, mining and structural geologists); hydro-geologists and hydrologists; engineers (including – civil, open pit and underground mining, geotechnical, geo-environmental, chemical, social and environmental scientists); and mineral valuation specialists.

## Nuclear Energy Sector

6.29 In relation to the nuclear energy sector, we received evidence relating to the construction and design of new nuclear power stations. There are job roles currently on the shortage occupation list in relation to the decommissioning of nuclear plants, but the industry skill set required differs between the construction and decommissioning of nuclear plants (see. Box 6.6).

### Box 6.6: Production managers and directors in mining and energy

**4-digit SOC 2010 Occupation:** **1123 Production managers and directors in mining and energy**

**Only the following job titles within this occupation are presently included on the shortage occupation list:**

The following job titles within the decommissioning and waste management areas of the nuclear industry: managing director, programme director and site director.
The following job titles within the electricity transmission and distribution industry: project manager and site manager.

**Top-down data**

| **Shortage** | **Occupation passes 5 out of 6 available indicators** | | |
|---|---|---|---|
| | **Spring 2015** | | **Spring 2015** |
| **P1:** Percentage change of median real pay (over 1 year) | 10.31 | **V2:** Percentage change of employment level (over 1 year) | -13.51 |
| **P2:** Percentage change of median real pay (over 3 years) | 12.58 | **V3:** Percentage change of median paid hours worked (over 3 years) | 0.00 |
| **P3:** Return to occupation | 0.48 | **V4:** Change in new hires (over 1 year) | - |
| **I1:** Change in median vacancy duration (over 1 year) | Data not currently available | **E1:** Skill-shortage vacancies / total vacancies | - |
| **I2:** Vacancies / claimant count | Data not currently available | **E2:** Skill-shortage vacancies / hard-to-fill vacancies | - |
| **V1:** Percentage change of claimant count (over 1 year) | -56.66 | **E3:** Skill-shortage vacancies / employment | - |
| **Sensible** | | | |
| Percentage of workforce born non-EEA | 9.7% | Percentage of workforce trained in past 13 weeks | 19.7% |

**Total employment in this 4-digit occupation is approximately 14000 (average, LFS, 2013Q4-2014Q3)**

Partner evidence received from: GPP Global Project Partners

Notes: (-) for some indicators, values are not reported due to small sample sizes.

6.30 We received evidence from GPP Global Project Partners regarding difficulty in recruitment in the areas of design, development and

construction of a new generation of Advanced Boiling Water Reactor (ABWR) nuclear power stations in the UK. The evidence presented related specifically to the search efforts made on behalf of Horizon Nuclear Power, a UK energy company developing a new generation of nuclear power stations, by Global Project Partners in relation to two positions: UK ABWR Chief Engineer; and UK ABWR Head of Power Station Design.

6.31 With no new nuclear power stations having been built in the UK for over 25 years, the development of local skills has stalled somewhat. There is a strong global demand for skilled workers in this sector, with over 60 reactors under construction in 13 countries, as nuclear power capacity worldwide is increasing steadily.

6.32 UK nationals with new build experience are often at retirement age or are working internationally on attractive pay packages. It is important to have a mixture of experienced leaders and younger generation working together on new build projects. The challenge in the UK market is the lack of experience of the reactor technology, specifically ABWR/BWR reactors. Senior positions for new build projects must have experience within the field of engineering, design, safety and project delivery.

6.33 A small number of experts in the fields listed, as well as the reactor technology will lead to a major advancement in knowledge within the UK market, in turn meaning the skills gap is bridged more quickly and effectively allowing the recruitment of fewer international candidates in the future. Trying to attract new build experts from other hazardous and safety critical industries is very difficult. For example, oil & gas candidates can be paid anywhere up to 50 per cent more on contract rates and permanent salary packages.

6.34 UK candidates do not have the relevant major project delivery experience on nuclear reactor or modern plant projects. A large number of the candidates have worked exclusively on decommissioning projects throughout their career, and on a number of occasions had exclusively worked on one site. The majority of the candidates in the UK sector do not have the experience in dealing with multiple stakeholders in relation to building a power station, unlike international candidates.

### Electronic Engineers

6.35 techUK's Electronics Network fielded a short survey to its membership specifically targeted at the inclusion of analogue electronics design engineers and power electronics design engineers on the shortage occupation list. The Electronics Network is described by techUK as a community of over 6,000 electronics-related companies.

6.36 We note that only 16 companies out of 6,000 members responded to this survey and consider that this does not indicate a widespread concern of a shortage within this occupation.

6.37 The headline results from the survey told us that:

- 14 out of 16 respondents experienced a shortage in analogue electronics design (AED) engineer roles (design and development engineers); and

- 12 out of 16 respondents experienced a shortage in Power electronics design (PED) engineers (SOC 2124 Electronics Engineers) roles.

6.38 NMI, a representative body for the electronics industry, responded to our call for evidence and identified six job titles which it believes are of particular strategic importance to maintaining and growing the UK Digital Technology sector. These are:

- embedded software engineers

- integrated circuit verification engineers

- power electronics engineers

- digital signal process engineers

- compiler developer

- systems architect.

6.39 We noted that two of the jobs on this list (embedded software engineer and compiler developer) could be thought of as falling into the digital technology area. We have not considered them in Chapter 5 along with the rest of the digital technology sector because we only received evidence about these jobs from this one source and did not consider there was sufficient evidence of shortage to warrant further consideration. We would like to understand more about these roles before determining to which sector they should be assigned and hope that NMI and others will submit evidence on this for our next review of the shortage occupation list.

6.40 On the other job titles provided to us, the responses to techUK (16 out of 6,000) are too low to be considered representative, let alone conclusive. The response from NMI provided better evidence. In particular, we note that both respondents identified power electronics engineers as a candidate for the shortage list and that it is already included on the list but only for jobs in the aerospace industry.

6.41 We have previously stated our concerns about the efforts made by the engineering sector to increase the number of home grown skilled engineers. BIS told us that the Government has heavily invested in areas such as vocational and higher education to raise awareness of engineering as a career path. We would like to hear more from the sector as a whole about this issue and suggest the Government think about commissioning us to consider the engineering sector either separately or as part of a wider review of shortage occupations. We therefore propose to look at the entire engineering sector during our next consideration of the shortage occupation list.

## 6.5 Teachers

6.42 We received evidence from the Association of School and College Leaders, who told us that schools and colleges report difficulty in attracting suitable candidates for posts requiring expertise in digital technology (both teaching roles and infrastructure support). Mathematics and science teachers are already on the list, and school and college leaders confirm that these are still occupations for which recruitment continues to be hard.

6.43 Teikyo Foundation (UK) Ltd told us they are experiencing difficulty recruiting teachers at their Japanese school, especially with regards to a welfare officer/teacher of personal, social and health education. They have advertised this position in the UK a number of times without having any applicant come anywhere near the requirements: someone fluent in the Japanese language but also its culture and the sensitivities of Japanese children.

6.44 We did not receive wider evidence from the sector about a shortage of particular teachers and are therefore not able to determine the extent of the reported shortages both in terms of numbers and whether these are a local or national shortage. We therefore make no recommendation about this occupation.

## 6.6 Video Games Industry

6.45 We have received evidence from TIGA, the trade organisation that represents the UK video games industry and met with UK Interactive Entertainment (UKIE) the trade body for the UK's games and wider interactive entertainment industry.

6.46 A number of job titles are currently on the shortage occupation list in visual effects and 2D/3D computer animation for the film, television or video games sector.

**Table 6.1: Job titles currently on the shortage occupation list and argued still to be in shortage within the visual effects and 2D/3D computer animation for film, television and the video games sectors and their corresponding occupations**

| SOC title and code | Job title (s) |
|---|---|
| IT Business analysts, architects and systems designers SOC 2135 (previously SOC 2132) | systems engineer |
| Programmers and software development professionals SOC 2136 (previously SOC 2132) | software developer and shader writer |
| Artists SOC 3411 | animator |
| Arts officers, producers and directors SOC 3416 | 2D supervisor, 3D supervisor, computer graphics supervisor, producer, production manager, technical director and visual effects supervisor |
| Graphic designers SOC 3421 | compositing artist, matte painter, modeller, rigger, stereo artist and texture artist |

6.47 TIGA told us they would like to see the following job titles added to the shortage list:

- game analyst;
- senior game artists, including user interface artist and technical artist;
- brand manager;
- senior game designers, including UX designer and digital design and marketing manager;
- localisation manager;
- social and digital media specialists, including community manager;
- senior producers, including technical producer, senior producer, associate producer, and line producer;
- games programmers.

6.48 TIGA said that the UK games industry is set for growth, partly because of the introduction of Games Tax Relief in March 2014, which reduces the cost of games development. Research conducted by Games Investor Consulting for TIGA indicates that Games Tax Relief could create and protect 10,300 highly skilled jobs and secure £450 million in investment in the UK games development sector over five years.

6.49 They told us that the UK games industry does work with UK universities to train and up-skill the resident labour force. About two-fifths of studios in a TIGA survey in 2010 had a relationship with a university. Formal education is only part of the job, games developers need years of experience to be suitably competent to contribute at senior levels to games development. A top level game can take around four years to develop.

6.50 In our interaction with representatives from the games sector we explained that we had only been commissioned to conduct a partial review of the shortage occupation list, but that we would consider the games sector when next asked to review wider occupation shortages. We make no recommendation about jobs in the games sector at this time.

## 6.7 Conclusion

6.51 As we said in our call for evidence, reiterated at the start of this chapter, and emphasised in our direct contact at meetings and events with corporate partners, although we were willing to receive evidence on job titles and occupations outside of those identified in our commission from the Government, we would not be making recommendations about these in this report.

6.52 For all the occupations and job titles discussed above save for chefs, employers are permitted to bring in skilled workers from outside of the EEA through the RLMT route. Should the Government ask the MAC to consider any or all of these occupations or job titles again in the future, we would be keen to receive more evidence from the respective industries.

# Chapter 7 Scotland

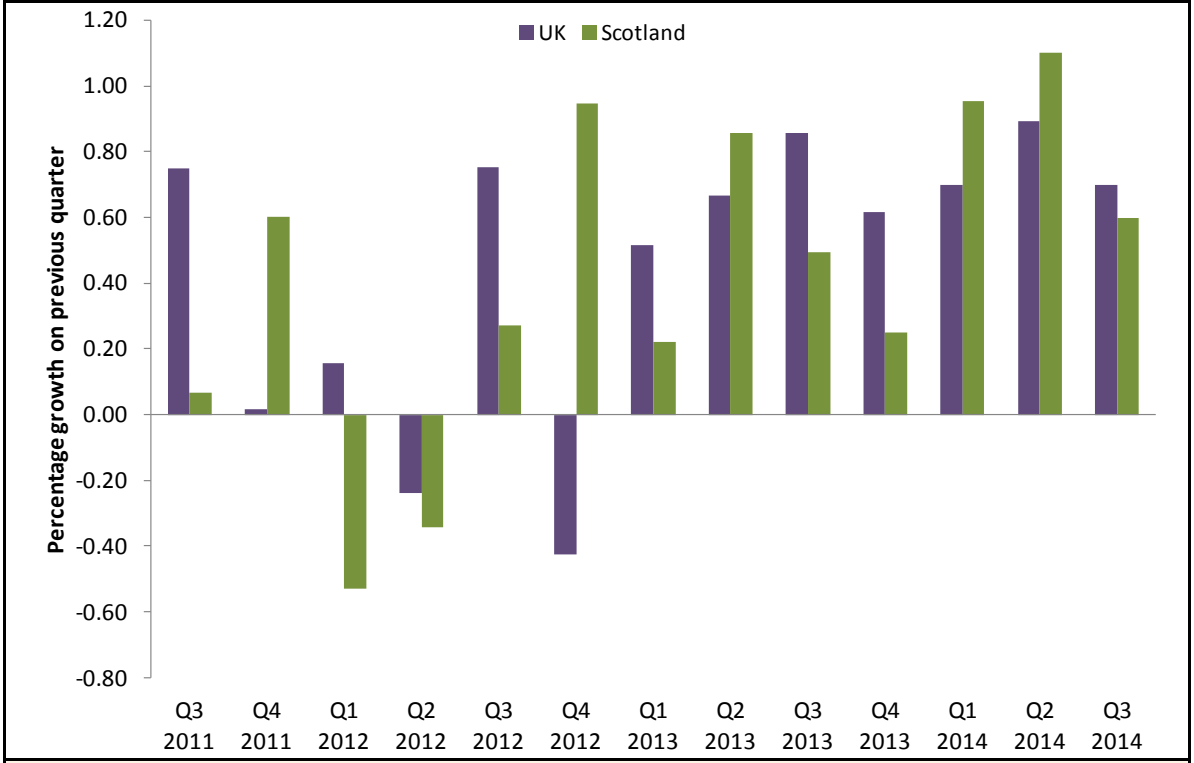
## 7.1 Introduction

7.1 This chapter considers data and evidence relating to occupations and job titles in Scotland. Scotland has an additional, separate shortage occupation list to reflect differing labour market demand needs compared to the rest of the UK. Therefore, this chapter is concerned with evidence and data received in relation to occupations and job titles experiencing a shortage only in Scotland.

7.2 Section 7.2 of this chapter looks at data on Scotland's economy and labour market. Section 7.3 describes the present Scotland shortage occupation list. We recount the engagement we had with Scottish employers and other bodies in section 7.4. The evidence we received in relation to the digital technology sector is described in section 7.5 and considered in section 7.6. Sections 7.7 and 7.8 respectively describe the evidence we received from the health sector in Scotland and our consideration of that evidence. Our recommendations for the Scotland shortage occupation list are set out in section 7.9.

## 7.2 The Scottish economy and labour market

**Figure 7.1: Quarterly GDP growth, Scotland and the UK, 2011 Q3-2014 Q4**




Source: Scottish Government (2014) and Office for National Statistics (2015a)

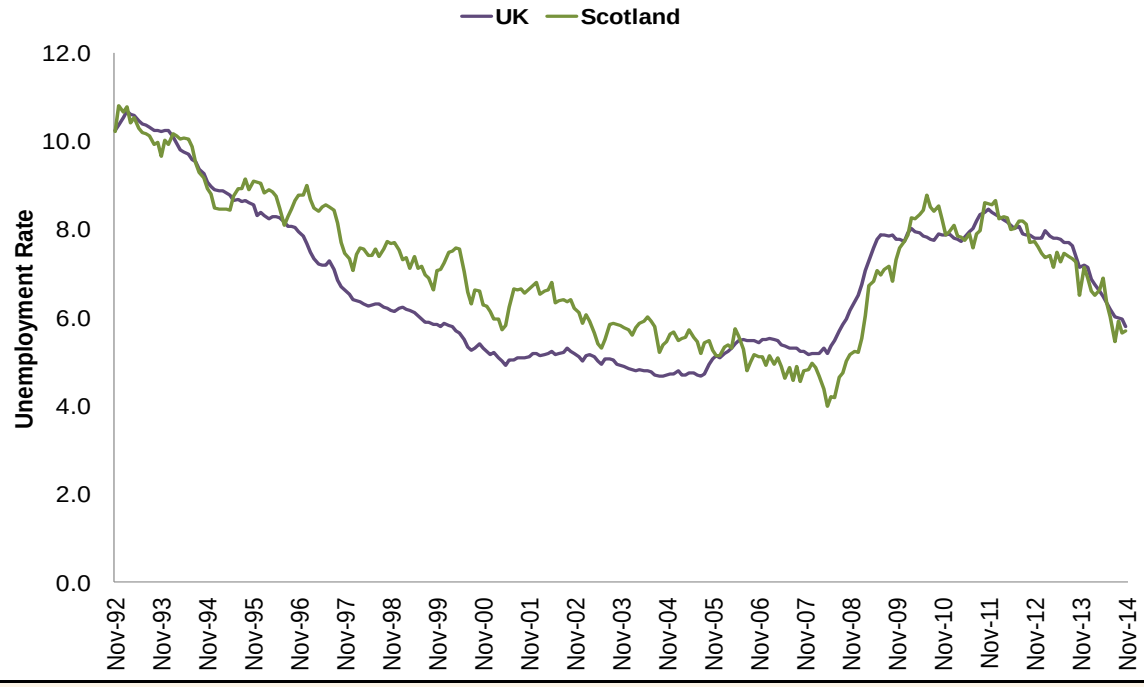
7.3 At 5.3 million, Scotland's population is 8.3 per cent of the UK total. Its economy represents 7.7 per cent of total UK gross value added.

7.4 Scotland and the UK as a whole have both experienced sustained positive growth rates in the past two years. Scotland has grown for every quarter since 2012 Q3. In 2014 Q3, the rate of growth for Scotland was 0.6 per cent which is marginally lower than the growth rate for the UK as a whole.

7.5 The Ernst and Young Scottish Independent Treasury Economic Model (ITEM) Club (2014) forecasts that the Scottish economy will have grown by 2.8 per cent in 2014, followed by weaker growth of 2.0 per cent in 2015 and 1.8 per cent in 2016.

7.6 As shown in Figure 7.2, Scotland experienced a greater increase in its unemployment rate (trough to peak) than the UK as a whole during the 2008 recession and into the recovery period. In the three months to November 2014, the unemployment rate in Scotland was 5.7 per cent, very similar to the UK-wide unemployment rate at 6.0 per cent.

**Figure 7.2: Unemployment rate, Scotland and the UK, July-Sep 1992 to July-Sep 2014**




Notes: Seasonally adjusted. The unemployment rates are those calculated in the three months to the date shown (inclusive). The definition of unemployment is internationally agreed and recommended by the International Labour Organisation. Individuals are defined as unemployed if they are aged 16 and above and are without a job, want a job, have actively sought work in the last four weeks and are available to start work in the next two weeks; or are out of work, have found a job and are waiting to start it in the next two weeks. The unemployment rate is calculated from the LFS and is given by the proportion of the economically active population (those who are in employment or unemployment) who are unemployed.
Source: Office for National Statistics (2014b)

7.7 As in Chapter 2, we have used data from the Employer Skills Survey carried out by the UK Commission for Employment and Skills to examine vacancy rates, hard-to-fill vacancies, and skill shortage vacancies across the broad occupation groups in Scotland (see paragraph 2.34 for a definition of these terms). As a proportion of employment, vacancies in Scotland are broadly similar across the main occupation groups, with peaks at four per cent for professionals and associate professionals. Skilled shortage vacancies as a proportion of vacancies is highest for skilled trades and professionals. On aggregate (across all occupations) the data on vacancies in Scotland is fairly similar to the data for the UK as a whole.

**Table 7.1: Hard-to-fill and skill shortage vacancy rates as a proportion of either employment or vacancies in Scotland in 2013**

| | | Percentage of employment | | | Percentage of vacancies | |
|---|---|---|---|---|---|---|
| | Employment (thousands) | Vacancies | Hard-to-fill vacancies | Skill shortage vacancies | Hard-to-fill vacancies | Skill shortage vacancies |
| Managers | 348 | 1% | *% | *% | 37% | 23% |
| Professionals | 268 | 4% | 2% | 1% | 42% | 39% |
| Associate professionals | 148 | 4% | 1% | 1% | 32% | 24% |
| Administrative/ clerical staff | 292 | 2% | *% | *% | 16% | 11% |
| Skilled trades | 196 | 3% | 1% | 1% | 53% | 43% |
| Caring, leisure and other services staff | 279 | 3% | 1% | 1% | 41% | 27% |
| Sales/customer service staff | 270 | 2% | *% | *% | 14% | 9% |
| Machine operatives | 164 | 2% | 1% | 1% | 41% | 32% |
| Elementary staff | 343 | 2% | 1% | *% | 29% | 11% |
| Total Scotland | 2308 | 2% | 1% | 1% | 33% | 25% |
| Total UK | 26959 | 2% | 1% | 1% | 29% | 22% |

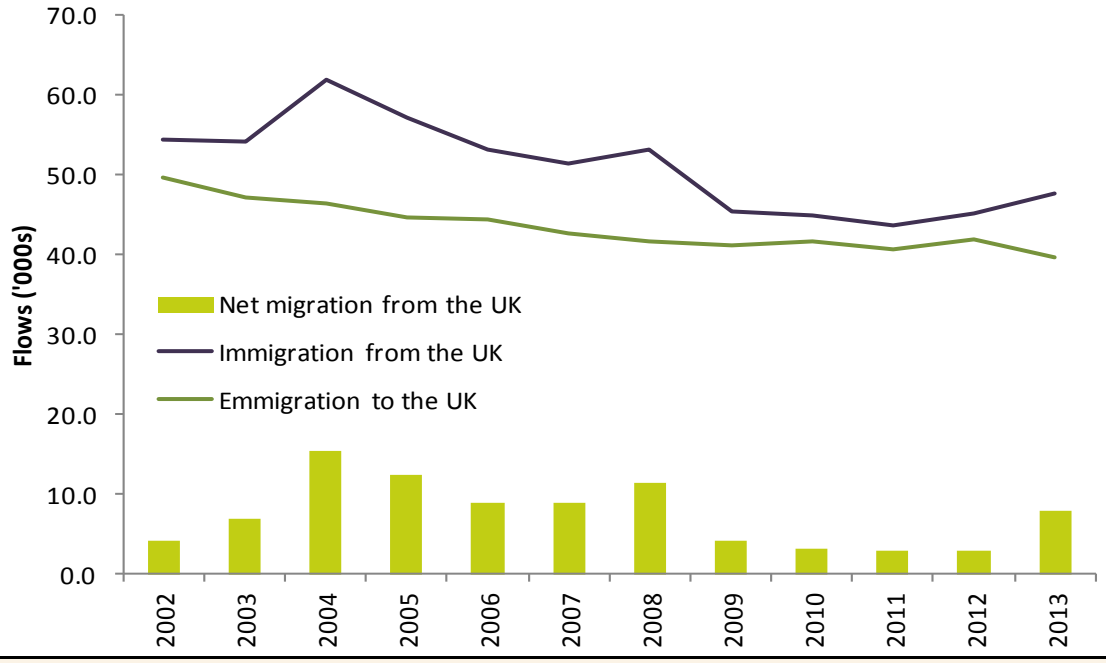
Notes: *% refers to when the rate is negligible, or does not round to 1%
Source: UKCES, Employer Skills Survey (2014)

7.8 Scotland has largely followed the same trends in the key economic and employment indicators as the UK as a whole.

## Migration trends

7.9 Figure 7.3 presents data on internal migration between the rest of the UK and Scotland since 2002. Net migration from the rest of the UK to Scotland has been consistently positive over this period. In 2013, net immigration to Scotland from the **rest of the UK** returned towards pre-recession levels after relative stagnation at around 3,000 or lower between 2009 and 2012. The relatively small net flows mask larger flows in each direction between the two. Immigration into Scotland from the rest of the UK was 48,000 in 2013, while emigration in the other direction was 40,000.

**Figure 7.3: Internal migration between the rest of the UK and Scotland, 2002-2013**



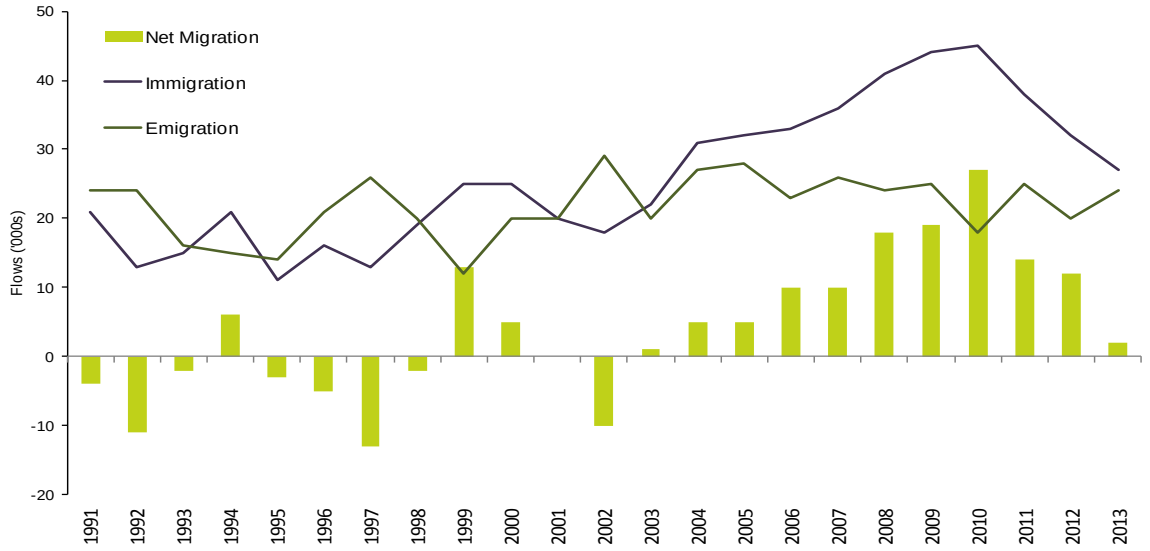

Notes: Long-term migrants between Scotland and the rest of the UK are based on the National Health Service Central Register (NHSCR).
Source: National Records of Scotland (NRS, 2014)

7.10 Net international migration from **outside the UK** to Scotland rose year on year from 2002 to 2010 reaching a peak of 27,000. Since this peak, net migration to Scotland has consistently fallen, reaching just 2,000 in 2013. Figure 7.4 presents migrant flows from 1991 to 2014, defining migrants as those intending to change their place of residence for one year or more according to the international UN definition.

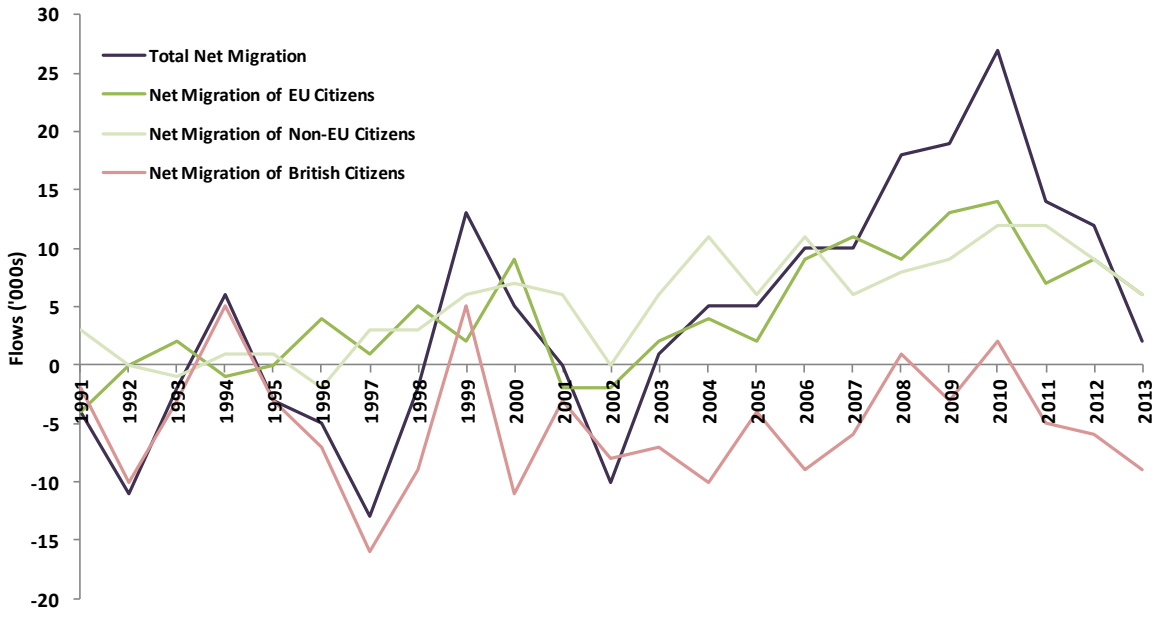
7.11 The trends for net migration to Scotland from within the EU and outside the EU have been similar over the last couple of decades. In the last decade, similar to the UK as a whole, Scotland experienced a significant rise in net migration from the EU, increasing from 2,000 in 2005 to peak at 14,000 in 2010. This rise was partly due to the expansion of the EU in 2004. Historically, non-EU migration has accounted for a larger proportion of total net migration. However since 2012, net migration to Scotland from the EU and from outside the EU have been roughly equal.

**Figure 7.4: Flows of long-term migrants from outside the UK to and from Scotland and net long-term migration from outside the UK by citizenship, 1991 – 2013**

**Inflows, outflows and balance of long-term migrants to and from Scotland, 1991 – 2013**




**Net long-term migration by citizenship, 1991 – 2013**




Notes: Long-term migrants are defined in the International Passenger Survey as those individuals who intend to change their place of residence for a year or more. This definition includes all nationalities, including British nationals. EU includes EU15, A8, A2, Malta, Cyprus and from 2013, Croatia.
Source: Office for National Statistics (2014h)

## 7.3 Scotland's shortage occupation list

7.12 Scotland has its own shortage occupation list which is additional to the UK wide shortage occupation list. The present shortage occupation list for Scotland is set out in Table 7.2.

**Table 7.2: Scotland shortage occupation list**

| SOC code and description | Job titles included on the present Scotland Shortage Occupation List and further criteria |
|---|---|
| N/A | **ALL** job titles and occupations on the UK shortage occupation list |
| 2113 Physical scientists | **ONLY the following jobs in this occupation code:**<br>• jobs on the UK Shortage Occupation List<br>• staff working in diagnostics radiology (including magnetic resonance imaging) |
| 2211 Medical practitioners | **ONLY the following jobs in this occupation code:**<br>• jobs on the UK Shortage Occupation List<br>• ST3, ST4, ST5 and ST6 trainees in paediatrics or anaesthetics<br>• SAS staff doctors in paediatrics or anaesthetics<br>• consultants in paediatrics or anaesthetics<br>• non-consultant, non-training doctors in the specialty obstetrics and gynaecology |

Source: UK Visas and Immigration, 2014

7.13 Our commission from the UK government was to conduct a partial review of some shortage occupations. We, therefore, did not seek and did not receive evidence of wider shortages in Scotland. We did receive evidence in relation to the health and digital technology sectors in Scotland and that evidence is discussed in this chapter.

## 7.4 Engagement with partners in Scotland

7.14 On 5 December 2014 the Chair of the MAC met with the Scottish Minister with responsibility for immigration, Humza Yousaf. We had previously contacted officials in the Scottish Government and sent a copy of our call for evidence. We subsequently met in London and in Edinburgh with officials from the Scottish Government.

7.15 We made contact with ScotlandIS, the trade body for Scotland's software, IT and creative technology businesses, and through them met with representatives from the Scottish digital technology sector. We attended a meeting in Edinburgh with employers, plus the Scottish Government and members of Talent Scotland, Scottish Enterprise and ScotlandIS.

7.16 We were given a tour of the offices of Hogarth Worldwide, a marketing implementation agency producing advertising and other marketing communications across all media and all languages, and had the opportunity to talk to some of their employees on the digital technology side about the work they did.

7.17 We visited Codebase, a seven storey digital technology incubator in Edinburgh housing around 30 small firms, and were given a tour of the premises by its founder, Dr Jamie Coleman. The aim of Codebase is to work with Scottish digital technology start-up business to build companies, drive innovation and increase investment. We saw many of the firms that were housed there engaged on a wide range of technology developments.

7.18 We also met with officials from the Scottish Government's Health Workforce and Performance Directorate along with representatives from the Scottish NHS.

## 7.5 Evidence from Scotland's digital technology sector

7.19 ScotlandIS published, together with Skills Development Scotland, a Skills Investment Plan for Scotland's ICT (information and communications technology) and digital technologies sector (Skills Development Scotland, 2014). The aim of the plan was to validate and bring clarity to the scale and nature of the skills issues that face the sector. Additionally, it was stated the plan will create direction and bring focus to the nature of the response required by the public sector and the industry on the priority of skills issues. Finally, it will provide a framework for investment to develop skills provision to meet industry needs.

7.20 The Skills Investment Plan set out a vision for developing and retaining a talent pool to support the growth of digital technology professionals. This will include responding to the immediate need for ICT and digital technology skills, broadening the future talent pipeline, making the education system more responsive to employers' needs, and raising the profile of the sector and careers within it.

7.21 The Skills Plan echoed many of the points that were made in evidence relating to the digital technology sector across the whole of the UK. Investment and company growth is creating an increased demand for digital technology skills and these skills have a positive impact in driving innovation and growth in areas such as engineering, defence and energy. The increasing use of digital technologies by businesses in other sectors was creating significant job opportunities and demands for relevant skills. This was being experienced in areas such as financial services, life

sciences and health, and the creative and cultural industries (Skills Development Scotland, 2014).

7.22 ScotlandIS supplied written evidence to us which cited shortages of skilled people in Scotland in the following jobs: product managers, user experience experts, software engineers, project managers and people with digital marketing skills. The single biggest skill set in demand was that of software engineer.

7.23 ScotlandIS gave us some data about the number of shortages in all jobs across the sector as a whole. A survey of a cross section of 40 companies in the industry employing a total of 5,506 people revealed 729 current vacancies (an average vacancy rate of 13 per cent) with anticipated demand over the next three years for an additional 2,403 staff, increasing headcount by 44 per cent. Many small and medium sized enterprises reported taking up to six months to fill roles for experienced staff. Larger companies were also reported as struggling to fill roles.

7.24 Members of the start-up community reported being priced out of the market and unable to find the people they need. Many established businesses are finding it takes up to six months to fill roles for experienced staff. They also report a higher rate of staff churn than normal, due to staff being poached by other employers. It was reported that the average time to fill a role has increased by a quarter over the last three years.

7.25 In relation to the specific job title of software engineer, ScotlandIS said that this was a predominantly, though not exclusively, graduate entry occupation. Average starting salaries for entry level software engineers were around £22,000 to £30,000, with some exceptional individuals now being offered in excess of £35,000. Average starting salaries across all levels of software engineering (i.e. for more experienced professionals) have increased from around £41,000 in 2012 to £47,000 in 2014.

7.26 In relation to our sensible criteria, ScotlandIS reported that offshoring shortage jobs to non-EU countries would damage the industry over time through loss of skills, intellectual property and economic value. The current domestic supply chain of skilled workers for the industry was described as inadequate, with not enough young people UK-wide taking up relevant courses at schools, college and university, or through apprenticeships and will take five to ten years to meet requirements.

7.27 ScotlandIS felt it unlikely that bringing in migrants would reduce employers' incentives to invest in training and upskilling of UK workers as the only way to maintain competitive advantage for a very fast moving industry is to ensure that the whole workforce is continually upskilling. Employment of migrants per se was held to be unlikely to have a negative impact on investment, innovation and productivity growth. On the contrary, a diverse workforce was held to be a significant asset for companies increasingly aiming to sell into global markets. The strong entrepreneurial drive that immigrants often have was also cited as of benefit to the industry.

7.28 Many employers across the sector were reported by ScotlandIS as having sought to access the wider EEA labour market, with particular success in eastern Europe, particularly Poland and the Baltic States, as well as in some of the Mediterranean countries such as Spain. However, IT skills shortages are being encountered across Europe.

7.29 The points made in the written evidence were reiterated at the round-table discussion with employers and public bodies. The meeting said that there was an impending skills crisis in digital technology jobs. Firms were intending to expand their staff and small and medium-sized enterprises in particular were finding it difficult to recruit the right people, especially technical staff. Large employers were meanwhile trying to right size their staffing. The biggest challenge was said to be in software engineering skills.

7.30 At the roundtable discussion, attendees restated that there was an estimated requirement of 10,000 new jobs per year in digital technology jobs (eSkills, 2012) and recruitment levels were presently running at about 4,000 per year. Estimated increase in demand could result in a further requirement for 8,000 more jobs. Salaries across the industry were increasing but firms in Scotland reportedly could not compete with salaries on offer elsewhere, especially in the US.

> *"It is arguable that by increasing the size of the IT/digital technologies workforce and raising general awareness of the employment opportunities this will help to encourage new people into the industry from within the UK. However with the latent demand already being experienced it will take some time to get to a position where there will be over-supply."*
>
> ScotlandIS response to MAC call for evidence

7.31 We were again told, as we had been about jobs across the whole UK, that many digital technology professionals were now preferring to work as contractors rather than salaried staff as pay was higher. Some firms do offshore some of their work to other countries but generally prefer the synergies generated by co-located staff, with one advantage being that UK workers learnt new skills.

## 7.6 Consideration of digital technology sector jobs in Scotland

7.32 The evidence we received from partners in Scotland related to the software engineer job title. This falls under SOC 2136 Programmers and software development professionals and Box 5.3 in Chapter 5 presents the top-down data for this SOC. It shows that this occupation passes six out of our ten available indicators and is therefore viewed as being in shortage. However, we are only considering the job title of software engineer rather than the whole SOC 2136 occupation.

7.33 From what we can gather, the job title of software engineer is a potential entry level role and the evidence from ScotlandIS stated that the appetite to recruit newly qualified workers has increased with 76 per cent of respondents to the 2014 Scottish Technology Industry Survey expecting to recruit graduates, compared to 52 per cent in 2012.

7.34 Home Office management information shows that in the year ending September 2014 1,393 certificates of sponsorship were issued in respect of the software engineer job title, although we do not know how many of these were issued to employers operating in Scotland. The evidence we had from Scotland in relation to shortages in the software engineer job title did not, on the whole, separate out information about shortages in this role from shortages across the wider digital technology sector.

7.35 In Chapter 5 we recount how we heard evidence that across the UK it is experienced staff that are most in shortage in this sector and that can have the biggest impact on a company's growth. Should our recommendations in that chapter be accepted then some firms in Scotland will be able to take advantage of this. We are less clear that there is a shortage of entry level staff into this sector and do not believe there is a separate case to be made over and above our UK recommendations in respect of Scotland at present. Employers in the UK including Scotland will be able to use the Resident Labour Market Test to bring in those entry-level employees that they are unable to recruit from within the UK. **We therefore do not recommend the inclusion of software engineer on the Scotland shortage occupation list.**

## 7.7 Evidence from Scotland's health sector

7.36 The majority of the information we received about the health sector in Scotland came from the Scottish Government's Health Workforce and Performance Directorate. We met with partners from Scottish Government Health Workforce and Performance Directorate and NHS Lothian.

7.37 The Directorate takes information from a number of sources including individual health boards, survey responses and the Information Services Division (ISD) (2014), a division of National Services Scotland, part of NHS Scotland. ISD provides health information, health intelligence, statistical services and advice to support the NHS in improving health care and planning and decision-making.

7.38 The Directorate conducts telephone interviews with health boards and takes information from both published and unpublished sources. The information collated is analysed to determine whether it demonstrated a shortage in a particular health specialism, and whether a situation had been vacant for more than six months and was thereby regarded as hard to fill. Only evidence meeting these requirements is put forward to the MAC by the Health Directorate.

7.39 We also saw evidence of a number of different options being deployed by the Scottish Government and at health boards to tackle shortages. The

exercise of providing information to the MAC had highlighted improvements in measuring techniques used by boards that allows for closer alignment to monitoring and managing the health workforce and which can help identify potential hotspots before they develop into shortages.

7.40 ISD publish a quarterly update of staff in post, vacancies and turnover for NHS Scotland workforce. The most recent update showed the following vacancy rates across NHS Scotlland:

- consultant (including Directors of Public Health) - 6.5 per cent (an increase from 4.4 per cent in 2013);
- nursing and midwifery - 3.6 per cent;
- allied health profession – 4.1 per cent.

7.41 The Health Directorate supplied us with the returns from each of the NHS Scotland health boards in relation to the job titles held to be in shortage. Some of these responses did not provide any information about the number of posts in shortage and for how long these vacancies had persisted. These jobs are, therefore, not considered for the shortage occupation list. Other boards do provide this evidence and this has been considered in relation to each of the nominated job titles.

7.42 We also saw the local delivery plans for each health board's workforce assessment which showed the impact of what we were told in other evidence. The causes of many shortages were cited as more people becoming sick and getting older and living longer. We also saw additional documentation including information from correspondence about shortages, notes of meetings and board level papers.

7.43 The Scottish Government endorsed the evidence in relation to the UK health sector that we received from the Centre for Workforce Intelligence (considered in Chapter 3 of this report) and said that the shortages identified also applied in Scotland. They identified a number of medical occupations that they wished to see placed on the Scotland shortage occupation list on account of the shortages only existing in Scotland based on the evidence they had received and supplied to us.

## 7.8 Consideration of evidence from Scotland's health sector

7.44 The occupations and job titles that the Scottish Government would like to see added to the Scottish shortage occupation list are set out below:

- SOC 2211 medical practitioner – anaesthetics, all grades
- SOC 2211 medical practitioner - paediatrics, all grades
- SOC 2211 medical practitioner - specialist medical: obstetrics and gynaecology, all grades

- SOC 2211 medical practitioner - psychiatry, all grades except CPT 1
- SOC 2211 medical practitioner - clinical radiology, non-consultant, non-training posts and CT 3, ST 4 – ST 7 trainees
- SOC 2211 medical practitioner - clinical oncology, consultant only
- SOC 2231 nurses – specialist nurse in neonatal intensive care units
- SOC 2113 physical scientist – medical physicists

7.45 Looking at each of these in turn, non-consultant, non-training posts only in **anaesthetics** are presently on the UK shortage occupation list but the Centre for Workforce Intelligence (CfWI) recommended they be removed from the list on the basis that there has been an 11 per cent growth in the size of the workforce over the last four years and this is a popular specialty. CfWI comment that there is evidence of a regional shortage but not a national one. The present Scotland list includes ST3, ST4, ST5 and ST6 trainees, SAS staff doctors, and consultants in this specialty (descriptions of these terms are given in Chapter 3 of this report). The Scottish Government's nomination would slightly extend this to cover all grades in anaesthetics for Scotland only.

7.46 Medical posts in **paediatrics** are not on the UK shortage occupation list and are on the present Scotland list as regards ST3, ST4, ST5 and ST6 trainees, SAS staff doctors, and consultants. The Scottish Government was therefore seeking to slightly increase the range of paediatrics posts covered by the Scotland shortage occupation list.

7.47 Posts in **obstetrics and gynaecology** are on the present Scotland list as regards non-consultant, non-training doctors in the specialty obstetrics and gynaecology. The Scottish Government asked that we increase this to cover all grades.

7.48 Consultants in **old age psychiatry** are on the UK list along with non-consultant, non-training posts in psychiatry. The CfWI recommended the removal of psychiatry posts from the shortage occupation list with the exception of old age psychiatry. Their reasons were that there is insufficient evidence of a national shortage, Home Office data confirms a low level of recruitment from outside the EEA into these roles, and that more needs to be done to increase the attractiveness of this specialty and the retention of the workforce. The Scottish Government asked that the Scotland list include all psychiatrist posts except CPT 1.

7.49 No posts in **clinical radiology**, **clinical oncology** or **medical physics** are presently on either the UK or Scotland shortage occupation lists. Although medical physicist was proposed to us under SOC 2113, we consider that it would be more appropriate to place it under SOC 2117. Healthcare science staff working in medical physics develop techniques such as x-ray and help with some treatments such as supervising doses of radiation. They work in areas such as radiotherapy and ultrasound.

7.50 **Specialist nurse in neonatal intensive care units** is presently on the UK shortage occupation list. CfWI recommended that it be removed from the list on the basis of improved staffing levels, a lack of robust evidence of a national shortage, a number of existing programmes and of proposals to address recruitment issues and a lack of data to confirm that international nurses are able to fulfil the current Nursing and Midwifery Council registration requirements.

7.51 Two areas were identified in the evidence as experiencing particular shortages, namely critical care and anaesthetists. The former area was being staffed by non-medical alternatives (basically, nurses were being trained up to carry this out) but there was no non-medical alternative to the latter area. Because of the time taken to train new staff, it was felt that the shortage of anaesthetists could persist for five years. There was also an issue with supply. A small survey of anaesthetists graduating in Scotland indicated that 30 per cent did not intend practising in Scotland. There was no further data on whether this 30 per cent planned moving to England or working in the private sector but anecdotal evidence suggested some had left the medical profession altogether.

7.52 A number of Scottish medical professionals were being lost to jobs abroad. We were told that the General Medical Council (GMC) requires any doctor going to practice abroad to obtain a Certificate of Good Standing from the GMC. The GMC publishes the numbers of applications on a UK-wide basis and these indicate a 5-10 per cent increase year on year in doctors moving abroad.

7.53 The impacts of the identified shortages ranged from increases in waiting times to patients having to travel further afield with an impact on ambulance services. There is also a heightened risk to health as some patients refuse to travel further, plus some units may be forced to close if they cannot get sufficient skilled staff. There is also a delayed discharge of patients leading to more pressure on the availability of beds. This was, we were told, creating a build-up of pressure within the system. For example, in Caithness a shortage of surgeons had led to non-admission of non-emergency cases after 6.00pm.

7.54 Health boards are subject to treatment time guarantees and a shortage of key staff means that work must be contracted out to the private sector. Salaries are higher across the private sector and experienced consultants were moving across to work in that sector.

7.55 Boards were using European Recruitment Services to identify suitable qualified replacement staff from within Europe. The issue was to establish compatibility of training of these staff with UK training. Boards use a code of practice for recruiting foreign staff that mirrors the World Health Organisation code of practice in order to avoid seriously depleting the available medical staff in other countries.

7.56 Some boards across Scotland reported finding it easier to recruit staff than do others. We saw evidence that boards were taking action to address this

including sharing information about recruitment practices, planning a generic advertising campaign and developing a workforce planning tool. We look forward to seeing more evidence of this so that use of best practice techniques reduces examples of some boards finding it harder to recruit than others across NHS Scotland.

## 7.9 Recommendations

7.57 We recommend the changes set out in Table 7.3 be made to the Scotland shortage occupation list.

**Table 7.3: Add to the Scotland shortage occupation list**

| SOC | Job title | Comment |
|---|---|---|
| 2211 Medical Practitioner | Anaesthetist, all grades | An increase from covering ST3, ST4, ST5 and ST6 trainees and SAS staff doctors and consultants. |
| 2211 Medical Practitioner | Paediatrician, all grades | An increase from covering ST3, ST4, ST 5 and ST6 trainees and SAS staff doctors and consultants. |
| 2211 Medical Practitioner | Obstetrician and gynaecologist, all grades | An increase from covering non-consultant, non-training doctors in obstetrics and gynaecology. |
| 2211 Medical practitioner | Psychiatrist (all grades except CPT1) | Not on Scotland shortage occupation list. |
| 2211 Medical practitioner | Clinical radiologist (non-consultant, non-training posts and CT3, ST4-ST7 trainees) | Not on Scotland shortage occupation list. |
| 2211 Medical practitioner | Clinical oncologist, Consultant only | Not on Scotland shortage occupation list. |
| 2231 Nursing and Midwifery | Specialist nurse in neonatal intensive care units. | On UK shortage occupation list at present. To be retained on the Scotland list. |
| 2117 Medical Radiographer | Medical physicist | Not on Scotland shortage occupation list. |

# Chapter 8 Recommendations

## 8.1 Introduction

8.1 We are grateful to the corporate partners that have contributed to the evidence base for this partial review of the recommended shortage occupation list. This represents our seventh review of the shortage occupation list since our first report in autumn 2008. The following section summarises our recommended changes to the UK shortage occupation list and Table 8.1 shows the full recommended UK shortage occupation list. Table 8.2 shows the recommended Scotland list.

## 8.2 The recommended UK shortage occupation list

8.2 Before providing the full recommended UK shortage occupation list, drawing together the reviews of individual occupations covered in Chapters 3 to 6, we outline all additions and removals with regard to the current list.

8.3 The MAC recommends that the following job titles **be added to the shortage occupation list**:

- consultants in clinical radiology – SOC 2211 medical practitioners;
- CT3 and ST4 to ST7 training roles in emergency medicine;
- non-consultant, non-training roles in paediatrics – SOC 2211 medical practitioners;
- non-consultant, non-training roles in old age psychiatry – SOC 2211 medical practitioners;
- core trainees in psychiatry – SOC 2211 medical practitioners;
- paramedics qualified to NQF6+ – SOC 3213 paramedics;
- prosthetists and orthotists – SOC 2229 therapy professionals n.e.c.;
- overhead linesworkers (low-voltage) – SOC 5249 electrical and electronic trades n.e.c.;

- product manager – SOC 2133 IT specialist managers;
- data scientist – SOC 2135 IT business analysts, architects and systems designers;
- senior developer – SOC 2136 programmers and software development professionals;
- cyber security specialist - SOC 2139 information technology and telecommunications professionals n.e.c.

8.4 The MAC recommends that the following job-titles **be removed from the shortage occupation list**:

- consultants in haematology – SOC 2211;
- non-consultant, non-training medical staff posts in:
  - psychiatry (excluding old-age psychiatry) - SOC 2211;
  - general medicine specialities delivering acute care services (intensive care medicine, general internal medicine (acute)) - SOC 2211;
  - anaesthetics – SOC 2211;
  - rehabilitation medicine – SOC 2211;
- HPC registered therapeutic radiographers – SOC 2217;
- specialist nurses working in neonatal or paediatric intensive care units – SOC 2231.

| Table 8.1: Recommended UK shortage occupation list for Tier 2 of the Points Based System, February 2015 | |
|---|---|
| **Occupation title and SOC 2010 code (see notes 1, 2 and 3)** | **Job titles included on the shortage occupation list (and other information where applicable)** |
| Production managers and directors in mining and energy (1123) | **ONLY the following job title within this occupation:**<br><br>**The following job titles within the decommissioning and waste management areas of the nuclear industry:** managing director, programme director and site director.<br><br>**The following job titles within the electricity transmission and distribution industry:** project manager and site manager. |
| Physical Scientists (2113) | **ONLY the following job titles within this occupation:**<br><br>**The following job titles within the construction-related ground engineering industry:** engineering geologist, hydrogeologist and geophysicist.<br><br>**The following job titles within the oil and gas industry:** geophysicist, geoscientist, geologist and geochemist.<br><br>**The following job title in the decommissioning and waste areas of the nuclear industry:** technical services manager.<br><br>**The following job titles within the mining sector:** senior resource geologist and staff geologist. |
| Civil engineers (2121) | **ONLY the following job titles within this occupation:**<br><br>**The following job titles in the construction-related ground engineering industry:** geotechnical engineer and tunnelling engineer.<br><br>**The following job titles within the oil and gas industry:** petroleum engineer, drilling engineer, completions engineer, fluids engineer, reservoir engineer, offshore and subsea engineer, control and instrument engineer, process safety engineer and wells engineer.<br><br>**The following job title within the mining sector:** senior mining engineer |
| Mechanical engineers (2122) | **ONLY the following job title within this occupation:**<br><br>**The following job title within the oil and gas industry:** All mechanical engineers. |
| Electrical engineers (2123) | **ONLY the following job titles within this** |

| Table 8.1: Recommended UK shortage occupation list for Tier 2 of the Points Based System, February 2015 | |
|---|---|
| **Occupation title and SOC 2010 code (see notes 1, 2 and 3)** | **Job titles included on the shortage occupation list (and other information where applicable)** |
| | **occupation:**<br><br>**The following job title within the oil and gas industry:** All electrical engineers.<br><br>**The following job titles within the electricity transmission and distribution industry:** power system engineer, control engineer and protection engineer.<br><br>**The following job titles within the aerospace industry:** electrical machine design engineer and power electronics engineer. |
| Electronics Engineers (2124) | **ONLY the following job titles within this occupation:**<br><br>**The following job titles within the railway industry:** signalling design manager, signalling design engineer, signalling principles designer, senior signalling design checker, signalling design checker and signalling systems engineer.<br><br>**The following job title within the automotive manufacturing and design industry:** specialist electronics engineers |
| Design and development engineers (2126) | **ONLY the following job titles within this occupation:**<br><br>**The following job title within the electricity transmission and distribution industry:** design engineer.<br><br>**The following job titles within the automotive manufacturing and design industry:** product development engineer and product design engineers.<br><br>**The following job title within the electronics system industry:** integrated circuit design engineer; integrated circuit test engineer. |
| Production and process engineers (2127) | **ONLY the following job title within this occupation:** chemical engineer.<br><br>**The following job title within the aerospace industry:** manufacturing engineer (process planning).<br><br>**The following job title within the decommissioning and waste areas of the nuclear industry:** technical services representative |

| Table 8.1: Recommended UK shortage occupation list for Tier 2 of the Points Based System, February 2015 | |
|---|---|
| **Occupation title and SOC 2010 code (see notes 1, 2 and 3)** | **Job titles included on the shortage occupation list (and other information where applicable)** |
| Engineering professionals n.e.c. (2129) | **ONLY the following job titles within this occupation:**<br><br>**The following job titles within the electricity transmission and distribution industry:** project engineer and proposals engineer.<br><br>**The following job titles within the aerospace industry:** aerothermal engineer, stress engineer, chief of engineering, and advance tool and fixturing engineer.<br><br>**The following job titles within the decommissioning and waste management areas of the civil nuclear industry:** operations manager, decommissioning specialist manager, project/planning engineer, radioactive waste manager and radiological protection advisor.<br><br>**The following job titles within the civil nuclear industry:** nuclear safety case engineer, mechanical design engineer (pressure vehicles), piping design engineer, mechanical design engineer (stress) and thermofluids/process engineer. |
| IT specialist managers (2133) | **ONLY the following job titles within this occupation:** Product manager.<br><br>**Other information:** Product managers must have five or more years documented evidence of related on-the-job experience and demonstrable experience of leading a team. |
| IT business analysts, architects and systems designers (2135) | **ONLY the following job titles within this occupation:** Data scientist.<br><br>**Other information:** Data scientists must have five or more years documented evidence of related on-the-job experience and demonstrable experience of leading a team.<br><br>**The following job title within visual effects and 2D/3D computer animation for film, television or video games sectors:** systems engineer. |
| Programmers and software development professionals (2136) | **ONLY the following job titles within this occupation:** Senior developer.<br><br>**Other information:** Senior developers must have five or more years documented evidence of related on-the-job experience and demonstrable experience of leading a team. |

| Table 8.1: Recommended UK shortage occupation list for Tier 2 of the Points Based System, February 2015 | |
|---|---|
| **Occupation title and SOC 2010 code (see notes 1, 2 and 3)** | **Job titles included on the shortage occupation list (and other information where applicable)** |
| | **The following job titles within visual effects and 2D/3D computer animation for film, television or video games sectors:** software developer, shader writer and games designer.<br><br>**The following job titles within the electronics system industry:** Driver developer and embedded communications engineer. |
| Information technology and telecommunications professionals n.e.c. (2139) | **ONLY the following job titles within this occupation:** Cyber security specialist.<br><br>**Other information:**<br><br>Cyber security specialists must have five or more years documented evidence of related on-the-job experience and demonstrable experience of leading a team. |
| Environmental Professionals (2142) | **ONLY the following job titles within this occupation:**<br><br>**The following job titles in the construction related ground engineering industry:** contaminated land specialist, geoenvironmental specialist and landfill engineer. |
| Medical practitioners (2211) | **ONLY the following job titles within this occupation:**<br><br>Consultant within the following specialities: emergency medicine, clinical radiology, and old age psychiatry.<br><br>Non-consultant, non-training, medical staff post in the following specialities: emergency medicine (including specialist doctors working in accident and emergency), paediatrics, and old-age psychiatry.<br><br>Core trainees in psychiatry.<br><br>Emergency medicine trainees at CT3 and ST4-ST7 level. |
| Medical Radiographers (2217) | **ONLY the following job titles within this occupation:** HPC registered diagnostic radiographer; sonographer; nuclear medicine practitioner; radiotherapy physics scientist, radiotherapy physics practitioner. |
| Health professionals n.e.c. (2219) | **ONLY the following job titles within this occupation:** Neurophysiology practitioner, neurophysiology healthcare scientist, nuclear medicine scientist. |

| Table 8.1: Recommended UK shortage occupation list for Tier 2 of the Points Based System, February 2015 | |
|---|---|
| **Occupation title and SOC 2010 code (see notes 1, 2 and 3)** | **Job titles included on the shortage occupation list (and other information where applicable)** |
| Therapy professionals n.e.c. (2229) | **ONLY the following job titles within this occupation:** Prosthetists and orthotists. |
| Secondary education teaching professionals (2314) | **ONLY the following job titles within this occupation:** Secondary education teachers within the subjects of maths and science (chemistry and physics only). |
| Actuaries, economists and statisticians (2425) | **ONLY the following job titles within this occupation:** informatician and bio-informatician. |
| Social workers (2442) | **ONLY the following job title within this occupation:** Social worker working in children's and family services. |
| Quality control and planning engineers (2461) | **ONLY the following job titles within this occupation:**<br>**The following job titles within the electricity transmission and distribution industry:** planning/development engineer and quality, health, safety and environment (QHSE) engineer. |
| Engineering technicians (3113) | **ONLY the following job title within this occupation:**<br>**The following job titles in the electricity transmission and distribution industry:** commissioning engineer and substation electrical engineer. |
| Paramedics (3213) | All paramedics.<br>**Other information:**<br>Paramedics must be qualified to NQF6+ level (degree level) |
| Artist (3411) | **ONLY the following job title within this occupation:** The following job title within visual effects and 2D/3D computer animation for film, television or video games sectors: animator. |
| Dancers and choreographers (3414) | **ONLY the following job titles within this occupation:** Skilled classical ballet dancer and skilled contemporary dancer.<br>**Other information:** For this job to be skilled (to level NQF4+), classical ballet dancers must meet the standard required by internationally recognised UK ballet companies (e.g. Birmingham Royal Ballet, English National Ballet, Northern Ballet Theatre, the Royal Ballet and Scottish Ballet). For operational purposes, |

| Table 8.1: Recommended UK shortage occupation list for Tier 2 of the Points Based System, February 2015 | |
|---|---|
| **Occupation title and SOC 2010 code (see notes 1, 2 and 3)** | **Job titles included on the shortage occupation list (and other information where applicable)** |
| | the type of factor to be taken into account may include whether the company has: performed, or has been invited to perform, at venues of the calibre of the Royal Opera House, Sadler's Wells or the Barbican, either in the UK or overseas; attracts dancers and/or choreographers and other artists from other countries; and is endorsed as being internationally recognised by a UK industry body such as the Arts Councils (of England, Scotland and/or Wales). |
| Musicians (3415) | **ONLY the following job title in this occupation:** Skilled orchestral musician who is a leader and principal or sub-principal or numbered string position.<br><br>**Other information:** For this job, the orchestral musicians who are leaders or principals must meet the standard required by internationally recognised UK orchestras (including London Symphony Orchestra, London Philharmonic Orchestra, Philharmonia Orchestra and Royal Philharmonic Orchestra). |
| Arts officers, producers and directors (3416) | **ONLY the following job titles within this occupation:** The following job titles within visual effects and 2D/3D computer animation for film, television or video games sectors: 2D supervisor, 3D supervisor, computer graphics supervisor, producer, production manager, technical director, and visual effects supervisor. |
| Graphic designers (3421) | **ONLY the following job titles within this occupation:**<br><br>**The following job titles within visual effects and 2D/3D computer animation for film, television or video games sectors:** compositing artist, matte painter, modeller, rigger, stereo artist and texture artist. |
| Buyers and purchasing officers (3541) | **ONLY the following job title within this occupation:** The following job title within the aerospace industry: manufacturing engineer (purchasing). |
| Welding trades (5215) | **ONLY the following job title within this occupation:** High integrity pipe welder.<br><br>**Other information:** Skilled to NQF level 4+ requires that the individual has three or more years documented evidence of related on-the- |

| Table 8.1: Recommended UK shortage occupation list for Tier 2 of the Points Based System, February 2015 | |
|---|---|
| **Occupation title and SOC 2010 code (see notes 1, 2 and 3)** | **Job titles included on the shortage occupation list (and other information where applicable)** |
| | job experience. |
| Metal working production and maintenance fitters (5223) | **ONLY the following job title within this occupation:** Licensed and military certifying engineer/inspector technician. |
| Electrical and electronic trades n.e.c. (5249) | **ONLY the following job title within this occupation:** Overhead linesworkers<br><br>**Other information:** Only workers recruited at Linesman Erector 2 level and above and who earn at least £32,000. |
| Chefs (5434) | **ONLY the following job title within this occupation:** Chef skilled to NQF level 4+.<br><br>**Other information:** Skilled to NQF level 4+ requires that the individual is earning at least £29,570 per year after deductions for accommodation, meals, etc; has five years of relevant experience in a role of at least equivalent status to the one they are entering; and that the job should not be in a fast food or standard fare outlet.<br><br>The Home Office also has additional requirements to prevent abuse (see Immigration Rules Appendix K) |
| Notes:<br>(1) SOC codes relate to the Standard Occupational Classification (SOC) 2010.<br>(2) n.e.c. stands for 'not elsewhere classified'.<br>(3) For official job descriptions relating to four digit occupations in SOC 2010, see [http://www.ons.gov.uk/ons/guide-method/classifications/current-standard-classifications/soc2010/soc2010-volume-2-the-structure-and-index/soc2010-volume-2.pdf.] | |

| Table 8.2: Recommended Scotland shortage occupation list for Tier 2 of the Points Based System, February 2015 | |
|---|---|
| **SOC code and description** | **Job titles included on the present Scotland Shortage Occupation List and further criteria** |
| N/A | **ALL** job titles and occupations on the UK shortage occupation list |
| 2211 Medical practitioners | **ONLY the following jobs in this occupation code:**<br>jobs on the UK shortage occupation list<br>• Consultants in :<br>○ anaesthetics<br>○ paediatrics<br>○ obstetrics and gynaecology<br>○ psychiatry<br>○ clinical oncology<br>• All grade roles in<br>○ anaesthetics<br>○ paediatrics<br>○ obstetrics and gynaecology<br>○ psychiatry (excluding CPT1)<br>• Non-consultant, non-training roles and trainees at CT3 and ST4-ST7 in clinical radiology. |
| 2231 Nurses and midwives | **ONLY the following jobs in this occupation code:**<br>Specialist nurse in neonatal or intensive care units |
| 2217 Medical radiographer | **ONLY the following jobs in this occupation code:**<br>Jobs on the UK shortage occupation list<br>medical physicist;<br>staff working in diagnostics radiology (including magnetic resonance imaging). |

# Annex A Consultation

## A.1 List of organisations that responded to the call for evidence

Adelaide House Nursing Home

Advantage NRG Ltd

Aerospace – Airbus Operations Ltd

AMEC Foster Wheeler

Apex Care Homes Ltd

AppShare Ltd (Scotland)

Armscare Ltd

Ascot Residential

Ashfield Court Care Home

Ashmere

Association of Independent Professionals and Self-Employed

Association of School and College Leaders

Balfour Beatty

Barchester Healthcare

Barons Park

Belong

Belfast Health and Social Care Trust

Belengrove Park Nursing Home

Berkshire Care Association

Brooklands Nursing Home

British Association and College of Occupational Therapists

British Hospitality Association

British Medical Association

British Poultry Council

Burnham Lodge Care

Care England

Care for Your Life Ltd

Care Plus Homes

Caritate Nursing Homes

Central London Community Healthcare

Centre for Workforce Intelligence

Chataway Care

Claridge Nursing Homes

Construction Industry Training Board (CITB)

College of Occupational Therapists

Convention of Scottish Local Authorities

Croft Care Group

Department for Business, Innovation & Skills (BIS)

Energy & Utility Skills and National Skills Academy Power (joint submission)

Engineer Employers Federation

ERA Homecare

Esteem Care

Excellent Care Homes

Flight care

Four Seasons Healthcare Ltd

Glebe House Nursing Home

Global Resource Bureau Ltd

Goldstar Chefs

Gresham Care Home

Guy's & St Thomas NHS Foundation Trust

Hampshire Hospitals NHS Foundation

Helen McArdle Care

Highbury House Nursing Home

Highcroft House

Hillcare

HMA International

HomeCroft

HSC Northern Ireland

Infosys Ltd

Isle of Wight NHS Trust

Kings College Hospital

Kingsley Napley LLP

Lincolnshire Partnership NHS Foundation Trust

Maplehurst Nursing Home

Migrationwatch UK

National Farmers Union

North East London NHS Foundation Trust

Northern Ireland Strategic Migration Partnership

Pennington's Manches LLP

Recruitment and Employment Confederation

Rolls Royce

Royal College of Nursing

Royal College of Paediatrics and Child Health

Royal College of Physicians and Surgeons of Glasgow

Royal College of Radiologists

Royal Pharmaceutical Society

ScotlandIS

Scottish Government

South Tees Hospital Foundation

TATA Consultancy Services

techUK

Teikyo Foundation (UK) Ltd

TIGA

TUC

UNISON

University College London Hospitals NHS Foundation Trust

Voltcom Group

Yelverton Nursing Residential Home

## A.2 Indicative list of organisations we met with/attended an event

Advantage NRG Ltd

AMEC

Apex Care Homes Ltd

Balfour Beatty

BECTU, trade union for the media and entertainment sector

British Medical Association

British Poultry Council

Brooklands Nursing Homes

BTS Group Ltd

Carillion

Centre for Workforce Intelligence

Clause-match

Coadec

College of Emergency Medicine

College of Occupational Therapists

Department for Energy and Climate Change

Department of Health

Department for Works and Pensions

Deloitte LLP

Digital Economy Unit, Department for Business, Innovation & Skills

Digital Shadows

Energy and Utility Skills

Funding Circle

Hailo

Hassle.com

Japan External Trade Organisation

Kings College Hospital

Kingsley Napley LLP

Intellectual Capital Group

Interserve

Health Education South London

Jetro

Laura Devine Solicitors

Level39

Mind Candy

Migreat

National Association of Medical Personnel Specialists

National Endowment for Science, Technology and the Arts

Nursing for Unison

Nutmeg

Open signal

Optimity

Passion Capital

Pennington Manches LLP

NHS Employers

Qubit

Room in the Moon

Royal College of Nursing

Silicon Valley Bank

Skills Matter

ScotlandIS

Scottish Minister for Europe and International Development

Scottish Government

St Mary's International

Tata Consultancy Services

Tech City

Tech London Advocates

techUK

TIGA

TUC

Ubisoft

UK Home Care Association

UKIE

Unruly Media

Unison

Unite

Voltcom Group

Wellcome Trust

# Annex B Certificates of Sponsorship for health and IT related occupations

B.1 The tables below contain information about the number of applications for certificates of sponsorship for each component of Tier 2 (RLMT, shortage occupation and intra-company transfer) for health and IT related occupations. The tables do not record the number of applications that were granted, nor the number of grants that resulted in an actual immigrant coming to work in the UK. The tables show the main nationalities, mean age and median salary and allowances for each occupation within the identified sectors currently under review.

**Table B.1 Health-related occupations by Resident Labour Market Test, shortage occupation and intra-company transfer main applicants, year ending September 2014**

| SOC code | Title | No. applications | | Main nationalities | Age (mean) | Median salary (£) | Median allowance (£) |
|---|---|---|---|---|---|---|---|
| **Natural and social science professionals** | | | | | | | |
| 2112 | Biological scientists and biochemists | SOL | 8 | - | 31 | 30,000 | 5,000 |
| | | RLMT | 220 | INDIA (22%) CHINA (11%) UNITED STATES (9%) | 33 | 31,000 | 5,000 |
| | | ICT ST | 7 | - | 46 | 48,000 | 11,000 |
| | | ICT LT | 4 | - | 38 | 56,000 | 8,000 |
| **Health professionals** | | | | | | | |
| 2211 | Medical practitioners | SOL | 709 | PAKISTAN (29%) INDIA (27%) EGYPT (8%) | 35 | 47,000 | 15,000 |
| | | RLMT | 2603 | PAKISTAN (20%) INDIA (18%) EGYPT (10%) | 34 | 44,000 | 15,000 |
| | | ICT ST | 7 | - | 54 | 314,000 | - |
| | | ICT LT | 2 | - | 50 | 157,000 | - |
| 2212 | Psychologists | SOL | - | - | - | - | - |
| | | RLMT | 19 | - | 31 | 33,000 | 5,000 |
| | | ICT ST | 7 | - | - | - | - |
| | | ICT LT | 2 | - | - | - | - |
| 2213 | Pharmacists | SOL | - | - | - | - | - |
| | | RLMT | 378 | INDIA (30%) MALAYSIA (24%) NIGERIA (9%) | 28 | 31,000 | 1,000 |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | - | - | - | - | - |
| 2214 | Ophthalmic opticians | SOL | - | - | - | - | - |
| | | RLMT | 36 | CANADA (50%) | 30 | 35,000 | 8,000 |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | - | - | - | - | - |

**Table B.1 Health-related occupations by Resident Labour Market Test, shortage occupation and intra-company transfer main applicants, year ending September 2014**

| SOC code | Title | No. applications | | Main nationalities | Age (mean) | Median salary | Median allowance |
|---|---|---|---|---|---|---|---|
| 2215 | Dental practitioners | SOL | - | - | - | - | - |
| | | RLMT | 34 | - | 36 | 45,000 | 13,000 |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | - | - | - | - | - |
| 2216 | Veterinarians | SOL | - | - | - | - | - |
| | | RLMT | 36 | UNITED STATES (44%) | 32 | 36,000 | 10,000 |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | - | - | - | - | - |
| 2217 | Medical radiographers | SOL | 143 | INDIA (20%) AUSTRALIA (15%) PHILLIPINES (11%) | 33 | 30,000 | 4,000 |
| | | RLMT | 10 | - | 38 | 32,000 | 4,000 |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | - | - | - | - | - |
| 2218 | Podiatrists | SOL | - | - | - | - | - |
| | | RLMT | 1 | - | 26 | 25,000 | - |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | - | - | - | - | - |
| 2219 | Health professionals n.e.c. | SOL | - | - | - | - | - |
| | | RLMT | 131 | INDIA (55%) PHILIPPINES (15%) | 31 | 22,000 | 4,000 |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | 1 | - | - | - | - |
| **Therapy Professionals** | | | | | | | |
| 2221 | Physiotherapists | SOL | - | - | - | - | - |
| | | RLMT | 123 | INDIA (72%) | 31 | 26,000 | 2,000 |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | - | - | - | - | - |
| 2222 | Occupational | SOL | - | - | - | - | - |

**Table B.1 Health-related occupations by Resident Labour Market Test, shortage occupation and intra-company transfer main applicants, year ending September 2014**

| SOC code | Title | No. applications | | Main nationalities | Age (mean) | Median salary | Median allowance |
|---|---|---|---|---|---|---|---|
| | therapists | RLMT | 53 | INDIA (42%) AUSTRALIA (25%) | 30 | 29,700 | 4,000 |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | - | - | - | - | - |
| 2223 | Speech and language therapists | SOL | - | - | - | - | - |
| | | RLMT | 9 | - | 32 | 26,000 | - |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | - | - | - | - | - |
| 2229 | Therapy professionals n.e.c. | SOL | - | - | - | - | - |
| | | RLMT | 102 | INDIA (56%) NEPAL (10%) | 31 | 22,000 | 1,000 |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | 2 | - | 25 | 41,000 | - |
| **Nursing and Midwifery Professionals** | | | | | | | |
| 2231 | Nurses | SOL | 54 | PHILLIPINES (52%) INDIA (30%) | 32 | 26,000 | 4,000 |
| | | RLMT | 2387 | INDIA (46%) PHILLIPINES (42%) NIGERIA (2%) | 30 | 24,000 | 3,000 |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | 1 | * | * | * | * |
| 2232 | Midwives | SOL | - | - | - | - | - |
| | | RLMT | 2 | * | 37 | 25,000 | - |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | - | - | - | - | - |
| **Health Associate Professionals** | | | | | | | |
| 3213 | Paramedics | SOL | - | - | - | - | - |
| | | RLMT | - | - | - | - | - |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | - | - | - | - | - |

**Table B.1 Health-related occupations by Resident Labour Market Test, shortage occupation and intra-company transfer main applicants, year ending September 2014**

| SOC code | Title | No. applications | | Main nationalities | Age (mean) | Median salary | Median allowance |
|---|---|---|---|---|---|---|---|
| 3216 | Dispensing opticians | SOL | - | - | - | - | - |
| | | RLMT | - | - | - | - | - |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | - | - | - | - | - |
| 3217 | Pharmaceutical technicians | SOL | - | - | - | - | - |
| | | RLMT | - | - | - | - | - |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | - | - | - | - | - |
| 3218 | Medical and dental technicians | SOL | 9 | - | 34 | 36,000 | 5,000 |
| | | RLMT | - | - | - | - | - |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | - | - | - | - | - |
| 3219 | Health associate professionals n.e.c. | SOL | - | - | - | - | - |
| | | RLMT | - | - | - | - | - |
| | | ICT ST | - | - | - | - | - |
| | | ICT LT | - | - | - | - | - |

Notes: - means no applications were made under this occupational code in the Certificate of Sponsorship data for 2014.

Source: Home Office Management Information, year ending September 2014 (see caveats at end of Annex)

**Table B.2 IT- related occupations by Resident Labour Market Test, shortage occupation and intra-company transfer main applicants, year ending**

| SOC code | Occupation | CoS applications | | Main nationalities | Age | Median salary (£) | Median allowance (£) |
|---|---|---|---|---|---|---|---|
| 2133 | IT specialist managers | SOL | - | - | - | - | - |
| | | RLMT | 222 | INDIA (42%)<br>UNITED STATES (10%)<br>AUSTRALIA (6%) | 33 | 44,000 | 6,000 |
| | | ICT ST | 200 | INDIA (82%)<br>UNITED STATES (12%)<br>PHILLIPINES (2%) | 37 | 46,000 | 29,000 |
| | | ICT LT | 714 | INDIA (80%)<br>UNITED STATES (7%)<br>JAPAN (3%) | 37 | 53,000 | 16,000 |
| 2134 | IT project and programme managers | SOL | - | - | - | - | - |
| | | RLMT | 263 | INDIA (41%)<br>UNITED STATES (12%)<br>CANADA (6%) | 34 | 48,000 | 6,000 |
| | | ICT ST | 595 | INDIA (85%)<br>UNITED STATES (7%)<br>PHILLIPINES (2%) | 37 | 42,000 | 3,000 |
| | | ICT LT | 1709 | INDIA (90%)<br>UNITED STATES (4%)<br>JAPAN (2%) | 37 | 49,000 | 16,000 |
| 2135 | IT business analysts, architects and systems designers | SOL | 26 | INDIA (46%) | 30 | 28,000 | 1,000 |
| | | RLMT | 1379 | INDIA (60%)<br>UNITED STATES (4%)<br>CHINA (4%) | 31 | 38,000 | 4,000 |
| | | ICT ST | 4724 | INDIA (95%)<br>UNITED STATES (2%)<br>CHINA (1%) | 32 | 34,000 | 23,000 |

**Table B.2 IT- related occupations by Resident Labour Market Test, shortage occupation and intra-company transfer main applicants, year ending**

| SOC code | Occupation | CoS applications | | Main nationalities | Age | Median salary (£) | Median allowance (£) |
|---|---|---|---|---|---|---|---|
| | | ICT LT | 2837 | INDIA (91%)<br>UNITED STATES (4%)<br>CHINA (1%) | 34 | 45,000 | 22,000 |
| 2136 | Programmers and software development professionals | SOL | 157 | INDIA (46%)<br>CHINA (10%)<br>UNITED STATES (9%) | 30 | 30,000 | 1,000 |
| | | RLMT | 2505 | INDIA (58%)<br>CHINA (7%)<br>NIGERIA (3%) | 30 | 35,000 | 3,000 |
| | | ICT ST | 7173 | INDIA (98%)<br>CHINA (1%)<br>UNITED STATES (1%) | 29 | 32,000 | 22,000 |
| | | ICT LT | 1728 | INDIA (88%)<br>UNITED STATES (4%)<br>SAUDI ARABIA (1%) | 33 | 43,000 | 26,000 |
| 2137 | Web design and development professionals | SOL | - | - | - | - | - |
| | | RLMT | 494 | INDIA (38%)<br>AUSTRALIA (7%)<br>BANGLADESH (6%) | 29 | 25,000 | 2,000 |
| | | ICT ST | 212 | INDIA (95%) | 27 | 26,000 | 25,000 |
| | | ICT LT | 26 | INDIA (65%) | 34 | 46,000 | 27,000 |
| 2139 | Information technology and telecommunications professionals n.e.c. | SOL | - | - | - | - | - |
| | | RLMT | 1079 | INDIA (67%)<br>NIGERIA (6%)<br>PAKISTAN (4%) | 30 | 29,000 | 2,000 |

## Table B.2 IT- related occupations by Resident Labour Market Test, shortage occupation and intra-company transfer main applicants, year ending

| SOC code | Occupation | CoS applications | | Main nationalities | Age | Median salary (£) | Median allowance (£) |
|---|---|---|---|---|---|---|---|
| | | ICT ST | 3574 | INDIA (97%)<br>UNITED STATES (1%)<br>CHINA (1%) | 30 | 30,000 | 20,000 |
| | | ICT LT | 845 | INDIA (91%)<br>UNITED STATES (4%)<br>CHINA (1%) | 34 | 43,000 | 20,000 |

Notes: see notes at end of table B.1

Applicants are required to meet the criteria for Tier 2 at the point of being allocated a certificate of sponsorship. Therefore, these data have been filtered to exclude those individuals who would not meet the current visa rules.

First, a main applicant to the RLMT route has been excluded if the occupation is not skilled to National Qualifications Framework level 6 or above (NQF6+) and/or earnings on the job (including allowances) are less than £20,500 per year.

Second, a main applicant to the shortage occupation route has been excluded if the occupation is not on the shortage occupation list as at 12 December 2014 and/or earnings in the job (including allowances) are less than £20,500 per year.

Third, a main applicant to the long-term intra-company transfer route has been excluded if their occupation is not skilled to NQF6+ and/or earnings in the job (including allowances) are less than £41,000 per year.

Finally, a main applicant to the short-term intra-company route has been excluded if their occupation is not skilled to NQF6+ and/or earnings in the job (including allowances) are less than £24,500 per year. Further, data is excluded if the salary reported is not annual or we were unable to distinguish between in/out of country applicants. Not all the individuals obtaining a CoS may be granted visas since some may have their visa applications rejected. Furthermore, even when a visa is granted, a person might not travel to the UK and on arrival they might also not be admitted.

All of the figures quoted are management information which have been subject to internal quality checks, but have not been quality assured to the same standard as National Statistics. As much of the input data (for example, salary levels) is self declared by the sponsor, it is not possible to validate the quality of the source information, and we are advised by the Home Office that data quality anomalies could impact on the findings. These data are provisional and subject to change. Median annual pay rounded to the nearest thousand. Median annual salaries are calculated using both in and out-of-country CoS used and as such may double count some individuals.

Where there were less than 10 applicants, nationalities have not been shown. Where there was only one applicant, no details have been included to retain confidentiality.

Source: Home Office management information, year ending September 30 2014

# Annex C Top down shortage methodology

## C.1 Introduction

C.1 This annex describes in detail the methodology used to indicate which 4-digit Standard Occupation Classification (SOC) occupations may be considered to be in shortage according to top-down analysis of national level datasets. The results of this analysis should be considered as indicative of shortage only and interpreted in the context of partner evidence.

C.2 This annex proceeds in three sections. First, it outlines the data sources used in the analysis. Second, it describes the top-down shortage methodology we have used for this review, highlighting any deviations from the methodology previously used. Finally, it lists the results of the top-down shortage methodology in full.

## C.2 Data

C.3 For our top-down approach, we analyse the most timely and relevant national level labour market datasets that are available to us. The main data sources used for the top-down analysis are:

- the Labour Force Survey (LFS);
- the Annual Survey of Hours and Earnings (ASHE);
- the Employer Skills Survey (ESS); and
- Jobcentre Plus (JCP) claimant count data.

C.4 For previous MAC reviews of the shortage occupation lists these sources have provided data for 12 indicators. However, since November 2012, Jobcentre Plus data on vacancies by occupation has been discontinued, leaving just 10 indicators with which to work.

C.5 Inevitably, this has implications for our top-down methodology. We will address longer-term solutions for revising our methodology in due course. For now, we have proceeded on the basis of the 10 available indicators and discuss this further below.

C.6 An important issue to consider in the analysis presented here is the revision of the SOC in 2010. The SOC classifies job titles into groups marked by similar skills and knowledge. It is periodically updated to reflect changes in the composition of jobs carried out in the UK and changes as new technologies are introduced at home and abroad. This revision is carried out approximately every ten years by the Office for National Statistics (ONS).

C.7 Since 2013, the recommended shortage occupation list has used SOC 2010. Earlier iterations of our top-down shortage analysis were carried out using SOC 2000.

C.8 Whilst most of the new analysis presented in this report draws on SOC 2010 data, the benchmarks, which are calculated using data in the period leading up to the end of 2008, have been calculated from data converted into SOC 2010 format. In addition, claimant count data by occupation continues to be published in SOC 2000 and has been converted to SOC 2010 for use in our analysis. For details of the methodology used to convert between SOC 2000 and SOC 2010, see Migration Advisory Committee (2013).

## C.3 Shortage Indicators

C.9 In Migration Advisory Committee (2008) we identified a total of 12 indicators of labour shortage for our top-down analysis. These fall into four broad categories including:

- employer-based indicators (reports of hard-to-fill or skill-shortage vacancies);
- price-based indicators (such as earnings growth);
- volume-based indicators (e.g. employment or unemployment); and
- other indicators of imbalance based on administrative data (e.g. vacancy duration or vacancy/unemployment ratios).

C.10 The 12 indicators of shortage used in the top-down methodology are listed in Table C.1 below. As vacancy data by 4-digit SOC code is not currently available from the Department for Work and Pensions, only ten of the twelve indicators are available for this iteration of the analysis.

C.11 We assign to each indicator of shortage a threshold value. For each indicator, apart from the percentage change in claimant count (coded V1), the value of the indicator must exceed or equal the threshold for shortage to be inferred. To be considered to be in shortage, according to the top-down methodology, an occupation must pass at least half of indicators available for that occupation. As we expect lower levels of unemployment to indicate shortage, this condition is inverted for indicator V1.

C.12 As discussed in previous shortage occupation reports (Migration Advisory Committee, 2010; Migration Advisory Committee, 2011; Migration Advisory Committee, 2013), we have decided to adopt what we refer to as a benchmarking approach for assessing our top-down indicators of shortage. This approach involves fixing the passing threshold for an indicator to its value at a point of historical stability in the labour market, which we have defined as having occurred in 2008.

C.13 Under the benchmarking approach, if the distribution of indicator values for a specific indicator shifts downwards in response to changes in economic conditions then fewer occupations are identified as being in shortage, and vice versa. Benchmarking provides a method of setting an absolute threshold for each indicator over time and, as a result, provides them with an automatic stabiliser property. The benchmarking approach will be kept under review in future iterations of the recommended shortage occupation list.

C.14 There is one exception to the benchmarking approach described above. Due to the nature of the indicator that estimates the return to occupation (coded P3), it is not appropriate to benchmark the threshold value for this indicator. Specifically, were the threshold value of this indicator to be benchmarked as described above, the number of occupations being assessed as experiencing labour shortage according to this indicator would increase over time, even without an increase in actual labour shortage. This is because both nominal and real pay tend to increase over time. Therefore, as in previous reports, we calculate the threshold value for this indicator based on the distribution of indicator values used in this report, rather than benchmarking to the end of 2008.

C.15 Table C.1 also outlines the specific data that are used to calculate the indicator values and benchmarked thresholds. The specification of the indicators of shortage remains unchanged from that used in the last review of the shortage occupation list (Migration Advisory Committee, 2013).

C.16 Therefore, except for indicator P3, the thresholds are unchanged from the previous reviews of the shortage occupation list. The threshold values were originally established by calculating the 12 shortage indicators using the threshold data listed in Table C.1. We then used the distribution of indicator values for the 97 4-digit SOC 2010 occupations that we identified as being skilled to NQF6+ to calculate the threshold values for the 12 top-down indicators.

**Table C.1: The 12 top-down indicators of shortage**

| Code | Indicator | Source | Threshold data | Indicator values data |
|---|---|---|---|---|
| P1 | Percentage change of median real pay [3](1 yr) | ASHE | 2006–2007 | 2013–2014 |
| P2 | Percentage change of median real pay (3 yrs) | ASHE | 2004–2007 | 2011–2014 |
| P3 | Return to occupation | LFS | N/A | 2013Q4–2014Q3 |
| I1 | Change in median vacancy duration (1 yr) | JCP | Apr 2006 – Mar 2007 to Apr 2007 – Mar 2008 | Data not currently available |
| I2 | Vacancies/claimant count | JCP | Jan 2007 – Dec 2007 | Data not currently available |
| V1 | Percentage change of claimant count (1 yr) | JCP | Mar 07 to Mar 08 | Nov 2013 – Nov 2014 |
| V2 | Percentage change of employment level (1 yr) | LFS | 2006Q1 – 2006Q4 to 2007Q1 – 2007Q4 | 2012Q4 – 2013Q3 to 2013Q4 – 2014Q3 |
| V3 | Percentage change of median paid hours worked (3 yr) | ASHE | 2004 – 2007 | 2011– 2014 |
| V4 | Change in new hires (1 yr) | LFS | 2006Q1 – 2006Q4 to 2007Q1 – 2007Q4 | 2012Q4 – 2013Q3 to 2013Q4 – 2014Q3 |
| E1 | Skill-shortage vacancies/total vacancies | NESS | 2007 | 2013 |
| E2 | Skill-shortage/hard-to-fill vacancies | NESS | 2007 | 2013 |
| E3 | Skill-shortage vacancies/employment | NESS/LFS | 2007 | 2013 |

C.17 As discussed in Migration Advisory Committee (2008), for each indicator our first preference is to calculate the threshold value using the median plus 50 per cent rule. Specifically, under this rule the threshold value is the median plus 50 per cent of the absolute value of the median. In those cases where we believe the shape of the distribution makes it unsuitable to use the median plus 50 per cent rule (for example, because the median is close to zero or the distribution is not approximately normal), we instead use the top quartile value as the threshold. For the indicator that measures the percentage change in claimant count (coded V1), these conditions are reversed, such that in the first instance the threshold value is given by the median minus 50 per cent of the median, and in the second it is given by the bottom quartile.

C.18 The resulting threshold values are listed in Table C.2 below.

[3] Pay adjusted to constant prices using Retail Prices Index data from ONS. Source: http://ons.gov.uk/ons/rel/cpi/consumer-price-indices/november-2014/consumer-price-inflation-reference-tables.xls [Accessed December 2014].

**Table C.2: List of shortage indicators and their threshold values**

| Code | Indicator | Source | Specification | Threshold value |
|---|---|---|---|---|
| P1 | Percentage change of median real pay (1 yr) | ASHE | Top quartile | 0.53 |
| P2 | Percentage change of median real pay (3 yrs) | ASHE | Top quartile | 3.44 |
| P3 | Return to occupation | LFS | Not benchmarked | |
| I1 | Change in median vacancy duration (1 yr) | JCP | Median + 50% | -2.96 |
| I2 | Vacancies/claimant count | JCP | Median + 50% | 0.44 |
| V1 | Percentage change of claimant count (1 yr) | JCP | Median + 50% | -23.58 |
| V2 | Percentage change of employment level (1 yr) | LFS | Top quartile | 9.69 |
| V3 | Percentage change of median paid hours worked (3 yr) | ASHE | Top quartile | 0.00 |
| V4 | Change in new hires (1 yr) | LFS | Top quartile | 0.01 |
| E1 | Skill-shortage vacancies/total vacancies | NESS | Median + 50% | 38.29 |
| E2 | Skill-shortage / hard-to-fill vacancies | NESS | Top quartile | 94.57 |
| E3 | Skill-shortage vacancies/employment | NESS | Median + 50% | 0.34 |

C.19 By comparing the indicator values against the threshold values, we can calculate, for each occupation, the indicators that are demonstrating shortage. For example, an occupation would have to experience real pay growth of more than 0.53 per cent over one year for shortage to be inferred for indicator P1.

C.20 In some cases it is not possible to estimate an indicator for a certain occupation or occupations, perhaps because of missing data, or small sample sizes. Therefore we assess our top-down shortage results with regard to the proportion, rather than the absolute number, of available indicators passed. In this, as in previous reports, we consider half of available shortage indicators being passed to be a good indication that an occupation may be in shortage.

## C.4 Results

C.21 Table C.3 details, for each of the 98 occupations skilled at NQF 6+, the number of indicators available, the number and proportion of indicators passed, as well as the total employment in the occupation. Occupations passing half or more of the available indicators are potentially in shortage. Table C.3 highlights 36 occupations that top-down analysis suggests may be in shortage. Note that this top-down analysis is indicative of shortage only and must be interpreted in the context of partner evidence.

**Table C.3: List of occupations skilled at NQF6+, shortage indicators available and passed**

| SOC 2010 | Occupation | Employment | Indicators available | Indicators passed | Percentage passed |
|---|---|---|---|---|---|
| 3532 | Brokers | 55,000 | 10 | 9 | 90.0% |
| 1150 | Financial institution managers and directors | 88,000 | 7 | 6 | 85.7% |
| 1123 | Production managers and directors in mining and energy | 14,000 | 6 | 5 | 83.3% |
| 1134 | Advertising and public relations directors | 26,000 | 7 | 5 | 71.4% |
| 1136 | Information technology and telecommunications directors | 74,000 | 7 | 5 | 71.4% |
| 1181 | Health services and public health managers and directors | 53,000 | 7 | 5 | 71.4% |
| 2423 | Management consultants and business analysts | 189,000 | 10 | 7 | 70.0% |
| 2114 | Social and humanities scientists | 14,000 | 6 | 4 | 66.7% |
| 3512 | Aircraft pilots and flight engineers | 21,000 | 6 | 4 | 66.7% |
| 3535 | Taxation experts | 33,000 | 6 | 4 | 66.7% |
| 1132 | Marketing and sales directors | 169,000 | 10 | 6 | 60.0% |
| 2127 | Production and process engineers | 55,000 | 10 | 6 | 60.0% |
| 2129 | Engineering professionals n.e.c. | 93,000 | 10 | 6 | 60.0% |
| 2136 | Programmers and software development professionals | 262,000 | 10 | 6 | 60.0% |
| 2139 | Information technology and telecommunications professionals n.e.c. | 163,000 | 10 | 6 | 60.0% |
| 2316 | Special needs education teaching professionals | 76,000 | 10 | 6 | 60.0% |
| 2461 | Quality control and planning engineers | 32,000 | 10 | 6 | 60.0% |
| 2472 | Public relations professionals | 47,000 | 10 | 6 | 60.0% |
| 1133 | Purchasing managers and directors | 52,000 | 7 | 4 | 57.1% |
| 2123 | Electrical engineers | 39,000 | 7 | 4 | 57.1% |
| 2213 | Pharmacists | 56,000 | 7 | 4 | 57.1% |
| 2425 | Actuaries, economists and statisticians | 37,000 | 7 | 4 | 57.1% |
| 2432 | Town planning officers | 24,000 | 7 | 4 | 57.1% |
| 2451 | Librarians | 25,000 | 7 | 4 | 57.1% |
| 1172 | Senior police officers | 15,000 | 6 | 3 | 50.0% |
| 2122 | Mechanical engineers | 78,000 | 10 | 5 | 50.0% |
| 2126 | Design and development engineers | 69,000 | 10 | 5 | 50.0% |
| 2134 | IT project and programme managers | 67,000 | 10 | 5 | 50.0% |
| 2216 | Veterinarians | 20,000 | 10 | 5 | 50.0% |
| 2413 | Solicitors | 116,000 | 10 | 5 | 50.0% |
| 2424 | Business and financial project management professionals | 202,000 | 10 | 5 | 50.0% |
| 2426 | Business and related research professionals | 39,000 | 10 | 5 | 50.0% |
| 2433 | Quantity surveyors | 39,000 | 10 | 5 | 50.0% |
| 2463 | Environmental health professionals | 14,000 | 6 | 3 | 50.0% |
| 3415 | Musicians | 54,000 | 6 | 3 | 50.0% |
| 3416 | Arts officers, producers and directors | 65,000 | 10 | 5 | 50.0% |

**Table C.3: List of occupations skilled at NQF6+, shortage indicators available and passed**

| SOC 2010 | Occupation | Employment | Indicators available | Indicators passed | Percentage passed |
|---|---|---|---|---|---|
| 1161 | Managers and directors in transport and distribution | 73,000 | 7 | 3 | 42.9% |
| 2212 | Psychologists | 37,000 | 7 | 3 | 42.9% |
| 2215 | Dental practitioners | 45,000 | 7 | 3 | 42.9% |
| 2217 | Medical radiographers | 22,000 | 7 | 3 | 42.9% |
| 2229 | Therapy professionals n.e.c. | 41,000 | 7 | 3 | 42.9% |
| 2318 | Education advisers and school inspectors | 33,000 | 7 | 3 | 42.9% |
| 2412 | Barristers and judges | 30,000 | 7 | 3 | 42.9% |
| 2419 | Legal professionals n.e.c. | 52,000 | 7 | 3 | 42.9% |
| 2444 | Clergy | 54,000 | 7 | 3 | 42.9% |
| 1131 | Financial managers and directors | 216,000 | 10 | 4 | 40.0% |
| 1184 | Social services managers and directors | 48,000 | 10 | 4 | 40.0% |
| 2137 | Web design and development professionals | 66,000 | 10 | 4 | 40.0% |
| 2142 | Environment professionals | 32,000 | 10 | 4 | 40.0% |
| 2211 | Medical practitioners | 237,000 | 10 | 4 | 40.0% |
| 2231 | Nurses | 596,000 | 10 | 4 | 40.0% |
| 2462 | Quality assurance and regulatory professionals | 71,000 | 10 | 4 | 40.0% |
| 2473 | Advertising accounts managers and creative directors | 32,000 | 10 | 4 | 40.0% |
| 3545 | Sales accounts and business development managers | 435,000 | 10 | 4 | 40.0% |
| 1171 | Officers in armed forces | 25,000 | 3 | 1 | 33.3% |
| 2124 | Electronics engineers | 32,000 | 6 | 2 | 33.3% |
| 2141 | Conservation professionals | 12,000 | 6 | 2 | 33.3% |
| 2214 | Ophthalmic opticians | 19,000 | 6 | 2 | 33.3% |
| 2218 | Podiatrists | 17,000 | 6 | 2 | 33.3% |
| 2443 | Probation officers | 13,000 | 6 | 2 | 33.3% |
| 2449 | Welfare professionals n.e.c. | 20,000 | 6 | 2 | 33.3% |
| 2452 | Archivists and curators | 13,000 | 6 | 2 | 33.3% |
| 2119 | Natural and social science professionals n.e.c. | 38,000 | 10 | 3 | 30.0% |
| 2121 | Civil engineers | 81,000 | 10 | 3 | 30.0% |
| 2133 | IT specialist managers | 180,000 | 10 | 3 | 30.0% |
| 2135 | IT business analysts, architects and systems designers | 104,000 | 10 | 3 | 30.0% |
| 2150 | Research and development managers | 39,000 | 10 | 3 | 30.0% |
| 2311 | Higher education teaching professionals | 156,000 | 10 | 3 | 30.0% |
| 2312 | Further education teaching professionals | 111,000 | 10 | 3 | 30.0% |
| 2314 | Secondary education teaching professionals | 411,000 | 10 | 3 | 30.0% |
| 2319 | Teaching and other educational professionals n.e.c. | 196,000 | 10 | 3 | 30.0% |
| 2431 | Architects | 53,000 | 10 | 3 | 30.0% |
| 2434 | Chartered surveyors | 56,000 | 10 | 3 | 30.0% |
| 2436 | Construction project managers and | 72,000 | 10 | 3 | 30.0% |

**Table C.3: List of occupations skilled at NQF6+, shortage indicators available and passed**

| SOC 2010 | Occupation | Employment | Indicators available | Indicators passed | Percentage passed |
|---|---|---|---|---|---|
| | related professionals | | | | |
| 2471 | Journalists, newspaper and periodical editors | 69,000 | 10 | 3 | 30.0% |
| 3534 | Finance and investment analysts and advisers | 176,000 | 10 | 3 | 30.0% |
| 2111 | Chemical scientists | 29,000 | 7 | 2 | 28.6% |
| 2112 | Biological scientists and biochemists | 98,000 | 7 | 2 | 28.6% |
| 2219 | Health professionals n.e.c. | 46,000 | 7 | 2 | 28.6% |
| 2221 | Physiotherapists | 54,000 | 7 | 2 | 28.6% |
| 2232 | Midwives | 44,000 | 7 | 2 | 28.6% |
| 2429 | Business, research and administrative professionals n.e.c. | 47,000 | 7 | 2 | 28.6% |
| 1121 | Production managers and directors in manufacturing | 284,000 | 10 | 2 | 20.0% |
| 1122 | Production managers and directors in construction | 166,000 | 10 | 2 | 20.0% |
| 1135 | Human resource managers and directors | 132,000 | 10 | 2 | 20.0% |
| 2315 | Primary and nursery education teaching professionals | 434,000 | 10 | 2 | 20.0% |
| 2317 | Senior professionals of educational establishments | 104,000 | 10 | 2 | 20.0% |
| 2421 | Chartered and certified accountants | 203,000 | 10 | 2 | 20.0% |
| 2442 | Social workers | 100,000 | 10 | 2 | 20.0% |
| 3538 | Financial accounts managers | 134,000 | 10 | 2 | 20.0% |
| 1173 | Senior officers in fire, ambulance, prison and related services | 14,000 | 6 | 1 | 16.7% |
| 2223 | Speech and language therapists | 13,000 | 6 | 1 | 16.7% |
| 3213 | Paramedics | 22,000 | 6 | 1 | 16.7% |
| 1115 | Chief executives and senior officials | 64,000 | 7 | 1 | 14.3% |
| 2113 | Physical scientists | 26,000 | 7 | 1 | 14.3% |
| 2222 | Occupational therapists | 40,000 | 7 | 1 | 14.3% |
| 1139 | Functional managers and directors n.e.c. | 112,000 | 10 | 1 | 10.0% |
| 1116 | Elected officers and representatives | - | 3 | 0 | 0.0% |

Source: LFS, ASHE, Nomis and ESS.

# Annex D Detailed list of other job titles submitted by partners

## Digital Technology

Tech London Advocates identified the following jobs as being in shortage and therefore nominees for inclusion on the shortage occupation list:

- Android developer
- Android engineer
- Back end engineer
- Back end developer
- Big data analyst
- Big data consultant
- Big data specialist
- C# .net developers
- C# developer
- Chief technology officer
- Client side developer
- Client side engineer
- Cloud engineer
- CRM dynamics developer
- Cyber security consultants/engineers
- Data analyst
- Data engineer

- Data scientist
- Developer
- Dev ops engineer
- Dev ops
- 3D technical developer
- Energy risk and trading management technologies
- Engineer
- E-Commerce (ATG/Hybris)
- ETL tools
- Front end developer
- Front end engineer
- Full stack engineer
- Head of product
- IBM technologies
- Infrastructure storage
- iOS developer
- iOS engineer

Infosys Limited asked that we consider for inclusion on the shortage list skills in the following areas:

- Information assurance (i.e. cyber) specialists
- Information security
- Information assurance consultants
- Java developer
- Junior Drupal developer
- Mobile app developer
- Mobile developer
- Mid-level Drupal developer

- Mulesoft
- Murex/Sophis
- Native app developer
- Net developer
- Oracle developer (E-business Suite)
- PEGA PRPC
- PHP developer
- PLM tools
- Product manager
- Professional technical writer
- QA engineer
- Quality assurance automation engineer
- Sales consultant security
- Sales consultant cloud security
- SAP
- Security architects
- Senior Drupal developer
- Senior cyber researchers
- Security operational analyst
- Senior 3D infrastructure and solutions developer
- SC clearable Java developer
- Software engineer
- Software developer
- Technical SEO manager
- Technical lead

tech UK identified the following specialised senior developer, big data specialist and cyber security specialist job titles:

- User interface developers
- Visionplus
- Web developers
- WCF/WPF

## Health Sector

| Table D.1: Additional job titles nominated for review by partners for which insufficient evidence was received | |
|---|---|
| **Consultants** | Radiology, Neuroradiology, Microbiology, Cardio anaesthetics, Oral and maxillofacial, Neurology, Histopathology |
| **Middle grade doctors** | Emergency medicine, Spinal Injuries, Haematology, General Medicine, ITU, Plastic Surgery, ENT, Neurorehabilitation, Paediatrics, Neonates, Anaesthetics, Cardiology, Diabetes and Endocrinology, Elderly Care, Gastroenterology, Respiratory, Ophthalmology |
| **CT level** | Orthopaedics, Neurosurgery, Neurology, Neurorehabilitation, ITU |
| **Nurses** | Band 5 nurses, registered general nurses, registered nurses, RMN, RNLD, intensive care/high dependency nurses; theatre nurses including perioperative, recovery, and scrub nurses; health visitors, school nursing, district nursing, palliative care/end of life care senior nurses |

# Abbreviations

| | |
|---|---|
| ASCL | Association of Schools and College Leavers |
| AHNH | Adelaide House Nursing Home |
| ACH | Apex Care Homes Limited |
| ARH Ltd | Ascot Residential Homes Limited |
| ACH | Ashmere Care Homes |
| AHCS | Academy for Healthcare Science |
| A-NRG | Advantage-NRG |
| AFW | Amec Foster Wheeler (Engineering) |
| ASHE | Annual Survey of Hours and Earnings |
| BB | Balfour Beatty |
| BCA | Berkshire Care Association |
| BPNH Ltd | Barons Park Nursing Home Limited |
| BHSCT | Belfast Health and Social Care Trust |
| BNHS | Brookland National Health Services |
| BHA | British Hospitality Association |
| BPC | British Poultry Council |
| BMA | British Medical Association |
| BLNRH | Burnham Lodge Nursing & Residential Home |
| BIS | Department for Business Innovation & Skills |
| BSS | British Sleep Society |

| | |
|---|---|
| CCT | Certificate of Completion Training |
| CEGB | Central Electricity Generating Board |
| CfWI | Centre for Workforce Intelligence |
| CYL Ltd | Care for Your Life Limited |
| CEM | College of Emergency Medicine |
| CPH | Care Plus Homes |
| CNH | Caritate Nursing Homes |
| CLCH NHS T | Central London Community Health Care NHS Trust |
| CNH | Chataway Nursing Home |
| CNH | Claridge Nursing Home |
| CoS | Certificate of Sponsorship |
| COT | College of Occupational Therapists |
| CITB | Construction Industry Training Board |
| COSLA | Convention of Scottish Local Authorities |
| CCG | Croft Care Group |
| CT | Core Training |
| CPT | Psychiatry core trainee |
| DHSSPSNI | Department of Health Social Services and Public Safety Northern Ireland |
| DNO | Distribution Network Operators |
| EEA | European Economic Area |
| EEF | Engineer Employers Federation |
| ESS | Employer Skills Survey |
| E-S UK | eSkills UK |
| E & US | Energy & Utility Skills |
| ECTB Ltd | Esteem Care Tudor Bank Limited |
| ECH | Excellent Care Homes |

| | |
|---|---|
| EU | European Union |
| FC Ltd | Flight Care Limited |
| FSHC | Four Season Health Care |
| GHNH | Glebe House Nursing Home |
| GRB Ltd | Global Resource Bureau Limited |
| GCH Ltd | Gresham Care Home Limited |
| GST NHS | Guys and St Thomas NHS |
| GC | Goldstar Chefs |
| GMC | General Medical Council |
| GP | General Practitioner |
| HEE | Health Education England |
| HLDSC | House of Lords Digital Skills Committee |
| HH NHS FT | Hampshire Hospitals NHS Foundation Trust |
| HMC | Helen McArdle Care |
| HHNH | Highbury House Nursing Home |
| HNH | HighCroft Nursing Home |
| HC Ltd | Hill Care Limited |
| HCC Ltd | Home Croft Care Limited |
| IELTS | International English Language Testing System |
| IPSE | Association of Independent Professionals and Self-Employed |
| IVQ | International Vocational Qualification |
| IWNHST | Isle of White NHS Trust |
| JCP | Jobcentre Plus |
| KN | Kingsley Napley LLP |
| LE1 | Linesman Erector 1 |
| LE2 | Linesman Erector 2 |
| LFS | Labour Force Survey |

| | |
|---|---|
| LPFT | Lincolnshire Partnership Foundation Trust |
| MAC | Migration Advisory Committee |
| MMCG Ltd | Maria Mallaband Care Group Limited |
| MNH | Maplehurst Nursing Home |
| MHCH | Marian House Care Homes |
| MTH Ltd | Martha Trust Hereford Limited |
| MC ltd | Milford Care Limited |
| NAMPS | National Association of Medical Personnel Specialist |
| NCNT | non-consultant, non-training |
| NFU | National Farmers Union |
| NCH | Nellsar Care Home |
| NEL NHSF | North East London NHS Foundation |
| NESS | National Employer Skills Survey |
| NHS | National Health Service |
| NISMP | Northern Ireland Strategic Migration Partnership |
| NQF | National Qualifications Framework |
| ONS | Office for National Statistics |
| PL | Park Lodge |
| PNH WLS | Peacock Nursing Home West Lothian Scotland |
| PCH | Premier Care Home |
| PTP | Practitioner Training Programme |
| PM | Pennington Manches LLP |
| RASSCH | Royal Alfred Seafarers Society Care Home |
| RR Plc | Rolls Royce Public Limited Company |
| REC | Recruitment & Employment Confederation |
| RLMT | Resident Labour Market Test |
| RNHA | Registered Nursing Home Association |

| | |
|---|---|
| RHNH | Rose Hill Nursing Home |
| RCA | Royal College of Anaesthetists |
| RCN | Royal College of Nursing |
| RCR | Royal College of Radiologists |
| RCPSG | Royal College of Physicians and Surgeons of Glasgow |
| RPS | Royal Pharmaceutical Society |
| SAS | Specialty and Associate Specialist |
| SG | Scottish Government |
| SMNH | Sibbertoft & Manor Nursing Home |
| STHNHS FT | South Tees Hospital NHS Foundation Trust |
| SNH Ltd | Sunbury Nursing Home Limited |
| SCA Ltd | Surrey Care Association Limited |
| SOC | Standard Occupational Classification |
| SOL | Shortage Occupation List |
| StR | Specialty Registrar |
| ST | Specialist Training |
| TIGA | The Independent Game Association |
| TUC | Trade Union Congress |
| TF | Teikyo Foundation (UK) Limited |
| TCS | Tata Consultancy Services |
| TLA | Tech London Advocates (LLP) |
| TCCH | Talbot Court Care Home |
| TF UK Ltd | Teikyo Foundation (UK) Limited |
| UCLH | University College London Hospitals |
| UKDT | UK Digital Taskforce |
| VG | Voltcom Group |
| WOCH NHS FT | West Oak Care Home NHS Foundation Trust |

| | |
|---|---|
| WeHC | Westgate Health Care |
| WoHC | Woodgate Health Care |
| YNRH | Yelverton Nursing and Residential Home |

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