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for the Futures Group



Life Sciences 2035: Developing the Skills for Future Growth

Technical Annex

In partnership with:



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A. Data and methodology note

Overview

This section provides a detailed overview of the datasets and methodology used throughout the Life Sciences 2035: Developing the Skills for Future Growth report.

The insights presented in this report were built by combining a number of different datasets.

Table A1: Summary of datasets used and their relation to each chapter in the report

Chapter	Dataset used
Chapter 2: UK Life Sciences Sector	Office for Life Sciences BioScience and Health Technology Sector statistics combined with data from Office for National Statistics Labour Force Survey and Lightcast staffing pattern matrix.
Chapter 3: Occupational Profile	Office for National Statistics Labour Force Survey
Chapter 4: Job Postings Analysis	Lightcast job postings analytics
Chapter 5: Skills for the Life Sciences	Lightcast job postings analytics
Chapter 6: Workforce Projections	Office for Life Sciences BioScience and Health Technology Sector statistics combined with data from Office for National Statistics Labour Force Survey and Lightcast staffing pattern matrix.
Chapter 7: Talent Pipeline	Data from the Department for Education, the Higher Education Statistical Agency (HESA) and Lightcast proprietary career pathway tool.
Chapter 8: Workforce Demographics	Office for National Statistics Labour Force Survey
Chapter 9: International Data	Lightcast job postings analytics

Defining the sector using official statistics

The Office for Life Sciences (OLS) Bioscience and Health Technology Sector Statistics dataset provides a comprehensive overview of the UK Life Sciences sector, focusing on its two main subsectors: biopharmaceuticals and medical technology. Within these subsectors, businesses – and therefore employees – are categorised into 'core' and 'service and supply' elements, each of which can be further divided into specific market segments. The OLS identifies a total of 304,190 people working in the sector across the UK.

The definition of each component of the Life Sciences workforce is as follows:

- **Core biopharmaceutical sector:** includes all businesses involved in developing and/or producing their own pharmaceutical products – from small, research and development (R&D) focused biotechs to multinational Big Pharma
- **Biopharmaceutical service and supply sector:** comprises businesses that offer goods and services to core biopharmaceutical businesses including, for example, Contract Research and Manufacturing Organisations (CRMOs), and suppliers of consumables and reagents for R&D facilities
- **Core medical technology sector:** includes all businesses whose primary business involves developing and producing medical technology products, ranging from single-use consumables to complex hospital equipment, including digital health products
- **Medical technology service and supply sector:** comprises businesses that offer services to core medical technology businesses including, for example, CRMOs, and suppliers of consumables and reagents for R&D facilities

The data does not include industrial biotechnology, animal health, not-for-profit organisations, public-funded institutions or universities.

The research concentrates on businesses involved in the core technical elements of the Life Sciences sector, with several service and supply segments – such as training, recruitment, and investment companies – excluded from the analysis. According to the OLS dataset, the excluded segments represent approximately 11% (33,000) of total employment in the UK Life Sciences sector. Further details of the exclusions are provided in **Table A2** and **Table A3**.

By focusing on core technical businesses, the report provides a clearer and more precise analysis of the sector's essential innovation and production capabilities. These businesses are directly responsible for scientific research, clinical trials, product development, and manufacturing, all of which are critical to understanding the sector's growth and challenges. Including non-technical sectors could dilute the findings, making it harder to address the unique skills challenges faced by scientific and technical businesses.

Table A2: Life Sciences employment totals with non-technical service and supply chain segments removed

	Total employment	Excluded from the study	In scope
BioPharma – Core	70,032	–	70,032
BioPharma – Service and Supply	79,920	16,983	62,937
MedTech – Core	117,212	–	117,212
MedTech – Service and Supply	36,714	15,975	20,739
Total	303,878	32,958	270,920
As a % of total		11%	89%

Source: Office for Life Sciences: Bioscience and Health Technology Sector Statistics 2021/22



Table A3: Service and supply chain employment breakdown by segment and inclusion/exclusion status

Service & Supply segment	Exclude from total	BioPharma Employment in 2022	MedTech Employment in 2022
Analytical Services	No	3,860	3,118
Assay developer	No	270	[x]
Clinical Research Organisation	No	13,482	1,917
Contract design	Yes	[x]	1,399
Contract Formulation Manufacturing	No	1,169	[x]
Contract Manufacturing/Research Organisation	No	26,804	5,615
Formulation/Drug delivery specialist	No	1,613	269
Information systems specialists	Yes	2,616	2,454
Investment Companies	Yes	250	93
Logistics and Packaging	Yes	5,104	2,163
Market Analysis/Information Consultants/Communications/Specialist consultants	Yes	7,285	5,282
Patent and Legal specialist	Yes	556	435
Reagent, Equipment and consumables supplier	No	14,319	9,543
Recruitment	Yes	892	2,320
Regulatory Expertise	No	1,213	277
Tissue and Biomass	No	207	[x]
Training	Yes	280	1,829
Total		79,920	36,714
Total of segments to exclude		16,983	15,975
Excluded segments as a % of total		21%	44%

Source: Office for Life Sciences: Bioscience and Health Technology Sector Statistics 2021/22

The OLS dataset is the most comprehensive source for estimating the overall size of the Life Sciences workforce, but it does not include details on workforce characteristics, such as occupation or demographics. For these insights, we use Office for National Statistics (ONS) Labour Force Survey microdata, which, although survey-based, is the most reliable source for this type of workforce data in the sector.

Since the ONS and other national sources, such as the Department for Education (DfE) and the Higher Education Statistics Agency (HESA), define sectors using Standard Industrial Classification (SIC) codes, different sections of this report apply different sector definitions.

OLS data forms the basis for workforce projections and job postings analysis, while ONS, HESA, and DfE data provide insights into workforce characteristics and the future talent pipeline. This approach ensures that each section of the report is based on the most accurate and relevant data available.

A best-fit sector definition was used within the SIC code library to identify the Life Sciences sector. This approach follows the methodology set out in the previous Life Sciences 2030 Skills Strategy report and applies the SIC codes listed in the table A4.

While this approach provides more detail on workforce characteristics, the ONS defines industries differently, separating manufacturing from R&D and grouping many R&D activities, including those beyond Life Sciences, into a single category. In this report, sections using this definition will refer to it as the Life Sciences sector (SIC definition).

Once the industry components were defined using the SIC codes, the next step involved breaking down sector employment into different occupations according to the ONS Standard Occupational Classification (SOC2020), using a detailed proprietary staffing pattern matrix from Lightcast.

Table A4: Definition of the Life Sciences sector using the ONS Standard Industry Classification

BioPharma		MedTech	
21.10	Manufacture of basic pharmaceutical products	26.60	Manufacture irradiation & electromedical equipment
21.20	Manufacture of pharmaceutical preparations	32.50	Manufacture of medical & dental instruments & supplies
R&D			
72.11		Research & experimental development in biotech	
72.19		Other R&D on natural sciences and engineering ¹	

The Lightcast staffing pattern matrix comprises 660 industries and 412 occupations across 12 geographies, containing percentages of occupation employment by industry over time.

This dataset is built by drawing from three main datasets:

- 1. Lightcast industry data**
- 2. Labour Force Survey**
- 3. Quarterly Labour Force Survey microdata**

¹ Note: This SIC code includes some activity that sits outside the Life Sciences sector; however, it is not possible to isolate these further.

The matrix is created through a three-step process. First, primary and secondary job counts are derived from LFS microdata. Next, occupation estimates for NUTS1 regions are created by combining LFS microdata with regional industry data. Lastly, staffing by region is created using regional industry and occupation margins, and national staffing seeds (baseline estimates for staffing patterns).

Section C of this technical annex contains a detailed version of the sector's staffing pattern matrix, including all occupations accounting for at least 500 sector jobs.

The occupational structure of the sector is presented using the ONS SOC2020 classification. ONS SOC2020 categorises the workforce into nine major occupational groups, subdividing further into around 400 distinct occupations. Each occupation groups together various job titles and roles that share similar tasks. As such, some key roles in the Life Sciences sector may not be reflected in the occupation's title, although they are included within its broader definition. Despite these limitations, this remains the most detailed classification of occupations within the Life Sciences sector achievable using official statistics.

Online job postings data

Lightcast job postings library

Lightcast proprietary online job posting library contains over 80 million postings collected in the UK since 2012. These postings are gathered daily by scraping thousands of job boards, online newspapers, and employers' websites. They are then cleaned and deduplicated to ensure that only one posting is counted for each opening, regardless of how many platforms advertise it. Job postings are then classified by location, industry, occupation, skills required, and any other type of relevant information that can be extracted from the advertisement, using a combination of official and proprietary taxonomies (classification systems).²

² Further details on the methodology used by Lightcast for scraping, cleaning, deduplicating and categorising job postings can be found at this link: <https://kb.lightcast.io/en/articles/6957446-job-posting-analytics-jpa-methodology>

This data complements official statistics by offering the most granular and up-to-date picture of employers' needs in a given area. It is worth noting that, unlike official statistics, which focus on the entirety of jobs in a sector, online job postings only offer a partial view of a sector – they provide insights specifically on those jobs companies that are actively recruiting for. It is important to note that while every job posting represents an available position, not every position is advertised online and that job postings are different from vacancies.

With these caveats in mind, there are a number of advantages in using this dataset, especially compared to official statistics. Firstly, the data's granularity allows for detailed sector analysis, including specific job titles and skill requirements. Secondly, timeliness of this data allows for near-real-time insights into employers' needs, with information available up to March 2024, compared to 2021/22 – the latest year covered by official statistics. Thirdly, this dataset can help spot emerging trends as they first appear in the labour market.

One downside of using online job postings data is that the quality of insights depends entirely on the accuracy of the information employers provide in their postings. The representation of job postings varies significantly by country and sector. For example, professional services activities are better represented in the sample than other activities typically not recruited online, such as in the hospitality sector or agriculture. Likewise, the sample is likely to be skewed towards larger companies and recruitment activity run by head hunters will not appear in the data.

Similar considerations need to be taken into account when interpreting the content of job ads: employers typically mention only the skills they deem more important or harder to find. Employers may not mention skills that are intrinsic to a job or may stop mentioning a skill once it becomes widespread, however, this does not mean the skill is less relevant to a given sector or occupation.³

³ Further information on the quality of Lightcast online job postings data can be found in this research paper published by the OECD in 2024: https://www.oecd-ilibrary.org/industry-and-services/how-well-do-online-job-postings-match-national-sources-in-large-english-speaking-countries_c17cae09-en

Defining Life Sciences using job postings data

Leveraging one of the key advantages of online job postings data – its granularity – the analysis was conducted by searching the Lightcast job postings library for postings related to Life Sciences companies.

The list used for the analysis included approximately 5,800 businesses identified in the OLS Bioscience and Health Technology Sector Statistics 2021/22, along with an additional 400 companies provided by the stakeholder group. A match was found for approximately 75% of these companies, whose names were then normalised to allow for a search in the Lightcast dataset. Any postings from these companies were classified as Life Sciences job postings and further categorised based on subsector (BioPharma and MedTech) and company size, using information provided in the databases.

The advantage of using this approach is that it includes all activities from companies identified as directly related to Life Sciences in official sector datasets. However, the downside of this approach is that whilst every company included in this definition has some Life Sciences activity, some companies operate across multiple industries.

Lightcast Occupation Taxonomy and the Core Life Sciences Roles

The data collected from online job postings is then classified into different occupational categories, using a combination of official and proprietary taxonomies.

While official taxonomies help match data from online job postings with that from official statistics, the Lightcast proprietary Occupation Taxonomy (LOT) allows for greater granularity in the analysis. This is because the Standard Occupation Classification (SOC2020) from the Office for National Statistics identifies approximately 400 occupations, compared to over 1,900 specific categories in the Lightcast Occupation Taxonomy.

LOT was designed specifically for the purpose of isolating different occupations at a greater level of granularity. The taxonomy hierarchically classifies over 1,900 specific occupations into 700 occupation groups and 32 broad career areas. This allows for a more detailed analysis of the roles businesses recruit for while avoiding the inconsistencies of using individual job titles, which can vary significantly between companies.⁴

Using this taxonomy, Lightcast first analysed the most frequently recruited for occupations by Life Sciences businesses, providing a broad overview of the various roles in the sector.

The analysis then focused on a number of specific research, science and regulatory occupations linked to the sector. These are referred to as '**Core Life Sciences Roles**' throughout the report. These were selected based on the level of Life Sciences sector knowledge, skills, and abilities they require, by combining a skills analysis with stakeholder input and findings from the literature review.

Section D of the technical annex provides a full list of these 'Core Life Sciences Roles'. Some 11 occupation categories – listed separately, one row per occupation – account for 80% of all job postings in the sector related to Core Life Sciences Roles. The other occupations are grouped into the 'Other research, science and regulatory' occupation category, as together they account for less than 20% of all job postings in these areas.

This approach allows for the isolation of Life Sciences jobs from other sector jobs. Doing so, this approach also helps isolate Life Sciences job postings from other jobs posted by companies with some Life Sciences activities but also operating in other sectors.

⁴ A detailed description of Lightcast Occupation Taxonomy can be found at this link. <https://lightcast.io/our-taxonomies>

Workforce projections

The insights presented in **Chapter 6** draw from historical data on employment from the Office for Life Sciences Bioscience and Health Technology Sector Statistics dataset⁵, combined with data from the Office for National Statistics Labour Force Survey and Lightcast staffing pattern matrix.

The aim of the projections is to understand the potential workforce demand for the sector between 2025 and 2035. Total workforce demand refers to the total number of jobs required as a result of replacement demand (i.e. workers leaving the workforce) and sector growth.

Replacement demand refers to the need for workers to fill roles vacated by those permanently leaving the workforce during a given period, for example, due to retirement. These estimates are based on likely replacement ratios drawn from the *Working Futures* publication and rely purely on historical trends.⁶

Three sets of projections for new job growth up to 2035 were created using ten years of data, from 2011/12 to 2021/22, under three different growth scenarios – continuation, low-growth, and high-growth. These growth scenarios differ slightly from those in the previous report by focusing on five-year instead of three-year average trends, a change made to enhance analytical robustness due to the disruptive effects of Covid-19 on the labour market.

The three growth scenarios were therefore calculated as follows:

- 1. Continuation scenario:** The average five-year trend rate of employment growth observed between 2011/12 and 2021/22.
- 2. High-growth scenario:** The highest average employment growth rate recorded over any five consecutive years within this period. For BioPharma, this was from 2017 to 2022, and for MedTech, from 2012 to 2017.
- 3. Low-growth scenario:** The lowest average employment growth rate recorded over any five consecutive years within this period. For BioPharma, this was from 2011 to 2016, and for MedTech, from 2017 to 2022.

These scenarios were then integrated with the Lightcast projection model and staffing pattern matrix, providing an occupational breakdown for each scenario and detailing workforce demand based on both growth and replacement needs.

It is important to note that these are projections, not forecasts; they are based solely on past trends. As with all projections, these are subject to change and should be considered as starting points for discussion rather than definitive predictions of the sector's future.

⁵ <https://www.gov.uk/government/statistics/bioscience-and-health-technology-sector-statistics-2021-to-2022>

⁶ Further details on the methodology behind replacement demand can be found here: <https://kb.lightcast.io/en/articles/7124860-how-does-lightcast-calculate-job-openings>

Education data

Graduate Pipeline

The analysis of the graduate pipeline is based on data from the Higher Education Statistics Agency (HESA) Student Legacy Record (excluding Alternative Providers) and the Graduate Outcomes Survey Results Record, 2020/21. This dataset provides key insights into the transition of graduates into the Life Sciences sector, including information on graduates' occupational destinations, the courses they completed, and the level and subject area of their qualifications. It also includes details about the educational institutions involved.

The data is collected through a survey conducted approximately 15 months after students complete their studies. Graduates are asked about their current employment status, including the industry in which they are employed and their specific occupational roles. The data is matched using Standard Industrial Classification (SIC) codes to identify industries of employment, and Standard Occupational Classification (SOC) codes to categorise graduates' roles. As the analysis relies on SIC codes, it relates to the Life Sciences sector (ONS definition).

Apprenticeship Pipeline

The analysis of the apprenticeship pipeline is based on data from the Department for Education's Apprenticeships in England by Industry Characteristics, Academic Year 2021/22 dataset. These are National Statistics detailing the characteristics of employers with registered apprenticeship starts in England. The data covers various dimensions, including industry, employer size, and apprentice characteristics such as qualification level and demographic information.

The source data is derived from the Individualised Learner Record (ILR), which is matched with the Office for National Statistics' Inter-Departmental Business Register (IDBR) to provide a detailed view of apprenticeship starts by industry. As with the graduate data, SIC codes are used to categorise the industry of the employer, meaning this analysis also relates to the Life Sciences sector (ONS definition).

To protect the anonymity of learners and employers, the Department for Education rounds data to the nearest ten, which may result in small differences between derived totals and original figures. Apprentices working through apprenticeship training agencies are not included in these figures, potentially leading to an underestimation of total apprenticeship activity within the sector.

Combined Insight

By integrating these two datasets, the analysis offers a comprehensive view of talent entering the Life Sciences industry through both higher education and apprenticeship routes. This approach captures the primary educational pathways into the sector, providing a broad understanding of how new talent is absorbed into the industry. The use of SIC and SOC codes across both datasets ensures consistency and comparability, allowing for a clear analysis of trends in employment and the types of roles being filled within the sector.

Demographics data and methodology

The workforce demographics data in **Chapter 8** originates from the ONS Labour Force Survey (LFS), a comprehensive and nationally representative survey that collects detailed information on labour market activities across the UK.

Despite an increasing policy focus on diversity and inclusion within the UK economy, sector-specific demographic data remains limited, restricting the ability to draw detailed conclusions about workforce diversity in specific sectors. The ONS LFS microdata, which provides granular, anonymised data, is the only official source of regularly updated national demographic information.

However, relying on survey-based data presents particular challenges, especially regarding accuracy and representativeness. The quality of insights depends on respondent participation and the precision of their responses and, as the analysis focuses on specific sectors and occupations, smaller sample sizes may reduce the representativeness of the data, potentially impacting the reliability of the findings.

To address these challenges, this analysis aggregates data from 12 quarters, covering three years (Q1 2021 to Q4 2023), to increase sample size and improve representativeness.

As this analysis is based on LFS data, the Life Sciences sector is defined using the ONS Standard Industry Classification (SIC) codes outlined in **Table A4**. This means the analysis is subject to the same limitations associated with a SIC code-based sector definition, as previously mentioned. Insights are presented for the overall Life Sciences sector and, where relevant, for each major occupation group (SOC1), benchmarked against the wider UK workforce. Note: the major occupation group 'Caring, Leisure and Other Service Activities' was not included in this section of the analysis, as it represents less than 1% of the Life Sciences sector workforce.

The analysis includes insights on the following demographic factors:

- **Sex:** Respondents are asked to identify their sex as either 'male' or 'female,' which means non-binary respondents are not separately identified in this data.
- **Age:** Respondents provide their age, which is then aggregated into six categories: 16-24, 25-34, 35-44, 45-54, 55-64, and 65+.
- **Disability:** Respondents self-report whether they consider themselves to have a disability under the Equality Act definition: *"a physical or mental impairment that has a 'substantial' and 'long-term' negative effect on your ability to do normal daily activities"*.⁷
- **Educational qualifications:** Respondents report their highest level of qualification, which is grouped into six categories: no qualifications, GCSE grades A*C or equivalent, GCE A-levels or equivalent, higher educational qualifications, degrees or equivalent, and other qualifications.
- **Ethnicity:** Respondents select from nine categories, later consolidated into four major ethnic groups for analysis: White, Asian and Asian British, Black British, Caribbean or African, and mixed or multiple ethnic groups and others.
- **Country of origin:** Respondents indicate their country of origin, grouped into five categories: UK, European Union, Other Europe, Asia, and Rest of the World.

⁷ <https://www.gov.uk/definition-of-disability-under-equality-act-2010>

International Data

The international analysis focuses on four countries – Ireland, Singapore, Switzerland, and the United States – which are globally recognised leaders in the Life Sciences sector due to their advanced R&D, manufacturing, and innovation capacities.

Data from official statistics for international comparisons

To assess the size and contribution of the Life Sciences sector in each country, Lightcast drew insights from official statistics. This analysis compares UK Life Sciences sector statistics from the Labour Force Survey with equivalent data from official labour market sources in each country. The UK Standard Industry Classification (SIC) codes for Life Sciences were then matched with the most relevant codes in each country's taxonomy.

Variations in data sources, availability, and classification lead to differences in how each country defines the Life Sciences sector. As a result, finding direct equivalents between UK sector definitions and those in benchmark countries can be challenging. In some cases, a UK Life Sciences subsector has no direct counterpart elsewhere, or it may correspond to multiple subsectors in another country. Conversely, a single subsector abroad might align with several UK subsectors. This limitation reflects not only discrepancies in the data but also the distinct roles that Life Sciences subsectors play in each country's economy.

Considering these limitations, **Table A5** lists the equivalent Life Sciences industry codes used in the analysis of US data. US data comes from the Bureau of Labour Statistics, the US equivalent of the UK's Office for National Statistics.

Data for Singapore was derived from the Department of Statistics Singapore's official website, focusing on employment in three Life Sciences-related manufacturing groups: Biomedical Manufacturing, Pharmaceuticals, and Medical Technology. Notably, Singapore does not report employment data specifically related to R&D, resulting in an underestimation of the total number of Life Sciences jobs in the country.

Table A5: US Life Sciences sector definition

US NAICS code	Industry name
325411	Medicinal and Botanical Manufacturing
325412	Pharmaceutical Preparation Manufacturing
339113	Surgical and Medical Instrument Manufacturing
339112	Surgical Appliance and Supplies Manufacturing
339114	Dental Equipment and Supplies Manufacturing
541714	Research and Development in Biotechnology (Except Nanobiotechnology)
541715	Research and Development in the Physical, Engineering and Life Sciences (Except Nanotechnology and Biotechnology)

Swiss data was obtained by combining insights from the Swiss BioTech Association and the Federal Statistics Office. The insights cover all activities related to Biotechnology and the Pharmaceuticals industry, and show a marked increase in Life Sciences employment in the Swiss public sector since 2016, while private sector employment has remained relatively stable.

Lastly, Ireland was excluded from this part of the analysis due to the unavailability of detailed data. The country's Labour Force Survey only reports data at a macro-industry level (equivalent of SIC2 digits in the UK), meaning it is not possible to isolate employment specifically related to Life Sciences.

Online job postings data for international comparisons

In addition to job postings data from the United Kingdom, the Lightcast job postings library includes over a billion job postings collected from thousands of job boards, staffing agencies, and employers' websites across the world. This data is collected, cleaned, deduplicated and categorised using a process similar to that outlined for the UK dataset.

The main advantage of using Lightcast job postings data is its ability to enable international comparisons, which are often unavailable through official statistics. However, it is important to note that the quality of insights from job postings depends on the accuracy of the information provided by employers. This quality may be influenced by cultural norms and the maturity of online labour markets, which vary by country.

To compare recruitment activity in the UK Life Sciences sector to that in the United States, Singapore, Switzerland and Ireland, this analysis starts from an occupational approach to define the Life Sciences sector. The UK analysis identified a list of occupations in Life Sciences businesses specifically linked to science, research, regulations, and compliance. These occupations – referred to as 'Core Life Sciences Roles' throughout the analysis and listed in detail in **Section D** of the Technical Annex – were those most likely to require Life Sciences-specific skills, knowledge, and abilities. Job postings for these occupations were used as the starting point for the international comparison of recruitment activity.

The analysis was then further refined to ensure only job postings for these occupations that were directly linked to Life Sciences companies were included. This was necessary because, in theory, a chemist role could also be recruited outside the Life Sciences sector. Since an equivalent list of Life Sciences businesses was unavailable for international comparisons, the search focused on job postings related to Core Life Sciences Roles. These postings had to mention at least one skill identified as distinguishing for the Life Sciences sector. Distinguishing skills, knowledge and abilities were identified based on the frequency with which they appeared in Life Sciences job postings in the UK labour market, compared to the entirety of the labour market, and are listed in **Table A6**.

Table A6: Distinguishing Life Sciences skills, knowledge and abilities

Distinguishing skills, knowledge and abilities

Life Sciences, Auditing, Clinical Research, Medical Devices, Good Manufacturing Practices, Biotechnology, Biology, Research, Drug Development, Mathematics, Pre-Clinical Development, Pharmaceuticals, Clinical Trials

B. Employment distribution of BioPharma and MedTech across English regions and devolved nations

Table B1: Employment distribution of BioPharma and MedTech across English regions and devolved nations

BioPharma	Share of sector employment	BioPharma employment per 10,000 population	MedTech	Share of sector employment	MedTech employment per 10,000 population
North East	3 %	18.81	North East	3 %	15.85
North West	11 %	23.10	North West	10 %	19.83
Yorkshire and The Humber	5 %	12.75	Yorkshire and The Humber	10 %	26.63
East Midlands	4 %	10.90	East Midlands	8 %	25.15
West Midlands	5 %	11.59	West Midlands	9 %	21.26
East of England	19 %	45.89	East of England	10 %	23.20
London	14 %	22.68	London	9 %	15.39
South East	24 %	38.18	South East	24 %	38.28
South West	3 %	7.13	South West	7 %	17.78
Northern Ireland	2 %	17.78	Northern Ireland	2 %	18.24
Scotland	7 %	18.13	Scotland	6 %	15.89
Wales	4 %	16.85	Wales	5 %	25.38

Source: Lightcast aggregation of data from the Office for Life Sciences: Bioscience and Health Technology Sector Statistics 2021/22, combined with population data for the Office for National Statistics Labour Force Survey.

C. Employment breakdown by occupation (SIC to SOCs staffing pattern matrix)

The table below provides the Lightcast Staffing Pattern Matrix for the Life Sciences sector. The number of sector jobs (defined using the SIC code definition) is broken down by occupation using the ONS SOC4 digit definition. Only occupations which account for more than 500 jobs were included.

Table C1: Life Sciences sector employment breakdown by occupation

Occupation name	Number of jobs in Life Sciences (2022)
Biochemists and Biomedical Scientists	12,200
Biological Scientists	11,780
Laboratory Technicians	11,180
Research and Development Managers	8,760
Programmers and Software Development Professionals	7,900
Physical Scientists	7,740
Other Researchers, Unspecified Discipline	6,640
Production Managers and Directors in Manufacturing	5,920
Chemical Scientists	5,840
Business and Related Research Professionals	5,750
Engineering Professionals n.e.c.	5,460
Sales Accounts and Business Development Managers	5,360
Natural and Social Science Professionals n.e.c.	5,290
Business and Financial Project Management Professionals	4,490
Actuaries, Economists and Statisticians	4,180
Medical and Dental Technicians	3,620

Occupation name	Number of jobs in Life Sciences (2022)
Quality Assurance and Regulatory Professionals	3,590
Chemical and Related Process Operatives	3,320
IT Business Analysts, Architects and Systems Designers	3,050
Other Administrative Occupations n.e.c.	3,040
IT Managers	2,800
Human Resource Managers and Directors	2,700
Book-keepers, Payroll Managers and Wages Clerks	2,560
Warehouse Operatives	2,520
Chief Executives and Senior Officials	2,340
Environment Professionals	2,300
Business Sales Executives	2,260
Financial Managers and Directors	2,160
Quality Assurance Technicians	2,020
Business Associate Professionals n.e.c.	2,020
Engineering Technicians	2,000
Functional Managers and Directors n.e.c.	1,980
Office Managers	1,980
Marketing and Commercial Managers	1,970
Marketing and Sales Directors	1,910
Packers, Bottlers, Canners and Fillers	1,880
Chartered and Certified Accountants	1,720

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Occupation name	Number of jobs in Life Sciences (2022)
Other health professionals n.e.c.	1,650
Customer Service Managers	1,640
Aerospace Engineers	1,550
Social and Humanities Scientists	1,550
Routine Inspectors and Testers	1,480
Higher Education Teaching Professionals	1,460
Other Vocational and Industrial Trainers	1,420
Mechanical Engineers	1,350
Science, Engineering and Production Technicians n.e.c.	1,350
IT Operations Technicians	1,340
Electrical Engineers	1,340
Elementary Process Plant Occupations n.e.c.	1,310
Engineering Project Managers and Project Engineers	1,310
Assemblers and Routine Operatives n.e.c.	1,300
Conservation Professionals	1,290
Planning, Process and Production Technicians	1,250
Delivery Drivers and Couriers	1,220
Customer Service Occupations n.e.c.	1,200
Personal Assistants and Other Secretaries	1,200
Metal Working Production and Maintenance Fitters	1,160
Buyers and Procurement Officers	1,120

Occupation name	Number of jobs in Life Sciences (2022)
IT User Support Technicians	1,060
Precision Instrument Makers and Repairers	1,050
Management Consultants and Business Analysts	1,040
Advertising and Marketing Associate Professionals	1,030
Specialist Medical Practitioners	1,030
Electronics Engineers	1,020
Electricians and Electrical Fitters	1,020
Health Services and Public Health Managers and Directors	1,010
Pharmacists	1,000
Legal Professionals n.e.c.	980
Health and Safety Managers and Officers	950
Production and Process Engineers	950
Stock Control Clerks and Assistants	940
Project Support Officers	940
Process Operatives n.e.c.	850
Finance and Investment Analysts and Advisers	850
Security Guards and Related Occupations	830
Metal Working Machine Operatives	820
Purchasing Managers and Directors	810
Information Technology Professionals n.e.c.	800
Managers and Directors in Retail and Wholesale	790

Occupation name	Number of jobs in Life Sciences (2022)
Officers of Non-governmental Organisations	780
Database Administrators and Web Content Technicians	780
Customer Service Supervisors	780
Quality Control and Planning Engineers	750
Information Technology Directors	720
Data Analysts	710
Construction Project Managers and Related Professionals	690
Generalist Medical Practitioners	680
Public Services Associate Professionals	670
Transport and Distribution Clerks and Assistants	660
Sales Administrators	620
Authors, Writers and Translators	600
IT Project Managers	600
Librarians	590
Computer System and Equipment Installers and Servicers	590
Human Resources and Industrial Relations Officers	590
National Government Administrative Occupations	570
Other Registered Nursing Professionals	530
Charitable Organisation Managers and Directors	510
Managers in Transport and Distribution	500

Source: Lightcast Staffing Pattern Matrix



D. Core Life Sciences Roles as defined in the Lightcast Occupation Taxonomy

The table below includes details of all the Core Life Sciences Roles identified as part of this report and their split into different categories.

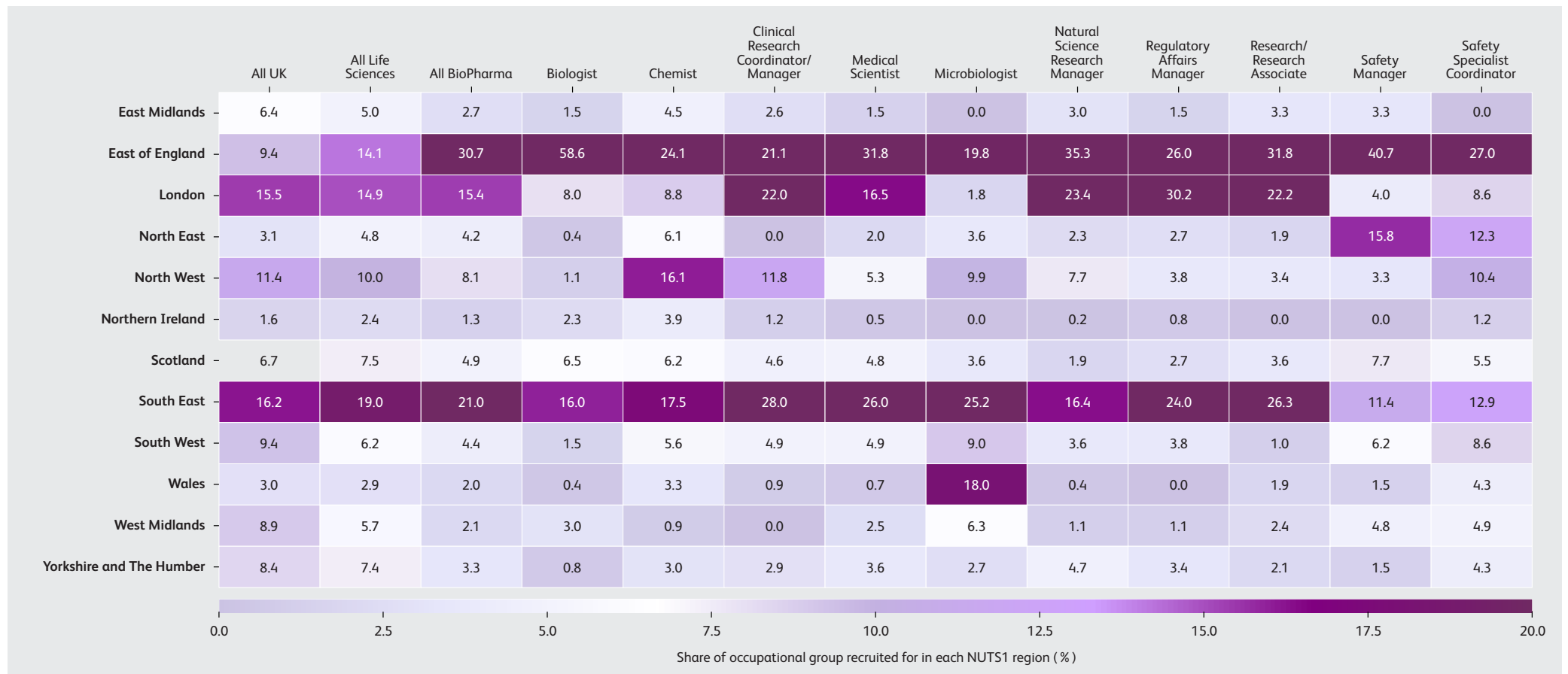
Table D1: Core Life Sciences Roles breakdown by specific job roles

Core Life Sciences Roles	Specific job roles included (specialised occupations)	Core Life Sciences Roles	Specific job roles included (specialised occupations)
Chemist	Analytical Chemist, Assay Development Scientist, Research and Development Chemist, Organic Chemist, Computational Chemist, Quality Control Chemist, Manufacturing Chemist, Chemistry Laboratory, Supervisor	Microbiologist	Microbiologist
Natural Science Research Manager	Natural Science Research Manager (General), Research and Development Director, Natural Science Research Director, Director of Laboratory Services	Chemical Technician	Chemical Technician
Medical Scientist	Medical Science Liaison, Pharmacology Research Scientist, Medical Research Scientist, Toxicologist, Drug Formulation Scientist, Drug Safety Scientist, Medical Laboratory Scientist, Infectious Disease Scientist	Other science & research, and regulatory occupations	Healthcare Account Representative, Biochemist, Biophysicist, Biological Technician, Bioinformatics Engineer, Biomechanical Engineer, Biostatistician, Bioinformatician, Biostatistics Manager/Director, Clinical Data Analyst, Clinical Documentation Specialist, Ethics Compliance Manager, Computer Scientist, Epidemiologist Clinical Director, Director of Case Management, Hearing Screener/Technician, Laboratory Manager, Laboratory Technician (General), Laboratory Analyst, Clinical Laboratory Technician, Laboratory Specimen Processor, Quality Control Laboratory Technician, Microbiology Laboratory Assistant, Pathology Laboratory Technician, Biology Laboratory Technician, Blood Bank Technologist, Medical Laboratory Technologist, Clinical Laboratory Specialist, Medical Technologist Supervisor, Logistics Technician, Healthcare Sales Representative, Pharmaceutical Sales Representative, Pharmaceutical Sales Manager, Medical Device Sales Representative, Medical Sales Account Manager, Medical Assembler, Chief Medical Officer, Neurodiagnostic Technician/Technologist, Orthotist/Prosthetist, Clinical Pharmacy Manager, Physical Scientist, Allergist/Immunologist, Pathologist, Pharmaceutical Product Manager, Healthcare Project Manager, Public Safety Director, Regulatory Affairs Specialist
Researcher/ Research Associate	Research Scientist		
Clinical Research Coordinator/ Manager	Clinical Data Manager, Clinical Data Specialist, Clinical Data Coordinator, Clinical Data Developer, Clinical Data Systems Consultant, Clinical Research Associate, Clinical Trial Manager, Clinical Project Manager, Clinical Research Manager, Clinical Research Director, Clinical Research Coordinator		
Regulatory Affairs Manager	Regulatory Affairs Manager		
Safety Manager	Safety Director, Drug Safety Manager, Patient Safety Director		
Biologist	Biologist (General), Cell Biologist, Molecular Biologist, Computational Biologist, Geneticist, Field Biologist		
Safety Specialist/ Coordinators	Drug Safety Specialist, Safety Specialist (General), Patient Safety Specialist, Consumer Safety Specialist		

Source: Lightcast Occupation Taxonomy

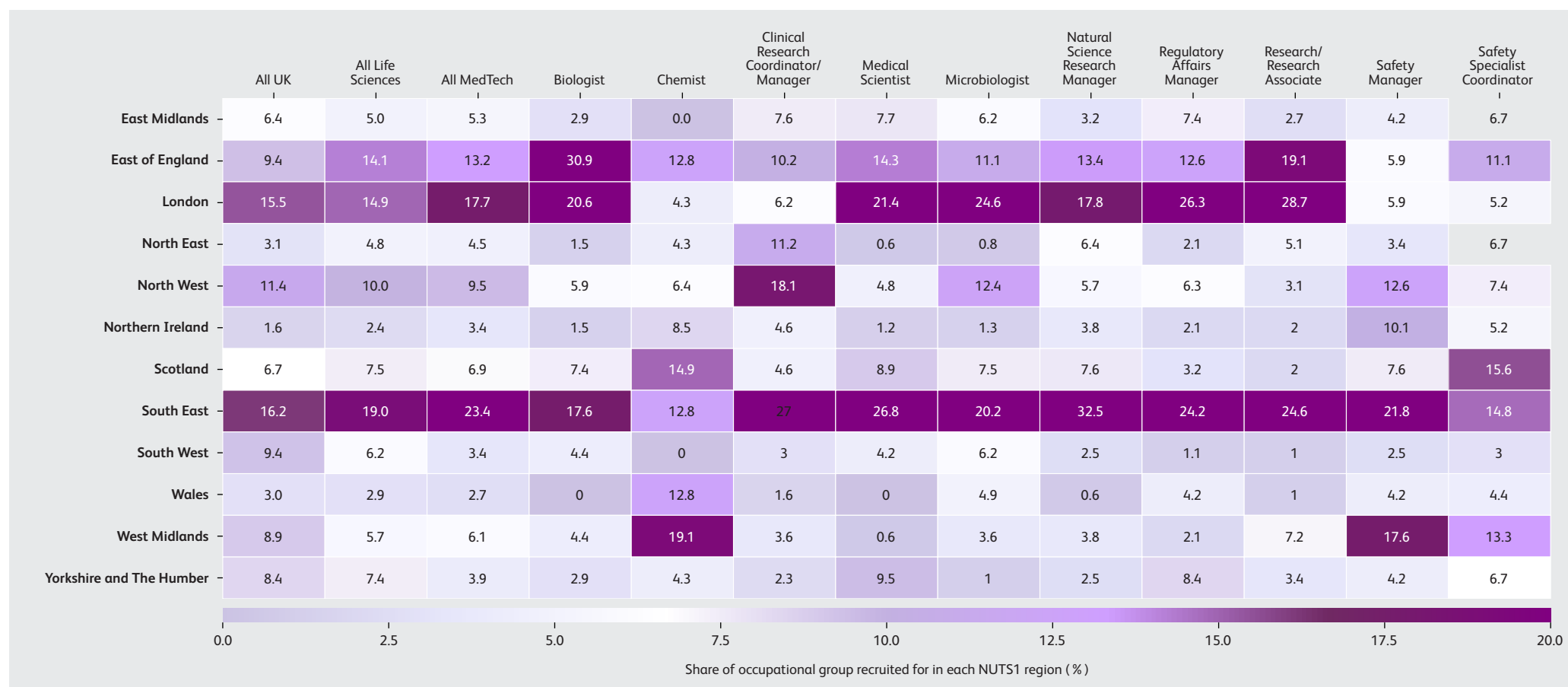
E. Additional insights on the breakdown of job postings activity by region and subsector

Figure E1: BioPharma job postings activity and the top 10 Core Life Sciences Roles by English regions and devolved nations, benchmarked against all UK job postings and the Life Sciences sector overall



Source: Lightcast, Job Postings Analytics

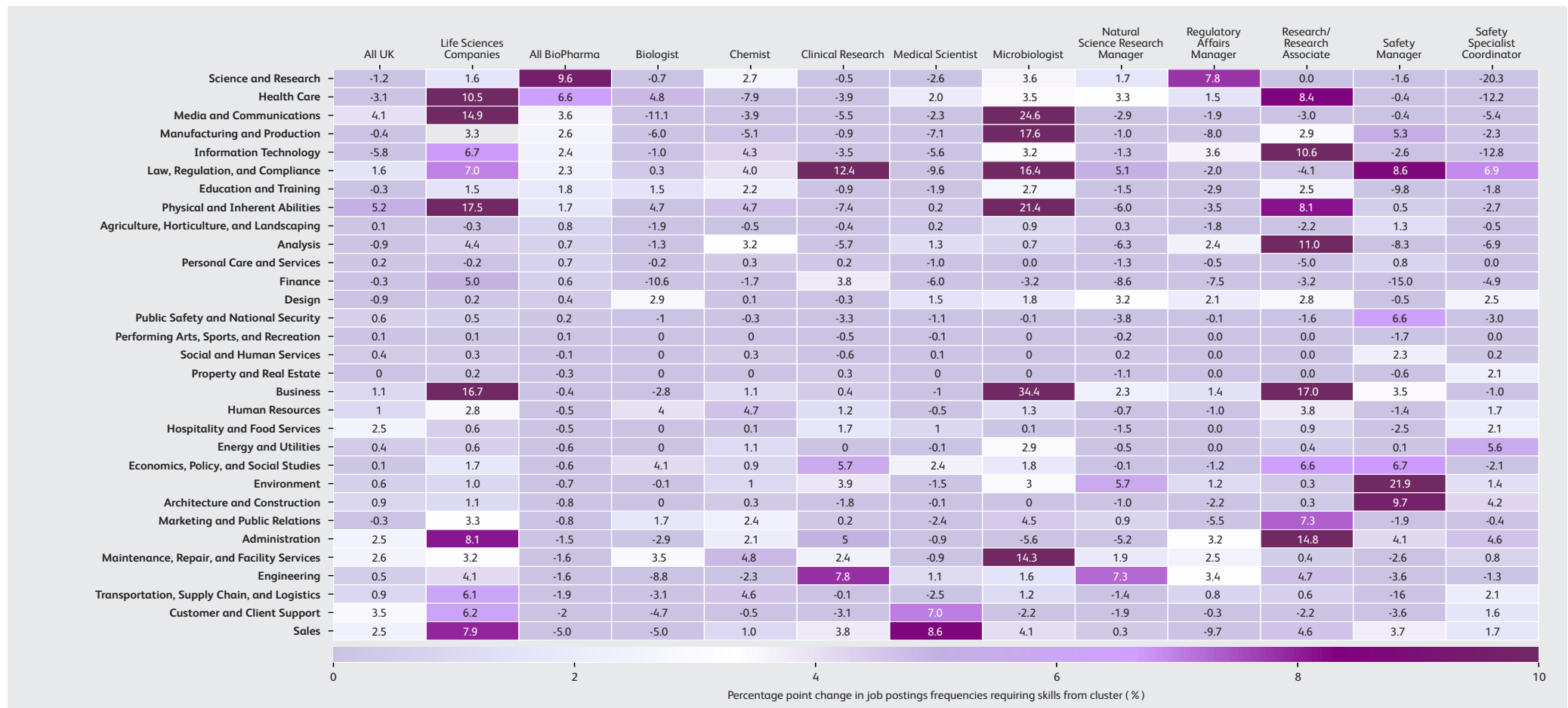
Figure E2: MedTech job postings activity and the top 10 Core Life Sciences Roles by English regions and devolved nations, benchmarked against all UK job postings and the Life Sciences sector overall



Source: Lightcast, Job Postings Analytics

F. Additional insights on changing skills requirements in BioPharma and MedTech online job postings

Figure F1: Changing skill requirements in BioPharma and its Core Life Sciences Roles



Source: Lightcast, Job Postings Analytics

Please note: The high score for 'Environment' in some roles may reflect references to a laboratory or controlled environment, rather than environmental skills.

Figure F2: Changing skill requirements in MedTech and its Core Life Sciences Roles



Source: Lightcast, Job Postings Analytics

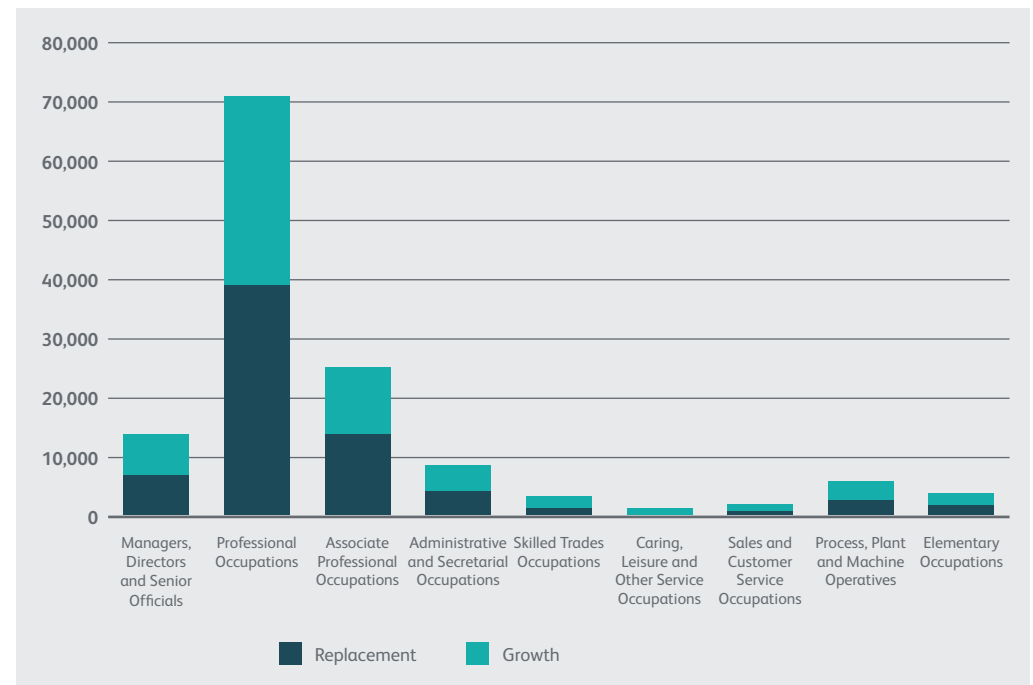
G. Additional insights on projections to 2035

Figure G1: Life Sciences employment by major occupation groups in 2024, with projected changes through 2035 under the continuation scenario



Source: Lightcast calculations based on Office for Life Sciences Bioscience and Health Technology Sector historical statistics

Figure G2: Projected workforce demand (growth and replacement) in the Life Sciences sector by major occupation groups through 2035 under the continuation scenario



Source: Lightcast calculations based on Office for Life Sciences Bioscience and Health Technology Sector historical statistics

H. Literature review references

Association of the British Pharmaceutical Industry (2022) '*Bridging the skills gap in the biopharmaceutical industry*'. <https://www.abpi.org.uk/publications/bridging-the-skills-gap-in-the-biopharmaceutical-industry-2022/>

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Medicine Manufacturing Industry Partnership (2023) '*Follow the green, high-tech road*'. <https://www.bioindustry.org/static/21d8a241-689c-4e28-ad57620c0257e4e8/MMIP-Report-2023.pdf>

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UK BioIndustry Association (2023) '*Diversity and inclusion in UK BioTech*'. <https://diversityinbiotech.org/>

UK BioIndustry Association (2024) '*UK Cell and Gene Therapy: leading the path to transformative medicine*'. <https://www.bioindustry.org/static/af2ee876-3d56-487f-84577fac4e022bb2/BIA-Cell-and-gene-therapy-report-2024.pdf>

I. Additional insights on talent pipeline

Figure I1: Regions of employment for graduates entering Life Sciences (ONS definition)

Scotland	370
Northern Ireland	140
Wales	160
England	3,265
North East	155
North West	330
Yorkshire and the Humber	185
East Midlands	155
West Midlands	110
East of England	645
London	590
South East	845
South West	215
County/unitary authority unknown	35

Source: Higher Education Statistical Agency: Graduate Outcomes Survey Results Record, 2020/21

Figure I2: Top 20 Higher Education providers for graduates entering Life Sciences (ONS definition)

HE Provider	Life Sciences Graduates
The University of Strathclyde	115
University of Nottingham	110
Imperial College of Science, Technology and Medicine	110
University College London	110
Newcastle University	105
The University of Manchester	105
The University of Birmingham	100
The University of Leeds	90
The University of Cambridge	85
The University of Bath	85
The University of Sheffield	85
Queen's University Belfast	85
The University of Kent	85
The Open University	75
The University of Southampton	70
The University of Oxford	70
The University of Edinburgh	65
Cardiff University	65
The University of York	65
The University of Bristol	65

Source: Higher Education Statistical Agency: Graduate Outcomes Survey Results Record, 2020/21

J. Additional insights on career pathways

Figure J1: Possible feeder occupations for the most advertised Core Life Sciences Roles

TOP OCCUPATIONS IN BIOPHARMA AND MEDTECH											
POSSIBLE FEEDER OCCUPATIONS	Medical Scientist	Biologist	Research/ Research Associate	Microbiologist	Chemist	Natural Science Research Manager	Safety Specialist Coordinator	Clinical Research Coordinator/ Manager	Safety Manager	Regulatory Affairs Manager	Chemical Technician
Zoologist/Wildlife Biologist	55%	76%	64%	64%	46%						51%
Soil/Plant Scientist	44%	59%	52%	52%	36%						
Laboratory Manager	88%	71%	69%	69%		77%					
Chemist	70%	72%	71%	71%	100%	70%				51%	
Researcher/Research Associate	80%	88%	100%			88%		65%			
Biomedical Engineer	56%	57%	63%	63%							
Biologist	81%	100%						45%			
Natural Science Research Manager	81%					100%		82%		73%	
Environmental Planner/Scientist		66%	61%	61%					66%		
Food and Agricultural Scientist/Technologist		50%	55%	55%							
Laboratory Technician					74%						80%
Environmental Technician					56%		72%		69%		
Compliance Officer/Analyst						71%	71%		75%		
Laboratory Technologist	87%	56%									
Medical Scientist	100%							63%		53%	
Environmental Compliance Specialist		56%					67%		69%		
Chemical Operator					60%		63%				
Equal Opportunity Representative/Officer						72%	65%				
Cytogenetic Technologist/Cytotechnologist	68%										
Data/Data Mining Analyst			66%	66%							

Note: only occupations that are top 10 feeders for the destination occupation receive a score. The table above features the 20 feeder occupations that cut across the highest number of most recruited Core Life Sciences Roles in BioPharma and MedTech.

Source: Lightcast, Career Pathways

Figure J2: Possible next-step occupations for the most advertised Core Life Sciences Roles

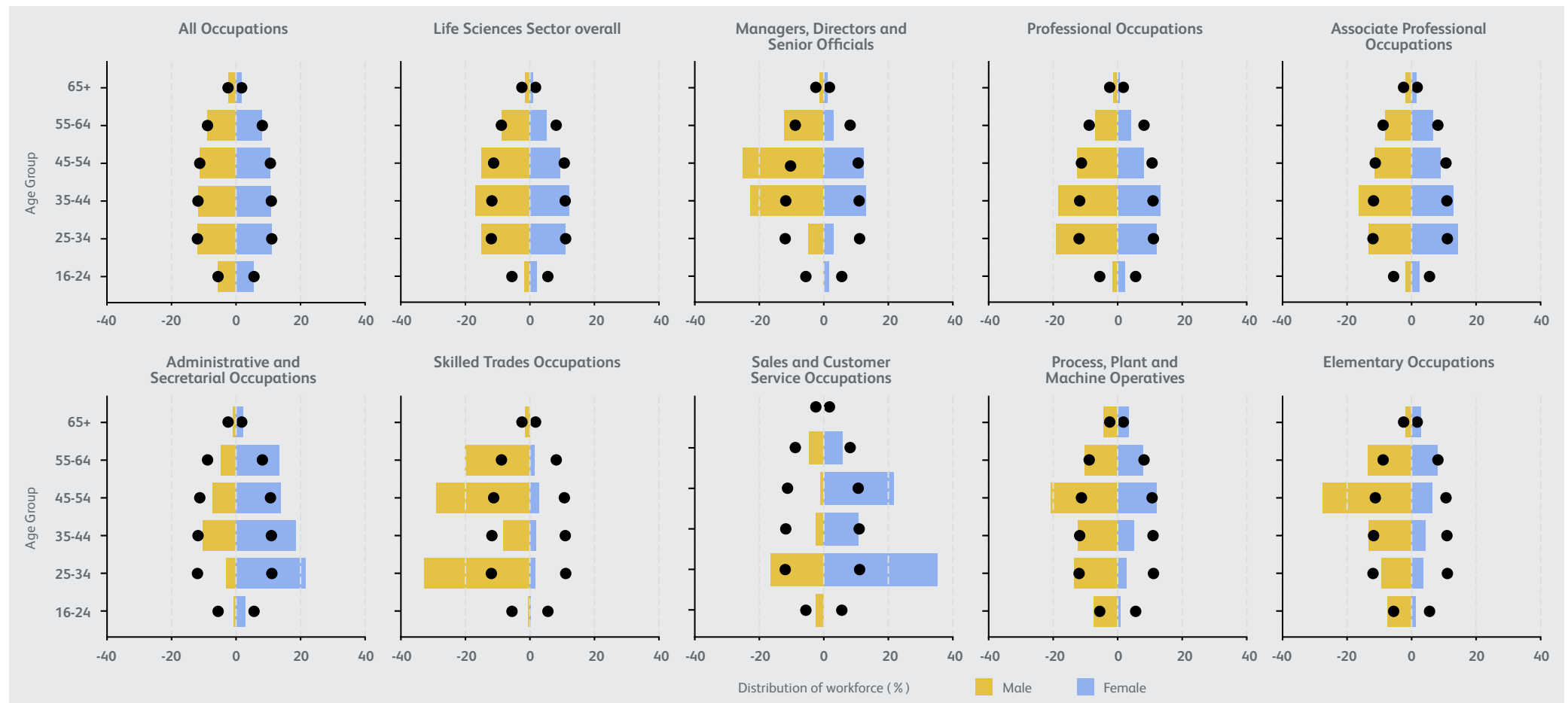
TOP OCCUPATIONS IN BIOPHARMA AND MEDTECH											POSSIBLE NEXT-STEP OCCUPATIONS
Medical Scientist	Biologist	Research/ Research Associate	Microbiologist	Chemist	Natural Science Research Manager	Safety Specialist Coordinator	Clinical Research Coordinator/ Manager	Safety Manager	Regulatory Affairs Manager	Chemical Technician	
81%	76%	88%		70%			82%				Natural Science Research Manager
66%	69%	77%			73%		63%				Biostatistician
76%	74%			70%						70%	Microbiologist
50%					78%		42%		61%		Media/Talent Director
49%					76%		46%	57%			Compensation/Benefits Manager
					69%	67%	43%	73%			Compliance Manager
72%		77%		81%							Biochemist
88%				74%						79%	Laboratory Manager
81%		88%		72%							Biologist
100%	81%	80%		70%							Medical Scientist
				53%		49%	65%				Regulatory Affairs Specialist
53%					73%		52%		100%		Regulatory Affairs Manager
66%	50%		52%								Histotechnologist/Histotechnician
	55%	76%					54%				Statistician
						64%		66%		56%	Lighting Technician
						60%		65%		58%	Production Plant Manager
				56%						60%	Quality Control Systems Manager
	58%	74%									Computer Scientist
	48%	69%									Analytics Manager
						86%		84%			Health and Safety Engineer

Note: only occupations that are top 10 next step occupations for the destination occupation receive a score. The table above features the 20 next step occupations that cut across the highest number of most recruited Core Life Sciences Roles in BioPharma and Med Tech.

Source: Lightcast, Career Pathways

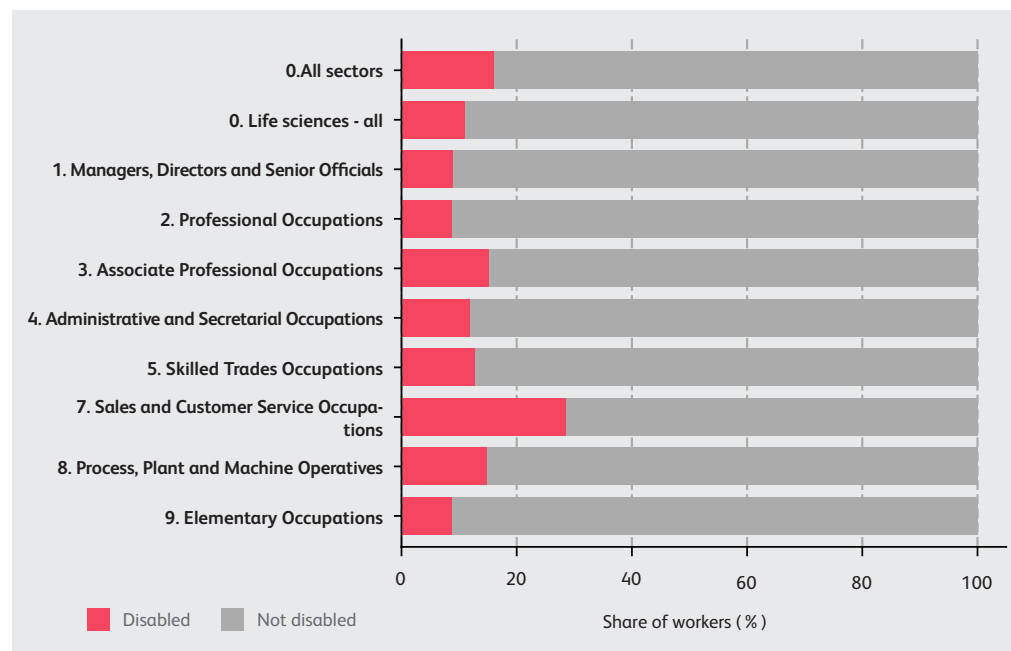
K. Additional insights on workforce demographics by major occupational group

Figure K1: Age and sex distribution in the Life Sciences sector by major occupational group



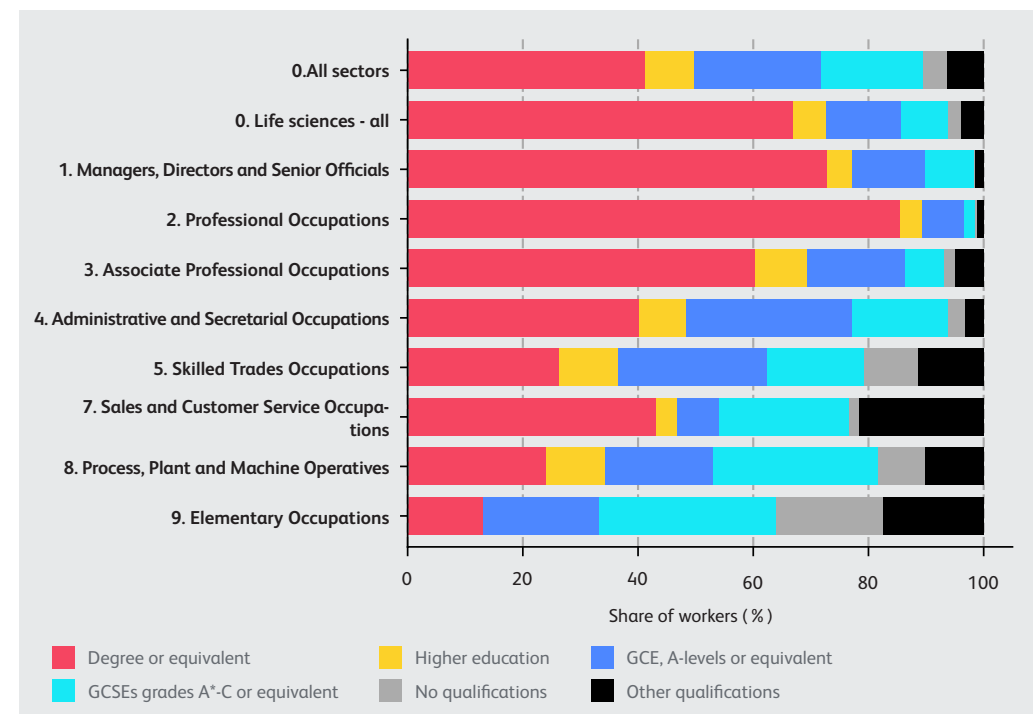
Source: Office for National Statistics: Labour Force Survey microdata, Q1 2021 to Q4 2023

Figure K2: Disability distribution in the Life Sciences sector by major occupational group



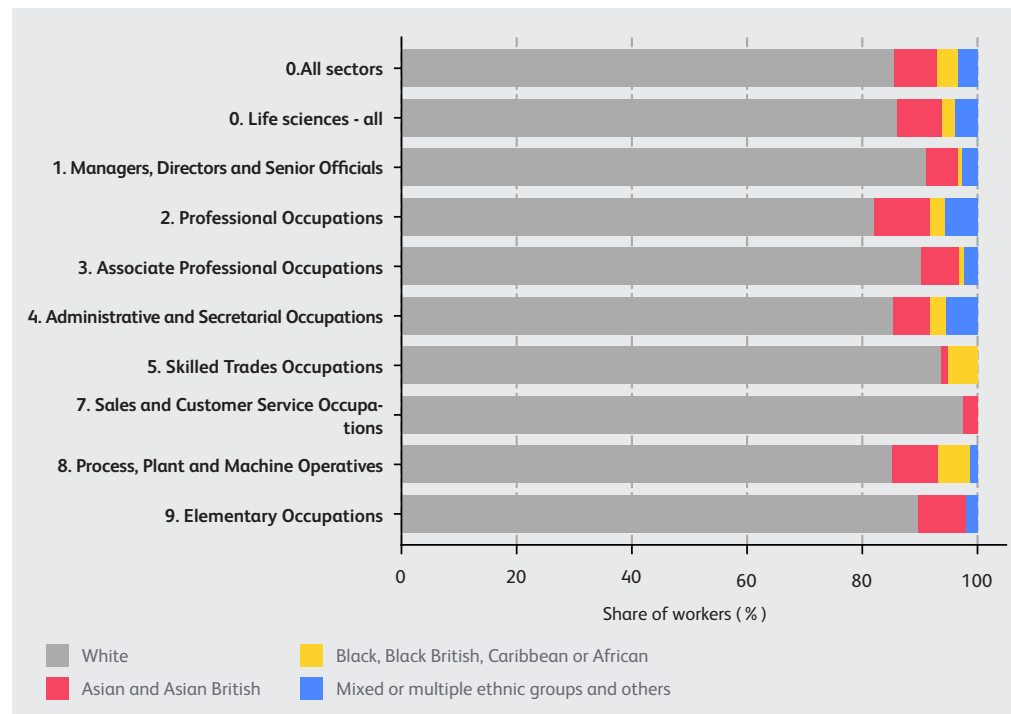
Source: Office for National Statistics: Labour Force Survey microdata, Q1 2021 to Q4 2023

Figure K3: Educational qualifications distribution in the Life Sciences sector by major occupational group



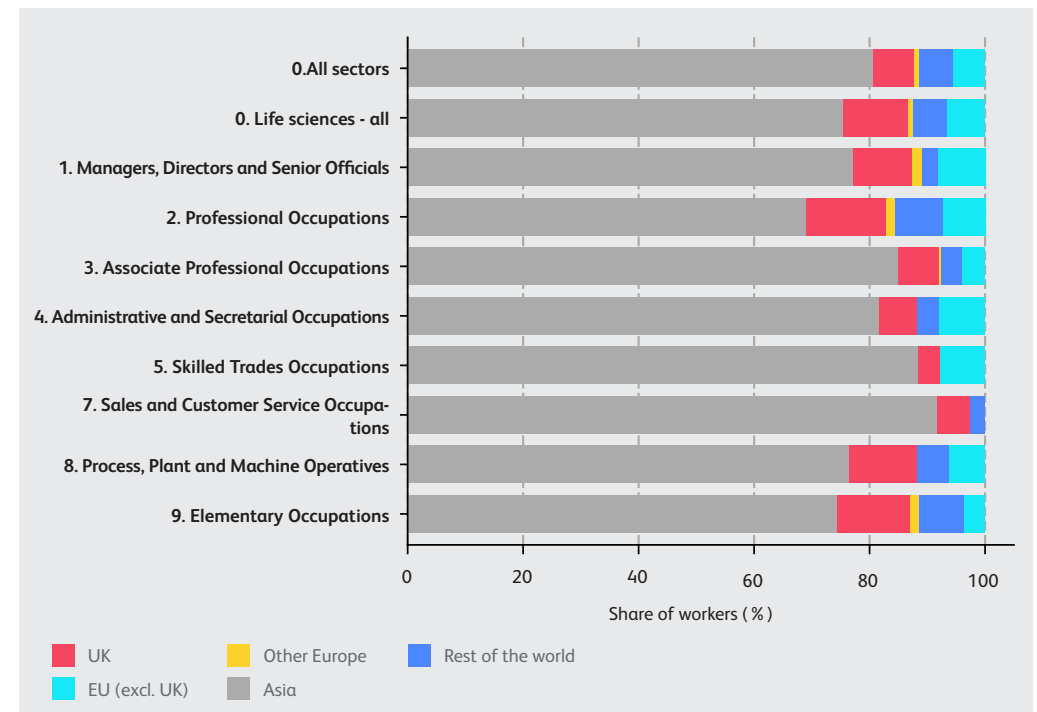
Source: Office for National Statistics: Labour Force Survey microdata, Q1 2021 to Q4 2023

Figure K4: Ethnicity distribution in the Life Sciences sector by major occupational group



Source: Office for National Statistics: Labour Force Survey microdata, Q1 2021 to Q4 2023

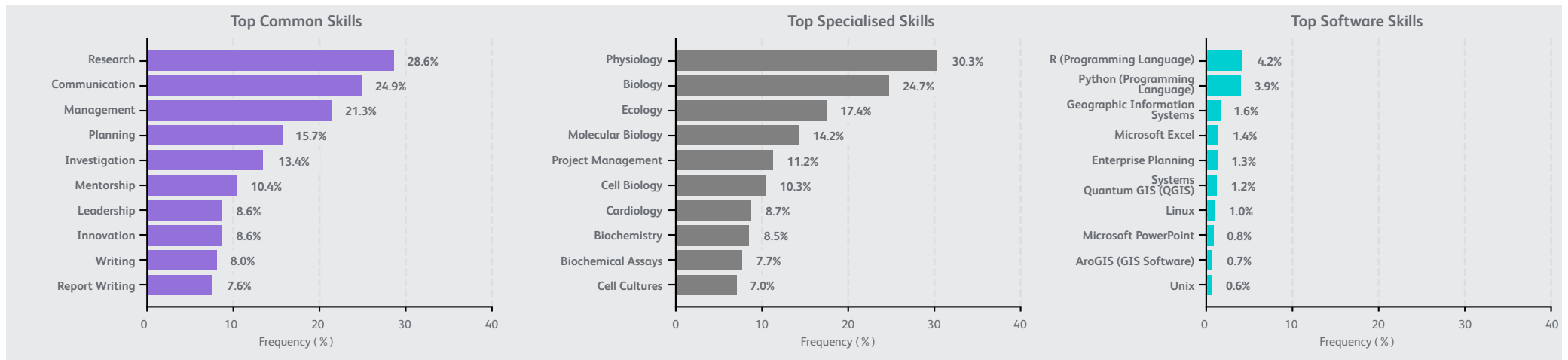
Figure K5: Country of origin distribution in the Life Sciences sector by major occupational groups



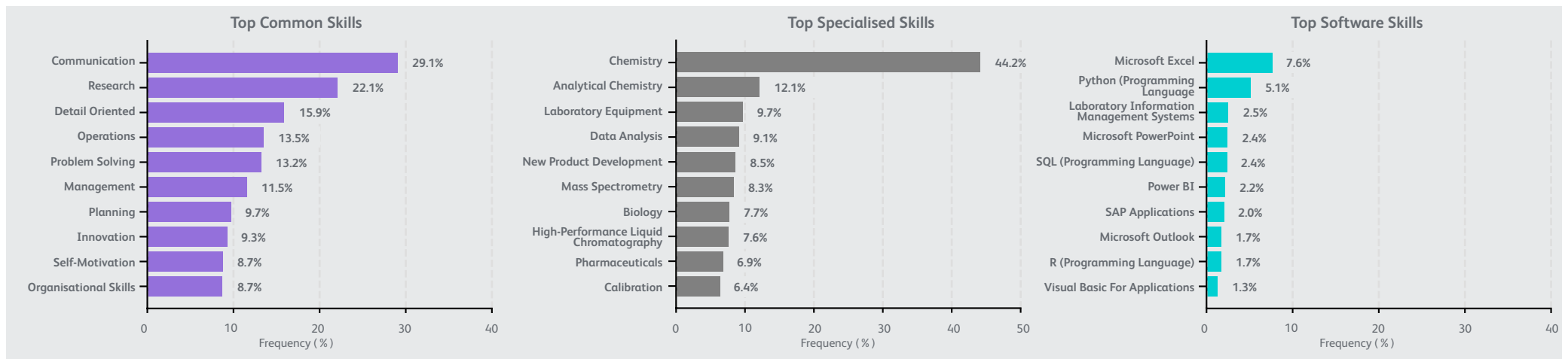
Source: Office for National Statistics: Labour Force Survey microdata, Q1 2021 to Q4 2023

L. Core Life Sciences Roles skills factsheets

Biologist

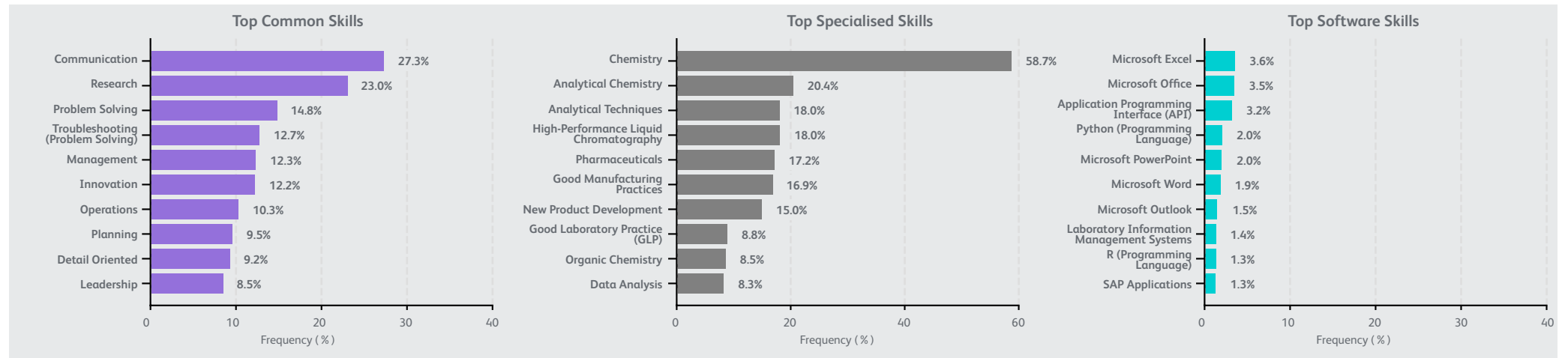


Chemical Technician

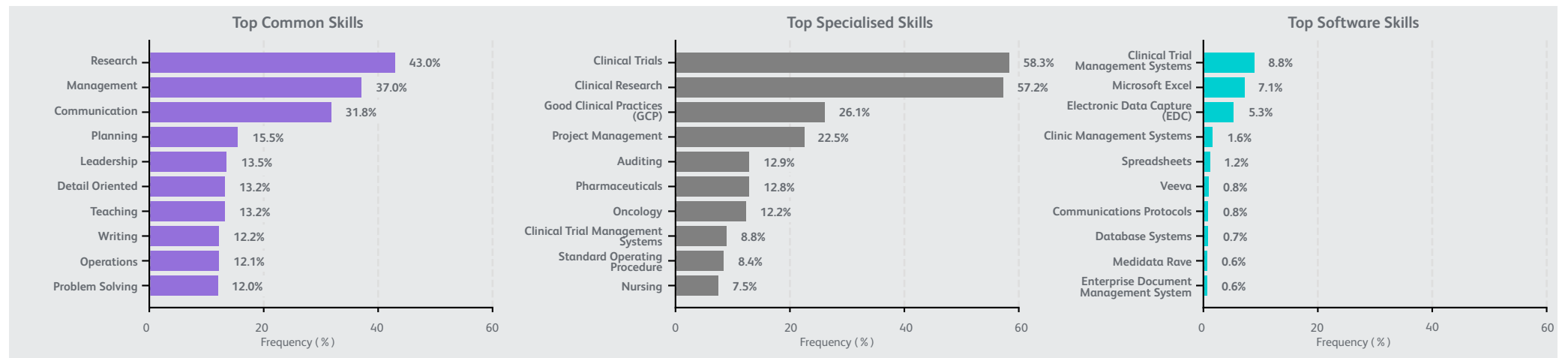


Life Sciences 2035: Developing the Skills for Future Growth

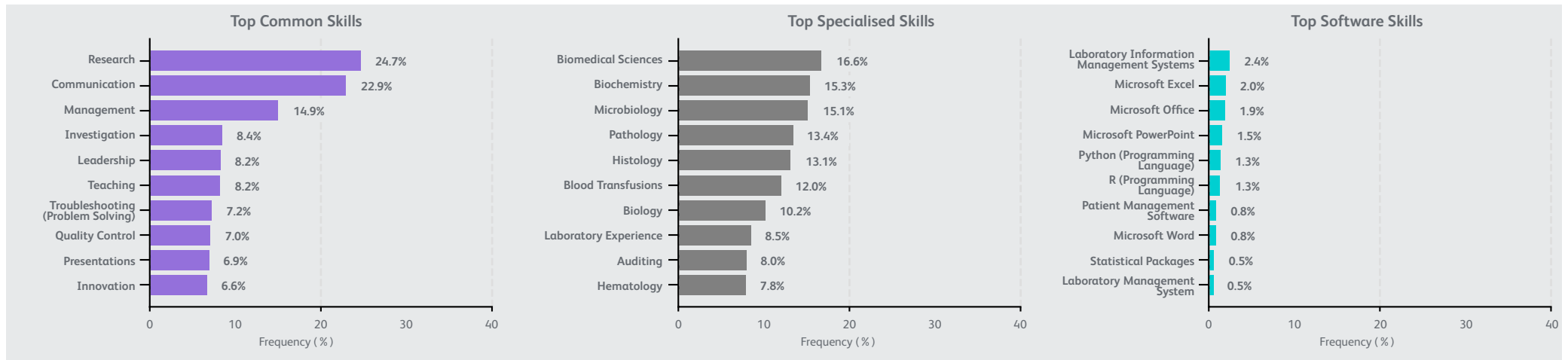
Chemist



Clinical Research Coordinator/Manager



Medical Scientist

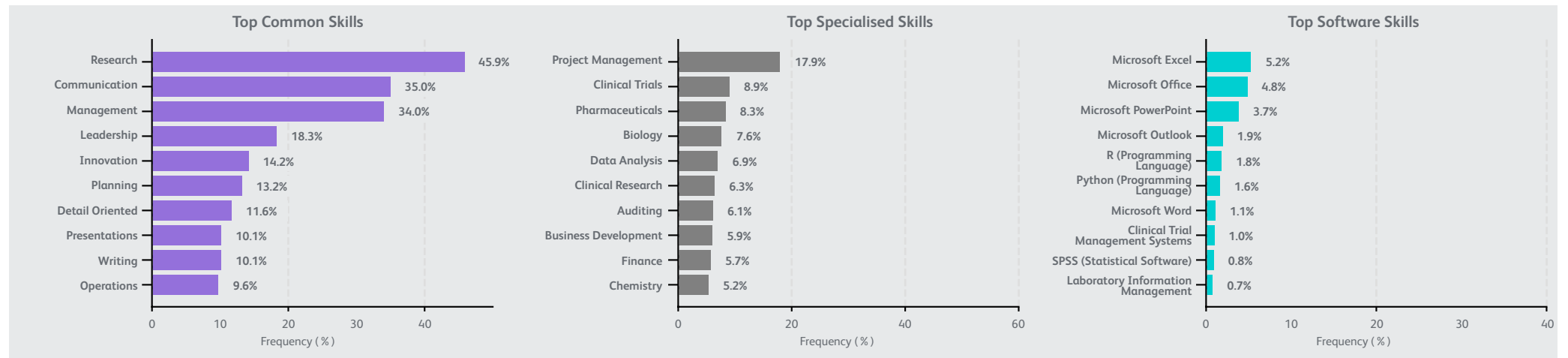


Microbiologist

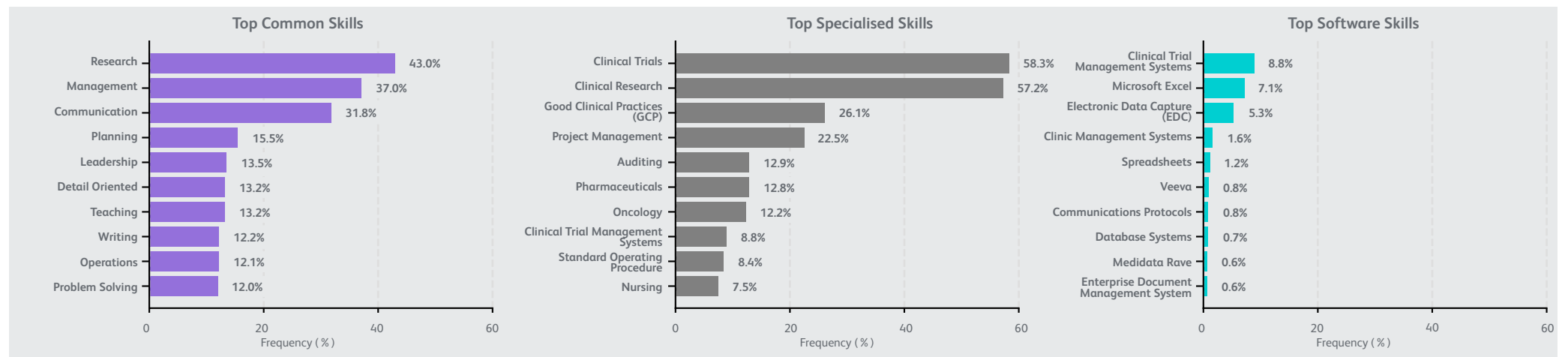


Life Sciences 2035: Developing the Skills for Future Growth

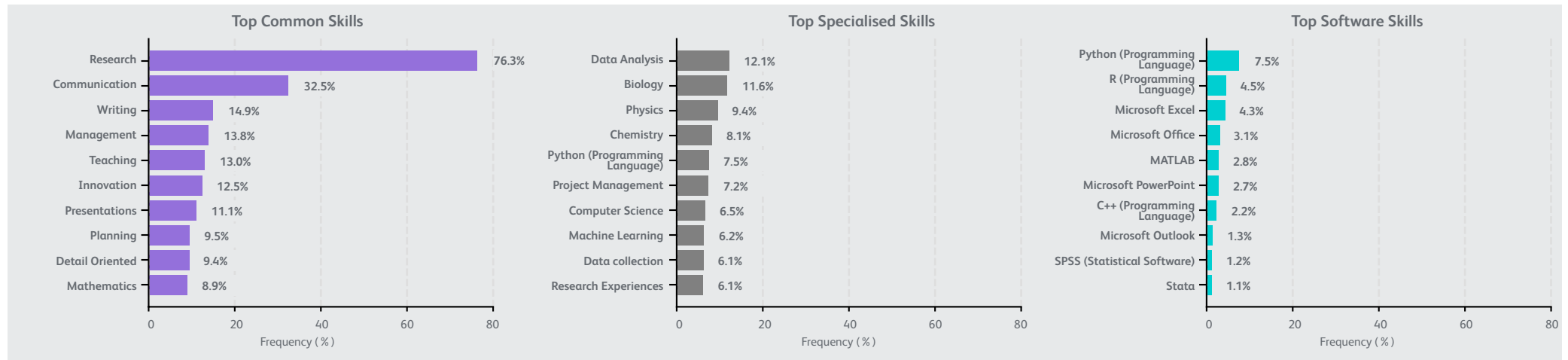
Natural Science Research Manager



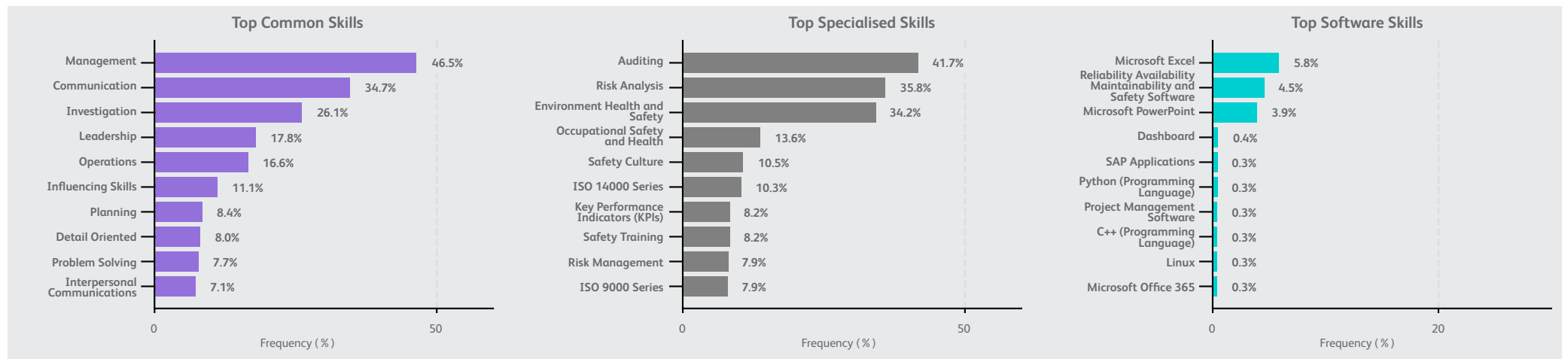
Regulatory Affairs Manager



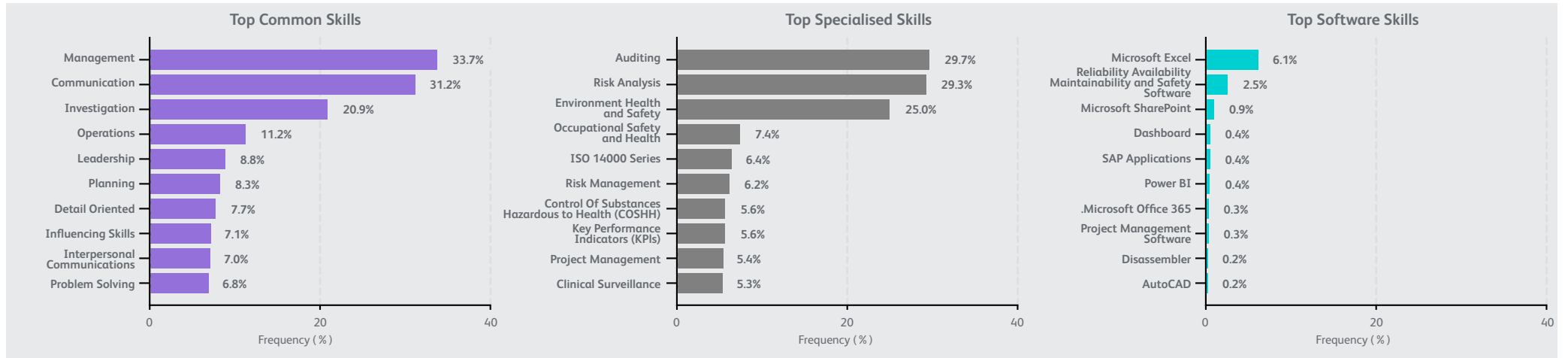
Researcher/Research Associate



Safety Manager



Safety Specialist/Coordinator



In partnership with:

