Office for Life Sciences

BIOSCIENCE AND HEALTH TECHNOLOGY SECTOR STATISTICS 2019

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Any enquiries regarding this publication should be sent to:
analysis@officeforlifesciences.gov.uk

Biotechnology and Health technology Sector Statistics 2019

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Key Messages

The UK life sciences industry employs 256,100 people in 6,300[1] businesses and generates a turnover of £80.7bn.

The Core Biopharma and Core Med Tech sectors contain businesses involved in the discovery, development and marketing of therapeutics, and medical devices respectively. The Core Med Tech sector is the largest by employment (102,800 or 40% of the industry) and Core Biopharma is the largest by turnover (£36.7bn or 45% of the industry).

The Core sectors are supported by two Service & Supply sectors that supply materials, equipment and specialist services. These two sectors employ 89,400 in 2,710 businesses with a turnover of £23.6bn.

The largest segment within the industry is small molecules, consisting of businesses with the majority of their activity developing and marketing therapeutics based on this technology. The segment employs 49,200 (19% of the industry) and generates a turnover of £31.7bn (39% of the industry total).

Along with small molecules, the Top 3 Core segments in the industry by employment include digital health (the largest segment by employment in Core Med Tech with 12,900 employees) and in vitro diagnostics (9,700 employees). The Top 3 Core segments in the industry by turnover are small molecules, in vitro diagnostics, and single use technology. In total these segments account for 44% of industry turnover.

Within the two Service & Supply sectors, the two largest segments contain businesses that supply contract manufacturing and research services, and that supply reagents and equipment. In Biopharma, these two segments employ 31,300 with a turnover of £12.0bn; in Med Tech, these segments employ 12,000 with a turnover of £2.3bn.

82% of the businesses in the industry are SMEs; these employ 24% of the industry total and generate 10% of the turnover. The Core Biopharma sector has a higher percentage of non-SME businesses at 31% compared to 18-19% for all other sectors. The Top 25 Global Pharmaceutical companies with activity in the UK (and are non-SMEs) employ 55% of the Core Biopharma sector.

The South East of England contains the largest population of life sciences industry jobs with a total employment across all four sectors of 61,700 or 24%. The East and North West of England together with the South East are the Top 3 regions by employment.

Employment in the Core Biopharma sector is concentrated in the South East and East of England, and London with 67% of all sector employees, compared to 40% for Core Med Tech employment.

[1] The number of business counts at the industry level is lower than the count at the sector and sub–sector (L0) level because in the latter analysis some businesses are counted in more than one sector. Eg Where a business has activity in both Core Biopharma and Core Med Tech. See Annex 2, Fig 10.

Trend Data

Between 2010 and 2019, the industry increased employment by 20,500, an increase of 9% at a compound annual growth rate of 0.9%. Over the period, all sectors except for Core Biopharma increased employment. This is compared to employment growth in all industries[2] of 12% since 2010 at a CAGR of 1.3%.

The employment decreases in Core Biopharma (5,400 in total over the period) were concentrated between 2011-2013, when a number of the large pharmaceutical companies underwent re-structuring.

Total industry turnover decreased in real terms[3] by £1.6bn between 2010 and 2019, which was the result of the decrease in Core Biopharma (£9.3bn), which was partially offset by increases in Med Tech and the Service & Supply sectors (£7.7bn).

Between 2010 and 2019, the single-use technology and assistive technologies segments replaced orthopaedic devices and re-usable diagnostic or analytic equipment in the industry's top 5 core segments by employment. By turnover, digital health replaced vaccines in the top 5 segments over the same period.

Between 2010 and 2019, most regions in England, Wales, and Northern Ireland have seen a net increase in employment in the life sciences industry. One region in England, the West Midlands, saw employment fall by 1,700, while employment in Scotland fell by 1,200.

[2] UK employment (all industries) taken from HI00 Regional labour market: Headline Labour Force Survey indicators for all regions 21st April 2020 release

[3] Deflated turnover calculated using Office for National Statistics defaltors to bring turnover values to 2019 equivalent values. GDP Deflators Spring Statement 2020 update issued 11th March 2020

Introduction

This report contains analysis of trends in the UK life sciences industry, covering the Biopharma and Med Tech sectors[4]. The three main measures of economic contribution and industry structure are:

- employment - the number of people employed by life science businesses
- turnover - the amount of money taken by businesses within scope of life science sector activities
- number of businesses – the number of life science businesses and their sites registered in the UK

It contains analysis of the industry looking at the economic activity of businesses that market therapeutic products and medical devices as well as the specialist Service & Supply chains that are key parts of the ecosystem. A segmentation approach is applied that enables a detailed analysis of the product and service categories that make up the industry[5].

The analysis is based on the 2019 database of sites and businesses updated between October and December 2019 using the methodology summarised in Annex 2. Since data is based on activity in 2019, any impacts from covid-19 will not be reflected in any trends seen in the statistics. The UK officially exited the UK in January 2020 and has entered into a transition period. The data in this report focusses on data up until 2019, so data is currently unavailable to determine any long term impacts on trends. This will continue to be reviewed going forward as more data becomes available. Similarly, this data is set prior to the Coronavirus (COVID-19) pandemic and so any potential impacts on the industry will not be reflected in this publication.

The year referred to in this report is the year of the update rather than the year of the turnover and employment figures; turnover and employment are for the latest 12 months available. For the majority of sites, these figures will have been derived from latest accounts submitted by businesses to Companies House; the figures may be submitted up to 9 months after the end of the accounting period (which itself may vary between businesses).

The data, charts, figures, and maps used in this document, plus separate infographics can be found at
https://www.gov.uk/government/collections/bioscience-and-health-technology-database-annual-reports

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

[5] See Annex 4 for a list of the segmentation categories

Terminology

Industry: used to collectively describe all Sectors covered in the analysis

Sector: used to describe Core Biopharma, Core Med Tech, Biopharma Service & Supply or Med Tech Service & Supply

Segment: used to describe the individual product or service groups within a Sector (see Annex 3 for a detailed list of segments)

Core Biopharma: 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

Biopharma Service & Supply: comprises businesses that offer goods and services to Core Biopharma businesses including, for example, Contract Research and Manufacturing Organisations (CRMOs), and suppliers of consumables and reagents for R&D facilities

Core Med Tech: includes all businesses whose primary business involves developing and producing Med Tech products, ranging from single-use consumables to complex hospital equipment, including digital health products

Med Tech Service & Supply: comprises businesses that offer services to Core Med Tech businesses including, for example, CRMOs, and suppliers of consumables and reagents for R&D facilities

Digital health: includes businesses involved in making products for both hospitals and consumers including products such as hospital information systems and mobile medical devices and apps. It is a segment wholly within the Core Med Tech Sector.

Genomics: an interdisciplinary field focusing on the study of the human genome and the application of resulting knowledge to human health. It is a cross-cutting categorisation across all four sectors.

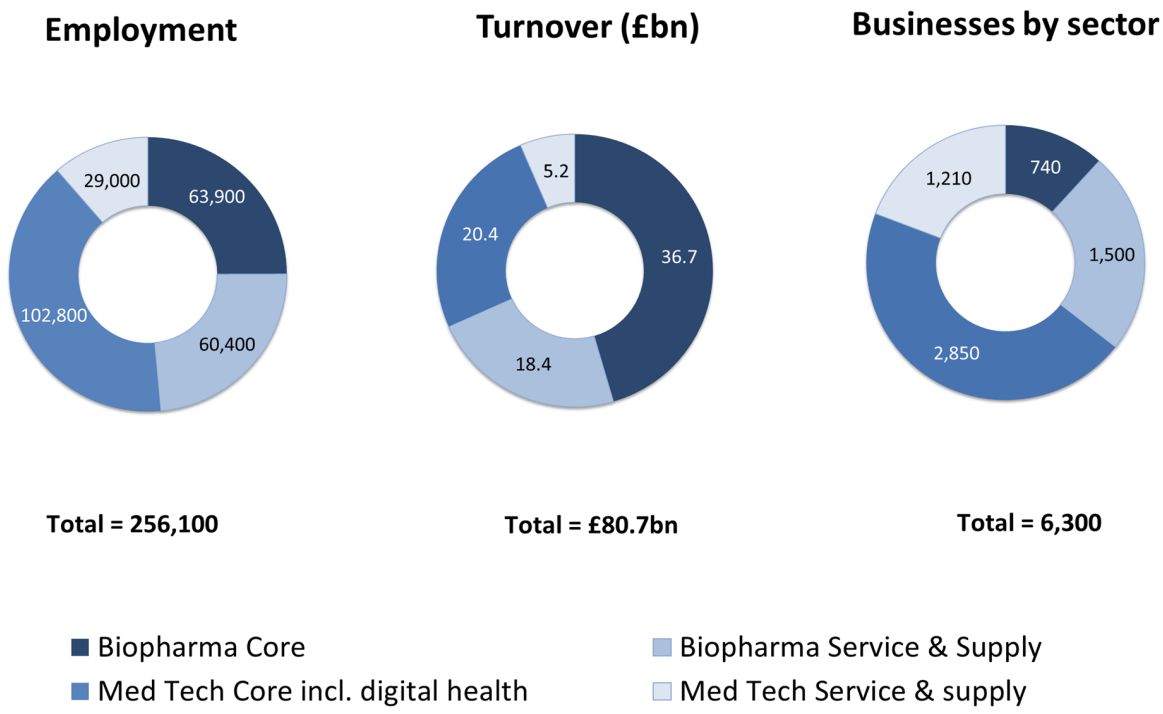
Business: used to describe an entity that is the legal owner of a group of trading addresses or sites and legal entities. A business may consist of more than one site or registered company. The term business is used in this document when discussing the whole life sciences industry and the four sectors.
There are 80 businesses that are active in more than one sector which means there is a small difference in the count of businesses at the industry level (6,150) compared to the sector level (6,230) and the sub-sector level (6,300). This document reports business counts at the sub-sector level. There is no difference in the sums of employment or turnover at the different levels of analysis. See Annex 2, Fig 10 for more detail.

Sites: used when referring to the data at the segment or geographical level. All data in the spreadsheets that accompany this document are analysed at the site level. This is the level at which all data entries (7,000 records) are held and analysed in the database. A single site is segmented and has employment and turnover assigned to it. As a business can have multiple sites and can operate in more than one segment, the total counts of sites at segment level is greater than the count of businesses referred to at sector level.

SME status: based on the European definition of Small and Medium-sized Enterprises (SMEs) and refers to businesses with fewer than 250 employees and which either have annual turnover up to and including €50m and/or have an annual balance sheet total up to and including €43m.

1. Industry overview

Figure 1: Total employment, turnover and number of businesses in the life sciences industry by sector



The life sciences industry employed approximately 256,100 people in the UK in 2019[6]. Approximately 131,800 (51% of the industry total) were employed in the Med Tech sector comprising the Core Med Tech and the Service & Supply segments. The Core Med Tech sector is the largest in the industry by employment and number of businesses with a total employment of 102,800 (40% of the industry) and 2,850 businesses (45% of the industry).

The digital health segment is included in the Core Med Tech sector and is the largest segment in this sector with 12,900 employees (5.0% of the industry) and the second largest in the Core sectors by employment.

The Core Biopharma sector contributes the largest turnover to the industry at £36.7bn (45% of the industry). This turnover is generated from 740 business (12% of the industry). Within the Core Biopharma sector, the Top 25 global pharmaceutical[7] companies by revenue make up 58% of this turnover (£21.3bn) and employ 55% (34,900) of the Core Biopharma employees.

[6] The analysis is based on the 2019 database of sites and businesses updated between October and December 2019 using the methodology summarised in Annex 2. This therefore represents a snapshot in time of annual data reported by companies.

[7] http://www.pharmexec.com/pharm-execs-top-50-companies-2019

The Service & Supply companies that support the Core Biopharma and Med Tech sectors have a combined employment of 89,400 compared to 166,700 for the two Core sectors. Turnover for the combined Service & Supply company sectors is £23.6bn compared to £57.1bn for the combined Core company sectors.

1.1 Core sectors

The two Core segments of the industry contain an estimated 3,590 businesses, with the majority in the Med Tech sector (79%). The businesses in these two sectors focus on the discovery, development and marketing of new therapies and medical devices.

- On average, a Core Biopharma sector business has a turnover seven times that of a Core Med Tech business and employs twice as many people.
- 32% of Core Biopharma sites have a turnover greater than £5m compared to 19% for Core Med Tech.
- 8% of Core Biopharma sites have 250 or more employees compared to 2% for Core Med Tech.

The global Top 30 Core Med Tech businesses by revenue[8] employ 17% of the total Core Med Tech sector and their revenue accounts for 27% of the sector total.

The global Top 25 Core Biopharma businesses by revenue[9] employ 55% of the total Core Biopharma sector and their revenue accounts for 58% of the sector total.

The largest segment in the Core Biopharma sector by employment is small molecules, employing 77% of the Core Biopharma sector. Digital Health, in contrast, is the largest segment within Core Med Tech and employs 13% of the sector total. The top 14 of 20 segments employ 90% of the Core Med Tech sector.

The five largest employment segments in the two Core sectors combined employ 89,800 or 54% of the total in the Core sectors. Of the five largest segments, all but small molecules are segments within Core Med Tech. The top five segments in the two Core sectors by turnover are small molecules, in vitro diagnostics, single use technology, digital health and orthopaedic devices. Together they have a combined turnover of £38.7bn or 68% of the total Core sectors; £31.7bn of which is from the small molecules segment.

Of the businesses in Core Biopharma 69% are SMEs compared to 81% in the Core Med Tech sector.

[8] The Top 30 ranking as based on https://www.mpo-mag.com/issues/2019-07-25/view_features/the-2019-top-30-global-medical-device-companies

[9] The Top 25 ranking based on http://www.pharmexec.com/pharm-execs-top-50-companies-2019

1.2 Service & Supply sectors

Both the Core Biopharma and Med Tech businesses are supported by large specialist UK based Service & Supply sectors.

The Biopharma Service & Supply sector employs 60,400 people in 1,500 businesses and generates a turnover of £18.4bn. The largest segments by employment in this sector are contract manufacturing and research, reagent & equipment suppliers, and clinical research organisation that together employ 41,100 people and account for 81% (£14.9bn) of the sector turnover.

The Med Tech Service & Supply chain sector employs 29,000 people in 1,210 businesses, with a turnover of £5.2bn. The largest segments in this sector by employment are reagent & equipment suppliers, contract manufacturing and research, and specialist consultants (excluding regulatory) that together employ 15,500 people and account for 54% (£2.8bn) of the sector turnover.

2. Sector overviews – Key facts

2.1 Biopharma sector

- In total, the sector employs 124,300 people: 63,900 in Core Biopharma businesses and 60,400 in Service & Supply businesses. The combined turnover of the sector is £55.1bn.
- Regionally, employment in the sector is concentrated in the South East, East of England, London, and the North West of England, and in Scotland.
- Large non-SME businesses are the major employers in Core Biopharma (91% of all employment in the sector). In the Service & Supply sector, the majority (81%) of the businesses are SMEs and employ 23% of the sector.

2.2 Biopharma – Core businesses

Overall, the Core Biopharma sector contains 740 businesses employing 63,900 people and a turnover of £36.7bn in 2019.

The sector breakdown shows that businesses whose main economic activity involves small molecule therapeutics form the largest segment, accounting for 64% (470) of businesses, 77 % of employees (49,200) and 86% (£31.7bn) of turnover. Antibodies, therapeutic proteins and vaccines are the next largest segments, together making up 18% (11,300) and 11% (£4.1bn) of employment and turnover respectively.

Geographical analysis of employment shows Core Biopharma businesses in all areas of the UK with the greatest concentration in the South East, East of England, London, and the North West of England which together account for 79% (50,400) of Core Biopharma employment.

Analysing the size of the businesses shows 31% (230) of Core Biopharma businesses are non-SMEs. These large businesses employ 58,200 people (91% of Core Biopharma employment) and account for £35.6bn of turnover (97% of Core Biopharma turnover). They represent 44% of total life sciences industry turnover and 23% of employment.

2.3 Biopharma – Service & Supply chain

Overall, the Biopharma Service & Supply chain consists of 1,500 businesses employing 60,400 people with a turnover of £18.4bn in 2019.

The sector breakdown shows the largest employing segment is contract manufacturing and research organisations that consist of 320 businesses employing 19,000 people. The largest segment in terms of turnover is reagent & equipment suppliers, which represents 45% (£8.3bn) of the total. Clinical research organisations complete the Top 3 Biopharma Service & Supply segments: in total the Top 3 account for 68% (41,100) of the employment.

Geographical analysis of employment shows the South East and East of England combined have the most Service & Supply businesses (580) and employees (40%), followed by Scotland (10%), London (10%) and the North West of England (9%).

Analysing the size of businesses shows that the Biopharma Service & Supply sector is predominately composed of SMEs (1,220) that make up 81% of businesses in the sector, yet they represent only 23% of employment (13,800 people) and 8% of turnover (£1.5bn) for the sector.

2.4 Med Tech sector (including digital health)

- In total, the sector employs 131,800 people: 102,800 in Core Med Tech businesses and 29,000 in Service & Supply businesses. The combined turnover of the sector is £25.6bn.
- Core Med Tech employment is spread across the UK. While the South East, London, and the East of England account for 40% of the employment in the Service & Supply sector, 60% is outside of South Eastern England[10], which is often considered to be the hub for such services.
- SMEs in both Core Med Tech and Service & Supply account for a similar proportion of businesses (81% and 82% respectively) and employment (31% and 33% respectively).

2.5 Med Tech – Core businesses

Overall, the Core Med Tech sector contains 2,850 businesses, employing 102,800 people with a turnover of £20.4bn in 2019.

The sector breakdown shows the largest segment by turnover is in vitro diagnostics followed by single use technology, digital health, orthopaedic devices, and assistive technology. These top five segments account for 42% (£8.5bn) of the Core Med Tech turnover. Digital health technology is the largest segment by employment followed by in vitro diagnostics, assistive

[10] South East, London and the East of England

technology, single use technology, and orthopaedic devices. These top five account for 47% (48,600) of sector employment.

Geographical analysis of employment shows there are sites spread across the UK and employment is less concentrated in the South East, East of England, and London. Compared to the Core Biopharma sector where 33% of employment is outside these regions, the majority (60%; 61,300) of Core Med Tech employment is outside of South Eastern England.

Analysis of the size of businesses shows that of the 2,850 businesses in Core Med Tech, 81% (2,320) are SMEs. They represent 31% (32,000) of Core Med Tech employment and 19% (£3.8bn) of Core Med Tech turnover. Core Med Tech SMEs account for 46% of the total number of life sciences SMEs.

2.6 Med Tech – Service & Supply chain

Overall, the sector contains 1,210 businesses that employ 29,000 and generates a turnover of £5.2bn in 2019.

The sector breakdown shows the largest segment of the sector is reagent, equipment and consumables suppliers, which has the highest number of businesses (300) and employs 26% (7,400) of the sector's total and 31% (£1.6bn) of its turnover. The next largest segments by employment are contract manufacturing and research followed by specialist consultants.

Geographical analysis shows, in contrast to Core Med Tech, the top 3 areas are the South East and North West of England, and the East Midlands. These three areas account for 48% (14,000) of the employment and 50% (£2.6bn) of the sector turnover.

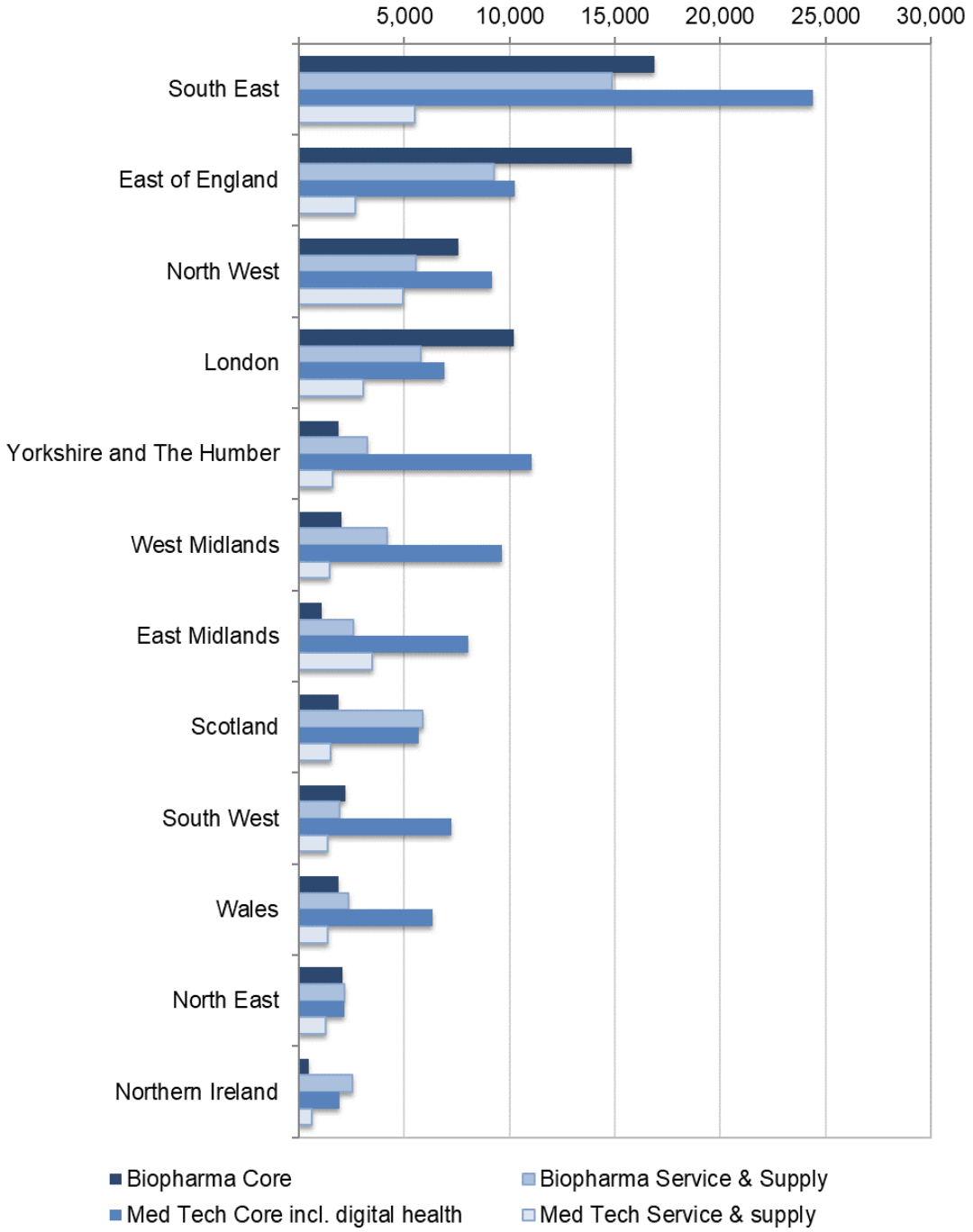
Analysis of the size of businesses shows that 82% (1,000) of businesses are SMEs, employing 9,600 people (33% of Med Tech Service & Supply) and accounting for £1.3bn (25%) of turnover.

3 Geographical analysis

- The South East of England contains the largest population of life sciences industry jobs with a total employment across all four sectors of 61,700 (24%). The East and North West of England together with the South East are the Top 3 regions by employment.
- The Core Biopharma sector is concentrated within the South East and East of England, particularly in an area stretching from Cambridge to Reading, and areas around Stevenage and in London. In the North West, Core Biopharma businesses are located along the corridor running from Liverpool to Manchester.
- Core Med Tech has concentrations of employment around the major cities in the Midlands and Yorkshire including Leeds, Sheffield, and Birmingham, as well as London and Reading.
- The Service & Supply sectors' employment is distributed in a similar pattern to the sector they serve but less concentrated around the major conurbations.

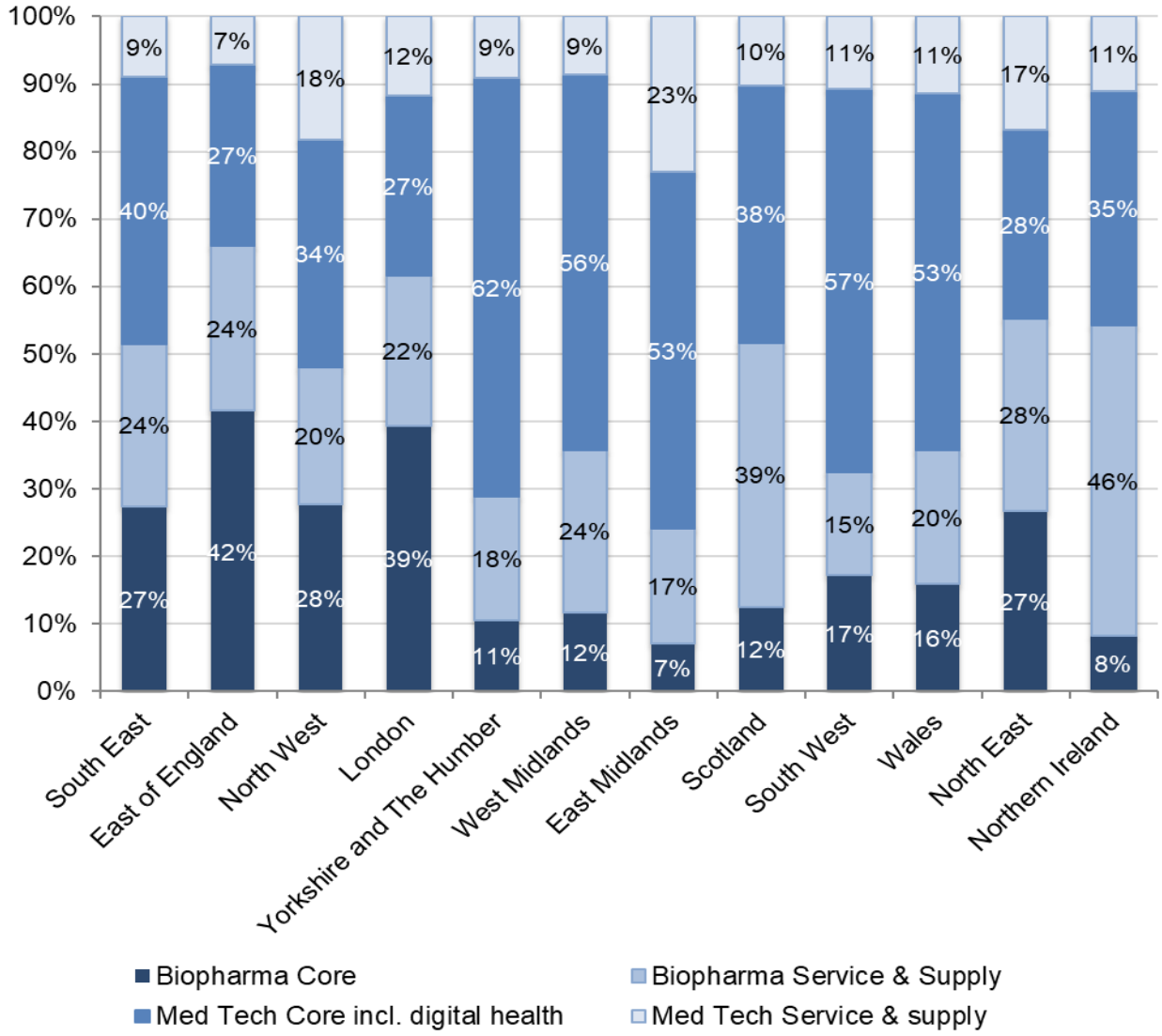
The distribution of employment by sector is shown in Figure 2. The South East of England contains the largest population of life sciences industry jobs with 61,700 (24% of the industry) employed across all four sectors. The Top 3 regions by employment include the South East followed by East of England, and the North West. Together these regions contain 50% (126,900) of all life sciences industry employees.

Figure 2: The distribution of the industry employment by sector across the regions of England and in Northern Ireland, Scotland, and Wales



The relative contribution of the four sectors to the overall life sciences employment in the regions is shown in Figure 3. In the South East, East of England, the North West, and London the Core Biopharma sector accounts for 33% of life sciences employment in those regions; Biopharma Service & Supply accounts for 38% of life sciences employment in Scotland, the North East of England, and Northern Ireland; Core Med Tech accounts for more than half of life sciences employment in East Midlands, West Midlands, Yorkshire and The Humber, Wales, and the South West of England; no region has Med Tech Service & Supply employment greater than 25%.

Figure 3: Regional employment in the life science sector displayed as a percentage of the total life sciences employment in the region



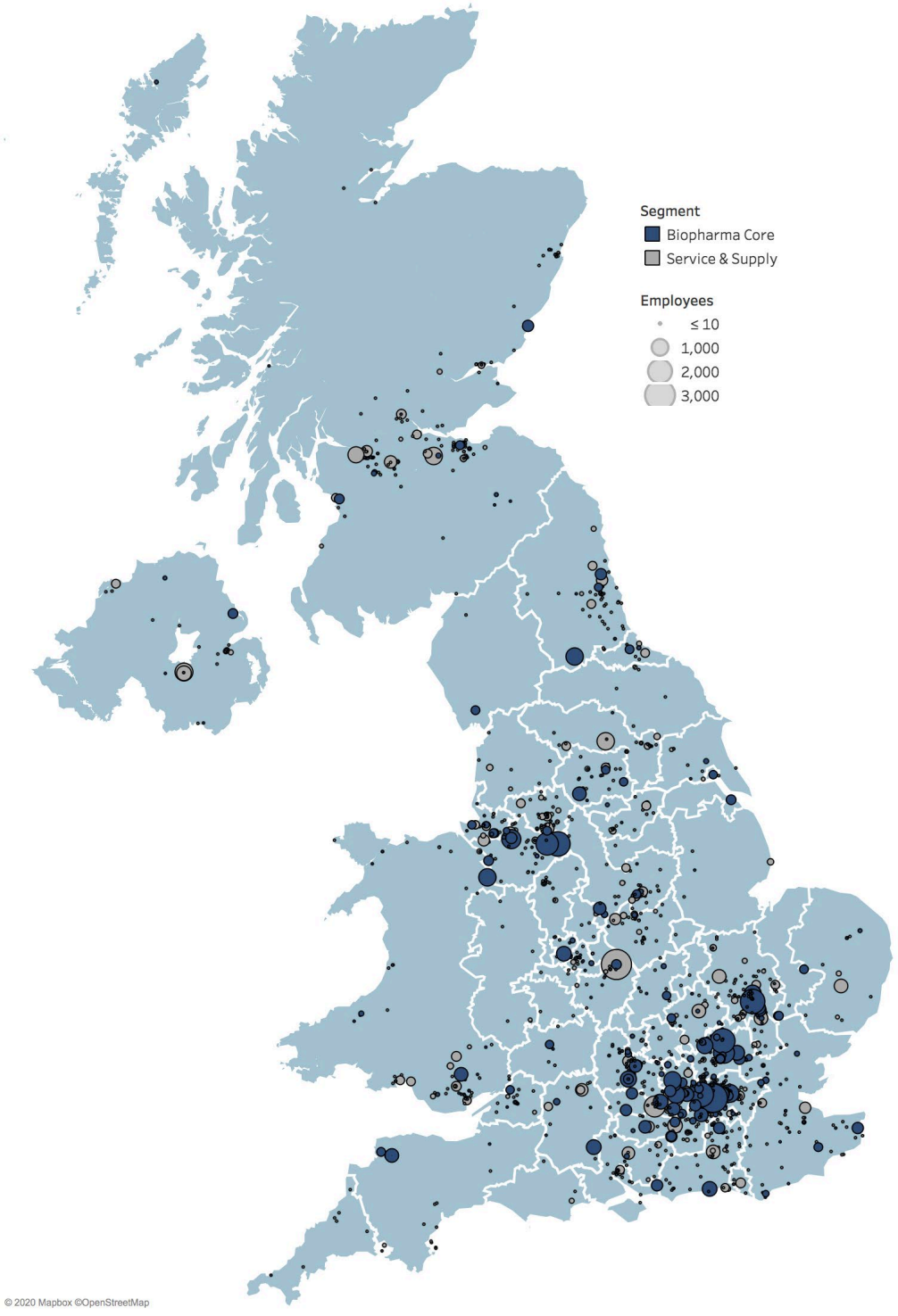
Maps of the distribution of life sciences employment across the UK (Fig 4 & Fig 5) give details on the location concentrations of employment.

3.1 Core Biopharma and Biopharma Service & Supply sectors regionally

The Core Biopharma sector is concentrated within the South East and East of England particularly in an area stretching from Cambridge to Reading including areas around Stevenage and in London. In the North West, Core Biopharma businesses are located along the corridor running from Liverpool to Manchester.

The Biopharma Service & Supply sector is more widely distributed than Core Biopharma, with the Top 4 regions employing 59% of the sector (compared to 79% for Core Biopharma). In particular, Scotland contains the third largest concentration of Biopharma Service & Supply sector employment representing 10% of the sector total.

Figure 4: Map showing the location and relative level of employment for the Core Biopharma and Service & Supply sectors

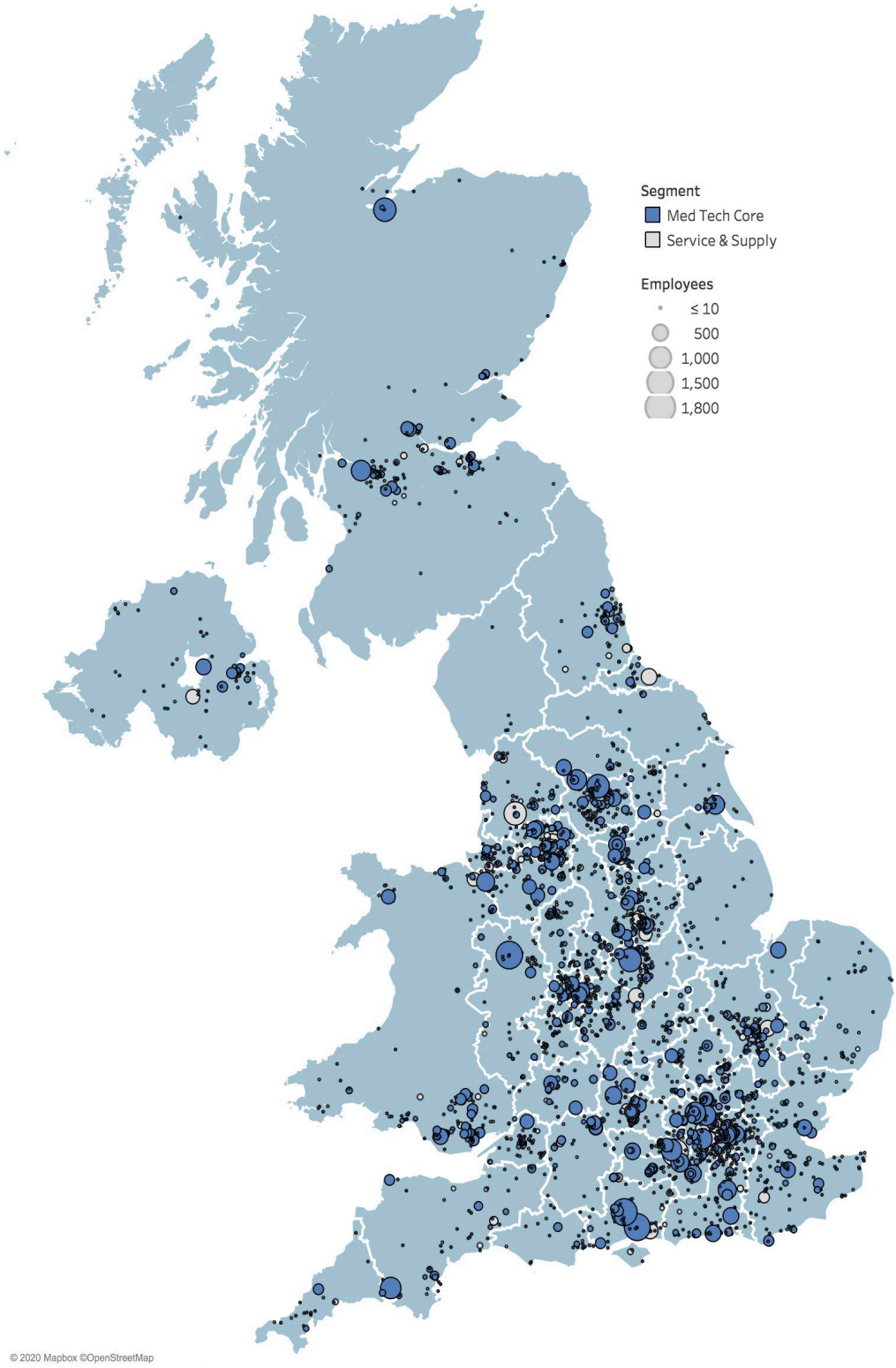


3.2 Core Med Tech and Med Tech Service & Supply sectors regionally

The Core Med Tech and Service & Supply sectors employment has concentrations of employment in areas around London and in the North West of England. In contrast to the

Biopharma sectors, Core Med Tech has concentrations of employment around the major cities in the Midlands and Yorkshire including Leeds, Sheffield and Birmingham.

Figure 5: Map showing the location and relative level of employment for the Core Med Tech and Service & Supply sectors



4 Digital health and Genomics

- The digital health segment employs 12,900 people and has a total turnover of £1.7bn.
- Between 2010 to 2019, the segment has increased employment by 3,300 and turnover by £490m.
- Of the businesses where the formation date is known, 63% (400) of digital health businesses were formed in the last 10 years.
- The Top 3 regions for employment in the segment are London, Yorkshire and Humber, and the South East.
- Overall genomics related activity in the UK is located in 60 sites with 2,700 employees and a total turnover estimated at £2.3bn.
- The largest activity in the Genomics segment is in sequencing services, consumables and instruments businesses that employ 1,800 and generated £2.2bn in turnover

4.1 Digital health

The digital health segment is composed of 640 businesses (670 sites), the highest number of businesses for a Core segment in the life sciences industry. Digital health employs 12,900 people and has a total turnover of £1.7bn.

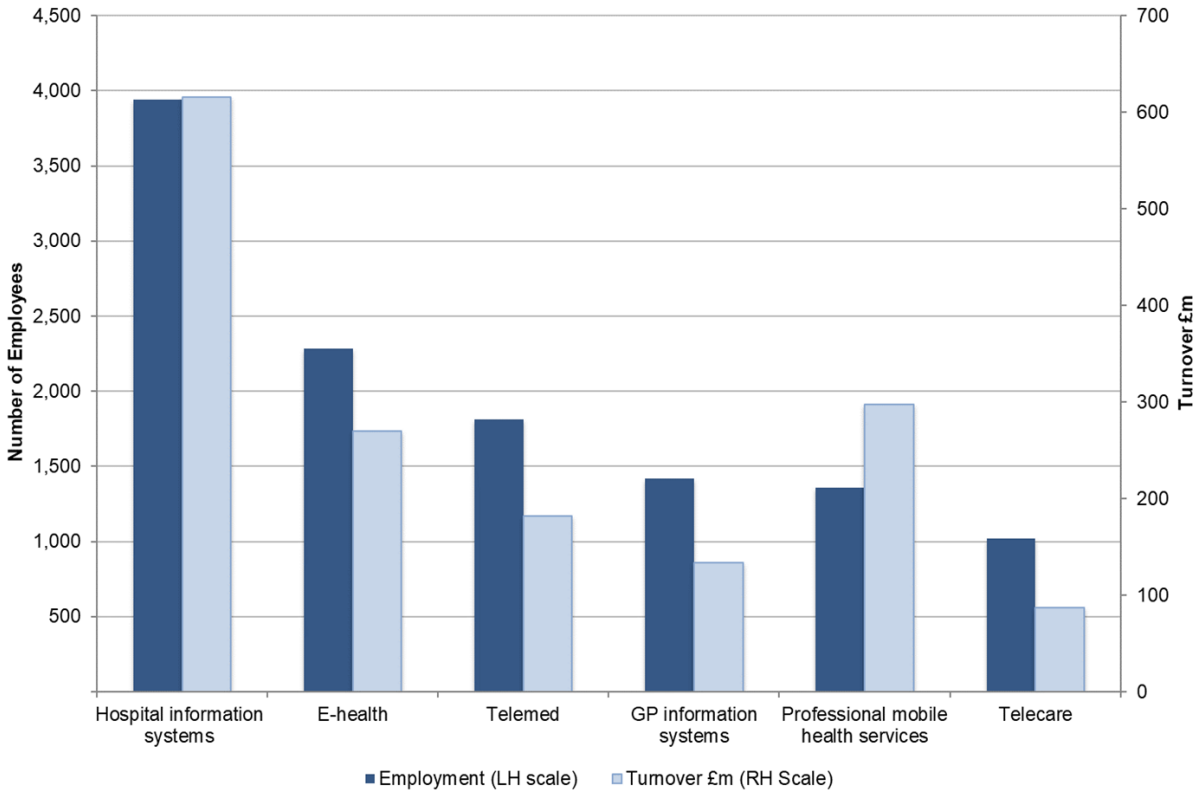
The estimated turnover and employment include only businesses where a significant proportion (over 20%) of their economic activity is in digital health. This approach does not include all the economic activity associated with, for example, large diversified businesses where digital health is not their main activity.

Geographically, 28% of the sites are located in London along with 26% of the employment in the segment. The Top 3 regions for employment in the segment are London, Yorkshire and Humber, and the South East. These regions together employ 57% of the segment.

Analysis of the sector breakdown shows that, within digital health, hospital information systems accounts for 35% (£616m) of turnover and 30% (3,900) of employment. The e-health analytics and medical monitoring & diagnostics are the next largest sub-segments by employment and together the Top 3 sub-segments employ 8,000 people, or 62% of the segment.

Analysis of the size of businesses shows that 80% (510) of digital health businesses are SMEs and employ 33% of digital health jobs (4,300), contributing £330m in turnover (19%) of the digital health segment turnover.

Figure 6: The distribution of employment and turnover for sub-segments of Digital Health (only segments with >900 employees shown)



4.2 Genomics

Genomics is an interdisciplinary field of science and technology focused on the study of genomes. In this analysis the focus is on the study of the human genome and the application of the resulting knowledge to human health. Since the instigation of the Human Genome Project in 2001, the field and its applications have grown. The global market for equipment, reagents, and services based on genomics was estimated at over £8bn in 2015 and is forecast to grow rapidly.[11]

Overall genomics related activity in the UK is located in 60 sites with 2,700 employees and a total turnover estimated at £2.3bn[12]. Between 2017 and 2019 the activity has increased employment by 1,100 and turnover by £0.6bn.

The largest activity in the segment is in sequencing services, consumables and instruments businesses that employ 1,800 and generated £2.2bn in turnover. Within this segment, sale of instruments is the largest activity by turnover, employing 500 (19% of the genomics total) and generating a turnover of £1.9bn (83% of the genomics total).

[11] Genomics in the UK, Deloitte study for the Office of Life Sciences, Sept 2015

[12] The economic activity is based primarily on businesses that have the majority of their activity in the sector either selling equipment, reagents or services. The analysis does not include in-house use or application of genomics for example for drug discovery & development

5 Industry and sector trends 2010-2019

In this section, the changes in employment and turnover between 2010 to 2019 are analysed using the same methodology as that from the supplemental report[13], published in 2018, using a subset of the database records. These cover 98% of all 2019 records; unincorporated businesses have been omitted from the time series as historic information is not available for these undertakings. All turnover figures given in this section are given in real terms and have been deflated to bring them in line with 2019 equivalent values.

- Over the period 2010 to 2019, the life sciences industry increased employment by 20,500 an increase of 9%, at a compound annual growth rate (CAGR) of 0.9%.
- Total industry turnover decreased in real terms[14] by £1.6bn between 2010 and 2019. This movement was driven by a decrease in the Core Biopharma sector (£9.3bn), which was offset by increases in the Core Med Tech sector and the Service & Supply sectors (£7.7bn).
- Over the period, Core Med Tech and the two Service & Supply sectors showed overall increases in employment totalling 25,900, while the Core Biopharma sector reduced employment by 5,400.
- This decrease in the Core Biopharma sector was concentrated in the small molecule sector and over the period 2012 - 2013, during which time a number of the Top 25 pharmaceutical companies underwent re-structuring.
- The Core Med Tech employment grew by 9,800 between 2010 to 2019, an 11% increase.
- Together, employment in the Service & Supply sectors grew from 2010 to 2019 by 16,100, with the largest increase in employment in the Biopharma Service & Supply sector (12,900).
- Over the 10-year period, the majority of regions in the United Kingdom have seen a net increase in employment in the life sciences industry. The West Midlands and Scotland were the exception to this, seeing a decrease in employment.

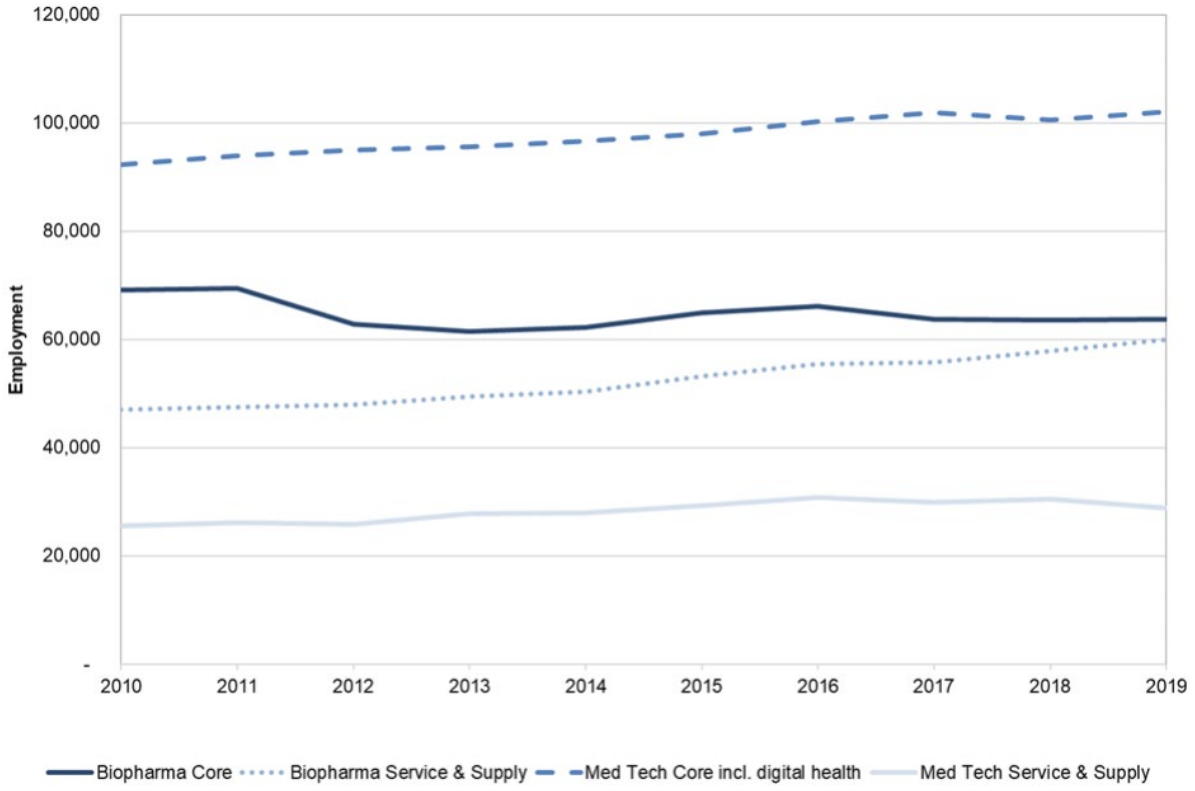
[13]https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/751210/Strength_and_Opportunity_2017_supplemental_report.pdf

[14] Deflated turnover calculated using Office for National Statistics defaltors to bring turnover values to 2019 equivalent values. GDP Deflators Spring Statement 2020 update issued 11th March 2020.

5.1 Life sciences industry trends

Over the period 2010 to 2019, the life sciences industry increased employment by 20,500, an increase of 9% compared to 2010, at a compound annual growth rate (CAGR)[15] of 0.9%. This is compared to employment growth in all industries[16] of 12% since 2010 at a CAGR of 1.3%. Over the period, Core Med Tech and the two Service & Supply sectors showed overall increases in employment totalling 25,900 while the Core Biopharma sector reduced employment by 5,400. Several of the Top 25 companies, who are the majority employers in the industry, completed site closures and reorganisations during this period. The Core Med Tech sector and the Biopharma Service sector have shown employment growth in the last year (3,700). The Core Biopharma sector has remained static (+200), whilst the Med Tech Service sector has fallen (-1,700).

Figure 7: Employment by life sciences industry 2010 to 2019



Total industry turnover decreased in real terms[17] by £1.6bn between 2010 and 2019, which was the result of the decrease in Core Biopharma (£9.3bn), which was partially offset by increases in Med Tech and the Service & Supply sectors (£7.7bn). From 2010 to 2011, total industry turnover grew but a decline followed until 2013 after which growth resumed. This

[16] UK employment (all industries) taken from HI00 Regional labour market: Headline Labour Force Survey indicators for all regions 21st April 2020 release.

[17] Deflated turnover calculated using Office for National Statistics defaltors to bring turnover values to 2019 equivalent values. GDP Deflators Spring Statement 2020 update issued 11th March 2020.

decrease was primarily driven by decreased revenue of £7.6bn in the Core Biopharma sector between 2011 and 2013 after which turnover remained broadly steady until a drop of £2.0bn in 2019. These decreases were offset by a steady increase of £6.2bn from 2013 in the Biopharma Service & Supply sector.

Table 1: Employment, turnover, and number of sites for the life sciences industry 2010 to 2019

	Year									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Employment	234,200	237,100	231,600	234,400	237,100	245,400	252,600	251,400	252,500	254,700
Turnover £bn (2019 prices)	82.4	82.9	79.8	74.7	75.5	75.4	76.4	78.8	80.6	80.7
Sites	6,180	6,350	6,490	6,670	6,660	6,790	6,740	6,640	6,980	6,850

Top 5 Segments

Comparing the Top 5 segments of 2019 to those of 2010:

- The Top 3 segments by employment have remained the same but fourth and fifth have changed with single use technology and assistive technology replacing orthopaedic devices and re-usable diagnostic or analytic equipment.
- The Top 5 by turnover changed rank, with vaccines being replaced by digital health in the list.

Figure 8: Top 5 segments in 2010 and 2019 in the Core sectors of Biopharma and Med Tech ranked by employment, turnover, and number of sites

	2010 Top 5 for core segments (excluding service & supply chain)		
	Employment	Turnover	Sites
1st	Small Molecules	Small Molecules	Small Molecules
2nd	Digital Health	Vaccines	Assistive Technology
3rd	In vitro diagnostic technology	In vitro diagnostic technology	Digital Health
4th	Orthopaedic Devices	Orthopaedic Devices	Re-usable diagnostic or analytic eqpmt
5th	Re-usable diagnostic or analytic eqpmt	Single use technology	Single use technology

	2019 Top 5 for core segments (excluding service & supply chain)		
	Employment	Turnover	Sites
1st	Small Molecules	Small Molecules	Digital Health
2nd	Digital Health	In vitro diagnostic technology	Small Molecules
3rd	In vitro diagnostic technology	Single use technology	Assistive Technology
4th	Single use technology	Digital Health	In vitro diagnostic technology
5th	Assistive Technology	Orthopaedic Devices	Single use technology

5.2 Core Biopharma and Med Tech sector trends

Core Biopharma

The Core Biopharma sector employment fell by 5,400 (-8%) between 2010 and 2019, at a CAGR of -0.9%. Most of this decrease happened between 2012 and 2013 when employment in the small molecules segment fell by 7,200. Since 2014, sector employment has grown moderately. The segments associated with biological or advanced therapy medicinal products (ATMP) therapeutics all showed employment increase totalling 2,200.

Over the 10 years, this sector's turnover fell by £9.3bn. Turnover decreased between 2011 and 2013, after which turnover remained broadly steady until a drop of £2.0bn in 2019

Table 2: Employment, turnover, and number of sites for the Core Biopharma sector 2010 to 2019

	Year									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Employment	69,200	69,500	62,900	61,500	62,200	64,900	66,200	63,800	63,600	63,800
Turnover £bn (2019 prices)	46.0	46.0	43.1	38.4	39.1	37.9	38.0	37.8	38.7	36.7
Sites	750	770	790	820	820	840	860	870	900	890

Core Med Tech

The Core Med Tech sector employment grew by 9,800 over the period 2010 to 2019, an increase of 11% on 2010, a CAGR of 1.1%. Twelve out of twenty segments in Core Med Tech had an increase in employment totalling 13,700, and seven segments accounted for 92% of this increase, led by digital health. Over the whole period, turnover grew in real terms by £0.5bn.

In the Digital Health segment, employment increased by 3,300 and turnover by £490m, which represents 34% and 40% growth respectively. The number of sites has doubled from 330 in 2010 to 670 in 2019. Of the businesses where the formation date is known, 63% (400) of digital health businesses were formed in 2010 or later.

Table 3: Employment, turnover, and number of sites for the Core Med Tech sector 2010 to 2019

	Year									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Employment	92,300	94,000	95,000	95,600	96,600	98,000	100,200	101,900	100,500	102,100
Turnover £bn (2019 prices)	20.0	20.2	20.1	19.9	19.6	19.3	19.3	19.7	19.7	20.5
Sites	3,030	3,070	3,100	3,180	3,120	3,170	3,130	3,070	3,200	3,120

5.3 Service & Supply sector trends

Both Service & Supply sectors increased employment and turnover between 2010 and 2019, by 16,100 and £7.2bn respectively, with the largest increase in employment in the Biopharma Service & Supply sector (12,900). The largest increases in these sectors were in the Biopharma contract manufacturing and research segment (5,100), and Med Tech reagent, equipment and consumable suppliers' segment (1,400).

Biopharma Service & Supply

Between 2010 and 2019, the Biopharma Service & Supply sector employment and turnover increased by 27% (12,900) and by 48% (£5.9bn) respectively. The sector exhibited steady growth in employment in all years and the CAGR over the period was 2.7%.

Table 4: Employment, turnover, and number of sites for the Biopharma Service & Supply sector 2010 to 2019

	Year									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Employment	47,100	47,500	47,900	49,500	50,300	53,200	55,400	55,800	57,900	60,000
Turnover £bn (2019 prices)	12.4	12.6	12.3	12.1	12.2	13.3	14.0	15.9	16.8	18.3
Sites	1,320	1,400	1,460	1,510	1,540	1,570	1,570	1,560	1,630	1,620

Med Tech Service & Supply

Between 2010 and 2019, the Med Tech Service & Supply sector employment increased by 3,200 and turnover by £1.3bn over the period. The sector had a downturn between 2018 and 2019 of 1700 employees and £0.3bn. The sector employment had a CAGR of 1.3% between 2010 and 2019.

Table 3: Employment, turnover, and number of sites for the Med Tech Service & Supply sector 2010 to 2019

	Year									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Employment	25,600	26,100	25,800	27,800	28,000	29,300	30,800	29,900	30,500	28,800
Turnover £bn (2019 prices)	3.9	4.1	4.2	4.3	4.6	4.9	5.2	5.3	5.5	5.2
Sites	1,090	1,120	1,140	1,160	1,190	1,200	1,180	1,150	1,250	1,230

5.4 Geographical trends

When comparing geographical employment data over the 10-year period, the majority of regions in England, Wales, and Northern Ireland have seen a net[18] increase in employment in the life sciences industry. One region in England, the West Midlands, saw employment fall by 1,700, while employment in Scotland fell by 1,200.

The geographical net changes in employment vary by life sciences sector. These major changes are:

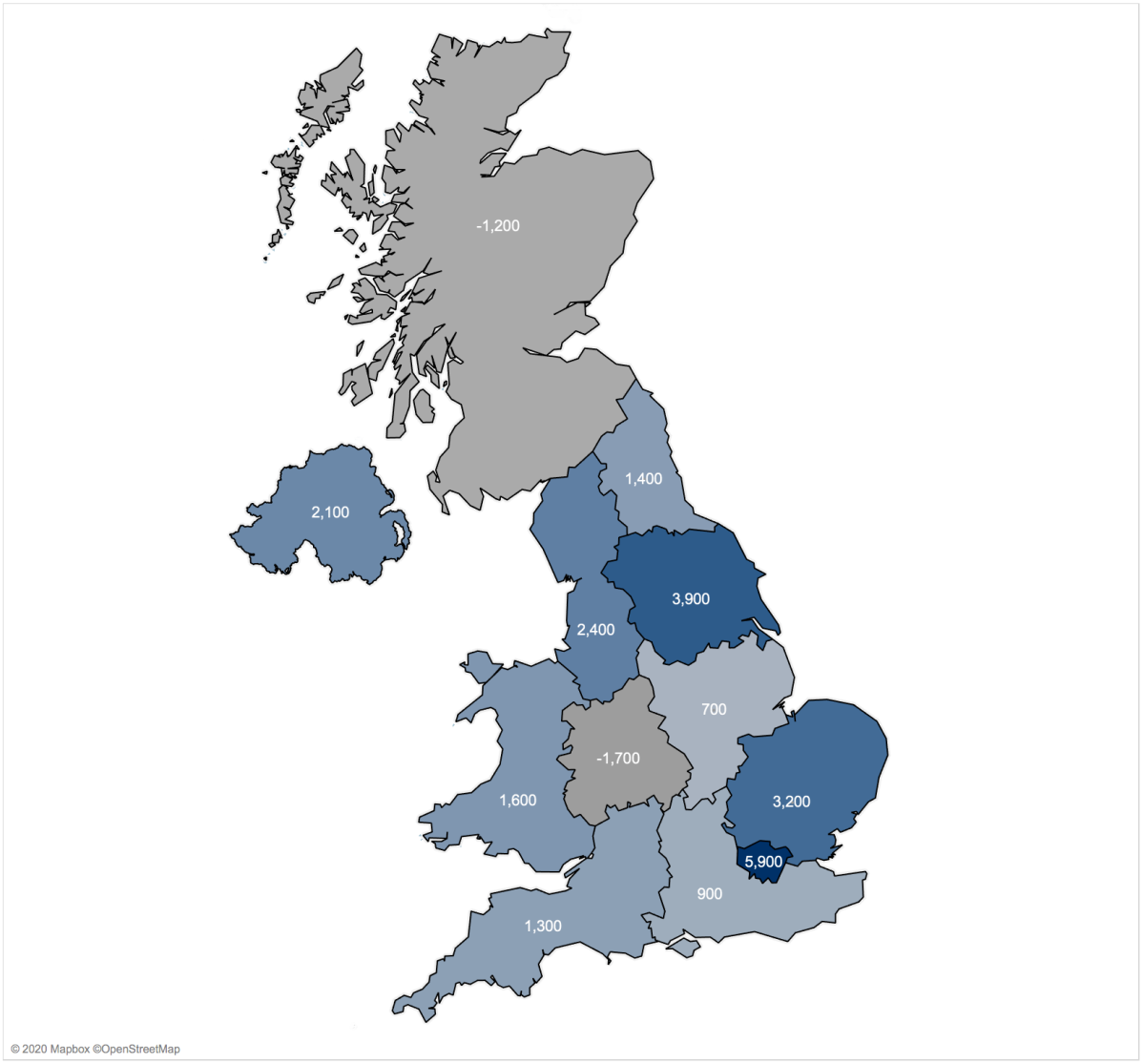
1. Core Biopharma – Large decrease in employment in the South East of England and an increase in the East of England. The main cause of the fall in employment in the South East was the restructuring of three Top 25 Pharma businesses that resulted in closures of a number of sites in the region.

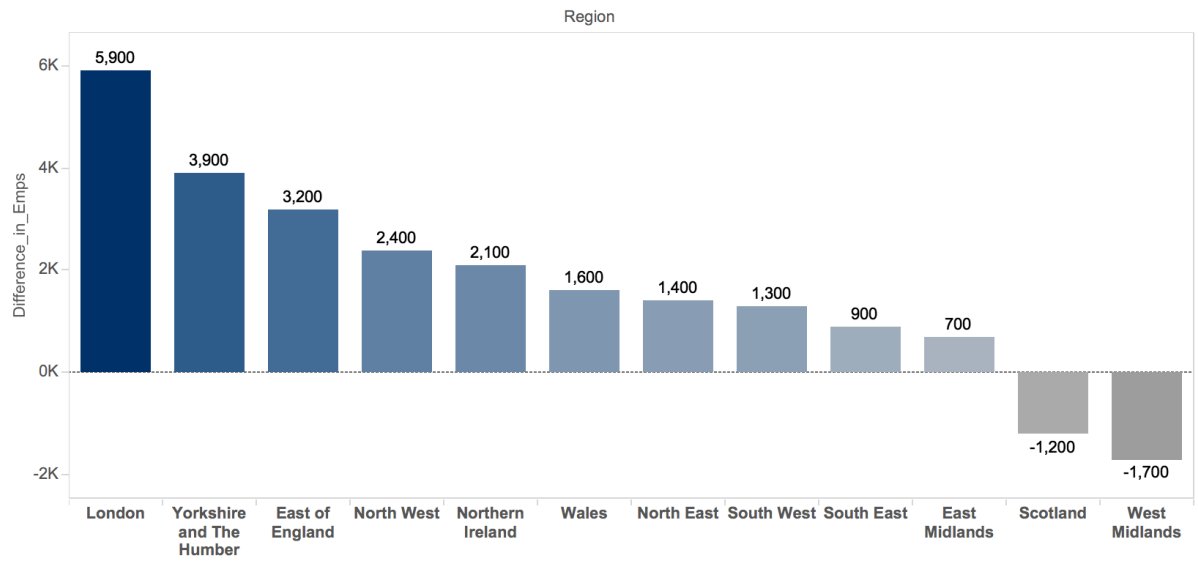
2. Core Med Tech – Increases in all regions of England except for decreases in the West Midlands (1,700) and East of England (900). Increases in Northern Ireland (700) and Wales (600) but a large decrease in Scotland (1,800). The fall in employment in the West Midlands is due to a mixture of causes. These include movement of businesses to other UK regions and acquisition of businesses by overseas owners leading to restructuring. The main cause of the fall in Scotland was the closure of a manufacturing plant operated by one of the Top 30 Medical Device businesses.

3. Biopharma and Med Tech Service & Supply – Increases in the majority of regions of England and in Northern Ireland, Scotland, and Wales. Large increase in the South East of England in the Biopharma and Med Tech Service & Supply sectors. Biopharma Service & Supply sector increases are also notable in London, North West, Yorkshire and The Humber and Northern Ireland. The West Midlands is the only region to see decreases in both Service & Supply sectors.

[18] The net changes in employment in a region will be the result of a combination of new company formation, growth at existing companies, movement between regions, inward investment into the UK and companies reducing employment or trading.

Figure 9: Net changes in employment between 2010 and 2019 for the life sciences industry in regions of England, Northern Ireland, Scotland, and Wales





Annex 1– Full data partners acknowledgement statement

The Office for Life Sciences gratefully acknowledge the contribution of the following regional and national organisations in the compilation of the life sciences database over the past eleven years.

The content of the database has been derived from a variety of proprietary data sources which have been provided under license. The Office for Life Sciences would like to acknowledge the assistance given by the owners of these data sources.

Business Information was accessed under license by Dun & Bradstreet (D&B) Limited and the FAME database from Bureau van Dijk Electronic Publishing. More details on how this data is used can be found in Annex 2 below.

The database construction, data integration, data analysis and commentary preparation were completed by a consortium led by Cels Business Services (CBSL) Ltd. The consortium included Kepier & Company Ltd and Lindum Research.

Data partners

- Association of British Healthcare Industries (ABHI)
- Association of the British Pharmaceutical Industry (ABPI)
- AXREM
- BioIndustry Association (BIA)
- BioNow
- Biopartner
- Biosciences Knowledge Transfer Network (KTN)
- British Healthcare Trade Association (BHTA)
- British In Vitro Diagnostics Association (BIVDA)
- HealthTech and Medicines Knowledge Transfer Network (KTN)
- Innovate UK
- Invest Northern Ireland
- MedCity
- Medicines Discovery Catapult
- Medilink East Midlands
- Medilink North of England
- Medilink South West
- Medilink West Midlands
- MediWales
- MHRA
- OBN
- One Nucleus
- Scottish Enterprise
- South East Health Technologies Alliance (SEHTA)
- TechUK
- Welsh Government
- West of England LEP

Annex 2 – Methodology

Summary

The annual update of the database is carried out in four main phases: compiling information on new businesses and existing businesses; classification or segmentation of new businesses; matching of business details with economic data from external databases; and validation of the data set.

Information on new businesses is sourced from the data partners and also by searches of publicly available and subscription databases. The data partners provide lists of businesses from their internal databases, which contain both potentially new businesses (those businesses that have been formed in the period after the last annual update) and existing businesses (those businesses that are already in the database). For existing businesses, this includes information the data partners have obtained on address changes, any information on employees at a location, or suggested segmentation changes.

The information from data partners and other information sources is cleansed to remove duplicates and records already in the database and is then segmented. Segmentation assigns each new business and site to a sector and segment. In some cases, allocation can be to more than one sector or segment, for example some large multi-national businesses produce both pharmaceutical and medical devices. If, based on the information available, a business cannot be assigned to a sector and segment, it is deemed to be not-in-scope (NIS). Such NIS business information is retained but is not included in the data set used to analysis the industry.

In order for a business to be classified as in-scope and their data to be included, they are assessed against the following criteria: have a legal entity in the UK; is a private limited company (this excludes universities, publicly owned institutions, NHS activities, and charities); and have 20% of their total UK turnover derived from one or more of the segments shown in Annex 3[19].

Businesses proposed for inclusion or identified through a search of new incorporations, are checked for "proof of life" i.e. signs of economic activity such as employees, turnover, award of funding, or an active website with contact details. Businesses which fail this test but appear to be in scope are reviewed again in the next project cycle.

Once the cleansed data set is prepared, it is used to source data on turnover and employment from either D&B or FAME, and from examination of published company reports or data. The turnover figures will include turnover on the sale of products wholly or partially manufactured outside the UK.

The data returns from D&B and FAME are carefully checked to ensure a correct match with the business location. Further detailed validation of the data is then carried out examining significant changes in the employment and turnover data. These changes are investigated to detect any anomalies through verification against other sources. For example, large changes

[19] The focus of the economic activity included in the database is from companies that either develop or produce pharmaceuticals or medical devices sold to healthcare providers (e.g. the NHS) and companies that are part of the supply chain to these Core companies. There is also included activity from some of the larger wholesale companies that historically were involved in manufacture.

in employment at a business site are scrutinised to see if information is available from press releases or other information in the public domain to verify the change. In 2018, Gender Pay Gap reporting was used both to detect potential anomalies by using the compulsory employment band data, and to verify or update using more detailed information provided by businesses within their own reports. The data for individual sites under one business is examined to ensure that there is no double-counting of employment or turnover data.

Once the validation analysis is completed, the data set is "locked" for the annual update cycle, ready for analysis for this publication.

Postcodes attached to records in the database allow geographical analysis of employment and turnover at site level. Where available, we have validated employment data for the large businesses by using information such as annual reports or websites to identify the number and types of employment.

The primary allocation of turnover to location is based on the legal entity information sourced from third party databases, validated for large businesses from annual accounts. This method of turnover reporting is used throughout the document.

To bring the definition used for SME status in previous datasets in line with that used in the database from 2017 onwards, we sourced information from D&B.

We used GDP deflators[20] to take account of inflation across the years. We also adjusted for population demographics to represent the changing size of the potential workforce[21].

Trends analysis

In order to create trends over the period 2010 to 2019 historical information for all businesses which have matched company registration number (CRN) was sourced. This backfilling approach creates a like-for-like snapshot for each year from 2010 from which we can observe trends. Because the dataset used for the trend analysis excludes companies and records where no CRN match was possible the 2019 employment and turnover figures in the trend analysis do not match those in the single year 2019 analysis[22]

To gather additional economic information (employment and turnover), third-party sources including Dun & Bradstreet (D&B), FAME, and published company-filed accounts or reports are used. These are the same sources as those used to construct the main annual dataset. Where economic data could not be sourced from company-filed accounts, an algorithm was used to populate the dataset based on growth profile averages for individual segments.

To source additional segmentation information, company reports and information available via Internet searches were used. This was necessary to align definitions, e.g. the merging of the 'Pharmaceutical' and 'Medical Biotechnology' sectors into 'Biopharmaceuticals' in the 2014 report.

[20] GDP Deflators Spring Statement 2020 update issued 11th March 2020.
[21] Regional labour market statistics: HI00 Headline indicators for UK region and countries issued 21st April 2020.
[22] 151 records did not have a matched CRN and are not included in the trend data set. The exclusion of these records reduces the 2019 employment and turnover in the trend dataset by 1,032 and £69m respectively.

Segmentation

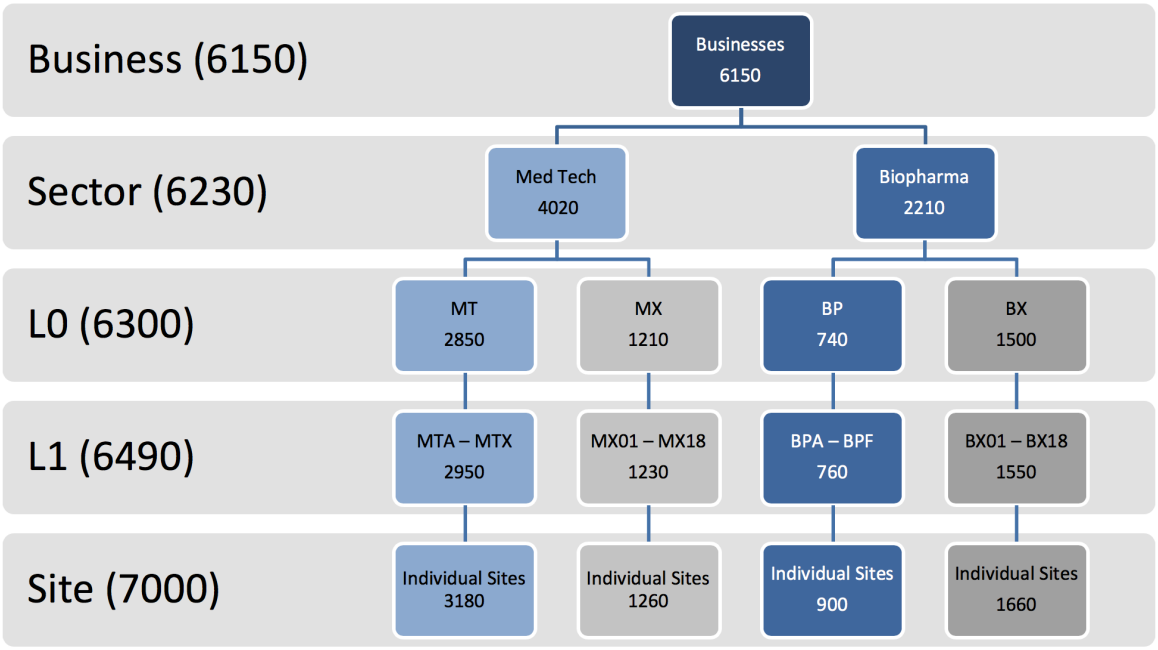
The life sciences database contains information on businesses in the UK structured at the level of trading address corresponding to the 7,000 records in the database for 2019. Using this as the lowest level of information the data is aggregated to site and company level to give the estimate of total number of life sciences businesses in the UK (6,300 at sub-sector, L0 level). Each trading address or site is examined to allocate the activity carried out to one of the segments in a sector. As a small proportion of businesses in the database have more than one trading address or site and can operate in more than one sector (for example can have activity in medical technology and pharmaceuticals), the sum of number of businesses at the sector, segment, and geographical level will be greater than the total number of businesses in the UK.

Each business and their individual sites are segmented depending on the main type of final medicinal product or device produced. Businesses that produce products that are directly used in healthcare are designated “Core” businesses to distinguish them from businesses that are active only in the Service & Supply chain.

It should be noted that in the Biopharma sector suppliers of over the counter (OTC) medicines are included along with generic suppliers and manufacturers.

Within the database, codes are used to allocate businesses and sites to one or more segments. Where a company has products that fall in more than one category. these are all coded, however only the code that represents the majority of the business activity is used in the analysis. Figure 10 breaks down the count of records in the database from the total number of businesses in life sciences down to the allocation of sites to business activity.

Figure 10: The count of records in the database at each level of classification from site level through segment, sector and industry for 2019.



Segmentation was reviewed for all businesses and sites in the 2014 update. During the 2015 update a number of the businesses that have large contributions to employment and turnover

were reviewed for segmentation and their turnover in scope (TOS). The Pharmaceutical and Medical Biotechnology sectors were also combined into a new sector: Biopharma.

Additional segmentation codes are used to further classify company activities by both product type and business activity. For example, in vitro diagnostics is further segmented into in vitro diagnostic products that involve clinical chemistry, immunochemistry etc. The business activity codes are used to code businesses and sites dependent on whether they undertake R&D, manufacturing, Service & Supply (of their products), and sales/distribution (of their products).

The codes for each sector containing Core businesses are shown in Annex 3. The Service & Supply chain sectors that serve the Biopharma and Med Tech sectors are coded with the prefix BP and MT respectively followed by the appropriate number to define the type of service or supply.

Alignment with Standard Industry Classification (SIC) codes

Standard Industry Classification (SIC) codes are used to classify businesses by industry in administrative statistics. This was last updated in 2008[23]. This classification system has categories for businesses whose primary activity is the manufacture of pharmaceuticals, manufacture of types of medical equipment, and those whose primary activity is biotechnology R&D.

The SIC system, however, does not allow identification of the full range of life sciences businesses. A bespoke industry segmentation based on this wider range, specifically to be used in the database, was defined with the assistance of the data partners and is summarised in Annex 3. This is the classification system used in this report.

We have analysed the SIC codes of the businesses within the database and only 25% of businesses in the life sciences database fall into the standard SIC codes used to identify the life sciences industry. The remaining businesses fall into another 250 SIC codes, demonstrating the on-going need for this report and for the life sciences database to describe and analyse the full breadth of this industry.

For comparison, Table 6 shows the total employment and turnover for businesses in the database with SIC codes typically used to define the life sciences industry.

[23] https://www.gov.uk/government/publications/standard-industrial-classification-of-economic-activities-sic

Table 6: Turnover, employment, and number of sites based on the SIC codes that cover the main sectors in the life sciences industry

SIC code description	SIC Code	Number of Sites	Employment	Turnover £bn
Manufacture of Basic Pharmaceuticals	21100	280	42,900	22.7
Manufacture of pharmaceutical preparations	21200	120	10,200	3.5
Manufacture of Irradiation, Electromedical and Electrotherapeutic Equipment	26600	40	1,500	0.4
Manufacture of Medical and Dental Equipment and Supplies	32500	530	28,000	5.7
Research and Experimental Development on Biotechnology	72110	820	14,000	5.0
Total life sciences based on SIC		**1,790**	**96,600**	**37.3**
Total life sciences in database		**7,000**	**256,100**	**80.7**

The additional benefit of the segmentation approach used in the life sciences database is the ability to make a more granular assessment of the sector, including growth rates and trends. For example, this is the only source of definitive information that shows employment and growth rates in digital health or allows us to understand the growth of advanced therapy medicinal products.

Timeline of events

The trends described in this report should be considered in context. A short timeline of political and life sciences-specific events is detailed below. This does not attempt to explain causality or justify the trends detailed above and should be viewed as contextual information only.

Table 7: Timeline of political and life sciences specific events

Date	Event
May 2010	UK General Election
Autumn 2010	Formation of Local Enterprise Partnerships (LEPs) in England
December 2011	Strategy for UK Life Sciences published
Duration of 2012	City Deals wave 1 (8 cities)
Duration of 2013	City Deals wave 2 (18 cities)
March 2014	Formation of the Office for Life Sciences
Late 2014 to early 2015	Devolution Deals (3 city regions)
May 2015	UK General Election
Duration of 2015	Growth Deals (39 LEPs)
June 2016	Referendum on UK leaving the European Union
June 2017	UK General Election
August 2017	Life Sciences Industrial Strategy published
December 2017	Life Sciences Sector Deal launched
December 2018	Life Science Sector Deal 2 launched

Annex 3 – Company ownership

The data sources contain information on the ultimate global owner of the businesses in the database. This information is available for 69% of the records in the database. However, the businesses where the owner origin is not known have a low economic impact as can be seen from Figures 11 and 12.

Figure 11: Distribution of sector employment between UK and Overseas life sciences businesses 2019

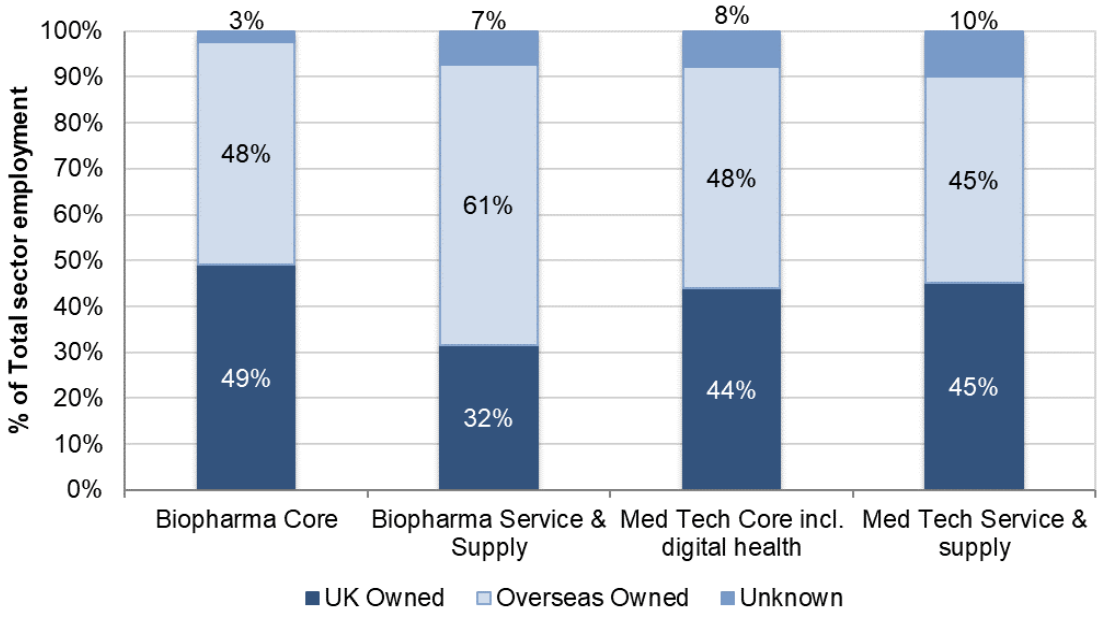
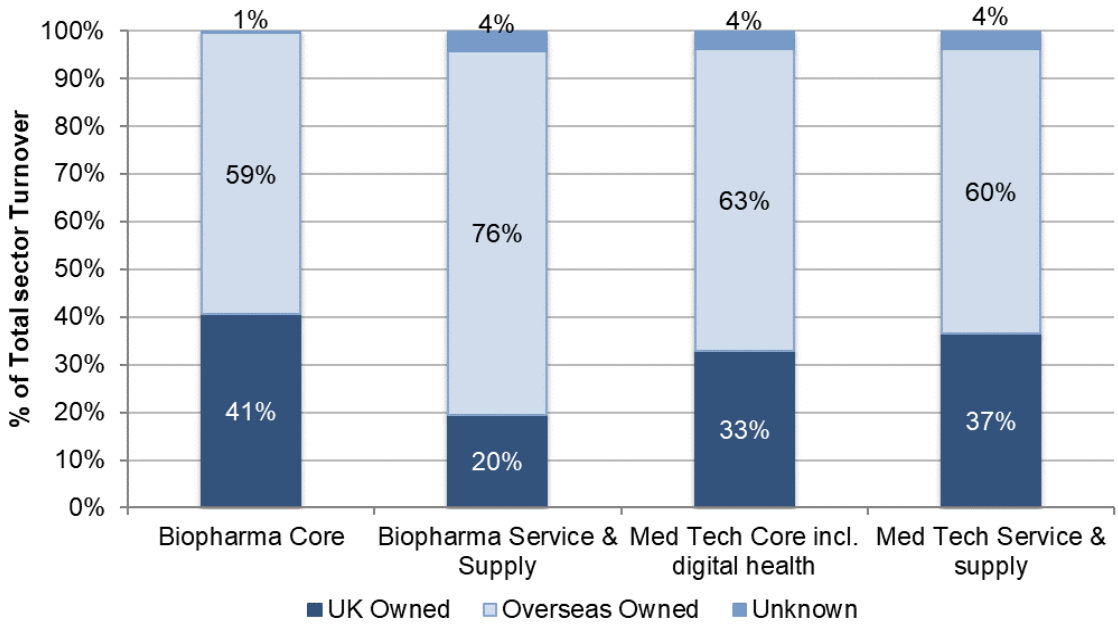


Figure 12: Distribution of sector turnover between UK and Overseas life sciences businesses 2019



Annex 4 – Segmentation codes

Biopharma Core (BP)	
Code	**Description**
BPA	Antibodies
BPB	Therapeutic Proteins
BPC	Advanced Therapy Medicinal Products (ATMPs)
BPD	Vaccines
BPE	Small Molecules
BPF	Blood & Tissue Products

Service & Supply Chain (MX/BX)	
Code	**Description**
X01	Clinical Research Organisation
X02	Contract Manufacturing Organisation
X03	Contract Formulation Manufacturing
X04	Assay developer
X05	Analytical Services
X06	Formulation/Drug delivery specialist
X07	Reagent, Equipment & consumables supplier
X08	Regulatory Expertise
X09	Patent and Legal specialist
X10	Logistics & Packaging
X11	Information systems specialists
X12	Tissue and Biomass
X13	Market Analysis/Specialist consultants
X14	Contract design
X15	Training
X16	Recruitment
X17	Investment Companies
X18	~~Healthcare service provider~~[24]

Business Activity	
Code	**Description**
BAA	Research & Development, including Design
BAB	Manufacture
BAC	Sales / Distribution
BAD	Service & Supply Chain

Genomics	
Code	**Main Value Chain**
GenA	Sampling
GenB	Sequencing
GenC	Analysis
GenD	Interpretation
GenE	Application
GenX	N.E.C

Medical Tech Core (MT)	
Code	**Description**
MTA	Wound Care & Management
MTB	In vitro diagnostic technology
MTC	Radiotherapy equipment
MTD	Medical Imaging/Ultrasound Equipment
MTE	Anaesthetic and respiratory technology
MTF	Orthopaedic Devices
MTG	Cardiovascular & vascular devices
MTH	Neurology
MTI	Ophthalmic Devices/Equipment
MTJ	Dental and maxillofacial technology
MTK	Drug Delivery
MTL	Infection Control
MTM	Surgical Instruments (reusable) n.e.c.
MTN	Single use technology n.e.c.
MTO	Re-usable diagnostic or analytic equipment n.e.c.
MTP	Implantable devices n.e.c.
MTQ	Assistive Technology
MTR	Mobility Access
MTS	Hospital hardware including ambulatory
MTT	Digital health

Digital Health	
Code	**Description**
MTT01	Hospital information systems
MTT02	GP information systems
MTT03	Social Alarms/Communications devices
MTT04	Personal medical records
MTT05	Telemed (medical monitoring) and telediag
MTT06	E-health – data analytics
MTT07	Digital Medical Electronics
MTT08	Professional Mobile health devices
MTT09	Professional Mobile health services/apps
MTT10	Consumer Mobile health devices
MTT11	Consumer Mobile health services/apps
MTT12	Training simulators and robotics

[24] Healthcare service providers have been designated as "out of scope" for this study. No new records have been added to the dataset in 2019. Existing records will be removed in 2020 and adjustments made accordingly.

Annex 5 - Data quality principles

As an Official Statistics publication, we aim to collect data and present this report in line with principles of the Code of Practice for Statistics[25] to engender trust in our data and encourage the use of this report as a reliable source of life sciences data.

This data quality statement covers the fourteen principles under the three pillars of the Code: trustworthiness, quality and value.

Trustworthiness:

T1: Honesty and integrity – Data is collected, processed and quality assured by an independent contractor. The initial technical specification is set by professional analysts within the Office for Life Sciences (OLS) who also engage regularly with the contractor, review methodological aspects, and undertake further quality assurance checks before publication.

T2: Independent decision making and leadership – OLS analysts abide by the Code of Practice, keeping pre-publication access to the data strictly to those involved in the report's creation and ensuring the statistical integrity of content. The Department's Head of Profession for Statistics is engaged when necessary.

T3: Orderly release – Pre-publication access to the report is restricted to those involved in the report's creation and publication. The report meets Government Statistical Service (GSS) standards of statistical impartiality, separating statistical commentary from any political, press or ministerial statements. Subsequent statements by the government using data from this report quote this source and non-governmental users are encouraged to do the same. Unscheduled corrections are released as soon as is practicable, alongside an explanatory note on both the cause and impact of the error, in line with the Code of Practice.

T4: Transparent processes and management – Substantial financial and administrative resources are employed to enable this data collection and effective quality assurance, including a proportion for further development of the report each year in light of new user requirements or new methodology / collection possibilities. We are transparent about our methodology and approach to quality, as evidenced in Annex 2.

T5: Professional capability – Data is collected, processed and quality assured by a consortia contractor. Each individual has appropriate analytic capabilities, data protection awareness and industry-specific expertise, and has been involved in the production of the report for several years. The report 'owners' within OLS are professional badged government analysts.

T6: Data governance – All professionals involved in the creation, publication and storage of this dataset are well-versed in data protection and operate in compliance with data protection legislation. We publish the maximum amount of data available without contravening third-party licence agreements, utilising GSS best practice for statistical disclosure control (e.g. banding commercially sensitive variables).

[25] https://www.statisticsauthority.gov.uk/code-of-practice/

Quality:

Q1: Suitable data sources – Full methodology including a description of third-party administrative data sources and their suitability can be found in Annex 2. The annex also contains a comparison between the health life sciences database and ONS SIC codes, the main alternative source. Different segmentation levels and how these are aggregated into final figures are explained in Annex 2, with the glossary defining key terms to ensure users are clear at what level figures are presented (e.g. businesses vs. sites).

Q2: Sound methods – Full methodology can be found in Annex 2, alongside assumptions made. Terminology is consistent through the report and accompanying files, with clear descriptions in the glossary. Year-on-year trends are for real growth only based on like-for-like data against the previous year. The method used for the real growth calculations is explained in the Annex 2.To ensure long-term trends are calculated using the most robust methodology and greatest level of data available, we will be undertaking extra trend analysis which will be published in a supplemental report later in the year.

Q3: Assured quality – Rigorous quality assurance has been undertaken by the contractor, OLS statisticians and an external business analyst within the wider Department. Quality assurance is a significant part of the technical specification and contract tendering process and is reviewed each year. When an unscheduled revision was necessary following the post-publication identification of an error in a previous report, we immediately alerted users, engaged with the Department's Head of Profession for Statistics, and published an explanation of the cause and impact of the error alongside the revised report, all in accordance with the Code of Practice.

Value:

V1: Relevance to users – We review content each year based on user needs, allowing a proportion of resource for that year's topic of interest. In previous years this has led to the inclusion of digital health and genomics as chapters in their own right, with a new cross-cutting classification designed to identify businesses operating it genomics. This year the topic of interest is a portrayal of long-term trends using an alternative methodology which will be published in a supplemental report later in the year. In response to user feedback, this year we have further extended the fields in the publicly available underlying businesses dataset to include all fields for which we are not restricted by commercial licences. In particular, we now include a unique reference number for each site.

V2: Accessibility – Data is free and equally available to all, published on gov.uk with no restrictions to access. Underlying data is published up to the extent our commercial licenses allow, with banded variables where we cannot provide exact figures. Commentary is objective and a range of graphical visualisations are used to aid comprehension.

V3: Clarity and insight – Commentary on the current size and shape of the life sciences sector is objective, focussing on impartial statistical messages. Charts and maps are used to illustrate these. Key statistical messages are highlighted up front. A comparison between the health life sciences database and ONS SIC codes, the main alternative source, is presented in Annex 2. The database itself is created through collaboration with a range of industry experts, including region-specific and sector-specific representation through trade bodies and other network organisations.

V4: Innovation and improvement – We review content, presentation and methodology each year based on user needs. Past development has primarily been around scope and how to identify new and emerging segments of the life sciences sector, e.g. digital health and genomics. Each new approach to scope is explored and tested with our data partners, and the statistical impact is fully considered before implementation. Other developments have included extending the scope of publicly available data fields.

V5: Efficiency and proportionality – Where possible, the database draws on existing information using third party sources, such as the D&B and FAME datasets and company accounts. All data partners are voluntary contributors. The need for this health life sciences database and report arises from the difficulty in identifying the life sciences sector from already-existing ONS sources since they use SIC codes, which do not encapsulate the full extent of the life sciences. In particular, as SIC codes were last refreshed in 2008, they do not allow easy identification of new and emerging segments within the medical technology sector, such as digital health. The database and report provide a valuable and robust evidence base on the size and shape of the UK life science sector.