

Our trailblazing scientists are the backbone of the industry and are working to improve the world¹



Our scientists are working to improve the world

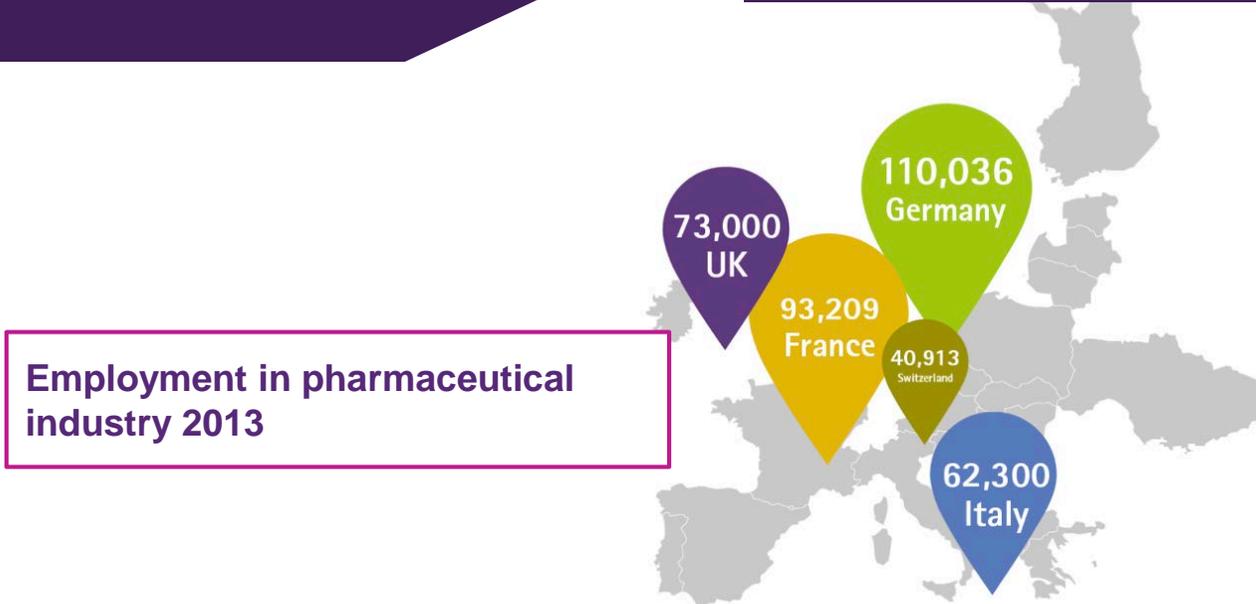
The trailblazers in the life sciences industry are the scientists that discover the molecules and develop the medicines to tackle the toughest diseases we face in society.¹

Who are the new pioneers stepping into the shoes of Sir Alexander Fleming, Louis Pasteur and Henry Wellcome? How do they add value to our economy as well as keeping patients and their families healthy?



1. Accelerated Access Review Report (page 15, C. The Challenge): <http://www.abpi.org.uk/our-work/value-access/Documents/ABPI%20AAR%20Final%20Submission%204%20Jan%202016.pdf>

The pharmaceutical industry makes a significant contribution to the European economy

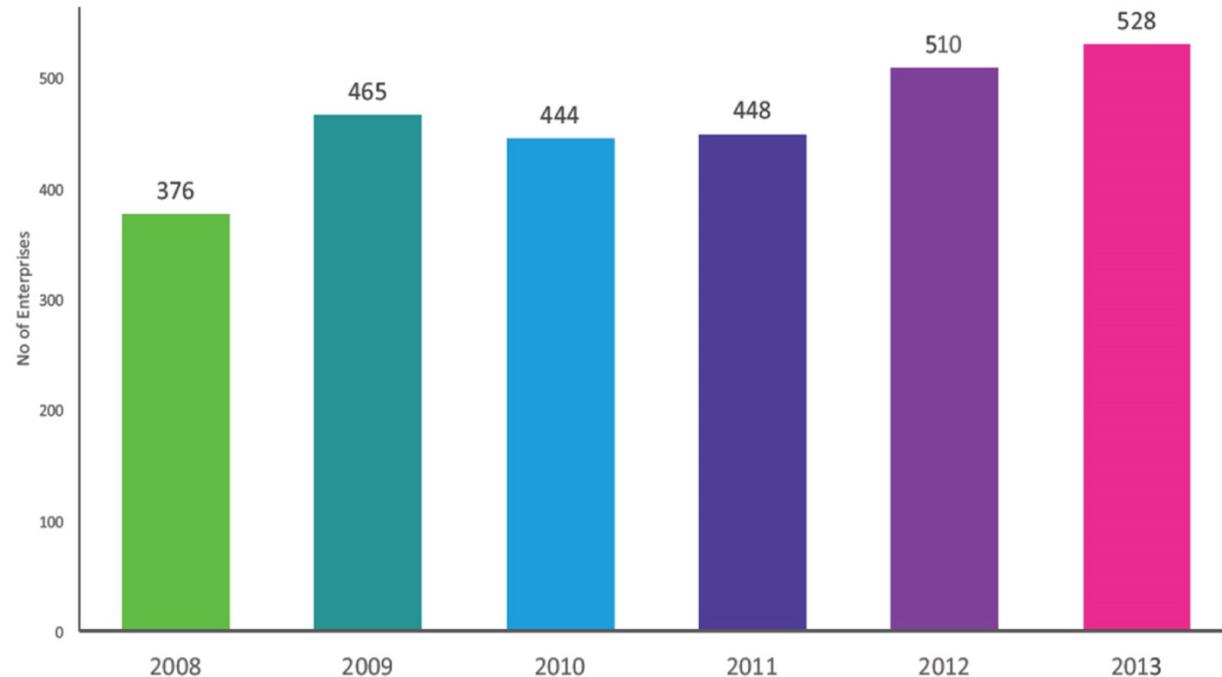


1. The Pharmaceutical Industry in Figures, 2016. EFPIA. <http://www.efpia.eu/uploads/Modules/Documents/the-pharmaceutical-industry-in-figures-2016.pdf>

The pharmaceutical sector represents an important sector for growth and employment in the UK



Number of pharmaceutical enterprises operating in the UK



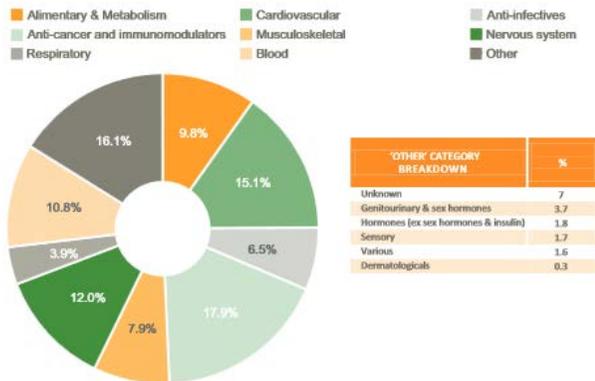
Pharmaceutical companies are the largest funder of R&D for chronic and deadly diseases in the UK



Pharmaceutical R&D Investment in the United Kingdom, 2012, by Disease Area

Total R&D expenditure in 2009 by Therapeutic area

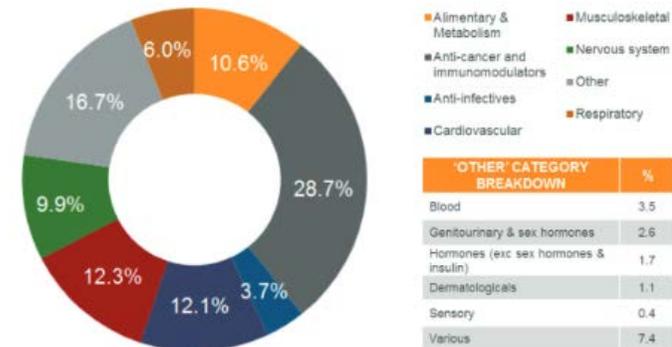
Total R&D expenditure in 2009 by Therapeutic area



The proportion of total R&D expenditure by therapeutic area presented in this figure is based on data from 20 companies (7 Major, 13 Mid and Other). Total R&D expenditure represented = US\$32.82bn

Total R&D expenditure in 2014 by Therapeutic area

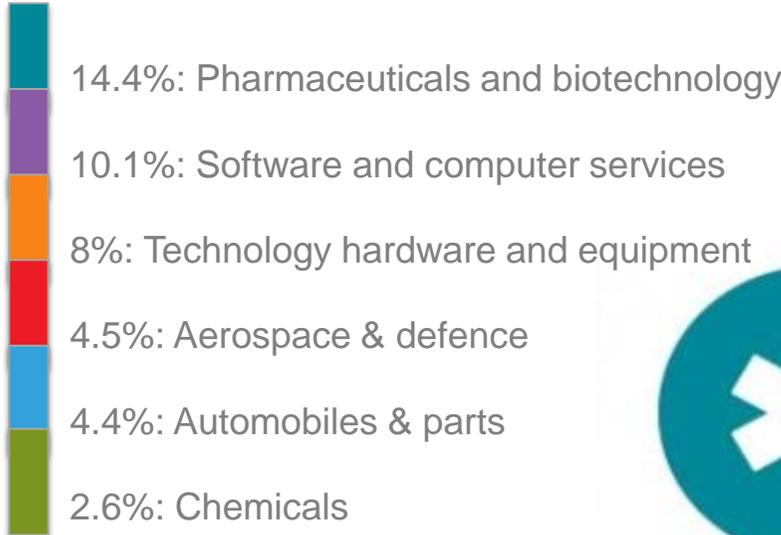
Total R&D expenditure in 2014 by Therapeutic area



The UK invest more of our revenue in generating new knowledge through R&D than other sectors across Europe



Research & development spending as a percentage of net sales, 2014

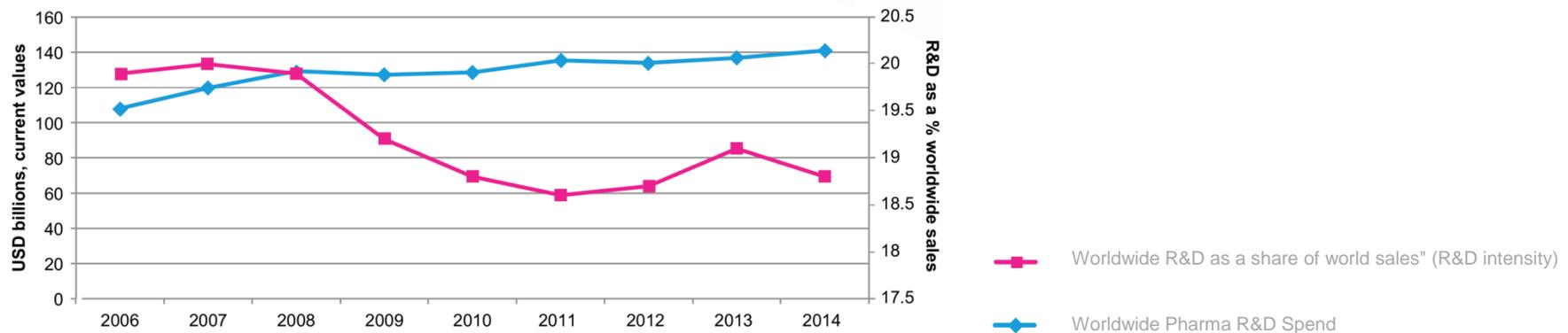


Industrial sectors ranked by R&D intensity (R&D as a percentage of net sales) Note: data relate to the top 2,500 companies with registered offices in the EU (608), Japan (360), the USA (829) and the Rest of the World (703), ranked by total worldwide R&D investment (with R&D investment above €17.9M) –

Worldwide Pharmaceutical R&D expenditure

According to EvaluatePharma¹ the **worldwide pharmaceutical industry invested over \$1.2 trillion in R&D** in the decade from 2004 to 2014 and they forecast an annual investment of \$162 billion by 2020. The figures below demonstrate that this **investment is growing moderately**, with only a recent decline in 2012 followed by a return to growth in worldwide R&D expenditure. The R&D intensity (R&D expenditure as a share of sales) however has declined, although at 18.8% in 2014, still one of the highest of any sector globally. **The US retains the highest share of R&D expenditure. In Europe, the UK has the highest share** if we exclude exchange rate effects.

Worldwide Pharmaceutical R&D expenditure

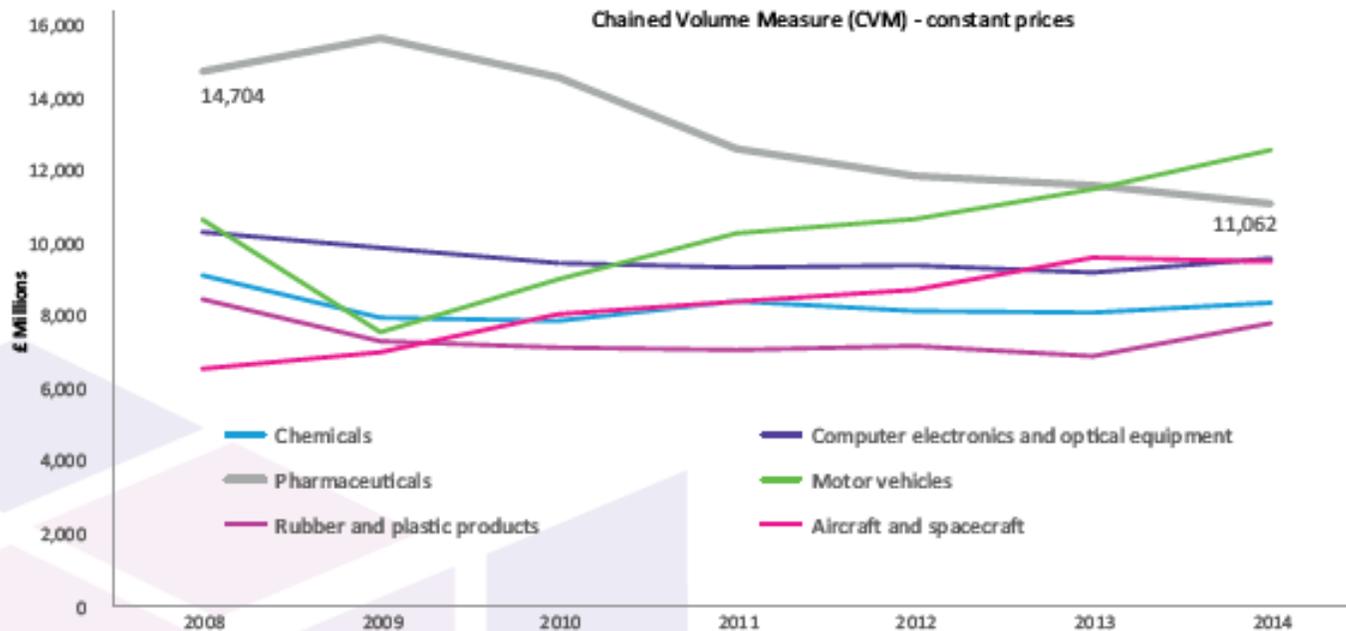


1. EvaluatePharma. World Preview 2014, Outlook to 2020. P.15. (London, 2014)

NOTES: EvaluatePharma date this analysis to 1st June 2014. Industry sales are based on the top 500 pharmaceutical and biotech companies.

The pharmaceutical sector adds the most value to the economy per employee

Gross Value Added (GVA)¹



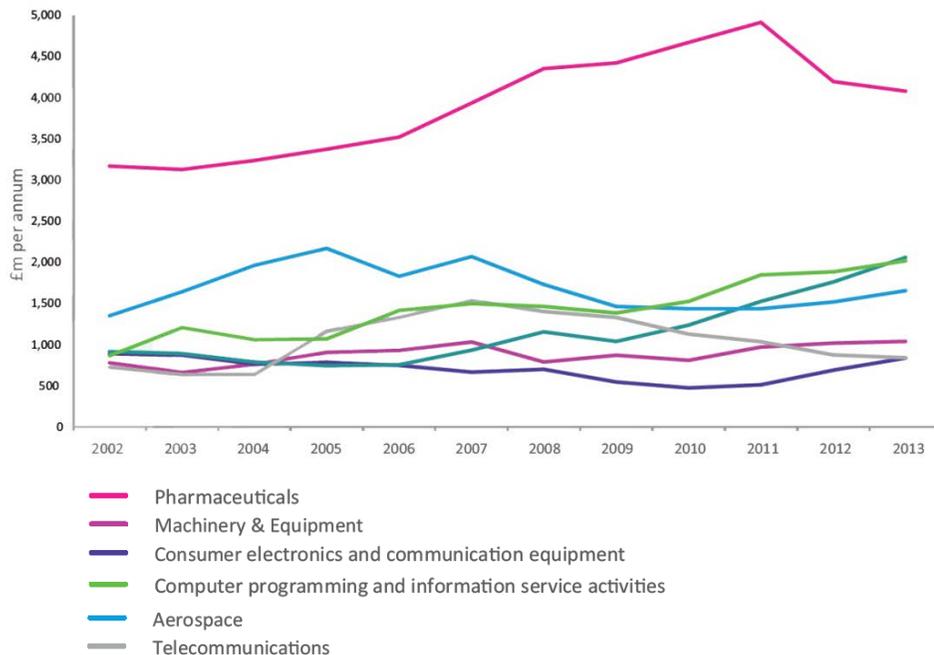
Pharmaceutical employees in Europe are generating **80% more value** per employee than other industries²

1. Office for National Statistics
2. Health Advances analysis; Eurostat Database.

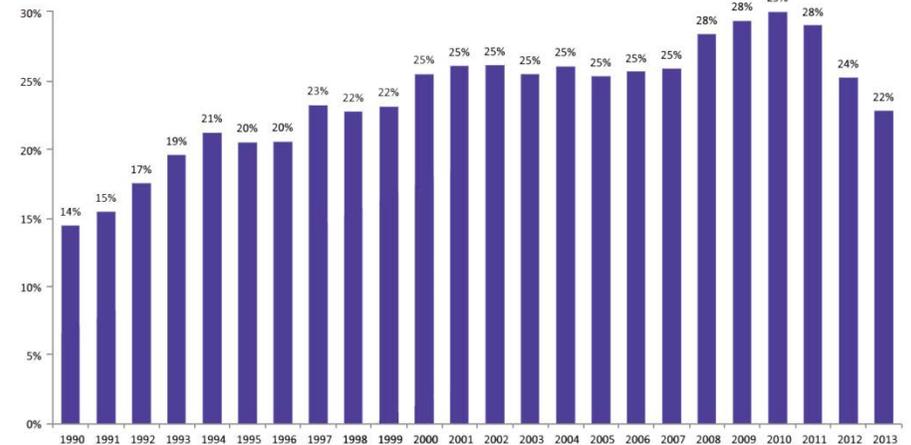
In the UK pharmaceuticals remain the highest research & development spending sector



Leading industries for UK R&D expenditure



Pharmaceutical R&D as a percent of all industry R&D



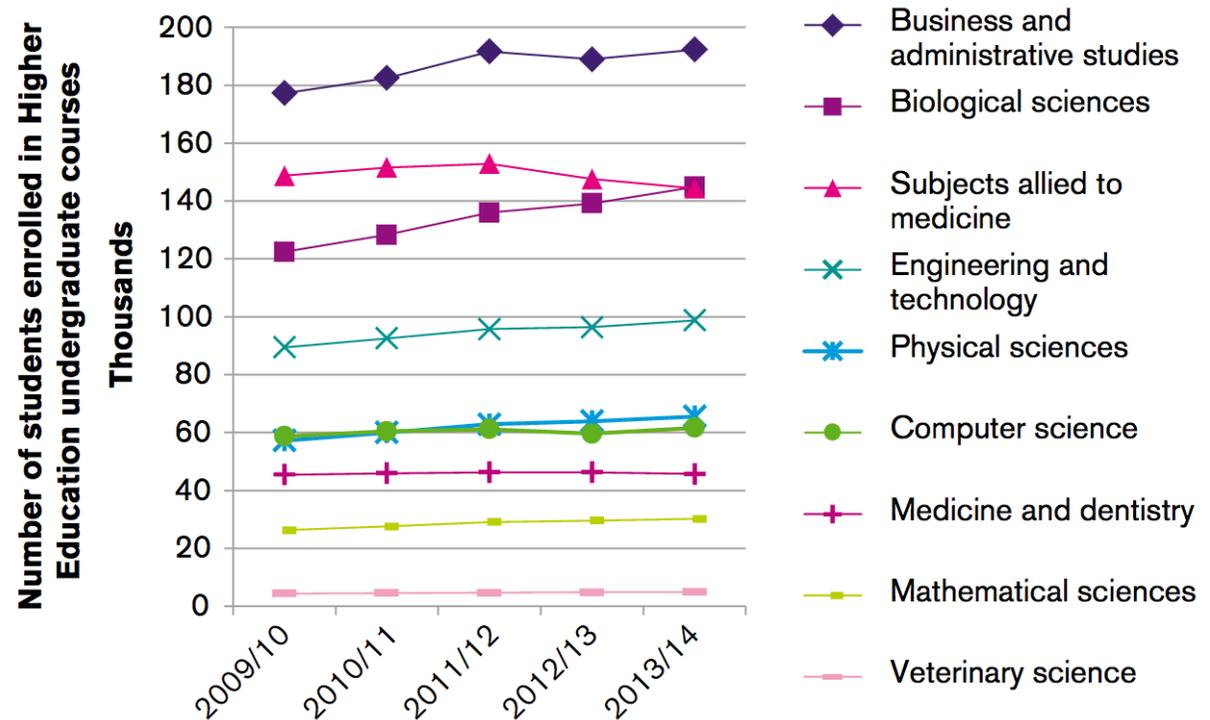
SOURCE: UK Office for National Statistics (ONS), Business Enterprise Research and Development (BERD) survey 2013

NOTES: The BERD survey is conducted annually by ONS. As part of the 2013 survey, approximately 5,400 questionnaires were sent to businesses known to perform R&D. This included around 400 of the largest R&D spenders, which accounted for approximately 77% of the 2013 total R&D expenditure estimate. Smaller R&D performers and others believed to be performing R&D were selected using various sampling fractions. Industry product group and business employment size were the stratification variables. Completed questionnaire were returned by 5,112 businesses, representing a response rate of 95%. The data are reported irrespective of the residence of the ultimate owner, but overseas activities of affiliates of UK businesses are not included.

The number of science, technology, engineering and maths (STEM) graduates has increased by 18 per cent over the past 10 years in the UK



Number of students enrolled in Higher Education per subject between 2009 and 2014^{1,2} (HESA 2014)



1. HESA 2014. <https://www.hesa.ac.uk/>

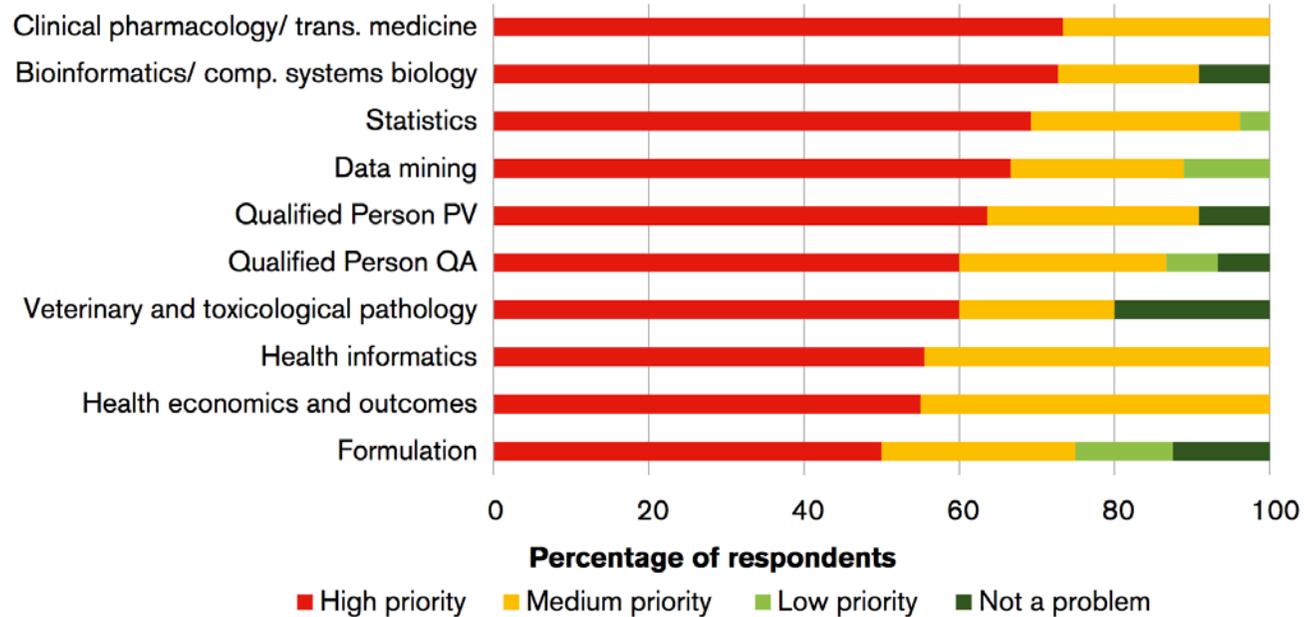
2. Bridging the skills gap in the biopharmaceutical industry: Maintaining the UK's leading position in life sciences. ABPI, Page 10. November 2015

The priorities identified when looking at the pharmaceutical industry skills gap

Top priorities

- The data obtained were analysed in order to determine top priority areas where immediate action is required to address skills gaps.
- Any discipline area with over 50% of respondents identifying it a high priority was considered a top concern and thus was further analysed.

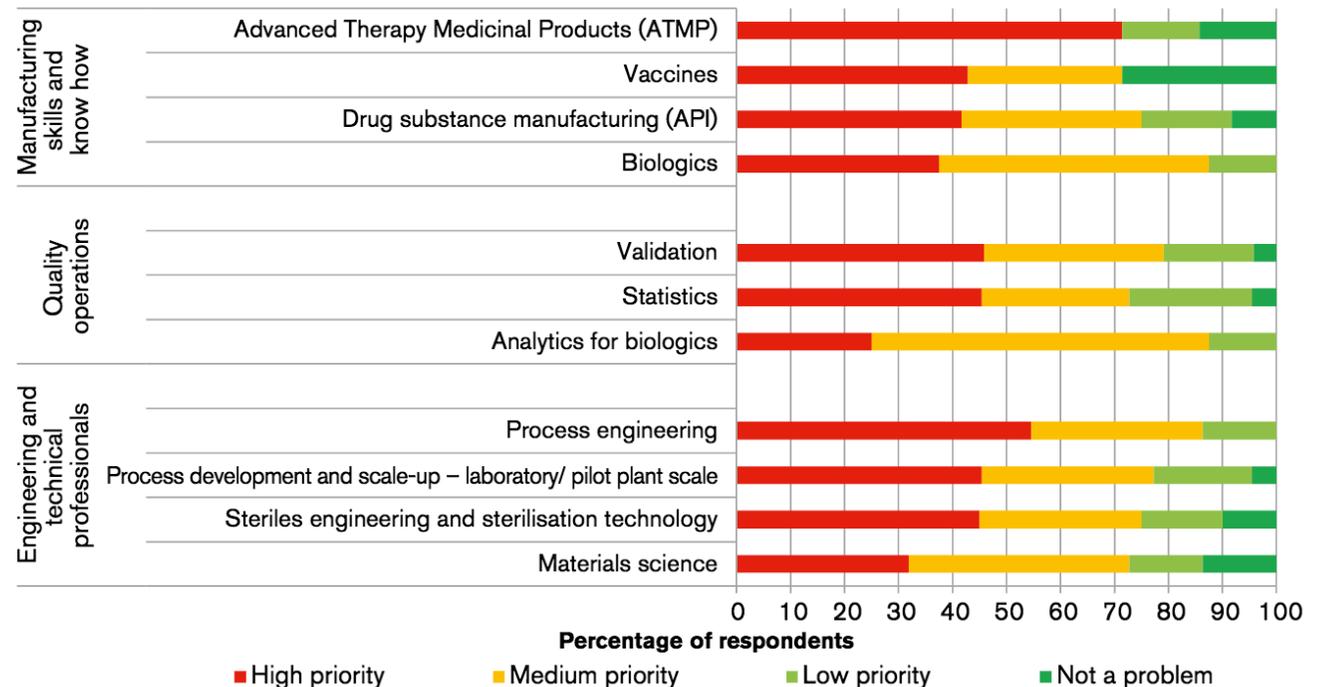
Percentage of respondents rating each top priority discipline as high, medium or low priority or identifying it as 'not a problem'



There are specific skills needed in manufacturing

Manufacturing top priority areas

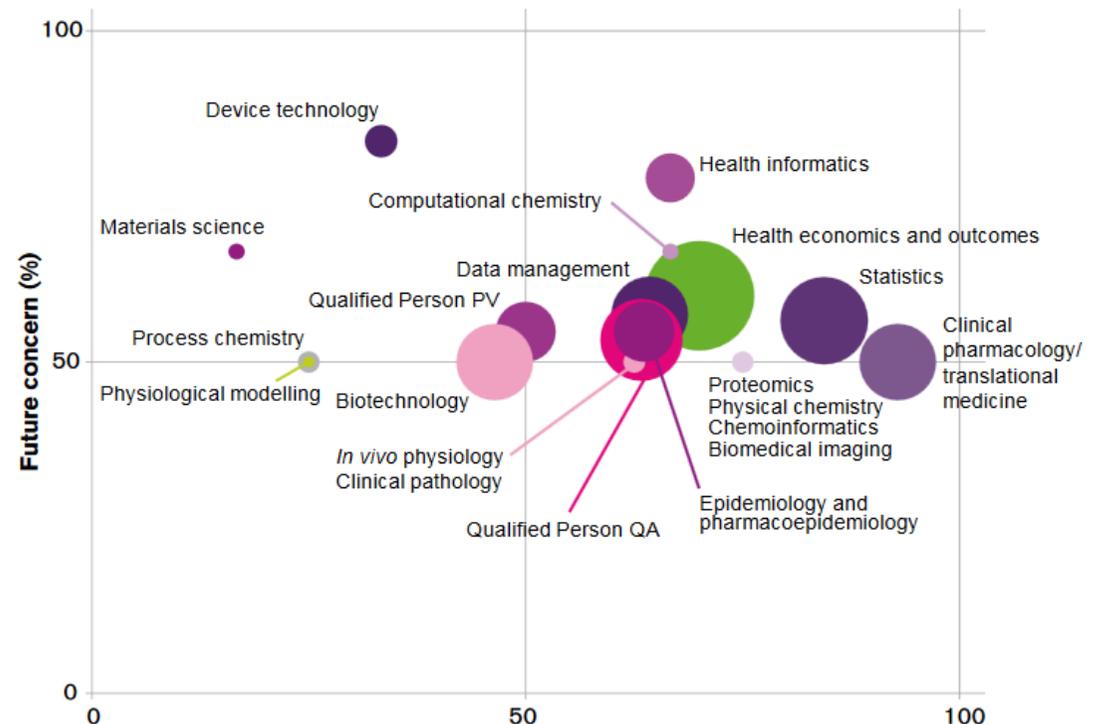
Percentage of respondents rating each manufacturing discipline as high, medium or low priority or identifying it as 'not a problem'



Identifying future issues for the sector and skills

Future issues

- Percentage of respondents rating each discipline area as a future concern vs. a current concern. (Only areas rated as a current and future concern by at least 50% of respondents are shown.)
- Size of bubbles represents the number of respondents in each area
- In vivo physiology and clinical pathology have overlapping data, as have proteomics, physical chemistry, chemoinformatics and biomedical imaging.



How can we bridge the skills gap in the pharmaceutical industry in the future?



- The Science Industry Partnership (SIP) Board should review the evidence and consider action that could be taken through the SIP to address the skills concerns identified.
- Where evidence suggests that high level and professional skills are concerns across both industry and academia, action will be sought through the Research Councils and appropriate Professional Bodies.
- The pipeline for the development of appropriate mathematical skills must be considered from primary education through to Masters and PhD graduate level training.
- ABPI Expert Network Groups, and the Medicines Manufacturing Industry Partnership (MMIP) Skills group (for manufacturing concerns), should monitor the critical disciplines in their area, make recommendations on action and raise concerns when it is becoming more difficult to recruit people with the skills required or when new needs are identified.



Addressing the skills needs identified in 2015 is not expected to be easy, in particular taking into consideration the challenging financial climate, but it is essential that they are addressed if the life science and health sectors are to continue to flourish in the UK. Many of the skills requirements affect not only pharmaceutical companies, but other life science companies, the academic science base and the NHS. In addition, by addressing the concerns identified, the UK could become a world-leading destination for the growth of the life science sector.



The pharmaceutical industry is an active partner in bridging the skills gap (I)



- Every two years the Association of the British Pharmaceutical Industry (ABPI) carries out research in the form of a survey to identify collaboration and other links between industry and academia. These links can range from interactions with undergraduates to postdoctoral researchers, fellows and professors. This report presents results from the 2015 survey and comparisons with data gathered since 2003, when the survey was established.

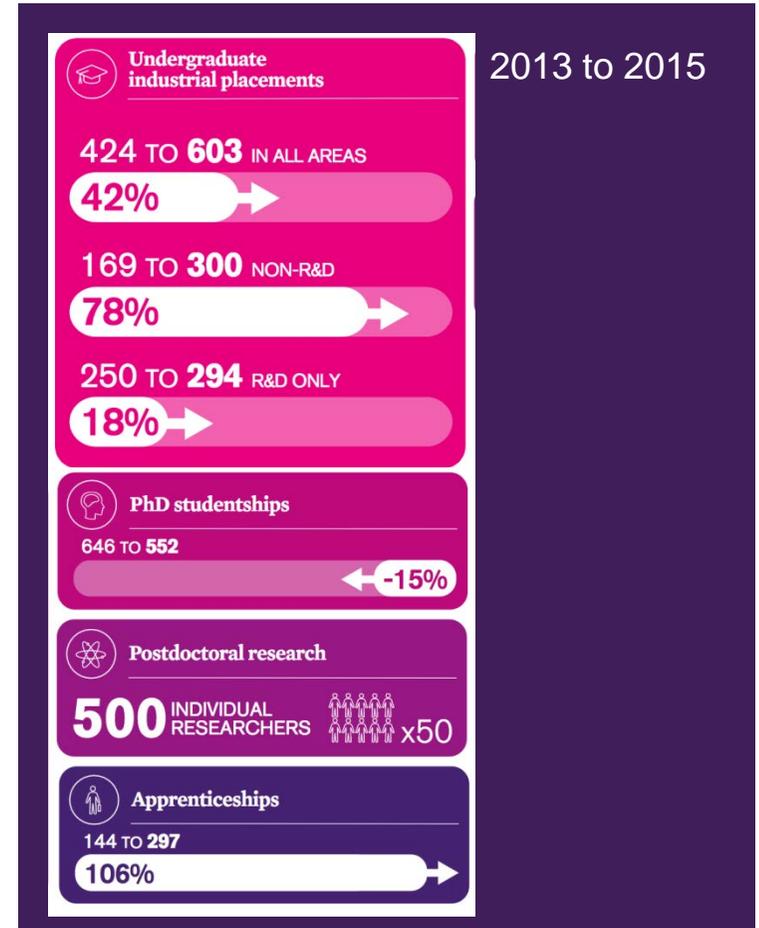


- The ABPI and its member companies are proud of the industry's active links with academia and its role in bridging the skills gap in education. These links range from interactions with undergraduates to post-doctoral researchers, fellows and professors.



- Recent years have seen an increase in the number of training opportunities for young people in pharmaceutical companies. This includes a huge increase in the number of apprenticeships offered in all areas and at all levels.

- At the end of 2015 there were a large number of young people undergoing training linked to pharmaceutical companies. Of these:
 - 294 are undergraduate industrial placements (R&D)
 - 300 are undergraduate industrial placements (non R&D)
 - 552 are PhD studentships
 - 500 are individual researchers involved in post-doctoral research
 - 297 are undertaking apprenticeships

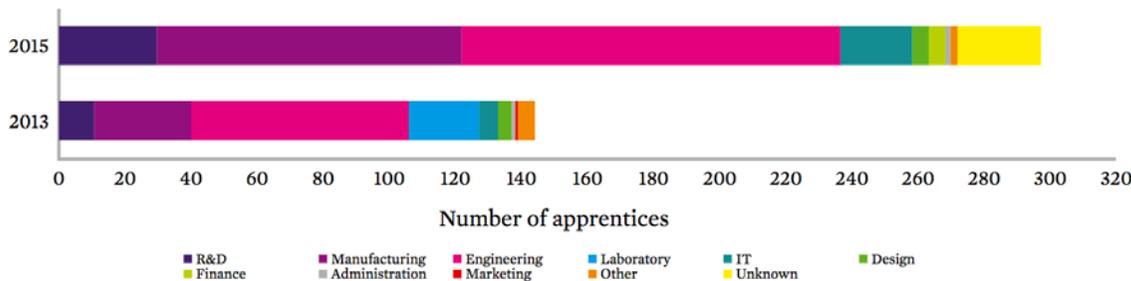


The pharmaceutical industry is an active partner in bridging the skills gap (II)



Aside from the ‘traditional’ R&D career path from undergraduate student to postdoctoral researcher and beyond, there is a growing emphasis on apprenticeships in the UK which is in part due to the Science Industry Partnership (SIP).¹ 2015 has seen a 106% increase in the number of apprentices being trained within the UK pharmaceutical industry, from 144 to 297; 10% (30/297) of which are in R&D – up from 8% (11/144) in 2013. The proportion of manufacturing apprenticeships has also gone up from 20% (29/144) to 31% (92/297).

Apprenticeships



Trends in the number of apprentices separated into business area in 2015 vs. 2013.

NOTE: No data was collected on apprenticeships before 2013. ‘Manufacturing’ includes apprentices in production, quality and supply chain.

COMMENTS: The total numbers of apprentices for each year were 144 in 2013 and 297 in 2015. Apprenticeships in R&D, manufacturing, engineering and IT account for a larger percentage of total apprentices in 2015 compared to 2013, suggesting that there is a greater emphasis on apprentice training in these business areas.

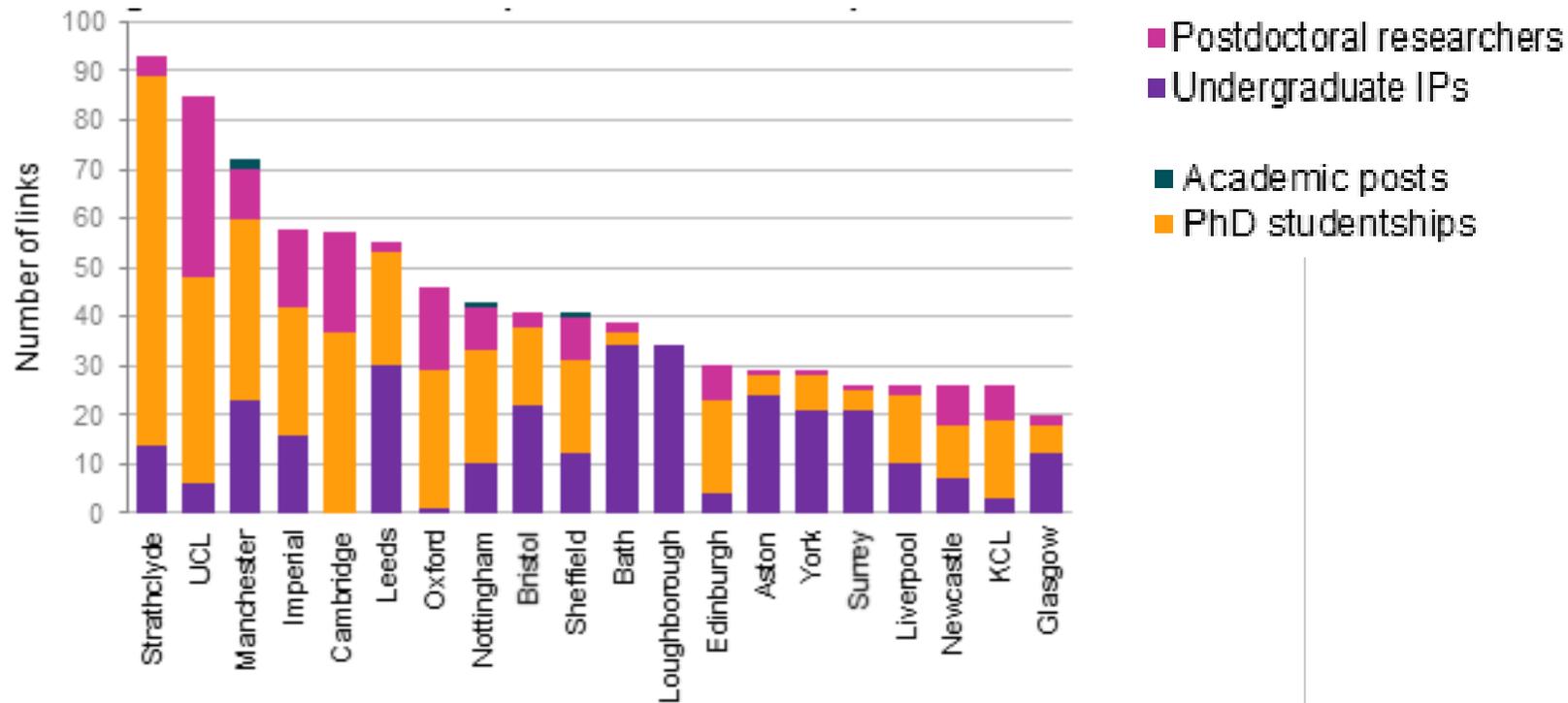
“ The apprenticeship scheme at Pfizer has given me an amazing opportunity to gain industry experience in a laboratory working with some incredibly talented scientists. It has allowed me to gain my academic qualifications whilst also learning and developing practical skills in an exciting and supportive workplace. ”

Charlotte Carr, apprentice,
Pfizer UK Global supply

1. Apprenticeship. Science Industry Partnerships. <http://www.scienceindustrypartnership.com/apprenticeships/>
Source: Developing talent and partnerships to create new medicines, ABPI, Page 11, September 2016

The pharmaceutical industry working with academia

Overall top 20 academic institutions for education and training interactions with UK pharmaceutical companies



We are heavily involved in finding the Science, Technology, Engineering and Mathematics (STEM) employees for the future



- ABPI members have 829 'STEM ambassadors' - a programme run by the Science, Technology, Engineering and Mathematics Network (STEMNET).
- Pfizer have over 30 STEM ambassadors and are also involved at a practical level in supporting the STEM students of the future with initiatives such as:
 - Lab in a Box – supporting practical chemistry in schools
 - Community Lab – providing students with an experience of practical chemistry
 - The SIP (Science Industry Partnership) ambassador programme – bringing older students into contact with practising scientists
- GSK have nearly 400 Ambassadors and have supported the STEM ambassador programme launch providing inspiring and engaging STEM programmes including:
 - EDT: Industrial Cadets and G04SET
 - Work Experience, Apprenticeships and Placements
 - STEM & SIP Ambassador Programmes
 - Hands-on STEM workshops in the classroom
 - STEM in Schools – a STEM Careers outreach programme



Judith from GSK (picture below) - 'The students have loved it - we're bringing science to life in products they see in their house every day. It also enables me to get a fresh perspective outside the day job and keep my passion for science alive when I see others get excited by it.'



Sources



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The pharmaceutical sector adds the most value to the economy per employee, slide 35	Health Advances analysis; Eurostat Database.
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In the UK pharmaceuticals remain the highest research & development spending sector, slide 36	ABPI R&D Sourcebook 2015, Page 22.

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The number of science, technology, engineering and maths (STEM) graduates has increased by 18 per cent over the past 10 years in the UK, slide 37	ABPI. Bridging the skills gap in the biopharmaceutical industry: Maintaining the UK's leading position in life sciences. Page 10.
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