Chemistry higher education data & messaging slidedeck

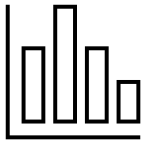
February 2025

(slides 6, 7 and 8 updated 20/02/2025)

Purpose and contents

The purpose of this document is to set out key information and data on chemistry provision in higher education. This includes:

1. Chemistry department maps
2. Undergraduate student numbers
3. Postgraduate student numbers
4. Research grants and contract income for chemistry in higher education institutions
5. Appendix 1: RSC's messaging on higher education
6. Appendix 2: Additional resources and links



Key takeaways from the data

- Recent closures of chemistry departments have led to sparser provision, or “cold spots” in some areas of the UK.
- Since 2019/20, the total number of undergraduates studying chemistry has fallen. In more recent years, the total number of first year undergraduates has started to rise again.
- The number of undergraduates studying chemistry from the EU has fallen most sharply in recent years, while the number of undergraduates studying chemistry from non-EU countries has risen.
- The number of postgraduates studying chemistry has increased between 2019/20 and 2022/23. This is being driven by an increased number of students from non-EU countries starting taught postgraduate chemistry courses.
- The total number of students studying for a PhD in chemistry has stagnated since 2015/16. But the total number of students starting a PhD in chemistry has fallen. This is largely driven by a fall in students from UK nations.
- PhD students from the EU have fallen, while PhD students from non-EU countries has seen moderate rises.
- In 2022/23, UK chemistry research has received £267,635,000 from research grants and contracts income. Most of this was from EPSRC.

Information about the data sources

HESA:

- HESA data represented in this slide deck is from the open data and official statistics pages - https://www.hesa.ac.uk/data-and-analysis. More detail can be found on the HESA webpage.
- Data on PhD students has been taken from previous RSC analysis of purchased HESA data - https://www.rsc.org/globalassets/22-new-perspectives/inclusion-and-diversity/rsc_hesa_chemistry_demographics_2023.pdf. This link includes additional detail about the processing of the data.
- Student numbers are rounded to the nearest five in accordance with HESA's Rounding Methodology.

UCAS:

- The UCAS data represented in this slide deck is from UCAS Undergraduate end of cycle data resources 2024 page - https://www.ucas.com/data-and-analysis/undergraduate-statistics-and-reports/ucas-undergraduate-end-cycle-data-resources-2024. The sector-level end of cycle data resources cover applicants and applications to courses recruited through UCAS.

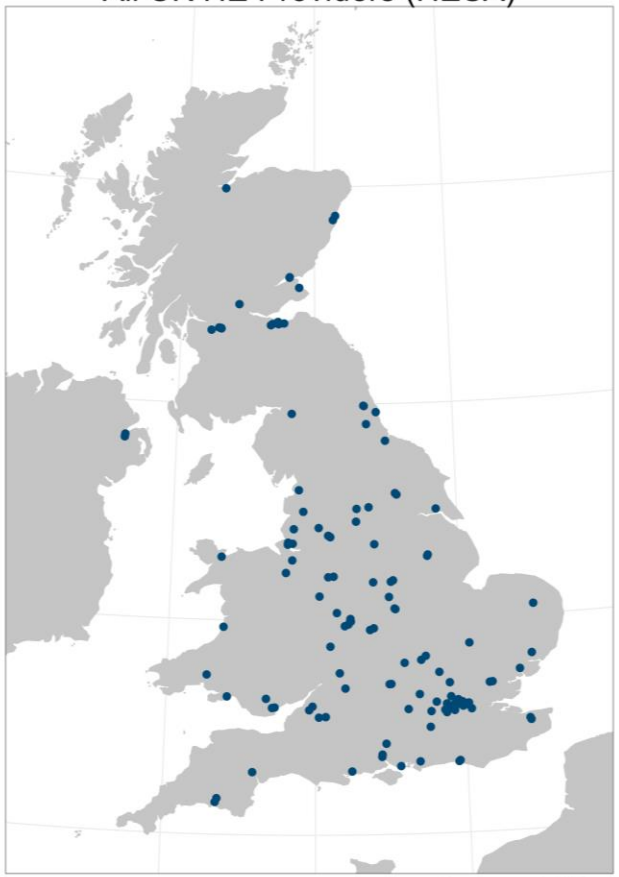
Additional information:

- HESA and UCAS both offer ways of measuring undergraduate student numbers but are slightly different. UCAS statistics are based on numbers of applications and acceptances on courses whereas HESA statistics are records of students who actually enrolled on courses. In some cases, accepted applicants never actually enrol on the course on which they have been accepted.

Chemistry department maps

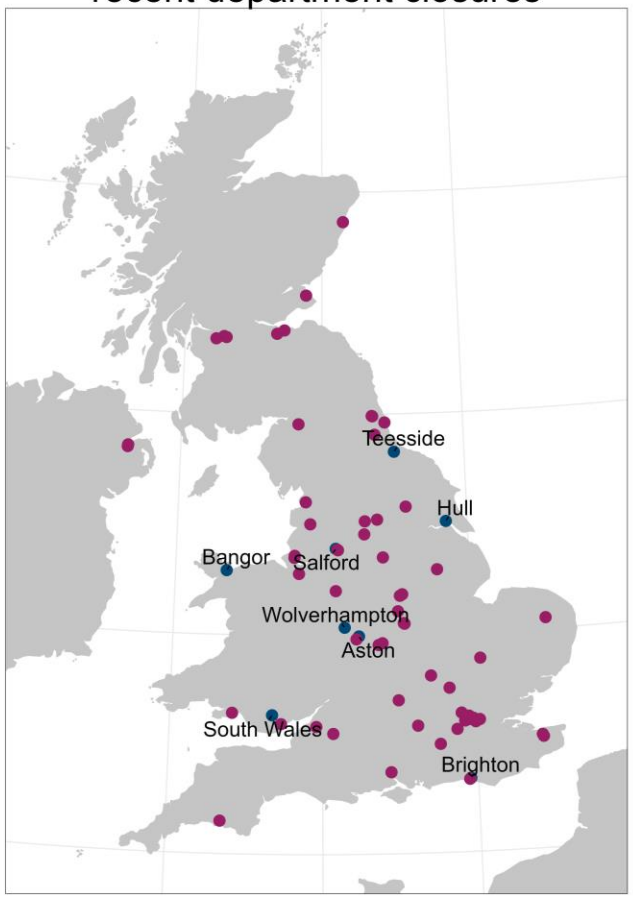
HE providers and chemistry departments

All UK HE Providers (HESA)



Source: HESA

Universities with 2022/23 Chemistry undergraduates plus recent department closures



• closed • open

Source: HESA, RSC internal research

Key points:

- Overall, in 2022/23 the provision of HE across the UK broadly matches the provision of Chemistry undergraduate courses across the UK, but there are some areas where **recent closures have led to sparser provision, or "cold spots"**.
- A number of universities have recently announced redundancies, reduction in provision and/or mergers. Should any of these difficult decisions lead to closures of chemistry courses and/or departments, this could risk further cold spots.

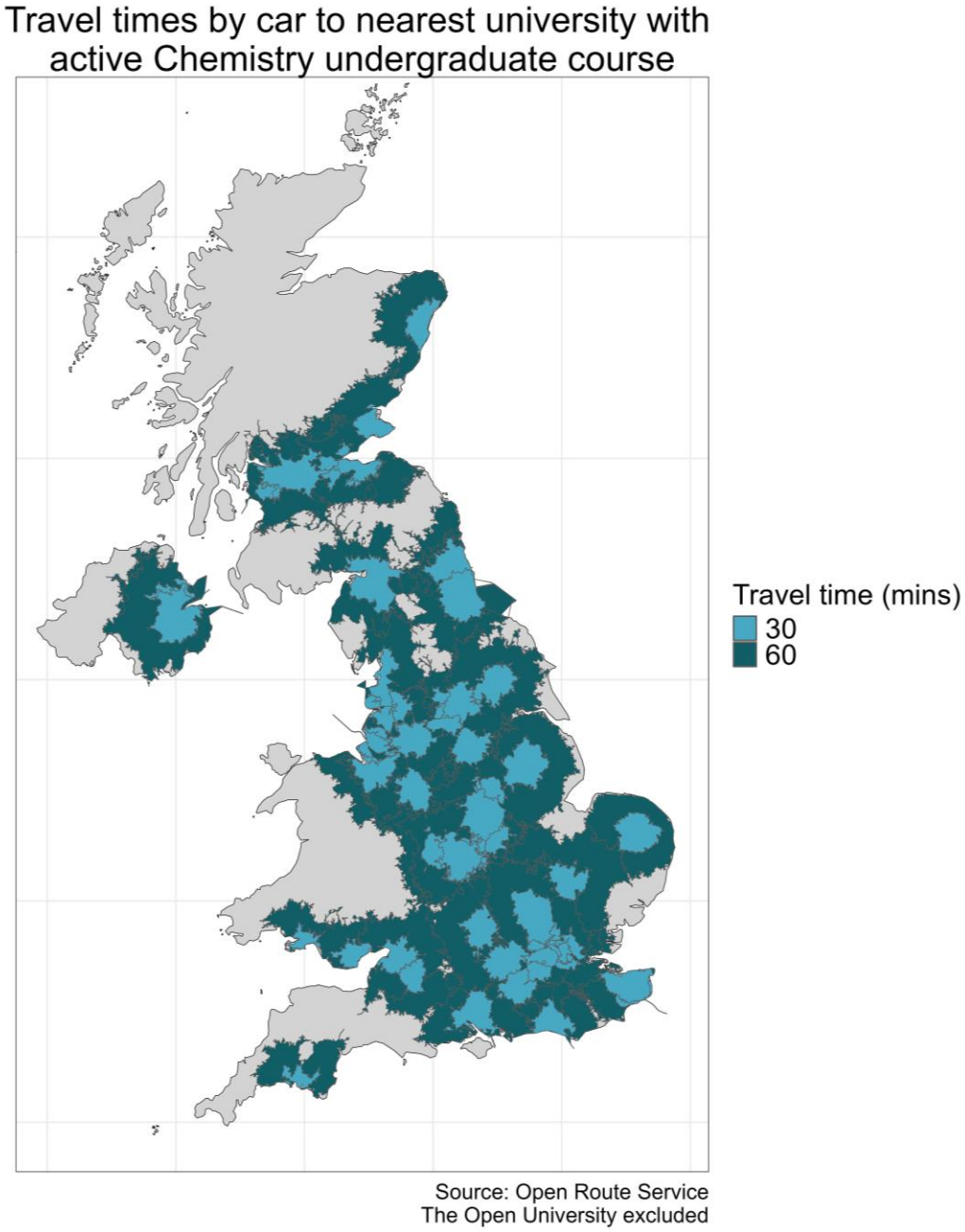
ROYAL SOCIETY OF CHEMISTRY

Please note: This map is up to date at the time of publishing. The departments marked as closed have either closed in the last few years, announced they will be closing and have stopped future student recruitment, and/or are teaching out.

Provision of chemistry undergraduate courses across the UK with travel time

Key points:

- This map shows, for each institution with an active chemistry course, the 30 minute and 60 minute driving range.
- Grey areas on the map are areas in which there is a driving time of one hour or more to the nearest active chemistry course.
- Closures have opened up several **cold spots**:
  - North Wales has been affected by the closure of Bangor.
  - Parts of Hull are now in a cold spot following closure there.
  - Suffolk is a significant cold spot, although this isn't related to any recent closures.
- A number of universities have recently announced redundancies, reduction in provision and/or mergers. Should any of these difficult decisions lead to closures of chemistry courses and/or departments, this could risk further cold spots.

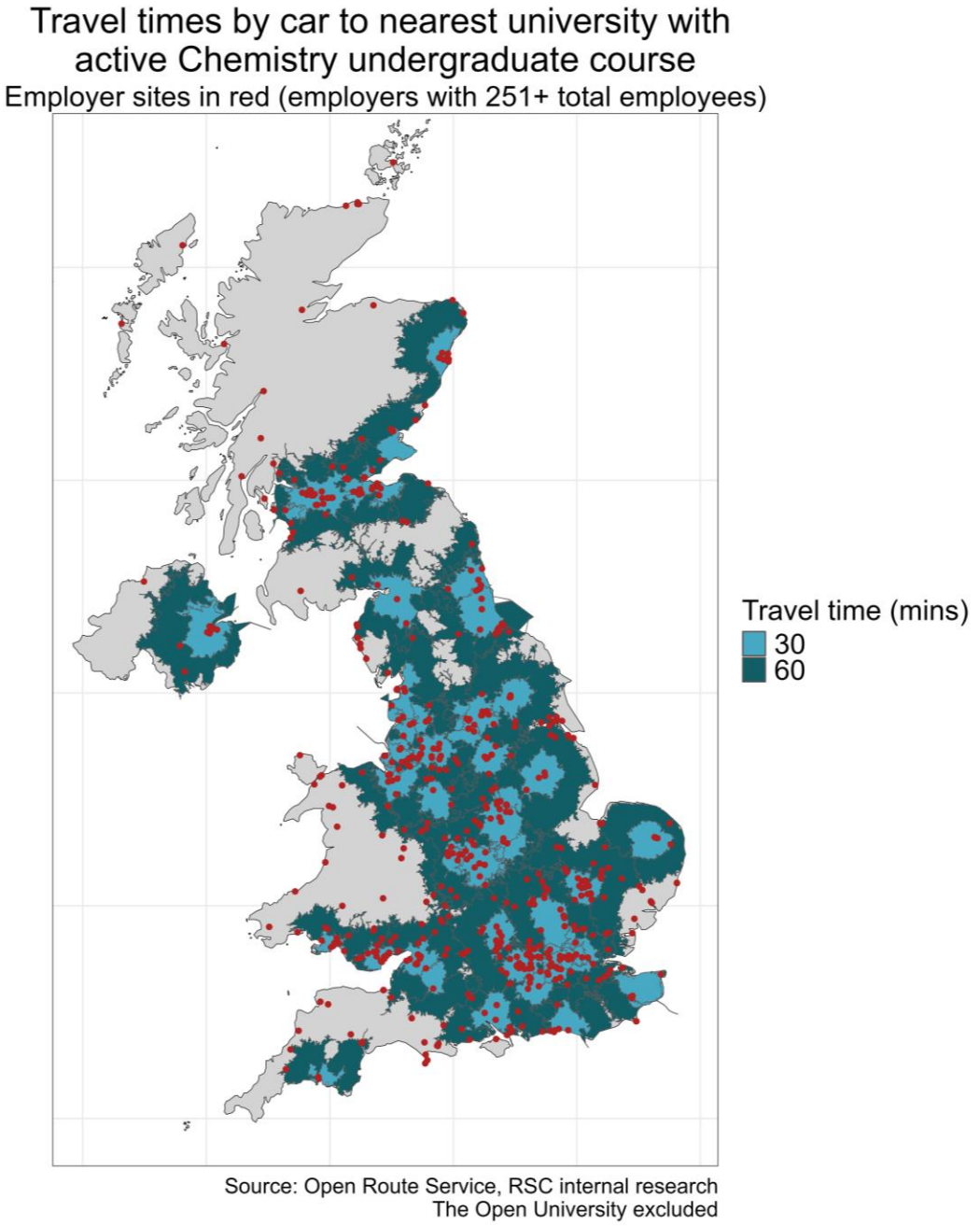


ROYAL SOCIETY OF CHEMISTRY

Provision of chemistry undergraduate courses across the UK with travel time and employers

Key points:

- This map overlays internally-collected Chemistry employer data, plotting employer sites from organisations with 251+ employees.
- The maps shows that chemistry employers are often closely located to chemistry departments. If more chemistry cold spots were to emerge, this could have an impact on employers in their local area.

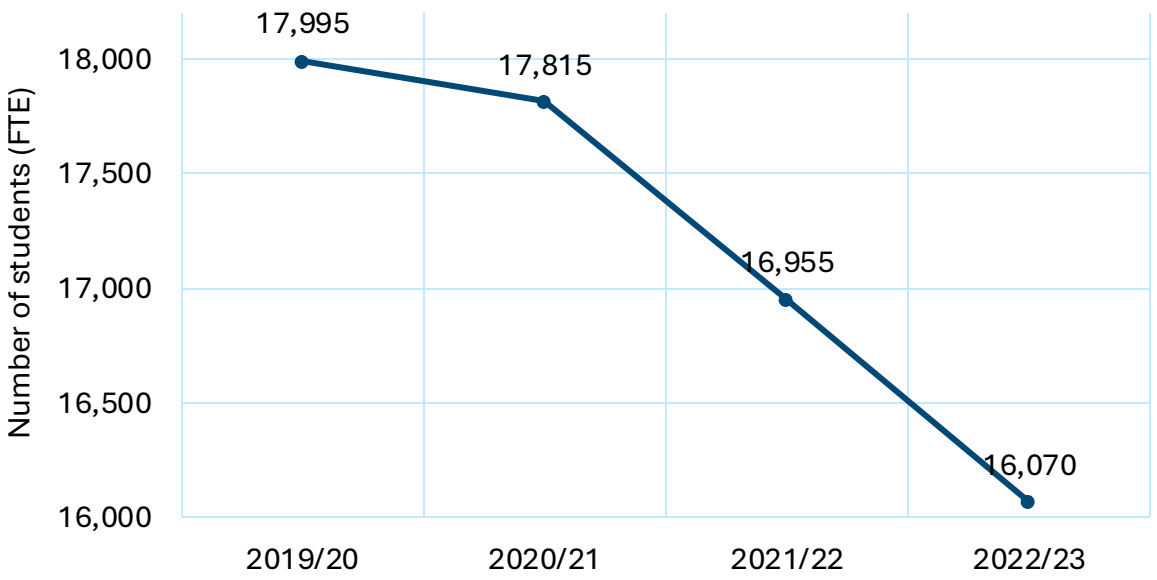


ROYAL SOCIETY OF CHEMISTRY

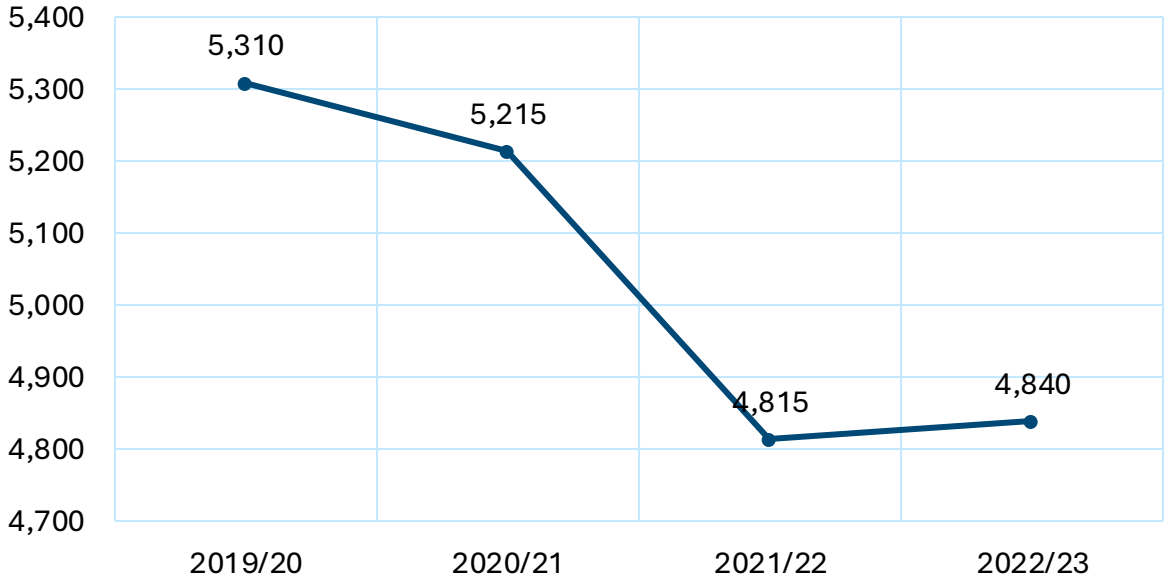
Undergraduate student numbers

Undergraduate enrolments in chemistry (HESA)

Total number of chemistry undergraduate enrolments, 2019/20 to 2022/23



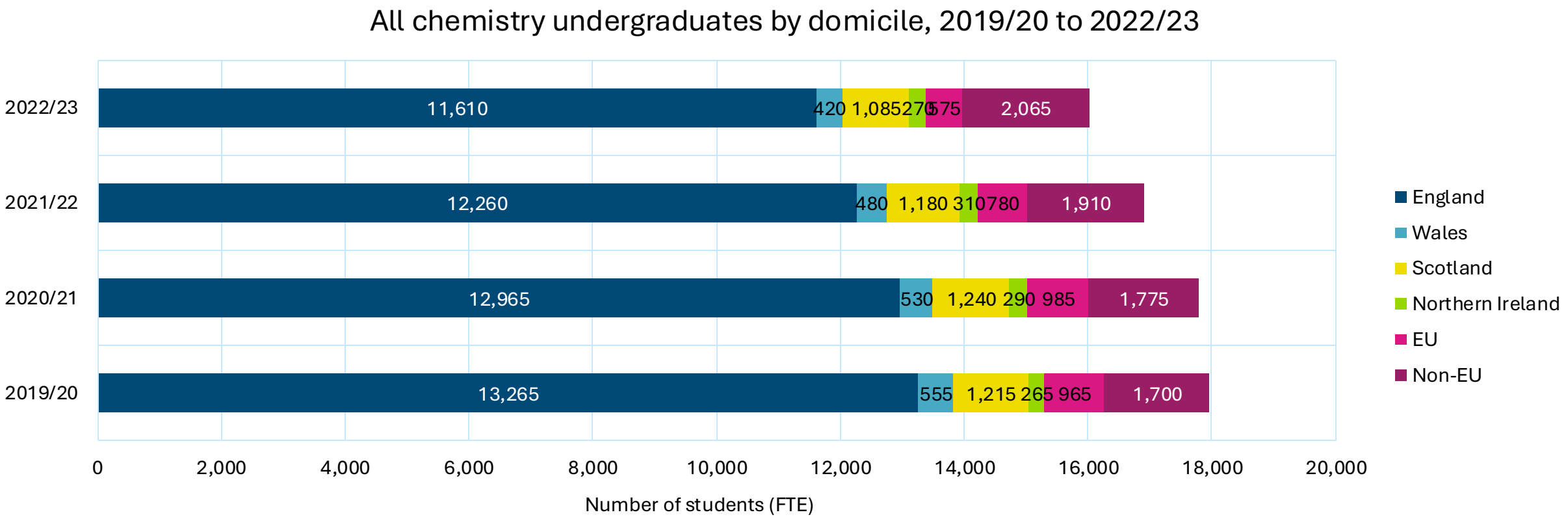
Total number of chemistry **first year** undergraduate enrolments, 2019/20 to 2022/23



Key points:

- The **total number of chemistry undergraduate enrolments (i.e., chemistry undergraduates in all years) has fallen by ~11% between 2019/20 and 2022/23**.
- The total number of **first year undergraduate chemistry students** has fallen in the period but there was a **small increase between 2021/22 and 2022/23**.

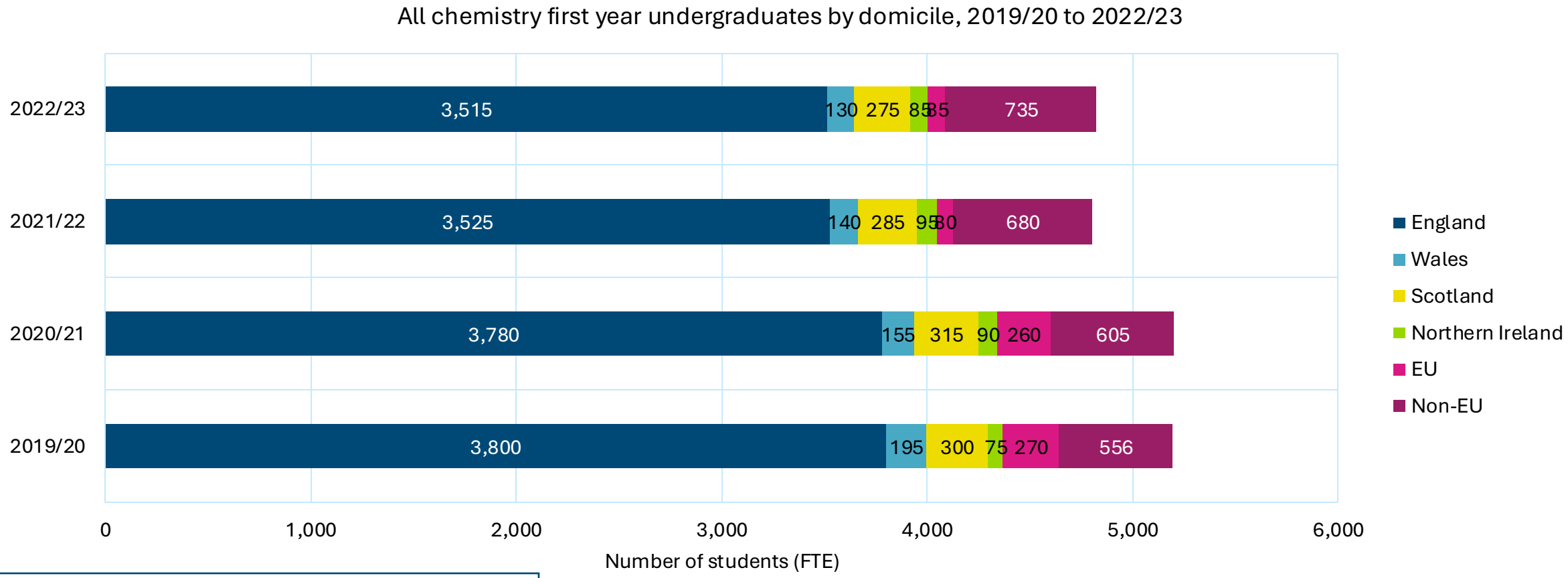
All undergraduate enrolments in chemistry by domicile (HESA)



Key points:

- The **UK nations have all seen a drop in chemistry undergraduate enrolments between 2019/20 and 2022/23**.
- The number of chemistry undergraduate enrolments from the EU has fallen by ~40% between 2019/20 and 2022/23.
- The number of chemistry undergraduate enrolments from non-EU countries has risen by ~21% between 2019/20 and 2022/23.

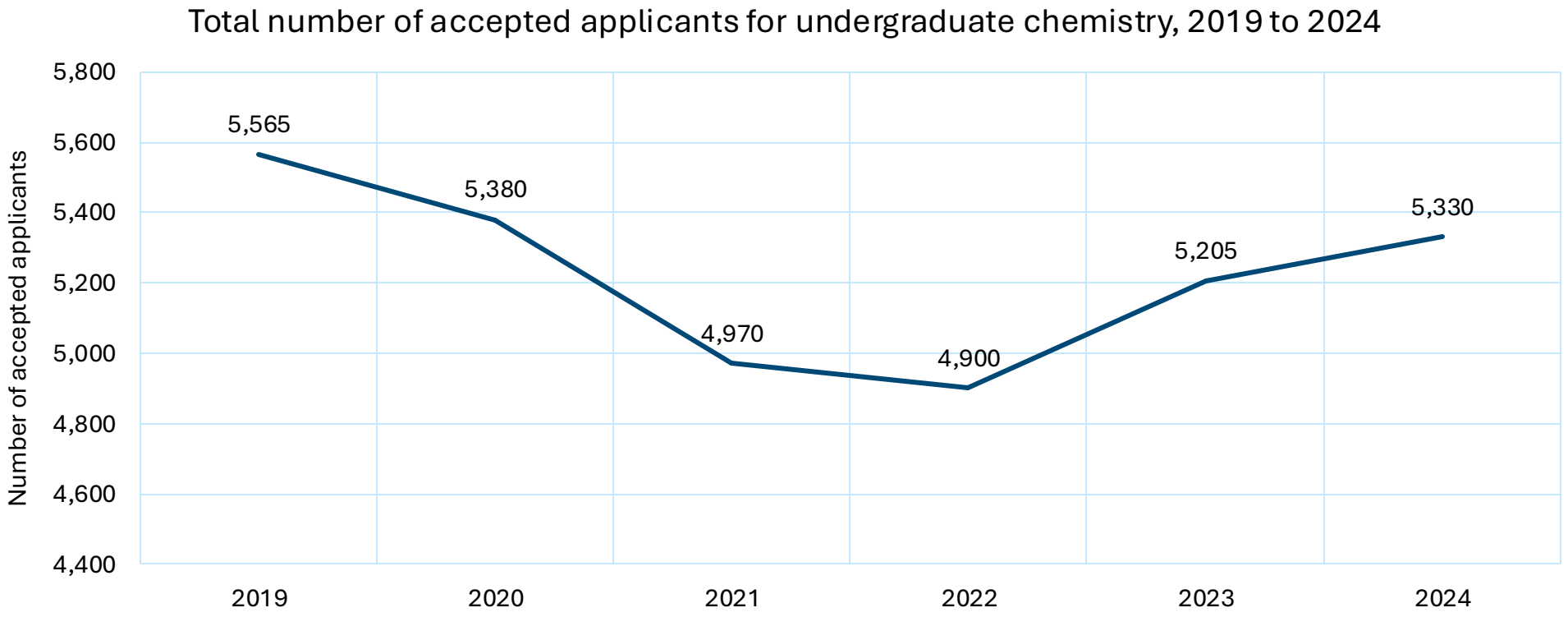
First year undergraduates in chemistry by domicile (HESA)



Key points:

- In 2019/20 and 2020/21, ~260-270 EU students started an undergraduate chemistry degree. This **fell to ~80-85** in 2021/22 and 2022/23.

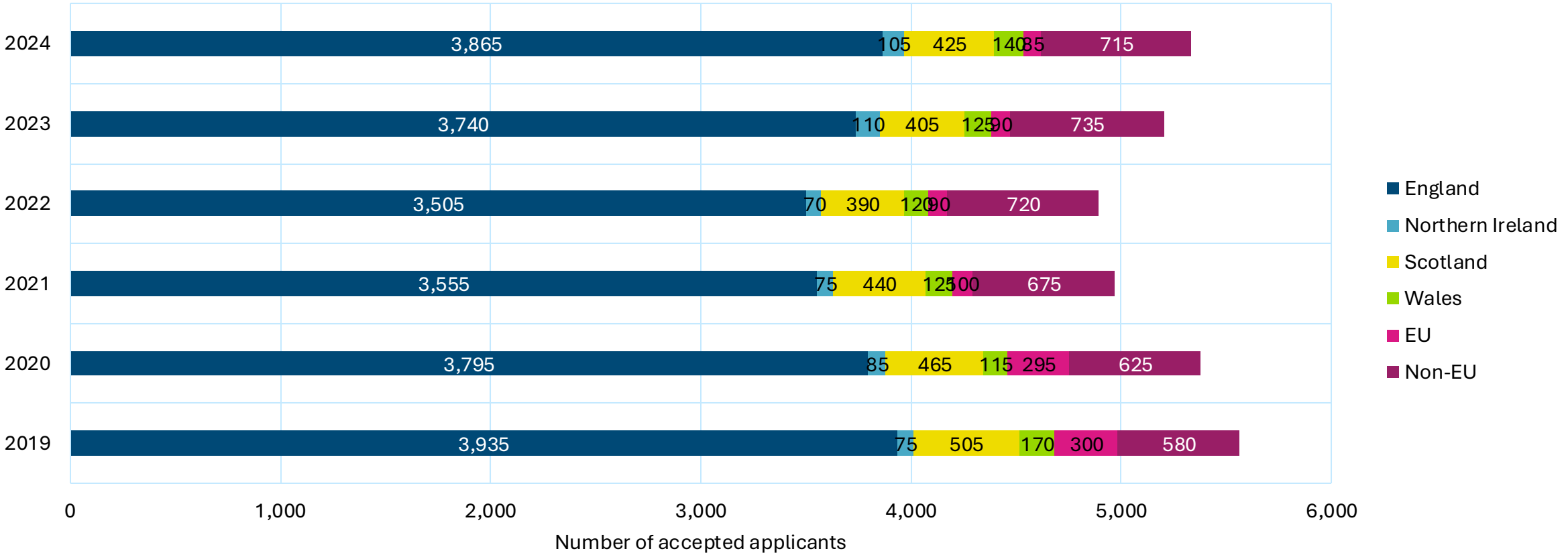
Undergraduate acceptances in chemistry (UCAS)



Key points:

- UCAS show the number of students that have been accepted on chemistry courses and hence will differ slightly from HESA statistics, but the general trend will be similar.
- Since 2023, we are starting to observe some **increases to the number of students who have been accepted onto chemistry courses**.

Undergraduate acceptances in chemistry by domicile (UCAS)

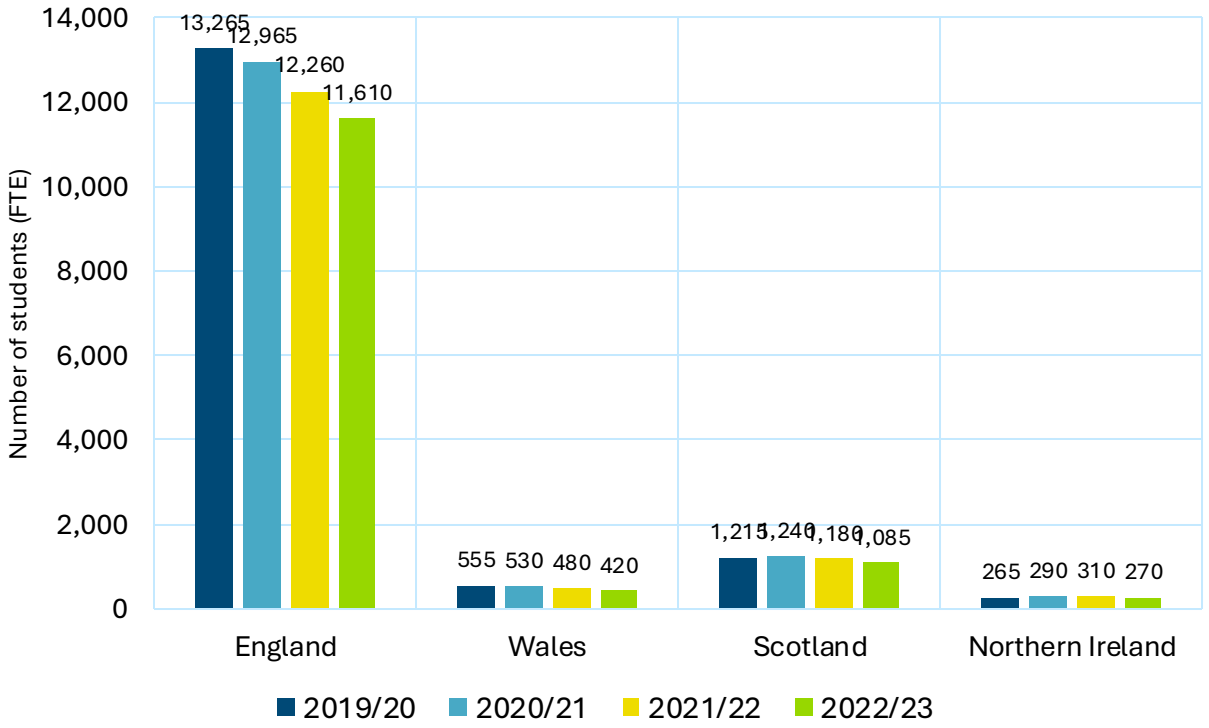


Key points:

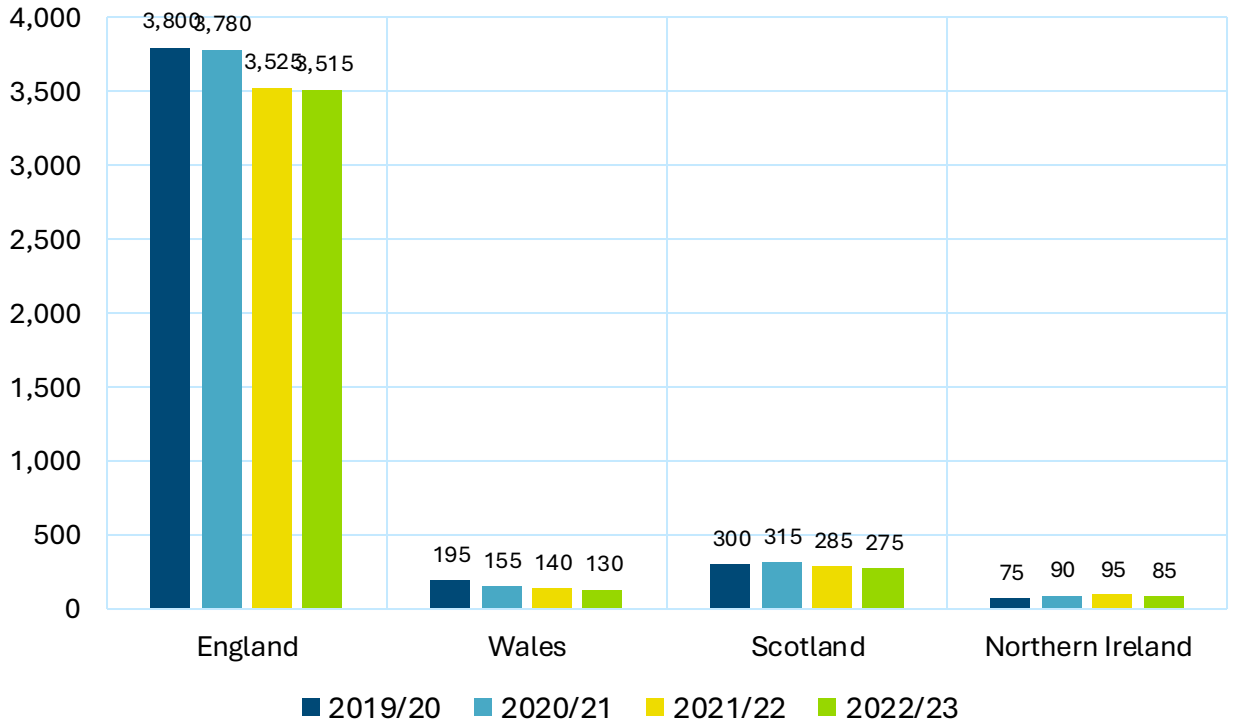
- The figure shows that the **number of chemistry undergraduate acceptances has started to increase in 2023 and 2024** compared to previous years, and this is largely driven by increases in students from UK nations.

Undergraduate in chemistry by UK domicile (HESA)

Number of chemistry undergraduates by UK domicile, 2019/20 to 2022/23

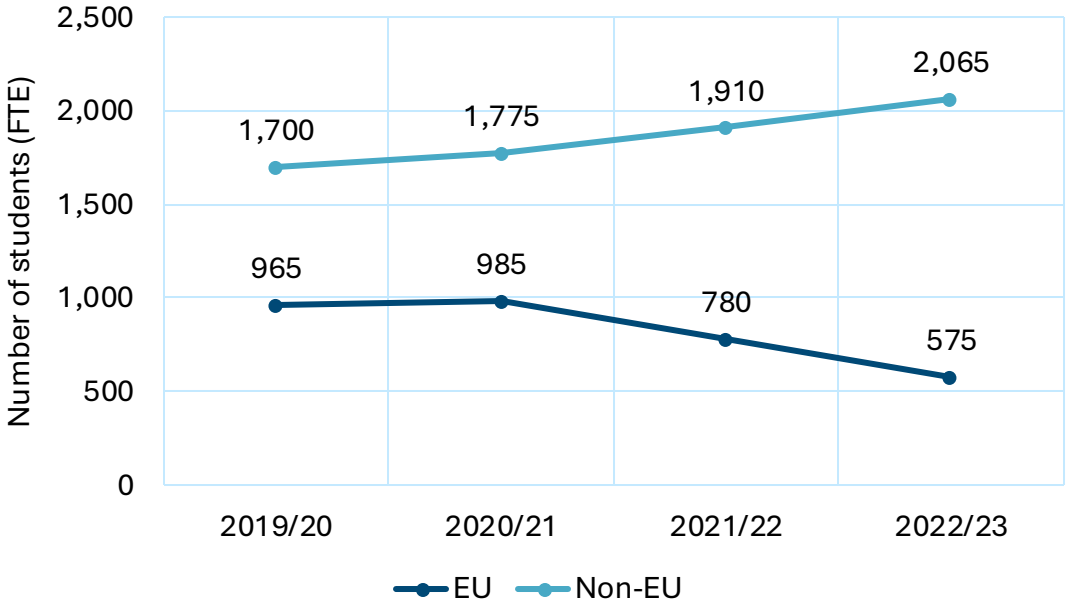


Number of chemistry first year undergraduates by UK domicile, 2019/20 to 2022/23

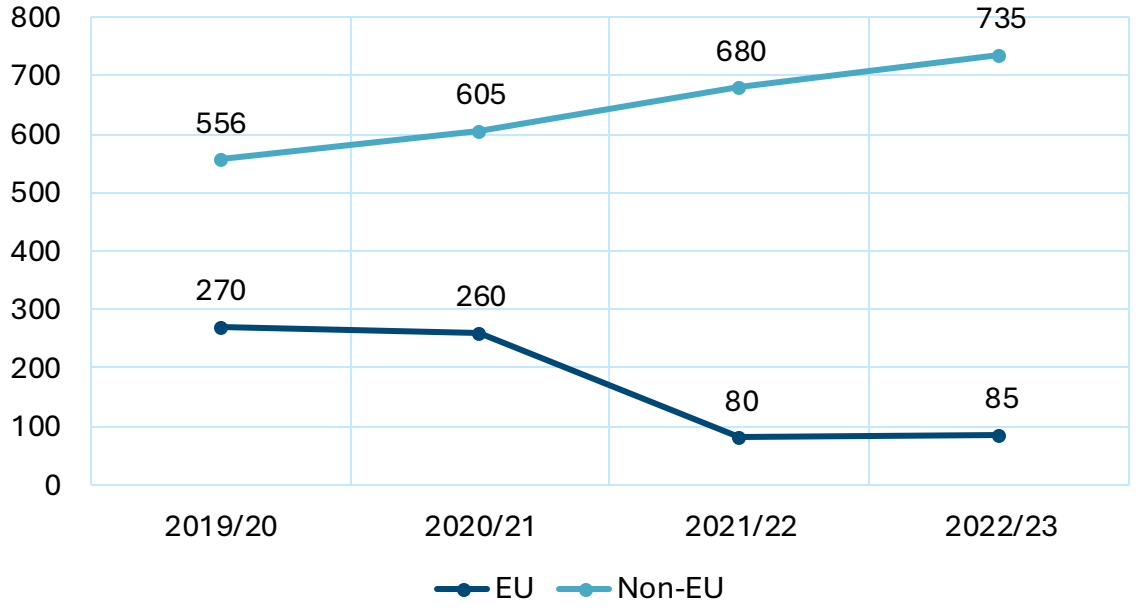


International undergraduates in chemistry (HESA)

Number of international chemistry undergraduates, 2019/20 to 2022/23



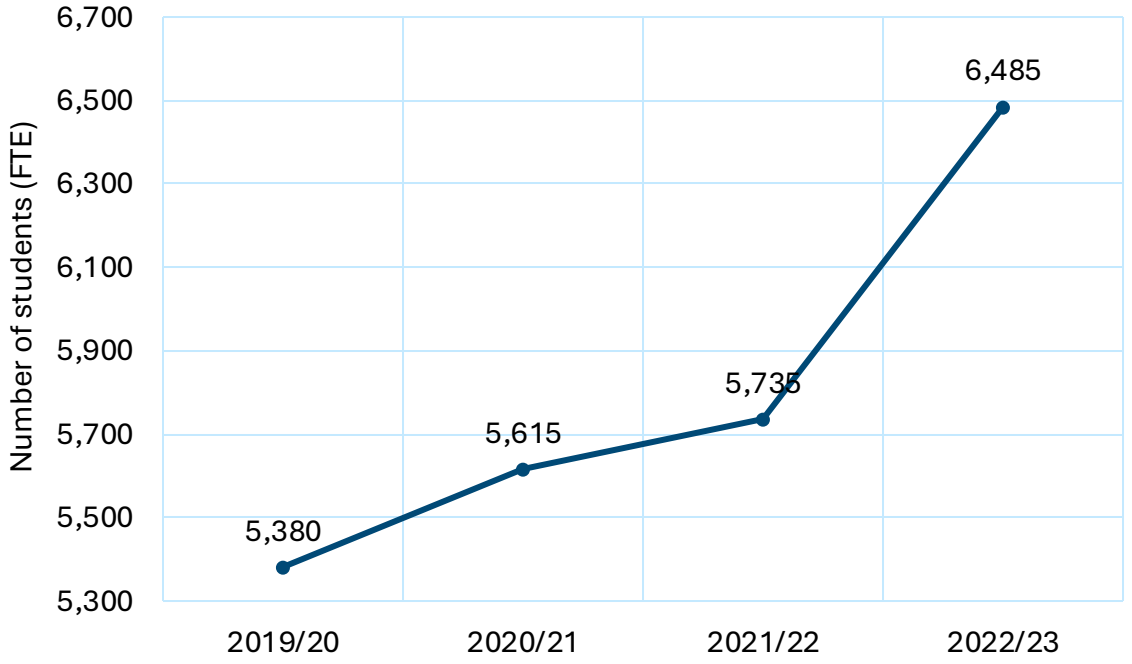
Number of international chemistry first year undergraduates, 2019/20 to 2022/23



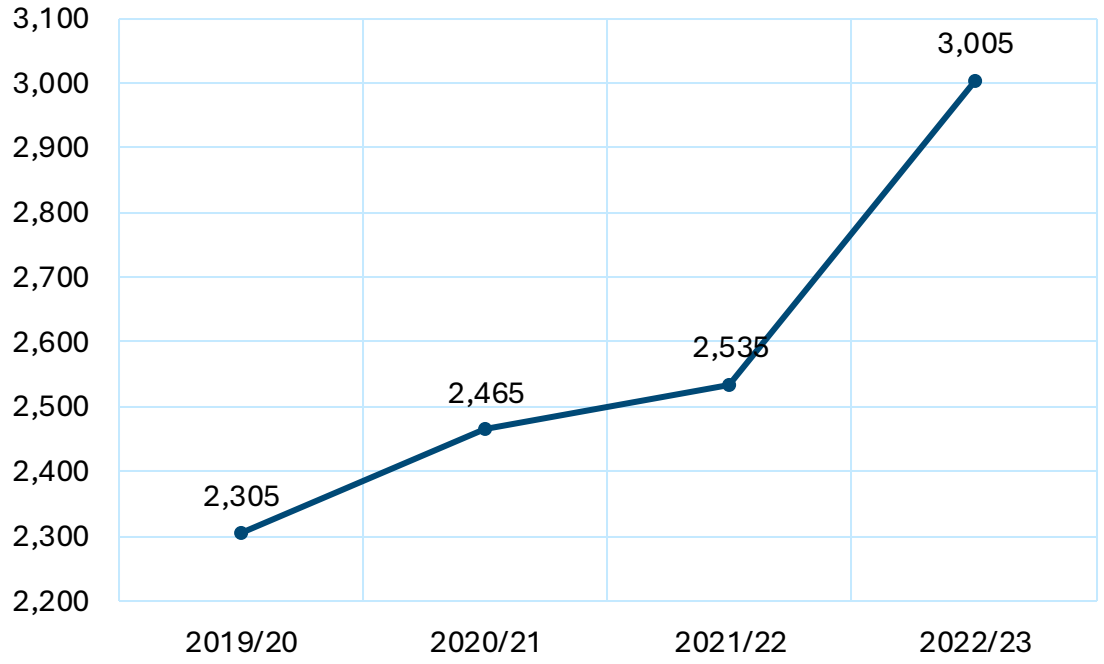
Postgraduate student numbers

Postgraduates in chemistry (HESA)

Total number of chemistry postgraduates, 2019/20 to 2022/23



Total number of chemistry first year postgraduates, 2019/20 to 2022/23

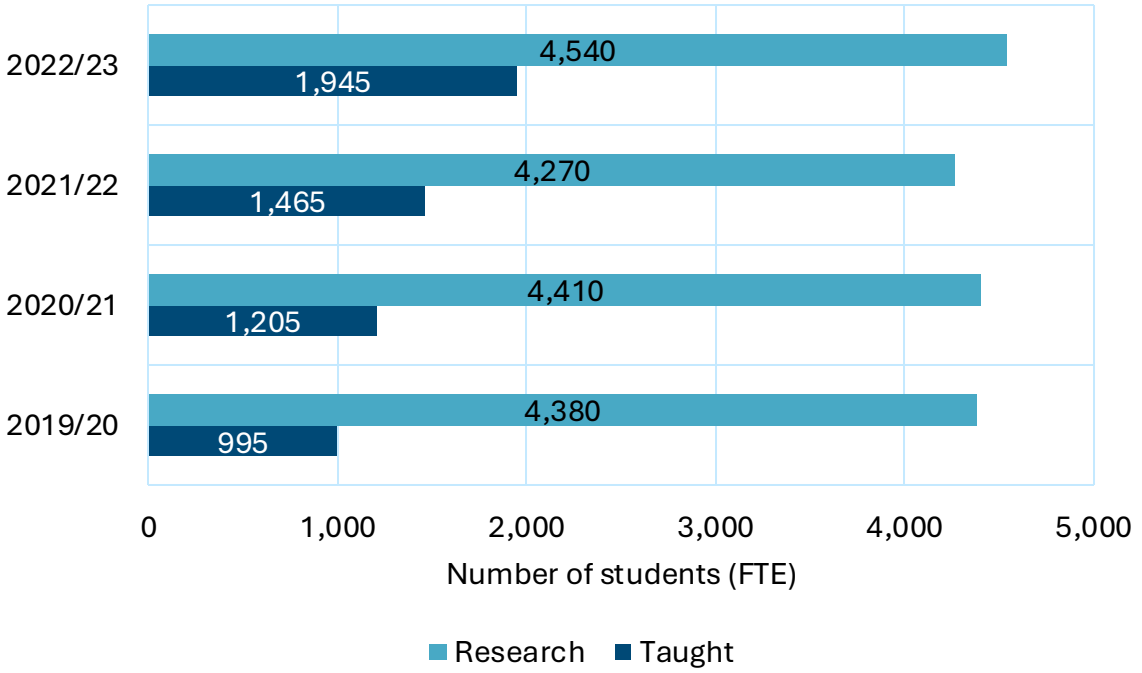


Key points:

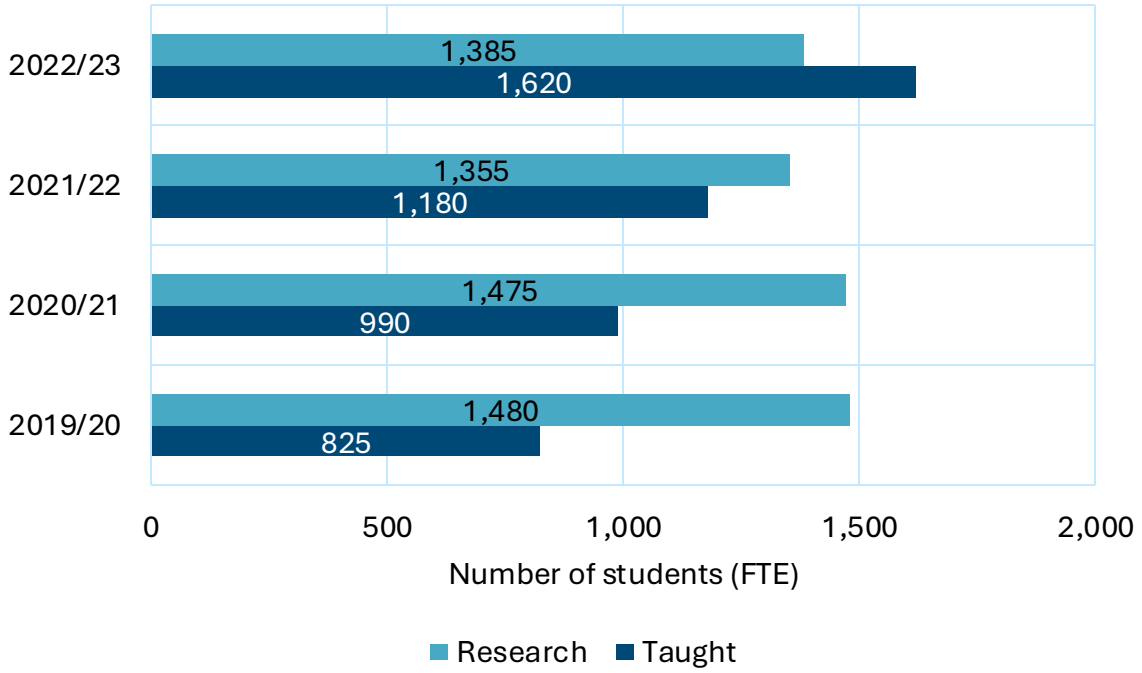
- The total number of chemistry postgraduate enrolments has **risen by ~20%** between 2019/20 and 2022/23.
- The total number of chemistry **first year** postgraduates has **risen by ~30% between** 2019/20 and 2022/23.

Research and taught postgraduates in chemistry (HESA)

Total number of postgraduate chemistry students broken down by research and taught degrees, 2019/20 to 2022/23



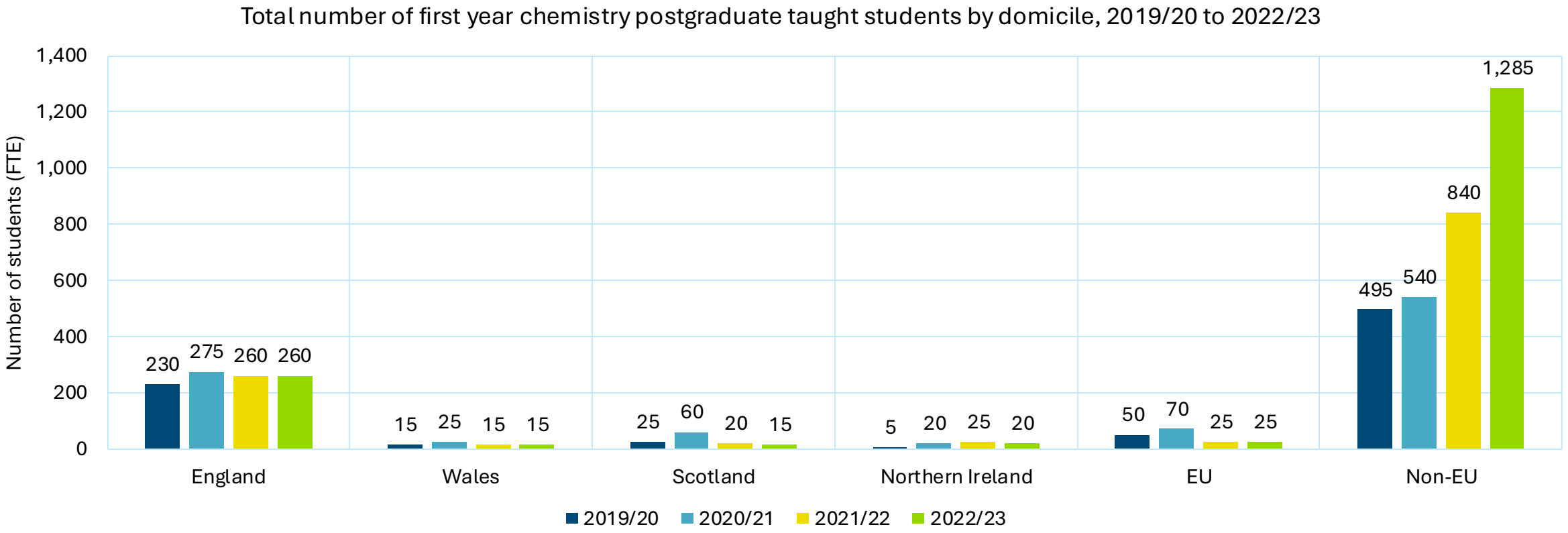
Total number of postgraduate chemistry <u>first year</u> students broken down by research and taught degrees, 2019/20 to 2022/23



<u>Key points:</u>

- Most postgraduate *research* degrees are PhDs. The number of ***research*** postgraduate enrolments has **remained relatively constant** over the last 4 years.
- However, ***taught*** postgraduates has **risen significantly**, almost doubling over the last 4 years.

Taught postgraduates in chemistry by domicile (HESA)

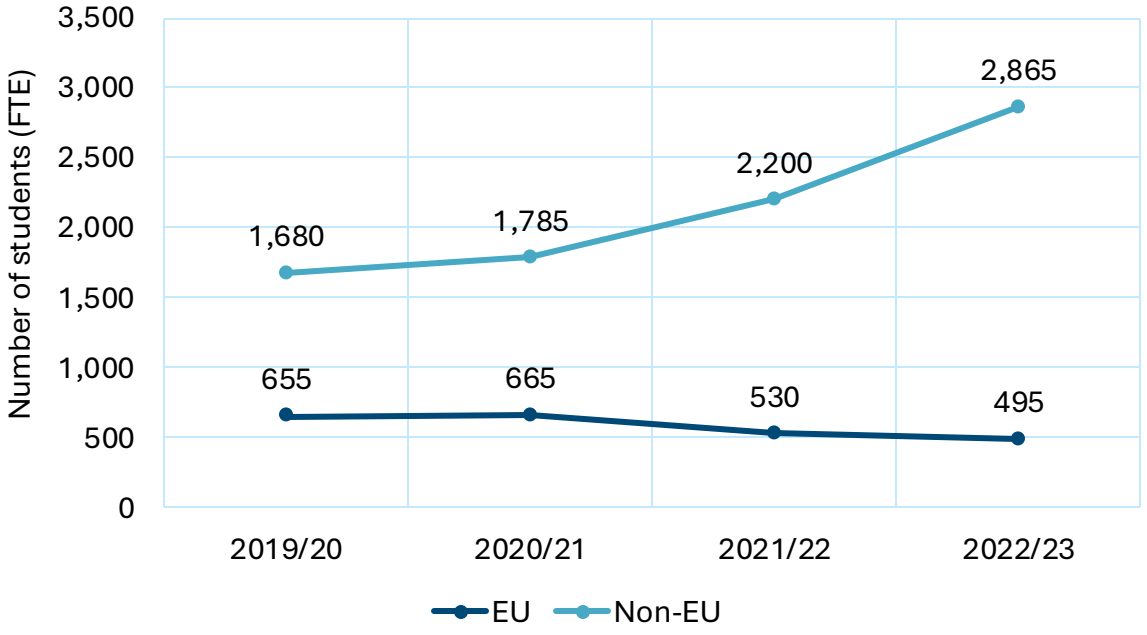


Key points:

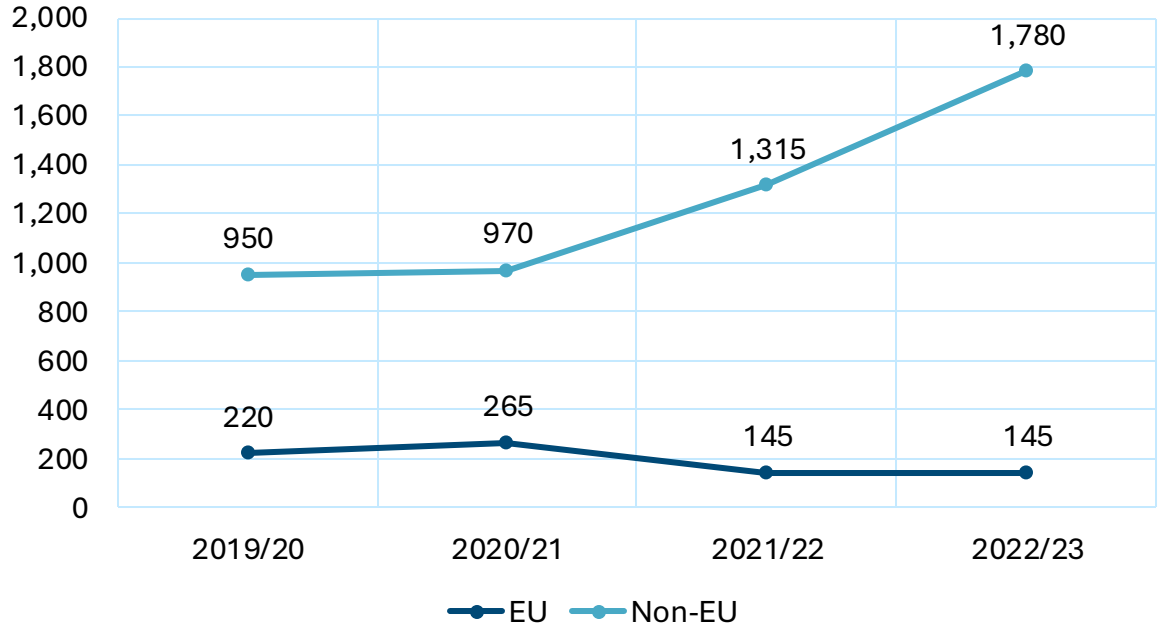
- The driver behind the large increases in taught postgraduate enrolments are increases in the number of non-EU international students.

International postgraduates in chemistry (HESA)

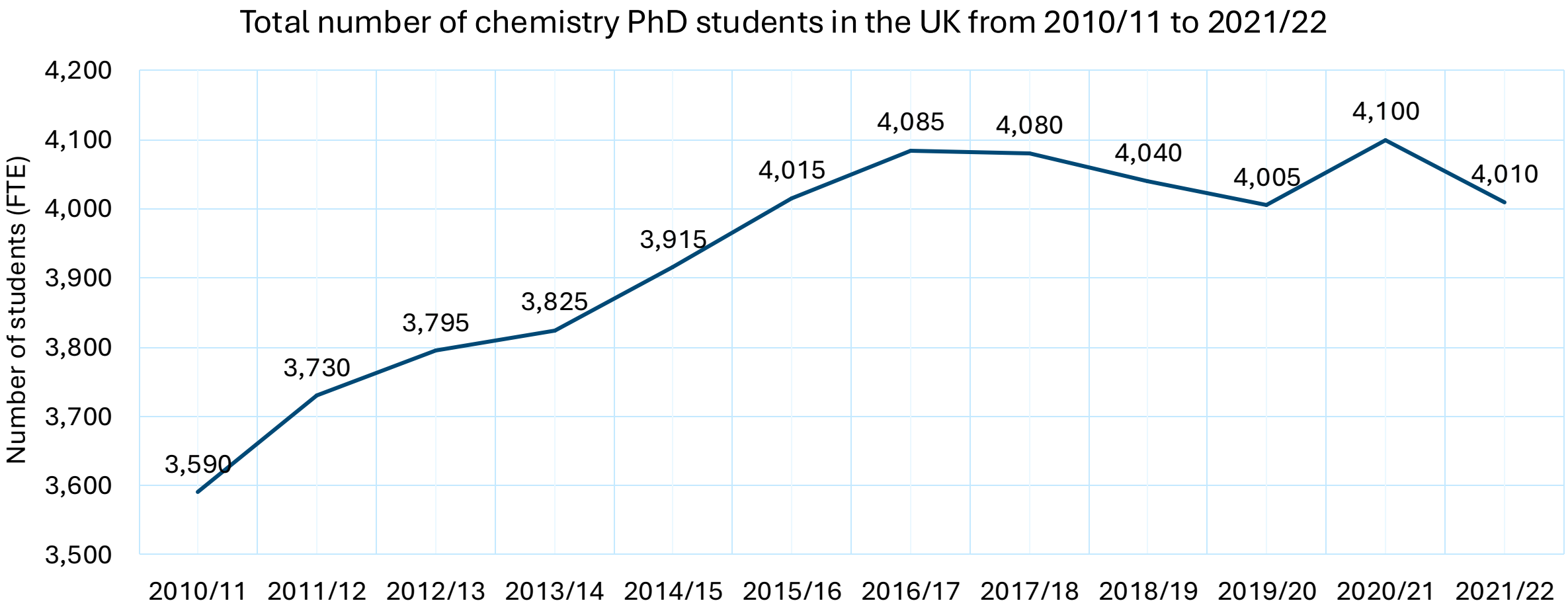
Number of international chemistry postgraduates, 2019/20 to 2022/23



Number of international chemistry first year postgraduates, 2019/20 to 2022/23



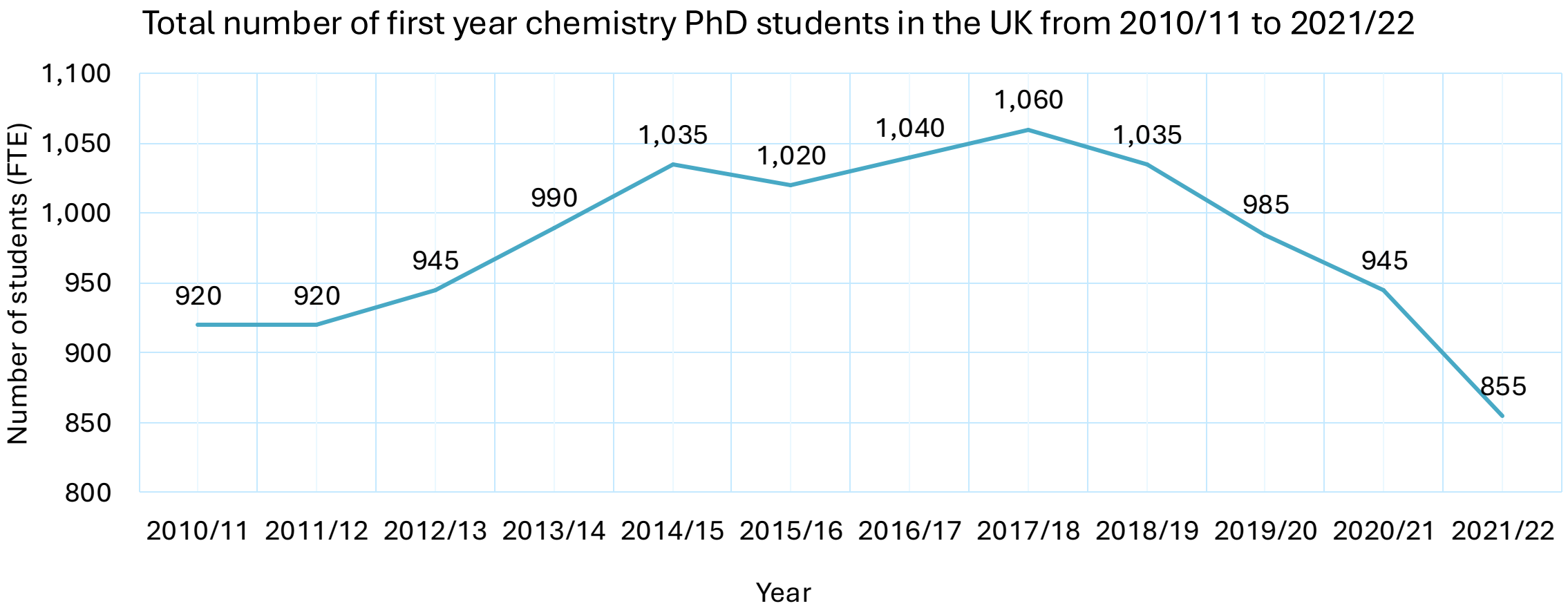
All PhD students in chemistry (HESA)



Key points:

- The total number of **chemistry PhD students has stagnated** since ~2015/16

First year PhD students in chemistry (HESA)

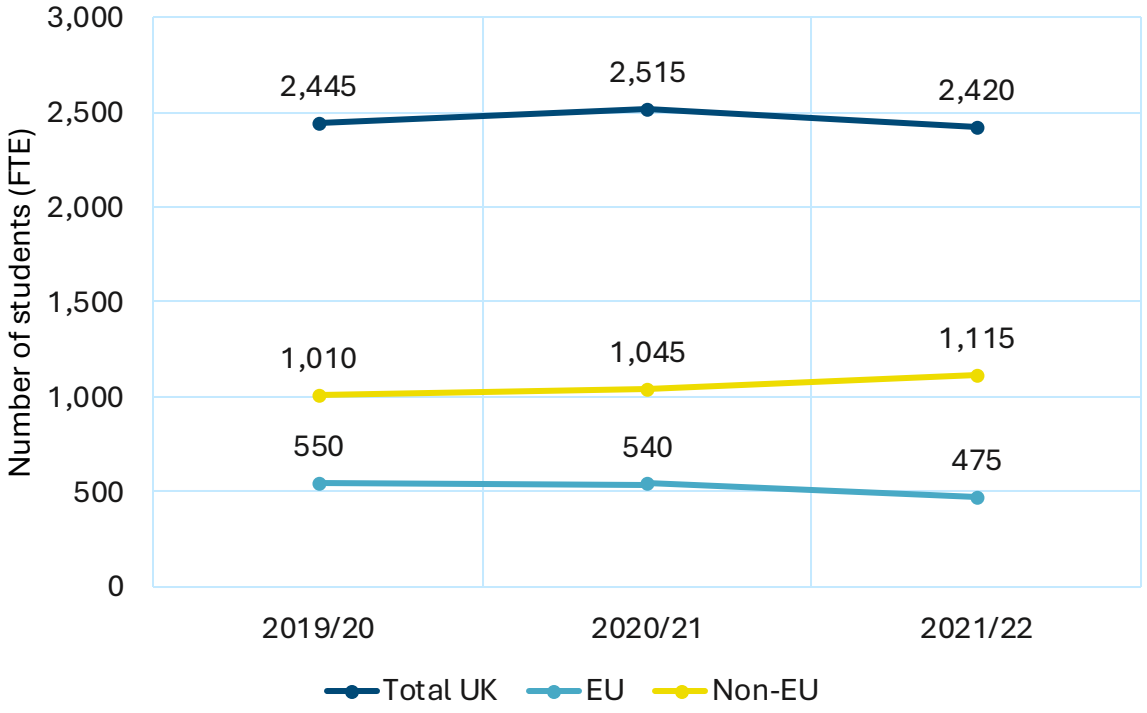


Key points:

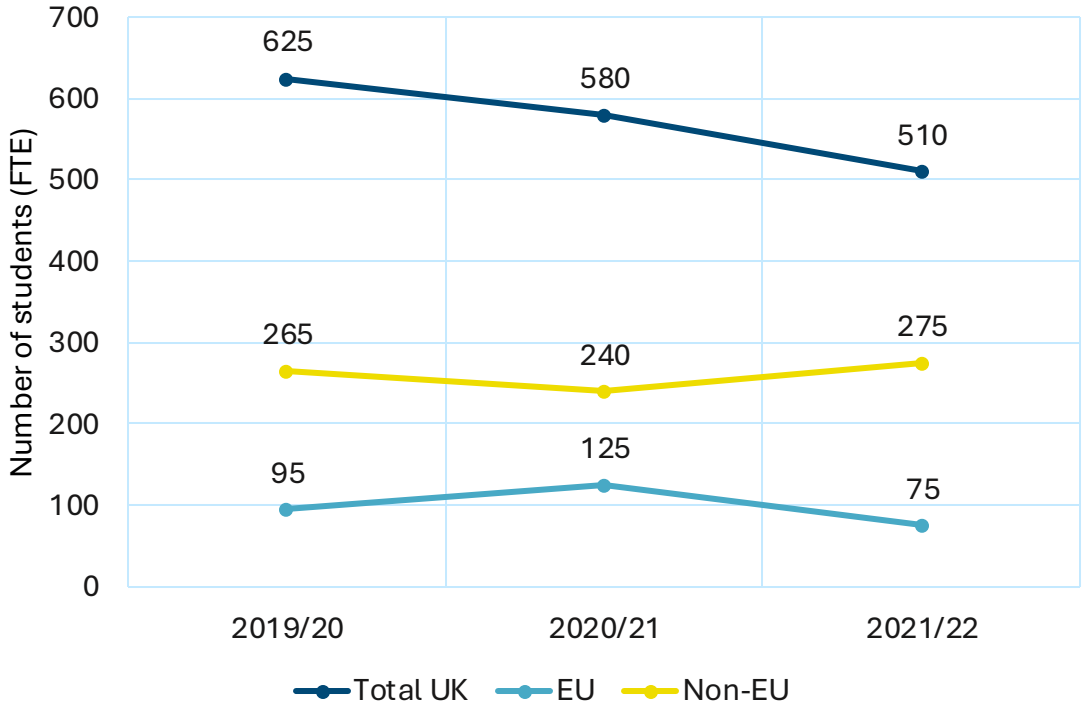
- Looking at **first year** PhDs only, we can see that the numbers **are falling**.
- It is likely that we are not seeing a corresponding fall in the total number of PhD students (across all years) as students could be talking longer to finish their PhDs (potentially in part, due to covid).

PhD students in chemistry by domicile (HESA)

Total number of chemistry PhD students studying in the UK, 2019/20 to 2021/22



Total number of first year chemistry PhD students studying in the UK, 2019/20 to 2021/22

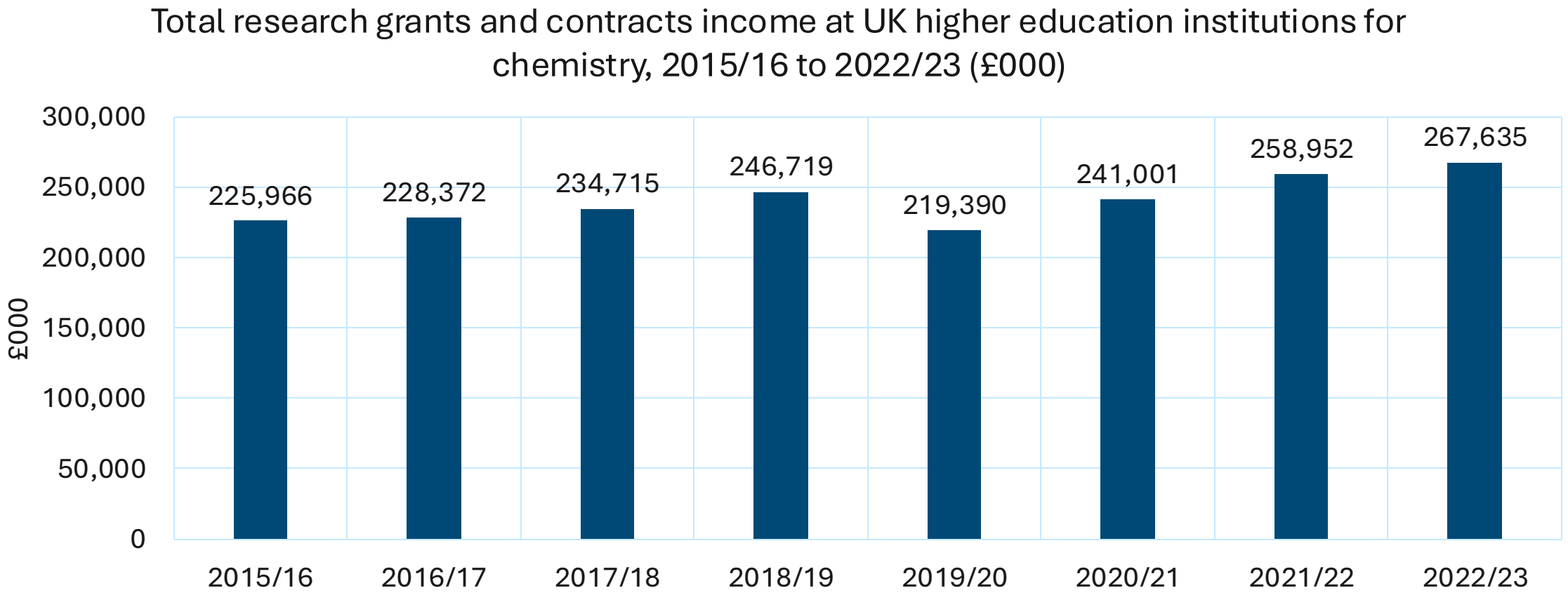


Research grant and contracts income for chemistry

What is research grant and contract income?

- The research grant and contract data displayed in the next slides includes all income in respect of externally sponsored research carried out by the HE provider or its subsidiary undertaking for which directly related expenditure has been incurred.
- Research grant and contract data excludes research funding from Research England, The Scottish Funding Council (SFC), The Higher Education Funding Council for Wales (HEFCW) and The Department for Education Northern Ireland (DfE (NI)).
- Definitions can be found on the HESA website - https://www.hesa.ac.uk/support/definitions/finances

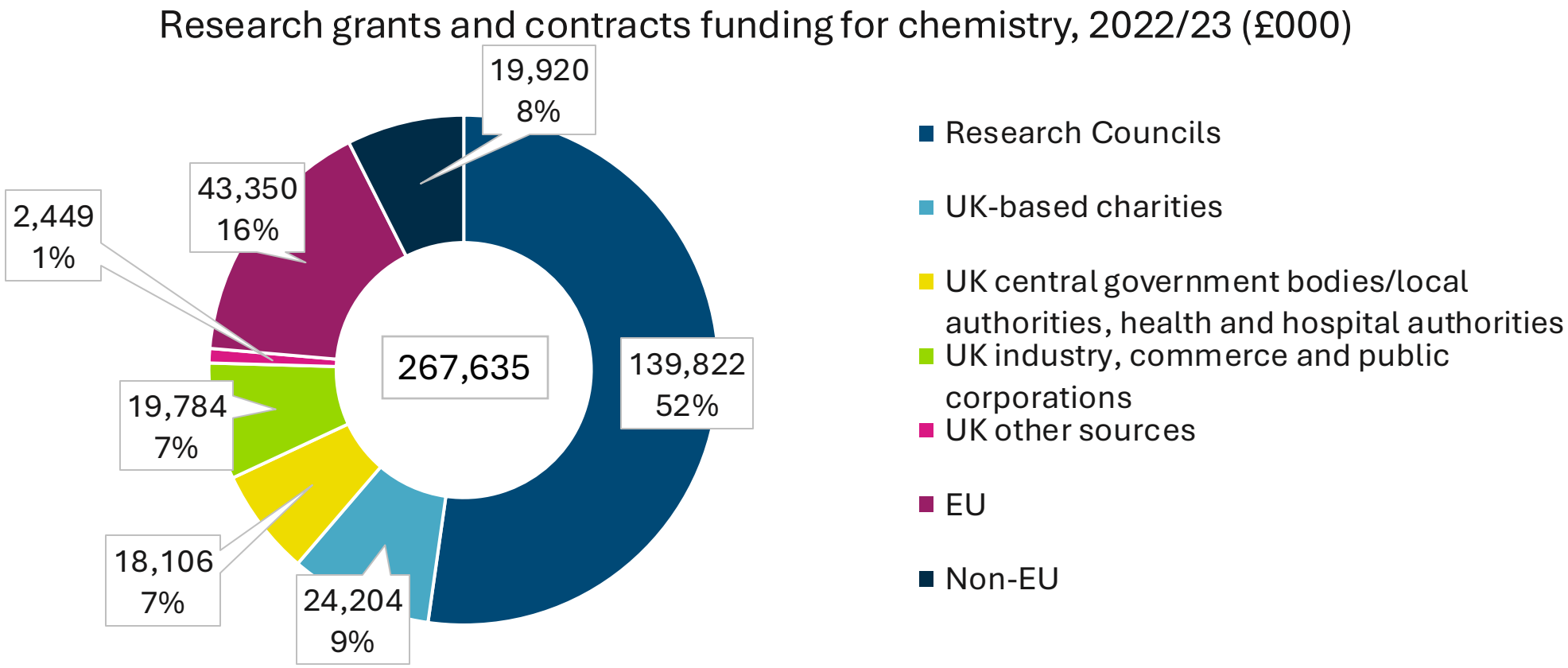
Chemistry research grants and contracts



Key points:

- Generally, the income chemistry departments received for research has increased year on year, however there was a drop in 2019/20.

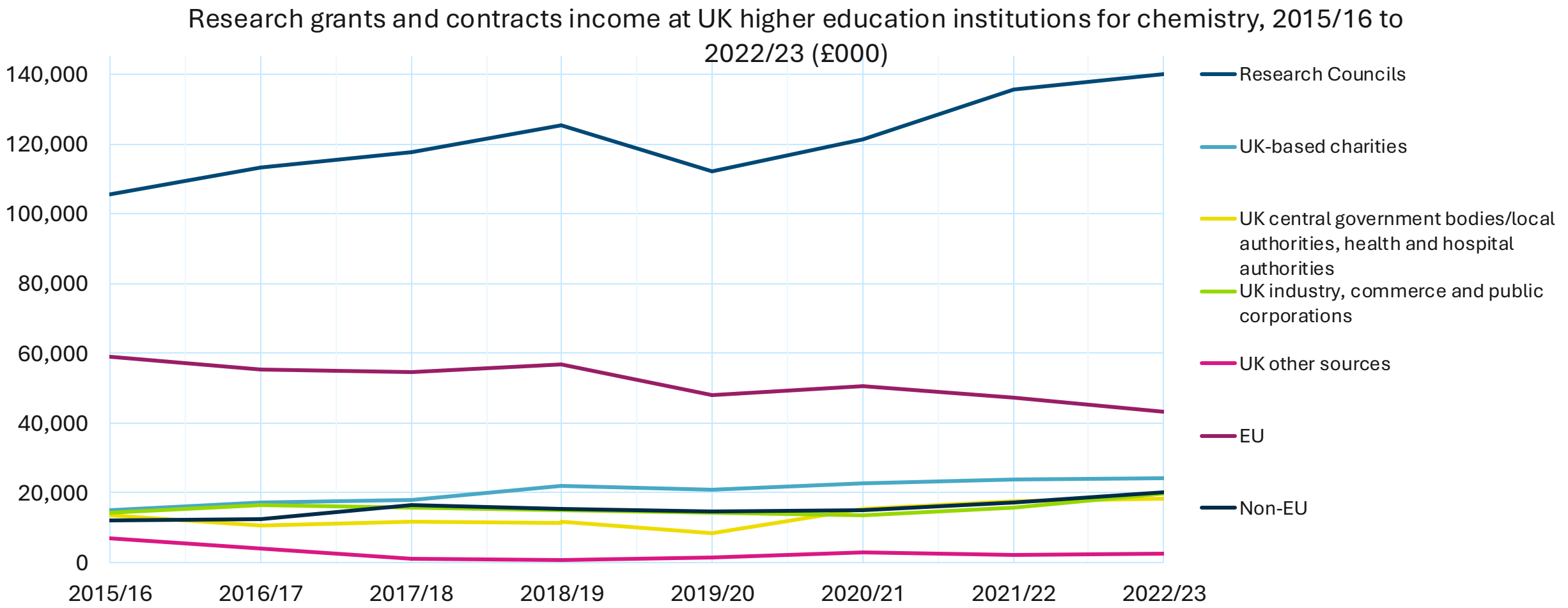
Chemistry research grants and contracts



Key points:

- Chemistry departments receive over half their income for research from Research Councils.

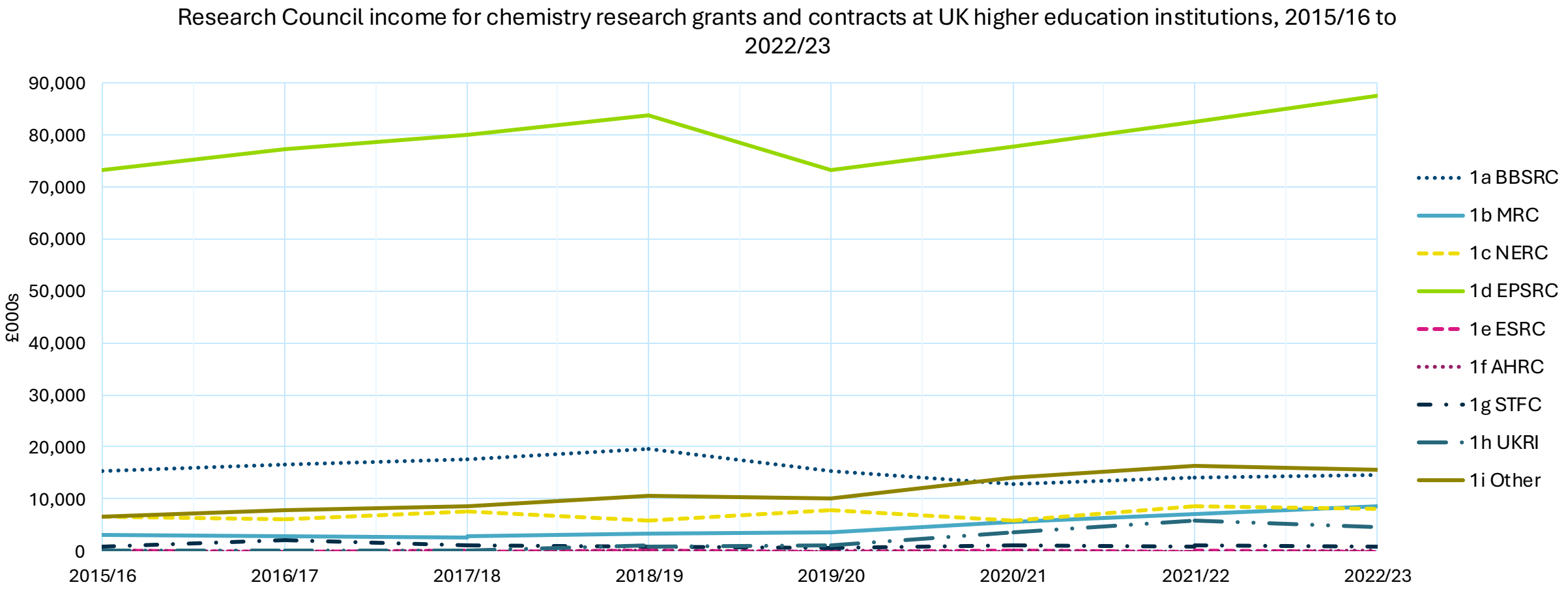
Chemistry research grants and contracts



Key points:

- Other the time period shown, income from Research Councils has increased (see next slide for a break down between Councils)
- Income from the EU has fallen during the period, likely as a result of uncertainty around association to Horizon Europe.

Chemistry research grants and contracts



Key points:

- Chemistry research receives most of its income through EPSRC.
- Until 2020/21, the second highest income stream for chemistry research was through BBSRC. Now it is via "Other" which includes income from the National Academies (see link in note slide for full definition).

Appendix 1: RSC messaging

RSC messaging

- Chemistry research is **improving lives by enabling innovation and advances in fields including healthcare, environment, and sustainability**. It plays and important role in the innovation economy by accelerating knowledge exchange, impact, and innovation, delivering a more productive, more R&D intensive economy that benefits business and residents across local regions and across the UK.
- Chemistry departments **make a strong contribution to regional and local economies**, for example through partnerships with local industry (e.g. collaborative R&D), especially SMEs, through knowledge exchange, innovation and impact and by providing access to the infrastructure and facilities that are necessary for research and development.
- Chemistry departments also **provide employers in all sectors with a pipeline of highly skilled employees necessary for sustained economic growth**. This is particularly important for sectors driving green innovation and better health. Employers in the chemical sciences are especially dependent upon employees with graduate-level skills
- There is a growing need for chemical scientists in future, as evidenced by both the Skills England's work and the RSC's report on the future chemistry workforce.

RSC messaging

- We are extremely concerned that one impact of the immediate financial challenges facing higher education is the **risk of universities closing departments such as chemistry** that provide substantial long-term benefits to the UK economy.
- Some of the institutions likely to be at risk **have a strong track record of supporting underrepresented groups** to achieve degrees.
- **It is vital that people can access higher education and vocational training in all regions and nations**. Many students and graduates are not mobile. We are concerned that the recent closure of the chemistry department in Bangor University and the planned closure in the University of Hull are creating 'chemistry deserts' where it is impossible to study chemistry. This will inevitably also affect employers of chemistry graduates in these regions.
- We recognise the **need for change in higher education** and will work with Government and other actors to shape this, whilst seeking to ensure the skills and capabilities we need in future through training chemical scientists.

RSC messaging

We call on Government to:

1. **Urgently address the financial sustainability of higher education** in a way that ensures quality chemistry teaching and research remain available in all regions to meet economic, employer and student needs.
2. **Address the cost-of-living issues affecting undergraduate and postgraduate chemistry students**.
3. **Ensure quality provision of both higher education and vocational and technical routes for chemistry in all nations and regions**, so that higher education in chemistry is accessible locally to all potential students.

Appendix 2: Additional resources and links

Additional resources and links

- Demographics of chemistry students and staff at UK higher education institutions 2012/13 to 2021/22
  - → This provides additional data including protected characteristics
  - → https://www.rsc.org/globalassets/22-new-perspectives/inclusion-and-diversity/rsc_hesa_chemistry_demographics_2023.pdf
- Future workforce and educational pathways (2025)
  - → This report uses quantitative and qualitative data to identify what the chemical sciences industry needs and how we can ensure the workforce of tomorrow as well as today has the skills needed to fulfil their ambitions in the chemical sciences.
  - → https://www.rsc.org/policy-evidence-campaigns/discovery-research-and-innovation/discovery-research-innovation-reports-surveys-campaigns/future-workforce-and-educational-pathways/
- Insights from REF2021 (2023)
  - → This considers the features of the chemistry submissions to REF2021. It provides an aggregated view and provides examples that consider the impact from, and research environment for, chemistry research in the UK. It also sets out what REF data tells us about social and economic impacts of chemistry research
  - → https://www.rsc.org/globalassets/22-new-perspectives/discovery/insights-into-research-excellence-framework-2021/rsc-ref-insights-report.pdf