# ABCS: Associations Between Characteristics of Students

# Autumn 2022

**Methodology**

# Contents

# Introduction

1. Association between characteristics of students (ABCS) is a set of measures that seeks a better understanding of how outcomes vary for groups of students holding different sets of characteristics. We define groups of students by looking at a set of characteristics so that we can determine the relationship of not just one characteristic on an outcome, but the relationship of multiple characteristics.

2. This document describes the core methodology used in creating all the ABCS measures, and unless otherwise indicated, the information presented here is relevant to all measures. In general, we have aimed to use a consistent methodology across all ABCS measures where possible. It is the intention that this document will support future publications of ABCS, as this methodology should remain unchanged.

3. There are now seven ABCS measures, which encompass all stages of the student lifecycle (both full-time (FT) and part-time (PT)):

   a. ABCS access – this measure looks at the access rates of young people in England.

   b. ABCS FT continuation – this measure looks at the continuation rates for full-time students.

   c. ABCS PT continuation – this measure looks at the continuation rates for part-time students.

   d. ABCS FT completion – this measure looks at the completion rates for full-time students. Completion is measured by tracking cohorts of students to discover if they have completed their course or are continuing to study after a certain number of years.

   e. ABCS PT completion – this measure looks at the completion rates for part-time students.

   f. ABCS FT progression – this measure looks at the progression rates for full-time students. Progression is measured according to whether a student has progressed to managerial or professional employment, further study or has another positive graduate outcome after completing their full-time higher education qualification. For a more detailed description, see the description of student outcome and experience measures definitions document.[1]

   g. ABCS PT progression – this measure looks at the progression rates for part-time students.

4. For details specific to a particular measure, please refer to the individual measure's document on the ABCS page of our website.[2]

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[1] See www.officeforstudents.org.uk/data-and-analysis/student-outcome-and-experience-measures/documentation/ (Description of student outcome and experience measures used in OfS regulation: definitions and methods used).

[2] See www.officeforstudents.org.uk/data-and-analysis/associations-between-characteristics-of-students/.

# Statistical modelling

## Modelling approach

5. For each ABCS measure, we use a statistical model to predict rates for each of the student groups. The groups consist of every possible combination of the characteristics being used for that model. Use of statistical modelling allows for assessment of whether there is a statistically significant relationship between the characteristics used and the outcome. Additionally, in the case of groups containing a small number of people, it is not always safe to assume that the observed behaviour of people in that group would reflect the behaviour of a larger group of people having those same characteristics. The use of statistical modelling gives us a 'best estimate' of the likely outcome of people holding those characteristics, based not only on the observed outcomes, but also accounting for the behaviour of those holding some of the same characteristics.

6. For all the statistical models (except ABCS access), we use the same student populations as defined in the student outcome measures.[3] For the ABCS access model, we use cohorts of school pupils at Key Stage 4 (KS4). The individualised data that we use comes from the Department for Education's (DfE's) National Pupil Database (NPD),[4] the Education and Skills Funding Agency's (ESFA's) Individualised Learner Record (ILR) and the Higher Education Statistics Authority's (HESA's) student record and student alternative record.

7. Where possible, each model uses the five most recent cohorts of data to maximise the number of unique groupings that we derive quintiles for. The exceptions to this are the two progression models, which are limited by the availability of Graduate Outcomes survey results. For the modelling, the cohorts of data are aggregated.

8. The ABCS modelling methodology uses a binary logistic regression model with all characteristics included as main effects, and then every two-way interaction between categories tested using a stepwise regression method with entry and stay criteria of α=0.05. This determines which of the two-way interactions are included in the final model. This could be considered a very conservative criterion, but because of the size of the data we are using, we believe that this is appropriate.

9. This methodology does not allow for only some parts of interactions to be included: either all interactions between two characteristics are included, or none are. Therefore, the final models may include some interactions which do not meet the α=0.05 criteria. As an example, Table 1 shows the parameter estimates for an interaction in the ABCS Access model. The reference category is Female * Not eligible for FSM. One category has a *p*-value less than 0.05, but the other category has a *p*-value greater than 0.05.

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[3] See www.officeforstudents.org.uk/data-and-analysis/student-outcome-and-experience-measures/documentation/ (Description of student outcome and experience measures used in OfS regulation: definitions and methods used).

[4] The DfE does not accept responsibility for any inferences or conclusions derived from the National Pupil Database (NPD) data by third parties.

**Table 1: Example interaction terms which do not meet the α=0.05 criteria**

| Effect | Variable 1 | Variable 2 | Estimate | Standard error | *p*-value |
|---|---|---|---|---|---|
| Gender*FSM eligibility | Male | Eligible for FSM | 0.03 | 0.01 | <0.0001 |
| Gender*FSM eligibility | Male | Unknown or N/A | 0.15 | 0.08 | 0.059 |

10. Only two-way interactions are included in the model. We considered higher order interactions as part of the preliminary analysis, but the number of possible factors created led to the model becoming unstable and therefore the predicted outcomes unreliable.

11. Having derived the predicted modelled rates for an ABCS measure, we used these to rank the students included in the modelling by their predicted rates. We then took the rate at the boundary of each 20th percentile; these five values became our 'breakpoints', which define the lower boundaries of our quintiles for this measure. Subsequently, given a student group defined by a combination of characteristics, we assign it a quintile by comparing the predicted outcome rate of that group with the breakpoints; at the boundary between two breakpoints, if the rate for the group is less than the breakpoint it will fall into the lower quintile of the two; if it falls exactly on or above the breakpoint it will fall into the higher quintile. Using this approach, two groups with the same predicted outcome rates will always be assigned the same quintile; however, this means that each quintile may not contain exactly 20 per cent of the population.

12. In selecting the characteristics for use in each of the models we were looking for characteristics that should not influence the outcome in question, but where there was evidence that the outcomes for groups within these characteristics differed. For example, there is no reason why a student's ethnicity should have an impact on the likelihood of them continuing into the second year of their course. However, our analysis of continuation rates showed that black students had lower continuation rates than students from any other ethnic background.[5] Conversely, while we know that prior attainment will have an impact on the likelihood of a young person entering higher education, this has not been included in the model because this is a justifiable – or valid – relationship.

13. The data quality framework was used to guide our selection of characteristics.[6] The stepwise selection process ensured that final models only contain those characteristics that meet the α=0.05 criteria for inclusion. No characteristics were included if data was not available for at least half of the cohorts being modelled. Although it would have been possible to include more characteristics than we have done (evidenced by their having an observable relationship with the outcome), having too many characteristics would potentially destabilise the model results due to overfitting.

14. During characteristic selection we also considered multicollinearity: this occurs when two or more characteristics are highly correlated with each other as well as the outcome and can cause model instability. In general, we found little evidence of multicollinearity, except between

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[5] See www.officeforstudents.org.uk/data-and-analysis/access-and-participation-data-dashboard/.

[6] See www.officeforstudents.org.uk/publications/differences-in-student-outcomes-further-characteristics/ (Annex A: Data quality framework).

the Index of Multiple Deprivation (IMD) and the Income Deprivation Affecting Children Index (IDACI) (see paragraphs 39 and 40 for details of these characteristics). This is to be expected, since they are both area-based measures of deprivation based on the student's home postcode, and because IDACI contributes to the calculation of IMD. We found, however, that inclusion of both measures adds value to the model.

15. In instances where data for a characteristic is missing, unknown or not applicable, we include them as their own 'Unknown or N/A' group in the modelling. Examples where data is not applicable include a TUNDRA quintile for a student 21 years of age or older, an Adult HE quintile for a student under 21 years of age (see paragraphs 32 and 47 for details about these characteristics), or an IMD or TUNDRA quintile for one domiciled outside of England.

16. For some characteristics, there are some groups or attributes that contain very small numbers of students. Where possible, we have kept them as their own distinct group for use in the modelling, but where their numbers are simply too small to maintain model stability, we have combined them with the group having the closest outcome rate.

## Dealing with combinations not present in the data

17. Although the modelling data used for an ABCS measure consists of several cohorts of actual student data, it will not necessarily contain every unique combination of characteristic values possible. For example, there may be no Asian or Asian British - Bangladeshi students who are also distance learners in the modelled data. As the intention is that ABCS quintiles can be applied to future student data, or indeed other sources of data, this would cause an issue if no quintile was assigned to such groups. We therefore derive ABCS quintiles for these combinations by predicting outcome rates using the model's parameter estimates, and assign quintiles based on the previously calculated breakpoints. These new combinations do not contribute to calculation of the breakpoints. Using this method allows us to cater for any combination of characteristic values seen in a student group that may be encountered in future.

## Dealing with unknown values and missing characteristics

18. For most of the characteristics used in the modelling, there are student groups with unknown values. In the modelling data we have not differentiated between values that are unknown for structural reasons (e.g. the data may not be collected by that provider type) and values that are unknown for other reasons (e.g. an invalid postcode resulting in unknown geographical measures). For each characteristic they are grouped into the category 'Unknown or N/A'.

19. When applying ABCS quintiles to future student data or alternative sources of data, there will often be student groups who have one or more characteristics with unknown or missing values. We have decided not to assign these characteristics the value 'Unknown or N/A', as we do in the modelling data, but to take a different approach to deriving their associated quintile. Instead, we calculate an average of the predicted outcome rates associated with the known values for that characteristic, weighted by the number of students in each of these groups. In effect, we are assuming that any student group with missing data for a characteristic is likely to have the same distribution of outcome rates as the wider population used for modelling.

20. We considered other methods for deriving quintiles for groups with missing characteristics. These were more complex and process intensive, and our analysis showed little benefit from using these approaches over the method outlined here.

21. An example is provided in Table 2 to illustrate the approach. From the modelled data we can see the number of students in each of the three free school meal (FSM) eligibility groups. (For simplicity we are assuming that all the other values for these students' characteristics are the same). By using the parameter estimates from the ABCS model, we calculate the predicted outcome rates for each of these groups and their corresponding ABCS quintile. If we subsequently wish to assign ABCS quintiles to a new data source and it contains individuals where their FSM eligibility is unknown (and they share the same values of all the other characteristics as the student groups in the original three groups), then we calculate a weighted average of the outcome rates across the three groups. Then, using the breakpoints, we derive the corresponding ABCS quintile.

22. Taking the example in Table 2, there are 700 students with a predicted outcome rate of 0.85, which contribute 700 multiplied by 0.85 to the missing data group, 250 students with a predicted rate of 0.45, which contribute 250 multiplied by 0.45, and 50 students with a predicted rate of 0.59, which contribute 50 multiplied by 0.59. These three contributions are then summed (737) and divided by the total number of students (1,000) to give the weighted average, which equates to the predicted outcome rate for the missing data group. This rate can then be compared with the breakpoints to derive which quintile the group falls into.

**Table 2: Example treatment of unknown FSM eligibility for a student group**

| FSM eligibility status | Number of students | Predicted outcome rate | ABCS quintile | Proportion of students (per cent) |
|---|---|---|---|---|
| Not eligible for FSM | 700 | 0.85 | Quintile 5 | 70.0% |
| Eligible for FSM | 250 | 0.45 | Quintile 2 | 25.0% |
| Unknown or N/A | 50 | 0.59 | Quintile 3 | 5.0% |
| Missing data | | 0.74 | Quintile 4 | |

23. Although the example in Table 2 relates to the case when a student group has only one attribute value missing, the same weighted average approach has been extended so that ABCS quintiles have been derived for cases where any number of characteristics for that measure have missing attribute values. It must be noted however, that the more characteristics that have unknown attribute values for a student group, the less confidence can be placed on the derived quintile so they should be used with caution in these cases.

## Principles for updating ABCS measures

24. The ABCS measures published in autumn 2022 use data from the most recent cohorts available as of august 2022. Although each year we receive an additional cohort of student and pupil data, we do not anticipate updating the ABCS measures on an annual basis. Instead, we will apply the following broad principles to determine whether it is necessary to update a measure.

25. When we receive a new year of data, we will assess the 'churn' of students, that is, the numbers of students changing quintile having re-run the model with a rolled-forward time series. In particular, we will look at the movement of students in and out of quintile 1, as students in these groups are likely to be the focus of policy efforts. We will also examine the changes in the breakpoints (the outcome rates that determine the boundaries between the quintiles).

26. When we judge there have been substantial changes in the results, we will consider recalculating the ABCS measure.

# Characteristics: data sources and definitions

27. This section summarises all the characteristics that are used across the seven ABCS measures. Each measure uses a different subset of these characteristics. This report outlines information applicable to all uses of these characteristics; any modifications particular to a single ABCS measure (such as grouping attributes) are detailed in the respective document.

## Data sources

28. The ABCS access measure is based on cohorts of school pupils; therefore, characteristics are obtained from pupil data. The other ABCS measures are based on student data, with characteristics either reported by providers or derived from such data.

29. The National Pupil Database (NPD) – this contains data on school pupils in England, supplied by the DfE.[7] This data source underpins the ABCS Access measure, and provides characteristics as used in this measure; pupil home postcode is also used to attach geographic measures such as TUNDRA, IMD and IDACI.

30. The Higher Education Statistics Agency (HESA) provides the student record and the student alternative record. The Education and Skills Funding Agency supply the Individual Learner Record (ILR), from which we obtain data on higher education learners at further education colleges.

31. Additionally, we have used various measures which are not supplied in the above data sources. Examples include the IMD and adult higher education quintiles. These are outlined in the following subsections. Since these are derived by the OfS for other work too, further details are available in the student outcome and experience measures core algorithms document.[8]

## Adult higher education quintile

32. Our Adult HE quintile 2011 measure assigns a quintile to an area based on the proportion of adults from that area that held a higher education qualification at the point of the 2011 census.[9] For details see the IPADULTHEQ section in the student outcome and experience measures core algorithms document. For the ABCS modelling, we have restricted this characteristic to those aged 21 or over at the start of their course, since for those under 21 we decided that TUNDRA is a more direct measure of likelihood of participation in higher education. Students aged under 21 years of age are assigned the value 'Unknown or N/A'.

## Age

33. Age (except in the ABCS access measure) is defined as the age of the student on the 31 August in the year in which they started their course. This is calculated using their birth date as

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[7] The DfE does not accept responsibility for any inferences or conclusions derived from the National Pupil Database (NPD) data by third parties.

[8] See www.officeforstudents.org.uk/data-and-analysis/student-outcome-and-experience-measures/documentation/ (Technical algorithms for student outcome and experience measures: September 2022 core algorithms).

[9] See www.ons.gov.uk/census/2011census.

reported on the ILR or HESA student or student alternative records. Age is not used as a characteristic in the access measure as we are defining the base population as 15-year-olds in Key Stage 4, so most individuals will be either 18 or 19 in student data.

34. For those aged under 21 at the start of their course, we separate 18-, 19-, and 20-year-olds; older students are grouped into age groups as detailed in the IPSTARTAGEBAND section in the student outcome and experience measures core algorithms document.[10] Any further aggregation of age groups for a particular measure is outlined in its corresponding report.[11]

## Care experience

35. Care experience describes whether a student has ever spent time in the care of a local authority in England or Wales, or Health and Social Care Trust in Northern Ireland, or who has self-declared as being in care for three months or more. The data is collected on the HESA student record only. The definition and reporting of care experience is complex; more details can be found on the HESA website.[12] See the IPCARELEAVER section in the student outcome and experience measures core algorithms document for details of the values used in our analysis.

## Disability

36. Disability information is only used from the ILR and HESA student and AP student records. Disability is self-reported by students. Details of the disability types used can be found under the IPDISABLETYPE section in the student outcome and experience measures core algorithms document.

## Ethnicity

37. Ethnicity information is taken from the NPD for the access measure and from the ILR and HESA student and AP student records for other measures. For details of the ethnicity groupings collected in the NPD see online.[13] For details of the OfS ethnicity groupings used for student data, see the IPETHNICDETAIL section in the student outcome and experience measures core algorithms document.

## FSM eligibility

38. FSM eligibility indicates whether the student was ever recorded as being eligible to receive free school meals in the six years prior to the March census date in their final year of key stage four (year 11). The data on free school meals eligibility is produced by the Department for

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[10] See www.officeforstudents.org.uk/data-and-analysis/institutional-performance-measures/technical-documentation/.(Technical algorithms for student outcome and experience measures: September 2022 core algorithms).

[11] See www.officeforstudents.org.uk/data-and-analysis/associations-between-characteristics-of-students/.

[12] See www.hesa.ac.uk/collection/c19051/a/careleaver.

[13] See find-npd-data.education.gov.uk/.

Education (DfE) as part of the National Pupil Database (NPD).[14] For ABCS Access, this data is used directly. For other ABCS measures, FSM data is linked onto data in the ILR and HESA student and student alternative records. For those measures, the data is restricted to only those who attended a state-funded mainstream school and were under 21 at the start of their higher education studies.

## IDACI

39. The Income Deprivation Affecting Children Index (IDACI) measures the proportion of children under the age of 16 in low-income households for a particular area in England.[15] It is calculated at lower-layer super output area (LSOA) level and is a supplementary measure to the Index of Multiple Deprivation (IMD), and therefore has been constructed for the Ministry of Housing, Communities and Local Government (MHCLG) by Oxford Consultants for Social Inclusion (OCSI) and deprivation.org. In this analysis, we use IDACI quintiles, where the most deprived areas are in quintile 1 and the least deprived are in quintile 5. For pupils or students domiciled outside of England, the value is set to 'Unknown or N/A'.

## IMD

40. The Index of Multiple Deprivation (IMD) is a measure of levels of deprivation for a small area within England.[16] It is calculated at lower-layer super output area (LSOA) level and uses several different measures to determine levels of deprivation. They have been constructed for the Ministry of Housing, Communities and Local Government (MHCLG) by Oxford Consultants for Social Inclusion (OCSI) and deprivation.org. In our analysis, we use IMD quintiles, where the most deprived areas are in quintile 1 and the least deprived are in quintile 5. For pupils or students domiciled outside of England, the value is set to 'Unknown or N/A'.

## Local or distance learner

41. Local learners are identified by comparing home travel to work area (TTWA) with study TTWA, which are calculated from home postcode and study postcode respectively. Local students are those whose home address is in the same TTWA as their provider. Distance learners are those who are not in attendance at the provider for their course. That is, they are studying at a distance from their provider. These definitions are based on the IPSTUDYLOCTYPE section in the student outcome and experience measures core algorithms document.[17]

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[14] The DfE does not accept responsibility for any inferences or conclusions derived from the NPD data by third parties.

[15] See www.gov.uk/government/statistics/english-indices-of-deprivation-2019.

[16] See www.gov.uk/government/statistics/english-indices-of-deprivation-2019.

[17] See www.officeforstudents.org.uk/data-and-analysis/institutional-performance-measures/technical-documentation/ (Technical algorithms for student outcome and experience measures: September 2022 core algorithms).

## National Statistics Socio-Economic Classification (NS-SEC)

42. NS-SEC is produced by the Office for National Statistics to measure the employment relations and conditions of occupations.[18] It is applied to individual students as follows: for those students who are under 21 at the start of their course, NS-SEC is based on the occupation of their highest earning parent. For those students aged 21 or over at the start of their course, NS-SEC is based on the occupation of the student themselves prior to higher education. This data is only collected in the HESA student record. See the IPSEC section in the student outcome and experience measures core algorithms document.[19] Occupations are coded using the Standard Occupation Classification 2010 (SOC) and then grouped further into these categories:[20]

    a. Higher managerial, administrative and professional occupations.

    b. Intermediate occupations.

    c. Routine and manual occupations.

    d. Never worked and long-term unemployed.

## Parental higher education

43. Parental higher education is only collected in the HESA student record. It gives the student's response to the question 'Do any of your parents have any higher education qualifications, such as a degree, diploma or certificate of higher education?'. HESA defines parents as 'natural parents, adoptive parents, step-parents or guardians who have brought you up.' See the IPPARED section in the student outcome and experience measures core algorithms document.

## Sex and gender

44. The NPD record collects information on gender, where the only response possible is either male or female, and this is what is used for the ABCS access measure.

45. For other ABCS measures, data on students' sex is taken from the ILR and HESA records, as detailed in the IPSEX section in the student outcome and experience measures core algorithms document; it is also possible to have the response 'other'.

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[18] See www.ons.gov.uk/methodology/classificationsandstandards/otherclassifications/thenationalstatisticssocioeconomicclassificationnssecrebasedonsoc2010.

[19] See www.officeforstudents.org.uk/data-and-analysis/institutional-performance-measures/technical-documentation/ (Technical algorithms for student outcome and experience measures: September 2022 core algorithms).

[20] See www.ons.gov.uk/methodology/classificationsandstandards/otherclassifications/thenationalstatisticssocioeconomicclassificationnssecrebasedonsoc2010#classes-and-collapses (section 7 classes and collapses).

## School types

46. School types are defined using the variable NFTYPE from the NPD. Our access model only includes schools that the Department for Education defines as 'state-funded mainstream' schools. This includes the following school types:

    a. Academy 16-19 Converter

    b. Academy 16-19 Sponsor Led

    c. Academy – converter

    d. Academy – Sponsor-led

    e. City Technology College

    f. Community School

    g. Foundation School

    h. Free School – 16-19

    i. Free School – Mainstream

    j. Free School – Studio School

    k. Free School – UTC

    l. Further Education Sector Institution

    m. Voluntary Aided School

    n. Voluntary Controlled School.

## TUNDRA

47. TUNDRA (tracking underrepresentation by area) is an area-based measure that uses tracking of state-funded mainstream school pupils in England to calculate young participation.[21] It only applies to students aged under 21 at the start of their course. For those aged 21 or over, or for students domiciled outside of England, these are placed in the 'Unknown or N/A' group. Due to similarities between TUNDRA and POLAR4, we have decided to no longer use POLAR4 as a characteristic.

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[21] See www.officeforstudents.org.uk/data-and-analysis/young-participation-by-area/about-tundra/.

# Using the ABCS measures

## Potential uses

48. We anticipate that there are a number of potential uses of the ABCS measures and the findings in this report, which include, but are not limited to:

    a. Providers may wish to apply ABCS quintiles to their own students, to get a better understanding of the outcomes and experiences of their students in higher education and identify any groups who have, historically, been less likely to achieve positive outcomes.

    b. Those involved in outreach activities may wish to understand which of the ABCS access quintiles prospective students are likely to fall into, to help identify and support groups less likely to access higher education.

    c. In the OfS consultation on the construction of student outcome and experience indicators for use in OfS regulation, and our analysis of responses, we proposed using ABCS quintiles as benchmarking factors for continuation, completion and progression outcomes.[22] We were clear in our analysis of responses that while we were minded to proceed with our proposed benchmarking factors, we were not taking final decisions at that point. The findings in the report facilitate further work to understand whether the factors and groupings we proposed for the purposes of benchmarking the completion and progression measures, continue to maintain the statistical integrity of the benchmarking approach.

49. When using the ABCS measures for any purpose, users should be aware that each ABCS measure is tailored according to the characteristics associated with positive outcomes at the stage of the student lifecycle to which it relates. As a result, we consider that each measure should only be applied to populations related to the stage of the student lifecycle to which that ABCS measure pertains. As an example, ABCS FT continuation quintiles should only be applied to undergraduate students, in the entrant year of their course, studying full-time.

## How to obtain ABCS quintiles for individuals or groups of individuals

50. To obtain the quintile for a small number of individuals or groups of individuals with exactly the same set of characteristics, the Tableau workbooks can be used.[23] The attributes for each characteristic can be chosen from the dropdown menus, and a derived quintile will be shown. If the individual or groups in the data you are using has a characteristic value that is missing, then the dropdown can be left as '—any [characteristic]—' and the derived quintile will reflect the weighted average approach as outlined elsewhere in this report (in paragraphs 18 to 23). It is not practical, however, to find the quintiles for large numbers of individuals using the dashboard, as this would require a lot of manual interaction.

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[22] See www.officeforstudents.org.uk/publications/student-outcomes-and-teaching-excellence-consultations/outcome-and-experience-data/.

[23] See www.officeforstudents.org.uk/data-and-analysis/associations-between-characteristics-of-students/.

51. To obtain quintiles for multiple individuals, it is necessary to use the data downloads to look up their quintiles based on the individuals' characteristics.[24] You will need to ensure that the characteristics match in terms of the attributes. If any attribute groups have been combined in the modelling data (for example, small groups such as the Gypsy or Traveller ethnic group are often combined with a larger ethnic group for ABCS modelling), then any individuals with this attribute should have their attribute value changed to match the larger group. This will allow the individual to be matched with the ABCS data. Information about which attributes have been combined in this way can be found in the report associated with each ABCS measure.

## What to do if you are missing data for individuals

52. If you are missing data for any characteristics for any individuals in your data, then these should be set to '—any [characteristic]—' (where [characteristic] should be replaced with the name of the characteristic in question), and the quintiles obtained by matching across all characteristics as usual. The 'Unknown or N/A' attribute is used only in the creation of the model and is not recommended for use when obtaining quintiles for individuals.

## How to interpret the Tableau dashboards

53. There is a separate dashboard for each ABCS measure. Using the dropdown menus, attributes can be selected for each characteristic, or '—any [characteristic]—' can be selected instead of choosing a particular attribute.

54. The lower panel shows the distribution of individuals across the ABCS quintiles. If all characteristics have an attribute selected, then 100 per cent of individuals will fall into a single quintile. This is because a group is defined by a combination of attributes, and each group has a single quintile.

55. If one or more characteristics are set to 'any' then the lower panel will show what proportions of students with any combination of those characteristics fall into each quintile. In addition, at the bottom of the dashboard a derived quintile is shown. This reflects a weighted average of the distribution of individuals across all quintiles, as described previously in this report.

## Further information

56. This series of reports provides an overview of the methodology developed for ABCS measures. For accessibility, high level descriptions have been used, rather than details of the implementation of the methodology in our software environment. If you have any questions, please get in touch: contact details are provided on the front page of this report.

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[24] See www.officeforstudents.org.uk/data-and-analysis/associations-between-characteristics-of-students/.