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Cambridge Assessment Statistics Reports: Recent highlights

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Introduction

The Research Division publishes a number of Statistics Reports each year based on the latest national examinations data. These are statistical summaries of various aspects of the English examination system, covering topics such as subject provision and uptake, popular subject combinations, trends over time in the uptake of particular subjects and the examination attainment of different groups of candidates.

The National Pupil Database (NPD) is the source of most of these reports. This is a very large longitudinal database, owned by the Department for Education, which tracks the examination attainment of all pupils within schools in England from their early years up to Key Stage 5 (A level or equivalent). It is updated annually from data provided by the awarding bodies and goes back as far as 1996. Another database, the Pupil Level Annual School Census (PLASC), can be requested matched to the NPD. This contains background information on candidates such as deprivation indicators, language, ethnicity and special educational needs. Other sources of data used to produce the Statistics Reports include the Inter-Awarding Body Statistics produced by the Joint Council for Qualifications (JCQ) and the National Candidate Results Archive.

This article highlights some of the most recent Statistics Reports, published between 2010 and 2011. Full copies of all the Statistics Reports are available in the research section of the Cambridge Assessment website (www.cambridgeassessment.org.uk) and new additions to the Statistics Reports series will be listed in future issues of *Research Matters*.

Routine reports: Provision, uptake and results of GCSE and A level qualifications

A number of the statistics reports are produced routinely on a yearly basis. These reports are simple presentations of provision, uptake and results of GCSE and A levels, without commentary on the results. The purpose of these reports is to make readily available examinations data that is not (to our knowledge) provided elsewhere.

Uptake and results of GCSE and A level qualifications over time (Statistics Report Nos. 30–33)

The first set of routinely produced reports presents data on all entries and results for GCSEs and A levels taken in England, Northern Ireland and Wales over a period of several years (the latest reports are for 2002–2010). The data are compiled from the Inter-Awarding Body Statistics.

Four separate reports are routinely produced each year:

- GCSE uptake and results by gender
- A level uptake and results by gender
- GCSE uptake and results by school type
- A level uptake and results by school type

Within each report, uptake and results are presented for all subjects together and then broken down by subject category. Within each subject category there are sometimes different specifications. For instance, the
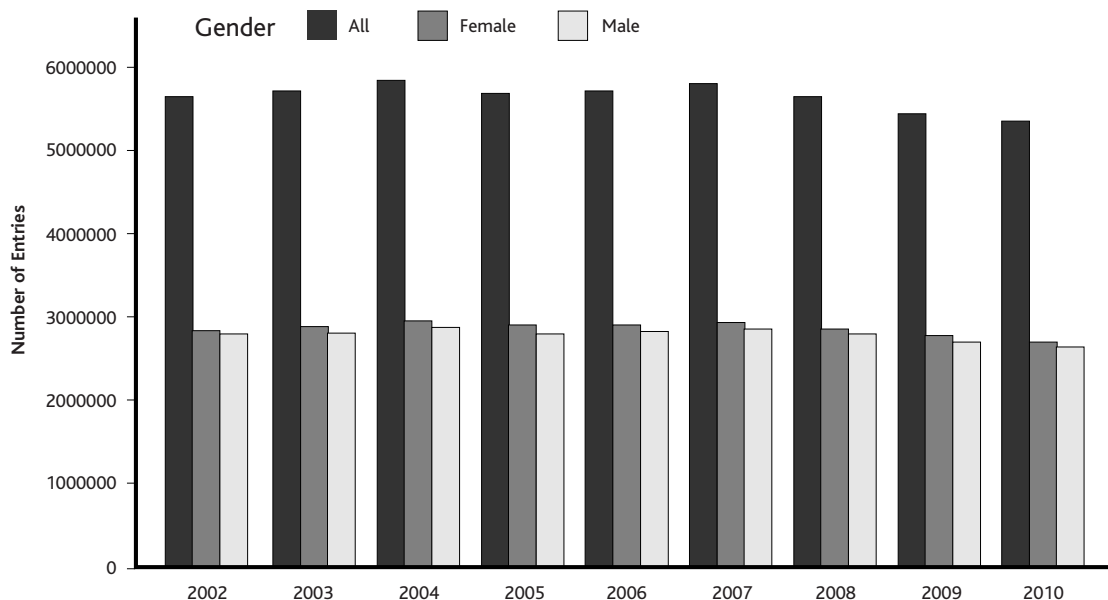
Figure 1:
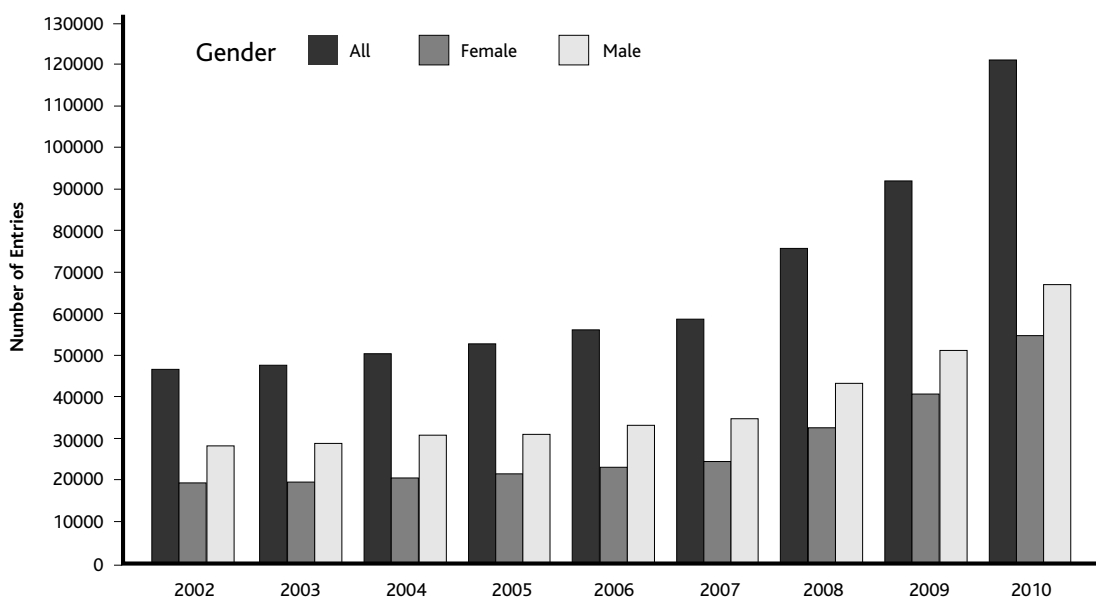**GCSE all subject entries**
2002–2010

Figure 2:
GCSE Physics entries
2002–2010

A level mathematics category includes Mathematics, Pure Mathematics, Further Mathematics and Statistics. Where individual subjects are of special interest these are presented separately. For instance, the modern languages category for both GCSE and A level was broken down into French, German and Spanish.

In each report the number of entries for each subject category is presented, followed by the cumulative percentage of candidates achieving each grade. Figure 1, taken from Statistics Report No. 31, presents the GCSE entries for all subjects for 2002–2010. An example of the trend in entries in an individual subject (GCSE Physics) is shown in Figure 2.

Provision and uptake of GCSE and A level qualifications (Statistics Report Nos. 27–28)

The second set of routinely produced reports is on the provision and uptake of GCSE and A level subjects in England in a given year, using data extracted from the NPD. Measuring these can identify subjects where levels of provision or uptake are low or declining.

The level of provision in a subject is defined as the percentage of schools with at least one student taking the subject. Uptake of a subject is measured as the percentage of all pupils taking at least one qualification of the same type (e.g. GCSE or A level) in the subject in question.

Four separate reports on provision and uptake are produced each year:

- Provision of A level subjects
- Uptake of A level subjects
- Provision of GCSE subjects
- Uptake of GCSE subjects

The levels of provision in the reports are presented by several school-level classifications: school type, school attainment, school gender composition (boys, girls or mixed), school size and school deprivation level. Similarly, uptake levels are reported by a number of student-level classifications: gender, school type, attainment, school gender composition and deprivation level.

Table 1: Provision of A levels by school type (percentages)

Subject	Academy	Comprehensive	FE/Tertiary College	Grammar	Independent	Sec Mod	6th Form College
Biology	73.0	92.0	72.9	99.4	87.1	56.4	94.8
Chemistry	66.1	88.4	68.6	99.4	84.4	42.6	96.3
English Literature	71.3	89.5	63.8	97.0	83.2	77.2	95.6
French	33.9	65.7	35.7	94.5	76.2	30.7	86.7
General Studies	16.5	37.0	8.7	59.8	15.8	14.9	42.2
Geography	47.8	83.0	44.4	98.2	80.1	57.4	88.1
History	67.8	90.6	65.7	99.4	83.5	64.4	94.1
Mathematics	79.1	94.4	73.4	99.4	90.4	73.3	97.8
Physics	55.7	83.7	60.9	99.4	82.3	38.6	94.8
Psychology	68.7	87.0	79.2	80.5	52.3	66.3	94.8

Table 2: Uptake of A levels by gender and prior attainment (percentages)

Subject	All	Male	Female	Low attainment	Medium attainment	High attainment attainment
Mathematics	24.4	31.5	18.4	6.8	19.2	44.5
Psychology	19.2	11.2	26.1	18.4	24.8	15.1
Biology	19.0	18.0	19.8	5.8	18.7	32.4
General Studies	16.9	17.0	16.8	11.1	18.4	22.3
History	16.3	17.4	15.4	10.7	16.6	22.3
English Literature	16.2	9.9	21.6	12.2	16.5	20.8
Chemistry	14.5	16.5	12.8	3.3	10.8	28.7
Geography	10.5	12.4	8.9	6.4	11.7	13.9
Business Studies: Single	10.5	13.5	7.9	13.2	12.9	5.2
Physics	10.1	17.4	3.9	2.7	8.5	18.1

Table 1 shows the provision of some of the most popular A level subjects in 2010 by school type (from Statistics Report No. 27).

Table 2 shows the levels of uptake of the ten most popular A level subjects in 2010 by gender and by prior attainment level (from Statistics Report No. 28). Prior attainment was defined by students' GCSE grades. GCSE grades were converted into scores (A* = 8, A = 7, B = 6 etc.) and a mean GCSE was calculated for each student, which was then used to divide students up into three approximately equal-sized attainment groups: low, medium and high.

The uptake reports also present the most common combinations of three or more A level subjects taken by candidates. In 2010 the combination taken by the largest percentage of students was Biology, Chemistry and Mathematics, which was taken by 4% of male students and 4.2% of female students.

Provision and uptake of specific GCSE and A level subjects

At times, the provision or uptake of a particular subject area becomes a matter of public concern due, for example, to a rapid decline in pupil numbers or to the lack of choice within a particular school sector. On other occasions, changes in educational policy draw attention to specific subject areas. As a result, specific analyses on provision or uptake of GCSE or A level subject areas are carried out.

This section of the article outlines some of the results from two statistical reports investigating two subject areas, science and ICT, which have been in the spotlight recently. Data for these statistical reports were extracted from the NPD.

Provision of science subjects at GCSE 2009 (Statistics Report No. 15)

Recent changes to the level 2 curriculum have provided schools and students with a much greater choice of science qualifications. In particular, since 2006, the programme of study for science sets out a core content that is relevant to all pupils and specifies curriculum requirements for the equivalent of a single GCSE (Core Science). Additionally, students can take one of two complementary GCSEs – GCSE Additional Science or GCSE Additional Applied Science – in order to cover a more comprehensive programme of science study. Students can also study separate GCSE Biology, GCSE Chemistry and GCSE Physics to gain three full GCSEs in science. Since 2002 there has also been a vocational route in science offered at GCSE level: Applied Science Double Award. This qualification was designed to offer students the opportunity to widen their participation in vocationally-related learning.

Statistics Report No.15 investigated the provision of GCSE science options in secondary schools in England in 2009. The percentages of schools offering each science option were tabulated overall and by school type, school attainment and school deprivation. Table 3, showing the most popular combinations of science subjects offered in secondary schools in England both overall and by school type, highlights that:

- Biology, Chemistry and Physics were available for certification in 2009 in about 46% of the schools (increasing by about 11 percentage points since 2007 – see report);

- the provision of Biology, Chemistry and Physics was higher in independent and grammar schools than in comprehensive schools. The Double Award (Core plus Additional Science) and the Applied Science Double Award followed the opposite pattern.

Table 3: Percentages of schools offering science subjects by school type, 2009

Science subject(s)	% of all schools	Comprehensive schools	Grammar schools	Independent schools
Core Science AND Additional or Additional Applied Science	72.44	87.44	82.15	70.76
Biology AND Chemistry AND Physics	45.52	52.32	88.10	57.55
Applied Science Double Award	7.79	12.00	1.19	1.62

There are other science qualifications at level 2 that account for a small percentage of the volume of science offered in schools (e.g. BTEC in Applied Science or OCR National Awards in Science). They are an alternative to the courses mentioned above and provide students with the technical knowledge and skills needed in the workplace, in further education or in training. The percentages of candidates taking these courses have been increasing over the last few years. Further work including these qualifications is currently ongoing.

Uptake of ICT and computing qualifications in schools in England 2007–2009 (Statistics Report No. 25)

The number of students taking ICT (Information and Communication Technology) and computing-related GCSE and A level qualifications has dropped in recent years, with a fall of 33% in just three years in ICT GCSE students, a fall of 33% in six years in A level ICT students and a fall of 57% in eight years in A level Computing students in England (The Royal Society, 2009).

Statistics Report No. 25 investigated trends in the numbers of students in England obtaining qualifications in ICT and Computing (or any related subjects) at Key Stage 4 and at Key Stage 5 over the years 2007 to 2009.

This report shows that in recent years many alternatives to GCSEs and A levels have been offered by the English awarding bodies (e.g. vocationally-related qualifications such as the Diploma in Digital Applications or the OCR Nationals). Some of these qualifications have become very popular among 14–19 year olds and some schools have moved away from GCSEs and A levels to take on vocational courses. In particular, Table 4 shows that:

- from 2007 to 2009, entries in GCSE ICT dropped both for the full course and for the short course (by 32% and 42%, respectively). There was also a fall of about 70% in the entries for the vocational GCSE in Applied ICT;

- the uptake of vocationally-related qualifications at level 2, such as BTEC Firsts, OCR Nationals and qualifications in the DiDA suite, experienced a large increase from 2007 to 2009.

Entries for level 3 qualifications, as well as entries by students' ability, students' level of deprivation and students' school type, are also available in Statistics Report No. 25. The report also includes population estimates

Table 4: Entries for ICT and computing (or any related subjects), 2007–2009

Level	Qualification	Entries		
		2007	2008	2009
1/2[1]	GCSE full course in ICT	78414	65211	53082
	GCSE short course in ICT/Digital Communications	77870	64072	45409
	Vocational GCSE Double Award in Applied ICT	26470	14481	7856
2	Functional skills	–	944	5613
	Key skills	6320	5835	3711
	GNVQ in Applied ICT	48703	–	–
	NVQs	35	50	35
	VRQs	2310	3908	3819
	Award/Certificate/Extended Certificate/ Diploma in Digital Applications (DiDA)	68774	114228	82550
	BTEC First for ICT practitioners	1393	9674	13986
	OCR Nationals in ICT	5022	60648	118081
	BCS[2]	5184	7453	5580
	Other	148	193	160

1 These qualifications are at levels 1 or 2 on the National Qualifications Framework, depending on the grade obtained. (http://www.direct.gov.uk/en/EducationAndLearning/ QualificationsExplained/DG_10039017).
2 BCS are qualifications awarded by The Chartered Institute for IT, formerly known as the British Computer Society.

of 15 year olds to 18 year olds for the years 2007 to 2009 for England, which can be used to check for an increase or a decline in the population of students.

Other areas of research in recent Statistical Reports

How old are GCSE candidates? (Statistics Report No. 20)

Although GCSEs are designed for sixteen year olds, older and younger candidates can enter for them. For this report the distribution of GCSE entries and candidates by age is presented for three different years (2000, 2004 and 2009). The results are then broken down by what are considered to be important factors, such as school type and subject. Finally, the most popular subjects taken by candidates of different ages are shown. The data for this report come from the National Candidate Results Archive, which consists of all GCSE entries from all exam boards in England, Wales and Northern Ireland.

Table 5 presents all GCSE entries in each of the three years, broken down by candidate age.

As expected, the vast majority of entries were from pupils aged 16. The second highest number of entries were 17 year olds in 2000 and 2004 (making up 3.1% and 2.3% of entries), and 15 year olds in 2009 (5.1%). Indeed, 2009 saw a notable increase in the percentages of entries from 15 year olds in comparison to earlier years (from 1.7% in 2004 to 5.1% in 2009).

Tables presenting entries by age in a number of individual subjects are also included in this report. They show that, for example, there were substantial numbers of pupils aged 17 who were taking GCSE English or Maths, the majority of whom were likely to be re-taking the qualification. In 2009, both subjects had large increases in the percentages of pupils taking the qualification early compared with previous years. They were both also popular amongst adult learners,

presumably people obtaining a qualification to help them get into higher education or to get a job.

In French there were substantial percentages of early takers, mainly 15 year olds but many at age 14. This was also one of the most popular subjects for 11–13 year olds and many of these candidates may be native speakers of the language. There were large increases in the percentages of 14 and 15 year old takers in 2009 compared with earlier years.

Table 5: GCSE entries by age (all subjects)

Age band	Number			Percentage		
	2000	2004	2009	2000	2004	2009
10 or younger	55	76	72	<0.1	<0.1	<0.1
11–13	1,514	1,821	3,473	<0.1	<0.1	0.1
14	4,878	10,768	42,258	0.1	0.2	0.8
15	54,259	82,652	263,166	1.2	1.7	5.1
16	4,250,321	4,687,506	4,615,162	93.3	94.2	90.1
17	143,041	112,287	118,189	3.1	2.3	2.3
18	34,075	27,472	31,776	0.8	0.6	0.6
19	13,138	10,981	13,366	0.3	0.2	0.3
20–24	14,327	11,411	12,357	0.3	0.2	0.2
25–54	38,242	29,366	23,763	0.8	0.6	0.5
55 or older	3,372	2,895	1,693	0.1	0.1	<0.1

Predicting A level grades using AS level grades (Statistics Report No. 29)

The university application process for candidates in the UK is run by UCAS. In the UCAS application process a referee for each candidate is required to submit predicted grades for the candidate's pending qualifications. These referee-predicted grades are then used by universities and colleges to inform the offers made to their applicants.

The main qualification completed by candidates in England before university entry is the A level. A level qualifications are usually undertaken across a two year period, with candidates typically completing corresponding AS level qualifications at the end of the first year. For these candidates, a potential alternative to referee-predicted grades is therefore their actual AS level results.

The purpose of Statistics Report No. 29 was to explore the possibility of using AS level results as an alternative to predicted grades in the UCAS application process. Specifically, the report used the 2009 and 2010 NPD to analyse how accurately 2009 AS level grades were able to predict 2010 A level grades for candidates in England.

The report identified that 2009 AS level grades were a reasonable predictor of 2010 A level grades, with 54% of A level grades equal to AS level grades and 93% of A level grades within one grade of AS level grades (where the data could be matched). However, AS level grades predicted slightly disproportionately for some subgroups of candidates: they were more successful at predicting A level grades for candidates who attained high AS level grades, female candidates, candidates from areas of low or medium deprivation and candidates from independent or grammar schools.

A recent Department for Business, Innovation and Skills (BIS) report (2011) investigated how accurately predicted grades were able to predict A level grades for all UCAS applicants in the 2009 examination year. The results of this study allowed direct comparison of the predictive ability of AS level grades against that of referee-predicted grades, albeit within the

limitations of different admission years. Table 6 presents the proportion of A level grades that were equal to, higher than, or lower than matched AS level versus predicted grade predictors in the two reports.

Table 6: A level grade equal to, higher than, or lower than predictor (AS level grade or predicted grade)

A level grade:	Predictor (column %)	
	AS level grade (2010 prediction)[a]	Predicted grade (2009 prediction)[b]
Equal to predictor	54.5	51.7
Higher than predictor	22.9	6.6
Lower than predictor	22.7	41.7
Total	**100**	**100**

Sources: a. Statistics Report No. 29; b. Department for Business, Innovation and Skills (2011).

Overall, AS level grades were a slightly more accurate predictor than predicted grades. Where the predictions were inaccurate, AS level grades were equally likely to be optimistic (A level lower than AS level) as they were pessimistic (A level higher than AS level). In contrast, predicted grades were substantially more likely to be optimistic than pessimistic. In the UCAS application process these varied balances of optimism relative to pessimism could have very different consequences for both the candidates and institutions involved (see Statistics Report No. 29 commentary for further discussion).

The BIS predicted grades report also investigated how accurately A level grades could be predicted for several different subgroups of candidates. Predicted grades were more successful at predicting A level grades for candidates who were predicted A grades, female candidates, candidates of high socio-economic status and candidates from independent schools. These patterns are very similar to those identified in the AS level grades report and highlight that AS level grades and predicted grades both predict slightly disproportionately for some subgroups of candidates.

Overall, the outcomes of the predicted grades report and Statistics Report No. 29 highlight that AS level grades could be considered as a possible alternative to (or supplement) referee-predicted grades. However, prediction of A level grades for both predictors could only be described as 'reasonable'. The key question for consideration might therefore be whether either of the predictors is sufficiently accurate for use in the UCAS admission process.

Candidates awarded the new A* grade at A level in 2010 (Statistics Report No. 36)

Two previous Statistics Reports (No. 6 and No. 14) have shown the rise in the number and percentage of candidates, since 1996, attaining three or more A grades at A level. Of candidates in England aged 17–18, only around 8% of those taking at least three A levels attained three A grades or better in 1996 (less than 11,000 candidates). By 2006, this had risen to over 15% (more than 24,000 candidates). There followed a year-upon-year increase up to 2009, when the figure stood at around 17.5% of that group (around 30,000 candidates). Approximately 28% of all grades awarded in 2009 were an A. These attainment increases were problematic for a number of competitive higher education institutions and courses, which were faced with the task of differentiating between an increasing pool of equally highly-qualified applicants.

Table 7: Percentages of candidates within each school type attaining the highest A level grades in 2010

Criteria	Comprehensive/ Secondary Modern	Selective/Grammar	Independent	Sixth Form College	FE/Tertiary College
	%	%	%	%	%
A* A* A* or better	1.5	4.7	6.5	1.5	0.8
A* A* A or better	3.9	10.6	14.3	4.2	2.4
A* A A or better	7.9	19.2	25.3	8.4	5.2
A A A or better	11.4	26.9	35.0	12.3	8.0

Table 8: School type breakdown of the candidates attaining the highest A level grades in 2010

Criteria	Comprehensive/ Secondary Modern	Selective/Grammar	Independent	Sixth Form College	FE/Tertiary College	Total N of candidates
	%	%	%	%	%	Count
A* A* A* or better	25.5	20.8	39.4	11.7	2.5	4639
A* A* A or better	28.2	19.2	36.0	13.4	3.0	11180
A* A A or better	30.0	18.4	33.7	14.4	3.4	21232
A A A or better	30.5	18.2	32.8	14.7	3.7	30144
Candidates with 3+ results	44.9	11.3	15.7	20.1	7.8	180181

Data source: National Pupil Database (DfE). Results are for pupils in schools in England who turned 18 in the school year 2009/10.
General Studies and Critical Thinking results are excluded as some HE courses will not accept these other than as a fourth subject.

The A* grade, first awarded at A level in 2010, was designed to differentiate between the highest ability candidates. It is awarded to candidates who attain an A grade overall (at least 80% of the uniform marks across all their units) plus at least 90% of the uniform marks across their A2 (normally second-year) units. Statistics Report No. 36 investigated attainment of this new grade by candidates' school type and gender.

In 2010, around 8% of A level entries were awarded the A* grade. Under 5000 A level pupils achieved three A* grades or better, this being less than 3% of the 180,181 17–18 year olds taking at least three A levels. Around 6% attained A*A*A or better and around 12% attained A*AA or better. The percentage attaining AAA or better decreased slightly from the 2009 figure, to just below 17%.

By school type, the percentage of pupils attaining three A* grades varied from around 6.5% in independent schools to under 1% in FE/tertiary colleges. It was around 1.5% in comprehensive schools and sixth form colleges. This is shown in Table 7. The results for grammar school pupils were closer to those of independent school pupils than they were to any other state school type. Over a third of independent school candidates attained grades AAA or better in 2010.

Table 8 shows that independent school candidates accounted for less than 16% of the A level candidature with three or more results but constituted almost 40% of the A*A*A* group. Comprehensive school candidates accounted for around 45% of the candidature but only 25% of the A*A*A* group. Independent school candidates and comprehensive school candidates accounted for around 32% and 31%, respectively, of those achieving grades AAA or better. It can be seen from Table 8 that the greater the number of A* grades rather than A grades specified in the

criterion, the more over-represented are candidates from independent and grammar schools.

The difference in A* grade attainment between males and females was much smaller than that between school types. Around 3% of males with three or more results, versus around 2% of females, achieved grades A*A*A* or better. Around 18% of males, versus 17% of females, achieved grades AAA or better. The A level candidature with three or more results is approximately 45% male. However, males became slightly more over-represented the higher the attainment criteria. Males comprised 54% of the candidates with grades A*A*A* or better and 47% of those with grades AAA or better.

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