



National Audit Office

MEASURING UP

HOW GOOD ARE THE GOVERNMENT'S
DATA SYSTEMS FOR MONITORING PERFORMANCE
AGAINST PUBLIC SERVICE AGREEMENTS?

JUNE 2010

**Comprehensive Spending Review 2007 covering the period
2008-2011**

**Review of the data systems for Public
Service Agreement 10 led by the
Department for Education:**

*'Raise the educational achievement of
all children and young people'*

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This report can be found on the National Audit Office website at www.nao.org.uk

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Summary

Introduction

1. This report summarises the results of our examination of the data systems used by the Government in 2009 to monitor and report on progress against Public Service Agreement (PSA) 10 “Raise the educational achievement of all children and young people”.

The PSA and the departments

2. PSAs are at the centre of the Government’s performance measurement system. They are usually three-year agreements, set during the spending review process and negotiated between departments and the Treasury. They set the objectives for the priority areas of the Government’s work.
3. This PSA is led by the Department for Education - formerly the Department for Children, Schools and Families - (the Department), with data provided by a range of sources. Each PSA has a Senior Responsible Officer who is responsible for maintaining a sound system of control across departmental boundaries that supports the achievement of the PSA. The underlying data systems are an important element in this framework of control.
4. The most recent public statement provided by the Department of progress against this PSA was in its 2009 Autumn Performance Report in December 2009.

The purpose and scope of this review

5. The Government invited the Comptroller and Auditor General to validate the data systems used by Government to monitor and report its performance. During the period October to December 2009, the National Audit Office carried out an examination of the data systems for all the indicators used to report performance against this PSA. This involved a detailed review of the processes and controls governing:
 - The match between the indicators selected to measure performance and the PSA: the indicators should address all key elements of performance referred to in the PSA.
 - The match between indicators and their data systems: the data system should produce data that allows the Department to accurately measure the relevant element of performance.
 - For each indicator, the selection, collection, processing and analysis of data: control procedures should mitigate all known significant risks to data reliability. In addition, system processes and controls should be adequately documented to support consistent application over time.

- The reporting of results: outturn data should be presented fairly for all key aspects of performance referred to in the target. Any significant limitations should be disclosed and the implications for interpreting progress explained.
6. Our conclusions are summarised in the form of traffic lights (Figure 1). The ratings are based on the extent to which departments have:
- put in place and operated internal controls over the data systems that are effective and proportionate to the risks involved; and
 - explained clearly any limitations in the quality of its data systems to Parliament and the public.
7. The remaining sections of this report provide an overview of the results of our assessment, followed by a brief description of the findings and conclusions for each individual data system. Our assessment does not provide a conclusion on the accuracy of the outturn figures included in the Department’s public performance statements. This is because the existence of sound data systems reduces but does not eliminate the possibility of error in reported data.

Figure 1: Key to traffic light ratings

Rating	Meaning ...
GREEN (Fit for purpose)	The data system is fit for the purpose of measuring and reporting performance against the indicator.
GREEN (Disclosure)	The data system is appropriate for the indicator and the Department has explained fully the implications of limitations that cannot be cost-effectively controlled.
AMBER (Systems)	Broadly appropriate, but needs strengthening to ensure that remaining risks are adequately controlled.
AMBER (Disclosure)	Broadly appropriate, but includes limitations that cannot be cost-effectively controlled; the Department should explain the implications of these.
RED (Systems)	The data system does not permit reliable measurement and reporting of performance against the indicator.
RED (Not established)	The Department has not yet put in place a system to measure performance against the indicator.

Overview

8. The Government's vision is to secure high quality teaching and learning in every setting, from early years to work-based learning providers, and to help every child and young person overcome barriers to learning. The aim of the PSA is to raise educational achievement through ensuring that children and young people enjoy and are engaged in learning, so that they are ready for further learning and the world of work. This PSA is supported by five indicators. There is a named officer within the Department responsible for each of these indicators who is supported by a lead analyst. Performance against the indicators is monitored quarterly within the Department as part of its internal PSA performance reporting.
9. For this PSA, we have concluded that the indicators selected to measure progress are consistent with the scope of the PSA and afford a reasonable view of progress.
10. Figure 2 summarises our assessment of the data systems:

Figure 2: Summary of assessments for indicator data systems

No	Indicator	Rating
1	Early years foundation stage attainment	AMBER (Systems)
2	Proportion achieving level 4 in both English and mathematics at Key Stage 2 (age 11)	GREEN (Fit for purpose)
3	Proportion achieving 5 A*-C GCSEs (or equivalent) including GCSEs in both English and mathematics at Key Stage 4 (age 16)	GREEN (Fit for purpose)
4	Proportion of young people achieving level 2 at age 19	AMBER (Systems)
5	Proportion of young people achieving level 3 at age 19	AMBER (Systems)

Note: the Department had been measuring the proportion achieving level 5 in English and Mathematics at Key Stage 3 (age 14) as a separate indicator. In October 2008 the Secretary of State announced that national tests would no longer be taken at Key Stage 3 and the Department no longer reports this indicator.

11. The Department has worked to integrate the above five indicators within this PSA into its operational and performance management activities, for instance by integrating them into its business plan and performance reports.
12. The Department has a Data Services Group, chaired by its Head of Profession for Statistics. This Group acts as a central point within the Department for the review of the data systems underpinning the majority of the Department's PSAs.
13. The Head of Profession for Statistics has day-to-day responsibility for data quality issues, with direct access and accountability to the Department's Accounting Officer as required.

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14. The Department's Director Generals are responsible for data quality in their respective areas of activity and take a proactive role in promoting high quality performance information, for example through the review of indicator definitions and involvement in the design of data systems. Furthermore, the Department's relevant members of staff receive training within this area appropriate to their roles, with regular reviews of their training needs.
 15. The Department has formal mechanisms for identifying and assessing areas of risk and reporting them to its Board. The Department's risk management processes include consideration of issues related to its PSAs.
 16. The Department undertakes internal monitoring and analysis in respect of its performance against its PSAs and the underlying indicators which support them, including the preparation of detailed reports which set out (per indicator): current performance, significant risks to performance and further action to be taken in order to mitigate the risks identified and to further achieve the Department's objectives. The Department reports performance against its PSAs to its Board on a monthly basis.
 17. Full performance is reported externally twice a year in the Department's Autumn Performance Report and the Departmental Annual Report.
 18. Our main conclusions on the Department's overall arrangements with respect to the PSA and the indicators that it encompasses are as follows:
 - The Department is currently in the process of developing a Data Quality Strategy. This document will be used to codify its overall approach to data quality, the roles and responsibilities of officers involved in data collection, data analysis and reporting. This document will then be used as the basis for ensuring data quality is embedded throughout the Department.
 - Quality control processes are undertaken either by individual Data Owners (officers responsible for data compilation), who complete these checks on their respective indicator, or through the Data Services Group. However the Department does not have a standardised quality control methodology which can guide and inform Data Owners on the processes which they must follow to ensure that data is of the required quality prior to it being used for the calculation of indicators. For example some Data Owners undertake reconciliation checks to ensure data which is transferred across IT systems is consistent; however this process may not be undertaken by another Data Owner for a data system which has a similar IT element.
 - Performance against the Department's PSAs reported within the published Autumn Performance Report 2008 contained performance reporting errors. These errors were identified after publication and corrected in subsequent versions. They were primarily due to performance data not being cleared for publication by the Data Owner. We were informed by Data Owners that they

were not aware that the data which they were producing would be featured within the Autumn Performance Report. A revised process has been implemented for the publication of performance data for the 2009 Autumn Performance Report to ensure that data reported is accurate and has been authorised for publication by the Data Owner.

- The Department has agreed measurement annexes for all of its PSA indicators, setting out the definition of the indicator and the data sources to be used. The current National Indicator Set was introduced following the Government's Comprehensive Spending Review 2007. In the majority of cases in respect of indicators defined through the National Indicator Set, a target which measures performance has not been set. However we noted that in some cases, internal targets have been set and performance reported to the Department's Board.
- The Department does not in all cases have detailed written procedure notes to explain how each indicator is to be calculated and how any outliers or missing data are to be addressed. While the Department's current procedures are in most cases robust, the fact that they are not all recorded formally may make it difficult for the Department to ensure the comparability of data over time, particularly if responsibility for the calculation of performance against a given indicator is passed to a different member of staff. Where this finding has implications for individual indicators, we explore it in the next section of this report. We recommend that for each indicator the Department develops formal procedure notes setting out how the indicator is to be calculated and reported, so that this work can be undertaken consistently over time and by different members of staff.
- The Department's Data Services Group has a remit to ensure robust processes are in place over the Department's data collection processes. However we noted that in some instances there are data streams which are used to compile indicators which are not reviewed by the Data Services Group. This occurs in some cases where data is provided directly to a Data Owner by another government body or an external contractor. This means that data which is used to compile indicators has not undergone an independent review to ensure it is of the required quality to support the indicator calculation. The Data Services Group is not fully aware of all the data systems within the Department which are used to compile indicators supporting its DSOs.

Assessment of indicator set

19. In undertaking the validation we reviewed the documentation associated with the PSA and considered whether the indicators selected to measure progress are consistent with the scope of this PSA. We conclude that the indicators selected afford a reasonable view of progress over the full age range of pupils from Early Years Foundation Stage, through Key Stage 2 and Key Stage 4 to age 19.

Findings and conclusions for individual data systems

20. The following sections summarise the results of the NAO's examination of each data system.

Indicator 1: Early years foundation stage attainment

Conclusion: AMBER (Systems)

21. We have concluded that the data system underlying this indicator is broadly appropriate. While nearly all local authorities are quality assuring EYSP data, some are at an early stage of this process so that there remain risks around the consistency of teacher assessments.

Characteristics of the data system

22. This indicator is defined under the National Indicator Set (NIS 72). The aim of the indicator is to measure the increase in the proportion of children turning 5 years of age achieving a total score of at least 78 across all 13 Early Years Foundation Stage Profile scales. A target has been set to increase this proportion by 4 per cent between 2008 and 2011. In addition, the indicator aims for scores of at least 6 to be achieved in each of Communications, Language and Literacy and Personal, Social and Emotional Development scales.

23. The Early Years Foundation Stage Profile is a continuous observational assessment during the academic year in which a child becomes 5. The assessment monitors development against 6 areas containing 13 scales devised by the Qualifications and Curriculum Authority (Qualifications and Curriculum Development Authority from 1 April 2010). These are as follows:

- Personal, Social and Emotional Development (3 Scales)
- Communications, Language and Literacy (4 Scales)
- Problem-solving, Reasoning and Numeracy (3 Scales)
- Knowledge and understanding of the world (1 Scale)
- Physical Development (1 Scale)
- Creative Development (1 Scale)

24. Each scale is measured between 0 and 9, with 9 being the highest level of achievement. The maximum score for the 13 scales is 117 with the target being each child should achieve at least 78, with scores of at least 6 in Communications, Language and Literacy, and in Personal, Social and Emotional Development.

25. The indicator is reported on the basis of individual child data produced by schools and settings which is collated by the relevant local authorities. Schools and settings provide data to local authorities through their management information system. Local authorities are responsible for validating the data and sending through data files to the departmental data collection system. Data is collated and validated within the Department and then matched into the National Pupil Database. The National Pupil Database is a longitudinal database that holds individual pupil level

attainment data for all children in maintained schools in England and in non-maintained and independent schools which take part in the assessments. Early Years Foundation Stage profile data is created when pupil teacher assessment records are matched to school census records and prior achievement records. The matching process identifies and eliminates duplicate records.

Findings

26. The data collection began in 2003 with responsibility for calculation of the indicator being allocated to a Service Manager within the Department. The Service Manager maintains a Risks, Actions, Issues and Dependencies log for the data stream. This log records mitigating controls and required actions to ensure data is of the required quality to produce performance against the indicator. These controls and actions are monitored by a Departmental Working Group which meets throughout the year to continually assess and manage data collection risks.
27. Consistency of pupil scoring is ensured through a moderation process undertaken by local authorities. The Department has an agreement with Ofqual to oversee this moderation process and it relies on Ofqual to ensure that data submitted by local authorities is valid and robust. The Qualifications and Curriculum Development Authority develops and modernises the national curriculum, assessments and examinations and Ofqual accredits and monitors qualifications in schools and colleges and within workplaces in the UK. Up to 31 March 2010 both of these functions were undertaken by the Qualifications and Curriculum Authority (QCA).
28. The QCA's report on implementation and moderation of the early years foundation stage profile (published November 2009) suggested that local authority mechanisms for ensuring robustness of EYFSP data had improved, including headteacher sign off of data and benchmarking against national comparatives of summary data for schools and settings. Some 98 per cent of local authorities are quality assuring EYSP data although some are at an early stage of this process.
29. The Department's data collection system validates data entered by local authorities and highlights instances of erroneous data which the Department then investigates and corrects as appropriate.

Indicator 2: Proportion achieving level 4 in both English and Mathematics at Key Stage 2

Conclusion: GREEN (Fit for purpose)

30. We have concluded that the data system underlying this indicator is fit for the purposes of measuring and reporting performance against the indicator.

Characteristics of the data system

31. This indicator is defined under the National Indicator Set (NIS 73) and it is a National Statistic. Key Stage 2 (KS2) is the stage of the National Curriculum between ages 8 and 11 years. This indicator relates to tests taken by pupils at the end of KS2. The KS2 examinations are administered and processed by the Qualifications and Curriculum Development Authority (QCDA). Ofqual now has responsibility for ensuring that standards in the tests remain consistent from year to year.
32. The QCDA provides the test results for each pupil to the Department and an external contractor, who has been appointed by the Department. The contractor processes this data and produces the KS2 Achievement and Attainment Tables (AATs). These AATs set out the proportion of pupils achieving a level 4 (or above) in both subjects out of the total number of pupils sitting an exam and are then used by the Department to produce the indicator.
33. The Department has an agreement with the contractor setting out the process by which data should be assessed for robustness and the quality control procedures which should be applied to ensure that the data is accurate.
34. As an additional quality control check the Department recalculates the AATs from the data provided by the QCDA to ensure that information reported within the tables is accurate. This process is documented and overseen by the Data Services Group. Any issues and inconsistencies are discussed with the contractor prior to the publication of the AATs and the indicator. The Department monitors the contractor's risk register and has also identified the risks to data quality on its own risk register.

Findings

35. The Department has established robust arrangements to ensure the examination results data for the AATs are appropriately collected, processed, analysed and reported. In particular, the Department recalculates the AATs from the raw data and compares results with the contractor's, investigating and resolving any discrepancies prior to the calculation of the indicator. Schools are also given the opportunity to challenge the results reported in the provisional AATs, prior to both the AATs and indicator being published.

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36. The Department has stipulated data quality and assurance requirements in its agreement with the contractor and has a programme governance model in place.
37. The Department has recently revised its governance structure for Achievement and Attainment tables. A Steering Group monitors progress against the planned annual reporting cycle and is responsible for identifying and mitigating data quality risks and issues.

Indicator 3: Proportion achieving 5 A*-C GCSEs (or equivalent) including GCSEs in both English and Mathematics at Key Stage 4

Conclusion: GREEN (Fit for Purpose)

38. We have concluded that the data system underlying this indicator is fit for the purposes of measuring and reporting performance against the indicator.

Characteristics of the data system

39. This indicator is defined under the National Indicator Set (NIS 75) and it is a National Statistic. The indicator measures the number of pupils achieving 5 or more GCSEs A*-C or equivalent including English and mathematics at Key Stage 4 (KS4) as a percentage of the number of pupils at the end of KS4. KS4 is the stage of the National Curriculum between the ages of 14 and 16 years.

40. The General Certificate of Secondary Education (GCSE) is the principal qualification at the end of KS4. Other qualifications include, National Vocational Qualifications, GCSEs in a vocational subject and Vocationally Related Qualifications.

41. These qualifications are administered and processed by the relevant awarding (examination) bodies. The Qualifications and Curriculum Development Authority has responsibility for accreditation of qualifications, defining the age group for which the qualification is approved and the contribution each qualification makes to achieving level 2 (equivalent to 5 GCSEs at grades A*-C) which is reported in the indicator.

42. The Department collects data from school management information systems through the School Census each January.

43. The awarding bodies provide the test results for each pupil to the Department and an external contractor, who has been appointed by the Department. The contractor processes this data and produces the KS4 Achievement and Attainment Tables (AATs) which are then published annually. These tables set out the proportion of pupils achieving 5 A*-C GCSEs or equivalent including GCSEs in both English and mathematics at Key Stage 4, out of the total number of pupils in schools at the end of KS4.

44. The Department has an agreement in place with the contractor setting out the process by which data should be assessed for robustness and the quality control procedures which should be applied to ensure that the data is accurate.

45. As an additional quality control check the Department recalculates the AATs from the data provided by the awarding bodies to ensure that information reported within the tables is accurate. This process is documented and overseen by the Data Services Group, any issues and inconsistencies are discussed with the contractor prior to the publication of the AATs and the indicator. The Department monitors the

contractor's risk register and has also identified the risks to data quality on its own risk register.

Findings

46. The Pupil Level School Census data is passed to an external contractor for validation. This process involves ensuring the data is as expected, within relevant parameters, consistent with previously submitted data and fit for purpose. This process of validation is documented.
47. The Department has established robust arrangements to ensure the examination results data for the AATs are appropriately collected, processed, analysed and reported. In particular, the Department recalculates the AATs from the raw data and compares results with the contractor's, investigating and resolving any discrepancies prior to the calculation of the indicator. Schools are also given the opportunity to challenge the results reported in the provisional AATs, prior to both the AATs and indicator being published.
48. The Department has stipulated data quality and assurance requirements in its agreement with the contractor and has a programme governance model in place.
49. The Department has recently revised its governance structure for the Achievement and Attainment tables. A Steering Group monitors progress against the planned annual reporting cycle and is responsible for identifying and mitigating data quality risks and issues.

Indicator 4: Proportion of young people achieving level 2 at age 19

Conclusion: AMBER (Systems)

50. We have concluded that the data system underlying this indicator is broadly appropriate but could be strengthened through formally documented procedures for collecting and processing the data and confirmation the data has been subject to appropriate quality control checks by other data providers.

Characteristics of the data system

51. This indicator is defined under the National Indicator Set (NIS 79) and is a National Statistic. The indicator measures the number of people who achieved qualifications sufficient to achieve level 2 by the time they are 19 years of age. The criteria for achieving level 2 are set by the Qualifications and Curriculum Development Authority; a number of different qualifications are eligible including GCSEs (at grades A*-C), AS Levels, Apprenticeships and National Vocational Qualifications.

52. Combinations of qualifications at different levels are allowed where their parts add up to 100 per cent for that level. For example a candidate with 3 full GCSEs at grades A* to C (20% each) and 1 AS level (50%) would be deemed to have attained level 2 (i.e. 60% + 50% = 110%). The most common method for achieving level 2 is by gaining at least 5 GCSEs at grade A*-C.

53. The population size of the cohort at the academic age of 14 is used. This is obtained from the School Census collected by the Department each January.

54. The data used to measure performance against this indicator is received via three data streams:

- awarding body data collected as part of the Achievement and Attainment Tables exercise;
- the Learning and Skills Council's Individualised Learner Record database collected from learning providers; and
- National Information System for Vocational Qualifications, collected by the Department from awarding bodies.

Achievement records are matched together at an individual level using personal identifiers such as name, date of birth, gender and home postcode where available.

Findings

55. The School Census data is passed to an external contractor for validation. This process involves ensuring the data is as expected, within relevant parameters, consistent with previously submitted data and fit for purpose. This process of validation is documented.

56. The Department has established robust arrangements to ensure the examination results data for the AATs are appropriately collected, processed, analysed and

reported. In particular, the Department recalculates the AATs and compares its results to the contractor's, investigating and resolving any discrepancies. Schools are required to check the results reported in the provisional AATs, any errors identified are corrected by the Department prior to publication of the revised AATs.

57. The Department places full reliance on the other data providers. Consistency checks are performed on this data but there are no documented checks performed to establish whether the data has been subject to appropriate quality control checks by other data providers.
58. The Department does not have formally documented procedures covering the process around collecting and processing the data in order to report the indicator.
59. The current methodology for compiling the indicator was introduced following a 2004 National Statistics Quality Review of the Measurement of Attainment of Young People. The Department recognises that the data matching process is not perfect and estimates that errors may overstate the total number gaining a level 2 qualification by +/- 0.1 percentage points.
60. Based on the cost to achieve a perfect match the Department considers this to be an appropriate level of accuracy.

Indicator 5: Proportion of young people achieving level 3 at age 19

Conclusion: AMBER (Systems)

61. We have concluded that the data system underlying this indicator is broadly appropriate but could be strengthened through formally documented procedures for collecting and processing the data and to confirm the data has been subject to appropriate quality control checks by other data providers.

Characteristics of the data system

62. This indicator is defined under the National Indicator Set (NIS 80) and it is a National Statistic. The indicator measures the number of people who achieved qualifications sufficient to achieve level 3 by the time they are 19 years of age. The criteria for achieving level 3 are set by the Qualifications and Curriculum Development Authority; a number of different qualifications are eligible including A and AS Levels, National Vocational Qualifications and Advanced Apprenticeships.

63. Combinations of qualifications at different levels are allowed where their parts add up to at least 100 per cent for that level. For example a candidate with two full AS levels at grades A to E (25% each) and one A2 level at grades A to E (50%) would be deemed to have attained level 3 (25% +25% + 50% = 100%). The most common method for achieving level 3 is by gaining at least 2 A Levels or 4 AS Levels at grades A-E.

64. The population size of the cohort at the academic age of 14 is used. This is obtained from the School Census collected by the Department each January.

65. The data used to measure performance against this indicator is received via three data streams:

- awarding body data collected as part of the Achievement and Attainment Tables exercise;
- the Learning and Skills Council's Individualised Learner Record database collected from learning providers; and
- National Information System for Vocational Qualifications, collected by the Department from awarding bodies.

Achievement records are matched together at an individual level using personal identifiers such as name, date of birth, gender and home postcode where available.

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