

Monitoring Review

Monitoring Review 3/15
May 2015

Official statistics, performance measurement and targets

Summary

This report sets out the approach that the UK Statistics Authority expects to see in the production and presentation of official statistics – including those drawn from administrative rather than other statistical sources – where the data are used to measure performance or achievement against targets.

Our review of official statistics, performance measurement and targets demonstrates that:

- the practice of using official statistics to report performance measures and achievement against targets is carried out with mixed success;
- statistical producers have a crucial role to play in putting measures (of current performance) and targets (for intended performance) into context – especially where statistical reporting of performance is central to informing democratic debate; and
- publishing information about measures and targets as official statistics provides assurance that performance levels are being measured and decisions made using statistics that are produced to high professional standards.

It underlines the importance of:

- senior officials responsible for policy making working with senior statisticians to embed statistical thinking in the development of performance measures and targets;
- bringing statistical thinking to bear when performance management systems are developed, and performance measures and targets are evaluated;
- performance measures and targets being recognised explicitly in official statistics that report the underlying data;
- those engaged in policy making and statistical production recognising the twin, mutually beneficial roles of the statistician as expert advisors in the policy making process and as independent producers of statistics that are compliant with the *Code of Practice for Official Statistics*; and
- senior departmental officials providing active support to enable statisticians to fulfil these dual roles effectively.

The Statistics Authority has identified seven actions that can enhance the public value of official statistics and of statisticians where performance measures and targets and official statistics draw on the same underlying data. The National Statistician - in his role as head of the Government Statistical Service – and the Permanent Secretary at the Department for Education – in his role as lead Head of Policy Profession across Government – both fully support the outcome of this review.

Developing performance management systems, measures and targets to support policy making

1. Statistical Heads of Profession (HoPs) and departmental Heads of Policy Profession should work together to enhance Government statisticians' role in policy making – particularly where it relates to target setting and performance measurement.
2. HoPs should seek out opportunities for statisticians to be involved in providing relevant advice – on topics such as possible data sources and measurement; the limitations of existing data; definitions of performance measures and targets; and of possible distortive effects.

Understanding the data underlying the performance measure or target and official statistics

3. Where a performance measure or target draws on administrative data, statisticians should:
 - a. implement the regulatory standard for quality assuring administrative data as set out in the Authority's *Administrative Data Quality Assurance Toolkit*¹; and
 - b. communicate the standards expected to the service providers who typically supply the data, and how providers are meeting those standards to users of the statistics.
4. Regardless of the type of data source (administrative data or statistical survey), statisticians should consider the possible distortive effects of any measures or targets – taking advice from practitioners – and where possible take action to address these effects in the design or redesign.

Communicating – about the data, the performance measures and targets, and the messages in the statistics

5. Statistical producers should publish a range of contextual information including details of:
 - a. the performance measure or target – design; policy or operational rationale; definitions and changes;
 - b. statistical methods; and
 - c. quality – including data quality assurance; the possible distortive effects of the performance measure or target on the data that underpin official statistics; any underlying seasonality; and other limitations arising from the use of the particular data source.
6. Statistical producers should provide narrative commentary supplemented by appropriate analysis that:
 - a. clearly explains what the statistics show in terms of progress in relation to the performance measure or target and the effects of that measure or target on behaviour, and also what the statistics show more generally;

¹ <http://www.statisticsauthority.gov.uk/assessment/monitoring/administrative-data-and-official-statistics/index.html>

- b. conveys the uncertainty in the statistics, regardless of whether the data are drawn from administrative data or from a statistical survey; and
- c. explains the implications of the contextual information – about the measure or target, and about methods and quality – for the use of the statistics.

Sharing good practice

- 7. Statistical producers should seek out opportunities to engage with external experts – to understand better some of the more complex statistical aspects of developing and presenting measures and targets – and with other producers to share good practice.

Official statistics serve the public good by assisting in the development and evaluation of public policy². As a matter of principle, if a performance measure or target is used to drive public sector performance or provide accountability, the statistical information underpinning it should be published as National Statistics. At the very least statistical producers should work towards achieving National Statistics status.

In the future, where performance measures and targets and official statistics draw on the same underlying data, and where the official statistics are being assessed for possible award of National Statistics status, the Authority will consider all of the relevant areas covered in section 2 of this review in its assessment of whether the statistics comply with the *Code of Practice*.

² The *Statistics and Registration Service Act 2007, section 7 (2)*
<http://www.statisticsauthority.gov.uk/about-the-authority/uk-statistical-system/legislation/key-legislative-documents/index.html>

1. Using performance measurement and targets in public policy

Introduction

- 1.1 Political accountability for policy and public service delivery necessitates the measurement of performance, often in the context of (implicit or explicit) statements about intended performance levels or policy goals – which we are referring to as performance measures and targets. Official statistics, produced using data from administrative systems and other sources, are frequently used to report levels of performance and achievement against targets. While performance measures and targets are intended to stimulate changes in behaviours or activities – or at least to indicate performance levels – their existence can also lead to distortive effects which could influence the recording and reporting of data.
- 1.2 The measurement of performance is one of the many uses of official statistics (along with, for example, resource allocation and policy formation), but the reporting of levels of performance and progress against targets can be among the most controversial ways in which official statistics are presented. Recent high profile issues include statistics about hospital waiting times, police-recorded crime statistics and migration.

Purpose of this Review

- 1.3 This report reviews the development of performance measurement and targets, and their communication in official statistics. The review has three main purposes:
- to raise awareness of the issues and risks arising when data are used to measure performance and achievement against targets;
 - to identify ways in which producers of official statistics can mitigate the risks; and
 - to identify ways in which the public value of official statistics that draw on the same underlying data as the performance measures and targets can be enhanced

It is intended to raise statistical producers' awareness of the Authority's expectations in relation to compliance with the *Code of Practice for Official Statistics*³ (*Code of Practice*).

Terminology used in the report

- 1.4 The concept of performance measurement and targets in public services has evolved over recent years and the term 'target' in particular is used less frequently – partly due to a policy shift by the previous coalition government from centrally imposed targets in favour of localism, or because of a recognition that 'targets' may be unpalatable to some working in operational areas where performance is measured. In practice, the language used to describe targets and performance measurement is not definitive, as demonstrated in annex B, and a range of other terms are used to reflect intended policy or operational outcomes – such as 'standards', 'indicators', 'goals' or 'ambitions' – that have varying degrees of formality. These are often interpreted as targets by commentators, employees or the wider public.

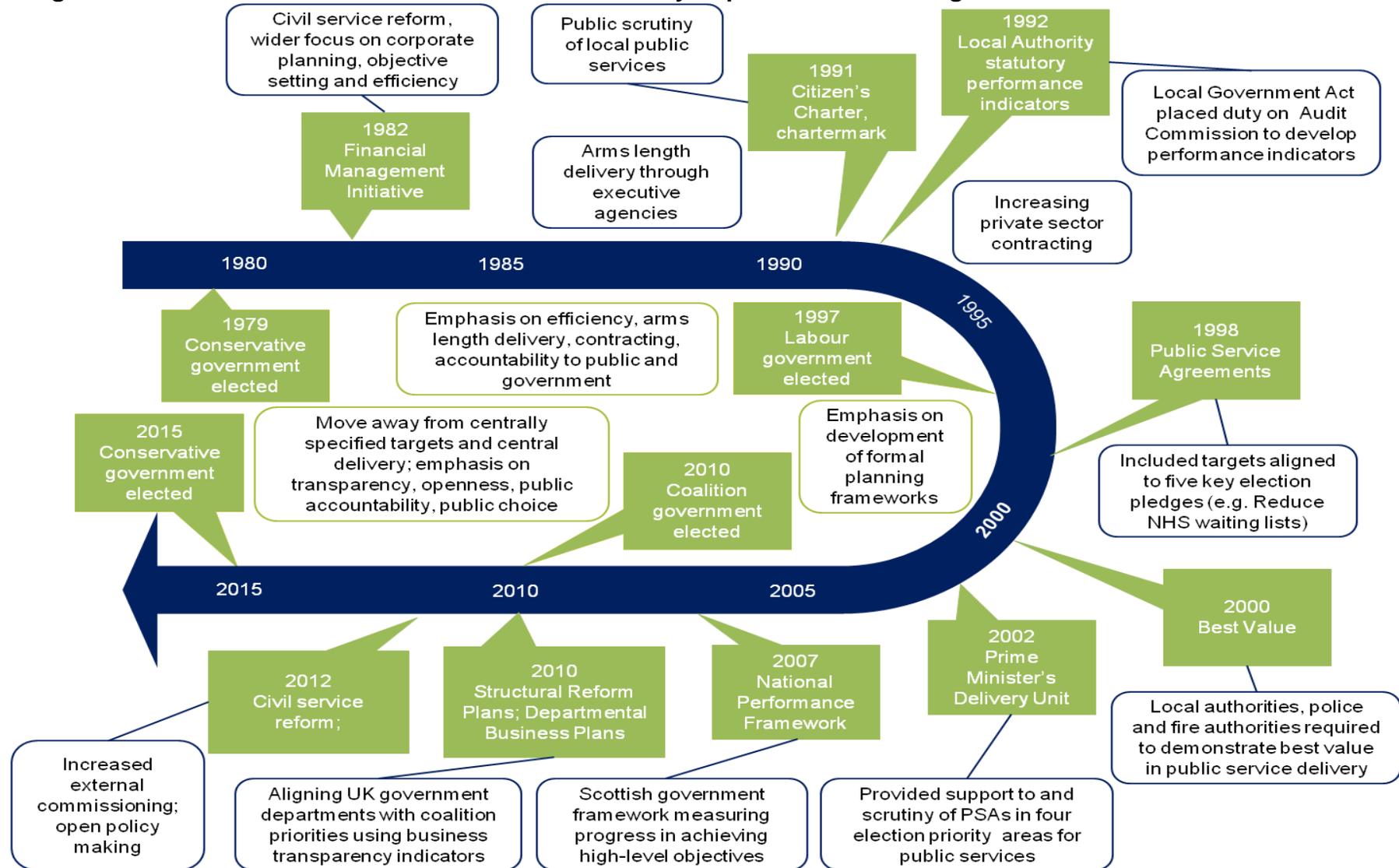
³ <http://www.statisticsauthority.gov.uk/assessment/code-of-practice/code-of-practice-for-official-statistics.pdf>

- 1.5 In this report we have used the terms ‘performance measurement’, ‘measures’ and ‘target’. We have adopted the convention that ‘performance measurement’ refers to ascertaining current or past levels of performance achieved, and that a ‘target’ relates to a particular level of performance that should be aimed for, met or exceeded over a period of time. Importantly, the recommendations included in section 2 apply equally to performance measures or targets – regardless of the terminology used - that are drawn from the same underlying data as official statistics.

Performance management in the UK

- 1.6 The collection and use of data to measure and manage performance – including through the use of targets – has been a long-standing feature in the public sector in the UK. It has grown particularly in the last 30 years, stemming from wider thinking about New Public Management and the increasing emphasis on business planning, efficiency and accountability, and delivery. Over a similar time period, increasing computing power and other technological advances have greatly facilitated the ability to record and use management information, hence supporting quantitative performance measurement. Some notable events in the recent development of performance management are shown in figure 1.1.

Figure 1.1: Selected notable events in the recent history of performance management in the UK



Source: UK Statistics Authority

Classifying performance measures and targets

1.7 Performance measures and targets that are used by the UK government and public sector can be classified as those that are:

- indicators collected together in over-arching performance frameworks;
- designed to measure progress against policy; and
- designed to measure the operational performance of projects, programmes or services.

Measures and targets can also have one or more of four over-arching purposes:

- aligning performance to organisational and policy priorities;
- monitoring contracts;
- improving operational performance; and
- providing accountability to the government and the public.

1.8 Within those broad classifications, in addition to the terminology used (summarised in paragraph 1.4), there is also considerable variation in the wide range of functions and uses they have; in their complexity; and in the ways they are published. To illustrate this variation, annex A provides details of the broad classifications and different characteristics for a range of examples of measures and targets. In particular it illustrates that:

The complexity of measures and targets

- some measures and targets have a relatively simple, unambiguous definition, for example some components of Scottish Government's National Performance Framework⁴;
- others involve a large number of separately defined concepts such as those involved in measuring hospital referral-to-treatment waiting times⁵;
- in some cases, important details – what is recorded and how it is recorded, or the actual definition – are open to interpretation: for example, statistics designed to measure hospital acquired infection⁶;
- a group of measures or targets are sometimes combined into a single overarching measure, the overall meaning of which may be difficult to interpret – for example, the Quality Outcomes Framework is reported as the total number of points achieved⁷; and
- some targets, such as the target to reduce net migration, are directly related to a desired outcome⁸, whereas the policy objectives of, for example, helping to

⁴ <http://www.scotland.gov.uk/About/Performance/scotPerforms/indicator>

⁵ <https://www.gov.uk/government/publications/right-to-start-consultant-led-treatment-within-18-weeks>

⁶ <http://www.milbank.org/publications/the-milbank-quarterly/search-archives/article/3897/what-counts-an-ethnographic-study-of-infection-data-reported-to-a-patient-safety-program?back=/issue/2012/3>

⁷ <http://www.hscic.gov.uk/catalogue/PUB15751/qof-1314-report.pdf>

⁸ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/120032/business-plan-doc.pdf

reduce poverty and increase social justice are less directly related to existing child poverty targets⁹.

Differences in publishing practice

- performance measurement, including progress against targets, is not always reported through official statistics, for example DCLG's Troubled Families Programme¹⁰
- performance frameworks are often reported in business plans, such as the UK Government's Business Transparency Indicators¹¹, or are reported through a dedicated website, such as Scottish Government's National Performance Indicators¹²
- in some cases, management information such as the hospital acquired infection example in annex A which the National Patient Safety Agency collected as part of a two-year programme to reduce infection rates in hospital intensive care units, and is unpublished¹³
- practice can vary between administrations: school-level examination statistics are published in England as official statistics¹⁴, but not in the devolved administrations

Developing and using measures and targets and the official statistics that report these

- 1.9 Statistical producers need to work with others to address the issues arising when performance measures and targets, and official statistics draw on the same underlying data. Other key participants are legitimately involved in developing and using performance measures and targets and the official statistics that report these. These include: ministers and officials engaged in policy making; practitioners, performance managers, data managers and suppliers; external regulators and auditors; and academics and researchers. Statistical thinking is particularly important:
- in the development and evaluation of performance measurement and targets; and
 - to enhance public value when the statistics are published.

Distortive effects and other issues that raise public concern

- 1.10 Deliberate gaming is one of the most widely recognised and reported issues associated with performance measurement and targets. Gaming has been reported in patient handling strategies among health care professionals¹⁵ and examination entries

⁹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/228829/8483.pdf

¹⁰ <https://www.gov.uk/government/news/troubled-families-programme-turning-117000-lives-around>

¹¹ <http://transparency.number10.gov.uk/business-plan/5/81>

¹² See footnote 4

¹³ See footnote 6

¹⁴ The Department for Education is currently working towards National Statistics designation for these statistics, which are published as part of school performance tables

<http://www.education.gov.uk/schools/performance/>

¹⁵ <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2667302>

in education¹⁶, for example. However, not all distortions are caused by deliberate gaming. The very fact that a target exists can affect behaviour in ways that were unintended – so-called ‘perverse incentives’. Furthermore, recent research suggests that those subject to performance measurement may perceive that a target is set even where no specific level of performance is specified¹⁷. In this review we have referred to deliberate gaming and other behavioural effects as distortive effects.

- 1.11 The report of the Royal Statistical Society Working Group that considered the impact of performance monitoring on public services¹⁸ included an example of distortive effects in the use of performance targets in schools in Texas, which led to improved performance as a result of ‘teaching to the test’. In examining differences in reported infection rates in Intensive Care Units, Dixon-Woods et al¹⁹ identified that distortive effects could, in part at least, result from differences in the way that data collection and reporting were undertaken and in variations in clinical practice. Importantly the authors suggested that the differences did not arise from a deliberate manipulation to achieve the target, but instead arose from different interpretations of what to record and report, and were said sometimes to be caused by accepted statistical practice (such as not reporting outliers).
- 1.12 Other issues that raise legitimate public concern are the design of performance measures and targets; the particular measures chosen; and the way that target results are used. The high profile nature and controversy surrounding some measures and targets may lead to the possibility of, or at least the perception of, external influences on the production or presentation of official statistics, and debate about the policy can extend to doubts about the veracity of the statistics.

¹⁶ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/180504/DFE-00031-2011.pdf

¹⁷ <http://www.milbank.org/publications/the-milbank-quarterly/search-archives/article/3897/what-counts-an-ethnographic-study-of-infection-data-reported-to-a-patient-safety-program?back=/issue/2012/3>

¹⁸ Bird S M, Cox D, Farewell V T, Goldstein H, Holt T, Smith P C (2005) ‘Performance indicators: good, bad and ugly’, *Journal of the Royal Statistical Society A* 168, Part 1, pp 1-27: www.rss.org.uk/uploadedfiles/documentlibrary/739.pdf

¹⁹ See footnote 17

2. Realising the benefits of reporting performance measures and targets through official statistics

Achieving public value

2.1 The *Code of Practice* implicitly requires producers of official statistics both to seek to achieve good value for the money spent on statistical work and to demonstrate publicly the nature of that value. National Statistics status can be interpreted to mean that the official statistics meet the highest standards of trustworthiness and quality, and add value to public decisions and debate. Producers of official statistics therefore need a deep understanding of the uses made, and potentially made, of the statistics for which they are responsible. We noted previously that public service performance measurement is one important use of official statistics; this section sets out how the public value of official statistics, in the context of performance measurement and targets, can be enhanced.

Improvements in practice to achieve greater public value

2.2 It is beneficial to apply statistical thinking to the development of performance measurement regimes and targets, and of course vital that statisticians work independently to ensure that the relevant statistics are presented appropriately. The key points arising from our review of performance measurement and targets and the official statistics that draw on the same underlying data – together with our recommendations – are presented in the rest of this section using the following dimensions, all of which are anchored in the *Code of Practice*:

- developing targets to support policy;
- understanding the underlying data;
- communicating about the data, the measures and targets, and the messages in the statistics; and
- sharing good practice.

2.3 Table 2.1 summarises the questions that statisticians and those engaged in policy making should ask when performance measures or targets are used as a policy or operational instrument, and the actions they should take to enhance the public value of the official statistics that are used to report them.

Table 2.1: Performance measurement, targets and official statistics: questions to ask and actions to take

Practice area related to performance measures and targets	Questions	Actions
Complying with the <i>Code of Practice</i>	Does the performance measure or target fall under the broad definition adopted in this report?	<ul style="list-style-type: none"> • Report performance against measures and targets as National Statistics, or as official statistics and work towards achieving National Statistics status • Ask the questions and adopt the treatments presented in the rest of this table
Developing measures and targets to support policy	Does the policy include performance measurement or include targets that have the aim of changing behaviour or assisting choice?	<ul style="list-style-type: none"> • Seek statistical advice and employ statistical thinking in the measure / target setting process • Seek opportunities for statisticians to be involved in providing statistical advice
Understanding the data underlying the measures and targets, and the statistics	Do the measures or targets draw on administrative data?	<ul style="list-style-type: none"> • Identify an appropriate level of quality assurance for data underlying targets • Communicate this to suppliers • Communicate assurance and audit arrangements to users
	Is the definition of the measure or target open to interpretation, poorly defined or does it include complex or multiple concepts or definitions?	<ul style="list-style-type: none"> • Change the definition to be less ambiguous, more clearly defined or simplify where possible
	Is there a strong incentive to improve performance, achieve a target (e.g. financial reward), or are their consequences of failing to achieve it (e.g. reputation, financial penalty)?	<ul style="list-style-type: none"> • Anticipate how people's behaviour might be distorted by the presence of a measure or target
Communicating about the measures and targets, and the statistics	Is contextual information provided that explains the performance measures or target and consequent limitations?	Provide users with sufficient information about: <ul style="list-style-type: none"> • The policy and operational context around the measure or target • The measure or target itself • Changes in design and operation of the measure or target with timeline • Data recording and quality assurance arrangements • Limitations arising from data errors and biases, or from the design of the measure or target • Patterns of seasonality in the target data
	Is information presented about what the statistics show about the measure or the target and the uncertainty in their measurement?	<ul style="list-style-type: none"> • Present analysis exploring current position against the measure or whether the target is achieved • Demonstrate effects of changes to the measure or target • Show progress against the target over an extended time period • Demonstrate uncertainty arising from the measures or targets
Sharing good practice	Has the statistical reporting benefitted from the knowledge and experience of others?	<ul style="list-style-type: none"> • Engage with external experts on performance measurement or targets, the subject matter or complex statistical issues such as uncertainty • Draw on good practice related to performance measurement and targets from other producers of official statistics

Developing performance measures and targets to support policy

- 2.4 Ministers identify priority areas and policy goals. They, or officials developing policy on their behalf, may specify the use of performance measurement or targets as an instrument to achieve those goals.
- 2.5 There is undoubted value – both to an administrative data management system and to the statistical system – in statisticians being centrally involved in the design and operation of performance management systems. Doing so enables statisticians to promote the use of administrative data for statistical purposes and to encourage the adoption of common classifications and definitions, without damaging the primary purpose of the system²⁰. And owners of administrative systems benefit from the application of statistical discipline – which can help to secure the quality of the data and to document and inform users about data changes
- 2.6 Professional statistical advice is equally valuable when those engaged in policy making wish to develop a new measure or target, or to change an existing one. Statisticians are best placed to advise about:
- data sources such as:
 - which data source is of suitable quality for use in measuring performance
 - the best way to collect data where no suitable source is identified
 - design of measures and targets, including:
 - definitions and wording (in order to identify and ideally avoid misinterpretation and distortive effects)
 - the use of composite measures or collections of targets
 - the appropriateness of a target to stimulate the required outcome

In order to realise the value of statistical thinking, those engaged in policy making need to create an environment in which statistical thinking is not regarded as optional, but as a vital component.

Box 2.1: Developing outcome indicators for hospital related deaths

When the NHS in England started looking into an appropriate target to measure hospital related deaths, it created a Steering Group for the National Review of the Hospital Standardised Mortality Ratio. This Group included five statistical producers from the NHS Information Centre as well as Health Informatics staff involved in performance management within frontline hospital trusts.

Recommendation 1 – Statistical Heads of Profession (HoPs) and departmental Heads of Policy Profession should work together to enhance Government statisticians' role in policy making – particularly where it relates to target setting and performance measurement.

Recommendation 2 – HoPs should seek out opportunities for statisticians to be involved in providing relevant advice – on topics such as suitable data sources and measurement, the limitations of existing data, definitions of performance measures and targets, and of possible distortive effects.

²⁰ UK Statistics Authority (2012), *Creating official statistics from administrative data*; Monitoring Brief 3/12; <http://www.statisticsauthority.gov.uk/assessment/monitoring/monitoring-reviews/index.html>

Understanding the data that underpin the measures and targets, and the statistics

- 2.7 Statisticians always need to understand the quality of the source data used to measure performance, and this understanding needs to be particularly strong when targets have been set. Where data are collected through statistical surveys, statisticians typically understand the risks to data quality and explain them routinely. The risks to quality arising from the statistical use of administrative data tend to be less well understood and explained. The Authority's *Administrative Data Quality Assurance Toolkit* applies to all statistics that draw on administrative data, including those where performance measures and targets – using the broad definitions adopted by this review – also draw on that data. It explains the regulatory standard that the Authority applies when it determines the suitability of practices used by statistical producers for the quality assurance of administrative data.

Recommendation 3 – Where a performance measure or target draws on administrative data, statisticians should:

- a. implement the regulatory standard for quality assuring administrative data as set out in the Authority's *Administrative Data Quality Assurance Toolkit*; and
 - b. communicate the standards expected to the service providers who typically supply the data, and how providers are meeting those standards to users of the statistics.
- 2.8 The simple existence of a performance measurement regime or target presents risks to data quality, regardless of whether the associated performance measurement system draws on administrative data or statistical surveys. One risk that statistical producers need to address relates to the definition of the measure or target. If a measure or target is poorly designed – ambiguous, or involving multiple concepts or definitions – data recording is unlikely to be consistent or accurate, and the resulting statistics will be devalued. This does not necessarily involve deliberate misreporting, as was previously described in paragraph 1.10.
- 2.9 The incentive to achieve a target or the consequences of not doing so may lead to deliberate misreporting or misrecording, or to other distortive effects. For example, misrecording has been identified in police recorded crime data, as has the manipulation of definitions of the start and finish points of hospital waiting time data. Even without a target being set, the very fact of performance measurement may also distort behaviour.

Recommendation 4 – Regardless of the type of data source (administrative data or statistical survey), statisticians should consider the possible distortive effects of any measures or targets – including taking advice from practitioners – and where possible take action to address these effects in their design or redesign.

Communicating – about the data, the performance measures and targets, and the messages in the statistics

- 2.10 The importance of statistical thinking in the development of performance measurement systems and targets was identified earlier in this report. This section describes how a core skill of official statisticians – their understanding of the data – can be applied in order to enhance public value at the point that the statistics are published. Open and

professional communication about a measure or target – involving clear narrative, advice and analysis – is vital. This section describes what the Authority means by ‘open and professional communication about a measure or target’. It distinguishes between two categories of information:

- contextual information about the characteristics of the data and statistics²¹; and
- information about what the statistics show²².

Contextual information about the characteristics of the data and statistics

2.11 Users need a wide range of background information so that they can make informed judgements on the basis of the statistics, including about:

- the policy and operational context of the performance measure or target, describing why it has been set and what it is intended to achieve;
- the measure or target itself, including definitions, thresholds, and exceptions, and any incentives or sanctions;
- any changes in the design and operation of the measure or target over the time of its operation, together with information about the reason for the change and the basis of the revisions (for example user feedback, research or evaluation);
- the possible distortive effects of performance measurement systems or targets on underlying behaviour or on the statistics, and any limitations for the use of the statistics caused by the distortive effects; often work is carried out externally by academics and other researchers to identify distortive effects and links to appropriate research should be provided;
- arrangements for data recording, and quality assurance processes, including those of data suppliers;
- errors and biases in the data and the limitations they place on the uses of the statistics;
- any limitations resulting from the design of performance measures or targets, including limitations that arise where these are based on data that are the best available but have known shortcomings, or when the measures or targets are not closely related to the policy outcome; and
- patterns of seasonality – in making appropriate comparisons over time users need to understand any natural variation in results at different points in the year.

Recommendation 5 – Statistical producers should publish a range of contextual information including details of:

- a. the performance measure or target – design; policy or operational rationale; definitions and changes;
- b. statistical methods; and
- c. quality – including data quality assurance; the possible distortive effects of the performance measure or target on the data that underpin official statistics; any

²¹ the *Code of Practice* requires producers to “publish details of the methods adopted” (Principle 4 practice 1); to “ensure that users are informed about the quality of statistical outputs” (Principle 4 practice 2); and to “provide information on the quality and reliability of statistics in relation to the range of potential uses” (Principle 8 practice 1)

²² the *Code of Practice* requires producers to “prepare and disseminate commentary and analysis that aid interpretation” and to “provide factual information about the policy or operational context of official statistics” (Principle 8 practice 2).

underlying seasonality, and other limitations arising from the use of the particular data source.

Information about what the statistics show

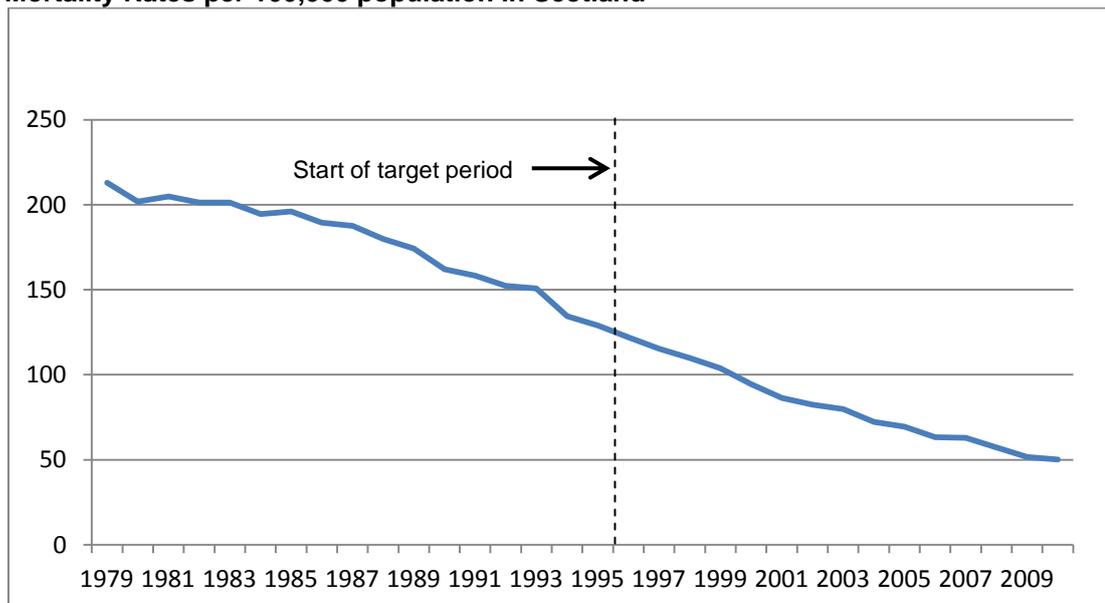
2.12 Statistical producers should always recognise performance measures and targets explicitly in statistical releases that report these data. Statistical producers need to provide users with a range of information:

- progress on the performance measure or progress against the target;
- progress presented within the context of a time series that extends back beyond the period that a target has been in operation (see Box 2.2) to inform views about the role of the target in achieving the desired outcome;

Box 2.2: Demonstrating progress: reducing the mortality rate due to coronary heart disease

In Scotland, a target was in place for the reduction in the mortality rate due to Coronary Heart Disease (CHD) between 1995 and 2010. By the end of 2010, this target had been achieved. As figure 2.1 shows, including a longer time period in analysis demonstrated that the trend for falling mortality due to CHD had started some time before the implementation of the target.

Figure 2.1: Coronary Heart Disease: Ages under 75 European Age Standardised Mortality Rates per 100,000 population in Scotland



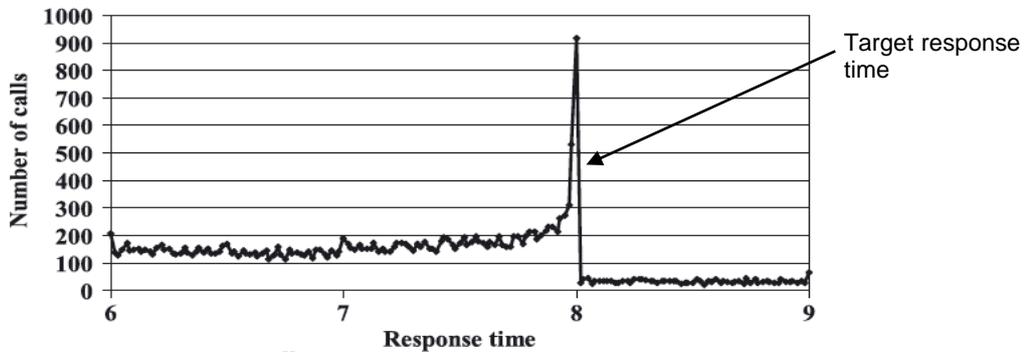
Data Source: National Records Scotland – Deaths and Population

- analysis that places the ‘headline’ results in a broader framework that illuminates performance or how the target is being achieved – for example, while users will be interested in the proportion of cases handled within a given time, their understanding will be enhanced by an analysis of the distribution around the given time. This might show that people or organisations are modifying their behaviour or activity to achieve the target in a way that was not intended;

Box 2.3: Analysis of data recording about response times by an ambulance trust

Figure 2.2 presents an analysis of the number of calls by the time in minutes taken to respond to the calls. The target was set for response within 8 minutes. It shows an example of how one ambulance trust had adjusted response times, as found by the Commission for Health Improvement (at the time the NHS's independent inspection body).

Figure 2.2: Number of calls by the response time in minutes



Source: Bevan and Hamblin (2009)²³

- analysis that demonstrates the effect of change in the design or operation of a performance measure or target over time; and
- uncertainty in the statistics – methods for evaluating and presenting uncertainty in statistics derived from sample surveys (such as the use of confidence intervals around survey estimates) are well established. In cases where administrative data are used, presenting uncertainty is equally important. This might involve comparisons between units (such as schools, hospitals, general practices or other service providers) or between cohorts, comparisons over time, and comparisons of results with other sources.

Recommendation 6 – Statistical producers should provide narrative commentary supplemented by appropriate analysis that:

- a. clearly explains what the statistics show in terms of progress in relation to the performance measure or target and the effects of that measure or target on behaviour, and also what the statistics show more generally;
- b. conveys the uncertainty in the statistics, regardless of whether the data are drawn from administrative data or from a statistical survey; and
- c. explains the implications of the contextual information – about the performance measure or target, and about methods and quality – for the use of the statistics.

²³ G Bevan and R Hamblin (2009) Hitting and missing targets by ambulance services for emergency calls: effects of different systems of performance measurement within the UK. *Journal of the Royal Statistical Society*, 172, Part 1, pp161-190:

Sharing good practice

- 2.13 Individual statistical producers are likely to find it easier to achieve the necessary improvement in the development and communication of performance measures or targets in official statistics if they pool their expertise and create opportunities for collective learning and improvement in relation to reporting those measures and targets through official statistics.

Recommendation 7 – Statistical producers should seek out opportunities to engage with external experts – to understand better some of the more complex statistical aspects of developing and presenting measures and targets – and with other producers to share good practice.

The Authority's position

- 2.14 Reporting levels of performance and progress against targets using official statistics presents strategic opportunities for statisticians to enhance the public value of the statistics – by increasing the role of the statistics to support expert scrutiny and public accountability; by stimulating informed debate about a policy; and by encouraging better informed choices by the public of service providers.
- 2.15 Equally, a measure or target will benefit if performance is reported through official statistics – especially those with National Statistics status – by lending credibility, and assurance that performance is being measured and decisions made using statistics that are produced to the highest professional standards. Indeed, the Authority's position is that, as a matter of principle, the statistics underpinning a performance measure or target that is used to drive public sector performance or provide accountability should be published as National Statistics, thereby signalling that it meets the highest standards of trustworthiness, quality and public value, adding value to decisions and debate.
- 2.16 If statistical producers are unable to assert their role in developing measures and targets and do not report these appropriately through official statistics, then the public value of the statistical service and of the statistics is diminished. Mitigating the risk that either of these happens requires statisticians to fulfil their twin roles as expert advisors within the policy making process and independent producers of impartial and objective statistics that are compliant with the *Code of Practice*. This can be a challenge, and it requires the establishment – by senior officials in policy making and statistics – of a culture that enables statisticians to display their professionalism and expertise in support of the public good.
- 2.17 In the future, where measures and targets, and official statistics draw on the same underlying data, and where the official statistics are being assessed for National Statistics designation, the Authority will consider all of the relevant areas covered in section 2 of this review in its assessment of whether the statistics comply with the *Code of Practice*.
- 2.18 There are circumstances under which the Authority will regard management information – particularly in aggregate form - as being official statistics; and to expect it to be produced in accordance with the *Code of Practice*²⁴. A particular consideration

²⁴ http://www.statisticsauthority.gov.uk/news/management-information-and-research-data-as-official-statistics.html#_ftn1

when identifying official statistics is where data are used to monitor or measure the government's performance or delivery – either generally, or against formal targets²⁵. Where information about performance measurement or targets is released as management information, the Authority recommends that the Department or agency should take steps to report the statistics that are drawn from that same data as official statistics, so that the discipline of the *Code of Practice* can apply and statistical producers can work towards their eventual designation as National Statistics.

²⁵ Identifying official statistics: <http://www.statisticsauthority.gov.uk/national-statistician/ns-reports--reviews-and-guidance/national-statistician-s-guidance/index.html>

Annex A: Characteristics of a range of current performance measures and targets

Table A1 highlights the variation between illustrative range of performance measures and targets that illustrate the variations highlighted in section 1. In addition to their overall classification and over-arching purpose, the table shows their characteristics, demonstrating the variation in terms used to describe them; the wide range of functions and uses they have; their complexity; the data sources they draw on and the underlying policy. The measures and targets in each column are described according to the elements contained in each row (described in the left-hand column).

Table A1: Example targets and their characteristics

Target	Business Transparency Indicators	National Performance Framework	School-level examination statistics for England	Child poverty	Work Programme	Hospital referral-to-treatment waiting times	Quality Outcomes Framework	Hospital acquired infection	Migration statistics
Overall classification	High-level performance framework / indicator	High-level performance framework / indicator	Operational performance measurement	Policy progress measures	Operational performance measurement	Operational performance measurement	Operational performance measurement	Operational performance measurement	Policy progress measures
High-level purpose	Aligning performance to priorities; accountability to the government and the public	Aligning performance to priorities; accountability to the government and the public	Improving operational performance; accountability to the government and the public	Accountability to the government and the public	Contract Monitoring; accountability to the government and the public	Improving operational performance; accountability to the government and the public	Aligning performance to priorities; improving operational performance	Improving operational performance	Accountability to the government and the public
Used by / set for	United Kingdom government departments	Scottish Government	Department for Education, set for individual schools in England	Department for Work and Pensions (DWP)	DWP for Work Programme contractors	NHS for NHS hospitals	NHS for General Practices in the UK	National Patient Safety Agency for Hospital Trusts	Home Office; reported by ONS

Target	Business Transparency Indicators	National Performance Framework	School-level examination statistics for England	Child poverty	Work Programme	Hospital referral-to-treatment waiting times	Quality Outcomes Framework	Hospital acquired infection	Migration statistics
Policy	Making government more open by generating comparative data and providing public information	Creating a more successful country with opportunities for all by increasing sustainable economic growth	Making schools and colleges more accountable	Helping to reduce poverty and improve social justice	Helping people to find and stay in work	NHS Constitution: Right to access services within maximum waiting time	Improve the quality and efficiency of medical care	Reduce hospital acquired blood stream infections	Reducing net migration from hundreds of thousands to tens of thousands
Nature of target	Measure current status	Measure change from baseline year or measure relative position	Minimum threshold for each measure for individual schools in England	Threshold percentage meeting definition by 2020/21	Success ratio in placing job seekers into work	Treatment within specified time	Minimum threshold, points awarded on a scale up to maximum threshold	Mean infection rate for England per thousand patient days	Measures net change between inflow and outflow
Function	Demonstrate effect of govt policies and reforms on cost and impact of public services	Hold government to account; demonstrate progress	Hold schools in England to account, promote choice	Secretary of State has statutory duty to meet targets	Hold contract providers to account; demonstrate effect of work programme	Hold govt, NHS, hospitals to account; provide patient choice	Change behaviour to improve the quality of care for long term conditions	Improving patient safety	Accountability – migration policy
Use	Track performance	Measure and report performance	Monitor performance of schools in England	Monitor performance nationally and at regional and local level	Manage performance of contract providers; measure and report performance	Monitor performance against standards in NHS Operating Framework	Incentivise (resource and reward) General Practices	Measure performance (programme, not ICU level)	Track performance and analyse migration at lower level geographies

Target	Business Transparency Indicators	National Performance Framework	School-level examination statistics for England	Child poverty	Work Programme	Hospital referral-to-treatment waiting times	Quality Outcomes Framework	Hospital acquired infection	Migration statistics
Terminology used for targets	Input and impact indicators	Purpose targets; National Indicators	Floor standards	Target measures	Minimum performance levels; business transparency indicator	Operational standards	Indicators grouped in areas within domains	Goal	Impact Indicator
Complexity	Multiple indicators varying in complexity	Multiple targets and indicators, varying in complexity	Composite of 2-4 measures; simple definitions	Complexity around survey based data collection of income; defining and measuring poverty	Multiple targets for 3 payment groups	Complex definitions; rules on when to start, pause and stop clock; framework guidance on how to apply	Complexities around defining eligible patients and exceptions and prevalence	Multiple measurement stages; complex definitions, judgement required	Differences between international and internal migration. Also concept of short-term migration
Data sources	Management information	Administrative data; survey data	Administrative data, subject to external scrutiny	Surveys where resulting statistics are designated as National Statistics	Supplier management information, subject to DWP scrutiny	Management information	Management information	Required administrative data collected for Matching Michigan programme	Surveys (IPS), Asylum seeker management information; NHS patient registrations and Higher Education student data
Vehicle for publishing	Business plans; quarterly performance updates	Scotland Performs – web-based platform	Official statistics statistical first release; official statistics published within broader set of performance tables using web-based platform	Statutory duty to report - published as official statistics	Report published as official statistics	Report published as official statistics	Official statistics - administration level statistical first releases; GP results - web-based platform	Unpublished; used as management information	Report published as official statistics

Annex B: Definitions and properties

Table B1 sets out definitions and properties of terms used in performance measurement and target setting appearing in various relevant documents published since 1999 that are produced by a range of academics and public sector organisations. It illustrates that the language used to describe performance measurement and targets is not definitive (paragraph 1.4).

Table B1: Definitions and properties

Concept	Definition / property	Source
Intelligence systems	Gather background information on quality of performance without specifying required levels	Foley & Goldstein (2012) ²⁶
Intelligence	Used to learn about improvement, evaluate policy and as a basis for intervention at various levels	Hood et al (2009) ²⁷
Performance information systems	Set of performance measures for an organisation and processes for producing that information	National Audit Office (2001) ²⁸
Performance Information	Information used to measure organisation's progress towards its objective	National Audit Office (2001)
Performance monitoring	Records, analyses and publishes data; Informs public about effectiveness of policies on services; Data tracking and reporting	Bird et al (2003) ²⁹ Bird et al (2003) Panchamia and Thomas (2014) ³⁰

²⁶ Foley B and Goldstein H (2012) *Measuring Success: League tables in the Public Sector*; The British Academy Policy Centre: <http://www.britac.ac.uk/policy/Measuring-success.cfm>

²⁷ Hood C, Dixon R, Wilson D (2009) '*Managing by Numbers*': *the Way to Make Public Services Better?*; ESRC Public Services Programme: <http://www.publicservices.ac.uk/wp-content/uploads/policy-briefing-nov2009.pdf>

²⁸ National Audit Office, HM Treasury, (2001), *Choosing the Right FABRIC: A Framework for Performance Information*; United Kingdom: <http://www.nao.org.uk/wp-content/uploads/2013/02/fabric.pdf>

²⁹ Bird S M, Cox D, Farewell V T, Goldstein H, Holt T, Smith P C (2005) 'Performance indicators: good, bad and ugly'; *Journal of the Royal Statistical Society A* 168, Part 1, pp 1-27: www.rss.org.uk/uploadedfiles/documentlibrary/739.pdf

³⁰ Panchamia N, and Thomas P (2014) *Civil Service Reform in the Real World*; Institute for Government: http://www.instituteforgovernment.org.uk/publications?field_publication_authors_nid=1232&sort_by=field_publication_date_value&sort_order=DESC&=Apply

Concept	Definition / property	Source
Set of performance measures	Measure of how well a service is performing against its objectives;	National Audit Office (2001)
Performance measures	Quantify an organisation's progress; Measure of performance against a robust scale; Systems to collect data to demonstrate performance on standards and targets; Describe whether the service has achieved the goals that were set.	National Audit Office (2001) National Audit Office (2001) Audit Commission (1999) ³¹ National Audit Office (2001)
Quantitative measures	Have specified targets	UK Statistics Commission (2006) ³²
Performance indicators	Assess impact on services; Identify under or well performing institutions or people; Public accountability; Measure how well a service is performing against its objectives; Proxy where clear and simple measures are not feasible or available; Quality of the functioning of institution or system; Can be combined into a single indicator	Bird et al (2003) Bird et al (2003) National Audit Office (2001) National Audit Office (2001) Foley & Goldstein (2012) Foley & Goldstein (2012)
Quantitative indicators	Combined with others for the purpose of the target	UK Statistics Commission (2006)
Ranking systems/league tables	Comparative evaluation of performance or quality by institution or unit	Foley & Goldstein (2012)

³¹ Audit Commission (1999), *A measure of Success, Setting and monitoring local performance targets*, Best Value Management Paper: <http://archive.audit-commission.gov.uk/auditcommission/subwebs/publications/studies/studyPDF/1313.pdf>

³² UK Statistics Commission (2006), *PSA targets: The Devil in the Detail*, Report No. 29: <http://www.statisticsauthority.gov.uk/reports---correspondence/archive/statistics-commission-archive/research/index.html>

Concept	Definition / property	Source
Targets	Commitments to achieve a level of service; Set a specific goal; Express a specific level of performance an organisation is aiming to achieve; What level of performance is expected; Measure performance against a specific threshold standard	Audit Commission (1999) National Audit Office (2001) National Audit Office (2001) National Audit Office (2001) Foley & Goldstein (2012)
Performance target	Level of performance organisation aims to achieve from a particular activity	National Audit Office (2001)
Statistical target	Capable of precise measurement	Statistics Commission (2006)
Standards	Promises to users about level of quality and service; Minimum acceptable level of performance; level of performance generally expected	Audit Commission (1999) National Audit Office (2001)

Annex C: Administrative data – a draft toolkit for non-statisticians in statistical producer bodies

Table 2.1 provided a list of questions that statisticians and those engaged with policy making should ask when performance measures and targets, and official statistics are drawn from the same underlying data. The purpose of the draft toolkit that is reproduced in this annex is to provide a framework to guide the judgments of non-statisticians when confronted with statistics derived from administrative data – which is often used in performance measurement and target setting. It was first included as annex A in the Authority's exposure draft report on *Quality Assurance and Audit Arrangements for Administrative Data*³³. Question 8 of this draft toolkit specifically refers to the use of data to measure the operational performance of suppliers who are subject to key performance indicators or targets. We have included the full toolkit in this annex because all of the questions apply equally well to statistics that report performance measurement and targets and the questions merit re-stating.

As part of the suite of publications covering administrative Data, the Authority will publish guidance aimed at officials involved in policy making through the Statistics Authority's Administrative Data and Official Statistics web page³⁴. This guidance will build upon the original draft toolkit that is reproduced here. Statistical input is an important part of policy making and this guidance will point to critical questions that those involved in policy making can ask about the statistics they use and of the statisticians who produce them. While most of these questions are relevant to the other main source of official statistics – surveys – they are particularly pertinent to statistics based on administrative data. We are therefore seeking to help those involved in policy making become more intelligent customers through this toolkit.

The draft toolkit takes the form of 10 key questions. While they work as a sequence of questions, there is no need to work through in methodical order; any of these questions can be asked on its own or in combination with any of the others. The key point for those using it is a willingness to interrogate the strength of the data and obtain assurance on the reliability of that data.

³³ <http://www.statisticsauthority.gov.uk/assessment/monitoring/administrative-data-and-official-statistics/quality-assurance-and-audit-arrangements-for-administrative-data.html>

³⁴ <http://www.statisticsauthority.gov.uk/assessment/monitoring/administrative-data-and-official-statistics/index.html>

The 10 questions

1. Where do the data come from?

This is a simple, straightforward question. Your statisticians should be able to give you a clear answer, explaining the nature of the data, who produces them and why. This question is a good starting point – and if the answer sounds vague or unconvincing, this can be the jumping off point for further questions as you look to interrogate the data rigorously.

2. Is there a consistent time series?

A good way of understanding the statistics is to see how they behave over time. A time series can demonstrate to you how the underlying data have been affected by contextual factors – which you may know better as a policymaker than the statisticians who work on the production of the official statistics.

3. If there's a limited time series, how do you caveat the statistics you've got, and what warnings do you give about the conclusions that can be drawn?

This is crucial. Your organisation is likely to be criticised – not least by the UK Statistics Authority – if you disseminate statistics which argue for a clear pattern or response to a policy initiative when you don't have a time series to enable you to make these claims with confidence. It's always worth considering the extent to which the time series might be subject to cyclical patterns, such as economic growth.

4. What is the story behind the pattern revealed by the statistics?

Understanding the story behind the patterns is important – though this is more an internal check: to satisfy yourself that the patterns are plausible, fit your own experience. Be cautious about going public with this story until you have explored other explanations for the patterns in the data.

5. Have you changed measurement – or data suppliers – and might this be a plausible explanation for the pattern you see in the statistics?

Sometimes, what seems to be a good story – how a particular initiative has produced a clear result – is in fact the product of changes in the way data are measured, collected or categorised. Data are particularly prone to change where the supplier itself has changed (e.g. from one contractor to another; or from a shift in organisational responsibilities; or a change programme within the supplier).

6. Is there any sense in which these data are obviously subject to confirmation bias – to saying what those who commission it want to hear?

This is a difficult question for you to ask, because it could be that there is a tension between the role of statisticians as independent data collectors and your responsibilities for the successful delivery of policy. Nevertheless, it is an essential question to ask, even if the answer does not make for comfortable reading.

7. What level of assurance do you have over the administrative data?

The UK Statistics Authority has recently emphasised the importance of statisticians obtaining assurance over the underlying administrative data that feeds into official statistics. So your statisticians ought to have a clear answer to the question about how they know the underlying data are reliable. If not you should ask them to get it.

8. How important are the data to the supplier – to meeting their own KPIs or success factors?

If the data supplier uses the underlying administrative data as the basis for a) its performance against a key performance indicator and b) for its returns to your statisticians, there is a potential for criticism of your statistics – because people may believe that the data supplier is incentivised to record the data in ways which make it look good. In this context, assurance is even more important.

9. What do you know about the processes by which the data have been compiled?

Like many of the other questions here, this is a remarkably simple question that can guide you as to how far you should rely on the statistics based on the data. If your teams don't seem to understand or trust the process, it's probably right to be concerned about the reliability of the official statistics.

10. How independent are the statisticians from the suppliers of the data?

The *Code of Practice for Official Statistics*³⁵ is the key document designed to ensure high quality statistical practice in government bodies. One of its key principles is the need for statisticians to act independently of both data suppliers and political decision-makers. So you should always ask your statisticians how they have complied with the independence requirements of the *Code of Practice*.

³⁵ <http://www.statisticsauthority.gov.uk/assessment/code-of-practice/index.html>