

STATISTICIAN COMPETENCE FRAMEWORK

➤ The aim

This competence framework aims to improve consistency of approach to professional statistical grades (the Government Statistician Group – GSG) across the Government Statistical Service (GSS). It will allow managers to set the requirements of a GSG post in a GSS context, and to judge when people are suitable to meet these requirements. It provides guidance to individuals and their managers about how they should develop. It provides a basis for managers to gauge overall statistical capacity, especially in a planning context.

➤ The content

The range of statistical posts available across the GSS from those which need general statistical service delivery skills to others requiring subject area or methodological expertise, makes it impossible to produce competences detailed enough to cover every eventuality. Instead, this framework shows the core areas of knowledge and expertise expected of statistical staff working in the GSS. It has been deliberately kept short and simple.

➤ What the framework does not cover

The framework does not incorporate Professional Skills for Government Core Skills. To become fully effective, members of the GSS will have to acquire both the PSG core skills and the core statistical competences. Wherever possible this framework should be integrated into departmental competence frameworks, and performance and pay systems.

➤ The framework shows what would be expected of people at three levels, and also includes Senior Civil Service competences (Pay Band 1)

- Level 1 After about a year in post at start of career (Assistant Statistician or Statistical Officer, or equivalent)
- Level 2 After a few years experience, with some project or team management responsibilities (Assistant Statistician after probation or Higher Statistical Officer, or equivalent). Senior Statistical Officers would expect to have solid level 2's with perhaps a few Level 3's.
- Level 3 As a main grade statistician (Grade 7 or equivalent)
- Level 4 As an SCS Pay Band 1. Grade 6 equivalent would expect to have some Level 4 competencies as well as solid Level 3 competencies.

➤ Five principles of working as a government statistician underpin these competences:

1. Understand customers' requirements and the policy context in which they operate
2. Provide objective and relevant statistical advice
3. Be creative and flexible in your problem-solving – try to see the bigger picture
4. Provide good quality management of data, processes and products
5. Be proactive and influence customers and colleagues

➤ Using the GSS network

Finally, the GSS has a wealth of expertise and many experts who can give advice and support. Members of the GSS are encouraged to use this network to assure and improve the quality of their processes and products, and to aid their own professional development.

➤ Technical Competence – Data Analysis

For admission to the GSG, candidates have to demonstrate that they have a certain level of statistical analytical knowledge in a range of techniques. The current minimum for both Assistant Statisticians and Statistical Officers, is that they understand how to apply at least **two** statistical techniques from List A, and their underlying assumptions and limitations. This means that they need to demonstrate under what circumstances it would be appropriate to deploy the technique, the most important assumptions on which the technique relies and the consequences of these assumptions not holding, how the technique works, what the expected outputs would look like and how to interpret them.

For promotion to Grade 7 (i.e. competence level 3), candidates should be able to demonstrate competence in at least **three** of the techniques from List A.

Ideally candidates would use examples from their own experience, and this may constitute strong evidence of competence, but it is not necessary for experience to be demonstrated in all instances.

List A: Statistical Techniques for data analysis required for admission to or promotion within the GSG

1. Analysis of Variance, (**any of** ANOVA, MANOVA, ANCOVA, MANCOVA);
2. Multiple Regression, **either** time-series **or** cross-sectional **or** both
3. Other Multivariate techniques: **any of**, Principal Components Analysis, Factor Analysis, Clustering techniques; Discriminant analysis
4. Stochastic Processes: including for example, Markov chains, Queuing processes; Poisson processes, random walks
5. Time Series Analysis: **any of**: Time series models; ARIMA processes and stationarity; Frequency domain analysis
6. Generalised Linear Model; **any of**: log-linear models; logistic regression, Probit models, Poisson regression
7. Hypothesis testing: **all of**: formulation of hypotheses; types of error; p-values; common parametric (z, t, F) or non-parametric (χ^2 , Mann-Whitney U, Wilcoxon, Kolmogorov-Smirnov) tests
8. Index numbers: **most of**: Laspeyres/Paasche indices, hedonic indices; chaining; arithmetic and geometric means as applied to indices.

STATISTICIAN COMPETENCES – Level 1

Collection of data to meet customer requirements	Analysis and interpretation to meet customer requirements	Dissemination	Professional issues
<p><i>Knowledge about sources</i></p> <ul style="list-style-type: none"> Is aware of data sources directly relevant to own work or subject area. Understands that using administrative systems to produce statistics will have implications for the definitions and quality of data. 	<p><i>Technical awareness and application</i></p> <ul style="list-style-type: none"> Understands application of main statistical techniques and software used in their area. Can describe the main theoretical and practical features, assumptions and limitations of at least two techniques from list A. Is aware of a range of other techniques. Can describe the significance of the Central Limit theorem and Bayes' Theorem Proficiency in at least one statistical programming language/package 	<p><i>Explaining statistical concepts and findings</i></p> <ul style="list-style-type: none"> Can communicate clearly (orally – one to one or in small groups – and in writing) simple or familiar concepts or own work. Is aware of need to tailor communication to audience. 	<p><i>Regulatory Framework</i></p> <ul style="list-style-type: none"> Is familiar with the Code of Practice for Official Statistics. Understands how the Statistics and Registration Service Act and related legislation affect their area. Is familiar with the National Statistician's Guidance. Ensures own outputs meet these criteria. Aware of devolved structure of the UK and its general relevance to official statistics
<p><i>Identifying data fit for purpose</i></p> <ul style="list-style-type: none"> Identifies strengths and limitations of data sources they use. 	<p><i>Provision of data and research fit for purpose</i></p> <ul style="list-style-type: none"> Understands customers' requirements and relates this to information readily available in own area. Can produce appropriate analysis to meet customers' requirements. Can produce summary statistics (eg means, standard errors and indices) which describe data, allowing where necessary for extreme values. Can perform a range of quality assurance checks to a good standard 	<p><i>Disclosure and confidentiality (Data Protection Act; Open Government; Freedom of Information; Release Practices)</i></p> <ul style="list-style-type: none"> Understands basic concepts. Is aware of implications for own data and subject area. Completes mandatory training. Takes responsibility for the security of their own data assets. 	<p><i>Wider professional awareness</i></p> <ul style="list-style-type: none"> Takes steps to be aware of professional issues in own department, (such as participating in departmental AS/StO Group). Knows the structure of the GSS and its relationship with departments.
<p><i>Surveys and data collection</i></p> <ul style="list-style-type: none"> Understands principles of sample and survey design and collection methods. Understands sampling errors and issues such as non-response, 	<p><i>Awareness of context</i></p> <ul style="list-style-type: none"> Understands the policy making process and the role that statistical staff can play. Is aware of the policy and subject issues in own area. 	<p><i>Means of effective and appropriate presentation (plain figures and media)</i></p> <ul style="list-style-type: none"> Knows how to design charts and graphs. Is aware of guidance and good practice. 	<p><i>Continuing Professional Development</i></p> <ul style="list-style-type: none"> Identifies gaps in knowledge and plans to meet them. Keeps knowledge up to date and expands range.
<p><i>Data quality and management</i></p> <ul style="list-style-type: none"> Understands different methods of data storage, validation and extraction. Applies different methods of data storage, validation and extraction to own data. 	<p><i>Interpretation</i></p> <ul style="list-style-type: none"> Can draw out the main messages from data, analysis and research, and identify essential supporting information. Can use appropriate techniques. 	<ul style="list-style-type: none"> Can draft simple reports. Can present statistics in tables and charts to help users to understand and use their statistics. Can design simple outputs for the 	<p><i>Promoting a statistical approach and the correct use of statistics</i></p> <ul style="list-style-type: none"> Understands the role of statisticians in government and their own role in their department.

<ul style="list-style-type: none">• Uses relevant software effectively.	<ul style="list-style-type: none">• Can identify irregularities and discrepancies in data.	web.	
---	--	------	--

STATISTICIAN COMPETENCES – Level 2

Collection of data to meet customer requirements	Analysis and interpretation to meet customer requirements	Dissemination	Professional issues
<p><i>Knowledge about sources</i></p> <ul style="list-style-type: none"> Has detailed knowledge of data sources in their work area and working knowledge of other data sources in related areas. Has awareness of wider range of sources. 	<p><i>Technical awareness and application</i></p> <ul style="list-style-type: none"> Can describe the main theoretical and practical features, assumptions and limitations of at least two techniques from list A. 	<p><i>Explaining statistical concepts and findings</i></p> <ul style="list-style-type: none"> Can present own work or give joint presentations covering work of team to bigger groups or wider ranges, including more senior people. 	<p><i>Regulatory Framework</i></p> <ul style="list-style-type: none"> Understands the main provisions of the Statistics and Registration Service Act and subordinate legislation and guidance as they relate to statistics. Ensures compliance with Code of Practice for Official Statistics in their area and can articulate this to others. Is aware of the implications of the devolved structure of UK government for own Department's work and acts accordingly
<p><i>Identifying data fit for purpose</i></p> <ul style="list-style-type: none"> Can identify and assess suitability of other data sources. 	<p><i>Provision of data and research fit for purpose</i></p> <ul style="list-style-type: none"> Can suggest or recommend the most suitable sources, analyses and research. Can critically assess the quality and validity of data and their sources. Can design a quality assurance process that achieves a good standard 	<p><i>Disclosure and confidentiality (Data Protection Act; Open Government; Freedom of Information; Release Practices)</i></p> <ul style="list-style-type: none"> Knows the practical implications for own data and other data used. 	<p><i>Wider professional awareness</i></p> <ul style="list-style-type: none"> Keeps abreast of statistical developments in own and other departments, and the wider profession through networks, conferences and other meetings.
<p><i>Surveys and data collection</i></p> <ul style="list-style-type: none"> Can develop or design or manage surveys. Can develop or design or manage new data collection from administrative sources. 	<p><i>Awareness of context</i></p> <ul style="list-style-type: none"> Contributes to policy-making process and application of analysis to decision-making. Is aware of the potential contribution of other analytical groups and the skills and techniques at their disposal. Is aware of the main strategic priorities of own organisation. 	<p><i>Means of effective and appropriate presentation (plain figures and media)</i></p> <ul style="list-style-type: none"> Can draft articles and reports choosing the most effective structure and commentary, charts and tables as appropriate. Can summarise key messages briefly and effectively using visual media. Can draft material for the news media effectively. Can exploit web dissemination tools effectively. 	<p><i>Continuing Professional Development</i></p> <ul style="list-style-type: none"> Identifies gaps in knowledge and has plans to meet them. Keeps knowledge up to date and expands range.
<p><i>Data quality and management</i></p> <ul style="list-style-type: none"> Can assess most appropriate way to store data. Can specify complex validation routines. Can carry out complex data manipulation. Has knowledge of wider range of software. 	<p><i>Interpretation</i></p> <ul style="list-style-type: none"> Knows when to investigate outputs further and offers explanations. Validates analyses against external sources and research. 		<p><i>Promoting a statistical approach and the correct use of statistics</i></p> <ul style="list-style-type: none"> Takes opportunities to promote the use of statistics. Develops statistical knowledge and skills of colleagues.

STATISTICIAN COMPETENCES – Level 3

Collection of data to meet customer requirements	Analysis and interpretation to meet customer requirements	Dissemination	Professional issues
<p><i>Knowledge about sources</i></p> <ul style="list-style-type: none"> • Has good knowledge of data sources across government. • Can locate data in a range of published and unpublished sources. 	<p><i>Technical awareness and application</i></p> <ul style="list-style-type: none"> • Can describe the main theoretical and practical features, assumptions, applications, and limitations of at least three techniques from list A. • Can assess the potential of emerging technology. 	<p><i>Explaining statistical concepts and findings</i></p> <ul style="list-style-type: none"> • Can communicate appropriately to all levels of audience: ministers, press conferences. • Explains clearly statistical concepts and findings to non-specialists. • Chooses the most effective means of delivery and appropriate verbal and graphical content. 	<p><i>Regulatory Framework</i></p> <ul style="list-style-type: none"> • Understands all the main provisions of the Statistics and Registration Service Act and subordinate legislation and guidance as they are related to statistics. • Ensures compliance with Code of Practice in their area and can defend and uphold it as necessary. • Takes full account of devolved UK government structures in planning own work
<p><i>Identifying data fit for purpose</i></p> <ul style="list-style-type: none"> • Manages the acquisition of data fit for purpose. • Selects the right data for the purpose at hand and evaluates their strength. • Finds out what else has been done in the same field. 	<p><i>Provision of data and research fit for purpose</i></p> <ul style="list-style-type: none"> • Applies an innovative approach to meeting customers' requirements. • Proactively identifies customers' requirements including taking account of broader context. • Distinguishes the limits of applications of statistical findings. • Able to manage/appraise statistical aspects of academic research and quality assure results of research. • Can ensure that outputs and processes are quality assured to high standards, minimising errors 	<p><i>Disclosure and confidentiality (Data Protection Act; Open Government; Freedom of Information; Release Practices)</i></p> <ul style="list-style-type: none"> • Enforces legal and ethical aspects of data collection. • Keeps abreast of developments. • Influences and negotiates with interested partners. • Can produce innovative solutions to satisfy confidentiality and Data Protection requirements. • Promotes data sharing while minimising disclosure risks. 	<p><i>Wider professional awareness</i></p> <ul style="list-style-type: none"> • Contributes to national and international development of statistics and statistical methods where appropriate. • Communicates effectively with other members of the GSS and profession at large.
<p><i>Surveys and data collection</i></p> <ul style="list-style-type: none"> • Can manage and advise on all aspects of sample survey processes including sample size and sample design. • Can critically evaluate different sample designs and the statistical properties of associated estimators • Can develop new uses of existing sources and maximise the statistical potential of new sources. • Ensures compliance with legal and ethical requirements in own area. 	<p><i>Awareness of context</i></p> <ul style="list-style-type: none"> • Takes active steps to keep in touch with current policy and subject issues, and their impact on information needs and use. • Ensures understanding of the link between work in own area and the organisation's objectives. • Is aware of and promotes harmonisation and use of recognised data standards. 	<p><i>Means of effective and appropriate presentation (plain figures and media)</i></p> <ul style="list-style-type: none"> • Can exploit full range of media options. • Contributes to draft articles and reports taking account of wider context. • Can handle news and media in own area of expertise. • Can develop and implement a web dissemination strategy. • Can develop necessary skills for web dissemination 	<p><i>Continuing Professional Development</i></p> <ul style="list-style-type: none"> • Identifies gaps in knowledge and has plans to meet them. • Keeps knowledge up to date and expands range. • Assures and evaluates CPD of subordinates. • Shares own knowledge and experience to develop others. • Mentors others.
<p><i>Data quality and management</i></p>	<p><i>Interpretation</i></p>		<p><i>Promoting a statistical approach and the</i></p>

<ul style="list-style-type: none"> • Can implement Official Statistics data quality measures. • Brings expertise and innovation to data management issues. • Is aware of potential links with other data sources. • Involves IT specialists in developing and marketing new services. • Promotes increased efficiency and effectiveness in data gathering, in particular; Data sharing; Data matching; Minimising respondent burdens. 	<ul style="list-style-type: none"> • Identifies the wider implications of the statistics produced. • Draws sound inferences from data, spotting weaknesses in the evidence or analysis, and exploiting weak information successfully. 		<p><i>correct use of statistics</i></p> <ul style="list-style-type: none"> • Promotes the use of statistics and the role of statisticians to policy colleagues and other professional groups. • Be able to recruit, develop and lead a statistical team.
--	---	--	--

STATISTICIAN COMPETENCES – Level 4

Collection of data to meet customer requirements	Analysis and interpretation to meet customer requirements	Dissemination	Professional issues
<p><i>Knowledge about sources</i></p> <ul style="list-style-type: none"> Has good knowledge of data sources across government and outside government. 	<p><i>Technical awareness and application</i></p> <ul style="list-style-type: none"> Has a good theoretical and practical understanding of a broad range of statistical techniques and their application Can provide high-level critique of analyses proposed or received Ensures best practice is applied in their area 	<p><i>Explaining statistical concepts and findings</i></p> <ul style="list-style-type: none"> Can effectively influence ministers and senior officials on impact of statistical evidence on policy. Can communicate appropriately to all levels of audience: ministers, press conferences. Explains clearly statistical concepts and findings to non-specialists. Chooses the most effective means of delivery and appropriate verbal and graphical content. 	<p><i>Regulatory Framework</i></p> <ul style="list-style-type: none"> Provides guidance to others all the main provisions of the Statistics and Registration Service Act and subordinate legislation and Guidance as they relate to statistics; Ensures compliance with Code of Practice for Official Statistics in their organisation Promotes, defends and upholds Code in the wider organisation Understands interactions of SRSA with other legislation and guides colleagues appropriately Can act as or substitute for Head of Profession in all main aspects of the role Incorporates Devolution issues fully into Departmental and wider GSS planning and practice
<p><i>Identifying data fit for purpose</i></p> <ul style="list-style-type: none"> Can identify new 'statistical' needs and develop existing work areas or set up new work areas to meet these. Ensures that potential links with other data sources are evaluated and exploited. Manages the acquisition of data fit for purpose. Guides the selection of the right data for the purpose at hand and the evaluation of their strength. Is aware of the development of data sources across Government. 	<p><i>Provision of data and research fit for purpose</i></p> <ul style="list-style-type: none"> Applies an innovative approach to meeting customers' requirements. Proactively identifies customers' requirements including taking account of strategic priorities. Understands and communicates the limits of the applications of statistical findings. Can develop and direct an appropriate programme of statistical work to meet customer needs and priorities across a number of areas. Develops a culture and practices that ensure high quality statistical work 	<p><i>Disclosure and confidentiality (Data Protection Act; Open Government; Freedom of Information; Release Practices)</i></p> <ul style="list-style-type: none"> Ensures compliance with legal and ethical aspects of data holding and dissemination in own area Discharges responsibilities as a Senior Information Risk Owner. Influences and negotiates with interested partners. Can produce innovative solutions to satisfy confidentiality and Data Protection requirements. 	<p><i>Wider professional awareness</i></p> <ul style="list-style-type: none"> Influences and promotes development of GSS and Official statistics policies Promotes GSS agenda within their organisation. Influences development of relevant European and other international norms, standards and requirements
<p><i>Surveys and data collection</i></p> <ul style="list-style-type: none"> Can advise on, assess, and evaluate actual or proposed sample surveys. Can develop new uses of existing sources and maximise the statistical potential of new sources. Ensures compliance with legal and ethical requirements in own area. 	<p><i>Awareness of context</i></p> <ul style="list-style-type: none"> Takes active steps to keep in touch with current policy and subject issues, and their impact on information needs and use. Creates and implements strategies for keeping the provision of statistical information needs and use. 	<p><i>Means of effective and appropriate presentation (plain figures and media)</i></p> <ul style="list-style-type: none"> Can exploit full range of media options. Writes or quality assures draft articles and reports taking account of wider context. Ensures coherent web dissemination strategy and necessary skills in their area Can direct the programme of 	<p><i>Continuing Professional Development</i></p> <ul style="list-style-type: none"> Identifies gaps in knowledge and has plans to meet them. Keeps knowledge up to date and expands range. Develops in implements mentoring strategies. Mentors others including G6/7

		dissemination of statistical work in accordance with Code of Practice for Official Statistics.	<p>statisticians</p> <ul style="list-style-type: none"> Promotes and ensures compliance with CPD for the professional members of their team.
<p><i>Data quality and management</i></p> <ul style="list-style-type: none"> Can devise and implement Official Statistics data quality measures. Brings expertise and innovation to data management issues. Seeks to ensure that the statistical requirements are incorporated into decisions regarding the creation and maintenance of Government IT systems Ensures appropriate specialists skills and resources are involved in developing and marketing new services. 	<p><i>Interpretation</i></p> <ul style="list-style-type: none"> Identifies the wider implications of the statistics produced. Draws sound inferences from data, spotting weaknesses in the evidence or analysis, and exploiting weak information successfully. Ensures recipients of statistical advice, understand its quality and limitations and the size of any related risk. 		<p><i>Promoting a statistical approach and the correct use of statistics</i></p> <ul style="list-style-type: none"> Stays abreast of statistical developments in the GSS & exploits these in own work area. Stays abreast of relevant developments in business, academia and other countries Champions use of evidence and high quality analysis in own organisation at all levels Manages relations with other professions within the organisation, especially the analytical professions, to bring about collaborative working for the overall public good.