



Job description

Job title:	Senior Data Manager/Data Scientist or Data Manager/Data Scientist
Grade:	X
Department:	Clinical Effectiveness Unit (CEU)
Responsible for:	n/a
Accountable to:	Director of Clinical Effectiveness Unit (CEU)

Job summary

The roles provide a unique opportunity to be key members of the Clinical Effectiveness Unit (CEU), a leading centre for national clinical audit and research working to improve health services in the UK. The CEU is an academic collaboration between the Royal College of Surgeons of England and the Department of Health Services Research and Policy of the London School of Hygiene and Tropical Medicine (LSHTM) (<https://www.rcseng.ac.uk/surgeons/research/surgical-research/ceu>).

The CEU is internationally recognised for its expertise on the methods, organisation, and logistics of large-scale studies into the quality of hospital care. It has undertaken national projects in areas such as vascular surgery, joint replacement, breast cancer, emergency bowel surgery, and the treatment of children with a cleft lip or palate. The findings from these projects have contributed to changes in medical practice and clinical policy in the UK and beyond. The CEU is expanding, now also hosting the National Cancer Audit Collaborating Centre (NATCAN), a new national centre of excellence to help strengthen NHS cancer services and reduce variation in cancer care.

The postholders will be part of multidisciplinary teams, including senior clinical specialists, statisticians, clinical fellows and project managers, who together deliver national clinical audits and carry out research. Having rich national linked datasets provides opportunities to assess the quality of care and answer pressing questions about why some patients receive different treatments and outcomes than others. With the expansion of the CEU, there are opportunities to strengthen the data management and analysis processes within the unit. These new Data Managers / Data Scientists will be instrumental to providing efficient, highly collaborative innovative data science in the CEU and NATCAN. Ultimately this will improve the timely, interactive feedback to hospitals, driving improvements in care and outcomes for patients.

There are two roles available. The duties and responsibilities of each role will be split across the CEU and NATCAN, and will depend in part on the qualifications, experience, skills and interests of the post holder.

- To lead on/ support the work to improve the efficiency of data management, analysis and reporting within the CEU and NATCAN
- Efficient management of CEU/ NATCAN databases of national routine healthcare data



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- To design and implement statistical analyses, reusable data pipelines and data visualisations for national clinical audit and research projects in suitable software such as SQL, R, RShiny, Stata
- To support data access requests and management of information governance related to the datasets held within the CEU/ NATCAN

Senior Data Manager/ Data Scientist

This role is pivotal to the CEU's successful delivery of national clinical audits and impactful healthcare research. Working closely with the CEU Director and the Director of Operations, NATCAN, other multidisciplinary members of the CEU and the data providers in NHS England and Wales, the postholder will lead on reshaping the data management and analysis in the CEU and NATCAN. They will work to improve the flow of data into the CEU and on to the audit teams, drive improved cross-team working, introduce more centralised data wrangling, validation, and data science processes, develop more automated reporting, develop and carry out statistical analyses, and contribute to the design of the visualisation of results on hospital dashboards, as well as taking responsibility for the management of information governance within the CEU.

Data Manager/ Data Scientist

This is a key role in the effective data management and data science in the CEU and NATCAN. Working closely with the Senior Data Manager, other multidisciplinary members of the CEU and the data providers in NHS England and Wales, they will support the work to improve the efficiency of data management and analysis within the unit. They will have a key role in providing the data management and data science central to the CEU and NATCAN, working with the Senior Data Manager on the data flow into and within the CEU, data validation, data science processes, and automated reporting. Dependent on skills and expertise there will be the opportunity to pursue a PhD.

A current data scientist in the CEU says "These data manager/ data scientist roles provide a fantastic opportunity to be part of teams carrying out clinical audit and research with 'big data'. For this to drive quality improvement and make a real difference to patients, we need more input from data managers/ data scientists to handle the data coming into the CEU efficiently and analyse and report on it effectively. My role has been extremely well-supported from academics and clinicians at the forefront of their fields, and has provided me with invaluable opportunities to develop my data science skills, present at national and international conferences, and contribute to meaningful improvements for patients with cancer. I cannot recommend this position highly enough."

Further information about the CEU and NATCAN can be found at the end of this job description



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Specific duties and responsibilities

1. To lead on/ support the work to improve the efficiency of data management, analysis and reporting within the CEU and NATCAN

With the expansion of the CEU, there are opportunities to improve the efficiency of data management and analysis within the unit. Firstly, work is needed to improve the flow of data into the CEU and NATCAN. This is likely to involve working within the Data Access Request Service at NHS England, the National Disease Registration and Analysis Service, and/or Public Health Wales, who provide the majority of the data to the CEU and NATCAN, to improve the richness, quality and timeliness of data into the unit. Secondly, the postholders will work closely with the Director of the CEU and the Director of Operations, NATCAN and other multidisciplinary team members of NATCAN and the CEU to improve the efficiency of data management and data science in the unit, driving/ supporting improved cross-team working, introducing more centralised data wrangling, validation, and data science processes, and carrying out centralised data analysis to develop accurate and clinically important performance indicators to feed back to hospitals. Where possible, the postholders will develop and implement automated reporting of feedback to hospitals.

2. To lead on/ manage the CEU databases of national routine healthcare data

Many CEU and NATCAN projects involve the analysis of healthcare data from routine data sources. For example, it is common for studies of care delivered in English hospitals to use extracts of data from Hospital Episode Statistics and national clinical audits/ registries. The national routine healthcare datasets are stored on the CEU's secure file server and the Microsoft SQL Server database management system is used to manage these relational databases. The postholders will be responsible for extracting, documenting, cleaning and validating data, and carrying out data science. Areas contributing to this include:

- Extracting, wrangling and curating large scale linked clinical datasets ready for analysis using SQL or statistical software (R, Python, Stata), and supporting related documentation
- Developing and applying reusable data pipelines and applying algorithms and code lists to derive required variables
- Developing and performing systematic data quality checks across and within projects, to deal with duplicate, missing and erroneous data and incomplete data linkage

3. To design and implement statistical analyses for national clinical audit and research projects

In collaboration with other team members, the postholders will design and carry out statistical analyses within and across national clinical audit and research teams. These might be aimed at understanding how processes of care vary across different NHS organisations, or examining how different patterns of care may influence patient outcomes. The postholders will work with audit and research teams to:

- Undertake analyses of national datasets, such as clinical audit data, national cancer datasets, national administrative datasets, such as Hospital Episode Statistics (HES)
- Examine how different patterns of care may influence patient outcomes
- Produce dashboards and data visualisations to support local quality improvement.



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The roles will include communicating the findings of analyses to statistical and non-statistical team members (such as clinicians, policy-makers, patient and charity representatives). There will be opportunities to present analyses in seminars, and write up findings for project reports, and academic journal articles.

4. To support data access requests and management of information governance related to the datasets held within the CEU and NATCAN

CEU and NATCAN projects involve accessing national healthcare datasets, often linked to clinical datasets. The roles will support the process of applying for access to national healthcare datasets, with involvement (as appropriate) of national data controllers / partners, related organisations, and data collection system providers. The CEU and NATCAN must obtain approvals and demonstrate the CEU complies with information governance (IG) requirements. The postholders will support CEU staff to gain approvals and access healthcare datasets and develop processes which ensure that data access, management and analysis activities take place within a robust data sharing and information governance framework.

The storage and processing of healthcare data must conform to legal requirements including the General Data Protection Registration. The postholders will liaise with the RCS Data protection Officer (DPO) to support processes to ensure that data collection, data access, management and analysis activities meet legal IG requirements. These include registers of data sharing agreements and project datasets, data destruction documents, staff training records, the use of data encryption / security policy.

5. General

The post-holder is expected to:

- Maintain the confidentiality of data at all times and to ensure that the requirements of the Data Protection Act are met throughout the project.
- Develop and maintain effective working relationships with all members of the multidisciplinary teams in NATCAN and the CEU.
- Keep abreast of and adapt to changes in the national healthcare data landscape, developments in data science and data management of national healthcare data, and methods of feedback to hospitals (e.g. dashboards and visualisations).
- Carry out other occasional duties within the CEU and NATCAN, e.g. contributing to training workshops, deputising for specific tasks in the absence of CEU colleagues.
- Undertake such duties appropriate to the grade, as required by the Director of the CEU.

Dependent on qualifications and expertise, the post-holders will have the opportunity to pursue a PhD in health informatics, statistics, data science or data management. Working in the CEU and NATCAN will provide a wealth of potential topic areas, such as developing methods for monitoring healthcare performance, improving data validation of linked datasets, and evaluating methodologies of data linkage.

This job description will be subject to review in the light of changing circumstances and may include other duties and responsibilities as may be determined. It is not intended to be rigid or inflexible but should be regarded as providing guidelines within which the individual works.

March 2024



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Person specification

	Essential	Desirable
Qualifications	<ul style="list-style-type: none"> A higher degree (MSc) in a quantitative discipline (such as health informatics, statistics, data science or data management) or equivalent academic qualification and experience 	<ul style="list-style-type: none"> A PhD in a quantitative discipline (such as health informatics, statistics, data science or data management) or equivalent academic qualification and experience
Experience and skills	<ul style="list-style-type: none"> Experience of undertaking statistical analyses using large datasets Experience of managing relational databases using SQL or similar Experience of working within multidisciplinary teams on healthcare projects Experience of applying information governance principles to healthcare data Knowledge of data protection and information security principles Good report writing and presentation skills Good organisational skills, including an ability to prioritise work to meet deadlines and work on various tasks simultaneously 	<ul style="list-style-type: none"> A good understanding of health-related research methods and study designs Experience of developing efficient data management, analysis and reporting processes across teams Experience of analysing national clinical datasets such as Hospital Episode Statistics, national clinical audit data, or national cancer datasets Experience of involvement in applications to access healthcare datasets Data visualisation / dashboard development experience Ability to communicate statistical concepts and results to a non-technical audience Knowledge of Section 251 and the common law duty of confidentiality
Technical competencies	<ul style="list-style-type: none"> Statistical analysis skills, including ability to critically evaluate numerical information In-depth knowledge of a widely used statistical package, such as R, STATA or Python 	<ul style="list-style-type: none"> Ability to formulate which statistical methods might be relevant to different clinical situations Knowledge of the NHS Information Governance framework



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People and interpersonal skills	<ul style="list-style-type: none">• Maintain high-levels of confidentiality• Has a good attention to detail• Willingness to undertake training, as required	
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The post holder will also need to demonstrate the following values:

Collaboration	We embrace our collective responsibilities working collaboratively and as one college.
	<ul style="list-style-type: none">• We work together, using our collective expertise and experience to effect positive change• We are open, honest and transparent, straightforward in our language and actions, acting with sincerity and delivering on our commitments• We take our responsibilities to each other, to patient care and to the environment seriously and we act with this in mind across our work
Respect	We value every person we come into contact with at the College as an individual, respect their aspirations and commitments in life, and seek to understand and meet their physical and wellbeing needs.
	<ul style="list-style-type: none">• We treat everyone we meet with kindness and integrity and we seek to promote these behaviours in others• We actively seek a range of views and experiences across our work, and we listen to, and make everyone feel, a valued part of the team
Excellence	We aspire to excellence and success. We share learning from our experiences, apply feedback into practice, and commit to continual improvement.
	<ul style="list-style-type: none">• We work hard to be the best at what we do, recognising and celebrating effort and achievement, and reflecting on our work, so we can learn and improve• We value and invest in research, education and training to drive excellence and put improvements in surgical practice, dentistry and patient care at the heart of our work• We always seek to learn and discover more, valuing knowledge and scientific evidence, basing our decisions on insights, fact and experience

The Royal College of Surgeons of England is an Equal Opportunities Employer. We are open to all talent and we actively ensure that all qualified applicants will receive equal consideration for employment without regards to age, disability, gender reassignment, marriage or civil partnership, pregnancy and maternity, race, religion or belief, sex or sexual orientation.



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Clinical Effectiveness Unit

The work of the CEU involves carrying out national clinical audits, developing audit methodologies and producing evidence on clinical and cost effectiveness. These audits have helped to identify and address variations in the delivery of health care across England and Wales, and improve outcomes for patients. The audits have also promoted quality improvement initiatives within the NHS and identified best practice.

An essential element of the CEU's strategy is that it considers audit projects as epidemiological studies of the quality of care. Epidemiological methods are used to generate high quality evidence on the processes and outcomes of health care as well as on their determinants. Another important feature of the CEU's strategy is the emphasis it gives to joint clinical and methodological leadership. This multidisciplinary approach creates a collaborative environment that ensures the project results are impactful and produced efficiently.

The CEU has 30 staff members, of whom 11 are academic staff members of LSHTM. The background of the staff demonstrates the multidisciplinary character of the Unit (medicine, health services research, medical statistics, epidemiology and public health). The Unit's Director is David Cromwell, Professor of Health Services Research.

National Cancer Audit Collaborating Centre (NATCAN)

NATCAN is part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP). The Centre is commissioned by the Healthcare Quality Improvement Partnership on behalf of NHS England and the Welsh Government. The Centre delivers 10 national cancer audits, including audits in breast, bowel, prostate, lung, ovarian, oesophago-gastric, kidney, pancreatic cancer, and non-Hodgkin lymphoma. It aims to:

1. Provide regular and timely information to cancer services on patterns of care in England and Wales.
2. Support NHS services to identify the reasons for variation in care and support quality improvement initiatives.
3. Stimulate improvements in cancer detection, treatment and outcomes including survival.

Cancer treatment is complex – there are multiple treatment options for different types of cancer. A patient's treatment plan needs to take into account their overall health, the stage of their cancer, and how they may respond to treatment. A key aim of each audit is to ensure the information produced for cancer services recognises these differences and supports hospitals to focus on specific parts of the care pathway.

NATCAN collaborates closely with professional groups, clinicians and patient charities to ensure that all relevant stakeholders inform the quality improvement goals of each audit. It is led by Dr Julie Nossiter, who is the Centre's Director of Operations, Prof David Cromwell, Dr Kate Walker, and Prof Jan van der Meulen who are public health academics at London School of Hygiene and Tropical Medicine (LSHTM), and Dr Ajay Aggarwal who is the Clinical Director.



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