



Privacy Impact Assessment (PIA) DeepMind Technologies

Your guide to Streams

What is Streams?	1
What will Streams do?	1
How will using Streams be different to what happens now?	1
Who will be processing the data?	2
What data will be sent to DeepMind for Streams?	2
What data will be stored?	2
What is a data controller or processor?	2
What will the data be used for?	3
How secure is the data?	3
When would you disclose my data?	3
How will you make sure my data isn't mistaken for another patient's?	3
Will you be able to see my information from other care providers?	3
What will happen to patient confidentiality?	3
Why do we need a Privacy Impact Assessment (PIA)?	4
What does this version of the Privacy Impact Assessment allow for?	4
How will you make sure only the right people can see my information?	4
What has the Trust done to reduce the risk to my privacy?	4
What algorithms will DeepMind run on the data?	4
What are the legal requirements for data protection?	5
How can I get involved?	5
Can I opt out?	5
How will Streams be piloted?	5
Case Studies of Streams' use	5

What is Streams?

Streams is a mobile application which will aid clinicians in providing your care at the Trust. Taunton and Somerset NHS Foundation Trust is working with patients to bring digital technology to the bedside to improve patient care and safety.

What will Streams do?

'Streams' is an app which will show blood and x-ray results on mobile devices, which means that clinical colleagues can make informed decisions more quickly, with immediate access at the bedside and on the move. The ability to use a mobile phone or tablet in the hospital environment has the potential to improve both the safety and quality of patient care. It means that people involved in your direct care can view results at the same time, without unnecessary delays. The Trust has worked with DeepMind to be able to digitally record vital signs, also known as 'observations' on the app. A patient's vital signs include pulse rate, temperature, respiration rate, and blood pressure, which will show if they are unwell. This will allow the right colleagues to monitor a patient's wellbeing in real time. The software will be able to flag patients who are at risk of Acute Kidney Injury (AKI) and aid doctors and nurses in providing the correct care and treatment.



How will using Streams be different to what happens now?

In its current stage, Streams will only show information that doctors and nurses are currently able to see on a desktop computer or paper record. The difference is that Streams is on a mobile device. Your doctor would usually have to go and find a computer to view your blood or x-ray results, but with a mobile they can be at the bedside with you to discuss your treatment. It also means clinicians

can easily see trends in your health with graphs showing your health over time. When a nurse or healthcare assistant records your observations at the moment, they are written on a paper chart. This key information shows how unwell you are by calculating a [National Early Warning Score](#) (NEWS) which advises colleagues of the steps which need to be taken for your health. If this paper chart is moved or misplaced, doctors and nurses cannot see trends in your health. By recording this crucial information in the Streams app, anyone directly involved with your care can see your observations immediately, wherever they are in the hospital. There is an electronic trail of who has accessed your information to ensure that only the right people have seen it, and to ensure patient privacy.



Who will be processing the data?

DeepMind Technologies Limited (DeepMind) has signed a five year service agreement (in May 2017) to act as a data processor on behalf of the Trust. The Trust is the data controller. This formed an anchor partnership to apply and develop, over a number of phases, a mobile application called Streams. This work will contribute to the Trust's digitisation obligations as a Global Digital Exemplar (GDE) site. For the Streams viewer to function, data about individual patients being treated in the Trust will need to be uploaded and held in the DeepMind Data Centre. DeepMind is acting strictly as a Data *Processor* on behalf of the Data *Controller* which is Taunton and Somerset NHS Foundation Trust. This means it cannot use the data for any other purpose. That would be illegal.

What data will be sent to DeepMind for Streams?

To identify your care, sending your personal information such as your full name, date of birth and GP will enable clinicians to use the Streams app to care for you. It will also track where you are in the hospital so colleagues involved in your direct care are able to monitor and care for you. Blood and x-ray results will be sent to the DeepMind data centre to be processed in order to be shown in Streams to help clinicians with your care. Colleagues will input your observations (vital signs) into the app in order to monitor your care and will be alerted if you are at risk of acute kidney injury, so they can step up your care accordingly.

Your data will be sent only if you are admitted to hospital as an inpatient. Once admitted, three years of historical data will be processed in the app so doctors and nurses can see a full picture of your health quickly, including any updates, to see trends in your health and inform your care. This will enable patient-centred, individualised care.

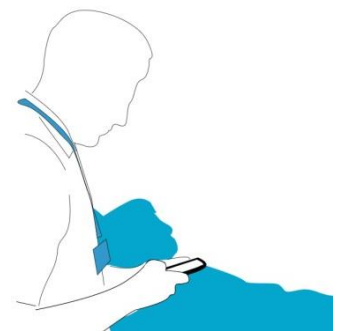
If you would like to see a complete breakdown of the data source, data set and type of data sent please refer to the full PIA.

What data will be stored?

The observations or vital signs data which are used to monitor you in hospital will be stored by DeepMind, as a part of the Trust's electronic records. Blood and X-ray results will need to be stored in order to process the data. Your data will be stored and updated for further admissions and treatment so that, for the duration of the contract between DeepMind and the Trust, clinicians can see a full picture of your health.

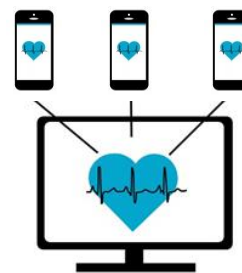
What is a data controller or processor?

A data controller is an organisation that has authority to decide how and why personal data is to be processed, for example using, storing and deleting data. Taunton and Somerset NHS Foundation Trust is the data controller as it owns the patient data. A data processor is an organisation which processes data on behalf of the data controller. DeepMind is acting as the data processor on the Trust's behalf. The Trust decides the purpose and how the data should be processed; DeepMind has no responsibility or control over the data but will hold and process it. There will be no further data disclosure to any additional controller or any other external party. The data will only be used for the purposes described.



What will the data be used for?

Contractually, DeepMind can use the data only for the Streams app, which shows information (blood and x-ray results, as well as observations and identify potential acute kidney injury) on a mobile app instead of a desktop/paper. Any further processing, other than as expressly instructed by the Trust, would be in breach of the service agreement and Data Protection Act and therefore illegal.



How secure is the data?

The Trust understands that the data being transferred, stored and processed by DeepMind is sensitive personal data and we have considered a range of privacy concerns and related risks.

- The Trust has the latest software to provide a secure, locally managed data centre that is not accessible from any public network. Only authorised colleagues have access to the Trust's database. Any transfer of data will be over secure NHS networks to which the data centres are connected.
- DeepMind and its proposed data centres have been checked to ensure that they meet high security standards and all policies and procedures are in place to ensure the safety of the data. DeepMind will store the Trust's patient data in England. The data will not be transferred abroad.
- The Trust has a written contract that DeepMind can use only personal data agreed by the Trust. The Trust will also commit to a regular review of its work with DeepMind to check that the contract and data security provisions are complied with.

When would you disclose my data?

Disclosure of data is under the Trust's control. The only circumstance in which DeepMind would disclose the Trust's data is if required by law or expressly instructed by the Trust (for example if a patient requests to view their own personal data, otherwise known as a subject access request). As Data Controller, the Trust retains sole control in determining data retention and destruction criteria. Destruction will be witnessed at the ceasing of the service agreement.



How will you make sure my data isn't mistaken for another patient's?

The data will come from different electronic health care systems so the Trust has a process to ensure that the correct information matches to the correct patient records. This is carried out by a process of demographics matching. This involves matching your first name, last name, date of birth and postcode, as well as matching your NHS / hospital number with two of them. If DeepMind fails to process data, it will flag instances in order to protect the data.

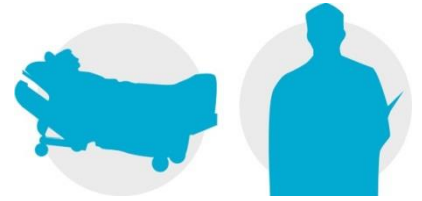
Will you be able to see my information from other care providers?

In order to provide your care, currently your blood and x-ray results are shared from Somerset Partnership and Yeovil District Hospital, as well as your GP. This is able to happen due to current agreements for patient data. It means that even if you are cared for in another local hospital, the right colleagues in Taunton can see these results. The Trust already has agreements in place with Somerset Partnership and Yeovil District hospital to see the same information on the Streams app via a mobile device and is working to secure data arrangements with each GP practice. If you visit any of the above healthcare providers after admission, your information will be updated and will be available on re-admission to the Trust. Your doctor or nurse will be able to use this to be better able to provide individualised, whole-person care.

What will happen to patient confidentiality?

There will be no change to patient confidentiality. As with paper, only staff involved with your care will be able to view your information. There is an electronic trail of who has accessed patient information in Streams which makes it easier for the Trust to verify that patient data is only being used for the correct purposes. Access is tightly controlled and inappropriate access or misuse of the

data is deemed as serious misconduct and is robustly dealt with by the Trust. The Trust will continue to proactively monitor colleagues' use of electronic systems.



Why do we need a Privacy Impact Assessment (PIA)?

The Trust realises that processing data through third parties on its behalf could present potential data privacy risks and concerns for patients. This PIA describes what patient data is to be transferred, why it is being transferred, and how it will be processed and held within the DeepMind data centre. If any changes are required in the agreement it will trigger a new Privacy Impact Assessment which will be available through the Musgrove Information Governance website; any historical PIA's can be found here.

What does this version of the Privacy Impact Assessment allow for?

This PIA describes how data will be sent to DeepMind for processing in the Streams app. It allows for the validation and piloting of recording observations, viewing information through Streams and the use of both for direct patient care for all inpatients after the pilot. A small group of patients will be involved in the pilot phase which will be used to confirm that Streams is clinically safe, sustainable, and ensure the safeguarding of patient data. At this stage, extended demographics fields, x-ray and blood requests, procedures and diagnoses are not included in the data transfer.

How will you make sure only the right people can see my information?

The Trust uses a tightly controlled access directory, 'Microsoft Active Directory' to manage access to information and check colleagues are authorised. This means that only authorised individuals have an account. All mobile devices with access to the Trust network are matched with this system and verified frequently. The device can also be remote-wiped. Streams checks every ten minutes that colleagues logged in are still authorised members in the directory. If an account is found to be not authorised they will be unable to access any patient data.

What has the Trust done to reduce the risk to my privacy?

The Trust has done the following in order to minimise any potential risks to privacy.

- Minimise the amount of data transferred to DeepMind data centre by including only data that are clinically needed.
- Store data in a secure data centre, deemed appropriate and Data Protection Act compliant by Trust technical and information governance leads
- Ensure access to patient data is restricted to colleagues who have a legitimate healthcare relationship with the patient
- Monitor access to patient data at both the DeepMind data centre and front facing mobile application
- Review the PIA on a regular basis to make sure that both existing and emerging privacy and related risks are assessed and that action is taken to minimise the risk
- Continue to engage with the public through a thorough, transparent process, putting patients at the core of digital developments.
- Enabling patients/the public to guide the protection and use of their data.

What algorithms will DeepMind run on the data?

There will be limited data processing within the DeepMind data centre. Doctors and nurses using Streams will be shown the result of an Acute Kidney Injury algorithm, which was previously viewable and calculated in the Trust's existing systems. This is a national, NHS-mandated algorithm used by all Trusts which does not involve any artificial intelligence. Clinicians using Streams will be able to see how the acute kidney injury outcome is determined. After this, they can apply their clinical judgement to deliver the appropriate care. This will improve both the safety and quality of care for patients.

Introducing any further algorithms would change the contract between DeepMind and the Trust, and therefore another Privacy Impact Assessment would be produced as result.

What are the legal requirements for data protection?

This document has been written to meet the following legal requirements.

- Caldicott Reports 1997, 2013, 2016
- Data Protection Act 1998/General Data Protection Regulation
- NHS Confidentiality Code of Practice 2003
- Computer Misuse Act 1990
- Common Law Duty of Confidence
- Care Quality Commission standards
- NHS The Care Record Guarantee
- Freedom of Information Act 2000

How can I get involved?

Taunton and Somerset NHS Foundation Trust is committed to putting patients at the core of digital developments, enabling patients to work alongside clinicians to develop the best solutions for the delivery of their care. The Trust has already actively involved patients in a number of design workshops, product review sessions and planning events and our Musgrove Partners are involved in the project at all key stages. The Trust is committed to continuing to work, in collaboration, with the people it serves to provide information to the public which clearly shows the way the data can and will be used and to demonstrate that the data is safely and legally held. Please contact information governance if you would like to be further involved in the project.



Can I opt out?

We will put you in contact with the Trust's [Caldicott Guardian](#) for information and to discuss your concerns.

How will Streams be piloted?

Recording observations

This first stage of the pilot will ensure that the data feeds are accurate and safe. Secondly, colleagues will complete dual entry, using both current practice of writing observations on paper, and also recording information into the Streams app. The digital team will assist with dual entry which is essential to check the new process is clinically safe. Once this has been assured, the stand alone pilot will begin on one ward and after building on the learning and best practice from the pilot, the Trust will transition safely to an organisation wide use of digital observations.



Streams Viewer

The aspect of Streams that shows clinicians x-ray and blood results (named Streams Viewer) will be piloted separately to make sure it is clinically safe, operationally sustainable and to safeguard patient information. The stages of this include checking data feeds are accurate and safe, before piloting to ensure new processes are clinically safe, and finally the full deployment to view x-ray and blood results on a mobile device.

Case Studies of Streams' use

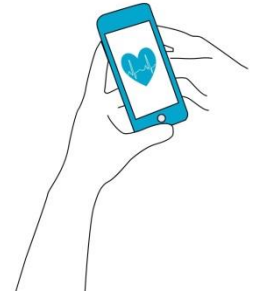
Below are a series of scenarios which give clinical examples of how data processed by DeepMind and presented by Streams will enable the delivery of safer patient care.

Example 1: Seeing changes in results over time to help diagnose.

Elaine has collapsed at home, and after being brought into hospital the admissions nurse is reviewing her health. Nurse Stone is at the bedside, and uses the Streams app on a mobile to see Elaine's most result and past blood results. Nurse Stone finds that a previous episode of a low red blood count was caused by a gastric bleed. Elaine's health is monitored by putting her observations onto Streams, after reviewing this as well; the clinical team decide they need to consider a gastric bleed as the cause.

Example 2: Why historical data is important.

John has joint pain in his knee, and after a doctor tells him he has a small rise in his liver test, he is concerned for his health. The attending clinician, Dr. Wood, is able to review John's historical blood tests while talking to him at the bedside. It shows that these changes have been occurring for the past five years, and the doctor is able to reassure John that this abnormality is unlikely to be the cause of his joint pain. Once John is discharged his data will continue to be updated as necessary for further admissions.

**Example 3: Set of patient observations**

Ben is unwell and has been admitted to hospital to stay on a ward. When a patient is admitted to hospital, nurses take 'observations' which measure a patient's vital signs such as his pulse and temperature which will monitor his health. The nurse inputs his vital signs into Streams, which calculates a National Early Warning Score (NEWS) of 5. Depending on the score, Streams will show a pre-set advice screen. Ben has scored a 5, which means that he needs to be monitored more closely with observations very hour, and should be seen by a doctor. The doctor visits Ben and can see on Streams that his NEWS result has increased, and a graph of his vital signs shows a clear trend. The doctor adjusts Ben's treatment plan and asks the nurse to put observations into Streams every hour so she can monitor how he is throughout the day.

Example 4: Monitoring for future care

Adriana is admitted to hospital after having a fall at home and doctors and nurses find that she has iron deficiency anaemia. Doctors investigate and run several tests but no identifiable cause is found. Adriana is given medication to treat the anaemia and when she recovers she is discharged from hospital. Her doctor recommends that she is monitored at her GP with regular blood tests, which will continue to be updated in Streams. After a year, Adriana has become unwell again and needs to be readmitted to hospital. The admitting team are able to see the initial investigation and the trends of her blood tests over the last year which helps inform doctors of how best to treat Adriana quickly.