

The use of Google Drive in clinical audit

Audit is an important aspect of clinical governance and of the training of health-care professionals. Conventional methods of audit data collection can be time consuming and inefficient. This article suggests a novel technique of using Google Drive, with adherence to the Caldicott principles, to facilitate data collection in both local and multicentre audits.

Introduction

Audit plays an integral part in clinical governance and in health service professional training. Conventionally, audit data collection is done using paper proformas which are then manually transferred to electronic spreadsheets. However, this can be time consuming and inefficient. As with all paper-based systems, there are also issues regarding the quality of data collection, data storage and data loss.

Use of cloud-based storage of data is now increasingly popular among both industrial and personal consumers and many service providers now offer this. All services are subscription based but some provide free storage systems and others provide fee-based services. Google Drive is a free online cloud-based storage service that also allows its users to create online questionnaires using a tool known as Google Forms. These questionnaires can then be distributed electronically to various individuals involved in data collection for a particular audit.

This article suggests a novel technique using Google Drive to create an online form that serves as an audit proforma to facilitate audit data collection in both local and multicentre audit projects.

Method

Setting up a Google account

Once an audit proposal has been registered and approved by the local audit department, the first step is to set up a Google account. Go to <https://accounts.google.com/SignUp>. Then enter details in the relevant sections to create a Google account.

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Any first and last name can be entered here. A good option is to use the word 'generic' for both. Username selection is entirely up to the account holder. The authors suggest that the audit registration number is included in the username for identification and record keeping purposes. This number can usually be obtained from the trust's audit department once an audit is approved.

Mobile number and an alternative email address are generally not required when entering details. Once the account holder is satisfied with the details entered, clicking 'Next Step' will generate the new Google account.

Creating an audit proforma in Google Forms

Next, login to Google Drive via <https://drive.google.com> using the new account username and password. By clicking on Create/Forms, an empty template will load (Figure 1). An audit proforma can now be developed using the tools available. Various formats such as multiple-choice or checkboxes can be configured using this tool. The template also allows the user to insert section headers or page

breaks, allowing data input in a more systematic manner. Figure 2 shows a completed audit proforma using the template that is ready for data collection.

Patient list and data pseudo-anonymisation

After an audit proposal has been approved, a master spreadsheet containing patient

Figure 2. An example of a completed electronic proforma ready for data collection.

Figure 1. An example of an empty form template.

identifiable details such as hospital number or date of birth can be obtained from the audit department. This spreadsheet must then be anonymised or pseudo-anonymised. Pseudo-anonymisation is often preferred as it allows audit data to be traceable and preserves the audit trail. A standard practice is to apply 'series numbers' which are unique to different patients. In the event that backtracking is needed, the series number documented in the proforma can be crosschecked with the master spreadsheet. The master sheet must be kept on an NHS encrypted system to protect patient confidentiality, but data that have been anonymised or pseudo-anonymised can be stored on Google Drive.

An example of a standard pseudo-anonymisation technique is shown below.

Series number	Example of hospital number
1	8123123
2	1231825
3	4528700

For pseudo-anonymisation of multicentre audits, designated codes specific to each hospital can be added to the series number to differentiate them as shown in *Table 1*.

Data collection

Once the proforma has been created using the template, clicking 'Send form' on the bottom of the page allows a proforma hyperlink to be emailed to those individuals involved in data collection. Data submitted over time will then be stored in a central spreadsheet (*Figure 3*). Upon completion of data collection, the account holder can download the data in the form of a Microsoft Excel spreadsheet or any other desired format as shown in *Figure 4*.

Discussion

The NHS is becoming increasingly computerized and hospitals are moving towards paperless data collection and storage systems. This move is now being applied to the process of clinical audit with a few NHS trusts subscribing to fee-based online data systems such as the OC Meridian platform by Optimum Contact (www.optimumcontact.com/), which also offers a robust security system.

There is also now more collaboration between centres, both in clinical audit and research, and this makes the use of cloud-

based data systems increasingly relevant as they enable data to be entered and accessed via a centralized database by an approved user from any internet-enabled device.

Table 1. Example of pseudo-anonymisation of patient identifiable details for multicentre audits

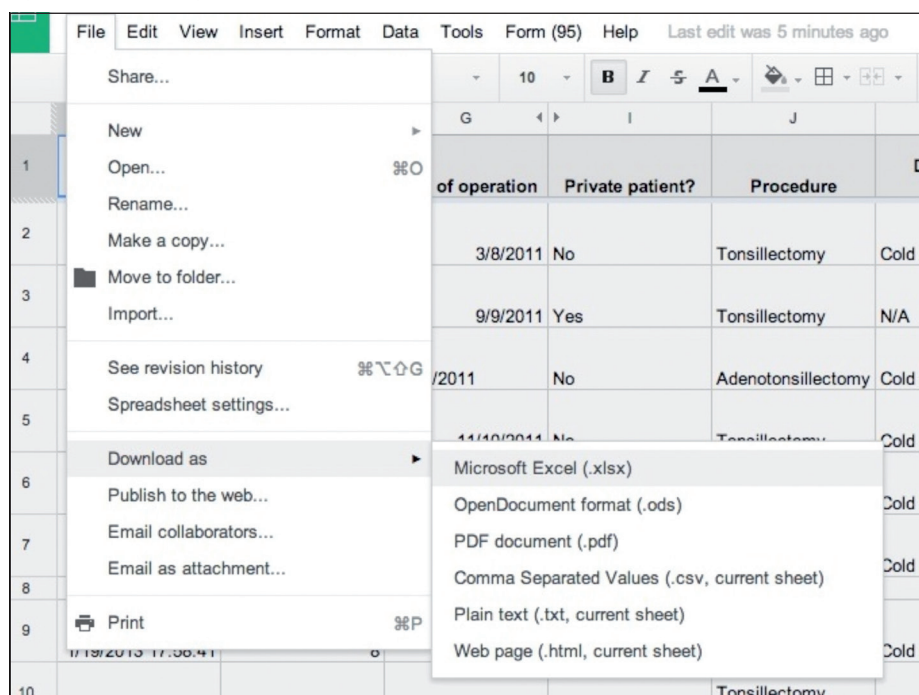
Royal Preston Hospital (PR)		Royal Blackburn Hospital (BB)		North Manchester General Hospital (NM)	
Series number	Hospital number	Series number	Hospital number	Series number	Hospital number
PR1	201231	BB1	543234	NM1	666432
PR3	444523	BB2	532123	NM2	342153
PR3	322512	BB3	553212	NM3	657864

Hospital numbers used in this table are purely for example purposes and do not reflect actual patient details

Figure 3. Example of submitted data stored on a central spreadsheet.

Timestamp	Series Number	Date of operation	Private patient?	Procedure	Dissection method	Bipolar Haemostasis?	Ties to lower poles	Grade of Surgeon
1/19/2013 17:44:26	1	3/8/2011	No	Tonsillectomy	Cold steel	Yes	N/A	A. Specialist
1/19/2013 17:46:50	2	9/9/2011	Yes	Tonsillectomy	N/A	N/A	N/A	N/A
1/19/2013 17:48:11	3	22/07/2011	No	Adenotonsillectomy	Cold steel	Yes	Yes	Staff Grade
1/19/2013 17:49:52	4	11/10/2011	No	Tonsillectomy	Cold steel	Yes	Yes	SpR
1/19/2013 17:52:09	5	14/12/2011	No	Adenotonsillectomy	Cold steel	Yes	No	Staff Grade
1/19/2013 17:53:44	6	13/07/2011	No	Tonsillectomy	Cold steel	Yes	No	Staff Grade
1/19/2013 17:58:41	8	12/8/2011	No	Tonsillectomy, EUA PNS	Cold steel	Yes	Yes	Core trainee (SHO)
1/19/2013 18:02:11	9	21/12/2011	No	Tonsillectomy, UVPP	Cold steel	Yes	N/A	Consultant
1/19/2013 18:03:49	10	25/02/2011	No	Tonsillectomy, Grommets	Cold steel	Yes	N/A	A. Specialist
1/19/2013 18:05:12	11	4/2/2011	No	Tonsillectomy	Coblation	No	No	Consultant
1/19/2013 18:08:28	12	14/10/2011	No	Tonsillectomy, EUA PNS	Cold steel	Yes	Yes	Staff Grade

Figure 4. Downloading audit data in the form of a Microsoft Excel spreadsheet or other formats.



How does Google Drive streamline the process of audit data collection?

Account users are able to create electronic audit proformas using the online tools available on its website. The hyperlinks to these proformas can then be distributed electronically via emails or embedded on a website. Clinicians involved in data collection can input data from any internet-enabled device using the hyperlink. These data are then collated on a central spreadsheet stored on Google Drive that is only accessible by the account holder. The whole process eliminates the need for using paper proforma, thereby saving cost. Data loss can also be prevented, as users are unlikely to be able to proceed with an online submission if a section within the form is incomplete.

Does using Google Drive adhere to Caldicott principles?

The Caldicott principles were developed in 1997 by the chief medical officer Dame Fiona Caldicott and later modified by the Department of Health (2013). They were designed to address use of patient identifiable data within the NHS. These principles, in conjunction with the eight principles highlighted in the Data Protection Act

1998 (Table 2), safeguard storage and use of patient data. When carrying out clinical audit or research it is essential that all those involved and all systems used act in accordance with these guidelines, regardless of the type of data collection system used. By following their trust’s clinical audit protocols, audit leads and participants are automatically complying with the majority of these principles.

However, there are specific areas that must be addressed when considering the use of an online data collection and storage system. These are issues surrounding how long the data are kept, how data are processed, whether data are protected by adequate security and whether the data are transferred outside of the European Economic Area countries. These issues, however, are negated in a straightforward fashion as the anonymisation code of practice issued by the Information Commissioners Office (2012) clearly states that data that are anonymised or pseudo-anonymised are not subject to the Data Protection Act and can be disclosed freely.

Therefore as long as the data held in the online database have no patient identifiable information they are free to be distributed and kept as the data controller sees fit.

However, in the case of pseudo-anonymisation, the means of identifying a patient from the data (e.g. patient list) must be kept in a manner in accordance with the Data Protection Act. In this case the authors recommend that this should be on an NHS password-protected encrypted computer.

There are clear benefits to using the Google Drive system as an adjunct to pre existing NHS IT tools. Its use modernizes, streamlines and enhances the process of clinical audit. It also makes it easier for the audit team to adhere to the latest Caldicott principles regarding data sharing. As long as anonymisation is used and the other Caldicott guidelines are followed, using Google Drive does not fall foul of the Data Protection Act.

What are the potential limitations of this system?

Some trusts’ IT departments may block cloud-based database storage websites. The authors recommend that clinicians interested in using this service discuss this with the trust’s IT department to obtain approval.

Finally, for data access and continuation of data collection purposes, it is advisable to give a copy of the new Google Drive login credentials to the local audit depart-

Table 2. The Caldicott and Data Protection Act 1998 principles

Caldicott principles	Justify the purpose
	Don't use personal confidential data unless it is absolutely necessary
	Use the minimum necessary personal confidential data
	Access to personal information should be on a strictly need to know basis
	Everyone with access to personal confidential data should be aware of their responsibilities
	Comply with the law
	The duty to share information can be as important as the duty to protect patient confidentiality
Data Protection Act 1998 principles	Personal data shall be processed fairly and lawfully
	Personal data shall be obtained only for one or more specified and lawful purposes, and shall not be further processed in any manner incompatible with that purpose or those purposes
	Personal data shall be adequate, relevant and not excessive in relation to the purpose or purposes for which they are processed
	Personal data shall be accurate and, where necessary, kept up to date
	Personal data processed for any purpose or purposes shall not be kept for longer than is necessary for that purpose or those purposes
	Personal data shall be accurate and, where necessary, kept up to date
	Appropriate technical and organizational measures shall be taken against unauthorized or unlawful processing of personal data and against accidental loss or destruction of, or damage to, personal data
Personal data shall not be transferred to a country or territory outside the European Economic Area unless that country or territory ensures an adequate level of protection for the rights and freedoms of data subjects in relation to the processing of personal data	

ment as a record. The account password can then be changed accordingly by the audit department, and can be given to new doctors who wish to take up the future role as the audit lead.

Conclusions

The use of Google Drive enables audit data collection to be done electronically in a streamlined manner, thereby saving time and providing flexibility to clinicians in a paperless environment. However, it is important to adhere to all aspects of the Caldicott principles and requirements of the Data Protection Act, ensuring patient confidentiality is not breached. **BJHM**

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Conflict of interest: none.

Department of Health (2013) Information to Share or not to share: The information Governance review. www.gov.uk/government/publications/the-information-governance-review (accessed 17 January 2014)

Information Commissioner's Office (2012) Anonymisation: managing data protection risk code of practice. http://ico.org.uk/for-organisations/data_protection/topic_guides/anonymisation (accessed 17 January 2014)

LEARNING POINTS

- The use of cloud-based and online data storage is increasingly popular among personal consumers and within the NHS.
- There are benefits of using Google Drive as a data collection tool as it modernizes, streamlines and enhances the process of clinical audit.
- It is important to adhere to the Caldicott principles when using Google Drive for clinical audits to ensure that patient confidentiality is not breached.

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