INTRODUCTION

Effective use of digital technologies enables the NHS to provide:
✓ high quality
✓ safe
✓ satisfying
✓ accessible
✓ and affordable healthcare.¹

Benefits of Digitisation in the NHS
Technology has the potential to bring about a fundamental change in the relationship between patients and healthcare professionals. Effective use of technologies drives improvements in quality, efficiency and population health, and improves patient experiences²:

- It can improve safety and quality of care, for example by reducing the risk of avoidable errors.
- Clinicians spend less time accessing information about patients.
- It can facilitate advances in medical practice, for example through research, and machine learning to support clinical decisions.
- Data can be used to improve service planning, such as aligning capacity with demand.
- It can enable people to take a more active role in their own health by providing access to relevant information and facilitating peer support online.
- Information sharing systems can improve the delivery of care and coordination between professionals across different organisations.

This chapter introduces the use of IT in general practice including electronic note-keeping, coding and recall systems.

NEED TO KNOW

The language of an electronic health record
The heart of the entire digital infrastructure are the databases: the individual Electronic Health Records (EHRs) for each patient. For this database to be useful, it must be searchable, and the data that is inputted has to be consistent. Therefore, a language of codes has been developed, called SNOMED CT. As someone enters data into an EHR, the information can be retained as ‘free text’, or preferentially, converted to these codes.
SNOMED CT is a structured clinical vocabulary for use in the EHR. It is a comprehensive and precise clinical health language with over 100,000 codes: these codes cover detailed diagnoses, symptoms, signs and observations, procedures, allergies and assessment tools.

All clinical software systems in Primary Care have adopted this language, and all other healthcare providers are due to adopt it by April 2020.\(^3\)

**The history of the use of IT in primary care**
GPs have been early adopters of IT in healthcare: from as early as 1975 it was reported that GPs have designed and implemented a full EHR. In 1980, the Royal College of General Practitioners and the British Medical Association presented a unified negotiating voice to government to facilitate uptake of the EHR in Primary Care. Between the late 1980s and 2004, the Department of Health increased the subsidy to GP practices for clinical software systems, and by the mid-2000’s there was near-complete uptake of EHRs in GP practices.

There are currently four clinical software systems that meet the government’s accreditation standards: EMIS, TPP, In Practice Systems, and Microtest (with EMIS and TPP as the most popular).\(^1\)

**Benefits and applications of an electronic health record**
Using an EHR has resulted in many functional benefits in primary care:

- **Improved access to information**: members of the primary care team can quickly access information, electronically search records, and view scanned documents.
- **Improved documentation**: though notes may be shorter, they are more legible and complete due to the use of codes.
- **Reduced time**: in filing, sorting, and accessing paper records.
- **Reduced space** requirements to store extensive paper records.

As well as these day-to-day benefits, there are many applications of an EHR:

- **Recall systems** - there are search functions within the clinical software system to search the EHRs of all patients to build a *disease register* for any diagnosis. This then enables GP practices to recall patients for regular reviews, and tailor the delivery of services. For example, some GP practices will invite all patients with diabetes to a diabetic clinic; other practices will review all the conditions that a patient may have at one holistic review. Patients on different disease registers could be recalled at varying intervals appropriate for that condition; and patients with the same condition of varying severity can be recalled at varying intervals. The clinical software system can be used to contact these patients: by automatically creating postal letters via *mail merge*, by automatically sending voice messages to telephones; by automatically sending SMS messages to mobile telephones; and by automatically sending emails to patients. If patients do not respond initially to invitations, further searches can be created to identify non-responders to send additional recall invitations.
• **Monitoring treatment targets** - utilising clinical guidelines to inform treatment targets, the EHRs of all patients at a GP practice can be searched to identify where targets are met, and where they are not. For example, a search could be built to identify all patients with hypertension, who have had a recent blood pressure measurement above a certain value. This search could then be narrowed to identify a particular age-group. Where treatment targets are not met, patients can be individually reviewed.

• **Public health initiatives** - the clinical software system can be used to search for uptake of public health initiatives. For example, eligible women who have engaged with the cervical screening programme can be identified; and those who have not can be reminded, and information shared with them to encourage them to engage. A similar approach can be used for other public health initiatives, such as childhood immunisations and smoking cessation services.

• **Health campaigns** - searches can be built to identify eligible patients for specific services, and invitations for patients to attend can be automated. For example, eligible patients for the seasonal influenza vaccination can be identified and invited to attend a GP practice.

• **Risk profiling for primary prevention** - risk calculators can be run within the clinical software system on any demographic of a patient cohort to ‘batch add’ a calculated value to individual EHRs. For example, a cardiovascular risk score could be added in batch to EHRs, and those patients above a certain threshold could be contacted if appropriate. A similar approach could be used to identify frail patients.

• **Identification of new population groups** - where health services can be tailored for specific population groups, IT systems can be used to identify patients where a code doesn’t exist in their EHR. For example, all patients at a GP practice can be sent an SMS message to ask if they are a carer; by replying, the information is directly coded into their EHR; this enables the GP practice to identify this population group and deliver specific services for them.

• **Prescribing safety** - there are many ways that a clinical software system can reduce avoidable prescribing errors. For example, when prescribing a new drug, the software automatically searches the EHR and alerts the prescriber if there is an interaction or contraindication: this can be particularly helpful in cases of polypharmacy. Similarly, searches can be run at regular intervals for all patients using certain drugs that require monitoring: for example, a patient using a disease-modifying drug that requires regular blood monitoring can be invited to attend for a blood test.

• **Prescribing efficiency** - often supported by a practice pharmacist, drugs which are considered to be more appropriate (for example those that are more cost-efficient) can be offered to patients instead of those that are identified as less appropriate.
• **Research** - the EHRs are both a valuable resource for medical research, as well as a means of identifying patients eligible for certain research trials. Through data sharing agreements, anonymised patient data from multiple GP practices can be collated to facilitate advancements in medical research. Where a GP practice is aligned with a medical research organisation, eligible patients can easily be identified to invite them to join a research trial.

• **Clinical decision tools** - certain tools can be enabled in the clinical software systems, which can guide clinicians where appropriate during consultations. For example, a tool to guide the use of antibiotics in a certain condition can be activated; similarly, alerts can be enabled when the software analysis of the EHR considers a patient at risk of a certain serious condition.

• **Performance indicators** - GP practices can demonstrate the performance of delivering medical services by searching the EHRs. Benchmarking performance data can be compared between different practices, as well as clinicians within a practice; variability can be analysed and addressed.

• **Portability and information sharing** - where appropriate, data sharing agreements are established to share vital information between organisations that deliver healthcare. Similarly, if a patient registers at a new GP practice, their whole EHR can be automatically transferred.

**Looking towards the future of the delivery of healthcare in primary care, the use of IT enables many services:**

• Booking appointments and requesting repeat prescriptions is already widely available, though uptake by patients is variable.

• Similarly, patients being able to access their EHR (to varying levels of detail) is available, though uptake by patients is relatively low. If a patient has had an investigation, they could review the result as soon as it is available in their EHR online or via an app, rather than by contacting the GP practice.

• As well as viewing their EHR, patients may be able to input data into it: for example, a patient with hypertension can input their home blood pressure measurements.

• The IT infrastructure in primary care can facilitate trends of consultation styles and preferences, such as enabling video consultations. Similarly, ‘live chat’ consultations are being utilised, sometimes augmented with the use of artificial intelligence.
ACTIVE LEARNING

✓ Identify how to access information in an EHR. Become familiar with identifying diagnoses, consultation notes, investigation results, and scanned documents.

✓ Practise adding data into an EHR: for example, a blood pressure measurement.
  o Once this data has been added, review the historic blood pressure measurements (either as a list of values, or as a graph).

✓ Ask the practice pharmacist, practice manager, or GP for support to build a search in the clinical software system. For example, identify all patients with diabetes; then identify those patients with an HbA1c above a certain value.

✓ Identify those patients who are current smokers, who have not had recent smoking cessation advice. Consider how healthcare services could be tailored for this population group.

✓ Speak with patients to hear their views on the data in their EHRs being shared. The sharing may be anonymised with research organisations; or not anonymised with other healthcare providers.

✓ Consider an audit topic on primary prevention. For example, a search could be built to identify patients with a certain cardiovascular risk score who have been offered a lipid lowering drug.

✓ Speak with patients to explore their preferences on consultation styles: do they prefer to meet with a clinician face-to-face; speak via telephone; via ‘live chat’ online or through an app; or via video call.

FURTHER LEARNING

RESOURCES

- [https://openprescribing.net](https://openprescribing.net) - Explore data of all prescriptions by GPs in England.
- [https://fingertips.phe.org.uk/profile/general-practice](https://fingertips.phe.org.uk/profile/general-practice) - Explore the profiles of all GP practices in England.
REFERENCES


The following resources have been developed in conjunction with SAPC Heads of GP Teaching. If you have any queries or questions regarding the resources on offer, please contact Prof. Joe Rosenthal or Prof. Alex Harding, Co-Chairs of SAPC’s Heads of GP Teaching Group.