Learning to Manage Health Information:
a theme for clinical education 2012
Making a difference
Acknowledgements

The 2012 edition of Learning to Manage Health Information could not have been developed without the help and support of a wide range of people and organisations.

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What is Health Informatics?

The following definition is generally agreed to sum up the scope of the Health Informatics discipline as it is currently practised.

‘The knowledge, skills and tools which enable information to be collected, managed, used and shared to support the delivery of healthcare and to promote health.’

_Making Information Count: A Human Resources Strategy for Health Informatics Professionals, Department of Health October 2002_

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Foreword

In 1999, the first edition of this curriculum framework was published. It is salutary to remind ourselves that in 1999 Google did not exist, none of the social media had been developed and hand held devices were essentially phone only.

The massive explosion in web connected devices and applications has profoundly changed all our lives in just over 10 years. We are truly in the middle of a revolution and we all need help to make sense of these changes. It gives me immense pleasure to introduce this newly revised framework which aims to help educators make the best use of all the new tools in the context of health.

As a practising doctor in haematology I rely on information and ICT for everything I do with patients, carers and members of the public. I also know that all my colleagues in nursing, primary care and the allied health professions have the same absolute need for great technology and applications.

Informatics is no longer a subject to be taught separately in the curriculum but simply the way we do things. The challenge for all of us is keeping up with the speed of change and new ways of doing things. Clinical knowledge is increasing at a faster rate than ever and it is now not possible for us to keep all we need to know in our heads. We increasingly rely on web based information which is also accessible to patients and the public. This is, in my view, a good thing as it means that our relationship with patients is changing to something where the power of knowledge is held as much by patients as by their clinicians. The new clinical role is now often about guidance and health coaching rather than focused on treatment.

One of the most exciting opportunities for me personally is the chance informatics gives me to harness the energy and excitement of students and young doctors in using technology. In all my contacts with them in health IT, I have always learned as much from youngsters as I have been able to teach. Health informatics is a great way to develop new ways of learning and one where we need to be able to link to established clinicians so that everybody can gain by improving our use of informatics.

This guidance will help you to drive adoption of health IT in your work and to develop new ways working with all of your teams and their patients. Please use it and share it with your friends and colleagues.

Charles Gutteridge
Section 1.0

Introduction

Learning to Manage Health Information (LtMHI) was first developed in 1999 to establish a common educational framework in health informatics for all clinical professionals at pre and post-registration levels, in all areas of healthcare. Its key purpose is to ensure clinicians have an understanding of health informatics; it is not about producing health informatics professionals, nor is it designed to provide a formal or “required” core curriculum.

LtMHI aims to provide guidance and assistance for those responsible for the development and review of national and local education programmes, whoever might deliver them. After a substantial revision in 2009, the 2012 edition of LtMHI has continued the process of modifying the preceding editions in light of developments in clinical practice and health informatics. The key assumptions and guidance have been reviewed in consultation with a range of stakeholders who are concerned with commissioning, developing and delivering clinical education programmes, to ensure they remain contemporary and fit for purpose.

The framework covers seven main themes associated with health informatics considered to be most relevant to clinicians:

- Protection of Individuals and Organisations
- Data, Information and Knowledge
- Communication and Information Transfer
- Health and Care Records
- The Language of Health: Clinical Coding and Terminology
- Clinical Systems and Applications
- eHealth: the Future Direction of Clinical Care

Separate consideration is also given to the essential information technology skills needed to support these themes.

To summarise, the key features of this framework are that:

- it concentrates on essential learning outcomes that are recommended to be incorporated into clinical education programmes;
- it provides guidance on the level of clinical education at which learning outcomes should be embedded (first health professional qualification, post first qualification level and continuing professional development, clinical and related management);
- it suggests sources of good practice and further information on the topics covered.

A key benefit of the framework is its role as a reference standard and benchmark. It can be used to inform and influence workforce and course development and help commissioners in the specification and procurement of local programmes.
Section 2.0

Health Informatics and Clinical Practice

In 2008 Professor Sir Bruce Keogh KBE, NHS Medical Director, made clear the importance of informatics for all clinicians, saying:

“From a clinician’s standpoint it is clear that we need an infrastructure that allows us to transfer patient-related information efficiently and securely, and helps us to assess our performance so that we can continue to improve; this is essential to the delivery of a high quality service.

...... the requirement for information is a constant theme – information for those who are providing care, information for patients and the public to make choices about their care, information for clinicians and other care providers who wish to assess and improve their performance, and information for researchers, planners, managers and regulators to improve services. In meeting these needs maintaining the security of personal data is paramount.”

The NHS White Paper, *Equity and Excellence: Liberating the NHS (2009)*¹ set out the Government's long-term vision for the future of the NHS. The vision builds on the core values and principles of the NHS; a comprehensive service, available to all, free at the point of use, based on need, not ability to pay. It set out how the NHS will:

- put patients at the heart of everything it does; no decision about me without me;
- focus on continuously improving those things that really matter to patients - the outcome of their healthcare;
- empower and liberate clinicians to innovate, with the freedom to focus on improving healthcare services.

*Liberating the NHS: An Information Revolution*² is part of the Government’s agenda to create a revolution for patients - “putting patients first” - giving people more information and control and greater choice about their care. It is about transforming the way information is accessed, collected, analysed and used by the NHS and adult social care services so that people are at the heart of health and adult social care services.

The extent to which informatics is now an integral part of contemporary clinical practice can be illustrated by considering the three principal areas of activity in healthcare:

1. Working with the patient: for example GP consultations, surgical procedures, phlebotomy, making an appointment.
2. Recording the patient contact: this includes making record entries (demographic as well as clinical) and communications with colleagues about the patient.
3. Reflection and learning: this includes personal learning, audit, research and use of information for service development, quality monitoring and planning.

These areas of activity can apply to the individual clinician (i.e. anyone who interacts with patients), or to healthcare organisations or, indeed, the Service itself.

**Contribution to patient care** encompasses:
- The changing dynamics of the professional / client encounter, where shared decision-making is increasingly the norm and both parties have approximately equal access to raw information and the sharing of information with peers and colleagues in a multi-professional, cross-sector environment.
- Using the computer as an information tool during the professional / client encounter: reading records or results, writing to templates, taking account of guidelines and decision support, following pathways. However, it is not just the ability to use the computer as a tool for current discussions but also the ability to use it for accessing and inputting into care pathways and accessing sources of knowledge.
- Shared access to the records: increasingly patients will have access to their own health records and personal health data, as well as health and lifestyle information through NHS systems and via unconstrained access to web-based material from other sources. Increasingly, patients should be able to see their care plan and check on their schedules and appointments. The government has announced that patients will have online access to their own GP records from 2015.

**Contribution to clinical record** includes:
- Understanding the basic aims and structures of information for care delivery in order to prioritise data for coding e.g. diagnoses and / or problems and interventions and understanding the critical importance of accuracy and data quality in this context.
- Writing to the record, or other forms of ‘written’ communication about patients.
- Writing records for use by others in different contexts; understanding how coded information on records will spread around the records system in the locality and beyond and how the contextual background of records can be lost in this process.
- Using common clinical terms that are understood in a multi-professional, cross-organisation environment.
- Patients accessing and contributing to their own records, e.g. clinical data from self-monitoring. The most important person to have details in the record is the patient. It is often the patient who is able to turn up with the relevant information, if they have been allowed access to it, whereas the hospital or GP can lose or not receive relevant information.
- Information Governance, confidentiality and privacy issues.

**Maintaining and Confirming Competence** incorporates:
- Continuing professional development (increasingly through e-learning including simulation and other technological approaches to delivering learning, e.g. mobile).
- Audit, reports and review – accessing sources of knowledge for the purposes of professional updating.
- Secondary uses of data such as research and service management.
- Being able to specify the data required for research purposes and then knowing how best to collect, analyse, interpret and present it for a wide range of purposes, including service development.
Figure 1 demonstrates the relationship between these areas of activity and how they are set in today’s information-rich environment.

![Figure 1: The Information-rich Clinical Environment](image)

The purpose of Figure 1 is to give an indication of how the various elements fit together and are interrelated. This is particularly true in respect of data quality, whether demographic (making the record in the notes of the right patient) or clinical (correctly representing the clinical status by appropriate clinical terminology). Teamworking, use of care pathways, decision support and alerts, as well as review and reflection, all depend on this.

These elements of practice are reflected in Learning to Manage Health Information, which expresses the requirements in terms of learning outcomes for all clinicians. These skills and competences are important today and will be increasingly so in the future.
Section 2.0: Sources of further information

**ABC of Health Informatics**

**Department of Health:** *Information policy*

**Department of Health:** *A Framework for Technology Enhanced Learning*

**Royal College of General Practitioners:** *curriculum statement on IM&T*
www.rcgp-curriculum.org.uk/PDF/curr_4_2_IMT.pdf

**Royal College of General Practitioners:** *Guidance on sharing electronic health records with patients*

**Royal College of Nursing:** *eHealth*
www.rcn.org.uk/development/practice/e-health

**Royal College of Physicians, Health Informatics Unit:** *Standards for Medical Record Keeping*
www.rcplondon.ac.uk/resources/clinical-resources/standards-medical-record-keeping

**Modernising Allied Health Professions (AHP) careers:** *a competence-based career framework*

**Skills for Health:** *Competence Tools*
https://tools.skillsforhealth.org.uk

**The Second eHealth Strategy for NHS Scotland 2011-17**
www.scotland.gov.uk/Publications/2011/09/09103110/0
Section 3.0

Essential Information Technology Skills for Clinicians

In healthcare, the need for IT skills is now essential rather than optional - clinical practice cannot be undertaken without accessing information systems and it is now expected that students and qualified clinical staff possess basic computer skills developed outside their professional lives. Most students at the start of their courses are familiar with email and search engines and all students use computers as an essential part of their studies. Today, the ubiquitous nature of IT and social networking in particular creates additional educational challenges as users may not always appreciate the risks associated with inappropriate information sharing on such platforms.

It cannot be assumed however that everyone actually has acquired these essential skills, particularly older students and clinical staff, for whom IT may not have formed part of prior academic studies. Curricula therefore need to be flexible enough to ensure that all learners acquire the level of IT competence required to undertake their studies. In some countries, an undergraduate student cannot enrol on a course until basic IT skills are confirmed.

The European Computer Driving Licence (ECDL) ceased to be supported by the NHS in England in 2008 and has since been replaced with the NHS IT Skills Pathway. The NHS IT Skills Pathway covers the full range of competencies for users of IT, from basic through to advanced levels. It has been developed in partnership with the NHS to provide an officially recognised route of learning and certification for the whole workforce. The main components are:-

- **NHS ELITE** (NHS eLearning IT Essentials) covers essential IT skills, such as how to use a keyboard and mouse through to file management, web and email skills. It offers both a pre and post assessment learning section.

- **NHS Ready for MOST** is a set of learning modules specifically designed to prepare learners for NHS MOST. It provides a natural progression for learners that have already undertaken NHS ELITE.

- **NHS MOST** (Microsoft Office Skills Training) covers higher level use of the common Microsoft desktop applications. Unlike ECDL, certification is available for each individual product studied.

As a minimum, all clinical staff should attain the IT knowledge and skills provided by NHS ELITE (additional details of the learning outcomes are included in Appendix 1). However, it may well be that staff need to achieve the higher level of competence offered by NHS MOST. Indeed, students should be encouraged to acquire these skills prior to undertaking their clinical studies.
Section 3.0: Sources of further information

**NHS IT Skills Pathway**
www.connectingforhealth.nhs.uk/systemsandservices/icd/itskills/pathway

**Essential IT Skills**
www.connectingforhealth.nhs.uk/systemsandservices/etd/eits

**NHS MOST**
www.nhsmost.co.uk
Section 4.0

Learning Outcomes and Sources of Further Information

The following sections provide a framework for the health informatics learning outcomes that are recommended for incorporation into clinical education programmes.

Each section follows the same format:

- A description of the suggested learning outcomes for the relevant theme
- A recommendation for the level at which each learning outcome should be embedded into education programmes
  - **Level A** First health professional qualification (undergraduate) level
  - **Level B** Post first qualification (postgraduate) level or for Continuing Professional Development (CPD)
  - **Level C** Clinical and related management development
- A brief discussion of the context for the particular learning outcomes of the theme
- Suggestions for sources of further information

All of the themes have a relevance and relationship to each other. For example, protection of individuals and organisations is dependent on the security of data, information and knowledge; health records are closely associated with coding and in themselves are used as the basis for communication with both patients and colleagues; clinical systems and applications provide the basis for eHealth initiatives.

The intentionally high-level approach, which describes generic learning outcomes mapped to key skills and knowledge, should ensure consistent minimum standards across a range of educational programmes. This evolutionary approach provides an opportunity to incorporate and develop the generic learning outcomes into local curricula for each level, through appropriate Quality Assurance Agency for Higher Education (QAA) processes that include programme validation, to match individual educational programme objectives and design.

The framework covers seven main themes associated with Health Informatics considered to be essential to clinicians:

- **4.1 Protection of Individuals and Organisations**
- **4.2 Data, Information and Knowledge**
- **4.3 Communication and Information Transfer**
- **4.4 Health and Care Records**
- **4.5 The Language of Health: Clinical Coding and Terminology**
- **4.6 Clinical Systems and Applications**
- **4.7 eHealth: the Future Direction of Clinical Care**
## Section 4.1

### Protection of Individuals and Organisations

<table>
<thead>
<tr>
<th>Description of Learning Outcomes</th>
<th>Applicable Level of Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Demonstrate understanding of the legislation, regulatory guidance and NHS protocols regarding the security, confidentiality and appropriate sharing of patient identifiable information.</td>
<td>A, B, C</td>
</tr>
<tr>
<td>2 Apply policies and practices in respect of requests from patients (or their representative) and clinicians for access to health records and related information.</td>
<td>A, B</td>
</tr>
<tr>
<td>3 Demonstrate understanding of the information governance and local “Caldicott Guardian” arrangements and the implications for health record keeping.</td>
<td>B, C</td>
</tr>
<tr>
<td>4 Demonstrate understanding of the benefits and risks of routine online patient record access and how to maximise the benefits for patients and the NHS.</td>
<td>A, B, C</td>
</tr>
<tr>
<td>5 Demonstrate understanding of the different arrangements and the associated responsibilities of clinical staff for security of all types of clinical information, especially electronically held, and for using such data for “secondary” purposes.</td>
<td>A, B, C</td>
</tr>
<tr>
<td>6 Demonstrate understanding of the purpose, principles and practice of clinical governance in health organisations, how patients can be involved and the implications of the emergence of the expert patient.</td>
<td>A, B, C</td>
</tr>
<tr>
<td>7 Explore the principles and practice of clinical audit and appreciate how this contributes to clinical governance, improving overall clinical practice, personal clinical practice and performance, and, if applicable, reaccreditation.</td>
<td>A, B, C</td>
</tr>
<tr>
<td>8 Demonstrate understanding of the sources of information needed for effective clinical governance and audit, including access to appropriate evidence-based information and patient record access.</td>
<td>A, B</td>
</tr>
<tr>
<td>9 Design and carry out audit with relevant supporting information.</td>
<td>A, B</td>
</tr>
</tbody>
</table>
The Relevance to 21st Century Healthcare

Ensuring the safety of everyone who comes into contact with health services is one of the most important challenges facing healthcare today. Central to this challenge is clinical governance, the process through which NHS organisations are accountable for continuously improving the quality of their services and safeguarding high standards of care. Information governance is fundamental for addressing these requirements.

Information governance is about the structures, policies and practice necessary to ensure the confidentiality and security of information, especially clinical information, and the ethical use and sharing of that information for the benefit of the individual to whom it relates and for the broader public good. Whilst a key focus is the use of information about users of health and care services and the outcomes they experience, it also applies to information and information processing in its broadest sense and underpins clinical, corporate and financial governance.

Information governance for Health and Social Care is based on those elements of law and policy from which applicable information governance standards are derived, and the activities and roles which individually and collectively ensure that these standards are clearly defined and met. In the NHS, the ultimate responsibility for establishing adequate information governance arrangements rests with the board and senior managers in every healthcare organisation. However, many professionally qualified NHS staff are also bound personally by professional codes of conduct which reflect similar objectives. Recent concerns about public sector data protection have resulted in the Cabinet Office mandating a range of standards for managing information risk, an important element of information governance. In healthcare these standards are reflected within the NHS Information Governance Toolkit (IG Toolkit).

All NHS organisations in England and others with access to NHS patient information to are required to:

- Assess and publish details of their performance against the IG Toolkit requirements on an annual basis.
- Ensure all their staff undertake appropriate information governance training annually as identified in the NHS IG Toolkit.
- Make staff aware continuously of the existing information governance policies and guidelines, the fact that they must be followed in practice, and that a breach of policy will be regarded as a disciplinary matter.

In addition, organisations that require access to national systems and services, including the NHS National Network (N3), must complete the Information Governance Statement of Compliance (IGSoC). The IGSoC is the process by which organisations enter into an agreement with the national service provider for access to systems and services. It includes completing an annual IG Toolkit assessment, and incorporates elements that set out terms and conditions for use in order to preserve the integrity of those systems and services. The purpose is to provide assurance that organisations connecting to NHS systems are meeting acceptable information governance standards so that the systems are not put at risk. As a consequence, all staff in these organisations must be aware of and adhere to these standards.
Information sharing standards are at the heart of NHS business and clinical applications. Access to electronic health records, whether by healthcare staff or patients, is a major information governance issue for all NHS organisations. The NHS Care Record Guarantee sets out a national commitment to use patient records in ways that respect an individual’s rights and promote health and wellbeing. Online patient record access (or record sharing with patients) will soon be routine and all clinicians, graduate and student, as well as administrative staff will need to be proficient in the process and maximising the benefits.

All NHS users of the Summary Care Records Service (SCR) applications must be authenticated to an intergovernmental standard which requires a very high level of proof of identity based on two factors: a Smartcard bearing a unique electronic identification; and a Passcode known only to the user. Organisations that deliver NHS care and need to access patient information within NHS systems and other national services must set up Registration Authorities to manage this process. The appropriate policies and use of smartcards and passcodes are fundamental to an organisation’s ability to meet its responsibilities around the Care Record Guarantee and are central to its information governance responsibilities.
Section 4.1: Sources of further information

Relevant legislation and any subsequent revisions including:


**BMA Confidentiality Toolkit**
www.bma.org.uk/ethics/confidentiality/confidentialitytoolkit.jsp

**NHS Care Record Guarantee**
www.nigb.nhs.uk/guarantee

**Confidentiality: NHS Code of Practice**
www.connectingforhealth.nhs.uk/systemsandservices/infogov/codes/confcode.pdf

**Care Quality Commission**
www.cqc.org.uk

**eICE eLearning Module: Information Governance**
www.cln.nhs.uk/eice

**Information Commissioner’s Office**
www.ico.gov.uk

**Information Governance Statement of Compliance (IGSoC)**
www.connectingforhealth.nhs.uk/systemsandservices/infogov/igsoc

**Information Security Management: NHS Code of Practice**
www.connectingforhealth.nhs.uk/systemsandservices/infogov/codes/securitycode.pdf

**National Patient Safety Agency**
www.npsa.nhs.uk

**NHS Information Governance - Guidance on Legal and Professional Obligations**

**NHS Information Governance Toolkit**
www.igt.connectingforhealth.nhs.uk
Summary Care Records Service (England)
www.connectingforhealth.nhs.uk/systemsandservices/scr

Patient Confidentiality and Access to Health Records
www.dh.gov.uk/en/Managingyourorganisation/Informationpolicy/
Patientconfidentialityandcaldicottguardians

Registration Authority
www.connectingforhealth.nhs.uk/systemsandservices/rasmartcards

RCGP Guidance: enabling patients to access Electronic Health Records
## Section 4.2

### Data, Information and Knowledge

<table>
<thead>
<tr>
<th>Description of Learning Outcomes</th>
<th>Applicable Level of Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Demonstrate understanding of the relationship and differences between data and information and how both can be used to support clinical practice and service management.</td>
<td>A, B, C</td>
</tr>
<tr>
<td>2 Demonstrate understanding of the principles of effective quality control and validation of data and information in clinical practice.</td>
<td>B, C</td>
</tr>
<tr>
<td>3 Demonstrate understanding of the nature of decision support tools and how they are used to support clinical activity.</td>
<td>A, B</td>
</tr>
<tr>
<td>4 Summarise, evaluate, appraise and present information / evidence relevant to a particular healthcare issue obtained from accredited online and other sources.</td>
<td>A, B</td>
</tr>
<tr>
<td>5 Describe and demonstrate understanding of current key NHS initiatives and developments in the field of IT-based knowledge resources.</td>
<td>A, B, C</td>
</tr>
<tr>
<td>6 Demonstrate understanding of the implications of computerised care pathways and clinical guidelines for patient care.</td>
<td>A, B</td>
</tr>
<tr>
<td>7 Analyse sources of information about patient and public views and expectations for healthcare and related services.</td>
<td>A, B, C</td>
</tr>
<tr>
<td>8 List the range, purposes, benefits and potential risks of aggregating clinical data.</td>
<td>A, B</td>
</tr>
<tr>
<td>9 Outline the secondary uses of patient information for health research and managing and planning care.</td>
<td>B, C</td>
</tr>
<tr>
<td>10 Demonstrate an understanding of the use of patient data for research.</td>
<td>A, B</td>
</tr>
<tr>
<td>11 Understand how routine direct online access to their records provides patients with evidence-based information to help them make decisions about care, including self-care.</td>
<td>A, B</td>
</tr>
</tbody>
</table>
Data, Information and Knowledge Management

Getting the right data and information to the right people at the right time in the right form to inform decisions and make a difference is the essence of why patients consult with health professionals, whose ability to improve the health of the individual patient is paramount. The consequence of not doing these things is suboptimal care, inefficient use of resources, preventable clinical errors, and limitations on the ability of patients and the public to take responsibility for their own health and care.

According to Ackoff³:
- Data consists of symbols that represent objects, events, and their properties.
- Information is data that has been made useful. Information answers the questions of who, what, where, when, and how many. Information is helpful in deciding what to do, not how to do it.
- Knowledge consists of instructions and know-how. Knowledge answers the “how” questions.

All clinicians need to appreciate the relationships and differences between data, information and knowledge in health, and how they each contribute to the effective delivery of care, patient safety and service management.

Data and Information Quality

Healthcare is increasingly an information-driven activity, and therefore, the quality of the underlying data assumes critical importance. Data must be of high quality if it is to be fit for its intended uses in supporting processes, decision making and planning.

All clinicians need to be able to rely on the accuracy of information available in order to be able to provide timely and effective treatment for their patients. Consequently all healthcare organisations and their staff, including clinicians, have a responsibility to ensure the data and information they create and use is of the highest quality and fit for purpose, whether that is for local or national purposes. High quality information means better patient care and increased patient safety; it has to be:
- accurate,
- contemporaneous,
- free from duplication, (e.g. where two or more different records exist for the same patient),
- free from confusion, (e.g. where different parts of a patient's record are held in different places, possibly in different formats, any fields that refer to the same entity need to be the same in each location and be maintained synchronously).

The learning outcomes for this theme bridge two activities:
1. creating and using patient-related data, and
2. accessing the `knowledge base of health’ (scientific research, guidelines, protocols, etc.).

The latter is commonly called Evidence-based Practice.

³ Re-Creating the Corporation; Russell Ackoff, Oxford University Press, USA, ISBN 978-0195123876
Evidence-based Practice

“Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research.”

Evidence-based practice is an approach to decision making in which the clinician uses the best information available, in consultation with the patient, to decide the option which best suits the patient. However, there is an increasing plethora of information sources available, both to clinicians and patients. These often disparate sources can make it difficult for decision-makers to gain access to the information they need. There are also no guarantees that the information they do access is based on the best evidence available; even if it is based on the best available evidence there are so many gaps that the conclusions may not be perfect.

In May 2009, a new service, NHS Evidence, was established by the National Institute for Clinical Evidence (NICE) to ensure that health and social care practitioners have easy access to high quality information. It is a web-based service that helps people find, access and use high-quality clinical and non-clinical evidence and best practice. Built around a powerful search engine, the service consolidates information from a wide range of sources in one central portal.

However, such information services do not replace the need for individual clinicians to develop critical appraisal skills, to help them to understand the methods and results of research and to assess the quality of that research. Clinicians need to be able to understand the value of different sources of information and their strengths and weaknesses. Most research is not perfect, and critical appraisal is not an exact science, but it can help in deciding whether a reported piece of research is good enough to inform a decision. These skills are essential to support the development and evaluation of clinical guidelines and care pathways, making informed decisions in individual patient circumstances, using tools such as the Map of Medicine and accessing NHS resources including NHS library services, NHS Evidence and NHS Local.

Information for Patient-centred Care

Increasingly data about NHS performance of all kinds will be available to citizens, mainly online, and increasingly, data will be matched to increase its value, e.g. where in my borough is the clinical practice with the best diabetes care? Consequently, clinicians need to understand:

- Data transparency, on the assumption that all data is available to the patient.
- The benefits and risks, for both patients and professionals, of patient record access and sharing; how to maximise the benefits, how the consultation is affected by patient record access and how the system is affected by record access.
- Decision aids.
- Transactional services for patients, e.g. appointment booking, requesting repeat prescriptions, and in the near future, the ability of patients to add to their record.

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Secondary Uses of Information

Data and information are not just used for direct patient care, but use of patient data for anything but direct patient care requires a legal basis such as consent or s251 support from the National Information Governance Board under the NHS Act (2006).

The Secondary Uses Service (SUS) is the repository for information on NHS activity for performance monitoring, reconciliation and payments. It comprises a core access-controlled data warehouse containing “pseudonymised” data (by allocating a consistent pseudonym for protecting patient confidentiality) which is the source of a wide range of healthcare analyses for the NHS and, Government, e.g. HES (Hospital Episode Statistics), the details of all admissions to hospitals in England. The data is used by organisations and individuals for management and clinical purposes other than direct patient care, including healthcare planning, commissioning, public health, clinical audit, benchmarking, performance improvement, research and clinical governance.

Clinicians should be aware of the particular aspects of SUS, but more generally should understand other secondary uses, such as how clinical data is used to support research, public health and the management of the health service. It should be remembered that patient data includes all data captured and not just that entered into clinical systems. Clinicians need to understand the implications, in terms of both the benefits and the risks, for aggregating data and information.
Section 4.2: Sources of further information

**BMJ Best Treatments**
www.besttreatments.co.nz/btgeneric/home.jsp

**Department of Health: Information policy**

**eICE eLearning Module: Data information and Knowledge**
www.cln.nhs.uk/eice

**Health Protection Agency**
www.hpa.org.uk

**International Council on Medical and Care Compunetics**
www.icmcc.org

**Map of Medicine**
www.mapofmedicine.com

**Medicines and Healthcare Products Regulatory Agency**
www.mhra.gov.uk

**NHS Direct**
www.nhsdirect.nhs.uk

**NHS Evidence**
www.evidence.nhs.uk

**NHS Information Centre for Health and Social Care**
www.ic.nhs.uk

**NHS Information Quality Assurance Programme (Data Quality)**
www.connectingforhealth.nhs.uk/systemsandservices/data/dataquality

**NHS Institute for Innovation and Improvement**
www.institute.nhs.uk

**National Institute for Health and Clinical Excellence**
www.nice.org.uk

**NHS Local**
http://nhslocal.nhs.uk

**National Patient Safety Agency**
www.npsa.nhs.uk
Secondary Uses Service (SUS)
www.ic.nhs.uk/services/secondary-uses-service-sus

Social Care Institute of Excellence
www.scie.org.uk

RCGP Guidance: enabling patients to access Electronic Health Records
## Section 4.3

### Communication and Information Transfer

<table>
<thead>
<tr>
<th>Description of Learning Outcomes</th>
<th>Applicable Level of Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Explore and describe the information flows which take place between different sectors of Health and Social Care.</td>
<td>A, B, C</td>
</tr>
<tr>
<td>2. Demonstrate understanding of different communication methods and technologies and their appropriate application in support of clinical practice.</td>
<td>A, B</td>
</tr>
<tr>
<td>3. Analyse why recorded information might vary between practitioners and understand the nature and importance of shared meaning for interprofessional communications.</td>
<td>B, C</td>
</tr>
<tr>
<td>4. Demonstrate understanding of, and evaluate the communications arrangements between, different professionals in a team and with other professionals in related services.</td>
<td>A, B</td>
</tr>
<tr>
<td>5. Demonstrate understanding of the principles of acceptable, effective communications and information exchange with patients and carers and be able to demonstrate how this can be achieved in clinical practice.</td>
<td>A, B</td>
</tr>
<tr>
<td>6. Ability to effectively send and receive information from other professionals, in written or electronic formats within guidelines of confidentiality and security.</td>
<td>A, B</td>
</tr>
<tr>
<td>7. Review the current arrangements for electronic communications with patients or carers and the scope for further development.</td>
<td>B, C</td>
</tr>
<tr>
<td>8. Understand how routine online patient record access influences the behaviour and attitudes of patients and professionals and how to maximise the benefit.</td>
<td>A, B, C</td>
</tr>
</tbody>
</table>
Changing Practices of Communication in the Information Age

“In the past we’ve given knowledge to clinicians who’ve then passed it on to patients, now our principles are that we give knowledge to patients and give them the opportunity to discuss it with clinicians.”

Sir Muir Gray – NHS Chief Knowledge Officer

The greater availability of and access to information has had a profound impact on the relationship between clinicians and patients. Clinical professionals are no longer defined by the knowledge they have and dispense in the consultation; the professional role is becoming more educative, interpretive and one of brokerage as far as knowledge and information are concerned.

Previously

Patient with a clinical problem → Visits Clinical Team → Gains information

Now and in the future

Patient with a clinical problem → Gains information via the internet, friends and family, own health record → Visits Clinical Team to gain understanding relative to clinical condition

Figure 2: The Changing Professional Role

Increasingly more patients (or their relatives) will have researched their condition, treatment, drugs etc before or after face to face communication with their clinician. Consequently, clinicians need to be aware of information to support patient communication from a variety of sources available both to the clinician and the informed patient; e.g. NHS Choices, NHS Evidence, NHS Scotland and NHS Wales eLibraries, Map of Medicine, other consumer health websites, PubMed, NHS Local, the patient’s own record, etc.

Clinicians need not only to communicate appropriately with patients, but also with colleagues and teams of health professionals, for multidisciplinary care or for interagency and cross-boundary information sharing and exchange and, indeed, for their own education, training and professional development.

Patients having routine online access to their health record can shift the balance in relationships between patients, their clinicians and their data. Patients feel more informed, more in control, can improve the accuracy of their record, In addition, they and the practices save time and appointments and telephone calls. Clinicians need to understand the impact of record access and how to maximise its benefits to patients and professionals.
To support all forms of communication, clinicians will need to be comfortable using a range of different technologies and to understand which might be appropriate to a particular communication, e.g. email, mobile phones / SMS, online meetings, live messenger and videoconferencing, and increasingly social networks, for example LinkedIn and Facebook. At the same time they must be aware of requirements for sensitive and secure data handling.
Section 4.3: Sources of further information

eICE eLearning Module: Data information and Knowledge
www.cln.nhs.uk/eice

NHS Evidence
www.evidence.nhs.uk

NHS Local
http://nhslocal.nhs.uk

East Anglia Communications Skills Cascade - A collection of communication skills resources has been setup by facilitators to promote and support the teaching of communication skills in healthcare.
www.skillscascade.com

Health Communication Research Centre - Cardiff School of English, Communication and Philosophy, Cardiff University
www.cardiff.ac.uk/encap/research/hcrc

www.tandf.co.uk/journals/titles/10810730.html

Patient Education and Counselling: Elsevier
www.elsevier.com/wps/find/journaldescription.cws_home/505955/description

Email Consultations in Health care:
### Section 4.4

### Health and Care Records

<table>
<thead>
<tr>
<th>Description of Learning Outcomes</th>
<th>Applicable Level of Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Demonstrate understanding of the purpose, basic structures, use and storage of patient health records, including paper-based and electronic patient records, and patient held records.</td>
<td>A, B</td>
</tr>
<tr>
<td>2 Demonstrate an understanding of the differences and importance of both structured, coded records and free text.</td>
<td>A, B</td>
</tr>
<tr>
<td>3 Demonstrate understanding of the importance of the primary care sector in the creation and collation of electronic healthcare records.</td>
<td>A, B, C</td>
</tr>
<tr>
<td>4 Demonstrate understanding of the level of access required to different parts of the personal health record.</td>
<td>A, B</td>
</tr>
<tr>
<td>5 Demonstrate understanding of consent models, confidentiality and security to ensure appropriate individual and team access to patient records.</td>
<td>A, B</td>
</tr>
<tr>
<td>6 Understand and discuss the implications of patient held and patient accessible clinical information for interprofessional clinical practice and multidisciplinary care.</td>
<td>B, C</td>
</tr>
<tr>
<td>7 Demonstrate understanding of the implications of the integration of patient identifiable clinical information within the NHS.</td>
<td>A, B</td>
</tr>
<tr>
<td>8 Demonstrate how to support patients when accessing their full GP record, maximising the benefits and minimising the risks.</td>
<td>B</td>
</tr>
</tbody>
</table>
Health Records in the Digital Age: Implications for Clinical Practice

Health records serve many purposes in the modern healthcare environment, but fundamentally they are the foundation of high quality, safe patient care. All clinical practice in the UK increasingly relies upon the electronic storage and communication of patient records and electronic communication of records. Currently primary care leads the way in their use through, for example, GP2GP (the electronic transfer of records between Practices). The deployment of new clinical systems in the hospital sector will increasingly impact on acute care and parallel the changes already occurring in General Practice.

Use of health records can be divided broadly into primary and secondary functions. The record’s primary function is to support direct patient care by acting as the basis of evidence for individual clinicians, supporting clinical decision making and providing an important means of communication with colleagues and with the patient. The record’s secondary function is to provide a legal record of care given and act as a source of data to support clinical audit, research, resource allocation, performance monitoring, epidemiology and service planning.

The need to monitor and improve the quality and safety of medical practice and services, along with widespread increasing expectations and the increasing costs of care mean the structure and content of the clinical record is becoming ever more important. Moreover the implementation of electronic patient records in the NHS critically increases the importance and need for structured records.

Structure and content standards are essential for ensuring that clinical data can be stored reliably, retrieved and shared between information systems. They need to be based on professional consensus that reflects best clinical practice and should facilitate, not hinder, the process of writing, communicating, retrieving and interpreting clinical information, so that care is safer and more efficient.

Record keeping standards can be sub-divided into two categories: generic standards for good practice and specific standards to define the structure and content in specific clinical contexts. Above all, standards are needed so that records are structured appropriately and clinical information is recorded in the right place, and account needs to be taken when writing the record that patients are able to have access either through the conventional Subject Access Request and / or through contemporaneous electronic access.

The health record is essentially a record of a very partial clinician view of the transaction between patient and clinician. However, we are entering a time when patients will be able to enter their own data and the record will become a more shared enterprise. Patients will be able to see their full or partial record at will and, ideally, this will be the whole, accurate, contemporaneous record, available anywhere, any time. Consequently, it will be increasingly important that clinicians understand the implications of patients being able to access their own health records and are able to provide support.

5 Patient record access—closer than you think; Dr Brian Fisher, GP
In England, the NHS Summary Care Records service offers a secure service that links patient information from different parts of the NHS electronically, enabling authorised NHS staff and patients to have the information they need to make care decisions. Detailed records (held locally) and the Summary Care Record (held nationally) enable each patient’s care records to be shared securely between different parts of the local NHS, such as the GP surgery and hospital.

Currently the Summary Care Record contains key information about the patient’s GP record:
- Medication, allergies and bad reactions to medication.
- Additional information added from the GP record with the explicit consent of the patient.

Patients in England will be able to access their Summary Care Record using the HealthSpace secure website. HealthSpace provides a range of online services that patients can use to help support, manage and co-ordinate their health and care. It currently provides two levels of service - a ‘basic service’ providing patients with an online personal health organiser, and a more ‘advanced service’ providing patients with access to their Summary Care Record (SCR), and a facility for exchanging secure electronic messages with clinicians (HealthSpace Communicator). Patients in Wales will be able to access their Individual Health Record (IHR), as well as order prescriptions and book appointments with their doctor, through the My Health Online secure website.

Other systems are also currently available in the UK to enable patients to see their full GP record online or through kiosks in the waiting room, or through a smartcard. Currently, 60% of practices in the UK can enable their patients to access their GP records online securely and for free. There are substantial benefits for practices and patients.6

6 Vanita Bhavnani, Brian Fisher, Marlene Winfield and Paul Seed How patients use access to their electronic GP record—a quantitative study Family Practice 2010; 0:1–7 doi:10.1093 / fampra / cmq092
Section 4.4: Sources of further information

**eICE eLearning Module: The Importance of Good Clinical Record Keeping**
www.cln.nhs.uk/eice

**Patient Record Access – Making It Work for You and the NHS:** *Fisher, B. London Journal of Primary Care, May 2011*
www.londonjournalofprimarycare.org.uk/articles/4299138.pdf

**PAERS:** *A system enabling patients to see their full electronic primary care record.*
www.paers.net

**HealthSpace:** *A secure website providing access to the Summary Care Record for patients in England (requires registration to gain full access)*
www.healthspace.nhs.uk

**Institute of Health Records and Information Management (IHRIM)**
www.ihrim.co.uk

**My Health Online:** *A secure website providing access to the Individual Health Record for patients in Wales*
www.wales.nhs.uk/nwis/page/52549

**NHS Wales Informatics Service**
www.wales.nhs.uk/sitesplus/956/home

**Nursing and Midwifery Council:** *Guidance on record keeping for nurses and midwives*

**Patient Confidentiality and Access to Health Records**
www.dh.gov.uk/en/Managingyourorganisation/Informationpolicy/Patientconfidentialityandcaldicottguardians

**Records Management: NHS code of practice**

**Royal College of General Practitioners:**
- *Enabling patients to access Electronic Health Records*
- *Good Practice Guidelines for General Practice Electronic patient records (v3.1)*
Royal College of Physicians:
- Standards for Medical Record Keeping
  www.rcplondon.ac.uk/resources/clinical-resources/standards-medical-record-keeping
- A self-assessment elearning module accessed via the Information Governance Toolkit
  www.igt.connectingforhealth.nhs.uk

Summary Care Records Service (England)
www.connectingforhealth.nhs.uk/systemsandservices/scr

Thornley House Medical Centre, Hyde, Cheshire: resources created by Dr Amir Hannan on patient access to health records
www.htmc.co.uk/pages/pv.asp?p=htmc0317
### Section 4.5

**The Language of Health: Clinical Coding and Terminology**

<table>
<thead>
<tr>
<th>Description of Learning Outcomes</th>
<th>Applicable Level of Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Demonstrate an understanding of the difference between terminologies and classifications.</td>
<td>A, B</td>
</tr>
<tr>
<td>2. Demonstrate understanding of the basis, application and limitations of the different clinical coding systems in use, including terminologies, classifications and related vocabularies.</td>
<td>A, B, C</td>
</tr>
<tr>
<td>3. Demonstrate understanding of the national standards and conventions used by the NHS in coding clinical data, and how that relates to international standards.</td>
<td>A, B</td>
</tr>
<tr>
<td>4. Demonstrate understanding of the use of clinical terms in recording clinical information in the patient record, and how that can facilitate reporting and analysis.</td>
<td>A, B</td>
</tr>
<tr>
<td>5. Explain why high quality coded clinical data is essential for the quality of clinical practice, the safety of patients and the communication of clinical information.</td>
<td>A, B, C</td>
</tr>
<tr>
<td>6. Discuss the importance of coded data for clinical research, epidemiology, public health and the conduct of national audit.</td>
<td>B, C</td>
</tr>
<tr>
<td>7. Explain how coding impacts on the production of information that patients are able to access.</td>
<td>A, B</td>
</tr>
<tr>
<td>8. Explain how coded data is important for supporting business workflows and administration, as well as measuring quality outcomes, e.g. Payment by Results (PbR), Quality and Outcomes Framework (QOF) and Commissioning Outcomes Framework (COF).</td>
<td>B, C</td>
</tr>
</tbody>
</table>
The Growing Importance of Coding and Terminologies

It is now vital that clinicians understand the purpose of coded clinical data, the uses to which it is put and the respective roles played by clinical terminologies, classifications and vocabularies in delivering safer patient care.

Accurate recording of the care given to a patient (usually diagnostic and procedure information) using clinical terms entered into the electronic record, leads to better quality information within the healthcare information system and enables sharing of data across multiple systems more effectively. It enables more effective searching of clinical records to support patient care, patient monitoring and risk management as well as the subsequent classification of data for administrative purposes and statistical analysis. The provision of better quality information for authorised health professionals helps improve the overall quality of patient care.

A clinical terminology is a structured list of concepts and their associated descriptions for use in clinical practice. Clinical terminologies provide for the detailed description of the care and treatment of patients and contain terms for things like diseases, symptoms, operations, treatments, drugs and healthcare administration. If clinical information is to be transferred safely and exchanged electronically, a standard clinical terminology is a necessary component of all clinical systems, enabling the clinician to record patient information in a consistent manner which is then able to be communicated efficiently and unambiguously between the different systems used by health and social care workers to support, for example, prescribing, referrals, hospital discharges and other business processes.

In the mid 1980s, a set of clinical terms – the Read Codes – were developed to enable GPs to capture, record and retrieve summary clinical data within computerised clinical information systems. In 1988 the Joint Computer Group of the Royal College of General Practitioners (RCGP) and the General Medical Services Committee of the British Medical Association (BMA) recommended that general practice clinical information systems standardise on the use of Read Codes. The use of Read V2 and CTV3 codes has become a key part of GP patient records. In 2001, a decision was taken to migrate to SNOMED CT (the Systematized Nomenclature of Medicine Clinical Terms) as the preferred standard terminology for use across all of primary, secondary and social care in the NHS. SNOMED CT, unlike the other terminologies, provides terms used by the different healthcare specialities and provides a single terminology that can be used by all healthcare professionals. SNOMED CT incorporates all the concepts covered by the Read Codes and is used increasingly in patient records within the NHS. It is seen as being at the cutting edge of clinical terminologies and although the Read Codes were innovative in their time, they are reaching capacity and are no longer able to meet the demands placed on clinical terminologies by modern medicine in an integrated electronic environment.

Coding can be made useful to patients when they access their medical records online. By linking codes in the record to Patient Information Leaflets and other facilities, the record becomes an automated information prescription for the individual patient.
Both the Read Codes and SNOMED CT have a relationship to the two classifications used in the NHS: International Statistical Classification of Diseases and Related Health Problems (ICD-10) and the Office of Population Censuses and Surveys Classification of Surgical Operations and Procedures Fourth Revision (OPCS-4). The NHS uses these standards to classify clinical data for a range of purposes including:

- Monitoring provision of health services across the UK.
- Research and monitoring of health trends.
- NHS financial planning and Payment by Results (PbR).
- Local and national clinical coding audit.
- Integrated governance.

Although ICD-10 and OPCS-4 play an important role in managing healthcare, they are not intended or designed for point of care recording of data by clinicians. Classifications are intended for population statistics and analysis; and also support secondary uses of health information.
Section 4.5: Sources of further information

**Department of Health**, including:
- **UK Terminology Centre**: support for SNOMED CT, Read Codes  
  www.nhscfhs.nhs.uk/uktc
- **Dictionary of Medicines and Devices**  
  www.dmd.nhs.uk
- **NHS Classifications Service**: support and maintenance for OPCS4 and ICD-10 Classifications  
  www.nhscfhs.nhs.uk/data

**eICE eLearning Module: Coding and Terminology**  
www.cln.nhs.uk/eice

**International Health Terminology Standards Development Organisation (IHTSDO):**  
*The not-for-profit association that develops and promotes SNOMED CT*  
www.ihtsdo.org

**Records Management: NHS code of practice**  

**Royal College of Physicians**: *Top ten tips for coding - a guide for clinicians*  
www.rcplondon.ac.uk/sites/default/files/top-ten-tips-for-coding-a-guide-for-clinical-staff.pdf

**Institute of Health Records and Information Management (IHRIM):** *Details of the National Clinical Coding Qualification (UK)*  
www.ihrim.co.uk
## Section 4.6

### Clinical Systems and Applications

<table>
<thead>
<tr>
<th>Description of Learning Outcomes</th>
<th>Applicable Level of Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Demonstrate understanding of how and why information technology is able to support clinical practice and new ways of working.</td>
<td>A, B, C</td>
</tr>
<tr>
<td>2. Demonstrate understanding of the functionality of the clinical systems and applications used in healthcare practice.</td>
<td>A, B</td>
</tr>
<tr>
<td>3. Demonstrate an understanding of the advantages and disadvantages of patient focused versus specialty, procedure or disease focused systems.</td>
<td>A, B</td>
</tr>
<tr>
<td>4. Demonstrate understanding of the key NHS national projects, initiatives and developments in the field of healthcare information technology.</td>
<td>B, C</td>
</tr>
<tr>
<td>5. Demonstrate skill in the use of clinical systems in a range of settings, including sharing the personal health record between clinician and patient.</td>
<td>A, B, C</td>
</tr>
<tr>
<td>6. Demonstrate awareness of clinical systems errors / reliability (e.g. transfer of data between platforms; data entry errors).</td>
<td>A, B, C</td>
</tr>
<tr>
<td>7. Demonstrate awareness of emerging information and communications technologies and their application in health.</td>
<td>A, B, C</td>
</tr>
</tbody>
</table>
What do professionals need to know and to be able to do?

All healthcare professionals should have a good understanding of the information systems available to support patient care and how to use those applicable to their own practice. In this context they need to understand the role, function, benefits and use of systems both in their local organisation and at a national level.

At a local level, whether in primary, secondary or community care, clinicians should be familiar with the purpose and relationships between the range of functions, benefits and uses of systems and services implemented across the NHS, for example:

In primary care:
- Comprehensive, problem-oriented clinical records
- Health screening
- Interactive, bespoke clinical guidelines
- Sharing records with patients

In secondary care:
- Patient Administration Systems (PAS) - including their integration with other systems;
- Picture Archiving and Communications Systems (PACS)
- Order Communications, Test Requesting and Diagnostics Reporting - including pathology and radiology tests and tests ordered in primary care;
- Letters with coding - discharge summaries, clinic and Accident and Emergency letters;
- Scheduling - for beds, tests, theatres etc.;
- ePrescribing - including 'To Take Out' (TTO) medicines.

In community and mental healthcare:
- Social Care systems
- e-SAP
- ContactPoint.

At the same time, health professionals need to understand the role and use of evidence-based decision support systems, which will become increasingly embedded in clinical systems, for example, alerts (as in Order Communications), algorithms (such as the Map of Medicine), and expert systems.

At a national level in England for example, clinicians will need to understand the purpose of:
- Summary Care Records
- Personal Demographics Service
- Choose and Book
- Electronic Prescription Service
- NHS Number
- GP2GP (electronic health records transfer directly and securely between GP practices)
- Systems for sharing records with patients
In England, these applications have been developed and managed nationally, although Government strategy is changing and other services may be provided at local level. Clinicians in Wales, Scotland and Northern Ireland will need to be aware of the development of national strategy and applications for health informatics in their respective home country.

Finally, clinicians will need to be aware of emerging technologies and how they are being applied in healthcare. Currently, some of these applications include:

- The development of personal health record systems, e.g. PAERS, Microsoft HealthVault.
- The increasing capabilities of mobile telephones for inputting and delivering health information.
- The use of personal digital assistants (PDAs), tablets and wireless-enabled environments, e.g. at the point of care.
- Instant messaging and web conferencing.
- Virtual reality and simulation.
Section 4.6: Sources of further information

eICE eLearning Module: Clinical Systems and applications
www.cln.nhs.uk/eice

Summary Care Records service
www.connectingforhealth.nhs.uk/systemsandservices/scr

Personal Demographics Service
www.connectingforhealth.nhs.uk/systemsandservices/demographics

Choose and Book
www.chooseandbook.nhs.uk

Electronic Prescription Service
www.connectingforhealth.nhs.uk/systemsandservices/eps

NHS Number
www.connectingforhealth.nhs.uk/systemsandservices/nhsnumber

GP2GP
www.connectingforhealth.nhs.uk/systemsandservices/gpsupport/gp2gp

NHS Wales Informatics Service: the national informatics programme of the Welsh Assembly Government
www.wales.nhs.uk/sitesplus/956/home

eHealth Directorate, Scottish Government Health Department: the eHealth Programme for Scotland
www.ehealth.scot.nhs.uk

Department of Health, Social Services and Public Safety, Northern Ireland: the Information and Communications Technology Strategy for Northern Ireland
www.dhsspsni.gov.uk/ict-strategy.pdf

Microsoft HealthVault
www.healthvault.com

PAERS: A system enabling patients to see their full electronic primary care record
www.paers.net
Section 4.7

eHealth: the Future Direction of Clinical Care

<table>
<thead>
<tr>
<th>Description of Learning Outcomes</th>
<th>Applicable Level of Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Demonstrate understanding of the concepts, scope and practice of eHealth.</td>
<td>A, B</td>
</tr>
<tr>
<td>2 Demonstrate understanding of the implications of eHealth applications for patients and clinical staff, clinical practice and communications.</td>
<td>B, C</td>
</tr>
<tr>
<td>3 Demonstrate understanding of the patient experience and perspective of eHealth applications.</td>
<td>A, B</td>
</tr>
<tr>
<td>4 Demonstrate understanding of the main assistive technologies and applications currently available and in development and their applicability to local services.</td>
<td>B, C</td>
</tr>
</tbody>
</table>
Preparing Clinicians for the Future - eHealth and the Clinical Curriculum

The World Health Organisation defines eHealth as:

… the use of information and communication technologies (ICT) for health to, for example, treat patients, pursue research, educate students, track diseases and monitor public health.

eHealth is a term for healthcare practice which is supported by electronic processes and communication. The term can be used inconsistently: some would argue it is interchangeable with health informatics or is a subset of health informatics, while others use it in the narrower sense of healthcare practice using the Internet. What is clear is that these new and emerging technologies will play an important role in enabling health care providers to respond to a range of challenges:

- Changing demographics.
- Changing disease patterns.
- Better informed and expert patients.
- The Wellness Paradigm - with responsibility for well-being shifting into patients’ hands.
- The emphasis on healthcare delivery moving from secondary to primary care.
- The search for cost containment.

Educators may query whether it is feasible to include eHealth in the clinical curriculum, given that the field is evolving so rapidly and it is impossible to predict what applications students will encounter in their placements or in their professional life. The summary below gives some examples of the range of services at the leading edge of medicine, healthcare and information technology.

- **Electronic Health Records**: enabling easy communication of patient data between different healthcare professionals (e.g. GPs, specialists, care teams).
- **Lifetime Health Records**: aggregation of individual electronic health records capturing longitudinal healthcare events leading to population-based tracking of health trends resulting in prediction and anticipation of hostile disease trends and thus prevention.
- **Telehealth and Telecare**: including all types of physical and psychological measurements and remote monitoring that do not require a patient to travel to a specialist.
- **Public Health Education and Information**: use of all media channels to inform citizens, both healthy individuals and patients, about medical and health topics and to increase self-help.
- **Personalised Healthcare Professional Continuing Education**: dissemination via both the internet and eLearning tools.
- **Health Knowledge Management**: specialist-oriented information provision (e.g. an overview of latest medical journals, best practice guidelines or epidemiological tracking).
• **Virtual Healthcare Teams and Wards**: healthcare professionals who collaborate and share information on patients, anywhere.

• **Medical Research Using eHealth Grids**: powerful computing and data management capabilities to handle large amounts of heterogeneous data.

Web technologies are of particular interest. The term Web 2.0 describes the trends in the use of World Wide Web technology and web design to enhance creativity, communications, secure information sharing, collaboration and the functionality of the web, concepts which have led to the development and evolution of web culture communities and hosted services, such as social networking sites, video sharing sites, wikis and blogs.

**Health 2.0** (as well as the closely related concept of **Medicine 2.0**), represents the possibilities between healthcare, eHealth and Web 2.0, including telemedicine, electronic medical records, mHealth, Connected Health, and the use of the internet by patients themselves through message boards, blogs, and other more advanced systems. The technologies will be useful in a number of areas e.g.:

• The Personal Health Record (PHR): typically a health record that is initiated and maintained by an individual patient.

• mHealth: the use of mobile devices in collecting aggregate and patient-level health data, providing healthcare information to practitioners, researchers, and patients, real-time monitoring of patient vitals, and direct provision of care (via mobile telemedicine).

• Personal Health Plans: the patient side of Pathways of Care that are currently paper-based

• Pathways of Care for Long Term Conditions: structured care plans tailored to individuals, encompassing social care, where care may be spread over many organisations and needs to be managed by the patient

• Patient empowerment: whereby patients work with their clinicians in partnership, to make their own choices and be able to act on them

• Communication: between the patient and healthcare professionals / care providers or between different healthcare professionals / care providers

### Use of Social Networking

Although social networking can be used to great benefit especially for communications campaigns and allowing patients to communicate, clinicians need to be aware of the potential issues of using social media inappropriately or incorrectly in relation to their work and clinical care.
The case for including eHealth in the curriculum

An understanding of the technologies that support these fields and their application is increasingly necessary for clinicians.

“The innovative use of new and emerging technology and systems design can be used to challenge and transform existing models of care and self-care, and to support the radical thinking required for delivery of QIPP, more personalised care and greater integration of health and social care.”

The use of assistive technology is set to grow as health and social care services move to provide people with more independence, choice and control, and deliver even better care to people with long term conditions. Today, such patients need not be mere recipients of care and can become key decision-makers in their treatment process. By ensuring that knowledge of their condition is developed to a point where they are empowered to take some responsibility for its management and work in partnership with their health and social care providers, patients can be given greater control over their lives. Self-management programmes can be designed specifically to reduce the severity of symptoms and improve confidence, resourcefulness and self-efficacy, whilst online communities of patients, sharing knowledge and information about specific conditions or providing mutual support are increasingly common. A current example of this is Renal PatientView, which aims to provide online information about renal patients' diagnosis, treatment, and their latest test results. Patients can share this information with anyone they want, and view it from anywhere in the world.

In the near future clinicians will be dealing with the ePatient supported by eHealth. According to Dr Ron Merrell, Head of the Medical Informatics and Technology Applications Consortium at Virginia Commonwealth University, USA in October 2002:

“In the new world order, the ePatient will be in an electronic care continuum with global medical knowledge.”

7 www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_110336.pdf
Section 4.7: Sources of further information

**World Health Organization: eHealth**
www.who.int/topics/ehealth/en

**European Commission Information Society:**
- *What is eHealth?*
- *eHealth strategy 2004-07*
  www.who.int/eht/en/eHealth_HCD.pdf
- *European countries on their journey towards national eHealth infrastructures (Jan 2011)*

**eHealth Nurses Network**
www.ehealthnurses.org.uk

**eICE eLearning Module: eHealth - the future direction**
www.cln.nhs.uk/eice

**Health 2.0 and Medicine 2.0: Tensions and Controversies in the Field**
www.jmir.org/2008/3/e23/

**Royal Society of Medicine: Telemedicine and eHealth Section**
www.rsm.ac.uk/academ/fortelem.php

**Renal PatientView**
www.renalpatientview.org

**The Telecare Services Association (TSA): the representative body for the UK telecare industry**
www.telecare.org.uk
Section 5.0

Guidance for Stakeholders

Constant change in the NHS demands the development of new skills to support new practices and processes. Health informatics is not exclusively the concern of technologists and enthusiasts but is a core requirement for all those who generate, retrieve and use information to support healthcare.

The ongoing challenge for commissioners and providers of clinical education is to embed health informatics into all clinical educational and vocational training programmes as far as possible, to help healthcare staff manage information better in a world that is expecting more “information empowered” professionals.

It is recommended that education commissioners include the learning outcomes set out in this framework in their specifications for clinical education; and that education providers look for opportunities with other providers for cross-educational opportunities.

Importantly, health informatics should not be taught as a distinct subject in its own right but should be woven and integrated into the wider clinical curriculum. It lends itself well to interprofessional learning which not only provides a wider perspective for learners, but also highlights the importance of interprofessional cooperation in the development, management and monitoring of all health information, especially that relating to patients or clients as individuals.

The opportunities for eLearning are increasing rapidly and there are growing possibilities for these methods to be used for effective teaching of many learning outcomes. The teaching of Informatics is highly compatible with virtual and online learning environments.

It is recommended that education providers regularly review their programmes to identify opportunities for additional distance and eLearning methods that can be used as feasible options for delivery of health informatics education.

In this document methods of assessment have not been specified for the different learning outcomes. Each provider will need to determine its own assessment arrangements according to local policy and practice.

However, it is recommended that there should be a very clear distinction made between the assessment and demonstration of understanding and knowledge and the assessment and demonstration of skills.

For education at post-registration / CPD and clinical management levels, the provision of academic credit is an effective way of attracting many healthcare professionals into continual learning and assists in their reaccreditation and revalidation arrangements.
It is recommended that commissioners and providers, in conjunction with professional and regulatory bodies, find ways of linking successful informatics learning to academic credit.

Many healthcare professionals continue to have limited or no education in informatics and yet the expectations of them to manage information effectively is a current and increasing requirement.

It is recommended that commissioners and providers consider the need for catch up or consolidation programmes, based on the guidance in this framework.
Appendix 1

Essential IT Skills Development

The NHS IT Skills Pathway covers the full range of competencies for users of IT, from basic through to advanced levels. It has been developed in partnership with the NHS to provide an officially recognised route of learning and certification for the whole NHS workforce.

Full details, including how to access the training can be found at the [NHS Skills Pathway](http://www.nhs.org).

The main components are:

- **NHS ELITE (NHS eLearning IT Essentials)** which covers essential IT skills, such as how to use a keyboard and mouse through to file management, web and email skills. It offers both a pre and post assessment learning section.
- NHS Ready for MOST is a set of learning modules specifically designed to prepare learners for NHS MOST. It provides a natural progression for learners that have already undertaken NHS ELITE.
- **NHS MOST (Microsoft Office Skills Training)** covers higher level use of the common Microsoft desktop applications. Unlike the European Computer Driving Licence, certification is available for each individual product.

DHID NHS Connecting for Health hosts a [Microsoft IT Academy](http://www.microsoft.com) that provides NHS staff members with flexible access to Microsoft technical courses and certifications at reduced costs.

The following table summarises the learning outcomes of NHS ELITE.
## NHS ELITE

<table>
<thead>
<tr>
<th>Essential Skills</th>
<th>Description of Learning Outcome</th>
</tr>
</thead>
</table>
| **Switching on and off** | • Know how to switch a computer on and off safely.  
• Know when it is appropriate to shutdown, restart, log off, and lock the computer and how to do so.  
• Be aware of the importance of choosing and changing login password to keep systems secure. |
| **Mouse skills** | • Be able to control the mouse to select, open and drag objects on the screen.  
• Use the mouse to operate scroll bars and access context menus. |
| **Keyboard skills** | • Input and edit text using the keyboard.  
• Be able to type text including numbers and symbols, using the Shift key appropriately to do so.  
• Be able to move the text entry cursor, use the Backspace and Delete keys to erase text, use the Return key to start a new line or submit information and use the Tab key when editing text or working with forms.  
• Know that pressing keys in combination can also be used to call up functions within an application. |
| **Using Windows** | • Be able to work with the Windows desktop.  
• Be able to use the Start menu and desktop icons to open application windows.  
• Be able to manipulate windows by maximising, minimising, resizing, moving and closing them. |
| **Working with applications** | • Use some of the common features of applications.  
• Be able to use toolbars and menus to access functions and work with dialogue boxes and task panes to make choices.  
• Be able to open, save and print files, access application 'Help'.  
• Be able to work with information (including tabular information) within applications, selecting information and using cut, copy, and paste to move it.  
• Be able to identify and exit non-responding applications using the Task Manager. |
| **File management** | • Manage and organise files and folders and know how to copy, move, delete and rename files and folders.  
• Be able to restore and empty files from the Recycle Bin. |
| **Web skills** | • Navigate web pages using the address bar, following links, using search engines and using web forms. |
| **Email skills** | • Open, send, reply and forward email messages.  
• Be able to organise messages; deleting them, moving them into folders and sorting them.  
• Be able to create contacts and address messages using the Address Book.  
• Be able to send and receive file attachments. |
Appendix 2

Miller’s Model of Learning and Assessment

Miller’s model creates a hierarchy of learning and behaviour that is linked to the development of professional practice. In addition it provides a model for assessment with increasing professional authenticity as the learner moves from knowing facts about a topic, through knowing how to use those facts and showing how and when that knowledge may be used, to using the knowledge in everyday clinical activity.

Different assessment tools are appropriate for each of these stages as shown below:

- **Does**
  - Performance assessment in vivo: Review of notes, audits, governance

- **Shows How**
  - Performance assessment in vitro: OSCE, simulation, problem solving

- **Knows how**
  - (Clinical) Context based tests: MCQ, essay type, oral

- **Knows**
  - Factual tests: MCQ, essay type, oral

*Miller GE. The assessment of clinical skills / competence / performance. Academic Medicine (Supplement) 1990; 65: S63-S7*
Appendix 3

Historical Development of Learning to Manage Health Information

Learning to Manage Health Information was first published in 1999 by the NHS Information Authority with the aim of establishing a common health informatics framework for clinical health professionals at pre and post-registration level. It included learning outcomes and standards for professional practice set out under eight themes covering areas of learning in health informatics.

The consultation process for developing the framework involved both professional and regulatory bodies and was supported by 28 different organisations, including a General Medical Council (GMC) endorsement to the effect that it would be a source of advice in support of the principles in the GMC’s own guidance.

Learning to Manage Health Information: Moving Ahead was published in 2002, with additional guidance and interpretation to take account of important developments in information, its management and educational approaches since the original publication. It followed the themes of the original framework and at the same time:

- consolidated, combined and simplified some of the descriptions and learning outcomes
- concentrated on essential learning outcomes that were recommended to be incorporated into educational programmes
- made a clear distinction between learning outcomes that improve understanding and knowledge and those that develop essential skills
- provided guidance on the appropriate level of education for each outcome.

Between 2001 and 2004 three universities in the UK were commissioned to undertake a series of research projects to further the evidence base about how health informatics education and training makes a difference to patient care and delivery of services, to examine where the standards were in use (or not) in curricula, to examine any issues and barriers and to consider what clinical education tutors needed to support their teaching strategies in this area. These projects were completed and compiled into a four-part publication, Health Informatics Education and Development for Clinical Professionals: Making progress? (NHS Information Authority, 2004).

In 2006 a study was undertaken which considered the standards as described in Learning to Manage Health Information: Moving Ahead and took a snapshot of implementation activity in three different environments as examples of proactive practice:

1. education commissioning;
2. higher education delivery; and
3. in-service education and support.

In 2009, Learning to Manage Health Information underwent a substantial review to update the main themes and their associated learning outcomes in light of developments in clinical practice and health informatics. This 2012 edition has refreshed and clarified the 2009 edition to ensure it remains contemporary and fit for purpose.
<table>
<thead>
<tr>
<th><strong>Glossary of Terms, Organisations and Services</strong></th>
</tr>
</thead>
</table>
| **Care Quality Commission**  
www.cqc.org.uk | The independent regulator of all health and social care services in England. |
| **Choose and Book**  
www.chooseandbook.nhs.uk | A national electronic referral service which gives patients a choice of place, date and time for their first outpatient appointment in a hospital or clinic. |
| **Dictionary of Medicines and Devices**  
www.dmd.nhs.uk | A vocabulary dictionary containing unique identifiers and associated textual descriptions for medicines and medical devices (previously known as the UK Standard Clinical Products Reference Source (UKCPRS)). |
| **eHealth Directorate, Scottish Government Health Department; the eHealth Programme for Scotland**  
www.ehealth.scot.nhs.uk | A programme which aims to change the way in which information and related technology are used within NHS Scotland in order to improve the quality of patient care. |
| **eHealth Nurses Network**  
www.ehealthnurses.org.uk | An online network for nurses with the aim "To facilitate professional development through the exploration of ehealth and its impact on patient care within a new collaborative environment". |
| **Electronic Prescription Service**  
www.connectingforhealth.nhs.uk/systemsandservices/eps | A national programme in NHS England which aims to enable prescribers - such as GPs and practice nurses - to send prescriptions electronically to a dispenser (such as a pharmacy) of the patient's choice. |
| **Essential IT Skills**  
www.connectingforhealth.nhs.uk/systemsandservices/etd/eits | A nationally available basic IT skills programme for NHS staff. |
| **GP2GP**  
www.connectingforhealth.nhs.uk/systemsandservices/gpsupport/gp2gp | A national NHS England programme which enables patients' electronic health records to be transferred directly and securely between GP practices. |
| **Health Protection Agency**  
www.hpa.org.uk | A national organisation with the role of providing an integrated approach to protecting UK public health through the provision of support and advice to the NHS, local authorities, emergency services, other arm's length bodies, the Department of Health and the devolved administrations. |
| **HealthSpace**  
www.healthspace.nhs.uk/visitor/default.aspx | A secure website providing access to the Summary Care Record for patients in England (requires registration to gain full access). |
| **Information Commissioner’s Office**  
www.ico.gov.uk | The UK’s independent authority set up to uphold information rights in the public interest, promoting openness by public bodies and data privacy for individuals. |
<table>
<thead>
<tr>
<th>Organization Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institute of Health Records and Information Management (IHRIM) <a href="http://www.ihrim.co.uk">www.ihrim.co.uk</a></td>
<td>An independent organisation set up to provide qualifications at different levels as well as career and professional assistance for members including those working in the fields of health records, information management, clinical coding and information governance.</td>
</tr>
<tr>
<td>International Council on Medical and Care Compunetics <a href="http://www.icmcc.org">www.icmcc.org</a></td>
<td>An international foundation operating as the knowledge centre for medical and care compunetics (COMPUting and Networking, its ETHiCs and Social / societal implications), making information on medicine and care available to patients using compunetics as well as distributing information on the use of compunetics in medicine and care to patients and professionals.</td>
</tr>
<tr>
<td>International Health Terminology Standards Development Organisation (IHTSDO): CT <a href="http://www.ihtsdo.org">www.ihtsdo.org</a></td>
<td>The not-for-profit association that develops and promotes SNOMED.</td>
</tr>
<tr>
<td>Map of Medicine <a href="http://www.mapofmedicine.com">www.mapofmedicine.com</a></td>
<td>A commercial tool which can be used by health organisations to describe and communicate care pathways, used in the redesign of services.</td>
</tr>
<tr>
<td>Medicines and Healthcare Products Regulatory Agency <a href="http://www.mhra.gov.uk">www.mhra.gov.uk</a></td>
<td>A national organisation which aims to safeguard the health of the public by ensuring that medicines and medical devices work and are acceptably safe.</td>
</tr>
<tr>
<td>Microsoft HealthVault <a href="http://www.healthvault.com">www.healthvault.com</a></td>
<td>A free online site produced and run by Microsoft where individuals can store, organise and share their personal health information.</td>
</tr>
<tr>
<td>My Health Online <a href="http://www.wales.nhs.uk/nwis/page/52549">www.wales.nhs.uk/nwis/page/52549</a></td>
<td>A free online service by NHS Wales which allows patients to update their details, book GP appointments and order repeat prescriptions online.</td>
</tr>
<tr>
<td>NHS National Institute for Health and Clinical Excellence <a href="http://www.nice.org.uk">www.nice.org.uk</a></td>
<td>An NHS organisation which aims to provide independent evidence-based guidance on the most effective ways to prevent, diagnose and treat disease and ill health, reducing inequalities and variation. NHS NICE also includes NHS Evidence, The British National Formulary, the National Electronic Library for Medicines and the National Prescribing Centre.</td>
</tr>
<tr>
<td>NHS National Patient Safety Agency <a href="http://www.npsa.nhs.uk">www.npsa.nhs.uk</a></td>
<td>An arm's length body of the Department of Health which aims to reduce the risks to patients receiving NHS care through national initiatives on patient safety and the National Clinical Assessment Service, which supports the resolution of concerns about individual practitioners.</td>
</tr>
<tr>
<td>NHS Care Record Guarantee <a href="http://www.nigb.nhs.uk/guarantee">www.nigb.nhs.uk/guarantee</a></td>
<td>The NHS Care Record Guarantee for England sets out the rules that govern how patient information is used in the NHS and what control the patient can have over this.</td>
</tr>
<tr>
<td>NHS Classifications Service; support and maintenance for OPCS4 and ICD-10 Classifications <a href="http://www.nhsfcfhs.nhs.uk/data">www.nhsfcfhs.nhs.uk/data</a></td>
<td>An NHS Service which provides clinical coding guidance and sets the national standards used by the NHS in coding clinical data.</td>
</tr>
<tr>
<td>Website</td>
<td>Description</td>
</tr>
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<td>----------------------------------------------------------------------</td>
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<tr>
<td><strong>NHS Direct</strong>&lt;br&gt;www.nhsdirect.nhs.uk</td>
<td>A 24 hour, 365 days a year, national telephone helpline and website, providing health advice and information for people in England. Wales has NHS Direct Wales and Scotland has Scotland 24 which provide a similar service.</td>
</tr>
<tr>
<td><strong>NHS Evidence</strong>&lt;br&gt;www.evidence.nhs.uk</td>
<td>NHS Evidence is a service that enables access to authoritative clinical and non-clinical evidence and best practice through a web-based portal, for health and social care sectors. It is managed by the National Institute for Health and Clinical Excellence (NICE).</td>
</tr>
<tr>
<td><strong>NHS Information Centre for Health and Social Care</strong>&lt;br&gt;www.ic.nhs.uk</td>
<td>An NHS England organisation which collects and provides health and social care information for frontline decision makers.</td>
</tr>
<tr>
<td><strong>NHS Information Governance Toolkit</strong>&lt;br&gt;www.igt.connectingforhealth.nhs.uk</td>
<td>The IG Toolkit is an online system which allows NHS organisations and partners to assess themselves against Department of Health Information Governance policies and standards. It also allows members of the public to view participating organisations’ IG Toolkit assessments.</td>
</tr>
<tr>
<td><strong>NHS IT Skills Pathway</strong>&lt;br&gt;www.connectingforhealth.nhs.uk/systemsandservices/icd/itskills/pathway</td>
<td>An NHS IT skills programme that covers the full range of competencies for users of IT, from basic through to advanced levels. It has been developed in partnership with the NHS to provide an officially recognised route of learning and certification for the whole workforce.</td>
</tr>
<tr>
<td><strong>NHS Local</strong>&lt;br&gt;nhslocal.nhs.uk</td>
<td>A range of digital services for NHS staff and the public in the West Midlands.</td>
</tr>
<tr>
<td><strong>NHS Wales Informatics Service</strong>&lt;br&gt;www.wales.nhs.uk/sitesplus/956/home</td>
<td>The national informatics programme of the Welsh Assembly Government.</td>
</tr>
<tr>
<td><strong>PAERS (Patient Access to Electronic Record Systems Ltd)</strong>&lt;br&gt;www.paers.net</td>
<td>A system enabling patients to see their full electronic primary care record, run by an independent company.</td>
</tr>
<tr>
<td><strong>Personal Demographics Service</strong>&lt;br&gt;www.connectingforhealth.nhs.uk/systemsandservices/demographics</td>
<td>A national NHS service which holds the national electronic database of NHS patient demographic details such as name, address, date of birth and NHS Number.</td>
</tr>
<tr>
<td><strong>Registration Authority</strong>&lt;br&gt;www.connectingforhealth.nhs.uk/systemsandservices/rasmartcards</td>
<td>Each organisation that delivers NHS care and needs to access patient information within NHS systems must set up Registration Authorities to manage the process of checking the identity of those wishing to access data and setting the appropriate access level.</td>
</tr>
<tr>
<td><strong>Renal PatientView</strong>&lt;br&gt;www.renalpatientview.org</td>
<td>A national NHS funded online tool which allows renal patients from some renal units to access information about their diagnosis, treatment and test results.</td>
</tr>
<tr>
<td><strong>Secondary Uses Service</strong>&lt;br&gt;www.connectingforhealth.nhs.uk/systemsandservices/sus</td>
<td>SUS is the single, comprehensive repository for healthcare data which enables a range of reporting and analyses to support the NHS in the delivery of healthcare services. It is run by Department of Health and NHS Information Centre for Health and Social Care.</td>
</tr>
</tbody>
</table>
| **Social Care Institute of Excellence**  
ww.scie.org.uk | An independent charity that gathers and analyses knowledge about what works in social care and translates that into practical resources, learning materials and services, to improve the knowledge and skills of those working in care services. |
| **Summary Care Records service**  
www.connectingforhealth.nhs.uk/systemsandservices/scr | The central NHS service which has produced and maintains the summary care records. |
| **The Telecare Services Association (TSA)**  
www.telecare.org.uk | The representative body for the UK telecare industry. |
| **UK Terminology Centre**  
www.nhscfh.nhs.uk/uktc | A Department of Health service that is responsible for the UK management of SNOMED CT, Read codes and other healthcare terminology products and Clinical Classifications. The UKTC maintains the NHS Dictionary of Medicines and Devices (dm+d) in partnership with the NHS Business Service Authority. |
| **UK Council for Health Informatics Professions**  
www.ukchip.org | The UK accreditation body for health informatics specialists. |