The benefits of structuring and coding clinical information

Dipak Kalra and Andrew Hinchley
Health information flows needing interoperability

- Wellness
  - Fitness
  - Complementary health
- Citizen in the community
- Social care
  - Occupational health
  - School health

Rapid bench to bed translation

- Teaching
  - Research
  - Clinical trials

Explicit consent

- Continuing care
  - (within the institution)

Implied consent

- Disease registries
  - Screening recall systems
- Public health
  - Health care management
  - Clinical audit

Real-time knowledge directed care

- Education
  - Research
  - Epidemiology
  - Data mining

De-identified

+/- consent

- Long-term shared care
  - (regional national, global)
Drivers for a holistic EHR

- Manage increasingly complex clinical care
- Connect multiple locations of care delivery
- Support team-based care
- Deliver evidence-based health care
- Improve safety
  - reduce errors and inequalities
  - reduce duplication and delay
- Improve cost effectiveness of health services
- Underpin population health and research
- Empower and involve citizens
- Protect patient privacy
Those requiring a semantically computable solution

- Manage increasingly complex clinical care
- Connect multiple locations of care delivery
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The EHR landscape

- Symptoms and history
- Body physical examination findings
- Medication and prescriptions
- Treatment
- Hypotheses, health issues (problems and diagnoses), risks
- Care planning
- Chronic disease management
- Tests and investigations
- Self management and home monitoring
- Well-being and fitness, rehabilitation after illness
- Procedures and operations
- Protocols, guidelines, care pathways
- Social welfare, culture, religion, attitudes, expectations, hopes, fears
- Communication, team-based collaboration
- Consent, permissions, disclosures, complaints

Dipak Kalra
Treatment

Medication and prescriptions

Symptoms and history

Body physical examination findings

Procedures and operations

Hypotheses, health issues (problems and diagnoses), risks

Conventional medical summary

Care planning

Advice and education

Chronic disease management

Tests and investigations

Self management and home monitoring

Protocols, guidelines, care pathways

Prevention and screening, population health measures

Communication, team-based collaboration

Well-being and fitness, rehabilitation after illness

Hospital admission

Cardiovascular medicine

Mental health

Consent, permissions, disclosures, complaints

Social welfare, culture, religion, attitudes, expectations, hopes, fears

Frequently re-used fragments
Dipak Kalra

the words

of the patient

and actions

of the clinician

personalised care

empowered care

personalised / predictive

medicine

clinical workflows

clinical guidelines

mapping to local services

and resources

cost containment

reimbursement

clinical outcomes

clinical and industry

research

commissioning

purchasing

service planning

public health

screening, prevention

clinical and industry

research

commissioning

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screening, prevention

personalised care

empowered care

personalised / predictive

medicine

clinical workflows

clinical guidelines

mapping to local services

and resources

Whittington Hospital

Healthcare Record

John Smith

DoB : 12.5.46

Dipak Kalra
Recommended priority use cases for safe shared care (SemanticHEALTH report)

- **New medication prescriptions**
  - requiring comprehensive information on concurrent medication and details of known allergies and conditions (not simple ETP)

- **Reminders and prompts**
  - for overdue or overlooked health care actions and interventions

- **Long term conditions**
  - supporting clinical guidelines and other forms of evidence to determine the optimal management strategy and care pathway for a given patient

- **Care transfers**
  - referrals and within-team workflow such as the degree of urgency and the expectations of the referring clinician from another team member

- **Care co-ordination**
  - ensuring that a high-level view can be taken of distributed (multi-team) care to protect against duplication, delay and incompatible interventions

- **Medical summaries**
- **Personal Health Records**
• The trade-off between coding and structuring of the clinical record

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• On behalf of the NHS CFHEP 009 Project

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• University of Edinburgh
Mixed-methods quantitative and qualitative approach

• WP1: systematic literature review
• WP2: qualitative study using purposeful sampling
  – patients, healthcare professionals, health service commissioners, policy makers, managers and administrators, system developers, researchers and academics
• WP3: collective case study: allergy, ethnicity, depression, diabetes
  – how information is captured and used in unstructured, structured, and coded forms, how and why these patterns arise, and what value each format provides to different stakeholders
• WP4: comparison of strategies adopted to promote structuring and/or coding in six other countries:
  – Australia, Brazil, Canada, Japan, Sweden and the United States
Systematic review: key findings

• Systematic review on the direct care benefits of structuring and/or coding of patient presenting history

• 10 studies identified, mainly focused on the use of structured templates
  – the resulting records tended to be more complete and more detailed
  – only three studies demonstrated that this better information resulted in improvements to patient care
  – primarily that clinicians were quicker to arrive at a diagnosis
    • appendicitis (an acute hospital)
    • tooth avulsion (a dental hospital)
    • urinary incontinence and falls in the elderly (primary care)
Literature review: key findings

- Broader literature review of primary empirical evidence of value to direct patient care, as defined by the IOM: *Crossing the Quality Chasm*
- 13 controlled studies had investigated measurable benefits to direct patient care of introducing structure and/or coding clinical documentation
- Proxy clinical outcomes can be improved if a structured EHR is combined with alerting or advisory systems in a specific targeted area
  - management of a long-term condition (diabetes, asthma)
  - a preventive intervention (VTE, immunisation)
  - appropriate choice of therapy (antibiotics)
Qualitative study: key findings

- Significant variation in documentation practices across locations, care settings and professional communities
  - due to variations in professional guidelines, protocols and education, organisation-specific requirements, reporting requirements, and medical-legal considerations

- Examples of immediate value gained from the use of structuring and/or coding
  - prescribing decision support in general practice
  - clinician productivity gains (time saving)
  - promotion of patient centred approaches to care
  - more immediate identification of patterns of disease
  - possibility for new forms of continuity of care
  - (otherwise mainly secondary uses)
Qualitative study: key findings

• Collection of information within a medical record is a highly interpretative process

• A mis-match between useful structures to support working practices and available IT systems
  – duplicate paper systems & spreadsheets lead to additional effort and increased potential for human error

• Linking clinical coding to reimbursement and performance management has a detrimental impact on the perceived value and importance of structures/codes

• Lack of structure within patient communication is an inhibitor to patient understanding of their own healthcare
Allergy: key findings

• Widespread acceptance among healthcare professionals that accurate structuring and coding of drug allergies and adverse drug reactions is clinically important
  – incentives to do this are largely irrelevant

• Current coding practice does not necessarily enable optimal leverage of decision support
  – rather because of difficulties in accurate coding this may introduce new areas of risk

• Given the professional buy-in, the substantial coding already being undertaken, the opportunity to share coded data throughout the NHS, this purpose represents an area worthy of further investigation and development
Ethnicity: key findings

• Omission of ethnicity data within nationally procured EHRs
• Lack of central supporting resources e.g. templates, training, incentives and/or sanctions
  – undermines guidance recommending the collection of ethnicity
• Coded ethnicity is collected by administrative staff and stored in admin. systems and not in the clinical record
  – regarded as of limited clinical utility
• Fixed lists have not evolved to reflect our communities
• Ethnicity considerations relevant to clinical care (e.g. religion, preferred language of communication, diet) usually captured within clinical narratives in free text
Depression: key findings

• GPs enter Read codes directly during consultations
  – But, little evidence of clinical benefits to inform immediate care decisions in primary care
• Secondary care clinicians make notes on paper
  – coded later by clinical coders, often using ICD-10
• No clear mapping between these coding systems
• Information in free text valued more than coded data
  – coding perceived to promote labelling and force-fitting patients into boxes
• Clinicians find it hard to choose an appropriate code
  – often pick the closest match, but not an accurate description of the patient’s situation
• Either need fewer codes, or lots more
Diabetes: key findings

• Clinical review dataset has been established for many years, well defined structures and codes
• Potential secondary use benefits are clear
• In primary care the use of structured templates and Read codes is high. Clinical benefits include:
  – having information available for consultations
  – easier to share information within the practice
  – monitoring and adherence to protocols
  – involving patients through on-screen graphics
  – GP2GP fast transfer of records
• Secondary care shows greater variation in practice
• Structured and/or coded EHRs are rarely used to improve information sharing
Cross cutting themes

• Use of templates is well established where guidelines and protocols have been used to develop and standardise professional practice
• Clinical information standards (record structures, term lists and rules) that embody good practice guidelines, and incorporate decision support, have been shown to improve the adoption of guidelines
• Drivers such as performance management, reporting and reimbursement, specifically QOF and PbR have diluted interest and engagement amongst healthcare professionals for whom the link between coding and quality of care is not explicit
Cross cutting themes

• The presently available clinical applications are not efficient and intuitive enough to remove the greater effort required to enter structured or coded information

• There is a need for better-harmonised terminologies, consistency in when and how specific terms are used, and alignment of coding practices across care settings

• Initiatives to improve data quality are important and successful, such as the audit and intervention cycles used in primary care e.g. PRIMIS, which should be extended into secondary care