

Using routine health data for applied epidemiology: Clinical Coding

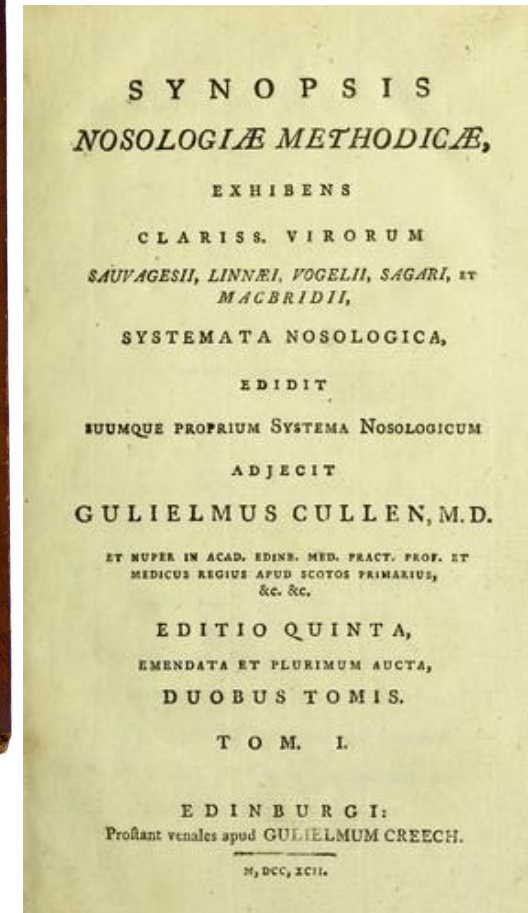
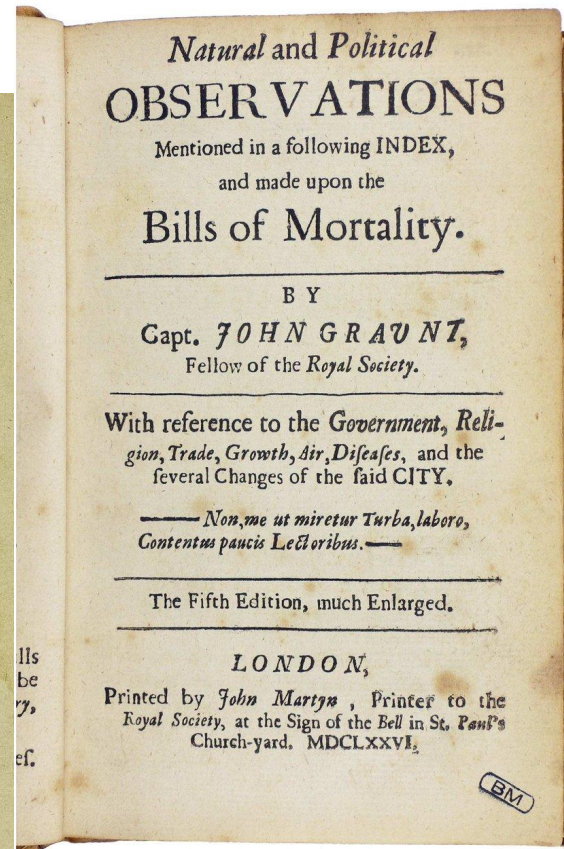
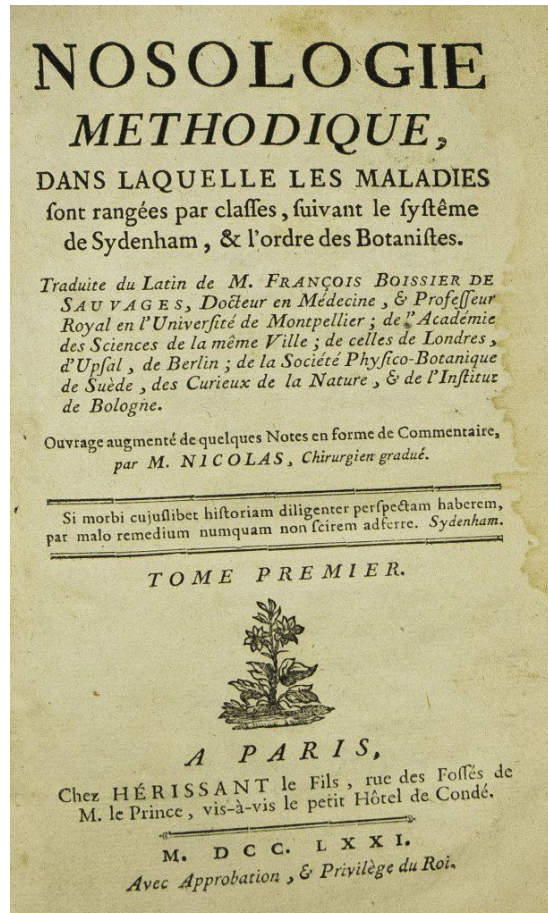
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Map Specialist, SNOMED International

Objectives for this Session

- Learn a brief history to clinical coding
- Define what clinical coding is within context of the NHS
- Introduce the basic concepts of statistical classifications
- Provide an overview of the clinical coding process in NHS hospitals
- Provide an overview of NHS information flows
- Discuss challenges and pitfalls that affect routinely coded data

To Classify is Human

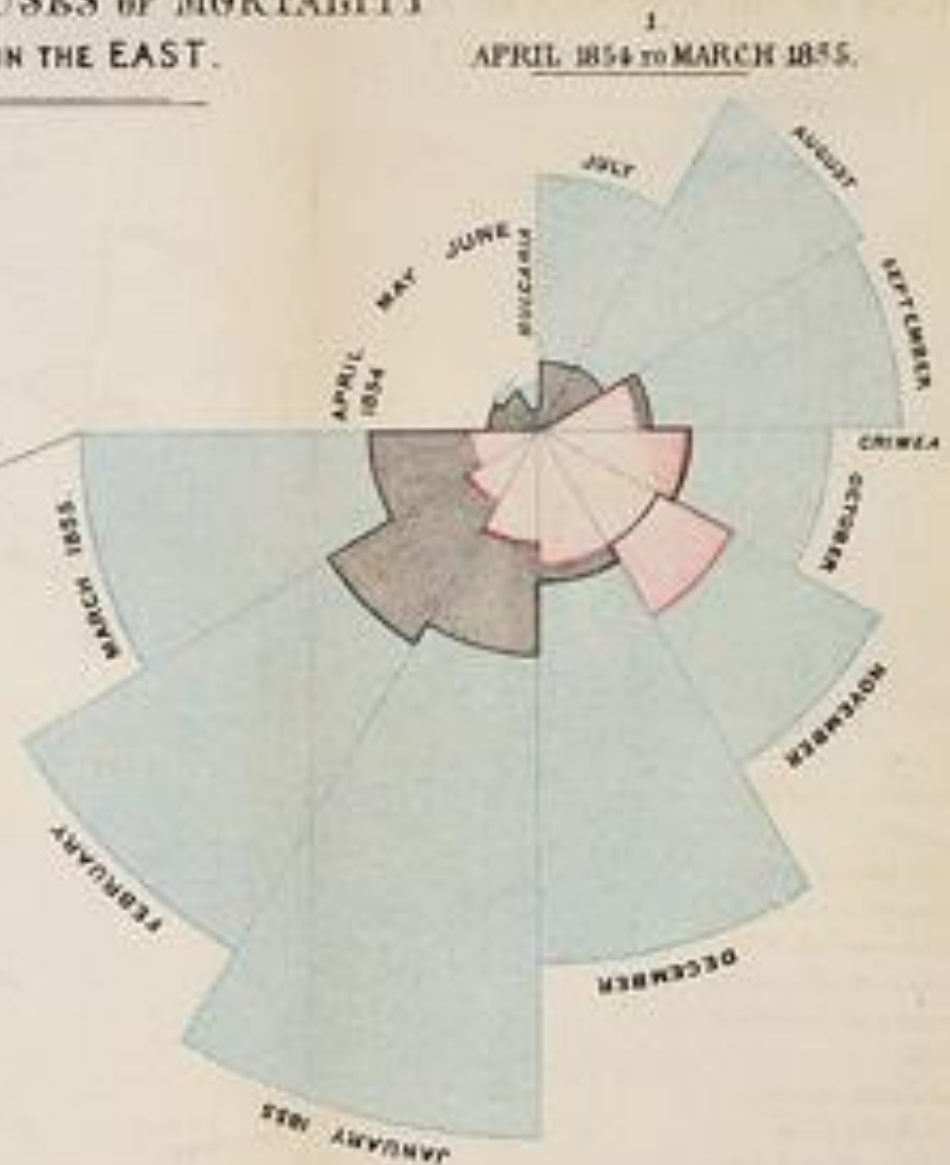


Florence Nightingale – Notes on Hospitals

“I am fain to sum up with an urgent appeal for adopting ... some uniform system of publishing the statistical records of hospitals. There is a growing conviction that in all hospitals, even in those which are best conducted, there is a great and unnecessary waste of life ... In attempting to arrive at the truth, I have applied everywhere for information, but in scarcely an instance have I been able to obtain hospital records fit for any purposes of comparison ... If wisely used, these improved statistics would tell us more of the relative value of particular operations and modes of treatment than we have means of ascertaining at present”



DIAGRAM OF THE CAUSES OF MORTALITY IN THE ARMY IN THE EAST.



The areas of the blue, red, & black wedges are each measured from the centre as the common vertex.

The blue wedges measured from the centre of the circle represent area for area the deaths from Puerile or Malignant Zymotic diseases, the red wedges measured from the centre the deaths from wounds & the black wedges measured from the centre the deaths from all other causes.

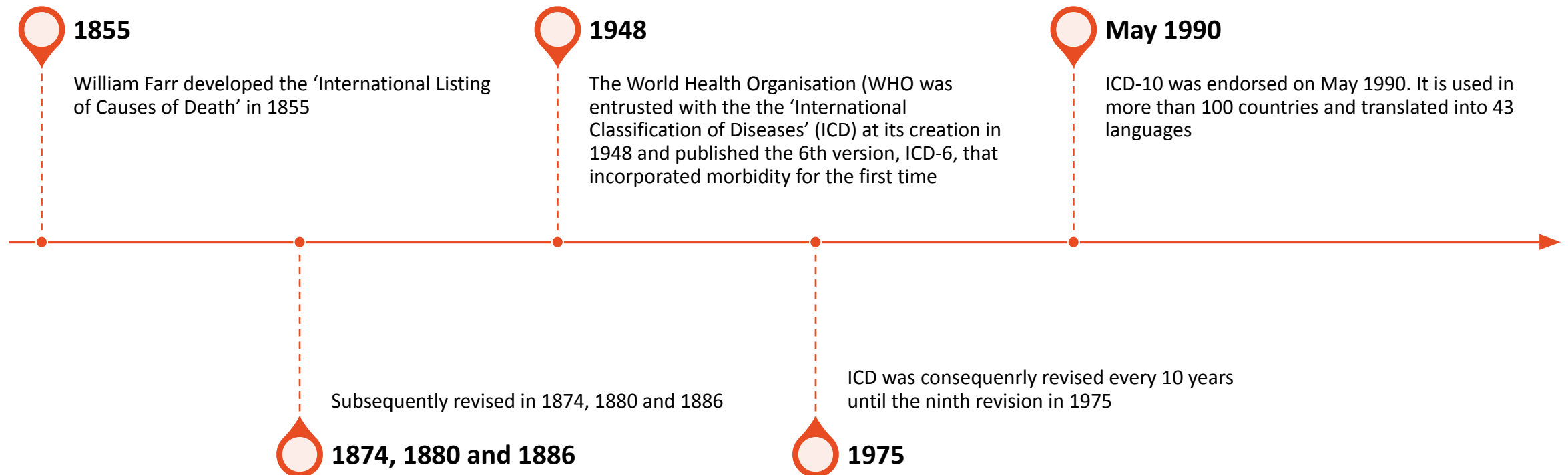
The black line across the red triangle in Nov^r 1854 marks the boundary of the deaths from all other causes during the month.

In October 1854, & April 1855 the black area overlaps with the red.

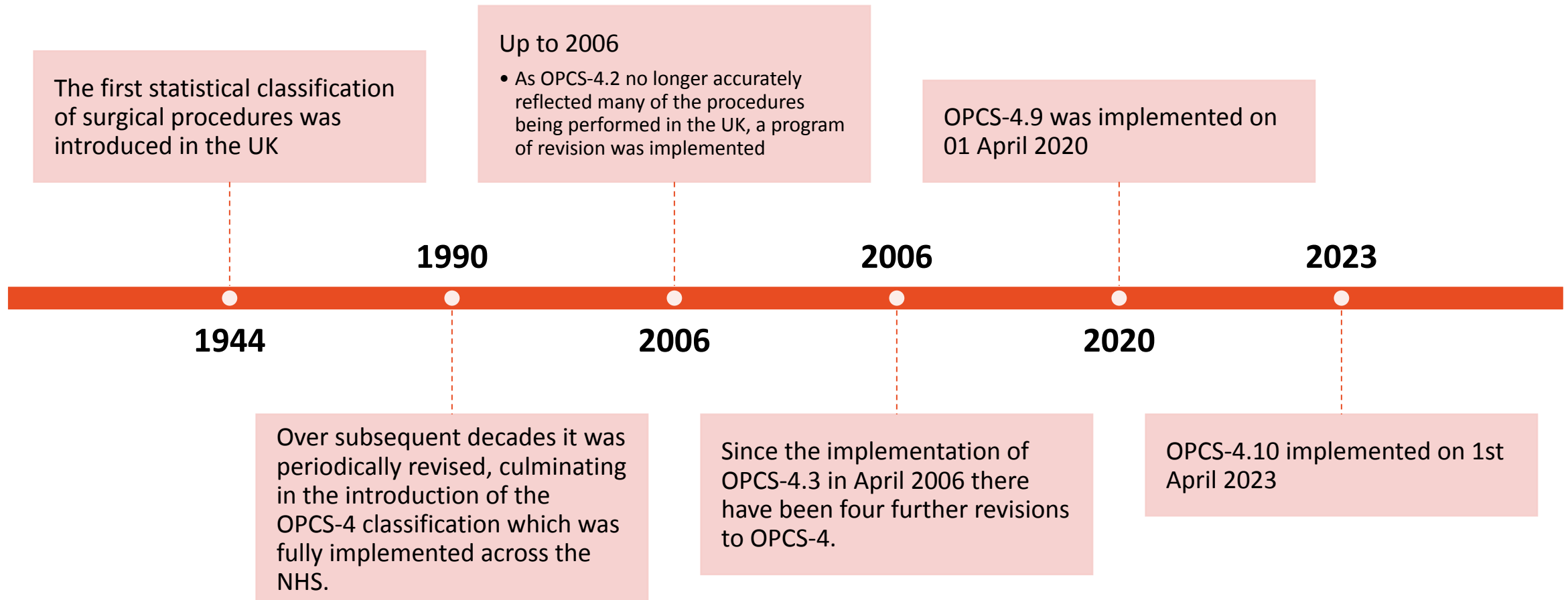
In January & February 1855 the blue overlaps with the black.

The entire areas may be compared by following the blue, the red & the black lines enclosing them.

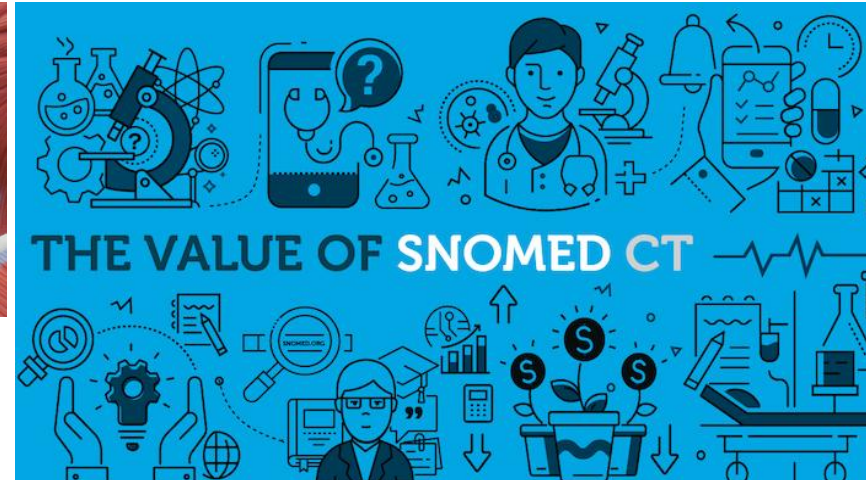
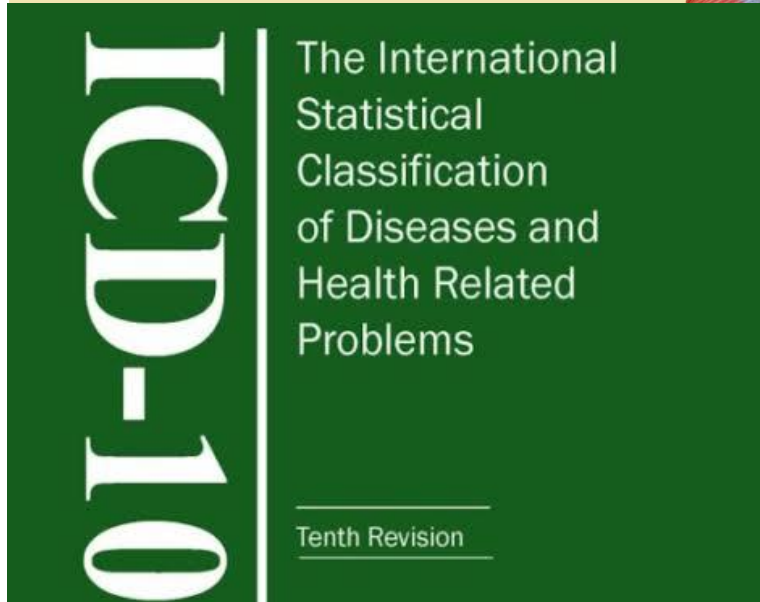
Development of the classification of disease



Development of the classification of procedures



Clinical coding in the NHS is a complex ecosystem of diverse standards and workflows



dm+d
unlock safer care

What is Clinical Coding?



What is Clinical Coding?

Clinical coding is the **translation of medical terminology**, as written by the **clinician** to describe a patient's complaint, problem, diagnosis, treatment or reason for seeking medical attention, into a coded format which is nationally and internationally recognised.

How? *Using Classifications to code*



‘A classification is a systematic arrangement of like entities based on differing characteristics’

Groups entities together in a standardised medical language (nomenclature)

Governed by rules and conventions

Provides a structured framework for statistical information

Nationally and internationally recognised

International Classification of Diseases (ICD-10)



International standard for defining and reporting diseases and health conditions

Used in over 100 countries worldwide

Used in clinical care and research, helping to:

Define disease

Study disease patterns

Manage healthcare and allocate resources

Monitor outcomes

OPCS-4 Classification of Interventions

What is OPCS-4

- Groupings of concepts, with definitions, to classify interventions and surgical procedures for statistical purposes

What does OPCS-4 do?

- provides the codes to summarise interventions and surgical procedures
- enables classification of information derived from the patient record at the end of a hospital episode of care
- focuses on what we want to 'count' for statistical and epidemiological analysis as well as reimbursement

How is OPCS-4 data used?

- in England the uses are defined in the **NHS Data Model and Data Dictionary** and specifically the **Admitted Patient Care Commissioning Data Set**
- is applied by clinical coders in accordance with business rules and clinical coding standards
- is a vital component of several national datasets, including:
 - [Hospital Episode Statistics \(HES\)](#) in England
 - [Patient Episode Data for Wales \(PEDW\)](#)
 - [Scottish Morbidity Records \(SMR\)](#)
- Approximately 12 million hospitals finished consultant episodes have a recorded OPCS-4 procedure / intervention code each year in England.

Scope of classifications

SNOMED CT (a clinical terminology)



A structured clinical vocabulary used by clinicians to record information in the EPR at the point of care



Enables the record of granular clinical information including content not within the classifications



Facilitates direct care and the management of care; enables the electronic sharing and transfer of data between systems

ICD-10 and OPCS-4 (statistical classifications)

Used by clinical coders to enter data into the PAS following a completed episode of care

Provides a summary of a hospital consultant episode of care

Supports statistical and epidemiological analysis for population health monitoring, organisation planning and reimbursement in hospital

What does the coded record contain?

Primary Diagnosis

The **main condition** treated or investigated during the relevant episode of healthcare.

Where a **definitive diagnosis** has not been made the main **symptom, abnormal findings, or problem** will be recorded.

Co-morbidities & Complications

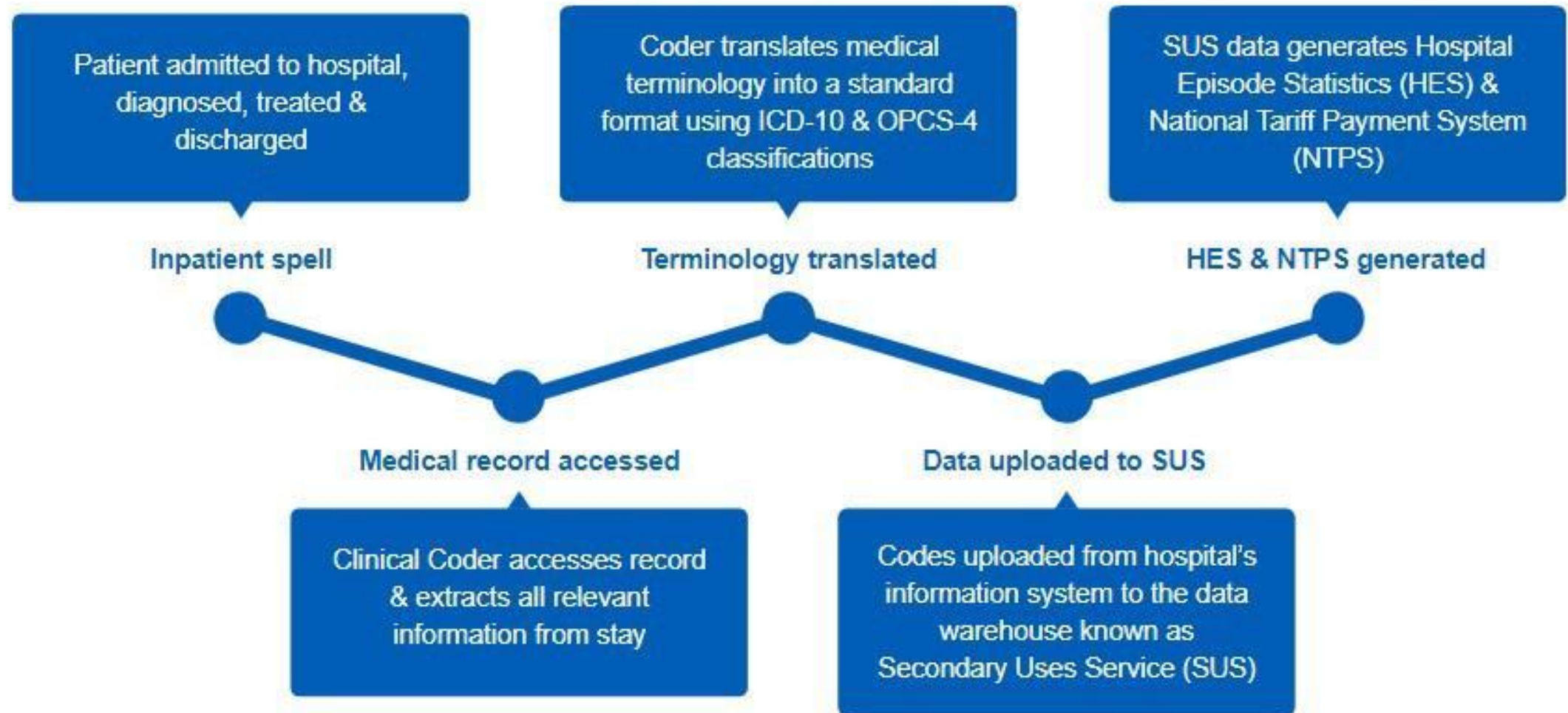
Any condition which co-exists in conjunction with another disease that is **currently being treated** at the time of admission or develops subsequently and **affects the management** of the patient's current episode of care.

NHS Data Model and Dictionary

A **Care Professional Admitted Care Episode** is the period of time during which a **patient** is under the medical responsibility of a **care professional**, such as a consultant, midwife, nurse, or AHP.

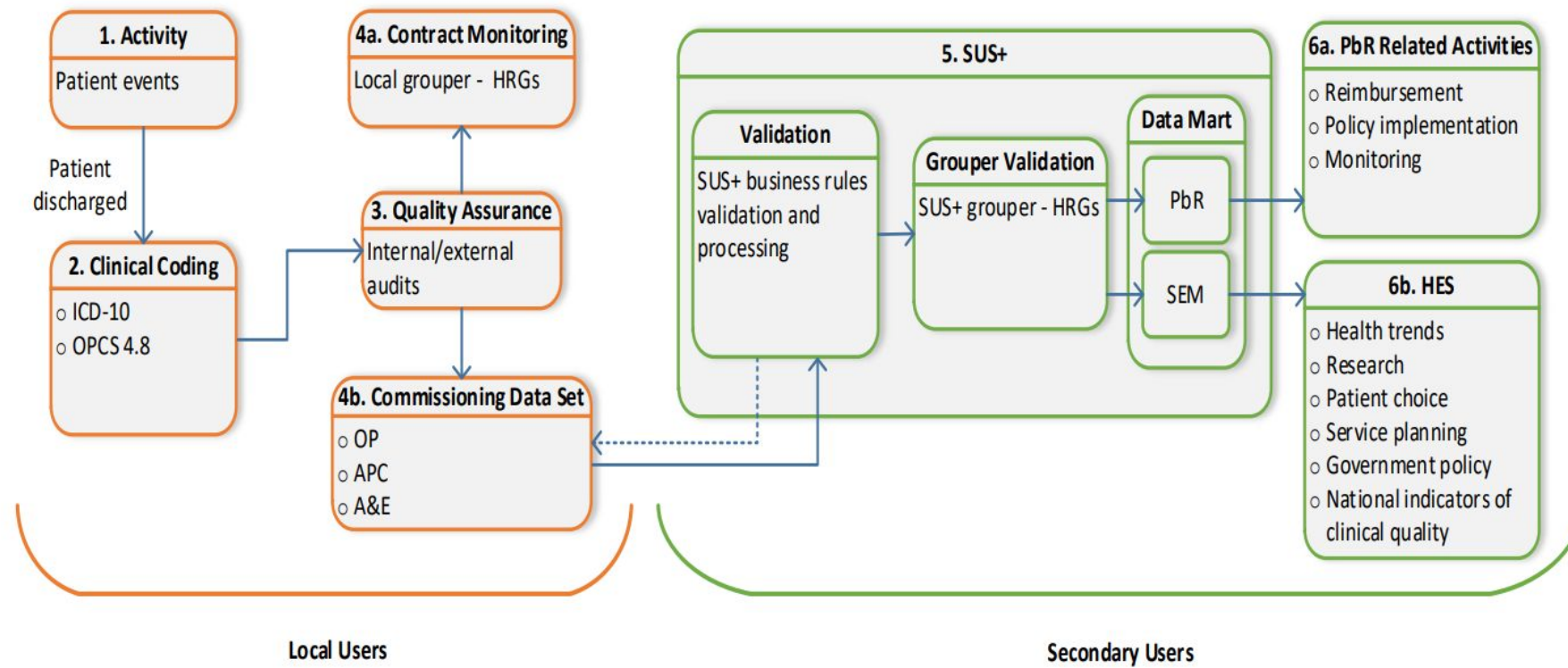
A **Hospital Provider Spell** is the total continuous stay of a **patient** using a hospital bed on premises controlled by a health care provider during which medical care is the responsibility of one or more care professionals.





The clinical coding pathway from admission to secondary user

Figures



Hospital Episode Statistics (HES)

- HES is a data warehouse containing details of all admissions, outpatient appointments and emergency department attendances at NHS hospitals in England
- This data is collected during a patients time at hospital and is submitted to allow hospitals to be paid for the care they deliver. HES data is designed to enable secondary use, that is used for non-clinical purposes, of this administrative data.

The benefits of HES:

Monitor trends and patterns in NHS hospital activity

Assess effective delivery of care

Support local service planning

Provide the basis for national indicators of clinical quality

Reveal health trends over time

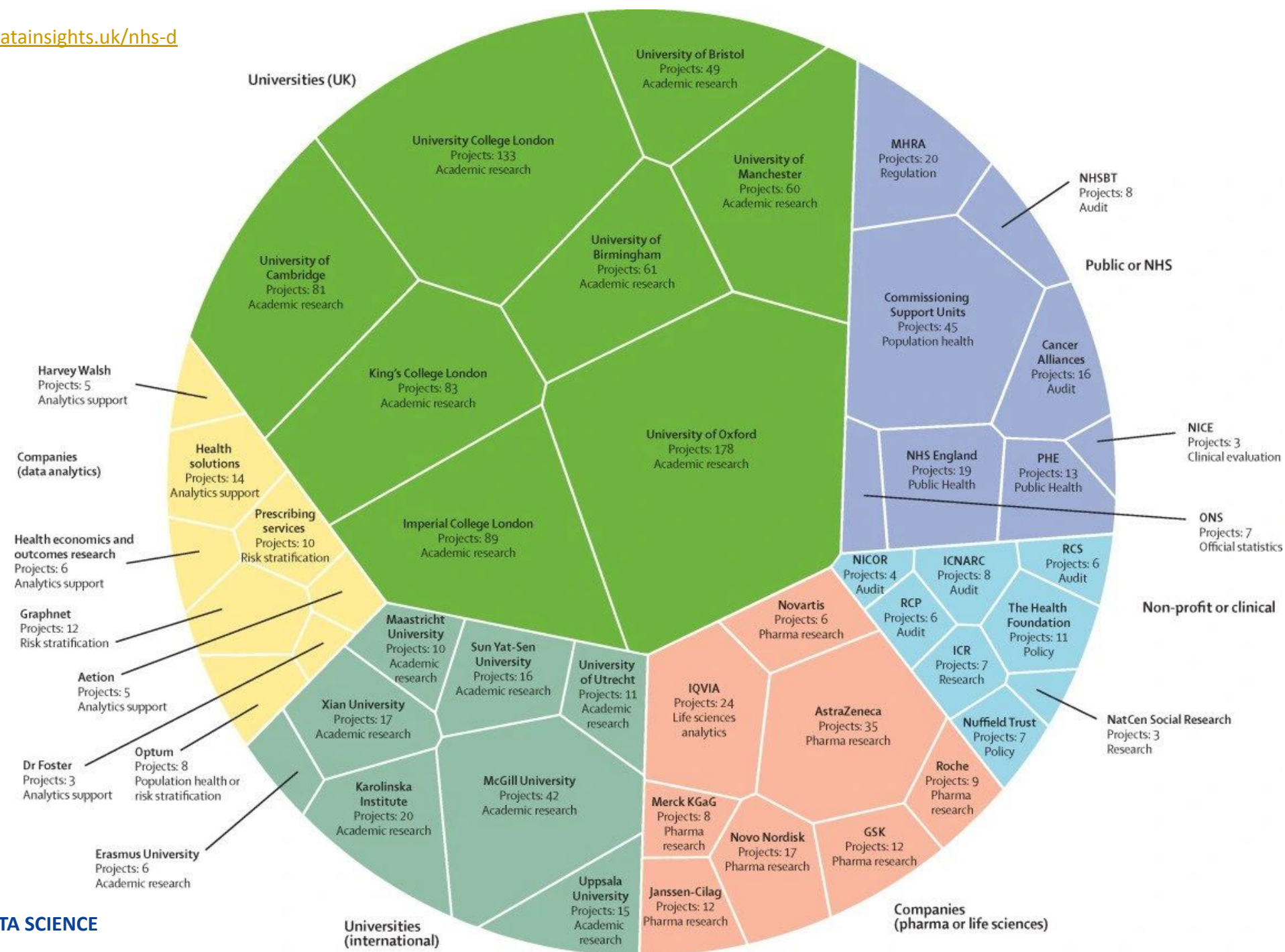
Inform patient choice

Determine fair access to health care

Develop, monitor and evaluate government policy

Support NHS and parliamentary accountability

Source: <https://datainsights.uk/nhs-data-consumers/>



#ItAllStartsWithACode ... or does it?

Date	★	CLINICAL NOTES
3/4/17	→	"T/mittur" - been to "night club" at 6:00 @ car camp 17m @ 12m 15m/16m → amr → wants ceph mixture - smoked 1500 → advised → phol/welise shp/sml 15m 2am

Document: Care plan (DRAFT) View... This document is currently in draft and may need editing and then signing. Delete

Date created: 31/05/2017 Date for review: 30/11/2017 Expiry date: 31/05/2018 Date signed: N/A

User	Date signed	
Mr. System Administrator	Not signed	Remove Sign...

Signatories
- Choose - Add signatory
Sign by uploading scanned signed copy...

Seizures Delete Move up Move down Hide

Mr Smith has severe seizures and in the event of status epilepticus, needs to be given phenobarbitone. His seizures are resistant to phenytoin. Therefore, administer... Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

Care team contact Move up Move down Hide

For 'Helen Durham Neuroinflammatory Unit Cardiff'

This patient is under the care of the Helen Durham Neuro-inflammatory service based from the University Hospital Wales. Our telephone number is 0292074xxx and if you leave a message, one of the multiple sclerosis specialist nurses will phone you back. Alternatively, if you think your patient is having a relapse, then we have a relapse clinic available on Friday mornings. To arrange an appointment please phone 0292074xxx.

For 'Cardiff Parkinson's and movement disorders'

For emergency admissions, please contact the Parkinson's disease specialist nurse on 0292074xxxx or email xxxx@xxxx.wales.nhs.uk. For medical queries, please contact Dr Bijl Mohamed or Dr. Chris Thomas. Out of hours, please contact the neurology specialist registrar or consultant for advice via UHW switchboard.

Clinical Coding
Intervention
Cataract
Diabetes
Sepsis
Infarction
COVID-19
Asthma
Procedure
GIRFT
Excision
Comorbidity
Morbidity
Heart Failure
Transplant
Fracture
Reimbursement
Hypertension
Suture
Osteoarthritis
NHS
Analysis
HSMR
Delivery
Symptoms
Model Hospital
Fibromyalgia
Injury
Pain
CKD
Mortality
Research
Smoker
Payment
Classifications
Depression
Statistical
Complications
Organ Failure
Pneumonia
PLICS
Imaging
Graft
HRG
HES
AKI
Epidemiology
Costing
Sepsis
COPD

The lifecycle of a code begins with a clinician making notes in the patient record. Clinical coders depend on clear, accurate case notes to do their job effectively.

Accuracy is reliant upon...

Clinicians recording clear and complete information on the patient's diagnosis and treatment.

The Coder translating that information into an accurate set of codes.

Lost in translation

ICD-10 code	Code description
R06.0	Dyspnoea
J44.9	Chronic obstructive pulmonary disease
I25.2	Old myocardial infarction
Z95.5	Presence of coronary angioplasty implant and graft
Z95.1	Presence of aortocoronary bypass graft
I50.1	Left ventricular failure
M19.9	Arthrosis, unspecified
E11.9	Type 2 diabetes mellitus – without complications



Ben Lovell
@DrBenLovell

...

Thinking about when abbreviations become a new language.
Do you speak the below NHS-ese?

64F
PC: SOBOE 4/7, °CP
PMH: COPD (FEV1 54%)
NSTEMI '17 - PCI to LAD
CABG '19, LVF(echo '20): EF=45%, OA,T2DM (basal bolus
12/12/12/16)
SH: iADLs, °ETOH
Imp=IECOPD
P=ABG, ECG, CXR, FBC

8:05 pm · 11 Feb 2021 · Twitter for iPhone



Michael Harwood-Jones
@_michaeljones

...

Replying to @DrBenLovell

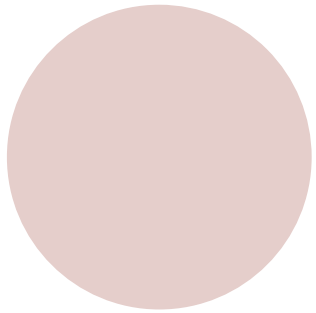
R06.0, J44.9, I25.2, Z95.5, Z95.1, I50.1, M19.9, E11.9.

I translated it into ICD-10-ese for you. 🤗

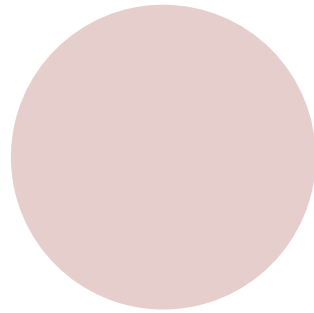
[Translate Tweet](#)

10:13 pm · 11 Feb 2021 · Twitter for iPhone

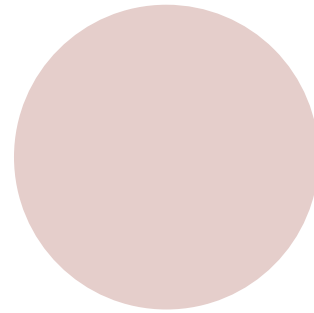
The Four Step Coding Process



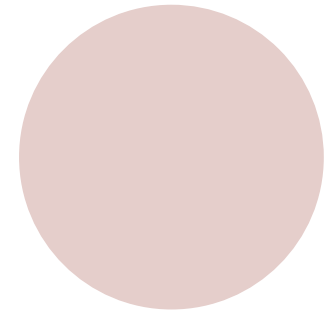
ANALYSE



LOCATE



ASSIGN



VERIFY

Source Document Variation

Variation in the source document used for coding leads to variation in coding

Each source document has drawbacks (even an EPR)

Failure to validate discharge summaries

Inconsistency

Leaving abnormal physiology unsaid

Lack of clarity about whether or not conditions recorded under Past Medical History (PMHx) are still present

Failure to date and sign entries

Failure to record information in the appropriate place

Failure to complete pathway documents



Common challenges

- Factors that have a significant impact on coding include:
 - Illegible writing
 - Idiosyncratic use of abbreviations
 - Failure to validate discharge summaries
 - Inconsistent & contradictory statements
 - Leaving abnormal physiology unsaid
 - Lack of clarity about whether conditions recorded under Past Medical History remain active
 - Failure to date and sign entries
 - Failure to record information in the appropriate place
 - Failure to complete pathway documents.

Difficulties in the clinical coding process

- Difficulties in assigning codes from incomplete records
- Coding process by clinical specialty

Coding delay

- Deadlines being achieved or missed

Hospital resources made available to coding activities

- Dedicated training budgets
- Access to on-site training/support
- Number of staff
- Payment of staff
- Clinical engagement

Clinical Coding Audits

- Dedicated audit resource
- Extent of data quality audit and validation undertaken

Miscoded or misdiagnosed?



“In this study, 52% of patients miscoded as having pneumonia were treated as having CAP by their attending clinicians, although on subsequent review these patients did not fulfil criteria for CAP; these constitute cases of miscoding due to misdiagnosis rather than coder-related error.”

Daniel P, Bewick T, Welham S for the British Thoracic Society, *et al* Adults miscoded and misdiagnosed as having pneumonia: results from the British Thoracic Society pneumonia audit *Thorax* 2017;**72**:376–379.

AUDITING SAFETY AT A NATIONAL LEVEL

Notable cases

Bristol Royal Infirmary Inquiry (Kennedy report, 2001)

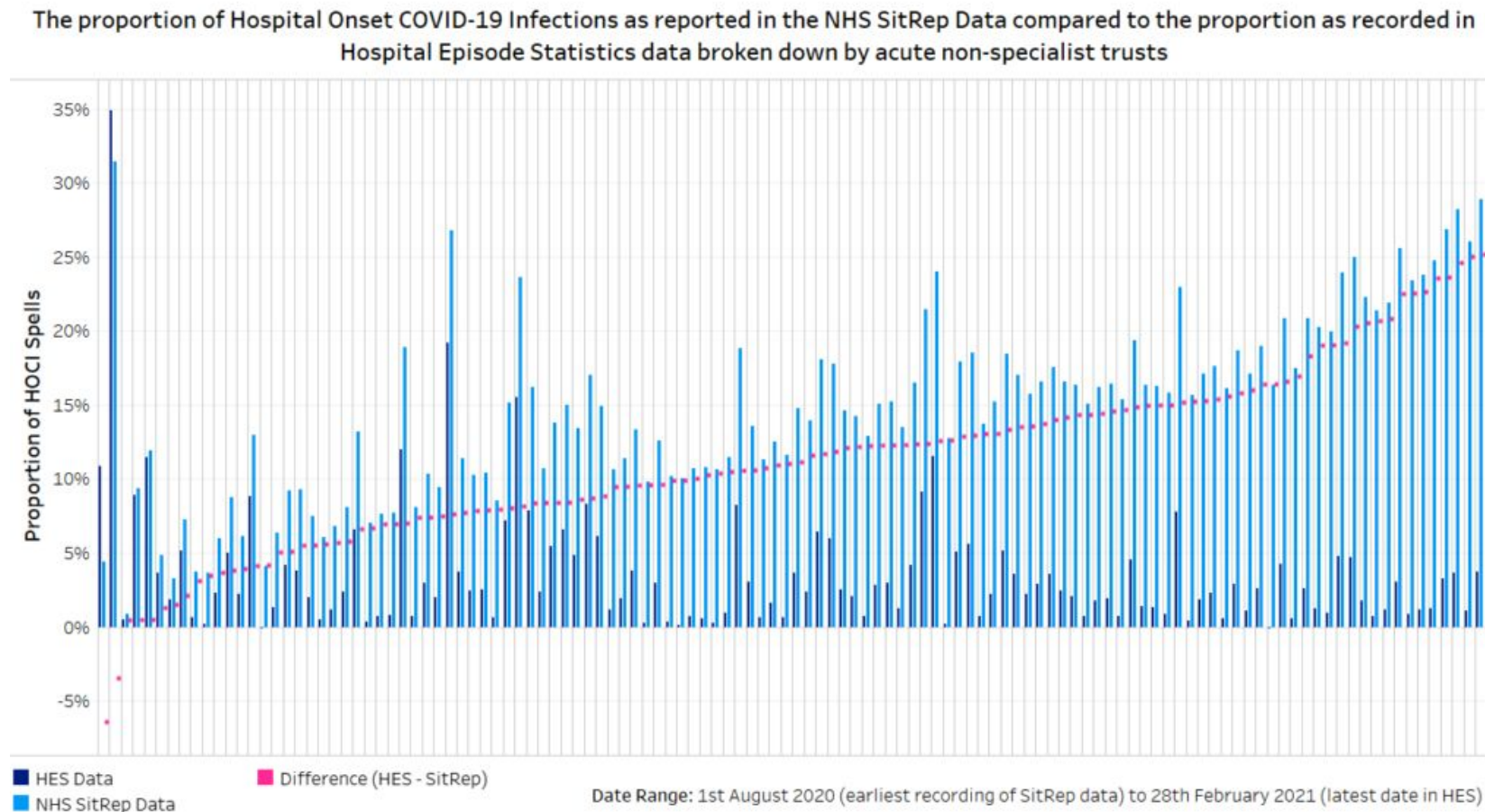
Mid Staffs Public Inquiry (Francis report, 2013)

Demonstrate the benefits of using HES data to identify trends in patient outcomes

Key recommendation is to improve working between clinician and coders

However, years later and this remains an ongoing concern

A study by Telstra Health UK (Dr Foster) into the recording of Hospital Onset Covid-19 Infection (HOI) has found that there is substantial variation in the way numbers are recorded, with most trusts under-reporting the situation.



In conclusion

Clinical coding is an important function within healthcare informatics. Coding datasets have various statistical and clinical uses: a high level of accuracy, completeness and specificity is paramount. Preventable errors can accumulate along the coding pathway and may have significant implications for health care management worldwide.

Errors occurring along the coding pathway can have significant financial and statistical ramifications. Clinicians and coding professionals must work collaboratively to improve the quality of healthcare data flows. Regular engagement between all influential parties along the coding pathway is vital, with frequent reviews of clinical documentation and coding reports a firm foundation for continual improvement. Accurate and reliable healthcare data supports the optimisation of patient care.

Thank you for listening

