JAMES READ MEMORIAL LECTURE

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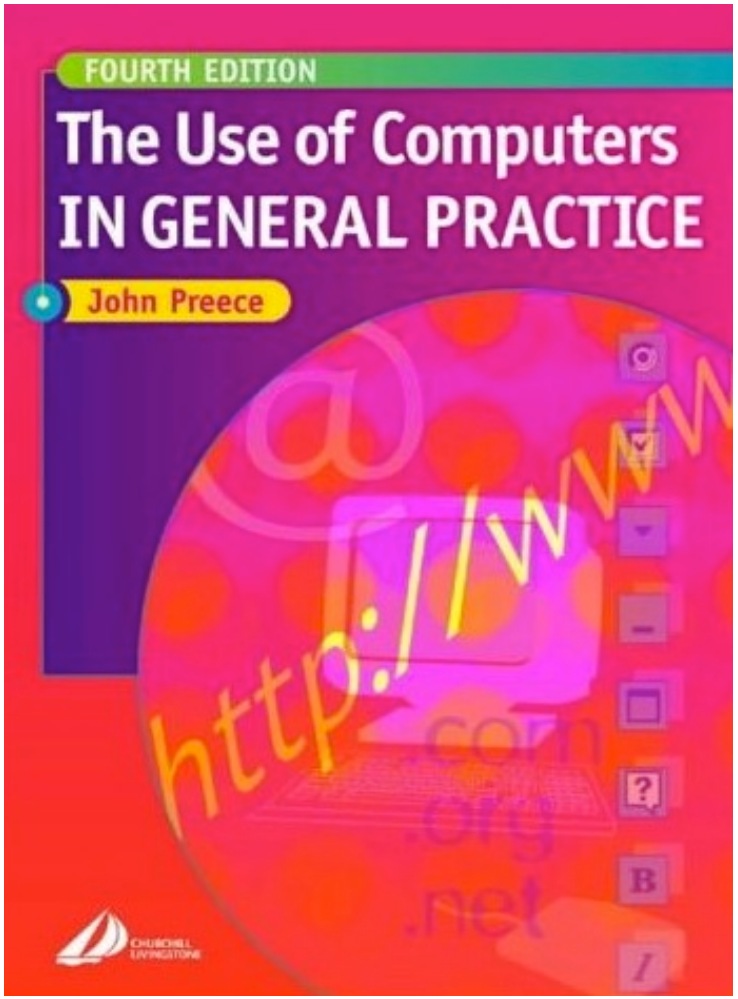
IHTSDO Conference
Sydney
14 October 2011

Standing on the shoulders of giants

- John Preece
- John Perry
- Clifford Kay

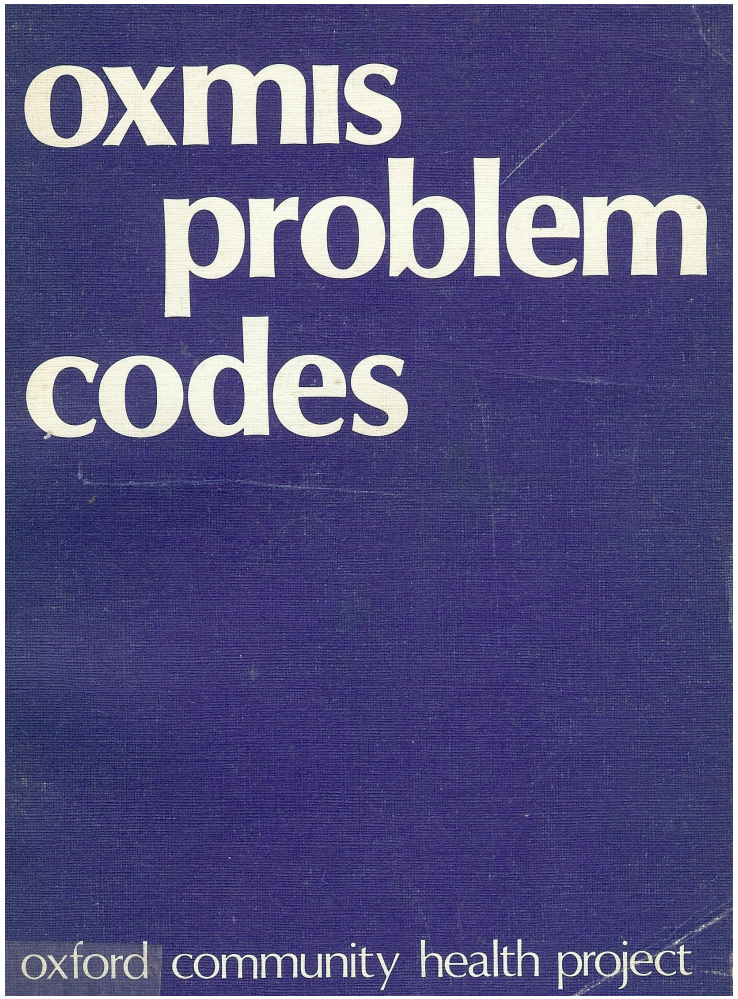
John Preece

- 1968 First use of computer in consulting room
- Led directly to Exeter GP Project – first successful system
- FP10 (Comp) computer prescription form
- Use of Computers in General Practice



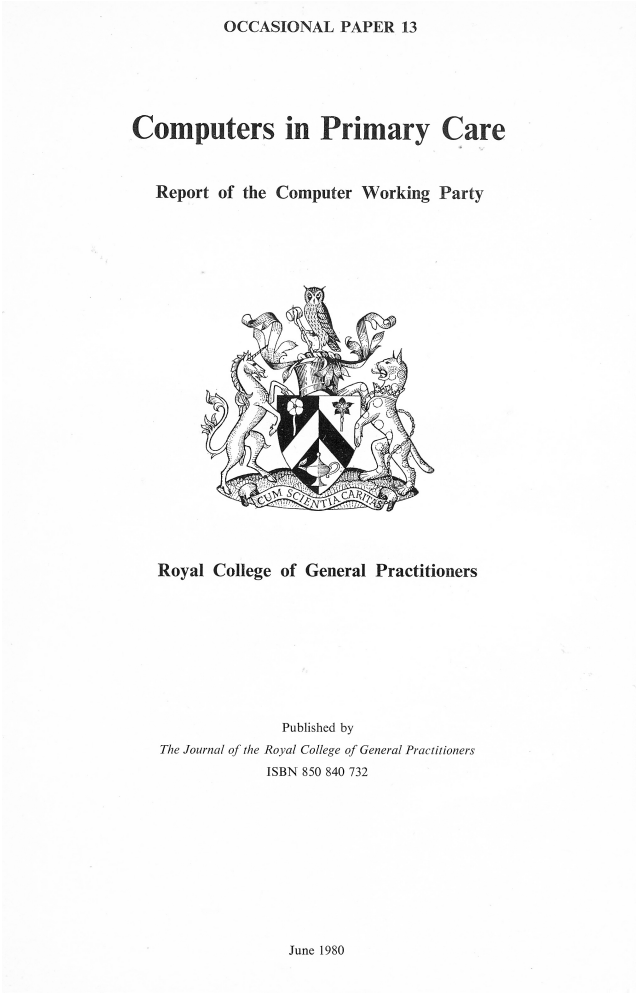
John Perry

- 1972 Oxford Community Health Project
  - Record linkage
  - Age/sex registers
- OXMIS problem codes
- Oxford conferences
- John Perry Prize



Clifford Kay

- RCGP Oral Contraceptives Study, 1968 (ongoing)
- Chair RCGP Computer Working Group 1978
- GP-INFO-80
- Computers in Primary Care Report 1980
- RCGP Morbidity Codes
- First GP appointments system



OCCASIONAL PAPER 13

Computers in Primary Care

Report of the Computer Working Party

Royal College of General Practitioners

Published by
The Journal of the Royal College of General Practitioners
ISBN 850 840 732

June 1980

GP-INFO-80

“GP-INFO-80 greatly exceeded our expectations ... the extraordinary sense of novelty and excitement experienced by those who were fortunate enough to be present - fortunate indeed, because the conference was three times oversubscribed”

Clifford Kay

Abies

- 1980 Abies GP system based on 6809 microcomputer
  - Age/sex register for call and recall
  - Repeat prescribing
  - 96 on/off flags
- 1981 Abies 2 multi-user system (Uniflex)
  - James Read and David Markwell were 3rd and 4th customers
- ABUG Abies User Group 1982
  - Chair: James Read

Micros for GPs

- June 1982 UK Government initiative
  - 150 free GP systems - Abies not included
- Meeting with Minister at ROH
  - DTI Grant
- April 1983 City funding
- Abies 3 consulting room system

Abies 3 Key Decisions

- UNIX or MUMPS
- Chose UNIX and Sculptor 4GL
  - Limited number of files
  - Fixed length fields
- 80 x 24 terminals
  - 4 character codes, 30 character rubrics

```
xxxxxxxxx|xxxxxxxxx|xxxxxxxxx|xxxxxxxxx|xxxxxxxxx|xxxxxxxxx|xxxxxxxxx|xxxxxxxxx|

id dd/mm/yy code T rubric..........................  qualifier........ dd/mm/y2 AU
```

Abies 3 Early Codes

- 4 character mnemonic codes (e.g. DIA1, DIA2)
- Practice-defined
- Printed look-up table
- Stop-gap measure
- Dec 2003 ABUG Meeting
  - Decision to develop standard coding scheme
  - Based on ICD-9
  - James Read volunteered to be editor
  - ETD 3 months

Original Motivation

- Commercial - Sell more systems
- Work straight from the box
- Commoditise GP computing

Abies 4

- 1985
- Abies Medical Dictionary
- James Read – Medical Director
- David Markwell – Technical Director
  - Unsurpassed user interface
    - single touch hierarchy navigation (up, down, sideways)
  - Extremely fast
  - Sub-second searches
    - by type, code, date, user and patient

Comprehensive Coding

James Read, Tim Benson

British Journal of Healthcare Computing, May 1986, pp22-25.

Abstract

The Read Clinical Classification is a super-set of ICD-9, ICPM and the OPCS Classification of Occupations.

New classifications have been developed to cover history and symptoms, examination and signs, prevention and administration.

The Read system covers the whole of medicine at a level of detail suitable for clinical notes on individual patients.

The hierarchical classification is suitable for statistical analysis.

It is designed for use with computers, incorporating automatic encoding and validations, with short fixed-length rubrics for each code and synonym.

Requirements

- Clinicians need to record information in the form, language and detail that is of greatest value in treating individual patients.
- Data should be held within the computer in a form that facilitates
  - statistical analysis of aggregated data,
  - information retrieval
  - communication between computers

Clinical Uses

- Structured medical records and notes
- Call and recall systems for preventive medical care
- Clinical protocols for diagnosis, treatment and follow-up of patients
- Self audit, peer audit and policy planning
- Administration, including accountancy and financial control.

Statistical Applications

- Clinical trials and research
- Health service management and planning
- Health and sickness surveys and epidemiology
- Pharmaceutical and actuarial market research
- International comparisons.

Classification and Nomenclature

- The Read Clinical Classification is a hierarchical statistical classification with the features of nomenclature. It has four levels of detail.
- When thought of as a nomenclature, the system has,
  - 27 first-level categories
  - 273 at the second level
  - 2770 at the third level
  - 24,948 terms in total

Hierarchical Codes

- Position-dependent hierarchy
- Alphanumeric
- Initially A-Z, 0-9
  - 36^4 = 1,679,616
- Later added a-z
  - 60^4 = 12,960,000

```
B...  Neoplasm
B1..  Malignant neoplasm
B13.  Carcinoma stomach
B136  Ca. greater curvature-stomach
```

Automated Coding

- Entry of first few letters of term (e.g. “rube”
- Display list
- Select by line number

```
0  H/O: rubella              1418
1  Rubella                   A47.
2  Rubella + pregnancy       K2A3
3  Rubella-congenital        O25l
4  Rubella health educ.      6794
5  Rubella antibody titre    439.
6  Rubella contact           65P5
7  Rubella damage-preg.      K364
8  Rubella screen            62J.
9  Rubella vaccination       65P.
```

Diseases (1)

- Based on ICD-9
  - Chapters
  - Sections
  - Subsections
  - Codes
- Only terms found in UK General Practice

G...	Circulatory system diseases
G7..	Cerebrovascular disease
G71.	Cerebral haemorrhage
G711	Subarachnoid haemorrhage
G712	Intracerebral haemorrhage
G713	Extradural haemorrhage
G714	Subdural haemorrhage

- Mid-86 lists started at 0

Diseases (2)

- 17 first level codes
- 115 two-digit codes
- 728 three-digit codes
- 2598 four-digit codes
- 2575 synonyms

```
Diseases
A Infectious disease
B Neoplasms
C Endocrine/Nutrit. diseases
D Blood diseases
E Mental disorders
F Nervous system diseases
G Circulatory system diseases
H Respiratory system diseases
I Digestive system diseases
J Genitourinary diseases
K Obstetric disorders
L Dermatological diseases
M Musculoskeletal disorders
N Congenital anomalies
O Perinatal conditions
P Injury and poisoning
Q Causes of injury and
poisoning
```

Lab Procedures

- Procedures originally based on ICPM
- Extended to include results
  - Probably a mistake!

```
4...   Laboratory procedures
46..   Urine examination
466.   Urine test for glucose
4661   Urine glucose test not done
4662   Urine glucose test negative
4663   Urine glucose test=trace
4664   Urine glucose test=+
4665   Urine glucose test=++
4666   Urine glucose test=+++
4667   Urine glucose test=++++
```

Surgical Procedures

- One of the least satisfactory sections
- Long names
- Only 3 hierarchy levels

```
7...   Operative procedures
7F..   Breast operations
7Fl.   Mastectomy
7F11   Breast lump local excision
7FI2   Partial mastectomy
7Fl3   Simple mastectomy
7F14   Extended simple mastectomy
7Fl5   Radical mastectomy
7Fl6   Extended radical mastectomy
7F17   Subcut mastect. + prosth
       implant
7F18   Subcutaneous mastectomy
```

History/symptoms

- Presenting symptoms
- Family, social, past medical history
- Improved on ICD-9 Chapter 16 (Symptoms signs and ill-defined conditions)
- Defined terms
  - e.g heavy smoker
  - Definitions not implemented in software

```
1...    History/symptom
13..    Social/personal history
137.    Tobacco consumption
1371    Complete non-smoker
1372    Trivial smoker
1373    Light smoker
1374    Moderate smoker
1375    Heavy smoker
1376    Very heavy smoker
1377    Ex-smoker
1378    Tobacco consumption unknown
```

Examination/Signs (1)

- Classified from scratch
- Based on body systems

```
2...  Examination/Signs
2B..  Central nervous system exam.
2BB.  O/E - retinal inspection
2BB1  O/E - retina normal
2BB2  O/E - retinal vessel narrowing
2BB3  O/E - retinal A-V nipping
2BB4  O/E - retinal microaneurisms
2BB5  O/E - retinal haemorrhages
2BB6  O/E - retinal exudates
2BB7  O/E - retinal vascular prolif.
2BB8  O/E - vitreous haemorrhages
```

Examination/Signs (2)

- 19 second level
- 282 third level
- 1480 fourth level
- 890 synonyms

```
2 Examination/signs
21 Depth of examination
22 General examination of pat
23 Exam. of respiratory system
24 Exam. of cardiovascular system
25 Exam. of digestive system
26 Exam. of genitourinary system
27 Obstetric examination
28 Nervous system general examn.
29 Motor/sensory systems exam.
2A Examination of reflexes
2B Central nervous system exam.
2C Haemopoietic system exam.
2D Ear, nose + throat exam.
2E Examination of fever
2F Examination of skin
2G Examination of the extremities
2H Orthopaedic examination
2I General sign qualifications
```

Prevention (1)

- Classified from scratch
- Very important to James
- Designed around protocols

```
Cervical neoplasia screening
Cx Screen - not offered
Cx Screen - offered
Cx Screen - not wanted
Cx Screen - wanted
Cx Screen - not needed
Cx Screen - up to date
Cx Screen - not attended
Cx Screen - not reached
Cx Screen - done
Cx Screen - no result yet
Cx Screen - normal
Cx Screen - abnormal
Cx Screen + fee claimed
```

Prevention (2)

- Contraception
- Pregnancy care and birth details
- Child healthcare
- Vaccination and immunization
- Chronic disease monitoring
- Health education and counselling
- Screening, etc

Respiratory disease monitoring

Initial respiratory assessment

Follow-up resp. assessment

Oral steroids last used

Intermittent drugs used more

Increasing exercise wheeze

Inhaler technique shown

Inhaler technique observed

Home nebulizer

Home oxygen concentrator

Resp. drugs side effects

Resp. treatment changed

Administration (1)

- Patient registration
- Encounters
- Claims
- Staff administration
- Practice finance
- Audit reporting

```
9...   Administration
93..   Contraception administration
931.   FP1001 claim status
9311   FPl001 claim signed
9312   FP1001 claim sent to FPC
9313   FP1001 claim up to date
9314   FP100l claim due
9315   FP1001 claim due next visit
9316   FP1001 claim cancelled
```

Administration (2)

9 Administrative procedures
91 Patient registration
92 Patient de-registration
93 Patient record types
94 Death administration
95 Maternity services admin.
96 Contraceptive services admin.
97 Immunisation services admin.
98 Other items of service admin.
99 Ancillary staff administration
9A Rent and rates payments
9B Supply of drugs payments
9C Training/seniority/leave adm
9D Certificates - administration
9E Medical examinations/reports
9F Child examn./reports/meetings
9G Notifications
9H Mental health administration
9I Practice supplies admin.
9J Drug stock control admin.
9K Forms - misc.
9L Accounting admin
9M Audit administration
9N Patient encounter admin data
9O Prevention/screening admin.
9P Clinical trial administration
9Q Research administration
9R Patient misc. admin. data

Read Codes V1 May 1986

	Coded Terms	Synonyms	Total Terms	%
Diseases	2,598	2,575	5,173	22%
Procedures	6,023	2,483	8,506	36%
Occupations	1,749	936	2,685	11%
History	1,299	890	2,189	9%
Examination	1,480	890	2,370	10%
Prevention	1,279	460	1,739	7%
Administration	696	416	1,112	5%
	15,124	8,650	23,774	

Moscow June 1986

Change Required

- Recognised we had something of real value
- Increasingly expensive to support
- Others wanted to use it
  - EMIS was first customer
- Had changed name to eponymous Read Codes in late 1985

CAMS

- Computer Aided Medical Systems Ltd
  - Owned by James Read
  - Exclusive rights to market codes
  - 50% royalty paid to Abies
  - Including on Abies systems
- Conflicts of interest
  - Customer and chair of user group
  - Director and shareholder
  - Supplier
  - Commercial partner

Free Computer Scheme

- May 1987 AAH funded Meditel to give computers to GPs in return for pharma data
- Abies licensed GP software to AAH Meditel
- Agreed to develop POMR based Abies 5
  - I had visited Larry Weed in 1977 and seem PROMIS
  - David Markwell had been trained at Guys using POMR
- Extremely ambitious
  - Complex technical triumph
  - Required GPs to link medication to problem
  - Less slick to use than Abies 4

Data Quality

- Refer to Physio
  - Enter “physio”
  - Select “Physiotherapist” (occupation)
- Tired all the time
  - Enter “tatt”
  - Select “Tattoo” backspace twice = “tatt”
  - Found in study of ADRs
- Entry of excluded or differential diagnoses as problems
  - Ca lung ?
  - Ca lung excluded
- This should have been addressed in software.

Every specialty is different

- Abies sought to sell clinical systems to hospitals
  - e.g. Wessex Clinical Project (Martin Severs)
- Every specialty works in a different way
  - especially specialised administration codes
- GP world view was built into the codes
  - Model of use ≠ Model of meaning
- Unfortunately we did not understand subsumption testing using transative closure tables

More is Less

- Myth that hospital clinicians would code to ICD-9 and OPCS-4 (surgical procedures) if they had better software and more detail
- Read Version 2
  - Expansion to 5-bytes
  - Many more rarely used terms
  - Did not improve things
- James Read was rather proud of his combinatorial explosions

Joint Computer Group Report

- Mid 1987 DH commission BMA GMSC/RCGP JCG to evaluate GP clinical coding systems
  - ICD-9
  - ICHPPC-2
  - ICPC
  - OXMIS
  - Read Clinical Classification
  - RCGP classification
  - SNOMED
  - Update morbidity dictionary

JCG Requirements List

- Comprehensive in breadth and depth
- Appropriate for GP usage
- Provision for central maintenance
- Amenable to statistical analysis
- Compatibility with ICD-9
- A hierarchical structure (second level)
- Accessibility of coding structure to the user (third level)

JCG Report

- August 1988
- Recommended Read Codes, with qualifications
  - Longer rubrics needed for operations
  - Align to national coding schemes (ICD-9, OPCS-4, PPA Drug Index, SOC (standard occupational classification))
  - A fully resourced UK standing professional committee should be established to maintain and control the classification
  - Guidance should be provided on usage

Purchase of the Read Codes

- November 1988 Commenced negotiations with James Read
- April 1989 James Read bought Abies IPR for £150,000
  - Abies involvement ceased almost immediately
- December 1989 DH offered £650,000 but then withdrew offer
- March 1990 DH paid James Read £1.25 million for IPR.
- Establish NHS Centre for Coding and Classification. with James as Director
- CAMS has exclusive distribution rights (owned by James)

- Source: The Purchase of the Read Codes and the Management of the NHS Centre for Coding and Classification Select Committee On Public Accounts Sixty-Second Report 1998 www.parliament.uk

Why Read Codes worked for GPs

- They were designed for use by GPs in their surgery
  - Model of use = Model of Meaning (Alan Rector)
- Comprehensive enough
- Easy to understand and consistent – what you see is what you get
- Modest evolutionary step (built on ICD-9)
- No paper version, allowed multiple updates, changes and extensions
- Quite easy to implement
- A single named responsible editor

A Team Effort

- James Read had vision and stamina to make it comprehensive
- Other Abies users contributed a lot (unacknowledged)
  - Roger Weeks developed most of the drug list and drug interactions
- David Markwell made the software work beautifully
- Tim Benson kept saying “Keep It Simple Stupid”

Inherent Problems

- Position-dependent hierarchy
  - Add new entries in the right place
  - Add more detail
  - Multiple parentage
  - Combinatorial explosions
- All to be solved by Read Codes Version 3 (aka CTV3)

A Short Digression

- What does this tell us about SNOMED CT today
- A short survey done in 2010.
- Return to say a few words about James Read the man.

Who Needs to Know What about SNOMED CT

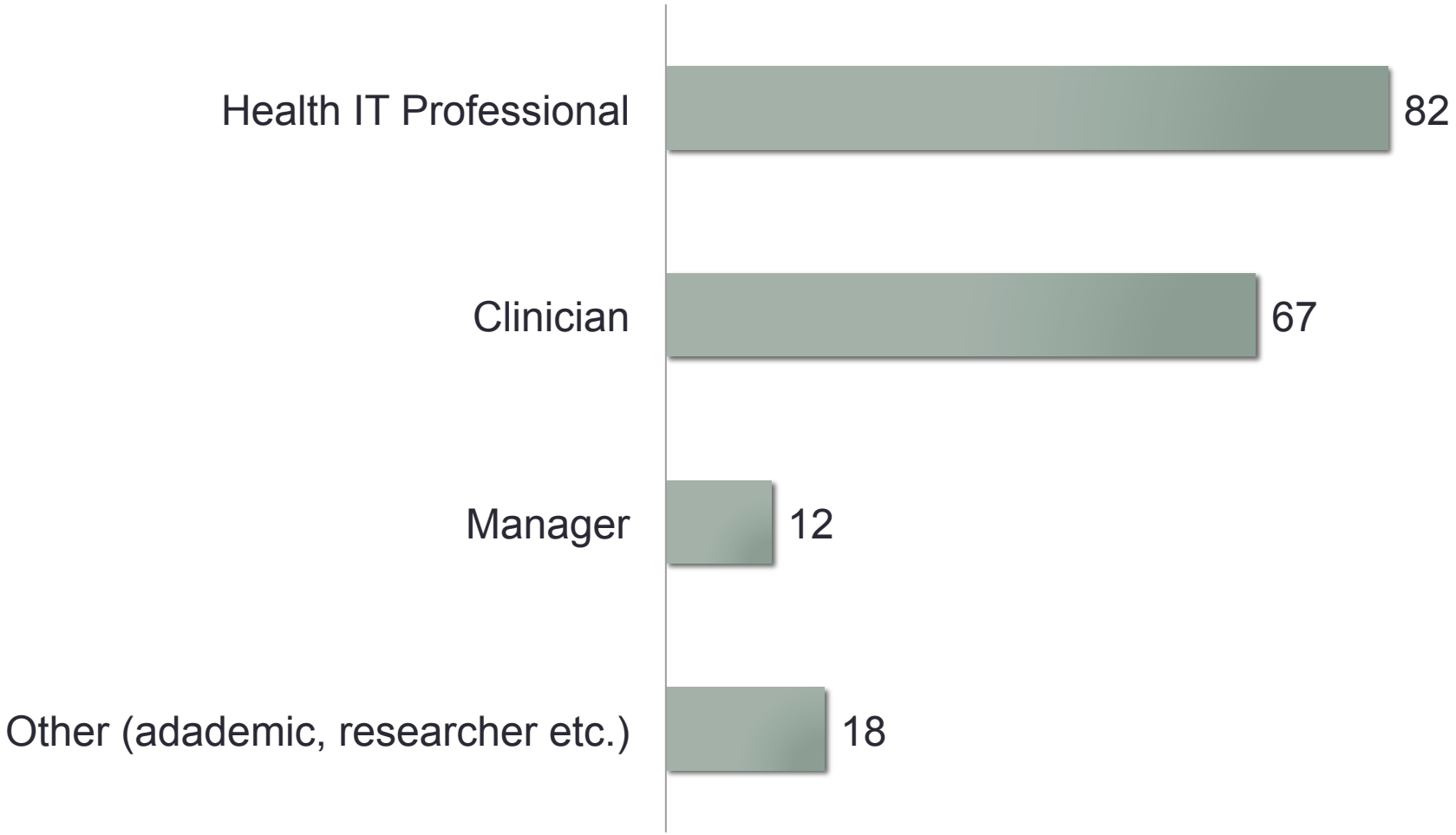
- Study funded by NHS Connecting for Health
- With Dr Ed Conley, Sintero Project, Cardiff University
- How much do people know?
- What do they think they need to know?
- Are the education and training needs being met?

- Full report will be published in European Journal of Biomedical Informatics December 2011.

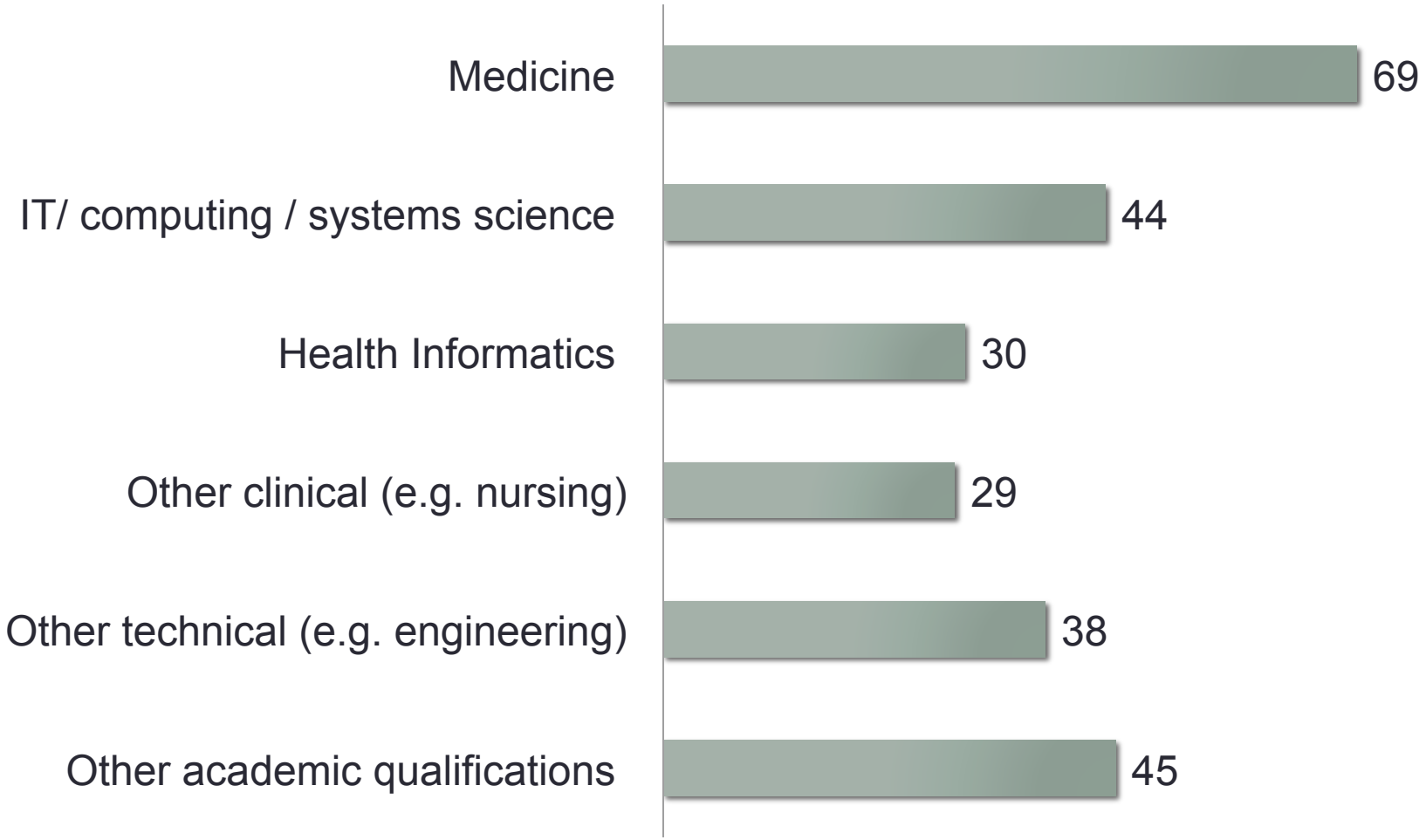
Method

- On-line survey
- Questions where we could not predict the answer
- About 1000 invitations, including many SNOMED experts
  - some in this room
- Single invitation only, no reminders
- 177 responses
- Missing values are excluded from results

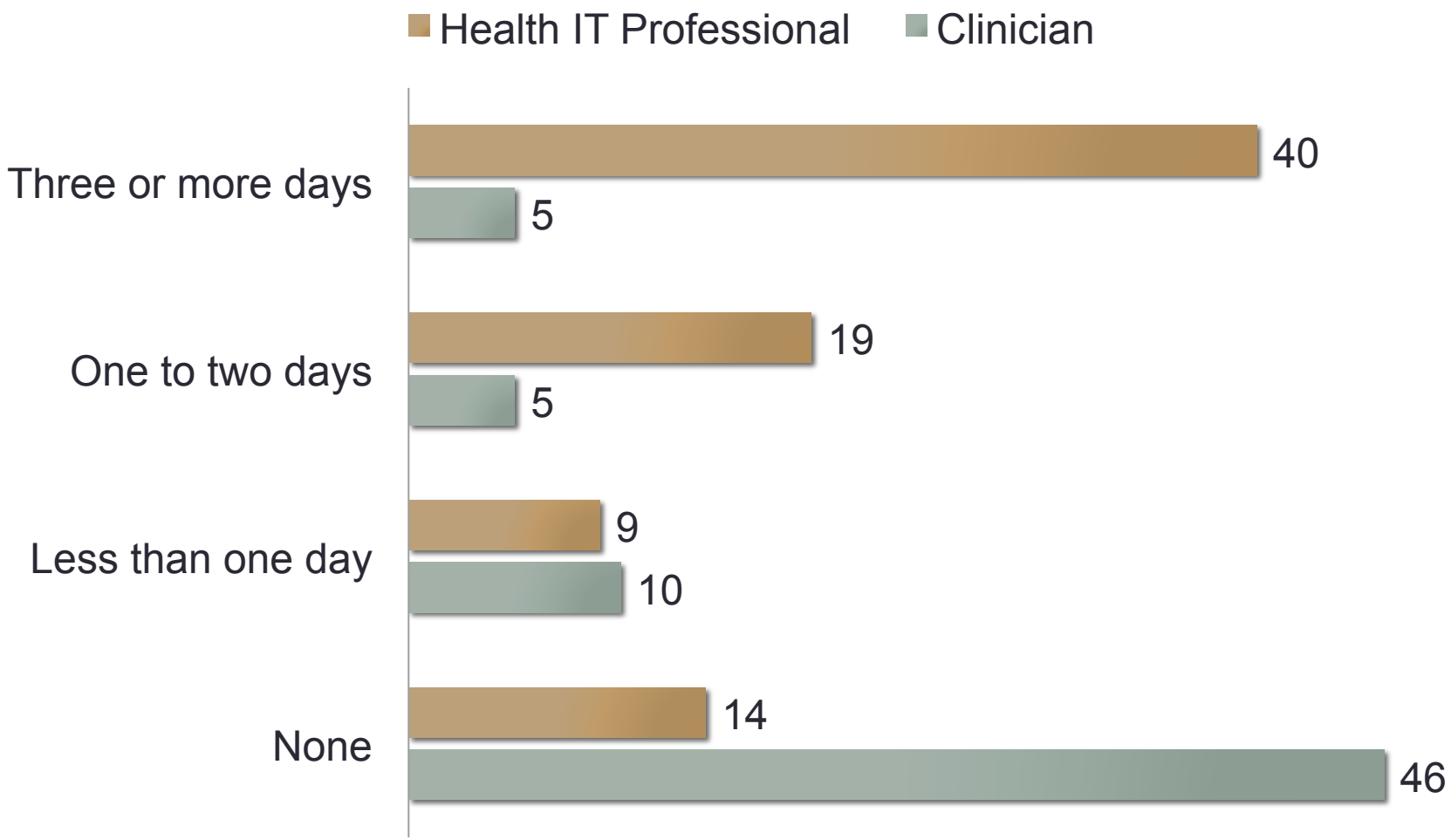
Job roles


Health IT Professional
82
Clinician
67
Manager
12
Other (adademic, researcher etc.)
18

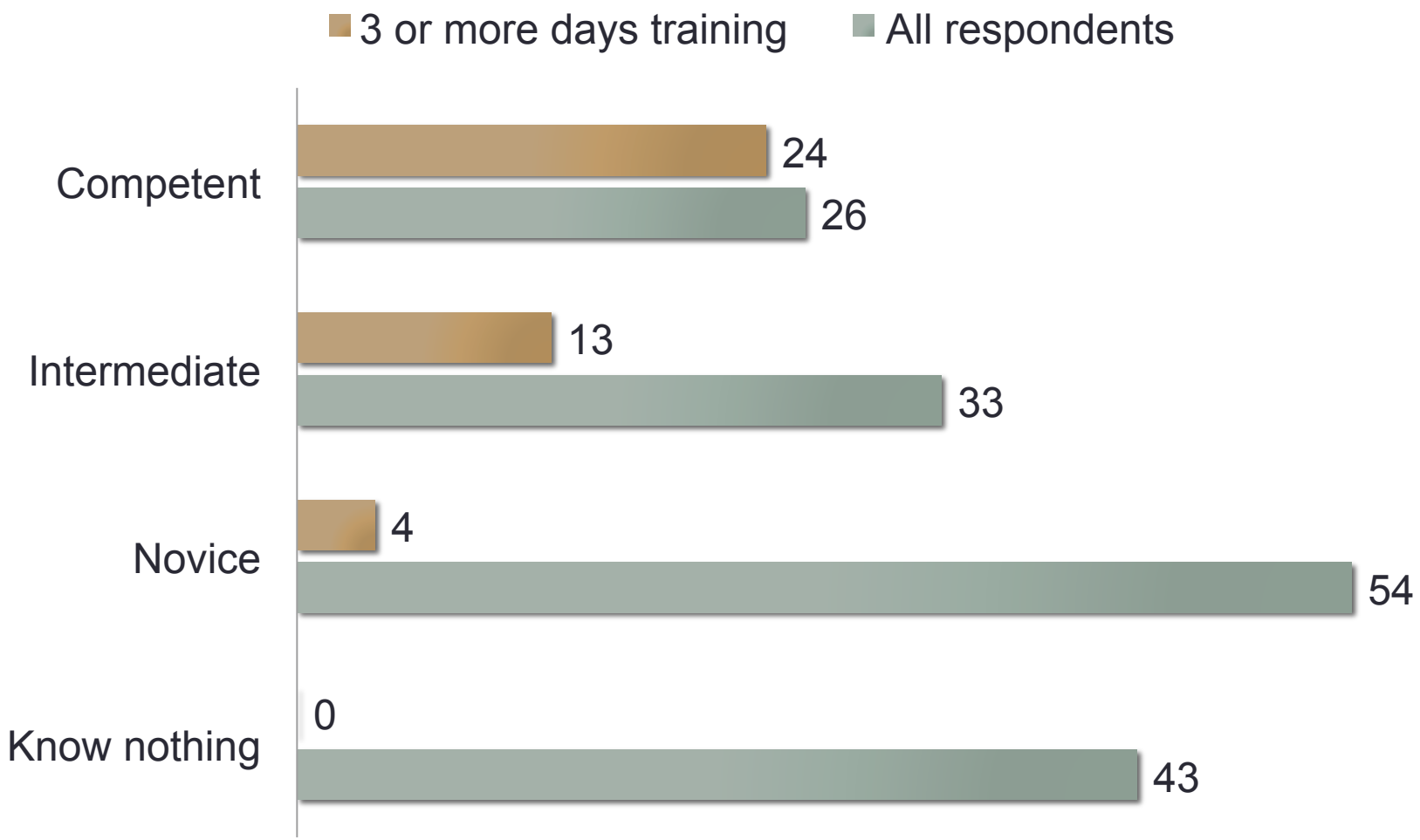
Academic qualifications (50% had >=2)



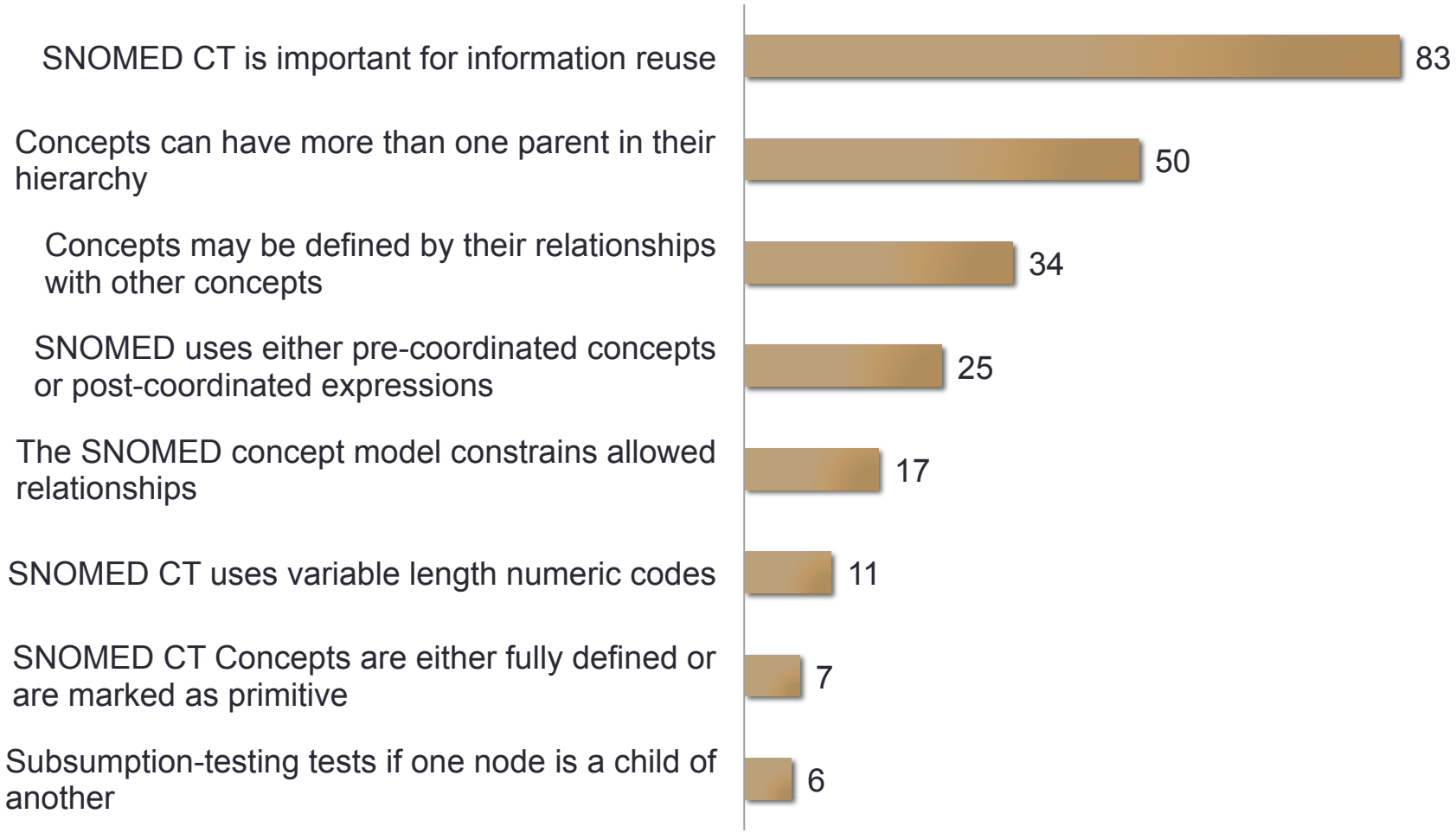
Training in SNOMED CT



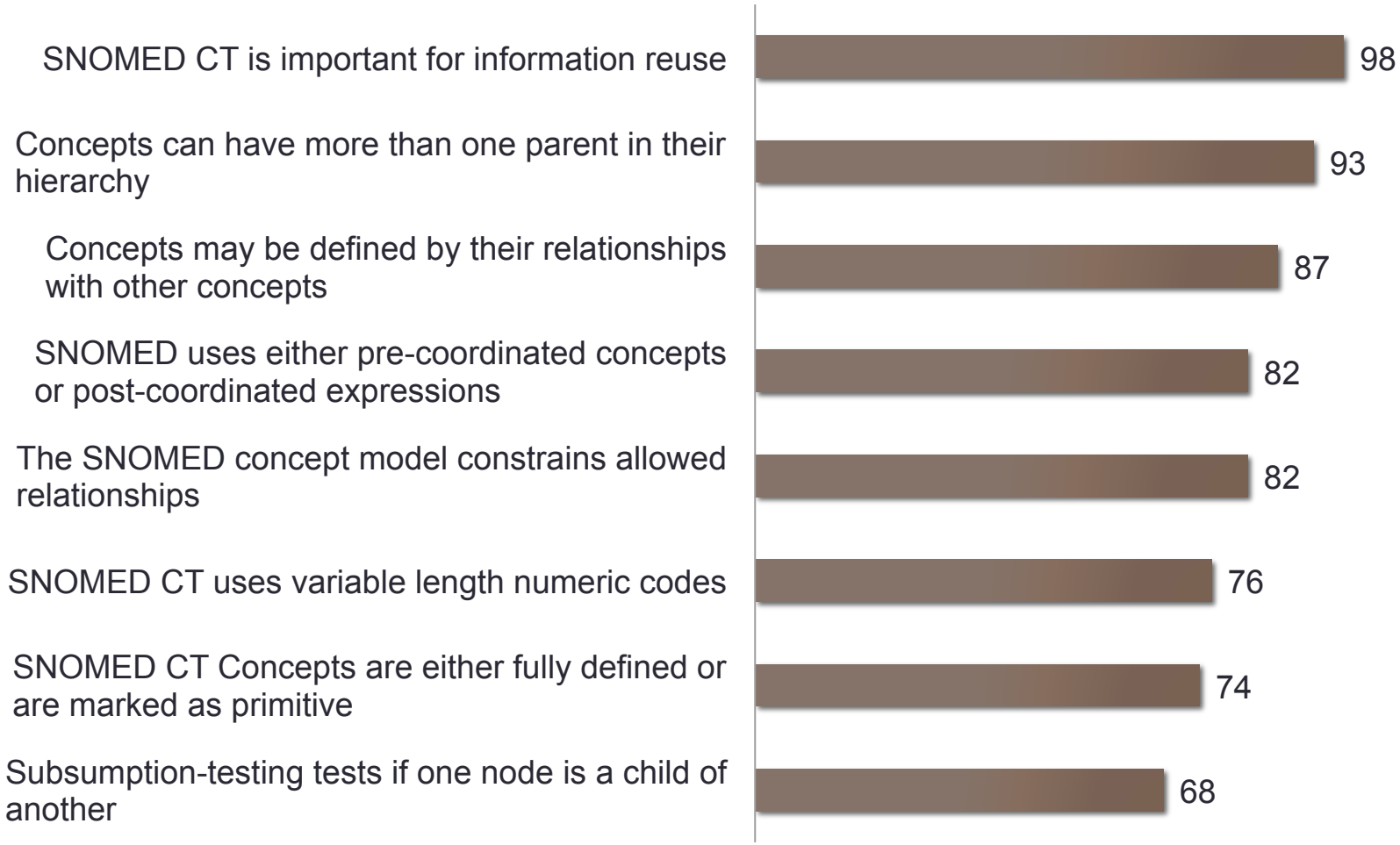
Competence and training



Clinicians need to know

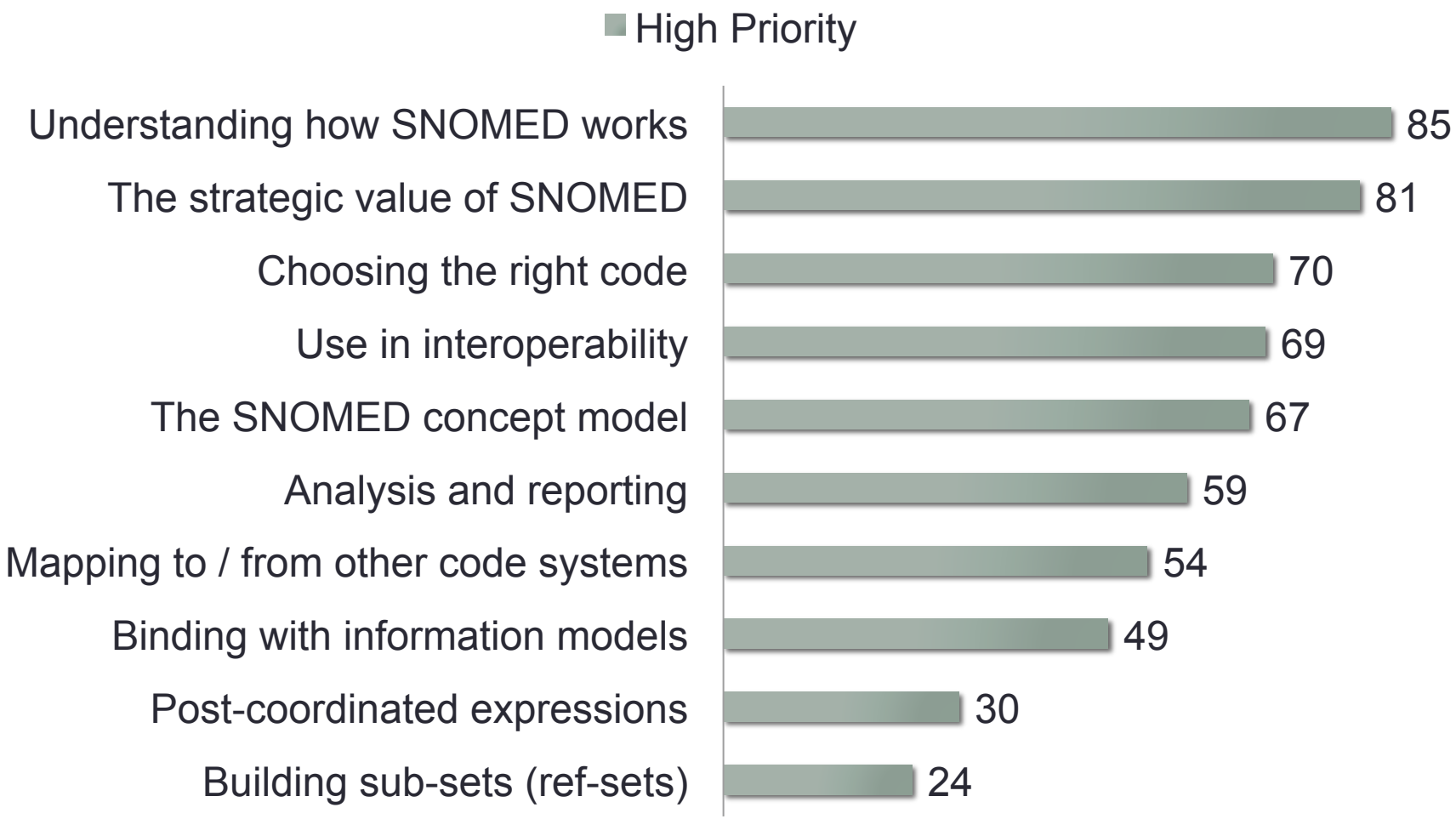


IT professionals should be able to explain



Barriers to adoption

Educational curriculum



Suggestions

- Clinician curriculum
  - Integrate clinical terminology
- Health IT curriculum
  - Teach decision logic
- Lower access barriers
  - Make all SNOMED accessible in web browser
- Universities role
  - Teach the teachers
- Research and evaluation
  - Promote research and publication
  - No papers on learning SNOMED

Recommendations

- The education deficit is real
- It mainly affects health IT professionals, not clinicians
- Terminology is neglected in HI curricula recommendations

- Teach description logic (and SNOMED) right at the start of undergraduate clinical courses
- Shift learning medicine
  - from learning a foreign language
  - to learning a logical framework

Why Read Codes matter today

- Direct ancestor of SNOMED CT
- Used by all GPs in UK and NZ for 15 years
- Without all GPs using Read Codes, GP Commissioning would be unimaginable
  - Health and Social Care Bill 2011

James: the man

- Completely honest
- Oblivious to conflicts of interest
- Very private, very determined, not very articulate
- Obsessive, a perfectionist in everything he did
  - Singer, runner, wine connoisseur

James D Read FRCGP OBE

"The reasonable man adapts himself to the world. The unreasonable one persists in trying to adapt the world to himself. Therefore all progress in the world depends on the unreasonable man"

- George Bernard Shaw

The Fence or the Ambulance

"Twas a dangerous cliff, as they freely confessed,
Though to walk near its crest was so pleasant;
but over its terrible edge there had slipped
A duke and full many a peasant.
So the people said something would have to be done,
But their projects did not at all tally;
Some said, "Put a fence around the edge of the cliff,"
Some, "An ambulance down in the valley."

But the cry for the ambulance carried the day,
For it spread through the neighbouring city;
A fence may be useful or not, it is true,
But each heart became brimful of pity
For those who slipped over that dangerous cliff;
And the dwellers in highway and alley
Gave pound or gave pence, not to put up a fence,
But an ambulance down in the valley.

"For the cliff is all right, if you're careful," They said,
"And, if folks even slip and are dropping,
It isn't the slipping that hurts them so much,
As the shock down below when they're stopping."
So day after day, as these mishaps occurred,
Quick forth would these rescuers sally
To pick up the victims who fell off the cliff,
With their ambulance down in the valley.

Then an old sage remarked; "its a marvel to me
That people give far more attention
To repairing results than to stopping the cause,
When they'd much better aim at prevention.
Let us stop at its source all this mischief." cried he,
"Come neighbours and friends, let us rally;
If the cliff we will fence we might almost dispense
With the ambulance down in the valley."

"Oh, he's a fanatic," The others rejoined,
"Dispense with the ambulance? Never!
He'd dispense with all charities, too, if he could;
No! No! We'll support them forever.
Aren't we picking up folks just as fast as they fall?
And shall this man dictate to us? Shall he?
Why should people of sense stop to put up a fence,
While the ambulance works in the valley?"

But a sensible few, who are practical too,
Will not bear with such nonsense much longer;
They believe that prevention is better than cure,
And their party will soon be the stronger.
Encourage them then, with your purse, voice, and pen,
And while other philanthropists dally,
They will scorn all pretence and put up a stout fence
On the cliff that hangs over the valley.

Joseph Malins (1844-1926)