

NSW Health Implementation of SNOMED CT in ED systems

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Setting the scene

- National ED Termset for Presenting Problem and Diagnosis
- NEHTA announces SNOMED CT for the Electronic Health Record
- FirstNet module for the NSW EMR
 - Rapid development / implementation
 - Intensive workshops and quick turnarounds

Initial position

Recording a diagnosis

ED across NSW Health were reporting ICD10/ICD9 and local values

No “coders” available in ED

SNOMED CT – an opportunity

No knowledge of coding needed at the point of capture

Was provided as part of the Cerner EMR package

Component for implementation of Electronic Discharge Summaries

SNOMED CT - adopted for capturing patient diagnosis in an ED

No review of SNOMED CT, knowledge of SNOMED CT in the development team lacking, short timeframes

THIS IS A STORY OF A JOURNEY



Initially

Diagnosis Search [X]

*Search: Contains [v] Within: [v]

Terminology: [...] Terminology Axis: [...]

View Synonym Concept Family Multi Axial Cross Mapping

Term /	Code	Terminology	Terminology...	
Acknowledging anxiety	338442012	SNOMED CT	Procedure	
Adjustment disorder with anxious mood	78975018	SNOMED CT	Finding	
Adjustment reaction with anxious mood	1230451012	SNOMED CT	Finding	
Alcohol-induced anxiety disorder	58300018	SNOMED CT	Finding	
Alleviating anxiety	339505012	SNOMED CT	Procedure	
Amphetamine-induced anxiety disorder	136578011	SNOMED CT	Finding	
AMT - Anxiety management training	342664015	SNOMED CT	Procedure	
Anticipatory anxiety	59111011	SNOMED CT	Finding	
Anticipatory anxiety, mild	19825011	SNOMED CT	Finding	
Anticipatory anxiety, moderate	61145016	SNOMED CT	Finding	
Anticipatory anxiety, severe	10782014	SNOMED CT	Finding	
Anxiety	81133019	SNOMED CT	Finding	
Anxiety about altered body image	339069013	SNOMED CT	Finding	
Anxiety about appearing ridiculous	414556012	SNOMED CT	Finding	
Anxiety about becoming fat	414548014	SNOMED CT	Finding	
Anxiety about behaviour or performance	370017015	SNOMED CT	Finding	
Anxiety about blushing	508408011	SNOMED CT	Finding	
Anxiety about body function or health	369994015	SNOMED CT	Finding	
Anxiety about choking	414537019	SNOMED CT	Finding	

FirstNet + SNOMED CT

Starting position observations:

- Clinicians access to SNOMED CT unrestricted
 - any term in SNOMED CT:
 - Terms: ~1,000,000; Concepts: ~ 390,000 +
 - including non-human, including organisms, path tests,
- Steps taken:
 - Configuration of the user interface
 - Default search operation “Begins with”
 - Supports a “favourites” list that can be tailored to site/ clinician
 - Favourites can only be set up and maintained by manual entry
 - Requires <enter> to commence search
- Training of users
 - in SNOMED CT
 - Search function and usability
 - Setting favourites

Getting to grips

FirstNet live

Issues raised – a call for help / advice on SNOMED CT
Diagnosis data is rubbish! Inability to analyse it

Analysis of the situation

Understanding the constraints of the system

- meeting with implementers / developers

Looking at the data

- through the HIE data warehouse

Meeting with clinicians, users



Short and longer term

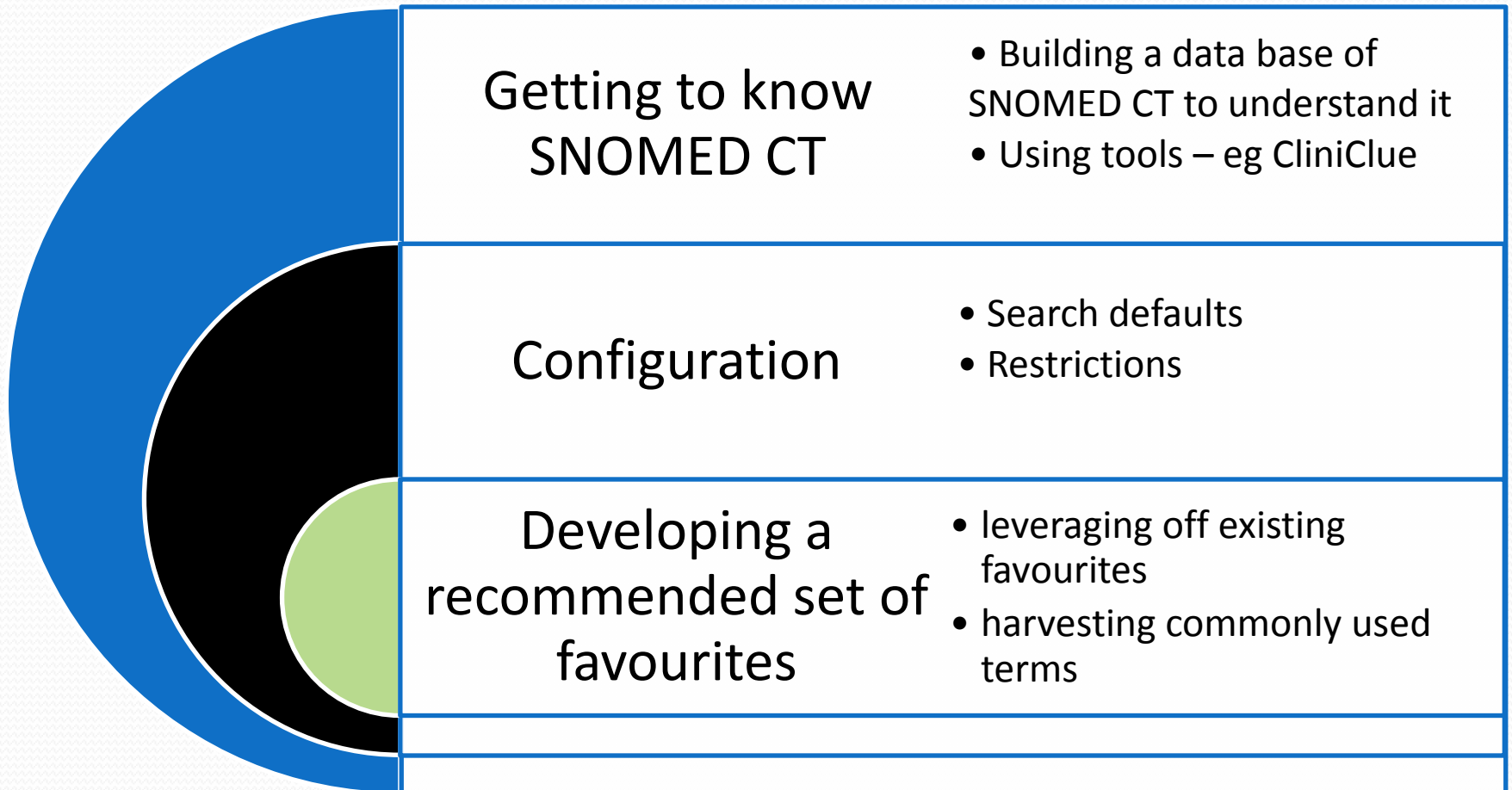
Short term goals

- How to work within the existing capabilities to improve outcomes

Long term goals

- Depending on success of above, what further change can be introduced to improve acceptance

The approach



Short term: Current Configuration

Diagnosis Search [X]

*Search: Contains [v] Within: [v]

Terminology: [...] Terminology Axis: [...]

Term ▲	Code	Terminology	Terminology...	▲
Adjustment disorder with anxious mood	78975018	SNOMED CT	Finding	
Adjustment reaction with anxious mood	1230451012	SNOMED CT	Finding	
Alcohol-induced anxiety disorder	58300018	SNOMED CT	Finding	
Amphetamine-induced anxiety disorder	136578011	SNOMED CT	Finding	
Anticipatory anxiety	59111011	SNOMED CT	Finding	
Anticipatory anxiety, mild	19825011	SNOMED CT	Finding	
Anticipatory anxiety, moderate	61145016	SNOMED CT	Finding	
Anticipatory anxiety, severe	10782014	SNOMED CT	Finding	
Anxiety	81133019	SNOMED CT	Finding	
Anxiety about altered body image	339069013	SNOMED CT	Finding	
Anxiety about appearing ridiculous	414556012	SNOMED CT	Finding	
Anxiety about becoming fat	414548014	SNOMED CT	Finding	
Anxiety about behaviour or performance	370017015	SNOMED CT	Finding	
Anxiety about blushing	508408011	SNOMED CT	Finding	
Anxiety about body function or health	369994015	SNOMED CT	Finding	
Anxiety about choking	414537019	SNOMED CT	Finding	
Anxiety about collapsing	414539016	SNOMED CT	Finding	
Anxiety about dying	414542010	SNOMED CT	Finding	
Anxiety about fainting	414551019	SNOMED CT	Finding	

Short term: Current Configuration

Diagnosis Search [X]

*Search: Contains [v] Within: Terminology [v]

Search by Name Search by Code

Terminology: SNOMED CT [...] Terminology Axis: Finding [...]

View Synonym [v]

Terminology Axis [X]

- <All terminology axes>
- Attribute
- Body structure
- Context-dependent cal
- Disease
- Environments and geo
- Events
- Finding
- Observable entity
- Organism
- Pharmaceutical / biologic product
- Physical force
- Physical object
- Procedure
- Qualifier value
- Social context
- Special concept
- Specimen
- Staging and scales
- Substance

OK Cancel

Term	Code	Terminology	Termin...
Adjustment c			Finding
Adjustment r			Finding
Alcohol-indu			Finding
Amphetamin			Finding
Anticipatory .			Finding
Anticipatory .			Finding
Anticipatory .			Finding
Anticipatory .			Finding
<input type="checkbox"/> Anxiety			Finding
Anxious			Finding
Feeling			Finding
Anxiety			Finding
Anxiety about			Finding
Anxiety about			Finding
Anxiety about becoming fat	414548014	SNOMED CT	Finding
Anxiety about behaviour or performance	370017015	SNOMED CT	Finding
Anxiety about blushing	508408011	SNOMED CT	Finding
Anxiety about body function or health	369994015	SNOMED CT	Finding
Anxiety about choking	414537019	SNOMED CT	Finding

Add to Favorites [v] OK Cancel

Search: capability & training

Diagnosis Search [X]

*Search: Contains Within:

Terminology: ... Terminology Axis: ...

Term ▲	Code	Terminology	Terminology Axis
Chronic anxiety	294960010	SNOMED CT	Finding

Search: Capability & training

Diagnosis Search

*Search: Contains Within:

Terminology: Terminology Axis:

Term	Code	Terminology	Termin...
Adjustment disorder with anxious mood	78975018	SNOMED CT	Finding
Adjustment reaction with anxious mood	1230451012	SNOMED CT	Finding
Alcohol-induced anxiety disorder	58300018	SNOMED CT	Finding
Amphetamine-induced anxiety disorder	136578011	SNOMED CT	Finding
Anticipatory anxiety	59111011	SNOMED CT	Finding
Anticipatory anxiety, mild	19825011	SNOMED CT	Finding
Anticipatory anxiety, moderate	61145016	SNOMED CT	Finding
Anticipatory anxiety, severe	10782014	SNOMED CT	Finding
<input type="checkbox"/> Anxiety	81133019	SNOMED CT	Finding
Anxiousness	2536376012	SNOMED CT	Finding
Feeling anxious	2536377015	SNOMED CT	Finding
Anxiety reaction	2536378013	SNOMED CT	Finding
Anxiety about altered body image	339069013	SNOMED CT	Finding
Anxiety about appearing ridiculous	414556012	SNOMED CT	Finding
Anxiety about becoming fat	414548014	SNOMED CT	Finding
Anxiety about behaviour or performance	370017015	SNOMED CT	Finding
Anxiety about blushing	508408011	SNOMED CT	Finding
Anxiety about body function or health	369994015	SNOMED CT	Finding
Anxiety about choking	414537019	SNOMED CT	Finding

Current Configuration: Favourites

Alerts, Problem

Alerts, Problems, and Diagnoses

Print 0 minutes ago

Diagnosis (Problem) being Addressed th

Clinical Dx	Date
Acute abdomen	10/06/2011

Diagnosis (Problem) being Addressed this Visit

Clinical Dx	Date	Dx Type	Code
Acute abdomen	10/06/2011	Discharge	16183017

***Diagnosis**

Abrasion, chest wall

Display As

Abrasion, chest wall

*Type

Discharge

*Confirm.

Confirmed

Show Additional Details

***Diagnosis**

Abrasion, chest wall

Responsible Provider

Sultana, Anthony

Comments

Display As

Abrasion, chest wall

*Clinical Service

Non-Specified

*Date

04/07/2011

*Type

Discharge

*Confirmation

Confirmed

*Classification

Emergency Departmer

Ranking

Show Additional Details

OK

OK & Add New

Add Problem & Diagnosis

Cancel

Up Home Favorites

- Abrasions
- Bites and Stings / Toxicology
- Blood & blood forming
- Breast
- Burns
- Cardiovascular
- Contusion and other soft tissue injury
- Crushing injury
- Dental
- Dislocation
- Endocrine
- ENT
- Foreign body
- Fracture
- Gastroenterology

Up Home Favorites

Folders

Previous Diagnosis

Folder: Folders\Emergency Dept Diagnoses\Abrasions

Term	Code	Terminology	Terminol
Corneal abrasion	142314019	SNOMED CT	Finding
Abrasion of face	322074013	SNOMED CT	Finding
Abrasion of scalp	322079015	SNOMED CT	Finding
Abrasion, chest wall	322146018	SNOMED CT	Finding
Abrasion, breast	322147010	SNOMED CT	Finding
Abrasion, abdominal wall	322148017	SNOMED CT	Finding
Abrasion, back	322149013	SNOMED CT	Finding
Abrasion, buttock	322150013	SNOMED CT	Finding

NSW ED Termset Development

Development of a more limited set

- Developed from an initial list from one ED Director
- Harvesting of appropriate commonly selected items from all EDs
- seeking to incorporate items in the NSW Set not in the National ED Termset
- adding items to SNOMED CT-Au



Follow up

Feedback processes

Compliance

Profiles

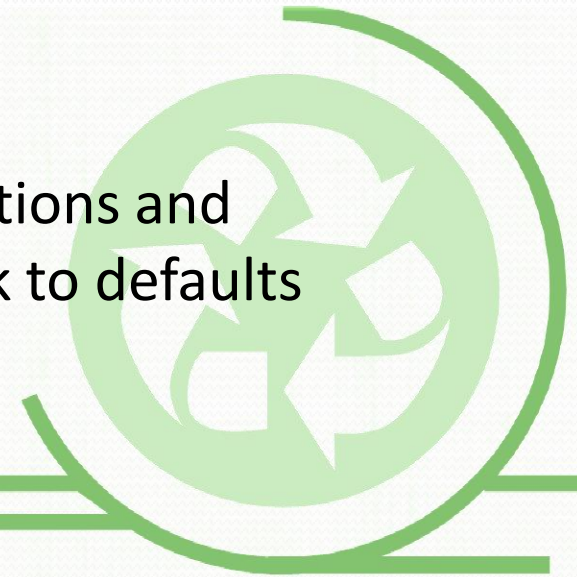
Issuing a NSW ED Termset for favourites – but no compliance enforcement mechanism

Further issues

Management of FirstNet implementations and control of set up - does not reset back to defaults

Packaging of SNOMED CT releases

- International vs Australian



Feedback

Frequency of specific diagnosis by a hospital (A202) by month - July

21522001 Abdominal pain (finding)	78
29857009 Chest pain (finding)	60
34014006 Viral disease (disorder)	43
233604007 Pneumonia (disorder)	39
25374005 Gastroenteritis (disorder)	38
161891005 Backache (finding)	35
195967001 Asthma (disorder)	34
68566005 Urinary tract infectious disease (disorder)	33
422400008 Vomiting (disorder)	27
71186008 Croup (disorder)	26
4120002 Bronchiolitis (disorder)	25
267036007 Dyspnea (finding)	24
69776003 Acute gastroenteritis (disorder)	23
125605004 Fracture of bone (disorder)	23
13645005 Chronic obstructive lung disease (disorder)	22

934 different diagnosis codes reported in one month

2534 cases assigned a diagnosis

- very specific diagnoses (rich data), some “bad” data

Feedback

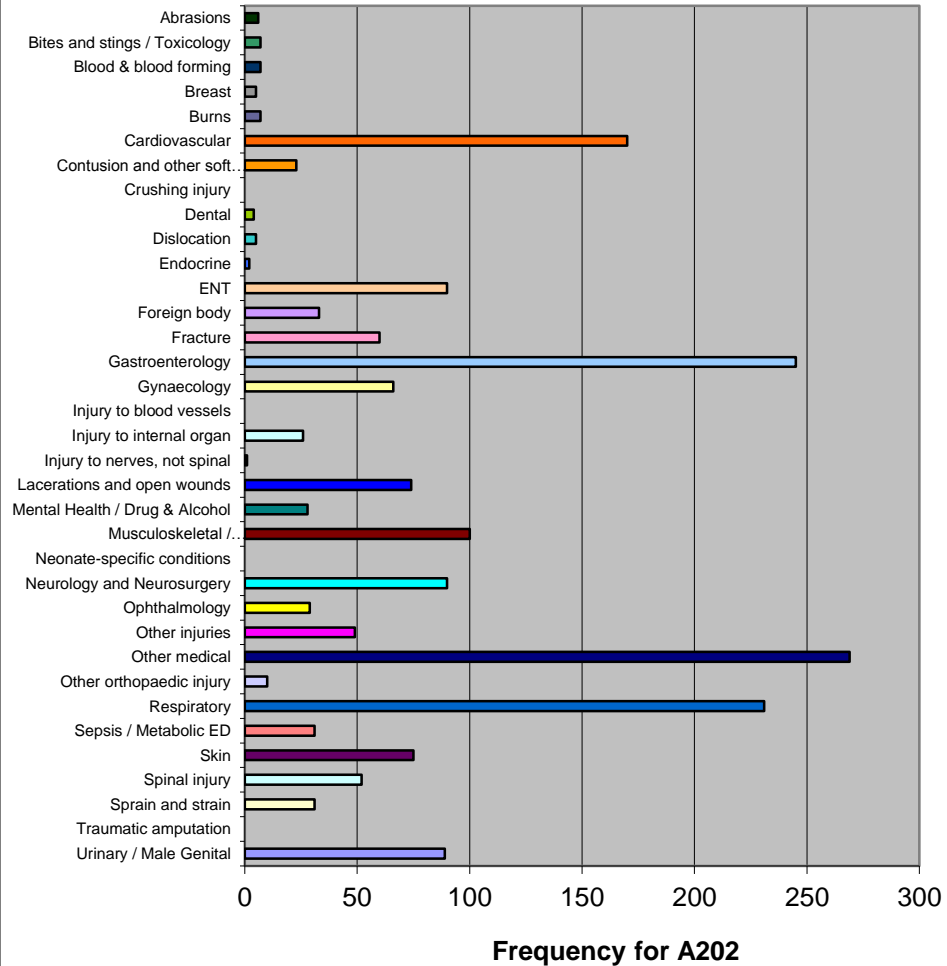
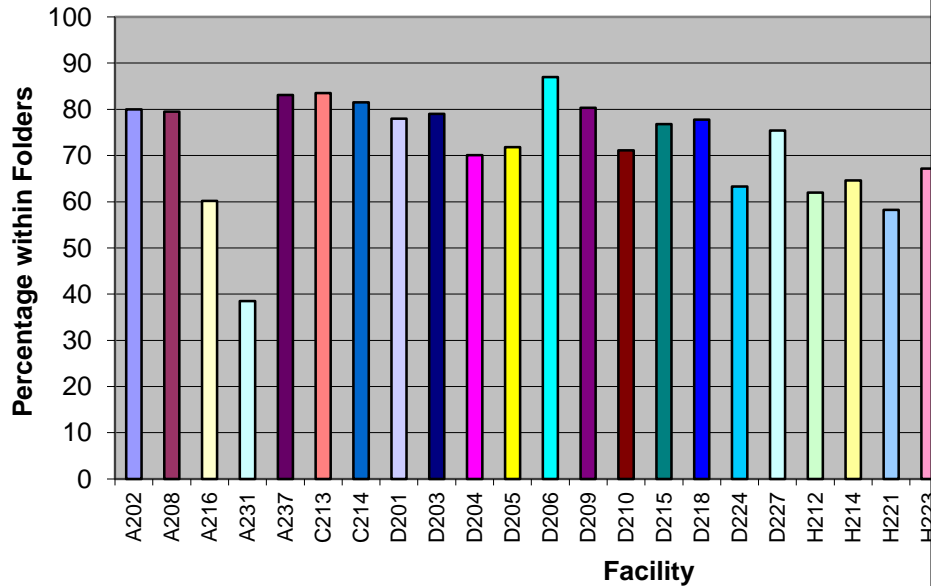
PROFILES
Analysis



Favourites Folder frequencies

COMPLIANCE

Percentage of SNOMED CT terms chosen
that are in Favourites



Next Steps

FirstNet review – awaiting release

Trialling of the EDRS (ED Ref Sets)

ED Activity –based funding based on URG
- issues for data analysts

Implementing the ED Ref Set

ED Ref Sets:

ED Diagnosis

ED Diagnosis in Presenting Problem

ED Findings in Presenting Problem

ED Reason for Presenting

FirstNet: User interface

- Presenting Problem

One value, not mandatory, free text entry possible, drop down list, screen control available does not permit “locking down” (shared list)

- Diagnosis

as shown earlier, multiple diagnoses can be recorded of various types but must have a **discharge** diagnosis. Supports favourites

Implementing the ED Ref Set

Presenting Problem:

Change: Mandatory, must correspond to a value set

Value Set construction:

3 Ref Sets relate to Presenting Problem

NEHTA Consultation

Approx 500 Concepts on merging the 3 ref sets

Preparing the Presenting Problem Ref Set for FirstNet Options:

- Concept identifier and Preferred Term
 - Concept identifier, Description Identifier and each Preferred Term and C
- OR
- Existing descriptions mapped to SCT-AU, restricted to Presenting Problem Ref Set



User Interface change: constrained set of values , control uses a search as you type filter against a drop down list.

Implementing the ED Ref Set

Diagnosis:

Based on the ED Diagnosis Ref Set: approx. 5000 concepts

Functionality / UI

– essentially the same, search as you type not available initially, but constrained by default to the ED Ref Set only. Able to extend the search to all of SNOMED CT, but recommended to constrain to clinical findings axis

- What set of values should be searchable?
 - 5000 Preferred terms only
 - 5000 Preferred terms and synonyms (12000 terms)



Implementing the ED Ref Set

Down stream data use and analysis

Clinical Data use

- Electronic Record – search and retrieval of cases
- Electronic discharge summary: data exchange - SCTID for the concept

Data analysis

- was based on frequency of individual selections and classification into NSW Health “favourites” categories
- **now:** Activity Based Funding for Emergency Departments
 - ED Diagnosis determines the Major Diagnostic Block
 - With other attributes each ED Episode is assigned to URG
 - “Efficient price” for ED services based on URG

Effect on data quality

- values outside the ED Diagnosis Ref Set?

Managing the ED Ref Set

Beyond the release management of 4 ED Ref Sets by NEHTA

Production of Implementation Sets for each release of SCT-Au

- Presenting Problem: merging of sets and generation
- ED Diagnosis: generation
- Production of
 - delta files: Additions, Removals, Modifications
 - complete snapshot replacement / load

Training and Education:

Target audience; appropriate content

Close the loop:

Feedback on data quality – impact on bottom line
Reports, comparisons, setting targets, monitoring

Implementation Lessons

- SCT implementation: many methods, simple provision of SCT is not one of them
- Survival based on the promise of benefits of clinical use of the data (ie clinical use)

Implementation success depends upon:

- capacity for system to “consume” and “present” SCT appropriately to the user
- Appropriate: requires business analysis and consultation with clinicians and consumers/users of the data

Present SCT : User interface design and utilisation of SCT concept relationships or reference sets

Consume SCT: Preparation of SCT products tailored to the needs of the application, taking account of intended use and constraints

Implementation Lessons

- Implementation success depends upon
 - Other aspects: training programs, support for data analysis, & ultimately the capacity to deliver clinical benefits

Management and governance:

- ED Ref Set management structure as a model for ongoing management
 - not a one-off exercise, need processes for managing change
 - process for reviewing and submitting items for change:
 - additions and deletions
- IM cycle:
 - Formulation
 - Implementation
 - Data review/quality assessment
 - Feedback
 - Formulation/ change,



Questions / Discussion