Application and implementation of Australian Medicines Terminology in Australia

National Clinical Terminology & Information Service
NEHTA
23 January 2013

National approach required

- Standards & specifications that offer semantic interoperability between disparate systems.
- Provide standard naming conventions.
- Avoids risks of duplication, avoidable expenditure & solutions that cannot integrate/scale across healthcare settings.
- Addresses specific priority clinical processes. Examples:
    - Medications Management
    - Discharge Summaries
    - Referrals

National vision for eHealth

eHealth will enable a safer, higher quality, more equitable and sustainable health system for all Australians by transforming the way information is used to plan, manage and deliver health care services[1].

---

[1] Australian Health Ministers' Conference, National E-Health Strategy, December 2008.

National vision for eHealth

- **Access**
  - Right consumer health information is electronically available to right person, at right place & time.
  - Consumers have electronic access to information needed to better manage & control their personal health outcomes.
  - Enable electronic access to appropriate healthcare services for consumers within remote, rural & disadvantaged communities.
- **Communication**
  - Enable Australian health sector to more effectively operate as an inter-connected system.
  - Enable multi-disciplinary teams to electronically communicate & exchange information, provide better coordinated health care across the continuum of care.

Australian Health Ministers' Conference, National E-Health Strategy, December 2008

National vision for eHealth

- **Privacy & security**
  - Provide consumers with confidence that their personal health information is managed in a secure, confidential and tightly controlled manner.
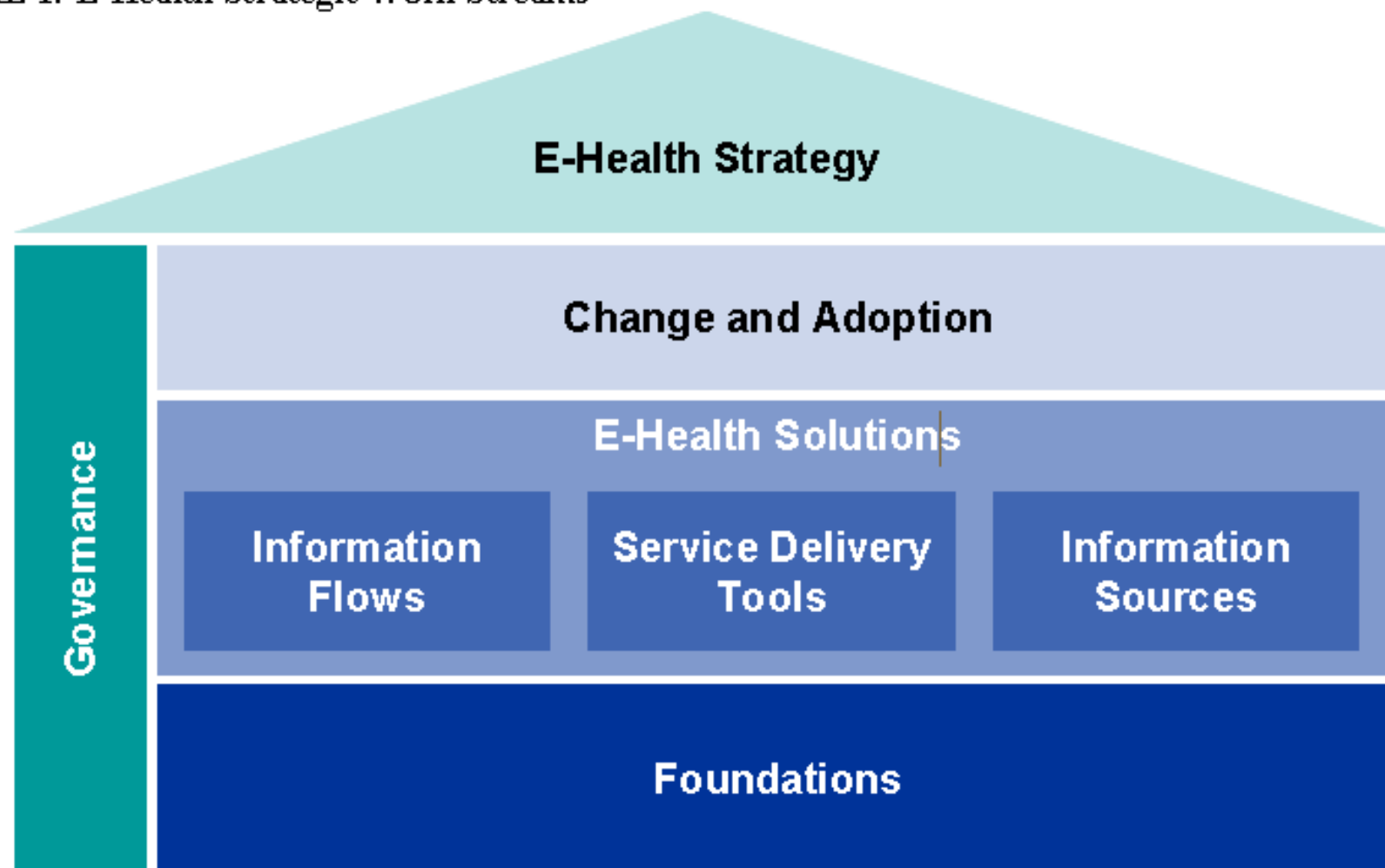- **Continuous improvement**
  - More effective reporting & sharing of health outcome information.
  - Improve quality, safety & efficiency by giving care providers better access to consumer health information, clinical evidence & clinical decision support tools.
  - Support more informed policy, investment & research decisions through access to timely, accurate & comprehensive reporting on Australian health system activities and outcomes.

Australian Health Ministers' Conference, National E-Health Strategy, December 2008

eHealth strategic work streams

FIGURE 1: E-Health Strategic Work Streams

Australian Health Ministers' Conference, National E-Health Strategy, December 2008

eHealth strategy overview

1. **Foundations**
   - Establish core foundations for electronic information exchange across the health sector.

2. **eHealth Solutions**
   - Facilitates delivery of specific systems & tools to address high priority needs of consumers, care providers & healthcare managers.

3. **Change and Adoption**
   - Foster stakeholder adoption of eHealth.

4. **Governance**
   - Ensure effective leadership, coordination & oversight of the national eHealth work program.

Australian Health Ministers' Conference, National E-Health Strategy, December 2008

Foundations (1)

1. **Identification and authentication**
   - Fundamental to nation's ability to securely & reliably access/share health information – NEHTA's Healthcare Identifiers Service and National Authentication Service for Health (NASH)
2. **Information protection and privacy**
   - Robust national privacy & regulatory regime to authorise eHealth initiatives – NEHTA's Policy & Privacy teams contribute to this
   - Ensure appropriate privacy safeguards & consent processes for access to & use of health information in eHealth initiatives.
3. **National eHealth information standards**
   - National program of information standards that underpin consistent & accurate collection & exchange of health information – AMT, SNOMED CT-AU, Clinical Information contributes to this
   - Consistent & inclusive process for development, endorsement & implementation of national eHealth standards.

Australian Health Ministers' Conference, National E-Health Strategy, December 2008

Foundations (2)

4. **Investment in computing infrastructure**
    - A key barrier to eHealth take-up is the relatively poor quality of computing infrastructure (PCs, network connectivity and core patient, clinical & practice management systems) across many parts of the Australian health sector.
    - Encourage care providers to invest in implementation & maintenance of an acceptable baseline of computing infrastructure.
5. **National broadband services**
    - Provide connectivity between all Australian care providers.
    - Infrastructure that is fit for use & priced in a manner that does not discourage sharing of health information across geographic & health sector boundaries – Australia's national broadband network (NBN) project

_____

Australian Health Ministers' Conference, National E-Health Strategy, December 2008

eHealth Solutions (1)

E-Health Solution Category	Priority Solutions	Description
Electronic Information Sharing	• Referrals • Event summaries including discharge summaries, specialist reports and notifications • Prescriptions • Test orders and test results • Care plans	Improving the capability of patient, clinical and practice management systems to support key electronic information flows between care providers. These key information flows provide a basis for improved care planning, coordination and decision making at the point of care.
	• Consumer demographics • Current health profile • Current medications list	The key datasets that provide the summary of a consumer's key health data and their current state of health, treatments and medications. These datasets will improve the quality of service delivery and will ensure that consumers do not have to remember or repeat this information as they navigate the health system.

_____

Australian Health Ministers' Conference, National E-Health Strategy, December 2008

eHealth Solutions (2)

E-Health Solution Category	Priority Solutions	Description
Service Delivery Tools	• Decision support for medication management • Decision support for test ordering	Encouraging the development of specific tools that improve the quality of clinical decision making and can reduce adverse events and duplicated treatment activities.
	• Chronic disease management solutions. • Telehealth and electronic consultation support	Encouraging development of specific tools that improve the management of chronic disease and the accessibility of care delivery. Chronic disease management solutions enable timely identification and monitoring of individuals and support management of their condition by providing automated reminders and follow-ups. Telehealth and electronic consultation tools enable improved rural, remote and disadvantaged community access to health care services.

_____

Australian Health Ministers' Conference, National E-Health Strategy, December 2008

eHealth Solutions (3)

E-Health Solution Category	Priority Solutions	Description
Information Sources	• Health care reporting and research datasets • Health information knowledge bases	Implementing improved datasets for health care management that provide access to longitudinal and aggregated information for analysis, reporting, research and decision making. Providing access to a set of nationally coordinated and validated health knowledge sources for consumers and care providers.
	• Individual electronic health records (IEHRs)	Implementing IEHRs that provide consumers with access to their own consolidated health information and provide care providers with a means to improve the coordination of care between multi-disciplinary teams. IEHRs can also support the collection and reporting of aggregated health information.

_____

Australian Health Ministers' Conference, National E-Health Strategy, December 2008

Change & Adoption (1)

- Activities that encourage & enable participants in the health care system to adopt eHealth solutions & change their work practices to be able to use them effectively.
- Develop national strategies to drive adoption of eHealth in Australia to a self sustaining tipping point as quickly as possible.
- Includes a coordinated program of awareness, training & education, incentive & compliance programs.
- Targeting consumers, care providers, health care managers & vendors.
- Pockets of successful eHealth implementations typically led by care provider community.

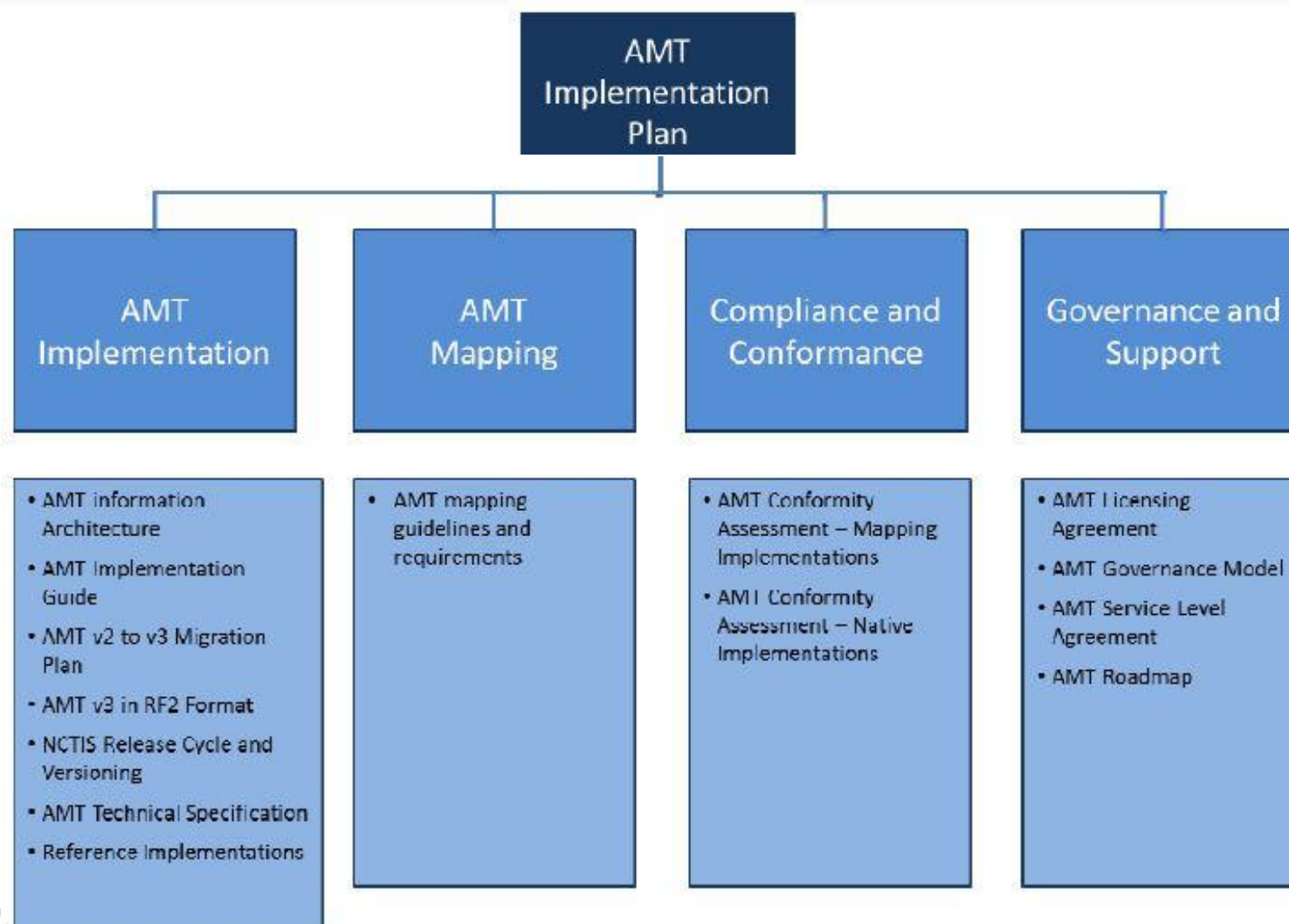---

Change & Adoption (2)

- National awareness campaigns
- Financial incentive programs
- National care provider accreditation
- Vocational & tertiary training
- Stakeholder reference forums & working groups

_____

Australian Health Ministers' Conference, National E-Health Strategy, December 2008
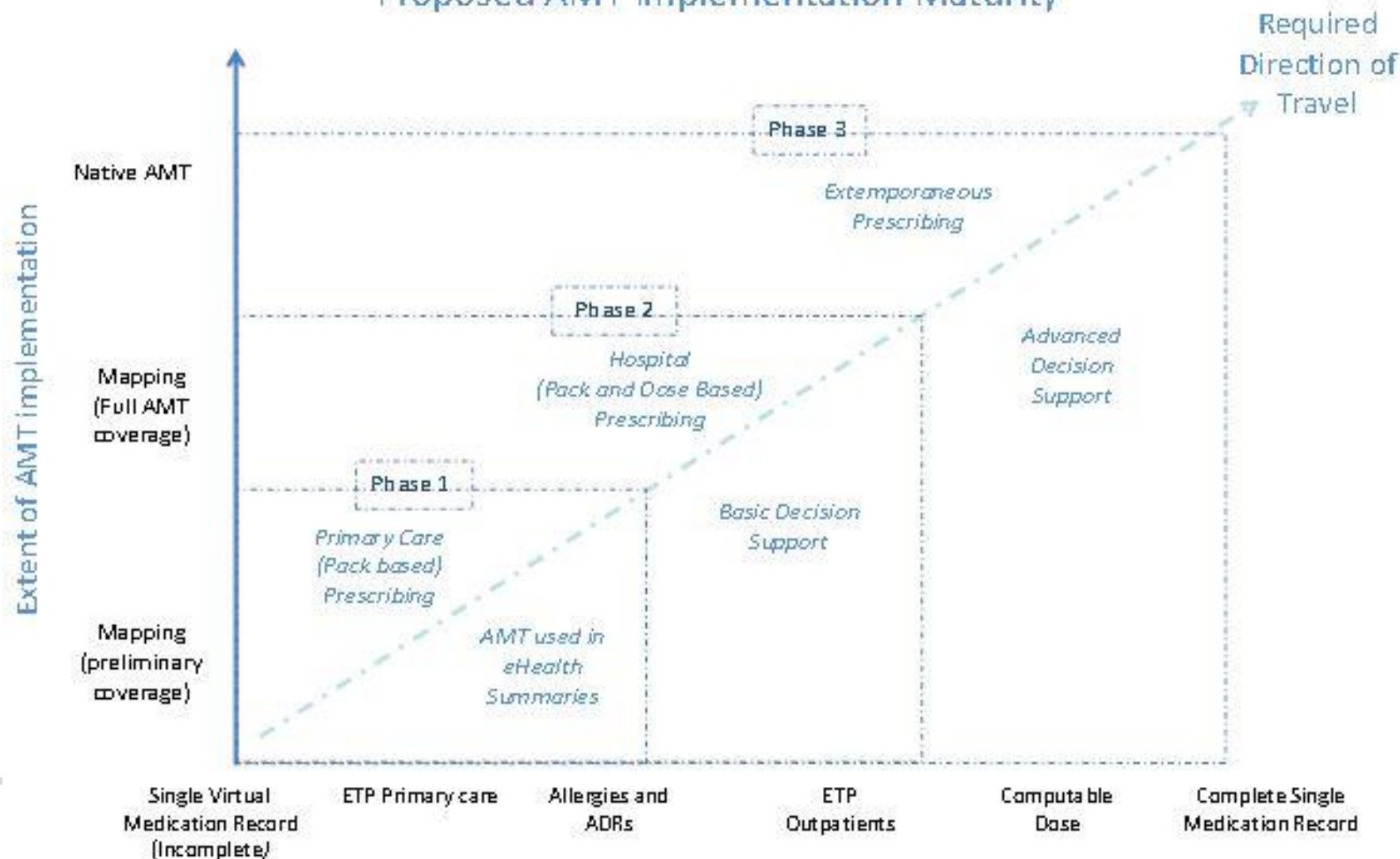
AMT Implementation Plan


```
                          AMT
                      Implementation
                          Plan
```

AMT Implementation	AMT Mapping	Compliance and Conformance	Governance and Support
• AMT information Architecture • AMT Implementation Guide • AMT v2 to v3 Migration Plan • AMT v3 in RF2 Format • NCTIS Release Cycle and Versioning • AMT Technical Specification • Reference Implementations	• AMT mapping guidelines and requirements	• AMT Conformity Assessment – Mapping Implementations • AMT Conformity Assessment – Native Implementations	• AMT Licensing Agreement • AMT Governance Model • AMT Service Level Agreement • AMT Roadmap

NCTIS, AMT Implementation plan, September 2011

Staged approach

Proposed AMT Implementation Maturity

AMT adoption strategies (1)

- Terminology product/ implementation support
- Education & training
- Implementation plan, roadmap
- Identify early adopters for AMT
    - Lead site for implementation – HealthSMART VIC
    - PBS PharmBiz
- Engagement with peak bodies and software vendor associations
- Upgrade from AMT v2 to AMT v3

AMT adoption strategies (2)

- NEHTA eHealth solutions
  - eMedications Management, strategy
  - Continuity of Care
- NEHTA Implementation vendor panels
  - GP desktop
  - Community pharmacy
  - Aged care
- National eHealth Record System/ PCEHR implementation sites
- Benefits realisation, Change & adoption, ePIP
- CTI Service Desk
- IHTSDO, AuCT-UG

"Middle out" approach

- Not "top down" or "bottom up".
- Develop public goods - National standards, foundations, broadband, workforce
- Different providers bring systems to national standards, rich capability to share information
- Government defines policy framework so public, private, local & central systems converge into functional national system
- Offer incentives (e.g. Practice Incentives Program - eHealth (ePIP))
- Legislation to protect privacy of citizens
- Engage with clinicians, governance
- Clinical safety, quality, conformance

Applications of AMT

At Data Entry

- Content coverage
- Specificity
- One concept, multiple descriptions – supports different ways clinicians prefer to describe a medicine
- Standard naming conventions - Australian healthcare context

Retrieval & Reporting

- Improved data precision in reporting - ability to aggregate data and report at various levels of details.

- Use terminology features and encoded data to assist with retrieval for planning, reporting, research.

- Standard terminology ensures 'apples are compared with apples' no matter where data sourced from.

- This is where the power of AMT can really be realised.

Communication

- Standard terminology across the health system
- Unambiguous concept identification

Supporting NEHTA eHealth initiatives

- Terminology embedded in NEHTA eHealth specifications in various clinical domains:
  - Continuity of Care (eDischarge Summaries, eReferrals)
  - eMedications Management (electronic transfer of prescriptions)
  - eDiagnostic Services
- National eHealth Record System/ PCEHR

eMedications Management (eMM)
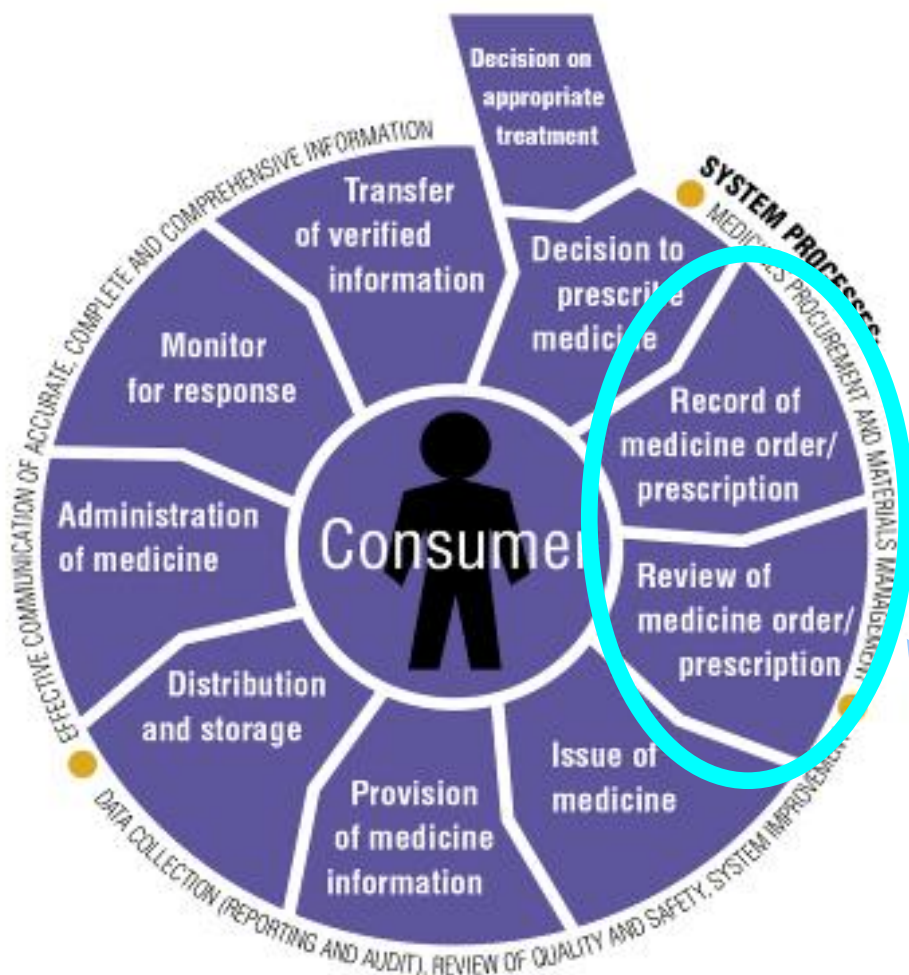
Electronic transfer of prescriptions (ETP)

Reproduced by Permission, Commonwealth of Australia,

Guiding principles to achieve continuity in medication management, July 2005 [APAC].

Longer Term Benefits

- Used with decision support
- Drive evidence based medicine
- Drive clinical process improvement
- Facilitate knowledge management

How do I use the AMT?

- It is not a standalone solution.

- It needs to be deployed IN a clinical software application.

- AMT is one part of an EHR product.

- The other half is the clinical application itself and its information model.

- Utilised in eHealth Solutions.

Implementation

- Healthcare providers and vendors may implement the AMT in their clinical information systems in multiple ways, dependent upon business need.

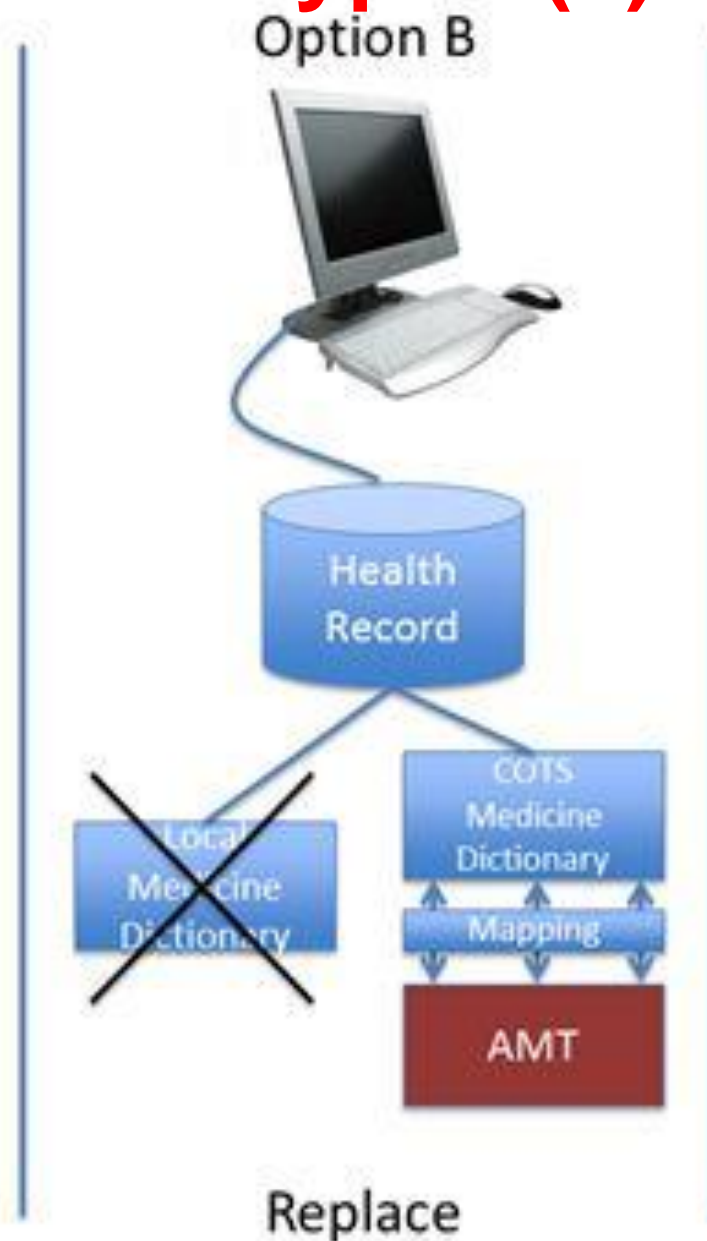- There are 3 broad options of increasing maturity for the implementation of AMT
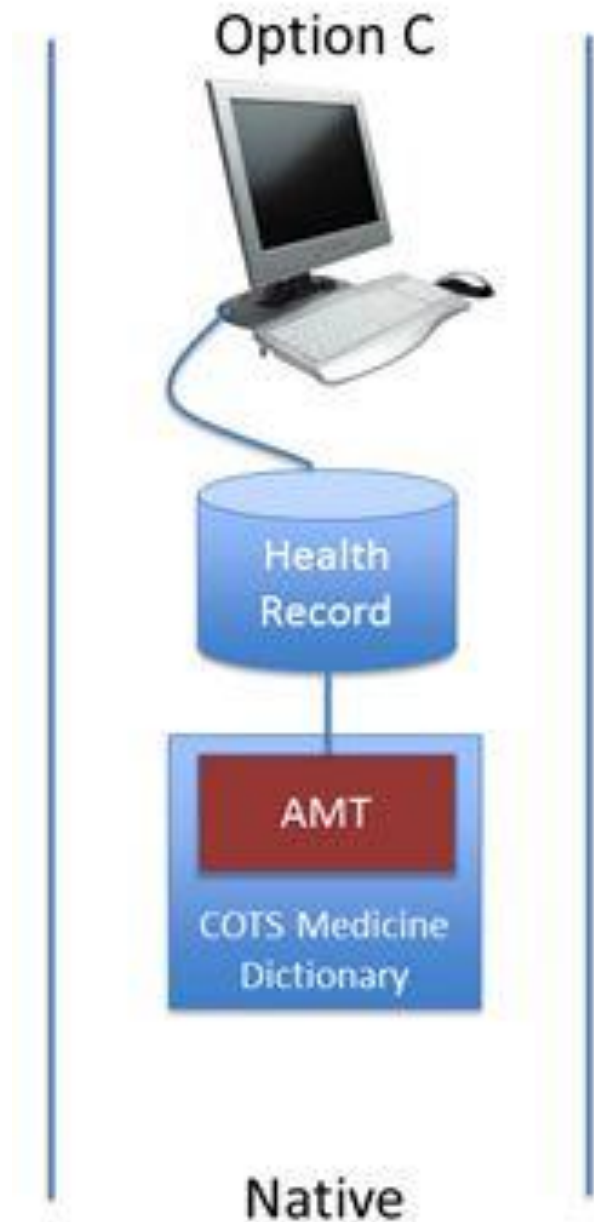
Implementation types (1)

Implementation types (2)

Option B

Replace

Implementation types (3)

Option C

Health Record

AMT

COTS Medicine Dictionary

Native

Information Models

Dealing with the information model

- Detailed Clinical Models (DCMs) were developed for NEHTA eHealth Solutions & provide a framework & context in which terminology can feed into.

- These will provide basic, minimum, standard data entry field for clinical software applications.

- Examples of DCMs are:

  – Adverse Reaction

  – Medication Instruction

  – Medication Action

  – Problem/Diagnosis

DCM example – Medication action

Archetype: Medication action (openEHR-EHR-ACTION.medication.v1)

| Header | **Description** | Protocol | Pathway | Reference model |

Structure: Tree
Occurrences: 1..1 (mandatory)
Cardinality: 2..* (*repeating, unordered*)

T	**Medicine** Coded Text ➡ Occurrences: 1..1 (mandatory)	The medicine, vaccine or other therapeutic good which was the focus of the action.	Medicines Terminology (A Medicinal Product Unit of Use (MPUU), a Medicinal Product Pack (MPP), a Trade Product Pack (TPP) or a Containered Trade Product Pack (CTPP).)
T	**Instructions** Text ➡ Occurrences: 0..* (optional, repeating)	Any instructions given to the subject of care or carer at the time of the action.	Free or coded text
	Ingredients and form Slot (Cluster) Occurrences: 0..* (optional, repeating)	Detailed information about the ingredient(s) including form and strength.	**Include:** openEHR-EHR-CLUSTER.chemical_description.v1 and specialisations [Included]
T	**Reason** Text ➡ Occurrences: 0..* (optional, repeating)	The reason(s) the specific action or step was carried out. Note: This is not the reason for the medication instruction, rather the specific reason e.g. for administration or for ceasing the medication.	Free or coded text
	Quantity Slot (Cluster) Occurrences: 0..* (optional, repeating)	The quantity of medicine, vaccine or other therapeutic good.	**Include:** openEHR-EHR-CLUSTER.amount.v1 [Included]
T	**Comment** Text ➡ Occurrences: 0..1 (optional)	A comment on the action taken.	Free or coded text
1₂	**Sequence number**	The sequence number specific to the action	

Previous   Next

ePrescription Structured Document Template

CONTENT				
	⊨	PRESCRIPTION ITEM		1..1
		📅	DateTime Prescription Written	1..1
		📅	DateTime Prescription Expires	1..1
		ID	Prescription Item Identifier	1..1
		I/T₀₁₀	Therapeutic Good Identification	1..1
		T	Formula	0..1
		⊨	DOSAGE	0..1
			T	Dose Instruction	1..1
		T	Instructions for Use	0..1
		T	Quantity of Therapeutic Good	1..1
		✓✗	Brand Substitute Allowed	1..1
		1₂3	Maximum Number of Repeats	1..1
		⧗	Minimum Interval Between Repeats	0..1
		T₀₁₀	Medical Benefit Category Type	1..1
		T₀₁₀	Grounds for Concurrent Supply	1..1
		T	PBS/RPBS Authority Approval Number	0..1
		T	State Authority Number	0..1

34

Dealing with the information model

- DCMs are specified and developed by NEHTA collaboratively with
  - Clinician input
  - User input
  - Open development and review

Dealing with the Terminology Model

- Making it safely implementable
- Making is easy to use
- Cut down the size of AMT to prevent mis-use

- Reference Sets and RefSetting techniques
- Find all the right content for a particular DCM and purpose
- Constraint modelling and binding
- Ensure that users can only use that 'right content'

NEHTA Detailed Clinical Models (DCM) Library

Medication | Adverse Reactions | Problems/ Diagnosis | Pathology | Imaging | Family Hx | Social Hx | Clinical Synopsis | Requested Services | Governance | Constraints | Tools

	Discharge	Referral	Health Summary	Specialist Letter
Medications	✔	✔	✔	✔
Adverse Reactions	✔	✔	✔	✘
Problem/Diagnosis	✔	✔	✔	✘
Family History	✘	?	✔	✘
Social History	✘	?	✔	✘
Lifestyle/Risk Factors	✘	?	✔	✘
Pathology	✔	✔	✘	✔
Diagnostic Imaging	✔	✔	✘	✔
Clinical Synopsis	✔	✔	✔	✔
Requested Services	✔	✔	✘	✘
Recommendations	✔	✘	✘	✔

Current AMT implementations

1. Stakeholders with existing AMT v2 live implementations

    - Multi-national acute sector vendor (Dept. of Health Victoria sites)

    - PharmBiz (PBS)

    - Vendor in aged care sector

    - MSIA (electronic recording & reporting of controlled drugs)

    - Various terminology browsers

    - Terminology bound to information models – NEHTA eHealth Solutions

2. Multiple implementations in development: mappings by GP/pharmacy vendors, private hospital, specialists, jurisdictions

Target AMT stakeholders

1. Stakeholders with significant market share in clinical prescribing/dispensing software
2. Vendors in NEHTA Implementation Vendor Panels

Product Management

- Maintain currency and quality of data
    - Request submissions
- Editorial rules
    - External review
- Governance
    - Internal & external
    - Editorial / content issue resolution
- User feedback / support
    - Service desk
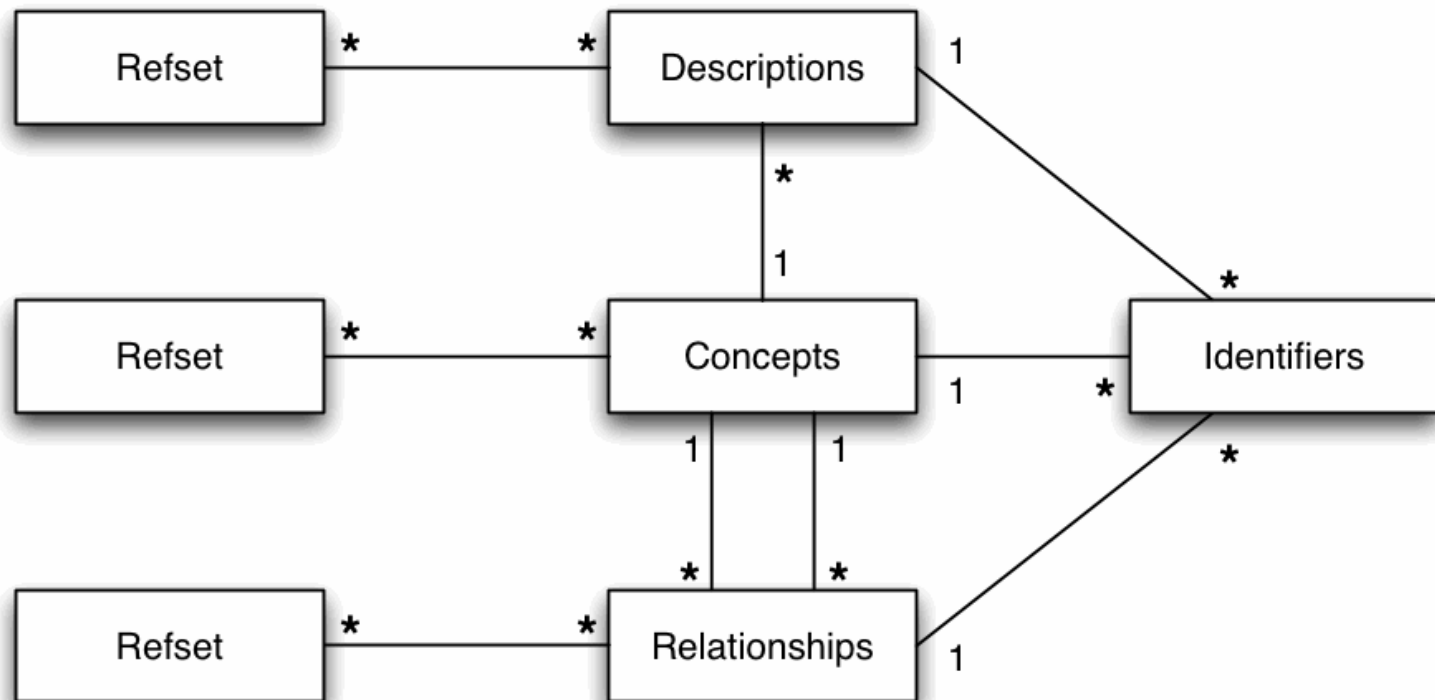   - Issue tracker
- Clinical safety
    - Incident management
- CCA

Product Development

- User engagement
  - Surveys, training workshops, phone/email, face-face
- Model Review
  - AMT v3 project
- Implementation plan
- Roadmap
- IHTSDO and international collaboration
- Strategies from national eHealth initiatives

AMT v3

- Simplified model based on national stakeholder input to increase adoption and implementation of AMT into clinical systems.

- Aligns with international SNOMED CT RF2 release format.

- Includes additions, exclusions and amendments to concepts, descriptions and relationships; additional reference sets.
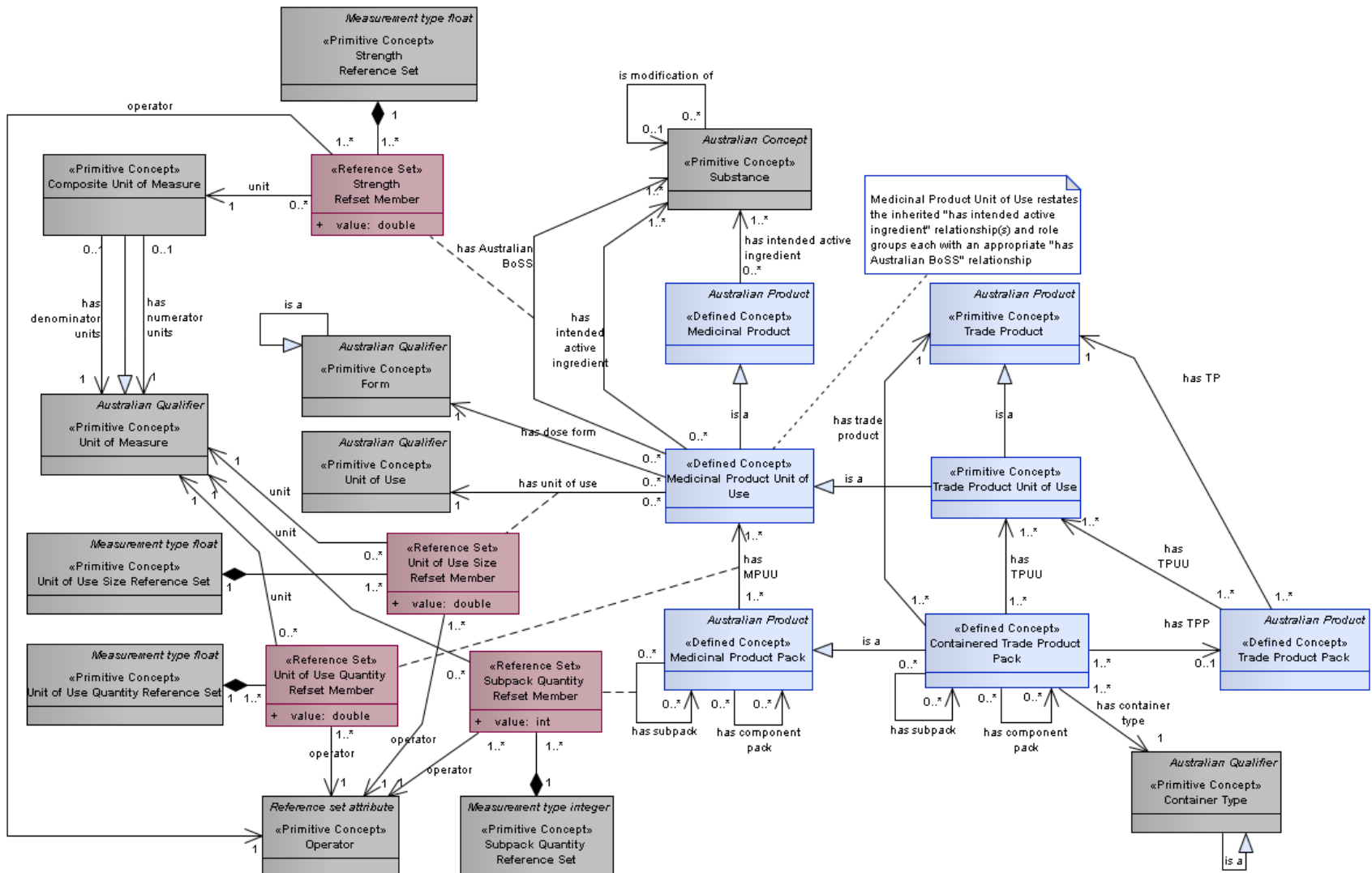
AMT v3 components

- Consists of concepts, descriptions and relationships.

- Reference sets that extend information about certain components.
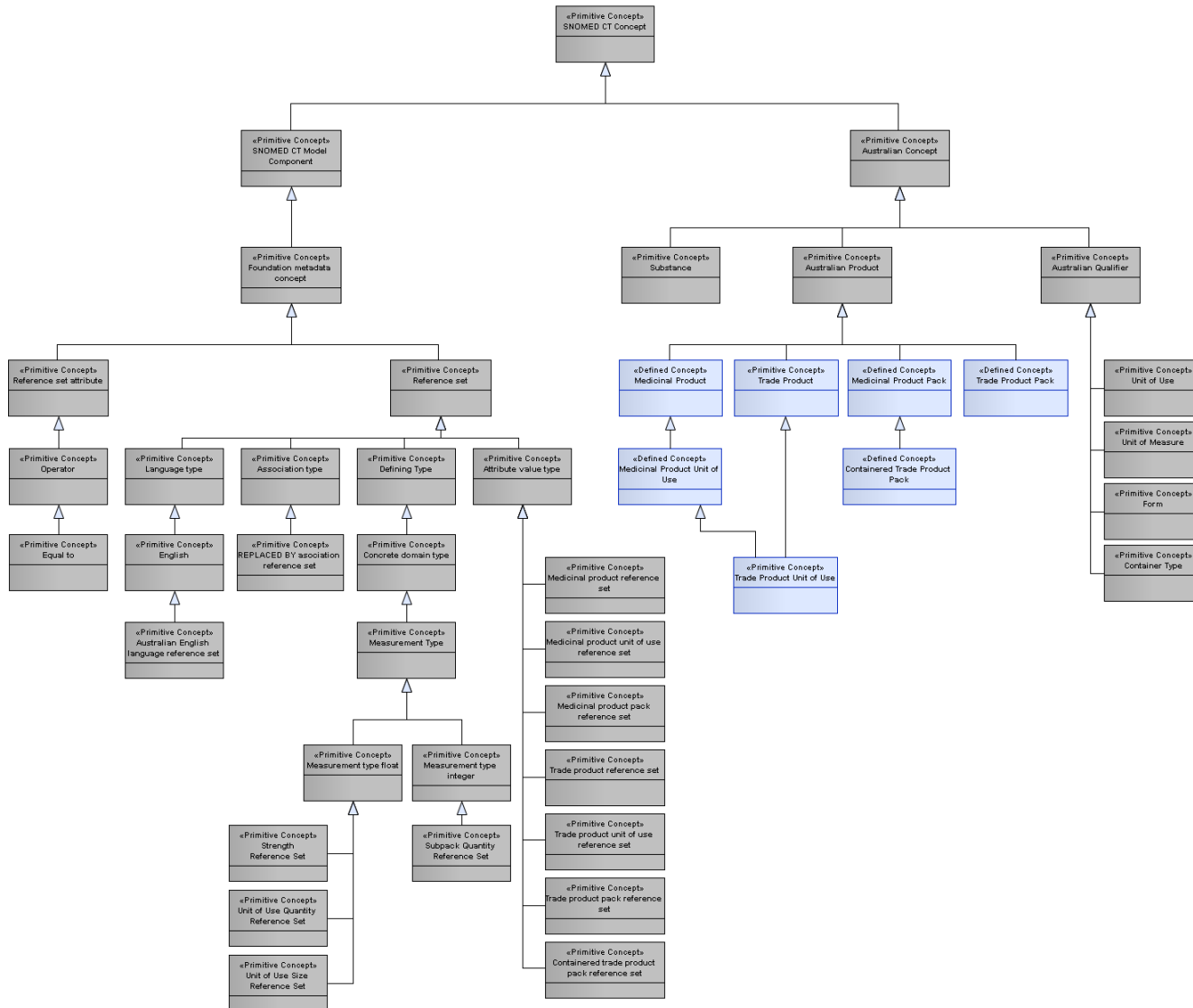
- A basic data model:

AMT v3 model

NCTIS, AMT Implementation Guide, February 2012

AMT v3 model concept hierarchy

NCTIS, AMT Implementation Guide, February 2012

National E-Health Transition Authority
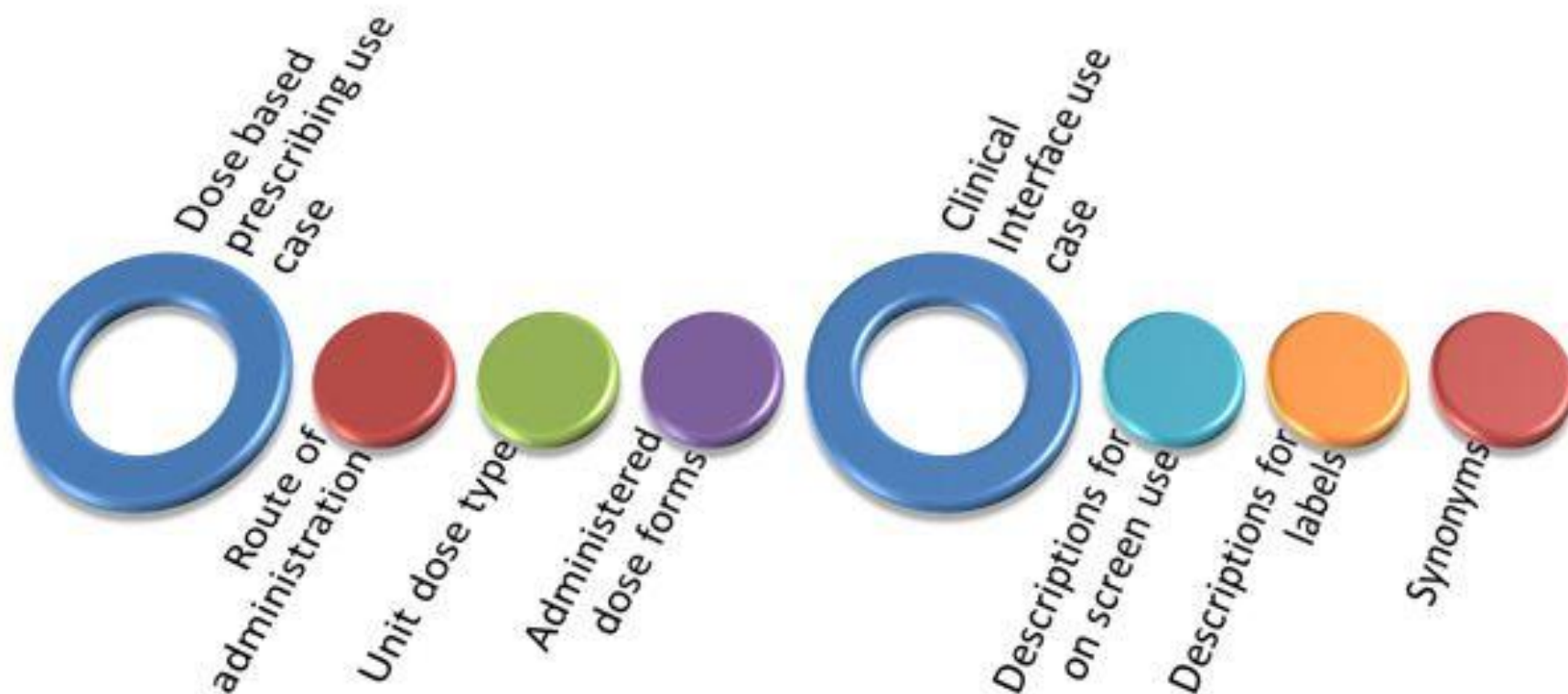**www.nehta.gov.au**

AMT Roadmap

Identified two priority use cases for development:

- Dose based prescribing.

- Descriptions for use in clinical application interface.

- Additional attributes and features needed to support these use cases.

AMT Roadmap 2012-2013

Other items

- GTIN
  - Supply chain use case, not clinical
- Product availability
  - Not terminology but useful for native implementation
  - Source of information?
- ATC
  - Some work done
  - Release as AMT reference set
- Therapeutic classes
  - Is there a standard for?
  - Many proprietary classes

Lesson learned / issues

- Resources/ Funding

- Tooling

- Use cases

- Support by the business

- Business/functional requirements

- Stakeholder buy in / engagement

- CCA

- Clinical safety

Lead implementation site - Issues

- Content coverage
  - Gap items
  - Devices vs. medicines
- Complementary medicines
- Special Access Scheme (SAS)
- Total parenteral nutrition solutions

Lead implementation site - Issues

- Synonyms, forms, differences

- Dose based prescribing

- Additional information requirements e.g. decision support

- Product Availability

- Length of descriptions / truncation - ensure that the display is clear and unambiguous

Lead implementation site - Issues

- Display of generic / medicinal products for multi ingredients

- Prescribing of multi-component products - ensure that each component is clearly identified for dose information

Lessons learned

- No mandate (officially) but jurisdictions buy in.
- Scope out requirements for use cases
  - Ensures appropriate concept used
  - Mapping considerations
- Understand the clinical environment, limitations of the clinical system, e.g. search capabilities
- Understand the limitation of the medicines terminology including what is does/does not include
- Ongoing maintenance
- Validation / Conformance / Compliance of implementation
- Stakeholder engagement
- Communicate, communicate, communicate!

Implementation considerations (1)

- Understand your requirements
    - Technical & organisational perspectives
- Understand benefits and limitations of terminology – content coverage
- Understand AMT model & release files
    - Choose specific components to implement
    - Use reference sets - Understand content & context
- User interface
    - Data entry/capture
        - Term length
        - Size of terminology - Reference sets to constrain data
        - Exclude inactive components
- Search functionality

- Data storage

- Maintenance

- Data retrieval/ analysis – reporting requirements

- Validation/ conformance/ compliance of implementation

- Communication – users, client, vendors, NCTIS

- Clinical messaging/ interoperability – NEHTA eHealth specifications and CDA guides

- Set realistic goals for delivery of specific benefits

- Avoid unrealistic expectations

IHTSDO involvement

- Pharmacy SIG
- Substance hierarchy redesign SIG
- Implementation SIG

Australian Clinical Terminology User Group (AuCT-UG)

- National forum to gain Australian input to, and share information from International Health Terminology Standards Development Organisation (IHTSDO) and the National Clinical Terminology and Information Service (NCTIS).

- Clinical input to the key international clinical terminology for healthcare information exchange

- NEHTA facilitated but not owned

- To join, please contact auctug@nehta.gov.au

Resources and Useful Links

- terminologies@nehta.gov.au