

Cross mapping nursing terminology.

With the
**ISO/IS 18104 terminology model and/or
the HL7 v3 information model**

William Goossen RN PhD



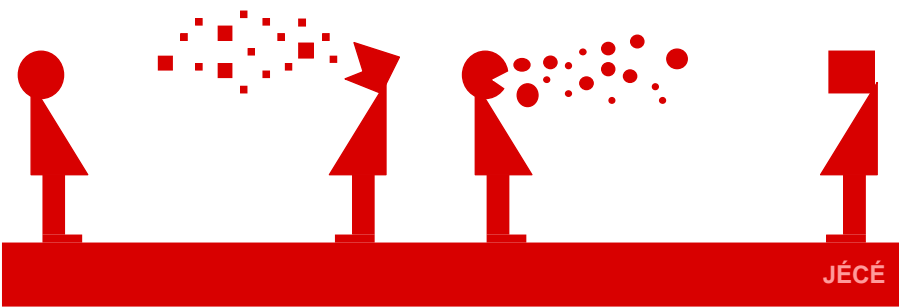
Overview care full cross mapping

- Introduction
- The need in practice to cross map
- The ISO 18104 Nursing terminology model
- Dissection as basis for cross mapping
- Information model use for cross mapping: HL7 v3
- Mapping local codes to SNOMED CT
- Conclusions




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We all know the problem....






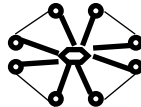
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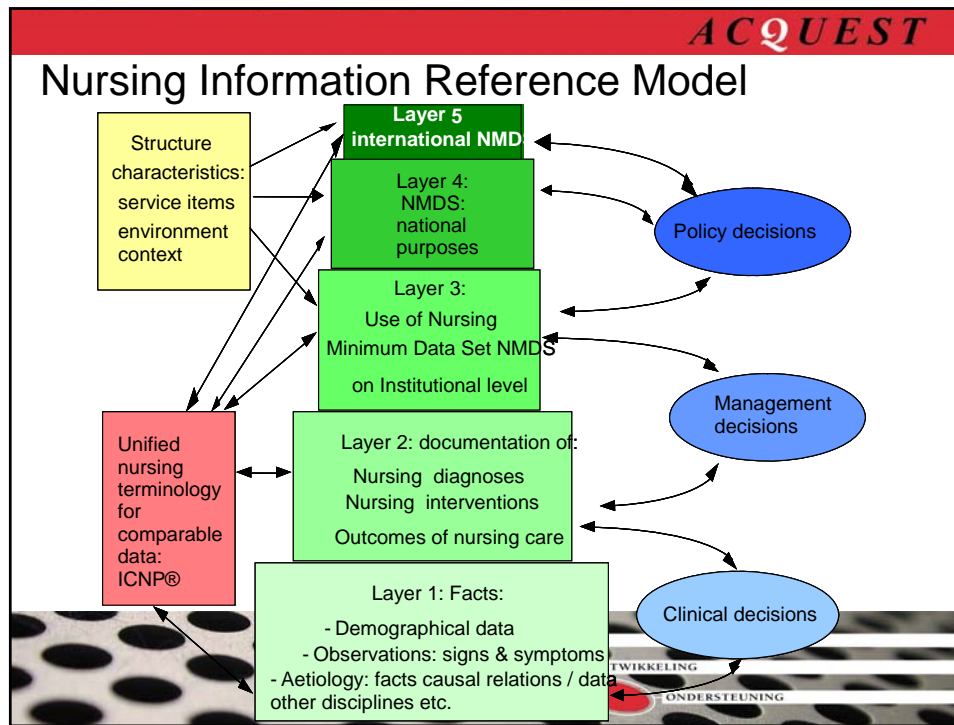


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Four Generations of Terminology Architectures

1		lists of concepts that are not grouped or placed in a hierarchy (e.g. alphabetical lists).
2		Mono-hierarchical, mono-axial •The top term is subdivided according to one guiding principle •enumerative, pre-combined and exhaustive
3		•Poly-hierarchical, multi-axial •More than one division of the top term and combinations of concepts from the various division and axes. •Combinatorial matrix, user driven combination of concepts •rules for combinations are implicit (only know to the users of the classification)
4		•Rules for combinations are explicit (represented by a knowledge formalism)



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Terminology model versus information model

- Terminology model: can we express the information all in words?
- Information model: do we need to combine different data to understand the information?

Decorative footer at the bottom includes a pattern of black circles and horizontal lines with the Dutch words: ONDERZOEK, ONTWIKKELING, and ONDERSTEUNING.

Cross mapping nursing terminology.

Testing the
ISO/IS 18104 to cross map
NMDSN, ICF & ICNP based on the
terminology model



Purpose ISO model - 1

- Support definitions of nursing diagnoses and actions
- Represent nursing diagnoses & actions for use within computer systems
- Framework for the generation of compositional expressions of atomic concepts within a reference terminology

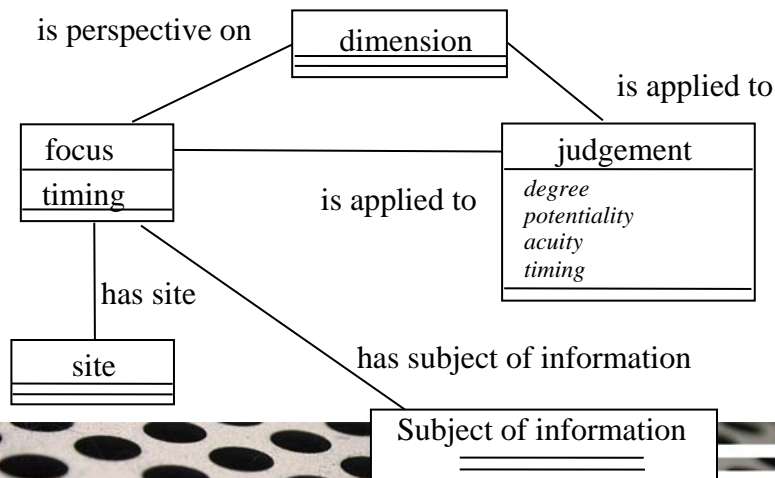


Purpose ISO model - 2

- Better nursing terminologies
- **Stimulate mapping between concepts from different terminologies**
- Systematic evaluation of terminologies
- Integrate nursing concepts in multidisciplinary terminologies such as LOINC and information models such as HL7 & OpenEHR.



ISO reference model, IS 2003, final



Nursing diagnoses in ISO:

- A descriptor for <<focus>> and a descriptor for <<judgement>> are mandatory for the intensional definition of a nursing diagnosis.
- In some special instances, a single descriptor (e.g., pain, anxiety) can serve the role of both <<focus>> and <<judgement>>.
- Other attributes are optional to support definitions of nursing diagnoses.



Optional attributes

- has dimension
- has site
- has subject of information
- has acuity
- has degree
- has potentiality
- has timing
- is applied to
- is perspective on



Dutch project Nursys

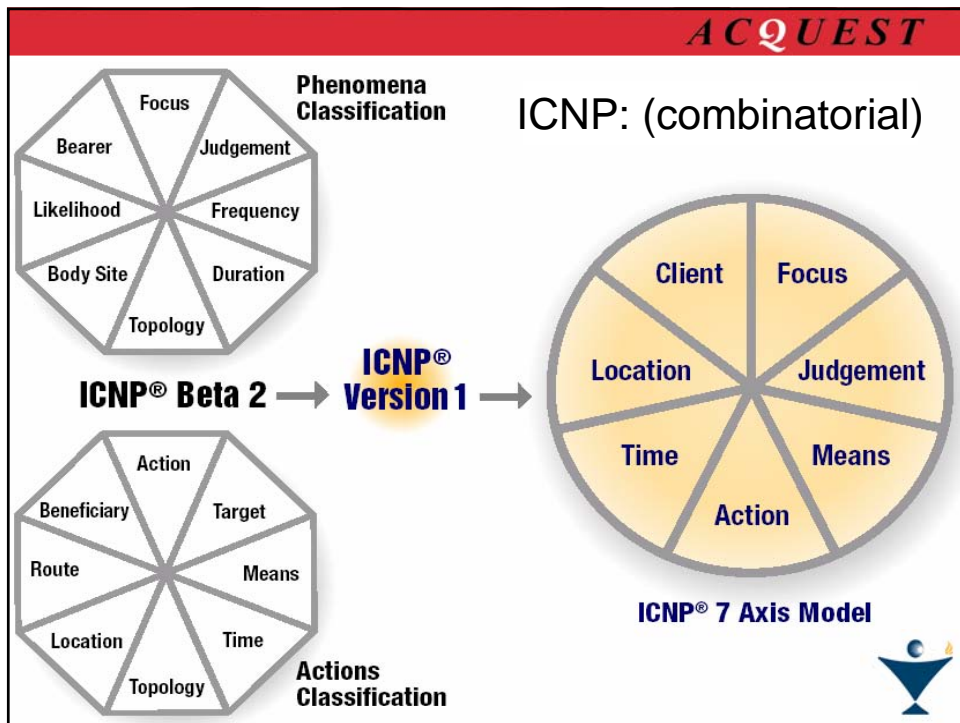
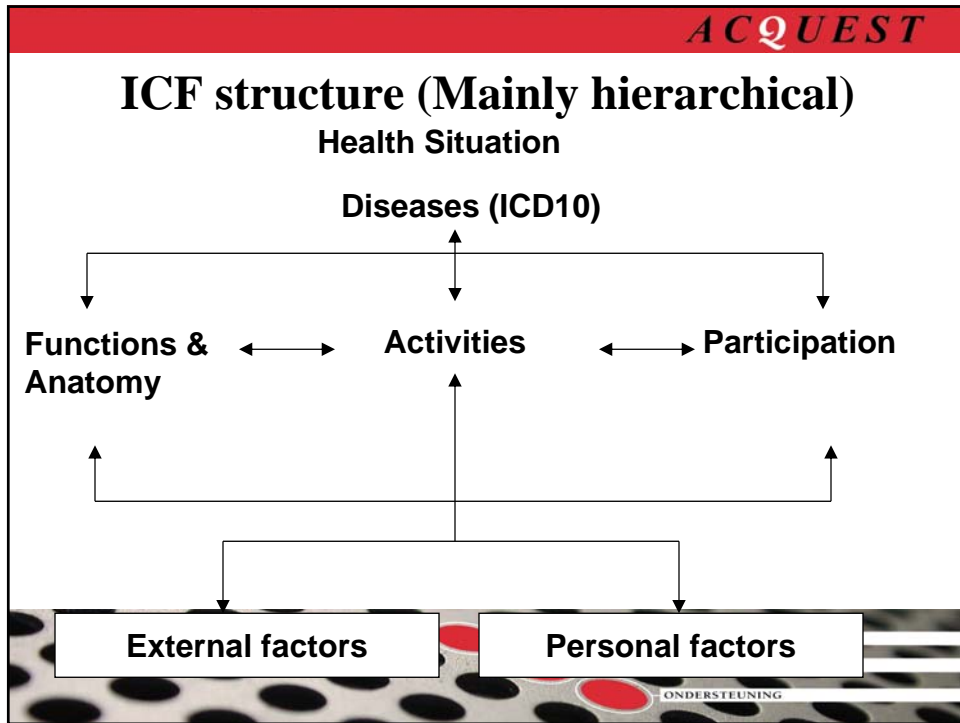
- Testing the ISO reference terminology model for nursing
- Using the NMDSN (aggregated level) as starting point
- Crossmapped via semantics and dissections 24 nursing diagnostic concepts with ICF and ICNP®.



NMDSN nursing diagnoses (List)

- Communication problem
- Knowledge
- Fear
- Uncertainty
- Problems in contact
- Insight health situation
- Problems regimen
- Motivation problems
- Behavioral problem
- Disorientation
- Cognitive problem
- Unrest
- Pain
- Sleeping problems
- Stress
- Decubitus (WCS)
- Problems elimination
- Fever
- Breathing problems
- Fluid and food
- Self care
- ADL (details)
- Risks
- Vital functions





Dissections approach

- Translate ICNP to have all in Dutch
- Put 24 NMDSN NDx terms in table
- Select matching concepts from ICF & ICNP (Dutch and English)
- Ask experts to complete empty NMDSN table with equivalents
- Check percentage agreement
- Select the common concepts
- Dissection according ISO model
- Compare on attribute level
- Decide on cross mapping capabilities



Mapping fear, decubitus & pain

Source: NMDSN, target ICF & ICNP

ICF:


- b1522 Range of emotion
- b810 Repair functions of the skin
- b280 sensation of pain

ICNP:

- 1A.1.1.2.1.1.5.7 Fear
- 1A.1.1.1.10.3.5.3 Decubitus
- 1A.1.1.1.13.1 Pain



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Findings: semantics							
NMDSN item 13 Pain	Researcher	Resp 1 English	Resp 3 & 4 English	Resp 2 Dutch	Resp 5 Dutch	Matching focus & Judgement (%)	
ICF	ICF b 280 – 289 Sensation of pain	B280-289 Pain	b 280 Sensation of pain	B280 pijn- Gewaar- wording	Pijn (b280 / b289)	5 of 5	1,00
ICNP® Focus	ICNP® 1A.1.1.1.13 .1 Pain	1A.1.1.1.13 .1 Pain	1A.1.1.1.13 .1 Pain	1A.1.1.1.13.1 Pijn	1A.1.1.1.1 3.1 Pijn	5 of 5	1,00
ICNP® Judgement	IB.1.1 yes	IB.1.1 yes		1B.13 Demonstration		2 of 3	0,67



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Dissections		
NMDSN	ICF	ICNP
pain	ICF: b180-189	ICNP: Pain
	Sensation of pain	1A.1.1.1.13.1
	Has dimension	
	sensation of	
Has focus pain	Has focus pain	Has focus pain
Has judgment pain	Has judgment pain	Has judgment pain
Has potentiality actual	Has potentiality actual	Has potentiality actual
Has subject of information	Has subject of information	Has subject of information
individual client	individual client	individual client
Has site –	Has site * not available	Has site: selection axis 1E topology and/or 1F location.
Has degree –	Has degree : generic ICF qualifier for impairment	Has degree severity of manifestation axis 1.B.13.
Has timing –	Has timing * not available	Has timing axis C. frequency

Conclusion pain

- Experts 100 % agreement
- Focus 100 % agreement
- Judgement 100 % agreement
- Modifiers: sufficient agreement, ICNP has more details, no real differences
- => these terms are ready for cross mapping between NMDSN, ICF and ICNP.

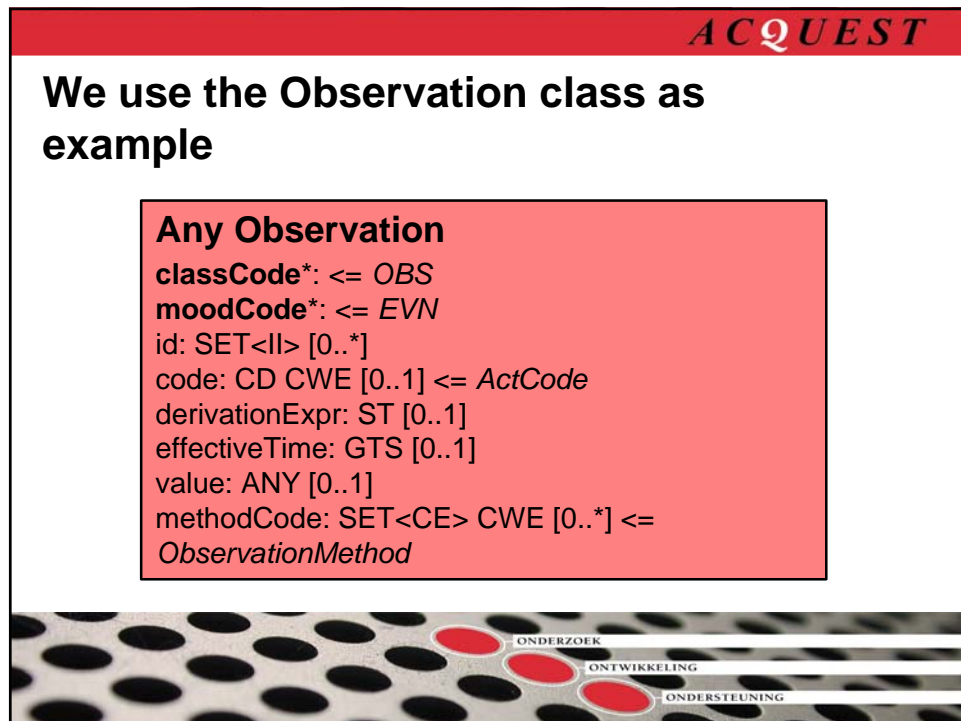
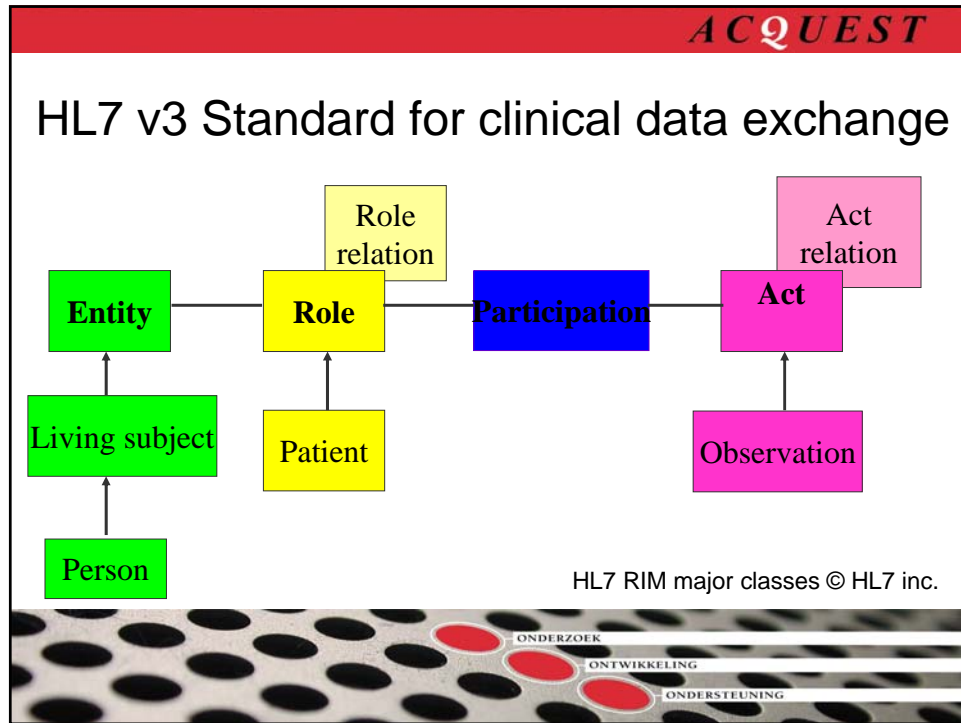


Cross mapping nursing terminology.

Using the information model

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Next steps: mapping concepts to HL7 v3 models

Painscore_VAS
(Acquest Februari 2005)
Doc_Obs_Pijnscore_Meting_V.0.1

↓

Painscore_VAS
classCode*: <= OBS
moodCode*: <= EVN
code: CD CWE [1..1] <= *Visueel Analoge Schaal*
effectiveTime: GTS [0..1]
interpretationCode: SET<CE> CWE [0..*]
<= *ObservationInterpretation* "0 = no pain, 10 = worst pain"

Terminology and coding

Actual patient data

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Nursing terminology synonyms in HL7 v3

Visual_analogue_Scale
(UDD_RMnnnnnr)
Description

↓

Visual_Analogue_Scale_Pain
classCode*: <= OBS
moodCode*: <= EVN
code: CD CWE [0..1] <= *ActCode*
(ICF b 280 - 289 Sensation of pain or ICNP@
1A.1.1.1.13.1 pain or NMDSN 13 pain)
derivationExpr: ST [0..1] "patient score"
effectiveTime: GTS [0..1]
value: PQ [0..1]
interpretationCode: SET<CE> CWE [0..*]
<= *ObservationInterpretation* "0 = no pain, 10 = worst thinkable pain"
methodCode: SET<CE> CWE [0..*]
<= *ObservationMethod* "VAS"

Terminology

Type of data

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Nursing Diagnoses
(UUDD_RMnnnnnn)
 Description

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Nursing Diagnoses
 classCode*: <= OBS
 moodCode*: <= EVN
 code: <= ActCode "PROBLIST"
 effectiveTime:
 value: CE CWE [0..1]
 methodCode: <= ObservationMethod
 (Determine the appropriate nursing diagnoses and use the right description from the problem list)

Example HL7 v3 use for nursing diagnoses in problem list

Mapping Domain Data, Vocabulary and HL7 R-MIM							
Variable	DMIM	attribute	Data type HL7	Cardinality	Vocabulary	Code	Example
Nursing diagnosis	OBS	value	CE	0..1	NANDA	***	Acute Pain
Nursing diagnosis	OBS	value	CE	0..1	ICNP	1A.1.1.1.13.1 & 1D.1	Pain & Acute
Nursing diagnosis	OBS	value	CE	0..1	ICF	d420	Change positions

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Cross mapping nursing terminology.

Mapping local terms to Snomed CT

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Ongoing project for SNOMED CT coding

- NICTIZ, the Dutch National IT Institute for Healthcare, promotes standardization in the domain of care.
- For the EHR development for care for stroke patients a template was developed: the care information model, combining knowledge, terminology and information model.
- Unique codes are needed, thus SNOMED CT was explored to see if it could provide unique codes for each variable.



CLUE - SNOMED CT (Core 0601 core) [Prerelease] [Registered user: williamfgoossen@cs.com]

ConceptId: 22253000 pain
Description Id: 37361011 clinical finding

Search: Pain Words - any order Refined search

- pain
- no pain
- bone pain
- loin pain
- heel pain
- jaw pain
- rib pain
- knee pain
- deep pain
- mild pain
- back pain
- foot pain
- hip pain
- rest pain
- hand pain

Hierarchy for 'pain': SNOMED CT Top Level Navigation Hierarchy

- pain / sensation finding
 - pain

Refine 'pain': Long canonical extended

Refinable attributes

- is a
 - pain / sensation finding
 - sensory nervous system finding
 - neurological finding

ConceptId: 22253000 22253000|pain
Description Id: 37361011

```
<code  
codeSystem="2.16.840.1.113883.6.96"  
code="22253000"  
displayName="pain" />
```

Snomed CT search

Findings SNOMED CT for FAI

Mapping Domain data, HL7 class and Vocabulary					
Variable from instrument	Clinimetric value set	Place in HL7 Model	Datatype HL7 (value)	Local Code CVA-KIS	SNOMED CT code
Frenchay Activities Index (FAI)	Total score	OBS: Code: Value:	INT	FAI-tot	273461000
1. cooking	0 = never 1 = 1x per week, 2 = 1 to 2x per week, 3 = (mostly) more than 2x per week	OBS: Code: value:	INT	FAI-koken	None
2. washing the dishes	0 = never 1 = 1x per week, 2 = 1 to 2x per week, 3 = (mostly) more than 2x per week	OBS: Code: value	INT	FAI-afw	None
3. washing clothes	0 = never 1 = 1 tot 2x per 3 months, 2 = 3 tot 12x per 3 months, 3 = minimum 1x per week	OBS: Code: value	INT	FAI-klew	none

Results: Snomed CT codes for stroke

Amount of care information models	Amount of concepts	Amount of SNOMED CT codes	Percentage of SNOMED CT codes
6 scientific scales	50	13	26%
26 models with individual concepts	157	107	68%
32 in total	207	120	58%

Agreement on 88,1% of the concepts between coder and expert.

For the self made codes 54,9% could be found in SNOMED CT.
And for the codes from an existing coding system 74,4%.

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Conclusions

- Careful mapping is essential for electronic data exchange in health care and nursing
- The ISO model and attributes of nursing diagnoses facilitate dissection of concepts from NMDSN, ICF and ICNP®
- This procedure helps in determining flaws, incompleteness, lacking details and commonalties
- Dissection reveals what concepts from NMDSN, ICF and ICNP® can easily be exchanged without loss of meaning for clinical and/or for aggregate purposes.
- ISO IS 18104 (2003) is useful for mapping nursing diagnoses.
- It is recommended to consider the ISO IS 18104 model and dissections as the 'gold standard' for scientifically sound and meaningful cross mappings between nursing classifications and terminologies.
- The ISO 18104 should also be tested for its other purposes.



Conclusions 2

- Information models allow linkage of one concept to several different terminologies, thus facilitating the use of synonyms. E.g. if organized well, e.g. in archetypes or templates, one institution can use NANDA, another ICNP®, and yet another ICF and still be able to communicate semantically identical information
- However, mapping local terminology to a reference terminology would be preferable.



Thank you for your attention!

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