



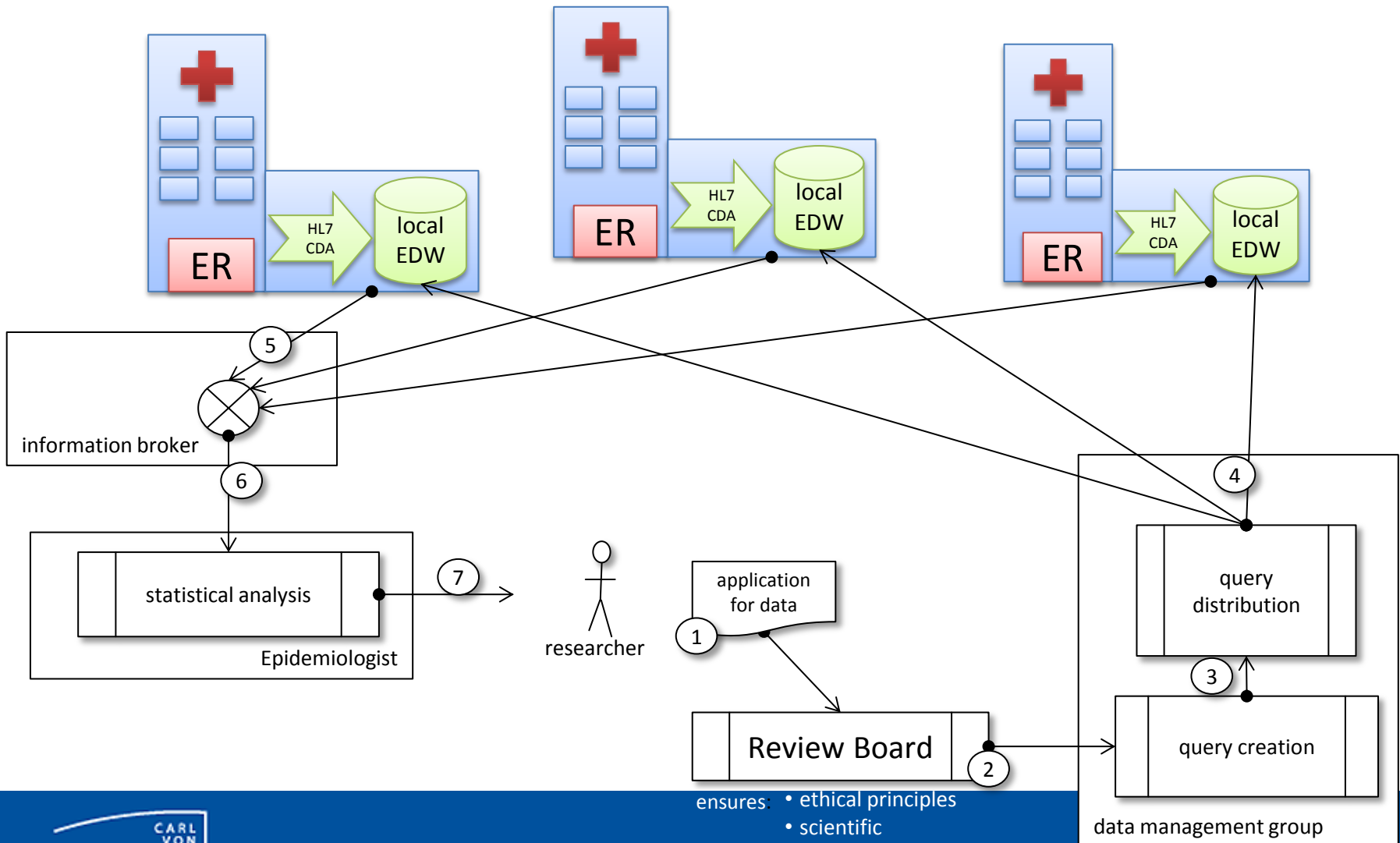
Importing structured emergency room data from hl7:cda - lessons learned

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i2b2 European Academic User Group meeting - Leicester



AKTIN - Distributed Infrastructure for Health Services Research



Technology

- Primary Source Documentation = Routine Data
 - Local Emergency Department Information Systems (EDIS)
- Local Interface EDIS/EDW
 - HL7 CDA Document
 - HL7 FHIR RESTful Webservice
 - IHE XDS.b SOAP Webservice
- Local Enterprise Data Warehouse (EDW)
 - I2B2 Database & WebClient
 - I2B2 Ontology
- Central Information Broker & Query Infrastructure
 - To do

Standardised Emergency Medicine Note

- Dataset consented by the emergency medicine professional association
 - Highly structured
 - Contains free text (not used)
 - De-identified in the local EDW
- Harmonised routine care documentation
 - Clinicians => Vendors / Providers

GKV / BG / UTV / P / ♀ / ♂

Name: _____

Straße: _____

Ort: _____

Tel: _____ Versicherungsnummer: _____

Aufnahme datum Aufnahmezeit Uhr Geburtsdatum

Allergien: KM Penicillin Andere

J N

Leitsymptom: _____ CEDIS _____ seit _____ h

Notfallanamnese / relevante Eigenmedikation / körp. Untersuchung

verantwort. Arzt: _____ Erster Arztkontakt _____ Uhr

Befunde / Verlauf / durchgeführte Therapie

_____ Uhr
Initiierung Therapie

MTS/ESI:

0 10 30 90 120

Schwanger:

ja nein unbekannt

Tetanusschutz:

ja nein unbekannt

Rankin-Skala:

0 1 2 3 4 5

Isolation:

Nein Multiresistenter Keim Gastroenteritis Tuberkulose Meningitis Umkehriso Andere:

Multiresist. Keim:

Ja Verdacht

MRSA 3-MRGN 4-MRGN VRE Andere

AF A /min

SpO₂ B %

RR sys C mmHg

HF /min

Augenöffnung		Verbale Antwort		Motorische Antwort	
<input type="checkbox"/> 4 spontan	<input type="checkbox"/> 3 Aufforderung	<input type="checkbox"/> 5 orientiert	<input type="checkbox"/> 4 verwirrt	<input type="checkbox"/> 6 Aufforderung	<input type="checkbox"/> 5 gezielt
<input type="checkbox"/> 2 Schmerzreiz	<input type="checkbox"/> 1 Keine	<input type="checkbox"/> 3 inadäquat	<input type="checkbox"/> 2 unverständlich	<input type="checkbox"/> 4 ungezielt	<input type="checkbox"/> 3 Beugekrämpfe
		<input type="checkbox"/> 1 keine	<input type="checkbox"/> 1 keine	<input type="checkbox"/> 2 Streckkrämpfe	<input type="checkbox"/> 1 keine
Summe: _____ + _____ + _____ = GCS _____					

Pupillenweite			Lichtreaktion		
<input type="checkbox"/> 2 weit	<input type="checkbox"/> 1 mittel	<input type="checkbox"/> 1 eng	<input type="checkbox"/> 2 prompt	<input type="checkbox"/> 1 träge	<input type="checkbox"/> 1 keine

KKT: E °C

☺ Schmerz: ☹️

0 1 2 3 4 5 6 7 8 9 10

Diagnostik:

Labor	<input type="checkbox"/> 1 h	<input type="checkbox"/> _____ Uhr	<input type="checkbox"/> opB
BGA	<input type="checkbox"/> 1 h	<input type="checkbox"/> _____ Uhr	<input type="checkbox"/> opB
U-Stix	<input type="checkbox"/> 1 h	<input type="checkbox"/> _____ Uhr	<input type="checkbox"/> opB
EKG	<input type="checkbox"/> 1 h	<input type="checkbox"/> _____ Uhr	<input type="checkbox"/> opB
Sono	<input type="checkbox"/> 1 h	<input type="checkbox"/> _____ Uhr	<input type="checkbox"/> opB
Echo	<input type="checkbox"/> 1 h	<input type="checkbox"/> _____ Uhr	<input type="checkbox"/> opB
CCT	<input type="checkbox"/> 1 h	<input type="checkbox"/> _____ Uhr	<input type="checkbox"/> opB
CT	<input type="checkbox"/> 1 h	<input type="checkbox"/> _____ Uhr	<input type="checkbox"/> opB
Traumascan	<input type="checkbox"/> 1 h	<input type="checkbox"/> _____ Uhr	<input type="checkbox"/> opB
Rö. WS	<input type="checkbox"/> 1 h	<input type="checkbox"/> _____ Uhr	<input type="checkbox"/> opB
Rö. Tho	<input type="checkbox"/> 1 h	<input type="checkbox"/> _____ Uhr	<input type="checkbox"/> opB
Rö. Becken	<input type="checkbox"/> 1 h	<input type="checkbox"/> _____ Uhr	<input type="checkbox"/> opB
Rö. Ext	<input type="checkbox"/> 1 h	<input type="checkbox"/> _____ Uhr	<input type="checkbox"/> opB

Zuweisung:

Ohne

Vertragsarzt/Praxis

KV-Notdienst am KH

KV-Notdienst außerhalb KH

Rettungsdienst

Notarzt

Klinik/Verlegung

Andere

Transportmittel:

Ohne

KTW

RTW

NAW/NEF/ITW

RTH/ITH

Anderes

Modelling and Coding

- CDA
 - HL7 ballot process successfully completed
 - More Documentation modules have to be implemented
- Terminologies
 - SNOMED CT
 - 80% - 90% can be coded with Snomed CT
 - Snomed CT license (only) for the project duration
 - LOINC
 - Preferred use of LOINC codes
 - Other Coding Systems
 - ICD10GM, CEDIS complaint list, Scores & Scales,...
 - Proprietary Codes

CDA Document

```
<entry typeCode="COMP">
  <observation classCode="OBS" moodCode="EVN">
    <templateId root="1.2.276.0.76.10.4034"/>
    <id root="1.2.276.0.76.4.17.9814184919" extension="556c07de-bc7e-4d3f-a241-5778eb87aa98"/>
    <code code="9269-2" codeSystem="2.16.840.1.113883.6.1" displayName="Glasgow coma score t
    <statusCode code="completed"/>
    <effectiveTime value="201501161924"/>
    <value xsi:type="PQ" value="12" unit="{score}"/>
    <entryRelationship typeCode="COMP" contextConductionInd="true">
      <observation classCode="OBS" moodCode="EVN">
        <code code="9267-6" codeSystem="2.16.840.1.113883.6.1" displayName="Glasgow coma
        <statusCode code="completed"/>
        <value xsi:type="PQ" value="3" unit="{score}"/>
      </observation>
    </entryRelationship>
    <entryRelationship typeCode="COMP" contextConductionInd="true">
      <observation classCode="OBS" moodCode="EVN">
        <code code="9270-0" codeSystem="2.16.840.1.113883.6.1" displayName="Glasgow coma
        <statusCode code="completed"/>
        <value xsi:type="PQ" value="4" unit="{score}"/>
      </observation>
    </entryRelationship>
```

I2B2 Concept Coding

- Quantitative
 - Glasgow Coma Scale
 - Concept=LOINC:9269-2 („Glasgow coma score total“)
 - Unit=score
 - Value=3-15
- Qualitative
 - Pupil Reaction
 - Concept=SNOMED:301949001 („Brisk pupil near reaction (finding)“)
 - Modifier=SNOMED:362508001 („Both eyes, entire (body structure)“)
 - ICD
 - Concept=ICD10GM:S93.6 („Sprain and strain of other and unspecified parts of foot“)

Coding Challenges (HL7 Terminfo)

- Our approach: „fully qualified“ / post-coordinated I2B2 facts
- TargetSiteCodes
 - Implemented as modifiers
- Negation
 - Back to original dataset
 - Code without negation
- NullFlavors
 - „Normal codes“ if available
 - Post-coordinated NullFlavors
- „Relocation“ / Splitting of Information in the CDA document
 - Back to original dataset

I2B2 Ontology

Navigate Terms

Find

- Modified rankin scale (Integer)
- Oxygen Saturation
- Pain severity
- Pregnancy Status
 - Not pregnant (finding)
 - Patient currently pregnant (finding)
- Reaction of pupil
 - Absent pupil reaction (finding)
 - Brisk pupil near reaction (finding)
 - Delayed pupil near reaction
- Respiratory rate
- Size of pupil
 - Constricted pupil
 - Dilated pupil
 - Medium size pupil
- Systolic blood pressure
- Transport Method
 - KTW
 - NAW/NEF/ITW
 - RTH/ITH
 - RTW
- Type of referral source
 - Accident and Emergency doctor (occupation)
 - Accident and Emergency service (qualifier value)

Group 1			Group 2		
Dates	Occurs > 0x	Exclude	Dates	Occurs > 0x	Exclude
Treat Independently ▼			Treat Independently ▼		
NAW/NEF/ITW (Transport method: Ambulance with emergency physician attendance)			Glasgow Coma Scale < 9		
<div style="border: 1px solid black; background-color: #f08080; padding: 5px; display: inline-block;"> none of these </div>			<div style="border: 1px solid black; background-color: #4682b4; color: white; padding: 5px; display: inline-block;"> AND </div>	<div style="border: 1px solid black; background-color: #90ee90; padding: 5px; display: inline-block;"> one or more of these </div>	

- Thank you for listening! – Questions and Discussion?