

# **Hemodialysis patient referral based on HL7 CDA R2 (ISO/HL7 27932:2009) document standard and DECOR**



**Nikos Kyriakoulakos**  
**Director of Standards HL7 Hellas, CTO Apollo SA**

***Berler A<sup>3,1</sup>, Erich Leisch<sup>5,1</sup>, Karapetakos G<sup>4,1</sup>, Kyriakoulakos N<sup>2,1</sup>, Thireos E<sup>3,1</sup>***

*<sup>1</sup>HL7 Hellas, Athens, Greece, ([www.hl7.org.gr](http://www.hl7.org.gr))*

*<sup>2</sup>Apollo SA, Athens, Greece, ([www.apollo.gr](http://www.apollo.gr))*

*<sup>3</sup>Athens Medical Society (AMS), Athens, Greece, ([www.mednet.gr](http://www.mednet.gr))*

*<sup>3</sup>Gnomon SA, Athens, Greece, ([www.gnomon.com.gr](http://www.gnomon.com.gr))*

*<sup>4</sup>CCS SA, Athens, Greece, ([www.ccs.gr](http://www.ccs.gr))*

*<sup>5</sup> Foundation for Research and Technolog, Crete, Greece, ([www.forth.gr](http://www.forth.gr))*

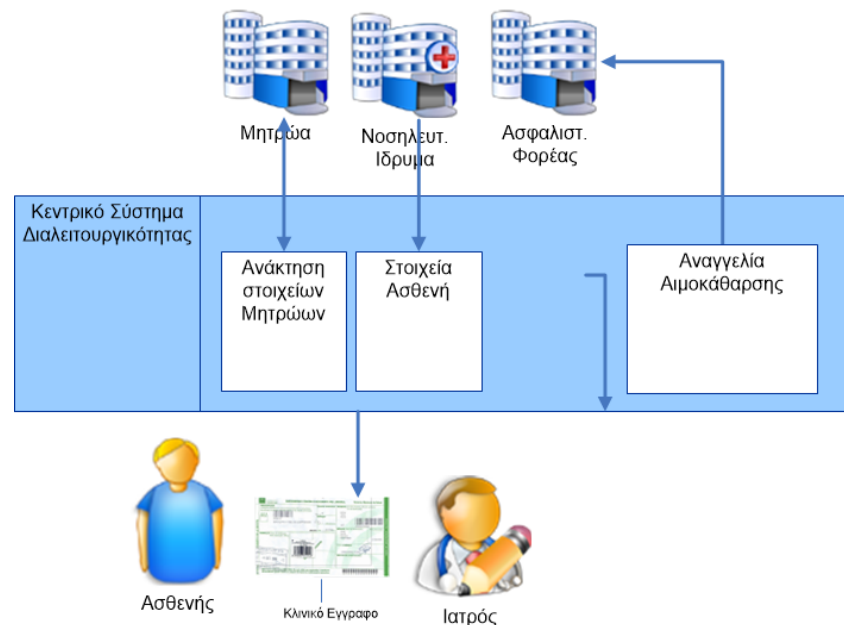


## Clinical Document Architecture: CDA

- CDA examples:
  - Discharge Summary
  - Patient **Referral**
  - **Consultation** Note
  - Patient **Prescription**
  - **Hemodialysis** referral

## CDA: Hemodialysis Referral

- ❑ Clinical Document: Hemodialysis Referral
- ❑ Use Case: Physician fulfils a clinical referral document related to a patient and hemodialysis procedure





## CDA: Hemodialysis Referral– Structure Body

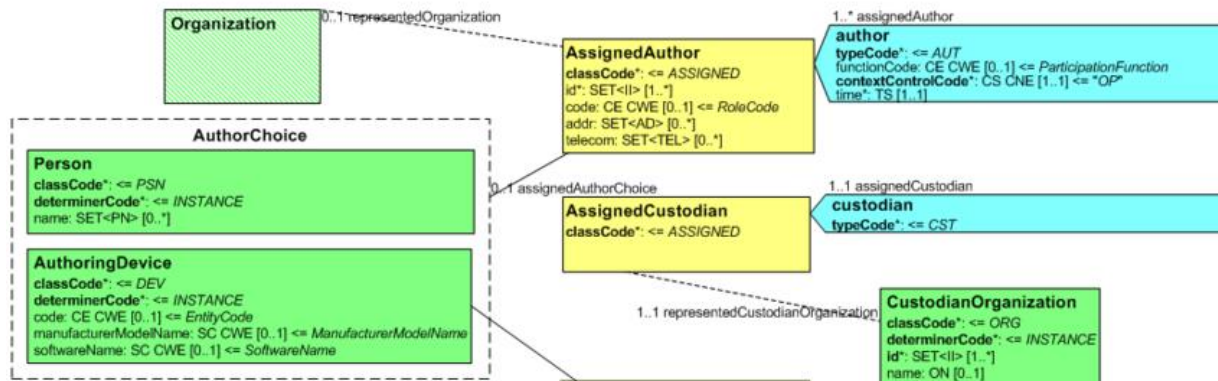
- ▲ ● component "COMP"
  - ▲ ● structuredBody "DOCBODY" Πληροφορίες εντολής για αιμοκάθαρση
    - !.. CDA Section Reason for Referral
    - !.. Πληροφορίες εντολής για αιμοκάθαρση
    - ▷ ● component "COMP"
      - !.. CDA Section Care Plan Section
      - !.. Οδηγίες για τύπο αιμοκάθαρσης
    - ▷ ● component "COMP"
      - !.. CDA Section Assesment Diagnosis
      - !.. Πληροφορίες για Διαγνώσεις που αφορούν την Αιμοκάθαρση
    - ▷ ● component "COMP"
      - !.. CDA Base Section Assesment
      - !.. Πληροφορίες για βασικές μετρήσεις που αφορούν την Αιμοκάθαρση
    - ▷ ● component "COMP"
      - !.. CDA Section Medical Indicators Assessment
      - !.. Πληροφορίες για Medical Indicators
    - ▷ ● component "COMP"

# Clinical Document – Record Target - Patient

```

<recordTarget typeCode="RCT" contextControlCode="OP">
  <!-- Patient Role - Default "PAT" -->
  <patientRole classCode="PAT">
    <!-- AMKA ή SSN -->
    <id extension="1234567890" root="2.16.840.1.113883.3.1937.99.62.3.25.7"/>
    <!-- Address Details - Στοιχεία Διεύθυνσης -->
    <addr use="H PST">
      <!-- Οδός -->
      <streetAddressLine>ΛΑΥΡΠΙΟΥ</streetAddressLine>
      <!-- Αριθμός -->
      <streetAddressLine>11</streetAddressLine>
      <!-- TK -->
      <postalCode>15662</postalCode>
      <!-- Πόλη -->
      <city>ΑΘΗΝΑ</city>
      <!-- Χώρα -->
      <country>GREECE</country>
    </addr>
    <!-- Αριθμός Τηλεφώνου use="H" - Αριθμός Τηλεφώνου-Κινητό use="MC" - email use="HP" -->
    <!-- Αριθμός Τηλεφώνου: <telecom use="H" value="tel:55354257"/> -->
    <!-- Αριθμός Τηλεφώνου-Κινητό: <telecom use="MC" value="tel:55354257"/> -->
    <!-- email: <telecom use='HP' value='mailto:name@anydomain' /> -->
    <telecom use="H" value="tel:55354257"/>
    <telecom use="MC" value="tel:55354257"/>
    <!-- Patient Name Details - Στοιχεία Ονόματος Ασθενή/Εξεταζόμενου -->
    .....
  </patientRole>
</recordTarget>
  
```

## Clinical Document – Author



```

<!-- Doctor responsible for the Document - Author of this document -->
<author typeCode="AUT">
  <functionCode code="221" codeSystem="2.16.840.1.113883.2.25.60.1.10.2" displayName="Doctor"
codeSystemName="epSOSHealthcareProfessionalRoles"/>
  <time nullFlavor="NA"/>
  <assignedAuthor classCode="ASSIGNED">
    <!-- AMKA η SSN -->
    <id extension="1234567890" root="2.16.840.1.113883.3.1937.99.62.3.25.7"/>
    <assignedPerson classCode="PSN" determinerCode="INSTANCE">
      <name>
        <given>ΚΩΣΤΑΣ</given>
        <family>ΦΩΤΙΟΥ</family>
      </name>
    </assignedPerson>
  </assignedAuthor>
</author>

```



# Clinical Document – Sections – Level 2

```
<!-- CDA Section Reason for Referral -->
<!-- Πληροφορίες εντολής για αιμοκάθαρση -->
<component typeCode="COMP" contextConductionInd="true">
  <section classCode="DOCSECT" moodCode="EVN">
    <!-- template id -->
    <templateId root="2.16.840.1.113883.2.25.60.1.10.13"/>
    <!-- Αριθμός Γνωμάτευσης -->
    <templateId root="2.16.840.1.113883.3.1937.99.62.3.25.19" extension="081201"/>
    <!-- Αριθμός Γνωμάτευσης, από δεσμευμένη περιοχή τιμών -->
    <templateId root="2.16.840.1.113883.3.1937.99.62.3.25.20" extension="081201"/>
    <!-- section code -->
    <code code="42349-1" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"
displayName="Reason for Referral"/>
    <title>Πληροφορίες</title>
    <text> Πληροφορίες (Τι είδος Αιμοκάθαρση θα πρέπει να γίνει στον ασθενή) </text>
  </section>
</component>
```



## Clinical Document – Sections – Level 3

```
<!-- CDA Base Section Assesment -->
<!-- Πληροφορίες για βασικές μετρήσεις που αφορούν την Αιμοκάθαρση -->
<component typeCode="COMP" contextConductionInd="true">
  <section>
    <templateId root="2.16.840.1.113883.2.25.60.1.10.15"/>
    <code code="8716-3" codeSystem="2.16.840.1.113883.6.1" displayName="Vital Signs"
codeSystemName="LOINC"/>
    <!-- Age, Height, Weight entries -->
    <!-- Age -->
    <entry typeCode="DRIV">
      <observation classCode="OBS" moodCode="EVN">
        <templateId root="2.16.578.1.34.10.5001"/>
        <code code="30525-0" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"
displayName="Age"/>
        <value xsi:type="PQ" value="60" unit="a" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance"/>
      </observation>
    </entry>
    <!-- Height -->
    <entry typeCode="DRIV">
      <observation classCode="OBS" moodCode="EVN">
        <templateId root="2.16.578.1.34.10.5002"/>
        <code code="8302-2" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC"
displayName="Height"/>
        <value xsi:type="PQ" value="182" unit="cm" xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance"/>
      </observation>
    </entry>
  </section>
</component>
```





HEALTH LEVEL 7

# CDA Development Art-Décor



## CDA Development - Methodology

### ■ Problem Domain – Medical

- Use case Analysis
- Interoperability Analysis (transactions)
- Define appropriate data (data sets)

## CDA Development - Methodology

### ❏ Problem Domain – Terminology

- Define value sets
- Define coding (ICD10, ICPC etc.)
- Define coding targets (analysis, statistics etc.)



## CDA Development - Methodology

### ❑ Problem Domain – ICT

#### ■ HL7v3:

- ◆ Reference Information Model
- ◆ XML serialization
- ◆ XML Schema
- ◆ CDA (part text, part structured data)

### ❑ RIM (Reference Information Model) Backbone

### ❑ OIDs

## DECOR Output - Conclusions

- ❑ Care Provider view
- ❑ Technical Documentation
- ❑ XML / CSV resources for implementers
- ❑ Schematron\*
  
- ❑ (Decor) Great Methodology focus on collaboration
- ❑ Reusable components (templates
- ❑ HL7 Greece affiliate will continue to support related projects
- ❑ National repository for HL7 CDA implementations



## Demo

### CDA for Hemodialysis (Intrasoft) - Project Information

- DECOR
- Project
- Datasets
- Scenarios
- Terminology
- Templates
- Issues

- General**
- Copyright
- Authors
- Version information
- Ids
- Status
- MyCommunity
- Development

**Name** CDA for Hemodialysis (Intrasoft)

**Description**

**Properties** Prefix: hemocda- Default language en-US  Contains reusable content?  Is private?  Experimental/Test? Notifier: on

**Publication location**

**Project overview** [Project Index](#)

**Project Id** 2.16.840.1.113883.2.25.60.1

**Repository reference**

URL	Prefix
<input type="text" value="http://art-decor.org/decor/services/"/>	<input type="text" value="ad1bbr-"/>
<input type="text" value="http://art-decor.org/decor/services/"/>	<input type="text" value="ad2bbr-"/>

**Namespaces**

URI	Prefix	Default
<input type="text" value="http://www.w3.org/2001/XMLSchema-insta"/>	<input type="text" value="xsi"/>	<input type="checkbox"/>
<input type="text" value="urn:hl7-org:v3"/>	<input type="text" value="hl7"/>	<input type="checkbox"/>
<input type="text" value="urn:hl7-org:v3"/>	<input type="text" value="cda"/>	<input checked="" type="checkbox"/>



## Demo

### CDA for Hemodialysis (Intrasoft) - Templates

- Templates**
- CDA Document Level Template
    - CDA Hemodialysis Order (0.1alpha)
  - CDA Header Level Template
    - CDA author (0.1alpha)
    - CDA component Hemodialysis Assesment (Canceled)
    - CDA componentHDAssesment
    - CDA confidentialityCode (0.1alpha)
    - CDA custodian (0.1alpha)
    - CDA effectiveTime (0.1alpha)
    - CDA id (0.1alpha)
    - CDA inFulfillmentOf (0.1alpha)
    - CDA languageCode (0.1alpha)
    - CDA Organization (0.1alpha)
    - CDA participant (0.1alpha)
    - CDA Person (0.1alpha)
    - CDA realmCode (0.1alpha)
    - CDA recordTarget (0.1alpha)
    - CDA title (0.1alpha)
  - CDA Section Level Template
    - CDA BaseSectionAssesment
    - CDA Section Care Plan Section

**CDA Hemodialysis Order**

Version	2015-10-19 18:08:25	Status	Draft
Version Label	0.1alpha	Id	hemocda-template-6
Name	CDAClinicalDocument	Display Name	CDA Hemodialysis Order

**Description, model, context and examples**

Description: Template CDA ClinicalDocument (prototype, directly derived from POCD\_RM000040 MIF)

Classification: CDA Document Level Template

Open/Closed: open

Used by / Uses: 0 Used by, 10 Uses

Relations	Type	Model/Template	as of
Specialization	2.16.840.1.113883.10.12.1	CDA ClinicalDocument (repository: ad1bbr-)	2005-09-07

Item	DT	Card	Conf	Description	Label
h17: ClinicalDocument					CDAClinicalDocument
Included from: 2.16.840.1.113883.3.1937.99.62.3.25.5 CDA realmCode (Dynamic) 0..1 O					
h17: realmCode	CS	0..1	R		CDArealmCode
CONF @code = GR					
h17: typeId	II	1..1	R		CDAClinicalDocument
@root 1..1 F 2.16.840.1.113883.1.3					
@extension 1..1 F POCD_HD000040					
h17: templateId	II	1..1	M		CDAClinicalDocument
@root 1..1 F 2.16.840.1.113883.2.25.60.1.10.6					
Included from: 2.16.840.1.113883.3.1937.99.62.3.25.2 CDA id (Dynamic) 1..1 R					
h17: id	II	1..1	R		CDAid
h17: code	CE	1..1	R		CDAClinicalDocument
CONF @codeSystem = 2.16.840.1.113883.6.1					
Example <code code="57144-8" codeSystem="2.16.840.1.113883.6.1" codeSystemName="LOINC" displayName="Nephrology Referral note"/>					
Included from: 2.16.840.1.113883.3.1937.99.62.3.25.6 CDA title (Dynamic) 0..1 O					
h17: title	ST	0..1	O		CDAtitle
Included from: 2.16.840.1.113883.3.1937.99.62.3.25.1 CDA effectiveTime (Dynamic) 1..1 R					
h17: effectiveTime	TS.DATETIME.MIN	1..1	R		CDAeffectiveTime



## Demo

### Templates

- Search
- CDA realmCode (0.1.alpha)
- CDA recordTarget (0.1.alpha)
- CDA title (0.1.alpha)
- CDA Section Level Template
  - CDA BaseSectionAssesment
  - CDA Section Care Plan Section
  - CDA Section Medical Indicators Assessment**
  - CDA Section Reason for Referral
  - CDA SectionAssesmentDiagnosis
  - CDA sectionHemodAssesment
  - CDA StructuredBodyHDAssesment
- CDA Entry Level Template
  - CDA Diagnosis
  - CDA Height
  - CDA Observation Medical Indicators
  - CDA Patient Age
  - CDA Procedure Type
  - CDA Weight
- Template type not specified
  - CDA author National SSN

### CDA Section Medical Indicators Assessment

Version	2015-11-10 18:31:10	Status	Draft
Version Label		Id	hemocda-template-22
Name	CDASectionMedicalIndicatorsAssesment	Display Name	CDA Section Medical Indicators Assessment

**Description, model, context and examples**

Description	Template CDA Section Medical Indicators Assessment (prototype, directly derived from POCD_RM000040 MIF)		
Context	Parent nodes of template element with id 2.16.840.1.113883.2.25.60.1.10.22		
Classification	CDA Section Level Template		
Open/Closed	open		
Used by / Uses	1 Used by, 9 Uses		
Relations	Type	Model/Template	as of
	Specialization	2.16.840.1.113883.10.12.201 CDA Section (repository: ad1bbr-)	2005-09-07
Example	<pre> &lt;section&gt;   &lt;templateId root="2.16.840.1.113883.2.25.60.1.10.14"/&gt;   &lt;!-- CDA Section Medical Indicators Assessment --&gt;   &lt;code code="52290-4" codeSystem="2.16.840.1.113883.6.1" displayName="Physical therapy treatment plan, Assessment   indicator" codeSystemName="LOINC"/&gt; &lt;/section&gt; </pre>		

Item	DT	Card	Conf	Description	Label
<> h17:section					CDASectionMedicalIndicatorsAssesment
@classCode	0..1	F		DOCSECT	



# **Hemodialysis patient referral based on HL7 CDA R2 (ISO/HL7 27932:2009) document standard and DECOR**



**Nikos Kyriakoulakos**  
**Director of Standards HL7 Hellas, CTO Apollo SA**

***Berler A<sup>3,1</sup>, Erich Leisch<sup>5,1</sup>, Karapetakos G<sup>4,1</sup>, Kyriakoulakos N<sup>2,1</sup>, Thireos E<sup>3,1</sup>***

*<sup>1</sup>HL7 Hellas, Athens, Greece, ([www.hl7.org.gr](http://www.hl7.org.gr))*

*<sup>2</sup>Apollo SA, Athens, Greece, ([www.apollo.gr](http://www.apollo.gr))*

*<sup>3</sup>Athens Medical Society (AMS), Athens, Greece, ([www.mednet.gr](http://www.mednet.gr))*

*<sup>3</sup>Gnomon SA, Athens, Greece, ([www.gnomon.com.gr](http://www.gnomon.com.gr))*

*<sup>4</sup>CCS SA, Athens, Greece, ([www.ccs.gr](http://www.ccs.gr))*

*<sup>5</sup> Foundation for Research and Technolog, Crete, Greece, ([www.forth.gr](http://www.forth.gr))*



HEALTH LEVEL 7

**Thank you!**

<http://www.hl7.org.gr>  
[kyriakoy@apollo.gr](mailto:kyriakoy@apollo.gr)