HL7 Version 3 Message

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A HL7 V3 Messages-based Communication for Biosignal Data Exchange

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= Abstract =

Purpose: The Healthcare service using a wireless device contains a sensor device using measured biosignal data, the transmission of data, and a home health network. Methods of data input, transferring, and managing biosignal data vary greatly, so the transferred data format needs to be standardized to meet data transmission methods like Health Level 7 and IEEE 1451, etc. HL7 V3 Messages can apply to the scenario of biosignal data exchange. We designed a system managing biosignal data for patients in home.

Materials and Methods: The system is composed of 4 major parts: [1] the generation of HL7 messages based on standardized biosignal data [2] the generation of query interaction message templates [3] the design of biosignal information database [4] a client/server program based on personal biosignal information management.

Results: We implemented the client/server application using the method of HL7 Query Messages in the specific scenario about biosignal data management. Also, the HL7-based biosignal messaging template and the database were designed. In the user interface, patient/doctor's options were developed separately and they enabled each user to have a sorted view of the accumulated data. The application using the standardization transmission protocol (HL7 V3 Messages) was XML format to input and search the data.

Conclusion: The standardized data transmission are so essential to share healthcare data and simplify software applications. Although their implementations were not easy to apply real situations, they would be a requirement in healthcare delivery systems.

Key words: Standard, HL7 Messages, Exchange, Query, Biosignal

: HL7 Version 3 Message

(Clinical Dodument Architecture)

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u- Hospital system,
Telemedicine service   Mobile u- Healthcare   .

2.

,   (1)   HL7 messages

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HL7   ,

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.   HL7 artifact   HL7 RIM Repository 2.16.2, Rose
Tree, V3 Generator 3.0.2.   Visio 2002   .

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HL7(Health Level7)   )   /

. Version 2.x

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Version 3.0

XML   , XML

.   HL7
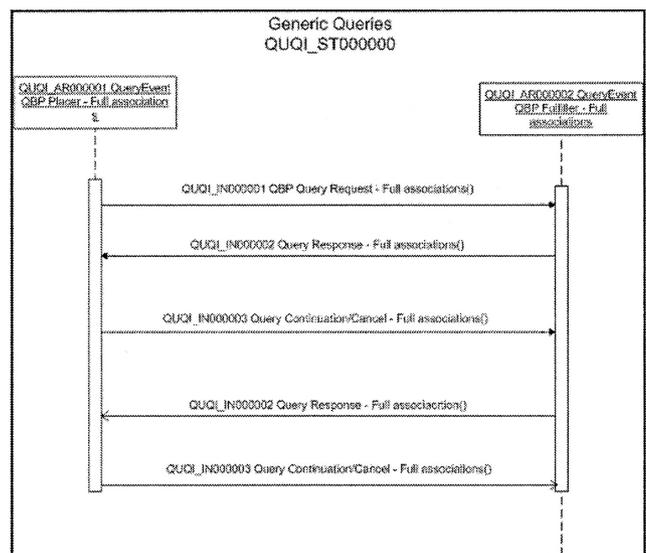
Element   Attribute

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HL7   .

HL7

1. QueryInfrastructure(QUQI_DM000000)   Interaction

Observation , , SpO2 .
VitalsignsSchema(REPC_HD 000130UV.xsd) ,
QueryInfrastructure   3.
(QUQI_DM000000)   Interaction   3
query specification Control Acts   (1)   HL7
.   ,   ,

Query Control Act Request: Query By Parameter
(QUQI_HD021000UV01)   V3 Generator 3.0.2.
Query Control Act Response/Acknowledgement   XML   , REPC_RM000130
(QUQI_HD120000UV01)   (ObservationVital Signs.xsd)   .
Query Control Act Request Continue/Cancel
(QUQI_HD000001UV01)   AddPatientAnnotation (COMT_RM300001)
.
(2)   Element
MS SQL Server 2005   XMLSPY 2003
, XML   Element   Attribute   .
.   StatusCode
' completed'   moodCode ' TYPEWRIT'
(3)   /   .

Microsoft Windows XP Professional   Microsoft
Visual Studio 2005   ,

```xml
<?xml version="1.0" encoding="utf-8" standalone="no"?>
<..Act xmlns="urn:hl7-org:v3" xmlns:xsi="http://www.w3.org/2002/XMLSchema-instance" xsi:schemaLocation="urn:hl7-org:v3 REPC_HD000130UV.xsd">
    <classCode value="OBS"/>
    <modeCode value="EVN"/>
    <id root="2.16.840.1.113883.19.3.2409" extension="1-976-245"/>
    <code code="ACT" codeSystem="2.16.840.1.113883.5.4" codeSystemName="ActCode">
        <originalText>Observation Vital Signs</originalText>
    </code>
    <statusCode code="completed"/>
    <interpretationCode code="w" codeSystem="2.16.840.1.113883.5.83"/>
    <subject>
        <class code="PAT"/>
        <typecode code="SBJ"/>
        <Patient_id value="          "/>
        <!--환자 ID 들어가는 곳-->
    </subject>
    <author>
        <modeCode code="TYPEWRIT" codeSystem="2.16.840.1.113883.5" displayName="typewritten">
        </modeCode>
    </author>
    <!-- 혈압측정 데이터가 입력되는 곳 ============================================================= -->
    <sourceOf>
        <classCode value="OBS"/>
        <modeCode value="EVN"/>
        <observationEvent>
            <id root="2.16.840.1.113883.19.3.2409" extension="1-976-245"/>
            <code code="SNOMED" codeSystem="2.16.840.1.113883.5.4" codeSystemName="ActCode">
            </code>
            <text mediaType="text/plain">확장기혈압</text>
            <statusCode code="completed"/>
            <!--측정시간 값이 들어가는 곳-->
            <effectiveTime value="       "/>
            <value value="         "/>
            <unit unit=" mmHg"/>
            <!--측정단위-->
        </observationEvent>
    </sourceOf>
```

2. ObservationVitalSigns   Template Message

(2)   .

response/acknowledge

HL7 Version 3 Query Control

QueryInfrastructure   Attribute   ‘ OK’   ,   ‘ NF’ (Not data found)
        Vocabulary   Element   Attribute   ‘ AE’ (Error)   .

                                                    .

                                            (3)

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statusCode   ‘ NEW   .   3   ,

                                                                                    .

```xml
<?xml version="1.0" encoding="utf-8" standalone="no"?>
<ControlActProcess xmlns="urn:hl7-org:v3" xmlns:xsi="http://www.w3.org/2002/XMLSchema-instance"
xsi:schemaLocation="urn:hl7-org:v3 QUQI_HD020000.xsd">
    <modeCode value="x_ActMoodIntentEvent"/>
    <classCode value="CACT"/>
    <id root="2.16.840.1.113883.19.3.2409" extension="       " displayable="true"/>
    <code code="A19427" codeSystem="2.16.840.1.113883.5.4" codeSystemName="ActCode"/>
    <authorOrPerformer>
        <typeCode code="AUT" codeSystem="2.16.840.1.113883.11.18935"/>
        <modeCode code="WRITTEN" codeSystem="2.16.840.1.113883.5.89" codeSystemName="HL7OID" displayName="Author"/>
    </authorOrPerformer>
    <queryByParameter>
        <queryId root="UUID"/>
        <statusCode code="NEW"/>
        <initialQuantity value="10"/>
        <Parameter>
            <Patient_id value="   "/>
            <Observation_id value="   "/>
            <StartTime value="200701150315"/>
            <EndTime value="200703150315"/>
        </Parameter>
    </queryByParameter>
</ControlActProcess>
```

3.   RequestMessage.xml

```xml
<?xml version="1.0" encoding="utf-8" standalone="no"?>
<ControlActProcess xmlns="urn:hl7-org:v3" xmlns:xsi="http://www.w3.org/2002/XMLSchema-instance"
xsi:schemaLocation="urn:hl7-org:v3 QUQI_HD020000.xsd">
    <modeCode value="x_ActMoodIntentEvent"/>
    <classCode value="CACT"/>
    <id root="2.16.840.1.113883.19.3.2409" extension="       " displayable="true"/>
    <code code="A19427" codeSystem="2.16.840.1.113883.5.4" codeSystemName="ActCode"/>
    <queryAck>
        <queryId root="2.16.840.1.113883.19.3.2409" extension="1-976-245" displayable="true"/>
        <statusCode code="New"/>
        <queryResponseCode code="OK"/>
        <!-- or Not data found = NF / Error = AE -->
    </queryAck>
</ControlActProcess>
```

4. Acknowledge   request response/acknowledge message

' valid'   )

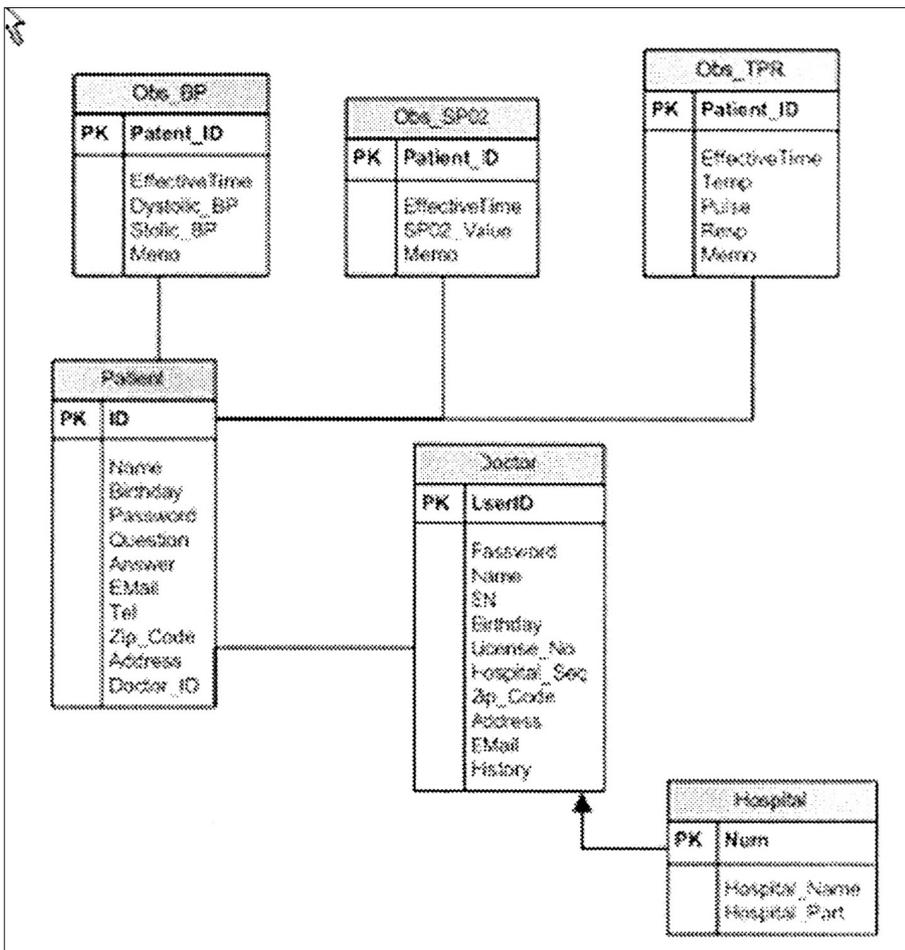.   5   REPC_ RM000130   .

.   PatientAnnotation   .

(4)   /

4.

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,   XML   HL7

.   .

acknowledge   .

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.   HL7   ,

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5. REPC_RM000130
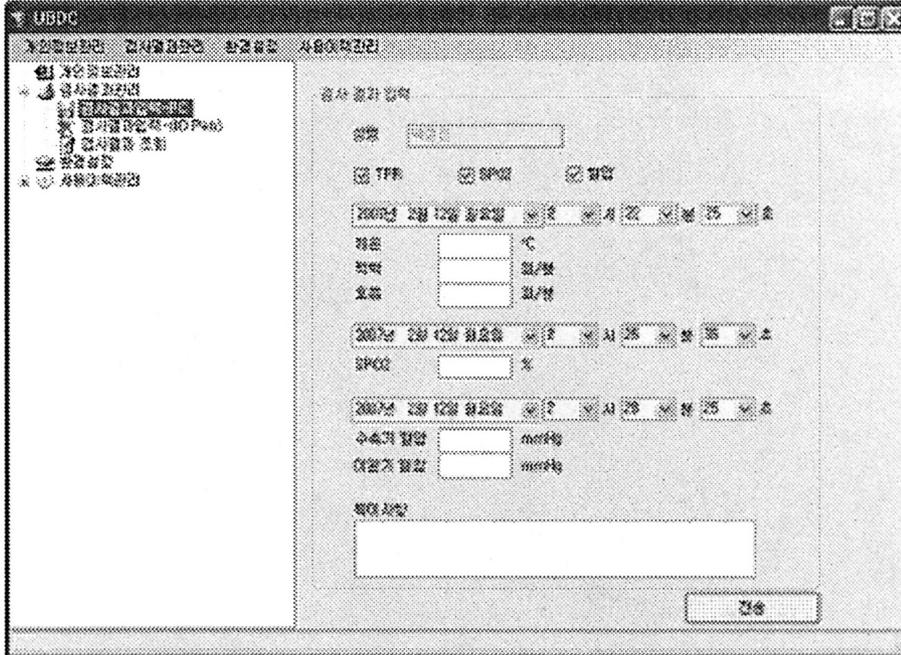
6.

7.
PatientAnnotation

```
<?xml version="1.0" encoding="utf-8" standalone="no"?>
<PatientAnnotation xmlns="urn:hl7-org:v3"
xmlns:xsi="http://www.w3.org/2002/XMLSchema-instance"
xsi:schemaLocation="urn:hl7-org:v3 COMT_HD300001UV.xsd">
    <classCode value="ACT"/>
    <modeCode value="EVN"/>
    <code code="ActPatientAnnotationCode" codeSystem="2.16.840.1.113883.5.4"
codeSystemName="ActCode">
        <originalText>Add Patient Annotation</originalText>
    </code>
    <text>    </text>
    <!--memo가 들어가는 곳-->
    <statusCode code="completed"/>
    <author>
        <classCode value="ASSIGNED"/>
        <typeCode value="AUT"/>
        <id>    </id>
        <!-- 의사 ID 정보입력 -->
        <time value="        "/>
        <!-- 입력시간 -->
    </author>
    <RecordTarget>
        <typeCode value="RCT"/>
        <Patient_id value="        "/>
        <!-- 환자ID 정보 입력 -->
    </RecordTarget>
</PatientAnnotation>
```

HL7 V3

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