mHealth in the Age of Interoperability

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Data, Data Everywhere!
Challenges

Volume (calculated values such as min/max)
Meaning (derived values such as steps)
Syntax/Semantics
  Interoperability
  Integration
Meaning
Human API

"bloodPressure":
{
  "id":550b8a8e834dd16f259663b1,"userId":52e20cb2ff56a62000001,"timestamp":2015-03-19T22:48:26.000Z,"source":"ihealth","systolic":117,"diastolic":76,"unit":"mmHg","heartRate":66}
"calculate or derive over 60 "features" that can contribute to characterizing human physiology"
By combining the market-leading engineering and innovation of Analog Devices with the unique biomathematical capabilities of LifeQ, the two companies plan to design sensors that enable personalized, continuous and accurate tracking of physiological parameters such as heart rate, sleep phases, sleep quality, blood lactate, 24-hour calorie intake as well as stress markers such as salivary cortisol.

April, 2016
Maximum over a time period
Situational information (sitting)
GET [base]/Observation?_query=obs.stats&code=8480-6&03/03/2016/07:00:00&03/03/2016/12:00:00
GET [base]/Observation?_query=obs.stats&code=8462-4&03/03/2016/07:00:00&03/03/2016/12:00:00
(LOINC: https://loinc.org/fhir/)
{  "resourceType":"Observation",  "id":"q",  "status":"final",  "code":{    "coding": [      {        "system":"http://loinc.org",        "code":"8460-6",        "display":"Systolic blood pressure"      }    ],  "subject": {    "reference": "Patient/1"  },  "encounter": {    "reference": "Encounter/1"  },  "effectiveDateTime": "2005-06-30T19:45:00-04:00",  "valueQuantity": {    "value": 146.0,    "unit": "mm[Hg]",    "system": "http://unitsofmeasure.org",    "code": "mm[Hg]"  }}
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FHIR Narrative

Generated Narrative with Details
id: blood-pressure
meta:
  identifier: urn:uuid:187e0c12-8dd2-67e2-99b2-bf273c878281
  status: final
code: Blood pressure systolic & diastolic (Details : {LOINC code '55284-4' = 'Blood pressure systolic and diastolic', given as 'Blood pressure systolic & diastolic'})
subject: Patient/example
effective: 17/09/2012
performer: Practitioner/example
interpretation: low (Details : {http://hl7.org/fhir/v2/0078 code 'L' = 'Low', given as 'Below low normal'})
bodySite: Right arm (Details : {SNOMED CT code '368209003' = '368209003', given as 'Right arm'})
component
code: Systolic blood pressure (Details : {LOINC code '8480-6' = 'Systolic blood pressure', given as 'Systolic blood pressure'};
  {SNOMED CT code '271649006' = '271649006', given as 'Systolic blood pressure'};
  {http://acme.org/devices/clinical-codes code 'bp-s' = '??', given as 'Systolic Blood pressure'})
  value: 107 mm[Hg]
component
code: Diastolic blood pressure (Details : {LOINC code '8462-4' = 'Diastolic blood pressure', given as 'Diastolic blood pressure'})
  value: 60 mm[Hg]
What’s This Got to Do With EHRs?
Argonaut Members

Accenture
athenahealth
Beth Israel Deaconess Medical Center
Cerner
Epic
Intermountain Healthcare
Mayo Clinic
MEDITECH
McKesson
Partners HealthCare System
Harvard SMART Project
The Advisory Board Company
Surescripts
SMART on FHIR
Cerner App Gallery

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Broad FHIR Interoperability?
Ricky Bloomfield, MD

“Once we have the data, we need to make meaningful use of it. This will be accomplished through advanced analytics and visualizations that will be presented to our providers as part of their workflow, whether on the desktop or mobile. SMART on FHIR-based applications will help serve this role. We are currently developing and testing several SMART on FHIR apps and have incorporated the platform into our Epic-based EHR.”