Expert-System-Based Interpretation of Hepatitis Serology Test Results as App Store iPhone Application

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Introduction

**Hepaxpert**

- Web-based expert system (telemedicine, in the sense of tele-interpretation)

- Expert-based textual interpretive analysis of hepatitis A, B, and C serology test results

**iPhone Client**

- Largest platform of both general mobile and medical mobile applications

- Planned: Iterative development based on customer feedback on technical issues and medical content
System architecture

**Client**
- iPhone
- Web Browser
- Application

**Server**
- Java EE 6
- RESTful WebService
- Knowledge Base
  - Arden Syntax rule engine
  - Database
  - Medical Logical Modules
Two clients:

**Mobile Client**

- **HBsAg**: negative
- **anti-HBs**: positive
- **anti-HBc**: not tested
- **IgM anti-HBc**: not tested
- **HBeAg**: negative
- **anti-HBe**: negative
- **anti-HBs titre**: 20

**Static Client**

- **Hepaxpert/Interpretation**
  - Knowledge-based interpretation of hepatitis A, B, and C serology

- **Input of test results**

- **Web service teleiatro®**
  - Test patients: A = Vaccination B = C

- **Hepatitis A serology**
  - anti-HAV: □ positive □ negative □ borderline □ not tested
  - IgM anti-HAV: □ positive □ negative □ borderline □ not tested
  - HAV-RNA: □ positive □ negative □ borderline □ not tested

- **Hepatitis B serology**
  - HBsAg: □ positive □ negative □ borderline □ not tested
  - anti-HBs: □ positive □ negative □ borderline □ not tested
  - anti-HBc: □ positive □ negative □ borderline □ not tested
  - IgM anti-HBc: □ positive □ negative □ borderline □ not tested
  - HBeAg: □ positive □ negative □ borderline □ not tested
  - anti-HBe: □ positive □ negative □ borderline □ not tested
  - anti-HBs titre: □ 20 □ U/l

- **Hepatitis C serology**
  - anti-HCV: □ positive □ negative □ borderline □ not tested
  - HCV-RNA: □ positive □ negative □ borderline □ not tested
Results: Two systems

**Mobile Client**

The patient is immune to the hepatitis virus B. This immunity may either have been acquired naturally through a hepatitis B virus infection just being passed through or as a result of an earlier infection, or it may have been induced by active or passive immunization.

**Static Client**

Positive results for total anti-HAV antibodies in combination with negative results for IgM anti-HAV antibodies indicate immunity to the hepatitis virus A and exclude the possibility of a recent hepatitis A. This immunity may either have been acquired naturally through an earlier infection or it may have been induced by active vaccination or passively acquired immunization.

The patient is immune to the hepatitis virus B. This immunity may either have been acquired naturally through a hepatitis B virus infection just being passed through or as a result of an earlier infection, or it may have been induced by active or passive immunization.

Vaccination Recommendation: If an indication for a hepatitis B vaccination exists, the primary course of immunization has been completed, and the last prior vaccination was given at least 1 month previously, an immediate hepatitis B booster shot is recommended to maintain the immunity. If the person is suspected of being a 'low responder' a titre check 2 months after the booster is advisable.

No test was made with regard to hepatitis C serology.