Patient Matching Definition

Patient matching: **Comparing** data from multiple **sources** to identify records that represent the same **patient**. Typically involves comparing varied demographic fields from different health data stores to create a unified view of a patient.
Identity Matching / Identity Resolution

Identity analysis:
- link analysis,
- data mining

Identity resolution:
- Merge/dedupe records

Identity matching:
- Measure record similarity.
- Search/retrieval

Attribute matching:
- Compare name, DOB, COB, address, etc.

Structured and unstructured data sources

Identity data repository
How FHIR Can Help

• FHIR Enabled Patient Matching
  • Current matching system have different scoring scales which makes interpretation of meaning difficult when using different systems.
    • 0-1, 0-100%, -4000-40000
  • Standardize patient matching score
    • -1 – 1, 0-100%, 0-1, (Probable, Possible, Certainly Not), Others

• Testing of Patient Matching Systems
  • Fit for Use
    • Algorithms tested on data that is representative of its use case.
  • Add Validation stamp to the FHIR returned FHIR profiles

• Move towards a specification for patient matchers that allows them to be interchanged like SMART on FHIR applications
Simplest Model

Client  Server
Need a Way to Incorporate Probabilistic Matching
Use Case

• A patient arrives at a provider
• The provider wants to query an eMPI to see if there are existing records for this person
FHIR

• FHIR Necessary but not Sufficient for Interoperability

• No Magic Bullet for matching
  • Currently many different matching solutions work well
  • No standardized solution to allow uniform integration into Health IT enterprises.

• Challenge
  • FHIR Great solution for Connection, Structure
    • Provides more than one way to do things
    • Need ability to Do Complex Matching and Entity Resolution

• Matching Complex Challenge
  • Dirty Data
  • Blocking
  • Schema Matching
  • Computational Complexity
  • Lack of Unique Identifiers or Identifiers
### 5.1.9 Search Parameters

Search parameters for this resource. The common parameters also apply. See Searching for more information about searching in REST, messaging, and services.

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Description</th>
<th>Paths</th>
</tr>
</thead>
<tbody>
<tr>
<td>active</td>
<td>token</td>
<td>Whether the patient record is active</td>
<td>Patient.active</td>
</tr>
<tr>
<td>address</td>
<td>string</td>
<td>An address in any kind of address/part of the patient</td>
<td>Patient.address</td>
</tr>
<tr>
<td>address-city</td>
<td>string</td>
<td>A city specified in an address</td>
<td>Patient.address.city</td>
</tr>
<tr>
<td>address-country</td>
<td>string</td>
<td>A country specified in an address</td>
<td>Patient.address.country</td>
</tr>
<tr>
<td>address-postalCode</td>
<td>string</td>
<td>A postalCode specified in an address</td>
<td>Patient.address.postalCode</td>
</tr>
<tr>
<td>address-state</td>
<td>string</td>
<td>A state specified in an address</td>
<td>Patient.address.state</td>
</tr>
<tr>
<td>address-use</td>
<td>token</td>
<td>A use code specified in an address</td>
<td>Patient.address.use</td>
</tr>
<tr>
<td>animal-breed</td>
<td>token</td>
<td>The breed for animal patients</td>
<td>Patient.animal.breed</td>
</tr>
<tr>
<td>animal-species</td>
<td>token</td>
<td>The species for animal patients</td>
<td>Patient.animal.species</td>
</tr>
<tr>
<td>birthdate</td>
<td>date</td>
<td>The patient’s date of birth</td>
<td>Patient.birthDate</td>
</tr>
<tr>
<td>careprovider</td>
<td>reference</td>
<td>Patient’s nominated care provider, could be a care manager, not the organization that manages the record</td>
<td>Patient.careProvider (Organization, Practitioner)</td>
</tr>
<tr>
<td>deathdate</td>
<td>date</td>
<td>The date of death has been provided and satisfies this search value</td>
<td>Patient.deceasedDateTime</td>
</tr>
<tr>
<td>deceased</td>
<td>token</td>
<td>This patient has been marked as deceased, or as a death date entered</td>
<td>Patient.deceased[x]</td>
</tr>
<tr>
<td>email</td>
<td>token</td>
<td>A value in an email contact</td>
<td>Patient.telecom(system=email)</td>
</tr>
<tr>
<td>family</td>
<td>string</td>
<td>A portion of the family name of the patient</td>
<td>Patient.name.family</td>
</tr>
<tr>
<td>gender</td>
<td>token</td>
<td>Gender of the patient</td>
<td>Patient.gender</td>
</tr>
<tr>
<td>given</td>
<td>string</td>
<td>A portion of the given name of the patient</td>
<td>Patient.name.given</td>
</tr>
<tr>
<td>identifier</td>
<td>token</td>
<td>A patient identifier</td>
<td>Patient.identifier</td>
</tr>
<tr>
<td>language</td>
<td>token</td>
<td>Language code (irrespective of use value)</td>
<td>Patient.communication.language</td>
</tr>
<tr>
<td>link</td>
<td>reference</td>
<td>All patients linked to the given patient</td>
<td>Patient.link,other (Patient)</td>
</tr>
<tr>
<td>name</td>
<td>string</td>
<td>A portion of either family or given name of the patient</td>
<td>Patient.name</td>
</tr>
<tr>
<td>organization</td>
<td>reference</td>
<td>The organization at which this person is a patient</td>
<td>Patient.managingOrganization (Organization)</td>
</tr>
<tr>
<td>phone</td>
<td>token</td>
<td>A value in a phone contact</td>
<td>Patient.telecom(system=phone)</td>
</tr>
<tr>
<td>phonetic</td>
<td>string</td>
<td>A portion of either family or given name using some kind of phonetic matching algorithm</td>
<td>Patient.name</td>
</tr>
<tr>
<td>telecom</td>
<td>token</td>
<td>The value in any kind of telecom details of the patient</td>
<td>Patient.telecom</td>
</tr>
</tbody>
</table>

What’s missing to satisfy the use case?

• The user can’t specify min/max matching scores on the returned results

• There is a desire for uniformity on the search score that is returned
  • Additionally, information on system validation and training would be helpful in interpreting the results.
Sample Query

• SearchPerson: POST
  https://pme.mybluemix.net/mdmcloud/pme/search/person
  • {
    "person": { "legalName": [ 
      { "lastName": "Smith", 
        "givenNameOne": "Tiger" } 
    ],
    "businessAddress": { "addressLineOne": "12 Main street",
      "residenceNumber": "22",
      "city": "Toronto",
      "provinceState": "Ontario",
      "zipPostalCode": "M5V 6D8",
      "country": "Canada"
    }
  }
}
Sample Response

- { "searchPersonResult": [ 
  
  "matchType": "CERTAIN",
  "score": "95",
  "sourceId": {
    "primaryKey": "101",
    "source": "MDMSP"
  } }, {

  "matchType": "POSSIBLE_MATCH",
  "score": "94",
  "sourceId": {
    "primaryKey": "102",
    "source": "MDMSP"
  } },

https://www.ng.bluemix.net/docs/#services/probabilisticmatch/index.html
accessed Feb. 18th 2016
Search Using FHIR

• Advanced Search Abstraction
  • GET [base]/Patient?query=name&parameters...

• Example
  • GET [base]/Patient?given=Robert&\family=Smith&birthdate=1990-01-01

• This can be leveraged to create a patient matching system interface
Potential Extensions to Search

• Single Threshold
  • GET [BASE]/Patien?given=Robert&Family=1990-01-01&/score?minscore>=90

• Dual Threshold
  • GET [BASE]/Patien?given=Robert&Family=1990-01-01&/score?minscore>=90&maxscore>=95
  • Could then cut off matches automatically for no-return, needs further review, and automatic matches