Key-Linked On-line Databases for Clinical Research

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Topics

- Goal: Sharing data
- Concept: Key-linked databases (DB's)
- Applications & Versatility
- Example: A Biomaterial Bank
- Summary
Goal

- Sharing data on individual research subjects
- A generic mechanism to maintain and access related data in different databases
The Key-Link

• Corresponding entities in two databases are linked by adding a common key attribute to both.
• Unique key values are generated as UUIDs or by a similar method.
• This key does not circulate except between these two DB's. In particular, it is never accessible to the client.
• Data from both sources are merged on the client
The Key-Link (2)

Entity: SUBJECT
Attributes:
   - FirstName
   - LastName
   - DOB
   - [HiddenKey]

Entity: SUBJECT
Attributes:
   - YOB
   - Diagnosis
   - ...
   - [HiddenKey]
Key-Link Attributes

- Name of link (arbitrary)
- Name of external database
- External database URL
- Master (boolean; identifies the local database as master)
- Name of local electronic data capture (EDC) form or entity
- Names of coupled data items (i.e., data attributes that are automatically synchronized)
Key-Link Functions

- Insert target record
- Update target record
- Insert or update target record
- Delete target record
- Initiate target session
Versatility
Some Technical Details

- Server Platform: Linux/Apache/PostgreSQL
- Client: any JavaScript-capable Browser
- Electronic Data Capture:
  - Forms generator “dbform” (Perl)
  - Data dictionary-driven
  - Extension API
- Key-link functionality partly in dbform and partly in extension module
Example: Access Master-DB
Example: Select Master Object
## Access Linked DB

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<tr>
<th>Zentrum</th>
<th>Patient Nr.</th>
<th>Name</th>
<th>offen</th>
<th>Eintrag Nr.:</th>
</tr>
</thead>
<tbody>
<tr>
<td>München</td>
<td>1</td>
<td>Thomas Müller</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Geschlecht
- männlich
- weiblich

### Vorname
- Thomas

### Nachname
- Müller

### Geburtsdatum [TT.MM.JJJJ]
- 08.05.1961

### SAP Patienten-ID
- 1234567

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### OP
- Zentrum: München
- Pat.-Nr.: 103-569-245
- OP Nr.: 1
- Batch-Nr.: 103-569-245
- OP-Datum [TT.MM.JJJJ]: 20.04.2011

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Summary

- Key-linked DB's are a powerful and versatile interoperability tool.
- Data in separate DB's that might be operated at different sites by different people can be shared in a controlled fashion.
- Compact functionality allows for affordable implementation.
- Future development: generalised specification (co-operations welcome) for implementation in different systems