BigMouth Dental Data Repository

Introduction and Research Opportunities
BigMouth Background

→ 2007: COHRI (Consortium for Oral Health Research Informatics) started by 14 dental schools
  • Who can join: All schools who use axiUm.
  • Goals to standardize data, terminology, forms, and sharing knowledge.
  • Iowa joined in 2020
  • Current Members: 45 Dental Schools in North America

→ 2012: BigMouth started by UT Houston, UCSF, Harvard, and Tufts
  • Funded by National Library of Medicine grant to develop an Inter-University Oral Health Research Database.
BigMouth Members

• The COD has been working since 2018 to become members
• Iowa Joined BigMouth in 2020

• Iowa IRB approval for BigMouth data transfers
  • Not an umbrella IRB
  • Each research project using BigMouth at COD must submit their own IRB application
BigMouth Members

• Current members: 10 schools
  • Iowa became the 10th school
  • Univ. of Minnesota in process of joining.
1.1 M

10 institutions - 4.05 Million patients
How has BigMouth Been Used

Skeletal Malocclusion: A Developmental Disorder With a Life-Long Morbidity
Nishitha Joshi, Ahmad M. Hamdan, and Walid D. Fakhoury

Measuring up: Implementing a dental quality measure in the electronic health record context
Aarti Bhardwaj BDS, MPH, Rachel Ramoni DMD, ScD, Elsbeth Kalenderian DDS, MPH, PhD, Ana Neumann DDS, MPH, PhD, Natan B. Hebbali BDS, MPH, Joel M. White DDS, MS, Lyle McClellan DDS, Muhammad F. Walji PhD

The Journal of the American Dental Association
Volume 147, Issue 1, January 2016, Pages 35-40


Duong Tran (2016). Risk factors associated with chronic periodontitis: a retrospective cohort study using a dental data repository.

Duong Tran (2016). Association between obesity and periodontitis: cross-sectional study on patients visiting universities' dental clinics in the United States.

Duong Tran (2016). Identifying patient overlap between dental and medical EHRs.
BigMouth Example

- Evaluate the association between malocclusion with other medical conditions
- 3,019 orthodontic patients
- Class II and III malocclusion
- Select medical conditions

**Table 4. Association Between Malocclusion and Different Medical Conditions for 3,019 Orthodontic (Malocclusion) Patients From the BigMouth Dental Data Repository [67]**

<table>
<thead>
<tr>
<th>Medical conditions (variable)</th>
<th>Chi-square value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleep apnea</td>
<td>0.7728</td>
<td>0.379</td>
</tr>
<tr>
<td>GI disorders</td>
<td>12.7649</td>
<td>0.000**</td>
</tr>
<tr>
<td>Lymphoma</td>
<td>2.6326</td>
<td>0.105</td>
</tr>
<tr>
<td>General dental problems</td>
<td>0.0169</td>
<td>0.896</td>
</tr>
<tr>
<td>Loose broken or missing filling</td>
<td>2.2985</td>
<td>0.129</td>
</tr>
<tr>
<td>Bruxism</td>
<td>0.2680</td>
<td>0.605</td>
</tr>
<tr>
<td>Cleft lip and palate</td>
<td>0.8272</td>
<td>0.363</td>
</tr>
<tr>
<td>Hypertension</td>
<td>26.8761</td>
<td>0.000**</td>
</tr>
<tr>
<td>Headache</td>
<td>311.1025</td>
<td>0.000**</td>
</tr>
<tr>
<td>Vision problems</td>
<td>2.9614</td>
<td>0.085</td>
</tr>
<tr>
<td>Functional pain/discomfort of oral cavity</td>
<td>318.2418</td>
<td>0.000**</td>
</tr>
<tr>
<td>Active tuberculosis</td>
<td>91.6427</td>
<td>0.000**</td>
</tr>
</tbody>
</table>

**Statistical significance.**
Data Transfer and QA

→ Data transfer
  • Quarterly updates for all schools
  • Next transfer is due November 13th
  • UI data will be merged with COHRI this cycle

→ QA
  • Age of patients is as of last tx date
  • Tx Clinics and tooth sites are not in BigMouth
  • Insurance queries will take special consideration
Clinical & Big Data Research Request Form

Clinical Research + Data Request = Clinical & Big Data Research Request Form

REQUEST FOR CLINICAL RESEARCH ACTIVITIES

Study Name
Study Title
Principal Investigator
Co-Investigator
Study Team Members

Length of study
Number of subjects

Chain
Funding
State of Approval

Study events as you imagine them from the UIUC:

BigMouth
axiUm
Mi-PACS
Epic

Clinical and Big Data Research Request form

Please type N/A if any required field if it is not applicable.

Please fill this form out completely and press the submit button when done. The form is not saved if you exit before submitting.

Study Name

PI name
No Person Selected
Add A Person
Search by Name or University ID

IOWA College of Dentistry and Dental Clinics
How to Access the Form

1. https://www.dentistry.uiowa.edu/
2. Click “Research”
How to Access the Form

3. Select “Clinical and Big Data Research Request Form"
How to Access the Form

4. Login Workflow and complete authentication
Clinical Research and Big Data Request Form
Workflow Support Steps

- Clinical Research
  - DEO → Kyungsup → Jin

- Big Data Research
  - Chuck → Brian → DEO → Kyungsup → Jin

- PIs need only one step of submission
Accessing Data
What information can you access
- Iowa – approx. 750,000 patient records
- COHRI schools – 4.05 million patient records

Level 1 Access
- Explore the data using the BigMouth Workbench (i2b2)
- Review overall numbers in BigMouth (for both Iowa and Member institutions)

Level 2 Access
- Attain detailed data for each individual patient
- Submit proposal to Research Review Committee
  - IRB Approval
- Receive dataset to conduct analysis
  - Fill out the research data request template
BigMouth Dental Data Repository Access Request

I am requesting access to the BigMouth Dental Data Repository. As the Requestor, I understand that in order to be granted access to the BigMouth Dental Data Repository, I must abide by certain requirements in regards to its use.

I understand that the data may not be disclosed, loaned, duplicated or shared with any other individual or institution without first securing written permission from the data owners.

I have implemented appropriate safeguards to prevent potential use or disclosure of data to any other entity. I have not, and will not, share the password associated with the account used to access the BigMouth Data Warehouse with any other person.

I attest I will NOT attempt to re-identify any de-identified data I might receive or been granted access.

I understand it is my responsibility to notify my Sponsor when access to the BigMouth Data Warehouse is no longer required.

Requestor’s User Name

Requestor’s Email Address

Requestor’s Signature  Print Name  Date

As the Sponsor, I have verified that the Requestor listed on this page should be granted access to the BigMouth Data Warehouse.

Sponsor’s Signature  Print Name  Date
## BigMouth - Data Elements

<table>
<thead>
<tr>
<th>Data elements in BigMouth</th>
<th># of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics</td>
<td>4,052,141</td>
</tr>
<tr>
<td>Diagnoses</td>
<td>471,926</td>
</tr>
<tr>
<td>Forms</td>
<td>1,387,073</td>
</tr>
<tr>
<td>Insurance Information</td>
<td>1,066,714</td>
</tr>
<tr>
<td>Odontogram</td>
<td>3,486,345</td>
</tr>
<tr>
<td>Periodontal charts</td>
<td>467,720</td>
</tr>
<tr>
<td>Practice</td>
<td>2,276,531</td>
</tr>
<tr>
<td>Medications</td>
<td>314,419</td>
</tr>
<tr>
<td>Procedures</td>
<td>2,354,461</td>
</tr>
</tbody>
</table>
Fees

- Level 1 Access: included in College of Dentistry's membership fee.
- Level 2 Access: $1500-4500/query to extract data
I Want to Apply

→ Once you have completed the Iowa workflow for access to BigMouth for your project
  • IRB approval needed for Level 2 access
  • Project submitted to BigMouth Clinical Research Committee for review
    • Each BigMouth member school has a member on the Clinical Research Committee.
    • Once approved, data will be extracted by BigMouth. Fee associated with extraction.

→ i2b2 tutorial: https://bigmouth.uth.edu/help.php
Questions?

College of Dentistry Big Data Board

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