Multimodal Approaches to using Big Data in Oral Health Services Research

Pete Damiano

Director, UI Public Policy Center
Professor, UI College of Dentistry

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In This Presentation

• University of Iowa Public Policy Center (PPC)
• Health services research and use of multimodal research
• Oral health services and use of multimodal research
• Example of oral health services research
  – Iowa Dental Wellness Plan evaluation
Public Policy Center Research Programs (PPC)

1. Transportation and Vehicle Safety
2. Health
3. Social and Education
4. Politics and Policy
5. Environmental
6. Iowa Social Science Research Center
Health Services/Policy Research

Study of the health care system

• Access to care
• Quality of care
• Costs of care
Multimodal (Mixed Methods) Approach using Big Data

- Administrative Data
  - Insurance enrollment files
  - Claims/encounter data
  - Provider data

- Surveys
  - Consumers, members, patients
  - Providers, administrators

- Qualitative data
  - Interviews
  - Focus groups
Each Approach Evaluates Different Aspect of the Question

- **Administrative Data**
  - Factual

- **Surveys**
  - Knowledge
  - Attitudes
  - Experiences

- **Qualitative data**
  - Methods development
  - Depth of inference
Oral Health Services Research at PPC
Oral Health Services Research Team

**Dentist Investigators**
- Ray Kuthy
- Susan McKernan
- Julie Reynolds
- Astha Singhal
- Donald Chi

**Behavioral Scientist**
- Natoshia Askelson

**Economists**
- Dan Shane
- Padmaja Ayyagari
- George Wehby

**Health Services Researcher**
- Elizabeth Momany (Asst. Director)

**GIS Expert**
- Mark Pooley
Oral Health Services Research

- Similar multi-modal approaches and methods
- No diagnosis codes
- Less evidence base for some services
Recent Use of Multimodal Approaches

1. Coordinating and Improving Oral Health Workforce Activities in Iowa
   - HRSA-supported
2. First Preventive Dental Exam: Disparities in Need, Costs and Behavioral Insights
   - NIH-supported
3. Iowa Dental Wellness Plan Evaluation
   - CMS- and Iowa DHS-supported
Iowa Dental Wellness Plan Evaluation
Iowa Health & Wellness Plan

• Medical portion designed to look more like private insurance
  – Began January 1, 2014
  – Includes healthy behavior incentives

• Dental Wellness Plan (DWP)
  – New adult dental benefit for expansion population
  – Began May 1, 2014
  – Administered by Delta Dental of Iowa
  – Mirrors medical insurance with healthy behavior incentives
Role of Multimodal Research in DWP Development

UI PPC Study of IowaCare Program (2013)

• IowaCare did not have a dental component
• Key findings:
  – Significant pent-up demand for dental care and lower oral health status among uninsured adults
Chronic Health Conditions of Uninsured

<table>
<thead>
<tr>
<th>Health conditions lasting &gt;3 months</th>
<th>% reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental, Tooth or Mouth Problems</td>
<td>39%</td>
</tr>
<tr>
<td>Back or Neck Problems</td>
<td>37%</td>
</tr>
<tr>
<td>Arthritis, Bone or Joint Problems</td>
<td>36%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>34%</td>
</tr>
<tr>
<td>Overweight/Obesity</td>
<td>31%</td>
</tr>
<tr>
<td>Allergies or Sinus Problems</td>
<td>29%</td>
</tr>
<tr>
<td>Indigestion, Heartburn or Ulcers</td>
<td>27%</td>
</tr>
<tr>
<td>Migraine Headaches</td>
<td>16%</td>
</tr>
<tr>
<td>Bladder or Bowel Problems</td>
<td>15%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>15%</td>
</tr>
<tr>
<td>Bronchitis, Emphysema, Lung Problems</td>
<td>14%</td>
</tr>
<tr>
<td>Heart Problems</td>
<td>11%</td>
</tr>
<tr>
<td>Asthma</td>
<td>11%</td>
</tr>
</tbody>
</table>

Source: IowaCare Member survey, 2013
Oral Health Status of Uninsured

Source: IowaCare Member survey, 2013
Dental Wellness Plan (DWP)

• Earned benefits maintained with recalls every 6-12 months
• Dentists encouraged to do an online clinical risk assessment (Previser)
• Reimbursement ~60% higher than Medicaid
• No annual maximum
DWP Earned Benefits Model

Core Services
Available at enrollment
- Diagnostic/Preventive
- Emergency
- Stabilization
- Large restorations near pulp
- Acute periodontal
- Dentures
- Limited endodontic care

Enhanced Services
After 1st periodic recall
- Restorative
- Non-surgical periodontal
- Endodontic care

Enhanced Plus Services
After 2nd periodic recall
- Crowns
- Tooth replacements
- Periodontal surgery

Exam must be made in 6-12 months
DWP Evaluation Plan
Key Questions for DWP Evaluation

• Access to care
• Quality of and satisfaction with care
• Cost of care
• Provider participation in and attitudes toward program
• Adequacy of provider network
• Outreach and referral services
Multimodal Research using Big Data in Action

Access to Care

Provider Surveys
- participation; willingness to treat

Consumer Surveys
- regular source of care; unmet need

Administrative Data
- dental utilization

Provider Panel Data
- network adequacy; provider density

Qualitative Data
- experiences getting care
Administrative Data

- Medicaid and Delta Dental of Iowa (Commercial) in SQL database
  - Claims/encounter
  - Enrollment
  - Provider
- Medicaid data
  - Past 16 years
- Delta Dental of Iowa
  - Past 10 years
- Statewide dentist tracking system
- Medicare
Administrative Data

Claims-based outcomes

• DWP vs Medicaid
  – Annual dental visit rate
    • Means tests
    • Pre/post
  – Preventive visit rate by tier
    • Means tests for each tier
  – Time to first visit
    • Survival analyses
Administrative Data

Cost outcomes

• DWP vs Medicaid
  – Incremental cost effectiveness ratios
    • Annual dental visit
    • ED use for non-traumatic dental
    • Dental exams for people with diabetes
      *Diabetes diagnoses identified from medical claims
Member Surveys

- DWP (n=4800) and Medicaid (n=6000) [new members]
  - Access to care
    - Unmet need
    - Timeliness of appointments
  - Regular source of care
  - Need to change dentists
  - Rating of care
  - Earned benefits model
    - Understanding and satisfaction with
Provider Surveys

Sample
- All private practice dentists in state (n=1400)
- Statewide dentist tracking system

Topics
- Level of participation
- Barriers to participation
- Earned benefits model
  - Understanding and satisfaction with
Network Adequacy

• Geographic assessment of the adequacy of the provider network
  – DWP vs Medicaid
    • Active providers (submitted at least one claim)
• Data
  – Administrative claims data
• Distance calculations
  – Private practitioners
  – Safety net
Multimodal Research in Action

Access to Care

- Provider Surveys: participation; willingness to treat
- Administrative Data: dental utilization
- Consumer Surveys: regular source of care; unmet need
- Provider Panel Data: network adequacy; provider density
- Qualitative Data: experiences getting care
Summary: Multimodal Research using Big Data

• Each individual research method has strengths/weaknesses
  – Have had some further strengthen analyses by linking survey and administrative data

• Using multiple approaches allows triangulation of issues/problems
  – Best done if this is considered at the front end of the study

• Ability to synthesize across results allows for better understanding of the nuances of the research findings
  – E.g., causes, implications
Discussion

Vinny