Integrating Medical-Dental Care Coordination for Diabetic Patients: Barriers, Solutions, and Successes

Panel: Incorporating Oral Health into Primary Care Health Home

American Association for Community Dental Programs
2015 Annual Symposium

Kansas City, MO
April 26, 2015
• **I do**, or my spouse/partner does, have a relevant financial interest of other relationship(s) with a commercial entity producing health care related product/services, and I have indicated the nature of this relationship below.

• I have received *research grant support* from Delta Dental of Wisconsin and DentaQuest Foundation. (Both of these entities offer health insurance products).
- Non-profit organization
- 56 locations and two hospitals
- ~3.7 million patient encounters in 2014
- 86 different medical specialties
- 650+ physicians | ~7000 staff
- 400+ research and educational projects
- 30,000 square miles of primary service area
• Nine FQHCs providing dental services to people from all of Wisconsin's 72 counties
• 40-plus FTE dentists
• 30,680 unique dental patients (2010)
• 41,449 unique dental patients (2011)
• 46,815 unique dental patients (2012)
• 44,267 unique dental patients (2013)
Oral Health: A National Problem

• Over **108 million** Americans lack dental insurance (2.5 times the number that have no health insurance)

• Oral health burdens **53 million** children and adults across the U.S.

• CMS projects that the total national expenditures for dental care will almost triple between 2000 and 2020 (from **$62.0 billion** in 2000 to **$167.9 billion** in 2020, a **271% increase**).

References:
• CMS
Oral-Systemic Connection

- Dry mouth often caused by medications prescribed for other systemic conditions; increases risk of caries and periodontal disease

- Periodontal disease is linked to conditions with systemic implications like:
  - Diabetes | cardiovascular disease/strokes
  - Respiratory infections
  - Adverse pregnancy outcomes
  - Infective endocarditis and prosthetic joints
  - Rheumatoid arthritis | neurodegenerative diseases
  - Pancreatic cancer | chronic kidney disease
Health Insurance Initiatives

• Delta Dental of Wisconsin has created a program that is designated to offer its members with certain chronic health conditions the opportunity to receive additional oral health benefits.\(^1\)

• Aetna initiated Dental/Medical Integration (DMI) program offering free dental care to at-risk members based on research.\(^2\)

• CIGNA offered extended benefits to expecting mothers, diabetics, and cardiovascular disease patients to improve health and lower costs.\(^3\)

• Blue Cross Blue Shield of Michigan commissioned a study by University of Michigan researchers, which demonstrated a link between good oral health and lower medical costs for diabetics.\(^4\)

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This trail leads to these important questions:

• If the future is medical health homes and accountable care organizations, where is oral health in that equation?

• Why isn’t it more prominent when evidence exists to support oral health’s inclusion in these new models or systems?
Why Is Diabetes a Concern?

- The estimated total death rates due to diabetes will double between 2005 to 2030 and will be the seventh leading cause of death in 2030.
- The U.S. Department of Health and Human Services has listed dental diseases as one of the complications of diabetes.
County-Level Estimates of Diagnosed Diabetes Among Adults aged ≥ 20 years: United States 2009


Diabetic Foot Ulcer

A 47-year-old diabetic patient with profound peripheral neuropathy developed a blister on the plantar aspect of her right heel that became recalcitrant to conservative treatment.

Wound surface area: ~ 3–4 cm²

Periodontitis

Diabetic patient with moderate periodontitis (pockets of 5–7 mm)

Ulcerated surface and area of tissue necrosis: 10–20 cm\(^2\)

Diabetes ↔ Periodontal Disease

• It is established beyond a reasonable doubt that diabetes has a deleterious effect on periodontal disease (PD) → risk of periodontitis is increased by approximately threefold in diabetic individuals compared with non-diabetic individuals.

• Evidence is mounting with respect to the impact of periodontal health on diabetic control → PD associated with insulin resistance and poor glycemic control.

• Clearly, in their role as guardians of health, it is critical for dentists and physicians to work together to manage their diabetic patients.


### Complications of Diabetes

<table>
<thead>
<tr>
<th>Systemic Complications</th>
<th>Oral Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetic neuropathy</td>
<td>Aggressive form of periodontitis</td>
</tr>
<tr>
<td>Diabetic nephropathy can lead to dialysis or kidney transplant</td>
<td>Necrotizing ulcerative gingivitis</td>
</tr>
<tr>
<td>Diabetic retinopathy and blindness</td>
<td>Tooth decay and root caries</td>
</tr>
<tr>
<td>Heart attack, stroke, foot amputation</td>
<td>Dental caries</td>
</tr>
<tr>
<td>Poor wound healing</td>
<td>Candidal infection</td>
</tr>
<tr>
<td></td>
<td>Burning mouth syndrome</td>
</tr>
<tr>
<td></td>
<td>Lichen planus</td>
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</tbody>
</table>
One quick example: United Concordia Study, Dr Marjorie Jeffcoat, 2012 - Looked at medical & dental claims data of people with Type II diabetes from a pool of 1.7M patients

The UCWellness Oral Health Study produced several key findings.

- Over the course of the study, each diabetic member who treated their gum disease:
  - Saved an average of $1,814 in medical costs annually.
  - Had an average reduction of 33% in annual hospital admissions.
  - Had an annual average of 13% fewer physician visits.

Treating Gum Disease in People with Diabetes Lowers Both Medical and Pharmacy Costs

- $1,814
- $1,477
- $3,291

Annual Medical Savings (starting in first year of treatment) + Annual Pharmaceutical Savings (after 7 treatments) = Combined Annual Savings

Pilot Effort to Integrate Oral Health Management Among Diabetic Patients

**Specific Goals**

1. Outreach and education to target individuals/patients from an insurer/HMO and subsequently from physician community.

2. Development and implementation of an integrated medical and dental EHR with bi-directional capabilities and embedded clinical decision support tools.

3. Interprofessional education and outreach to effectively and efficiently implement the EHR-based integration and promote collaboration at the individual professional level.

4. Development of monitoring processes and systems to evaluate performance and identify opportunities for improvement.
### Goal 1: SHP DM Patients and Closest Dental Center

#### Provisional Prioritization of SHP DM Members by Closest Dental Center and Priority Mailing Group.

<table>
<thead>
<tr>
<th>Dental Center</th>
<th>Priority Groups</th>
<th>Center Total</th>
<th>% Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
</tr>
<tr>
<td>Black River Falls</td>
<td>9</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Chippewa Falls</td>
<td>81</td>
<td>150</td>
<td>185</td>
</tr>
<tr>
<td>Ladysmith</td>
<td>29</td>
<td>99</td>
<td>42</td>
</tr>
<tr>
<td>Marshfield</td>
<td>484</td>
<td>856</td>
<td>1431</td>
</tr>
<tr>
<td>Medford</td>
<td>138</td>
<td>221</td>
<td>464</td>
</tr>
<tr>
<td>Neillsville</td>
<td>36</td>
<td>99</td>
<td>157</td>
</tr>
<tr>
<td>Park Falls</td>
<td>87</td>
<td>102</td>
<td>224</td>
</tr>
<tr>
<td>Rhinelander</td>
<td>187</td>
<td>255</td>
<td>414</td>
</tr>
<tr>
<td>Rice Lake</td>
<td>49</td>
<td>85</td>
<td>310</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1100</td>
<td>1878</td>
<td>3235</td>
</tr>
</tbody>
</table>

#### Priority Groups:
- **All Losing Medicaid and all keeping Medicaid with median HbA1c => 7.3 or that have no lab data**
- **All keeping Medicaid with HbA1c < 7.3 and All Advocare and Medigap with median HbA1c => 7.3**
- **Advocare and Medigap with no lab data**
- **Commercial with median HbA1c => 7.3**

#### Not prioritized:
- 4174 Advocare with median HbA1c < 7.3
- 366 Medigap with median HbA1c < 7.3
- 2463 Commercial with median HbA1c < 7.3 or No lab data
- 1016 TPA class

**Total**: 8019

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Marshfield Clinic

*Don't just live. Shine.*
Goal 2: Clinical Decision Support at Point of Care

- The CIWG worked closely with the clinical champions from the medical operations and dental operations in designing:
  - Clinical decision support (CDS) tools and care-coordination-referral tools within MC’s iEHR environment.
  - Patient-engagement tools within the Marshfield Clinic’s patient portal.
  - Medical-to-dental and dental-to-medical referral guidelines.
- Engaged with Marshfield Clinic Information Services (MCIS) to develop CDS, care coordination, and referral tool.
- Engaged with the providers, staff, and operational leaders at pilot sites to implement the intervention.
Integrated Medical-Dental Electronic Health Record Environment

- An electronic dental record module integrated with electronic medical record, CattailsDental ↔ CattailsMD
- supports well over 100k patients
**Park Falls Community:**
Population: 2,395 (2012)
Medical provider: MC/FHC
Dental provider: MC/FHC

**Medford Community:**
Medical provider: Aspirus
Dental provider: MC/FHC

**Stettin Community:**
Population: 2,554 (2010)
Medical provider: MC/FHC
Dental provider: Bridge CHC
Oral Exam Trigger for All Diabetic Patients in Dashboard

Alert for conducting visual oral examination of diagnosed diabetic patients in EMR

- If partially dentulous AND has not been to a dentist in more than 6 months
- If completely edentulous AND has not been to a dentist in more than 12 months
Collecting Oral Exam Information in Observation Entry

- **Oral Exam:**
  - [ ]

- **Collected Date Time:** 09/04/2014, 00:00 [Current Time]

- **Last visit to a dental provider:** [Clear]
  - 07/20/10

- **Last periodontal exam/teeth cleaning (required):**
  - [ ] Date
  - [ ] Unsure
  - [ ] In the last year
  - [ ] In the last 3 months
  - [ ] In the last 6 months
  - [ ] In the last 9 months
  - [ ] More than a year

- **Does the patient have any natural teeth present?** [Clear]
  - [ ] Yes
  - [ ] No

- **Did you conduct a visual oral examination today?** [Clear]
  - [ ] Yes
  - [ ] No

- **Visual Oral Exam Observations (optional):**
  - [ ] Bad Breath
  - [ ] Swollen gums
  - [ ] Bleeding gums
  - [ ] Redness of the gums
  - [ ] Ulcers in the mouth
  - [ ] Tooth decay
  - [ ] Broken teeth
  - [ ] Red/White lesions in the mouth
  - [ ] Missing teeth
  - [ ] Other
  - [ ] None

- **Refer to (optional):**
  - [ ] Internal Dentist (FHC)
  - [ ] External Dentist
  - [ ] Advised the patient to follow-up with their Dentist

- [ ] Done
  - [ ] Add Comment
Ulcers in the Mouth

Ulcers are painful sores in the mouth that appear as small, round, and white areas surrounded by red inflammatory border.

Visual Oral Exam Observations (option):
- [ ] Bad Breath
- [ ] Swollen gums
- [ ] Bleeding gums
- [ ] Other
- [x] Ulcers in the mouth
- [ ] Red/White lesions in the mouth
- [ ] Redness of the gums

Figure 1: Ulcerative lesion on inner side of the lip


Ulcer on the tongue

http://i.ytimg.com/vi/neuLsvuWOMM/maxresdefault.jpg
Dental patients who were never told they were pre-diabetic or diabetic, but had at least one self reported diabetic risk factor (had a first degree blood relative with hypertension, hypercholesterolemia, overweight) and had **26% or more teeth with deep pockets (5mm+) or 4 or more missing teeth** were correctly identified **72%** of the time as pre-diabetic or diabetic cases in the HbA1c sample and **75%** in the total population. The addition of a point-of-care HbA1c ≥ 5.7% increased correct identification to **87%** and **90%**, respectively.
Screening for Undiagnosed Diabetics at the Dental Center

Alert for blood glucose screening of undiagnosed diabetic patients in EDR
- If BMI > 35; OR
- If BMI > 30 and AGE > 60;

Observations
- Needs Collection: Blood Pressure
- Needs Collection: Tobacco Use
- Needs Collection: Blood Glucose Screening
  - 06/23/14 Body Mass Index 45.7 kg/m²
  - 06/23/14 Height 157.48 cm (62 in)
  - 06/23/14 Weight 113.40 kg (250 lbs)

Dental Alerts
- Pre-Medication
- Alcohol Usage, drinks/week: 1 drink/week

- Required
Dental Assistants

Testing Blood Glucose Level with Glucometer
Capturing Blood Glucose Measure at the Dental Center

- Collected Date Time: 02/11/2015, 00:00 [Current Time]
- Performing Facility (required):
  - Black River Falls Dental
  - Chippewa Dental Center
  - Ladysmith Dental Center
  - Marshfield Dental Center
  - Medford Dental Center
  - Neillsville Dental Center
  - Park Falls Dental Center
  - Rhinelander Dental Center
  - Rice Lake Dental Center
- Blood Glucose Test Value (required):
  - mg/dL
  - Ink Here
- Type of Screening (required):
  - Random
  - Fasting
- Last time patient had something to eat or drink (excluding water)? (required):
  - 0 - 2 hours
  - 2 - 4 hours
  - 4 - 6 hours
  - 6 - 8 hours
  - 8+ hours
- Refer to (optional):
  - Internal PCP (MC)
  - External PCP
- Education Provided (optional):
  - Resources provided
  - Ink Here
- Comment (optional):
  - Advised the patient to follow-up with their primary care provider
# Referral Guidelines After the Blood Glucose Screening at the Dental Sites

<table>
<thead>
<tr>
<th>Time Since Last Meal/Drink (Hours)</th>
<th>Blood Glucose Range (mg/dl)</th>
<th>Actions Required</th>
</tr>
</thead>
</table>
| n/a                              | 400 mg/dl and above         | • Refer the patient to a medical provider to be seen the same day or next day.  
                                 |                             | • Consider postponing any dental treatment. |
| 0 – 2 hrs                         | 300 to 399 mg/dL            | • Advise the patient to consult their medical provider about pre-diabetes/diabetes (recommendation is within next 4–6 months). |
| 2 - 8 hrs                         | 300 to 399 mg/dL            | • Refer the patient to a medical provider. |
| 2 - 8 hrs                         | 200 to 299 mg/dL            | • Advise the patient to consult their medical provider about pre-diabetes/diabetes (recommendation is within next 4–6 months). |
| 8+ hrs                           | 200 to 299 mg/dL            | • Refer the patient to a medical provider. |
| 8+ hrs                           | 126 to 199 mg/dL            | • Advise the patient to consult their medical provider about pre-diabetes/diabetes (recommendation is within next 4–6 months). |
| Any other time frame             | Any other value             | • No referral required. |
Referral to Medical Provider
Goal 3: Three Target Education Groups

- Physicians
- Dentists
- Patients
• Pre-post survey to capture information regarding the medical providers’ knowledge, attitude, and behavior regarding oral health practice.

• Large “N”—1407 medical care providers.

• A response rate of 14% (199/1407).

• 41% of respondents frequently/very frequently referred their patients to dental providers (p<0.0001).

• 48% of respondents suggested that medical providers should counsel their patients on oral-health-related issues on a frequent basis.

• 95% of respondents never provided fluoride varnish application in their practice.
Self-Reported Comfort Level of Physicians and Nurses

- **Nurse**
  - Very uncomfortable
  - Somewhat uncomfortable
  - Neutral
  - Somewhat comfortable
  - Very comfortable

- **MD/DO**
  - Very uncomfortable
  - Somewhat uncomfortable
  - Neutral
  - Somewhat comfortable
  - Very comfortable

- **Activities**
  - Applying fluoride varnish
  - Identifying signs of oral pathology
  - Examining tooth decay

- **Percentage Levels**
  - 0.00%
  - 10.00%
  - 20.00%
  - 30.00%
  - 40.00%
  - 50.00%
  - 60.00%
  - 70.00%
  - 80.00%

**Chart Legend**
- Green: Applying fluoride varnish
- Red: Identifying signs of oral pathology
- Blue: Examining tooth decay
Smiles for Life Curriculum

- Module 1 assigned to 328 primary care providers: 103 completed
- 31% response rate
• Pre-post survey to capture information regarding the dental providers’ knowledge, attitude, and behavior regarding diabetic patient management

• Smaller “N”—100 dental providers | Response rate: 24%
Academic Detailing
• Continuing education sessions
• Endocrinologist presentation
• Department meeting
• Computer-based training modules
• Pre- post-test questions
WHY IS DENTAL HEALTH IMPORTANT?

Practicing good dental health is important to maintaining a healthy mouth, teeth and gums. It will also help your appearance and quality of life.

Source: https://www.marshfieldclinic.org/healthy-living/dental/dental-why-important
• 51% of all patients reported (N=53) their knowledge increased from “no/not much knowledge” to “some/lots of knowledge” after viewing.

• 92% reported having “some/lots of knowledge” following viewing, regardless of initial knowledge level.
Patient Mailings

Did you know... you are at risk for dental issues because you have diabetes. People with diabetes are **2 times** more likely to develop serious gum disease.

Taking Care of Your Mouth Can Help Control Your Diabetes

Yes, it is true, your diabetes puts you at greater risk of having problems with your teeth and gums. Gum disease and tooth problems in people with diabetes can be more severe and take longer to heal because of less ability to fight bacteria in the mouth as well as other infection.

- People with diabetes are at higher risk for tooth and gum disease, including infection.
- Gum disease may affect blood glucose control, making diabetes harder to control and may increase the progression of diabetes.

Symptoms of Mouth Problems

- Red, swollen and bleeding gums
- Gums that have pulled away from teeth
- Pus between teeth and gums
- Bad Breath that won’t go away
- Permanent teeth that are loose or moving away from each other
- Changes in the way your teeth fit together when you bite
- Changes in the fit of dentures
- Sore, white or red patches on your gums, tongue, cheeks or roof of your mouth
- Patches that have turned into open sores
- Dry feeling in your mouth, dry rough tongue, cracked lips, mouth sores
- Burning feeling in mouth, bitter taste

What You Can Do to Prevent Dental Problems

- Keep your blood glucose as close to your target as possible
- Take diabetes medicines as instructed
- Eat healthy meals and follow your diabetes meal plan
- Brush your teeth at least twice a day and after meals with a soft toothbrush and fluoride toothpaste
- Floss your teeth at least once a day
- Drink water with fluoride every day

Action Steps

If you have not seen a dentist within the last six months you need to call now and schedule an appointment.

- See your dentist every 6 months
- Keep your dentist informed of any changes in diabetes conditions and medicines
- See your doctor on a regular basis
- Eat healthy meals and get plenty of exercise
- Work together with your physician and dentist to manage your diabetes

Distributed by: Security Health Plan.

In collaboration with: Marshfield Clinic

DentaQuest

Marshfield Clinic
Don’t just live. Shine.
Display Oral Exam Information in the Patient Portal
Next Steps: Goal 4—Operational and Health Economic Outcome

Operational Outcome: (Evaluate 12–18 months after the start of intervention).

- Evaluate the # of diabetic patients at pilot sites; (August 2014 to March 2015 = 1208 diabetics flagged for visual oral exam and 830 received it).
  - Of those, # who received a visual oral exam during their PCP visit.
  - Of those, # who received dental referral at their PCP visit.
  - Of those with referral, # who were referred to a non-MC &MC dental provider.
- Evaluate # of dental patients who were triggered for blood glucose screening. (September to December 2014 = 152 individuals consented.)
  - Of those, # who consented.
  - Of those who consented, # who were referred (internal, external).
  - Of those referred internally, number who saw a MC PCP.

- After successfully conducting the pilot testing at three sites, our goal remains to implement these tools system-wide.
- Make further tweaks and enhancement to the CDS and care-coordination tools to support system-wide implementation.
Next Steps: Goal 4—Operational and Health Economic Outcome

**Goal 4—economic outcome:** (evaluate beyond 3 years after start of the intervention).

- Is improved oral health associated with lower medical care costs?

**Diabetes**

<table>
<thead>
<tr>
<th>Study</th>
<th>Years</th>
<th>Avg Total Medical Cost per Person per Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>G Taylor (MI BCBS 2009)</td>
<td>2001–2005</td>
<td>~ 10% savings</td>
</tr>
<tr>
<td>M. Jeffcoat, et al. (CIGNA)</td>
<td>2006–2008</td>
<td>$2483</td>
</tr>
</tbody>
</table>
Extension of the Quality of Care Dashboard to Monitor Oral Health

Diabetes Mellitus Quality Measures

- Percent of Patients Meeting Criteria
- A1C2 Tested
- LDL at Goal
- Oral Exam
- Pneumovax
- Tobacco Asked
- BP at Goal
- A1C at Goal
- LDL Tested
- Oral Exam
- Pneumovax
- Tobacco Free
- Foot Exam

Number of Patients

[Bar chart showing at goal and not at goal for various measures]
Lessons Learned

• **Big bang implementation difficult to execute and may not be the most effective:** The original intent was to begin with a system-wide implementation of CDS tools and care-coordination/referral tools at all the medical/dental practices at the MC. After meeting with several leaders it was determined that a staged approach for implementing the intervention was necessary so as to reduce the burden on staff due to a major change in workflow.

• **The need for piloting any intervention:** Piloting the intervention at a handful of medical/dental sites was considered more realistic, less risky, and able to provide valuable information, lessons learned for a successful system-wide release.

• **Difficulties with EHR Enhancement:** Getting approval for EHR enhancement to support any new initiatives in the production system of a large health care organization is a very complex, time-consuming, expensive, and challenging endeavor. Achieving this at MC was no exception.
Lessons Learned

• **Have patience:** Having to receive approval and prioritization for the development of CDS and Care Coordination/Referral tools within MC’s iEHR environment involved navigating through multiple committees.
  - Be ready to effectively highlight the importance-background of the initiative
  - Be ready to receiving initial pushbacks—very common
  - Listen and understand their point of view and involve the end user community early in the game

• **Provider-operational reluctance for change:** Although all the chairs, administrators, providers and staff at the medical/dental pilot sites expressed the benefit of incorporating oral health for the diabetic patients, they did express concerns with the limited time available with their patients and having to incorporate “yet another” task at the care setting.

• **Incentivizing the provider practices:** Practices that are actively engaged in the cross-disciplinary care model for managing diabetic patients and their oral health would be one of the areas to investigate further.
# Project Leadership Team

<table>
<thead>
<tr>
<th>Name</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amit Acharya, BDS, MS, PhD</td>
<td>Project Director</td>
</tr>
<tr>
<td>Dixie Schroeder</td>
<td>Project Coordinator</td>
</tr>
<tr>
<td>Eric Penniman, DO</td>
<td>Clinical Champion/Advisor</td>
</tr>
<tr>
<td>Ram Pathak, MD</td>
<td>Director, Diabetes Education/Advisor</td>
</tr>
<tr>
<td>John Schmelzer, PhD</td>
<td>Co-Director, Evaluation</td>
</tr>
<tr>
<td>Joseph Kilsdonk, AuD</td>
<td>Co-Director, Education</td>
</tr>
<tr>
<td>Jane Wolf, RN</td>
<td>Co-Director, Insurance</td>
</tr>
<tr>
<td>Gregory Nycz</td>
<td>Co-Director, Dental Operations</td>
</tr>
<tr>
<td>Teresa Kleutsch, RN</td>
<td>Dental Division Administrator</td>
</tr>
<tr>
<td>Matt Eaton, DDS</td>
<td>Dental Operations Director</td>
</tr>
<tr>
<td>John O’Bien, DDS</td>
<td>Dental Operations Director</td>
</tr>
</tbody>
</table>
Acknowledgements
“The best scientific thought is agreed that dentistry is a field of medicine. . . . There is no logical right whatever to isolate [the oral cavity] from the rest of the body as if it were made up . . . of ivory pegs in stone sockets.”

– Dr. Alfred Owre

Dean of Dentistry
University of Minnesota, 1905-27
Columbia University, 1927-33