Framing the case for oral care:

Translating research to policy with combined claims data set for return-on-investment (ROI) analyses in Maine

Kala E. Ladenheim, PhD, MSPH [1], Margaret I. Gradie, PhD [1], Kathleen E. Perkins, MPA [2].

Medical Care Development, Division of Health Improvement

Abstract

The Maine Oral Return-on-investment (ROI) project created a Maine-specific database linking dental and medical claims; engaged stakeholders to define key elements and assumptions in a consensus approach to estimating ROI; and is using the method to estimate impacts of oral health services in Maine for pregnant women and people with diabetes to make the case for improved oral health services and promote policy changes with both public and private insurers.

ROI is used to frame research findings related to the impact of periodontal care on medical outcomes. Maine-specific data consisting of combined dental and medical claims allow us to replicate other studies and adjust results to Maine's population. Recent studies related to the impact of periodontal health and control of diabetes, birth outcomes, and other conditions mediated by inflammatory processes (Darre, Taylor) undergird the analysis. Controversy over the nature and strength of causality is expressed through sensitivity analysis.

Methods

Return on Investment. Return on Investment (ROI) = value of a health intervention as the ratio of expected benefits to costs, taking into account the timing of expected results. Makes business case to state agencies and employers.

Our process:

- **Recruit and convene an advisory group** *to advise on costs, outcomes and framing. We included appropriate clinical experts, lawmakers and insurers.*
- **Prioritize oral/medical connections to explore** *based on members' interests, results of intervention studies, and availability of Maine-specific data.*
- **Define non-medical cost outcomes and impacts to measure.** *The group endorsed the diabetes association methodology for estimating non-medical impacts and included the impact of improved oral health per se in our estimates.*
- **Frame findings to support public and private policy development.** *The ROI template that adjusts for Maine's experience is framed with different materials for: state policy-makers, (Medicaid and legislators;) providers; buyers; patients.*

ROI Challenges and Opportunities

ROI challenges:

- The science behind estimated benefits may not support precise estimates
- Studies are based on a population that differs in important ways from the state
- Intervention is not comparable or feasible
- In long-term projects the cost of money (interest rate) may exceed the value of the intervention

ROI opportunities:

- Stimulate discussion of impact of changes beyond medical outcomes
- Is a mechanism for head-to-head comparison of treatment vs prevention
- Engages different stakeholders by presenting intervention as a business opportunity

Oral Care ROI Formula

Return on Investment (ROI) of covering 4 periodontal visits for people at risk

=

[((medical cost due to diabetes complications related to periodontal disease-related changes in glycemic control) * (persons with diabetes)) +
((medical costs due to changed birth outcomes due to periodontal disease) *
(pregnant women at risk)) +
(Net present value of developmental delays in LBW children)] ·
(value of productivity due to changed presenteeism) …etc…..

÷

[(1.5% dental premium)*(insured group)]

Making the case with claims. Large retrospective studies of insurance claims measure the strength of the association between periodontal care and specific outcomes (Taylor). Large intervention trials are now under way (Offenbacher).

Coordinate with researchers. Maine's all-insurer data set includes dental and medical insurers. We consult with Taylor and Offenbacher to build on their studies.

Structure data extraction. With On-Point Health Data, we linked 3 years of Maine dental and medical claims. We added census and other data at county level.

Diabetes records	Pregnancy records
Person/year	Year pre and postpartum
Annual flags for claims related to diabetes and major complications	Flag low birth weight or preterm birth
Expenditures for each flag summarized using Episode Treatment Grouper (ETG)™	Average costs of preterm and LBW births because births contracted on prepaid basis

All records contain information on:

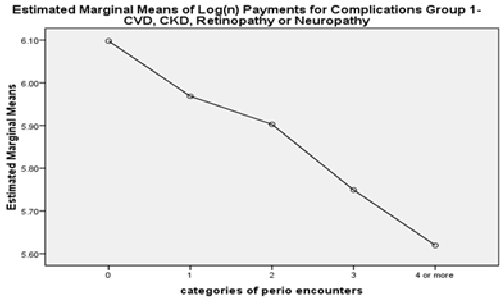
Payments: Total, ED, inpatient, outpatient and physician's office visits.

Person-level demographics: age, gender, sometimes family type, zip code.

Type of plan. Maine's data set includes all carriers, with dental and medical claims matched at the person level, plan type and coverage months.

Geographic data. County-level from Census and Maine Office of Rural Health used for factors such as income, rurality and dental provider shortages.

Early Results Show Expected Relationship



Controlling for age and gender. Covariates appearing in the model are evaluated at the following values: AGE = 53.3572

- **Caveat:** Medicaid claims have not yet been released. We are delaying analysis of the periodontal/pregnancy link until this data becomes available because half of all births in Maine are covered under Medicaid (MaineCare) or SCHIP

Conclusion: Framing ROI Results for Stakeholders

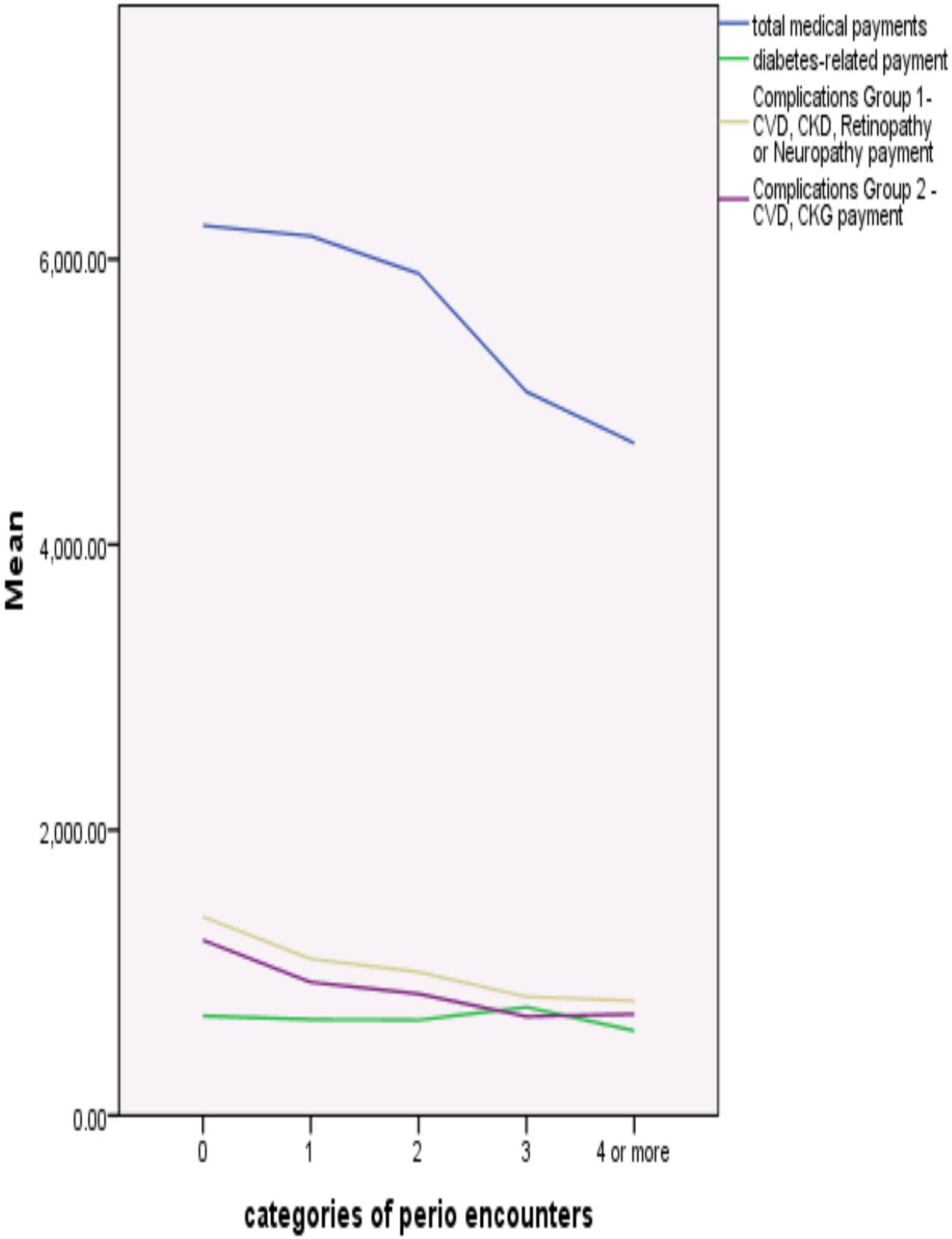
Policy recommendations are most effective when framed to address the values of the stakeholder group to which the recommendations are addressed. We ***reframe oral care as health care*** and translate our findings to the contexts where each stakeholder group applies health care policy.

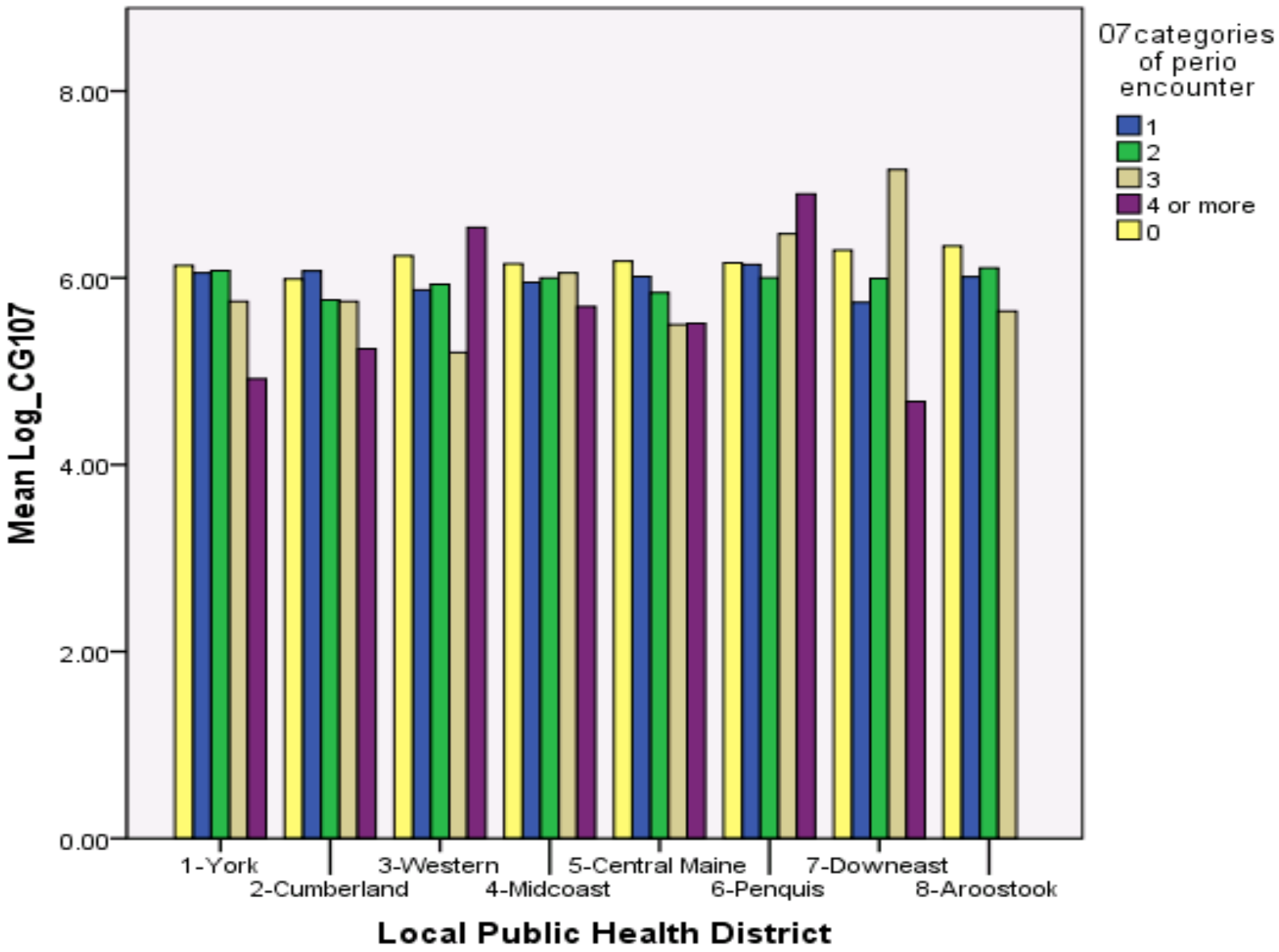
- **Oral health and medical providers** Includes an overview of scientific literature, clinical pathways and problems, as well as how to engage other members of a clinical team.
- **Buyers (public and private):** Focused on actuarial net cost, under differing assumptions. Dental and medical costs are now separate; shows how spending on one side can be offset by lower costs on the other. Net cost to public buyers includes long term costs related to pre-term births. Also shows intervention cost and time to pay-back.
- **Consumers:** Emphasizes self-care, opportunities for avoiding pain and disability and prioritizing non-covered periodontal care against other personal needs. Brief includes information to be used to make the case for better coverage with employers.
- **Lawmakers**: Legislative or policy language, federal cost-sharing and state budgetary implications. Administrative mechanism to closely monitor costs and savings suggested. Total budgetary impact, particularly short-term impact, and timing of longer-term results. Macro impacts including effects on employability and worker productivity.

1. Darre L, Vergnes J, Gourdy P, Sixou M. Efficacy of periodontal treatment on glycaemic control in diabetic patients: A meta-analysis of interventional studies. **Diabetes Metab.** 2008;34(5):497-506.
2. Janket S, Wightman A, Baird A, Van Dyke T, Jones J. Does periodontal treatment improve glycemic control in diabetic patients? A meta-analysis of intervention studies. **J Dent Res** 2005;84(12):1154-1159.
3. Lamster IB, Lalla E, Borgnakke WS, Taylor GW. The Relationship Between Oral Health and Diabetes Mellitus. **J Am Dent Assoc** 2008;139(suppl_5):19S-24S.
4. Offenbacher S, Lin D, Strauss R, et al. Effects of periodontal therapy during pregnancy on periodontal status, biologic parameters, and pregnancy outcomes: a pilot study. **J Periodontol** 2006;77(12):2011-24.
5. Taylor G, Borgnakke W. Periodontal disease: associations with diabetes, glycemic control and complications. **Oral Dis.** 2008;14(3):191-203.

MCD

MeHAF Maine Health Access Foundation


total medical payments
diabetes-related payment
Complications Group 1- CVD, CKD, Retinopathy or Neuropathy payment
Complications Group 2 - CVD, CKG payment
Mean
6,000.00
4,000.00
2,000.00
0.00
0
1
2
3
4 or more
categories of perio encounters


Mean Log_CG107
8.00
6.00
4.00
2.00
0.00
1-York
2-Cumberland
3-Western
4-Midcoast
5-Central Maine
6-Penquis
7-Downeast
8-Aroostook
Local Public Health District
07 categories of perio encounter
1
2
3
4 or more
0