

Breakthrough Strategies for Preventing ECC

Chronic Disease Prevention and Management Strategies

National Oral Health Conference

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Boston Children's Hospital
Until every child is well™

Disclosures

I will be presenting work and results that have received grant funding support from:

DentaQuest Institute

DentaQuest Foundation

Health Resources Services Administration



Learning Objectives

- Understand the Chronic Disease Management (CDM) approach to addressing ECC
 - What is it and why it works
 - Learn about engaging caregivers more effectively and support their efforts in becoming more informed and proactive partners in their child's oral health



Early Childhood Caries

But aren't they just baby teeth?

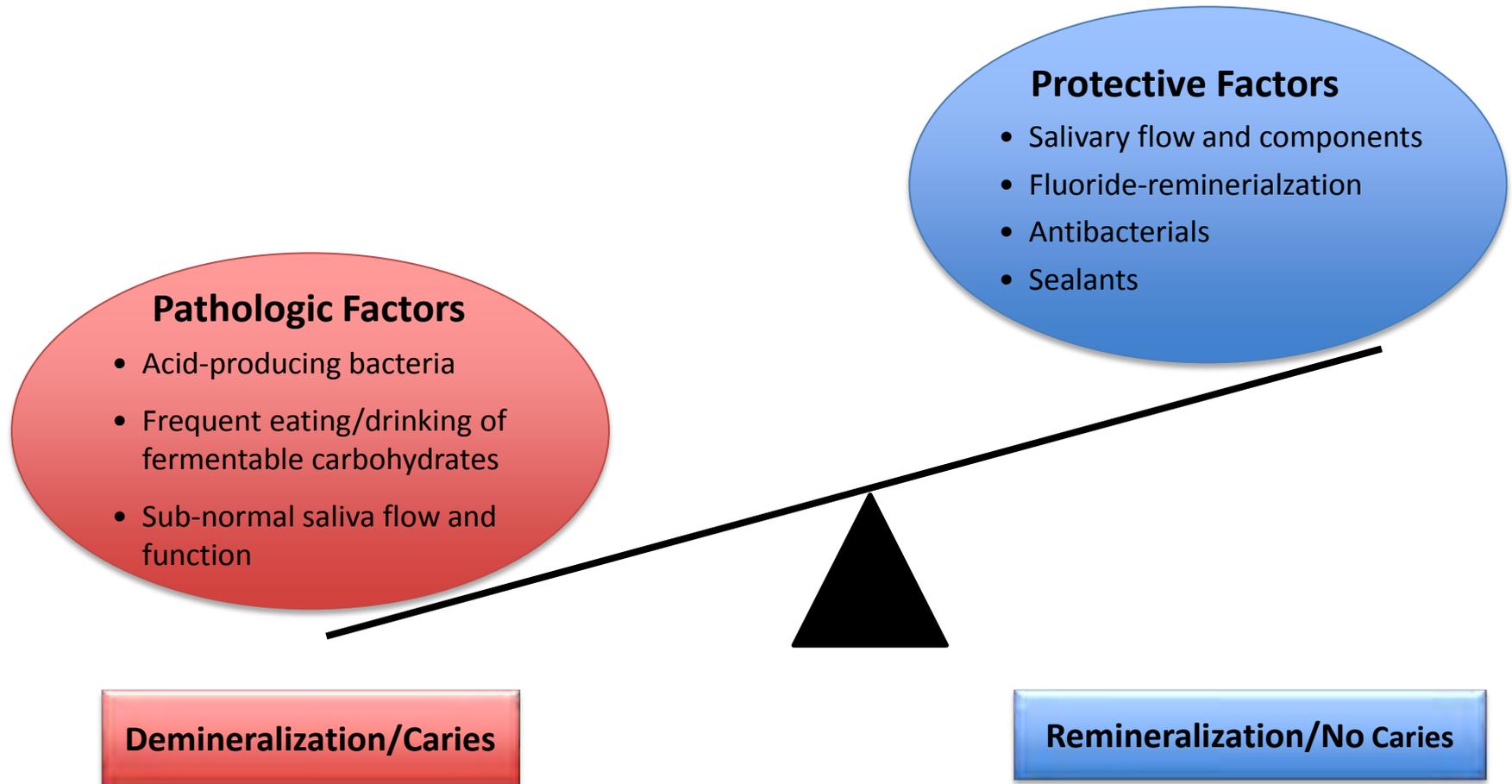


PROBLEM STATEMENT

- Hospital-based safety dental clinics care for a disproportionate number of children with ECC
- Many of these children are treated surgically
- Months-long backlogs for operating room care
- High rate of decay after treatment
- High cost of operating room treatment
- **Caries is a highly preventable disease**



The Caries Balance



Adapted from Featherstone JDB. Caries prevention and renewal based on the caries balance. *Pediatr Dent* 2006; 28:129.

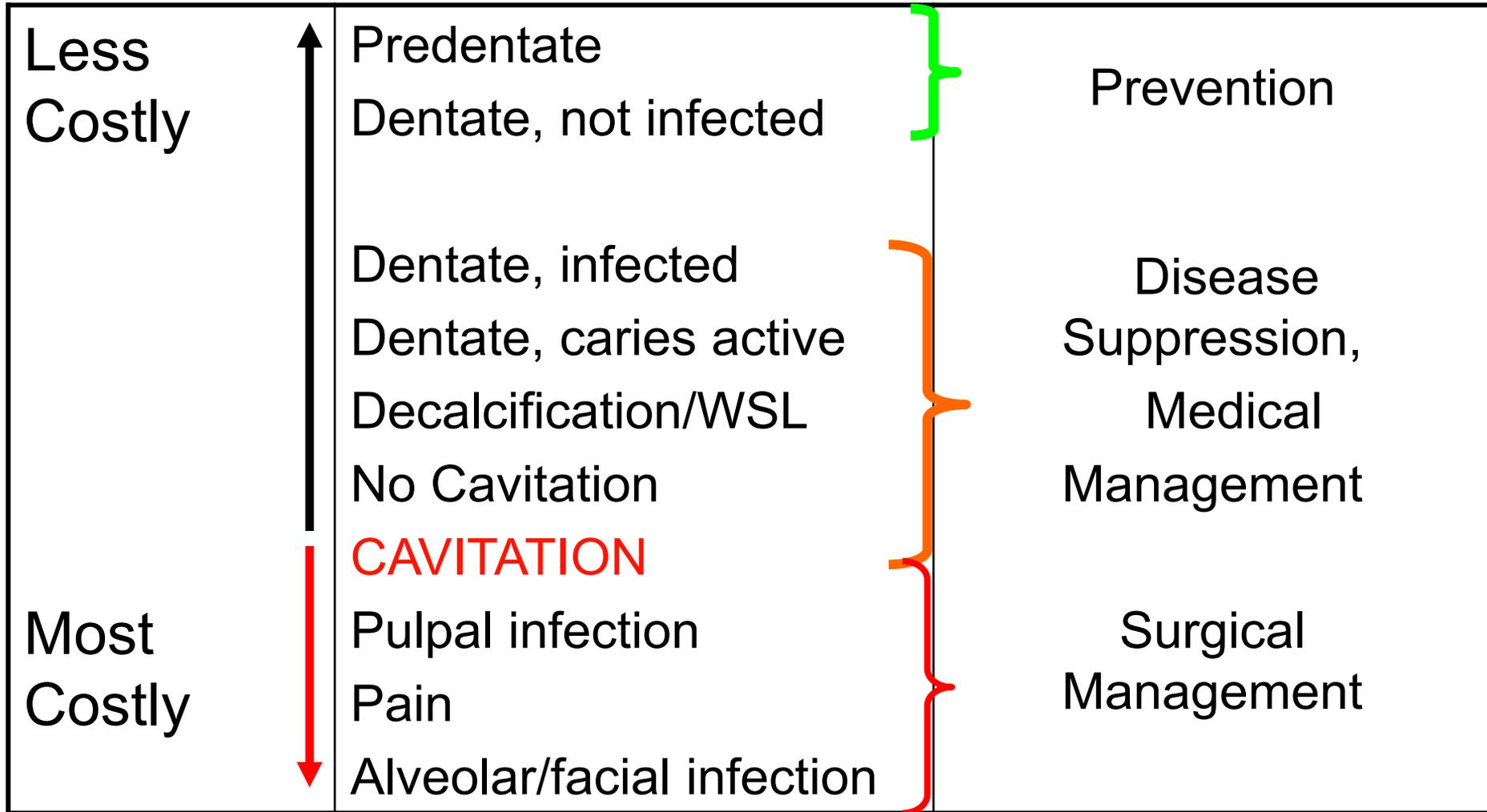


Current State

Dentistry, with its surgical tradition, commonly approaches dental caries...
as an acute **surgical** problem requiring restoration and repair rather than
as a chronic **medical** disease process requiring individually-tailored management of etiologic factors, Chronic Disease Management (“CDM”).



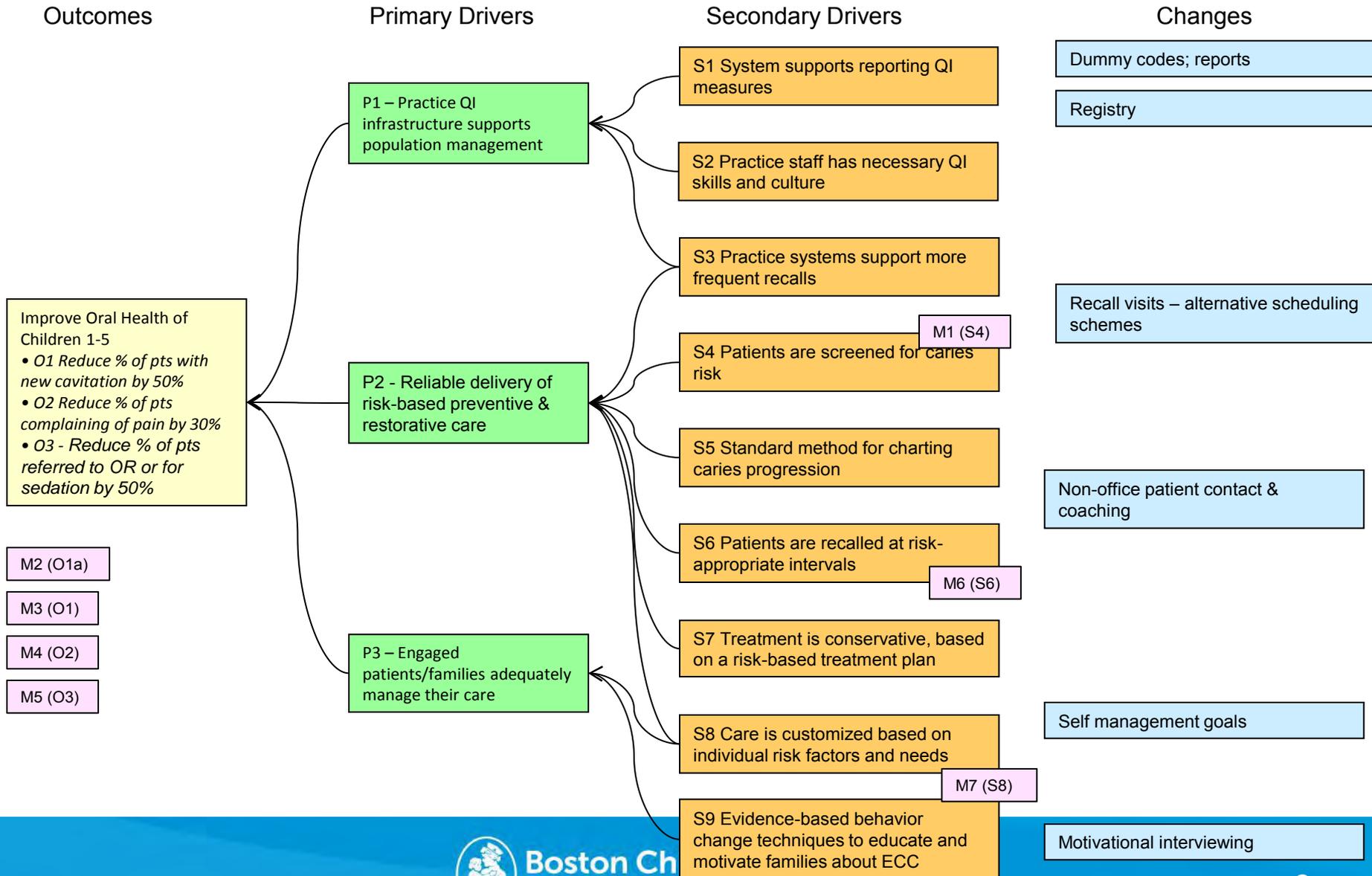
Why “CDM” for ECC is needed



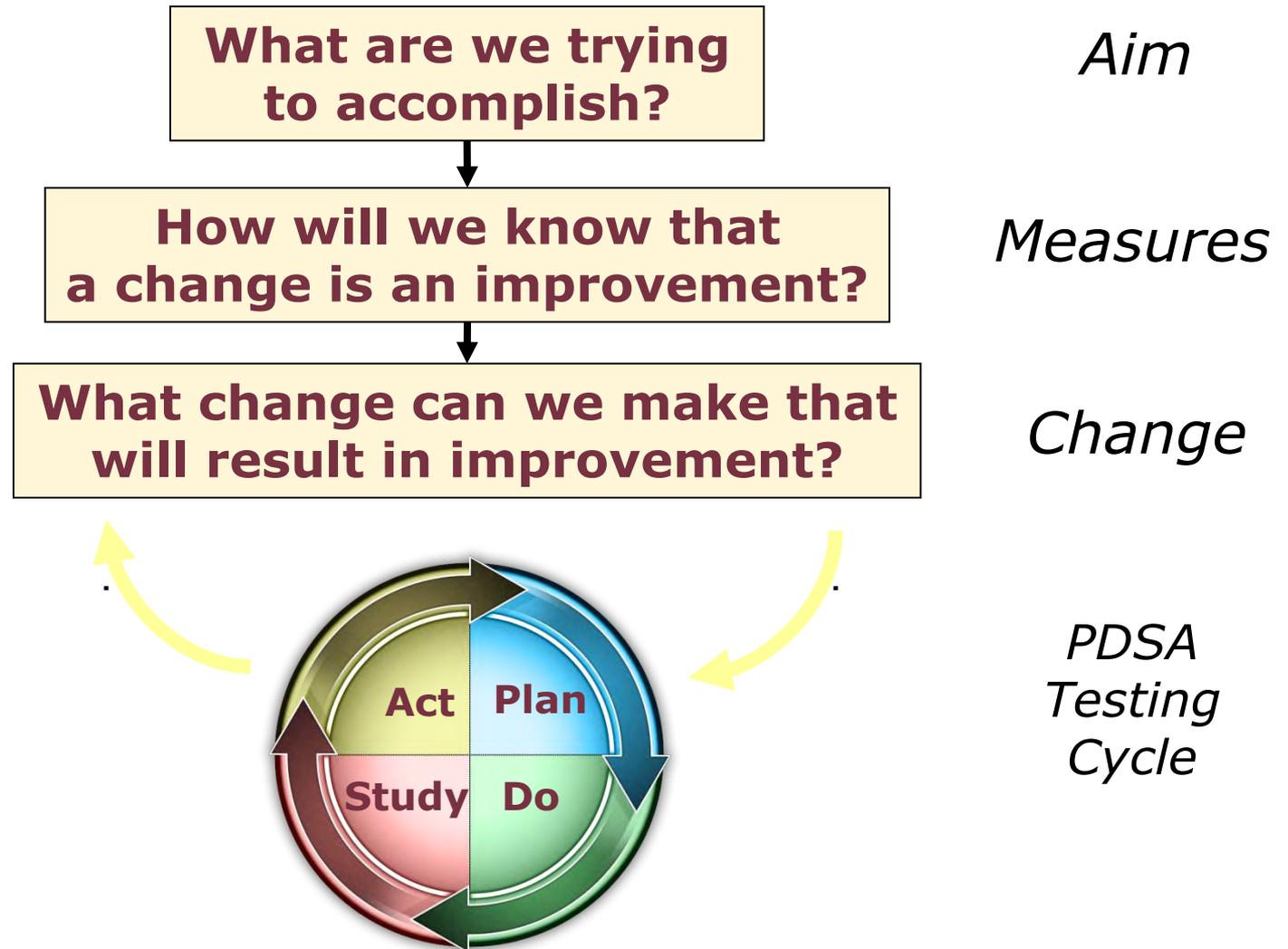
Opportunity for Improvement



DentaQuest Institute Early Childhood Caries Collaborative Driver Diagram



Model for Improvement



ECC Phase I (Demonstration Project)*

Aim Statement

Over an 18 month period, caries will be managed and caries progression will be reduced in all children under 60 months of age who present with high risk for ECC.

Goals

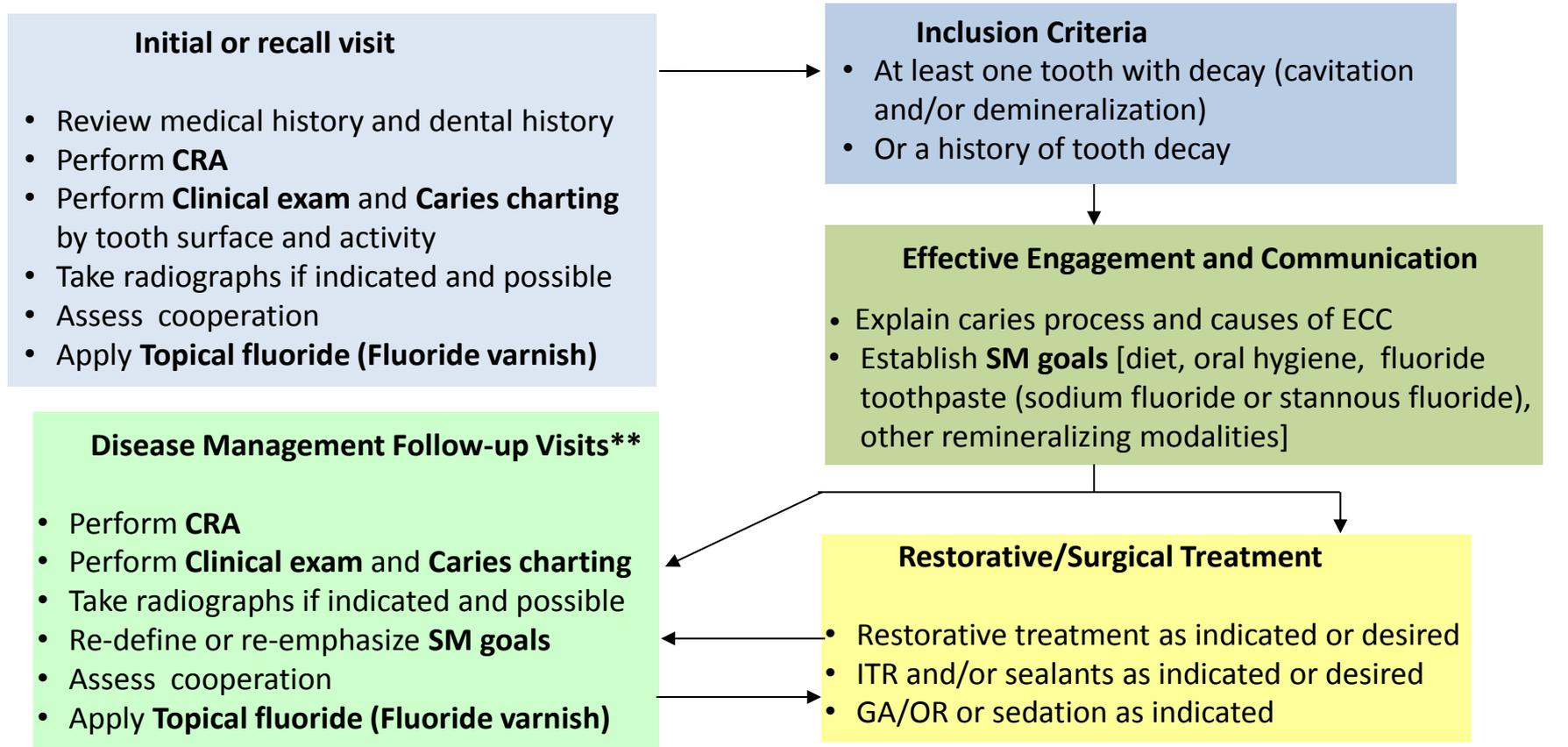
Reduce the percent of patients

- With new cavitation
- Who are referred to the operating room
- With pain

*At Boston Children's Hospital and St. Joseph's Hospital; and funded by DentaQuest Institute



ECC Collaborative Clinical Protocol*



****For Children at High Risk**
Next DM visit in 1-3 months

****For Children at Medium Risk**
Next DM visit in 3-6 months

****For Children at Low Risk**
Next DM visit in 6-12 months

ECC = early childhood caries
DM = disease management

ITR = interim therapeutic restoration
CRA = caries risk assessment

GA/OR = general anesthesia/operating room
SMGs = self management goals



ECC Collaborative Risk-based CDM protocol

Existing Risk Category	New Clinical Findings	Fluoride Varnish Interval	Self-Management Goals	Restorative Treatment	DM Return Interval	Other
Low	<ul style="list-style-type: none"> No disease indicators of caries; or Completely remineralized (arrested) carious lesions 	6-12 months	<ul style="list-style-type: none"> Twice daily brushing with F toothpaste† Stannous fluoride‡ on cavitated lesions 		6-12 Months	
Medium	<ul style="list-style-type: none"> No disease indicators,* but has risk factors** ; and/or inadequate protective factors*** Disease indicators present with some remineralization 	3-6 months	<ul style="list-style-type: none"> Twice or more daily brushing with F toothpaste Stannous fluoride on cavitated lesions Dietary changes 	<ul style="list-style-type: none"> Sealants ITR Conventional Restorative 	3-6 Months	<ul style="list-style-type: none"> Xylitol gum or candies or wipes Calcium phosphate paste
High	<ul style="list-style-type: none"> Active caries (disease indicators present) No remineralization occurring Heavy plaque 	1-3 months	<ul style="list-style-type: none"> Twice or more daily brushing with F toothpaste Stannous fluoride on cavitated lesions Dietary changes 	<ul style="list-style-type: none"> ITR Sealants Conventional restorative 	1-3 months	<ul style="list-style-type: none"> Xylitol gum or candies Calcium phosphate paste



Caries Risk Assessment and Self-Management Goals

Patient's First Name		Last Name		MRN	Name of Provider		Today's Date / /		Child's DOB / /		
Type of visit: (Circle all that apply)											
Initial	Recall	DM	Fluoride Varnish	Restorative	ITR	Sealants	Sedation	Emergency	OR	Other	
CAN BE COMPLETED BY CLINICAL STAFF, PATIENT OR DENTIST											
<i>Biologic Factors</i>											
Child has history of active caries	Y	N			<i>Comments</i>						
Mother has active caries	Y	N									
Siblings have active caries	Y	N									
Continuous bottle use	Y	N	SW								
Sleeps with bottle or nurses on demand	Y	N	SW	Describe							
Juice/milk in Sippy cup	Y	N	SW	Describe							
Frequent snacking	Y	N	SW	Describe							
SHCN	Y	N									
Potential caries causing medications	Y	N	Describe								
<i>Protective Factors</i>											
Tooth brushing	Y	N	_x/day								
Assistance with brushing	Y	N	SW								
Fluoride toothpaste	Y	N	_x/day								
Topical fluoride (Gelkam, Prevident, ACT)	Y	N	_x/day								
Floss	Y	N	NA								
Drinks fluoridated water	Y	N									
TO BE COMPLETED BY DENTIST											
<i>Disease Indicators/Risk Factors (from Clinical Examination)</i>											
Cavitation	Y	N	Where _____								
New Cavitation	Y	N	NA								
Deminerlization / New Demin (WS)	Y	N	Where _____								
Radiographic decay	Y	N	NA	Where _____							
Enamel defects	Y	N	Where _____								
Visible plaque	Y	N	SW	Where _____							
Gingivitis	Y	N	Improved	Describe							
Deep pits/fissures	Y	N	Where _____								
<i>Indicators of Improved Caries Risk (from Clinical Examination)</i>											
Remineralization	Y	N	SW	Where _____							
New remineralization	Y	N	Where _____								
Meeting self-management goals	Y	N	SW	NA							
Stannous fluoride staining	Y	N	NA								
<i>Other</i>											
Pain due to untreated caries	Y	N	Where _____								
Referral to OR/sedation	Y	N									
Behavior (Frankl score)	1	2	3	4							
Overall Caries Risk: Low Medium High											
NV: ___ months for DM/F varnish and _____											
Self management goals											
1) _____											
2) _____											
F-toothpaste ___x/day Gelkam ___x/day											

Self Management Goals for Caregivers

Patient Name: _____ DOB: _____

Your child has been assessed to have the following risk for caries (cavities):
 High Moderate Low

The pictures checked are the areas you should focus on between today and your next visit.

			
<input type="checkbox"/> Next fluoride visit in ___ months	<input type="checkbox"/> Healthy Snacks	<input type="checkbox"/> No Soda	<input type="checkbox"/> Juice only with meals or juice boxes
			
<input type="checkbox"/> Only water/unsweetened milk in bottle.	<input type="checkbox"/> No sippy cup or only water in cup.	<input type="checkbox"/> Daily brushing	<input type="checkbox"/> Brush twice with this amount of fluoride toothpaste.
* If bottle to bed, use only water			
			
<input type="checkbox"/> Drink fluoridated water	<input type="checkbox"/> Less or no candy & junk food	<input type="checkbox"/> Use Gelkam ___ x/day - Apply this amount to all teeth - No eating, drinking or rinsing for 30 mins	

Clinician's Comments: _____

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ECC Collaborative Phase I*

Outcomes After 30 Months ◇

Outcomes	Boston Children's Hospital			St. Joseph Hospital		
	ECC (N=403) %	Baseline (N=129) %	Improvement %	ECC (N=234) %	Baseline (N=80) %	Improvement %
New cavitation	26	75	▼ 65	41	71	▼ 58
Pain	13	22	▼ 38	7	31	▼ 23
Referral to Operating Room	11	21	▼ 48	15	25	▼ 68

*Funded by DentaQuest Institute

◇ Ng MW, Torresyap G, White BA, Graham G, Kane D, Scoville R, Ohiomoba H. Disease Management of Early Childhood Caries: Results of a Pilot Quality Improvement Project. J Health Care Poor Underserved 2012;23(3:Supplement):193-209.



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Early Childhood Caries Collaborative

Phase II* Results (7 sites)* ◇

Outcome Measure	ECC (N=344)**	Baseline (N=316)	Percentage Improvement	Improvement Range
New Cavitation	33%	46%	▼ 28%	▲ 14% - ▼ 71%
Pain	8%	11%	▼ 27%	▲ 80% - ▼ 100%
Referral to the Operating Room	14%	22%	▼ 36%	0% - ▼ 81%

Results include seven (7) clinical locations: Boston Children's Hospital (MA); Holyoke Health Center (MA); Native American Health Center (CA); Nationwide Children's Hospital (OH), Neighborcare (WA); St. Joseph's Hospital for Specialty Care (RI); University Pediatric Dentistry (NY)

**Random sample drawn from a population of total ECC Phase II population of 3030

*Funded by DentaQuest Institute

◇Ng MW, Ramos-Gomez F, Lieberman M, Lee J, Scoville R, Hannon C, Maramaldi P. Disease management of early childhood caries: ECC Collaborative Project. International Journal of Dentistry, 2014.



ECC Phase III*

Over 18 months, 30+ teams nationally have been engaged in testing changes, collecting data, and working with nationally recognized clinical and quality improvement experts to implement the practices and protocols of ECC disease management



*Funded by DentaQuest Institute



ECC Phase III*: Goals

- Provide tools, guidance and support to everyone willing to learn...to commit to continuous improvement...to achieve better care and outcomes...

The screenshot shows the DentaQuest Institute website. At the top left is the logo. A search bar is on the right. Below the logo is a navigation bar with 'ABOUT', 'LEARN', and 'CONNECT'. A 'LOGIN' button is also visible. The main content area features a large image of a smiling child with the text 'We provide clinical care and practice management solutions that help oral health care providers improve oral health'. To the right of this text are three blue boxes: 'Prevention & Disease Management', 'Quality Improvement Solutions', and 'Safety Net Solutions'. Below the main image is an 'Online Learning Center' section with a 'Welcome!' message and a 'News' section mentioning the launch of Phase III.

The cover of the 'HOW TO GUIDE' for the Prevention and Management of Early Childhood Caries Collaborative Phase III. It features the DentaQuest Institute logo at the top. The title 'HOW TO GUIDE' is in large, bold, black letters. Below it, in smaller text, is 'FOR THE PREVENTION AND MANAGEMENT OF EARLY CHILDHOOD CARIES COLLABORATIVE PHASE III'. At the bottom, there is contact information for DentaQuest Institute: 2400 Campbell Drive, Waltham, MA 02453.

The cover of the 'Risk-Based Disease Prevention and Management of Early Childhood Caries (ECC) FLIPCHART'. It is published by Boston Children's Hospital, Department of Dentistry. The title is in large, bold, black letters. Below the title is the subtitle 'A partnership between families and care providers'. The word 'FLIPCHART' is written in large, bold, red letters. The cover features several illustrations: a child sitting in a dental chair, a child brushing their teeth, and a dental professional examining a child's teeth. A sign on the wall says 'BRUSH AND FLOSS'. At the bottom, it says '2nd Edition'.

*Funded by DentaQuest Institute

Utilization ECC vs. Baseline*◇

ECC Disease Management patients had more visits, more preventive visits, and fewer restorative and OR visits than historical control patients.

Mean number of diagnostic and preventative visits by lengths of follow-up for ECC compared to baseline patients.

Months	Mean number of visits	
	Baseline	ECC
0 to 3	1.2 visits	2.1 visits
0 to 6	1.4 visits	2.9 visits
0 to 9	1.7 visits	3.5 visits
0 to 12	2.0 visits	4.2 visits
0 to 24	3.4 visits	6.9 visits

Visit type utilization for ECC compared to baseline patients

Type of dental care	Parameter Estimate ¹	St Error	P-value	Hazard Ratio
Diagnostic or preventive ²	0.55	0.11	<.0001	1.734
Restorative/ITR	1.32	0.42	.0016	3.728
OR	-0.59	0.20	.0028	0.552
Restorative/surgical	-0.61	0.12	<.0001	0.545

¹ Using Proportional hazards models adjusting for patient age, gender, race, ethnicity, type of dental insurance, and spoken language

² Including disease management among ECC patients

OR=operating room

*Funded by DentaQuest Institute

◇Samnaliev M, Wijeratne R, Grace Kwon E, Ohiomoba H, Ng MW. Cost-effectiveness of a disease management program for early childhood caries. J Public Health Dent 2014



Costs: ECC vs. Baseline *◇

Mean patient costs for all dental care, including 1st month

Length of evaluation	COSTS (2011 dollars) ¹			
Months	Baseline	ECC	Net savings	p-value
3	\$699	\$669	\$30	0.7736
6	\$1,092	\$880	\$212	0.1514
9	\$1,660	\$1,097	\$563	0.0091
12	\$2,025	\$1,262	\$762	0.0028
24	\$2,678	\$1,834	\$844	0.0260

¹ Mean costs of care were estimated using generalized linear models, adjusting for patient age, gender, race, ethnicity, type of dental insurance, and spoken language

*Funded by DentaQuest Institute

◇Samnaliev M, Wijeratne R, Grace Kwon E, Ohiomoba H, Ng MW. Cost-effectiveness of a disease management program for early childhood caries. J Public Health Dent 2014



Estimated Savings to the Medicaid Program *◇

(n=361 beneficiaries)

Length of evaluation	Outcomes ¹			
MassHealth costs (2011 US \$)				
Month	Baseline	ECC	Savings	p-value
3	\$456	\$359	\$97	0.057
6	\$662	\$530	\$132	0.087
9	\$778	\$641	\$137	0.121
12	\$918	\$735	\$182	0.055
24	\$1,418	\$1,197	\$221	0.151

Medicaid payments were estimated as a percentage of charges as follows:

- 57.8% of charges related to disease management visits
- 43.1% of charges for Restor/Surg visits
- 42.7% of charges for Restor/ITR visits
- 40.7% of charges for sedation
- 12.2% of charges in the OR

Estimated payments are adjusted for background differences (patient age, gender, race and ethnicity, type of dental insurance and spoken language) between the baseline and the ECC patients

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◇Samnaliev M, Wijeratne R, Grace Kwon E, Ohiomoba H, Ng MW. Cost-effectiveness of a disease management program for early childhood caries. J Public Health Dent 2014



Lila—from Cape Cod

- At age 2, local dentist recommended dental treatment in OR
- Mom sought second opinion
- Mom agreed to CDM protocol & FV and DM visits q3 mos
- At age 3-4, allowed sealants, fillings & crowns in clinic
- Continues to be Low Risk



Mason—from Western MA



Arrested
decay

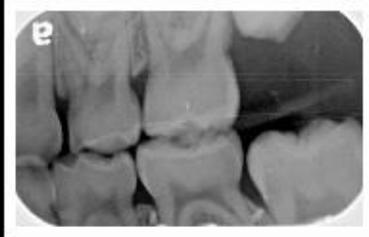
- At age 3, local dentist recommended dental treatment in OR
- Mom sought second opinion
- Mom agreed to CDM protocol & FV and DM visits q3 mos
- Some areas of decay arrested
- At age 3-4, allowed fillings in dental office
- Continues to be Low Risk
- Returns every 6 months



Alexa—from Boston



Age 4



Age 5



Age 6

- At age 4, Class II caries on BWs
 - Parents agreed to CDM protocol and q3 mos & FV
 - Experienced difficult restorative visit
- At age 6, replaced faulty composite
- High Caries Risk
 - q3-6 mos DM visits & FV
 - Sealants on 6's
 - Monitoring Class II caries



Observations

- Early results from ECC CDM interventions have demonstrated that CDM
 - can be implemented into clinical practice
 - has strong potential for reduction in new cavitation, dental pain and referral to the operating room compared to baseline rates



Conclusions

- ECC CDM may curtail caries activity while complementing dental repair -- stopping disease progression and cavity recurrence
- ECC CDM will require and benefit from evolving healthcare delivery and financing systems that reward health outcomes





Thank you!

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