The Eastman Teledentistry Experience: Past, Present, Future

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First National Teledentistry Conference, Rochester NY

June 8th, 2019

Yesterday

- An astute observation
- A timely suggestion
- Explore feasibility (R21)
- Test Utility (Aetna)
- Assess Effectiveness (K23)
- Develop interactive mode (HRSA)

Today

- Screen and Refer (Asynchronous)
- Two-way interactive video (Synchronous)

Tomorrow

Teledentistry

A new paradigm for oral health care

- Teaching
- Research
- Service

Thank You

Application of Asynchronous Modality to Establish a Dental Home for Underserved Urban Children

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American TeleDentistry Association

UR Medicine | Eastman Institute for Oral Health
Medicine of the Highest Order

Teledentistry beginnings

- Two U.S. Army pilot projects began in 1994, and they demonstrated that teledentistry could save patient travel.

- Evolved to patient screenings, specialty consultations, referrals, education, and emergency care in various dental specialties

- The virtual dental home – created in 2012-- is an innovative model for reaching underserved and vulnerable populations

Chronology of Teledentistry at EIOH

- **Collaboration with Pediatrics Health-e-Access program**

- **R21 planning grant to reduce disparities among Rochester children**

  Pilot study to assess feasibility of dental images to diagnose oral diseases (2003)

- **Aetna Foundation and Monroe County Department of Health grants (2004-2007) t**o screen underserved preschool children

- **NIH/NIDCR Funded study (2007-2012)** reduce oral health burden in urban preschool children

- **Department of Agriculture, HRSA (2010-present)** Synchronous modality (**2016-present)** Asynchronous model to screen for ECC onset (Dept. of Psychiatry and Einstein School of Medicine projects funded by NIH)

Modalities of Teledentistry

Teledentistry can take one of three forms:

- **asynchronous** (storing and forwarding images)
- **synchronous** (real-time interactive technologies)
- **mobile health care services** (smartphone apps and text messages)

How did we start?

Collaboration with Pediatrics Health-e-Access

URMC Pediatricians already
at local Head-Start Centers.

R21 planning grant to reduce disparities in oral health among Rochester children

Pilot study to assess feasibility of dental images to diagnose oral diseases

Asynchronous modality: what do we need?

- **An intraoral camera and storage mechanism for digital files**

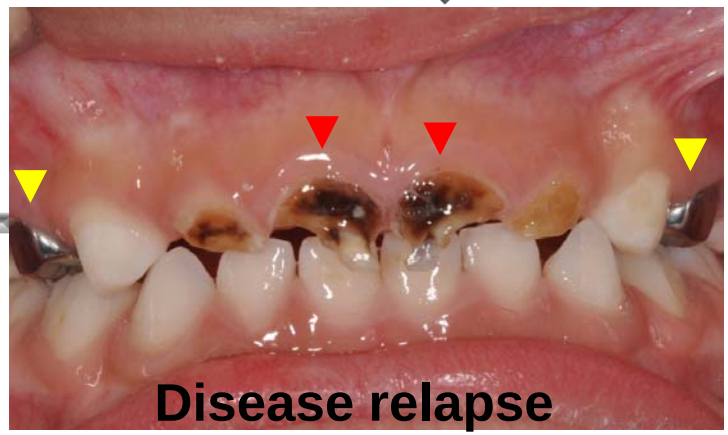
- **Non-dental personnel can be trained to take intraoral images (start with a typodont and an adult)-practice!**
- **Color printer and referral forms**

Why focusing on ECC and S-ECC?

S-ECC onset
(peak 3 years of age)

Oral rehabilitation
(OR)

"Silver smile"



Disease relapse
(***~40% relapse*** 6 months post OR)

Increased caries risk and caries experience in adult dentition

Graves CE, et al. 2004;
Berkowitz RJ, et al. 2011

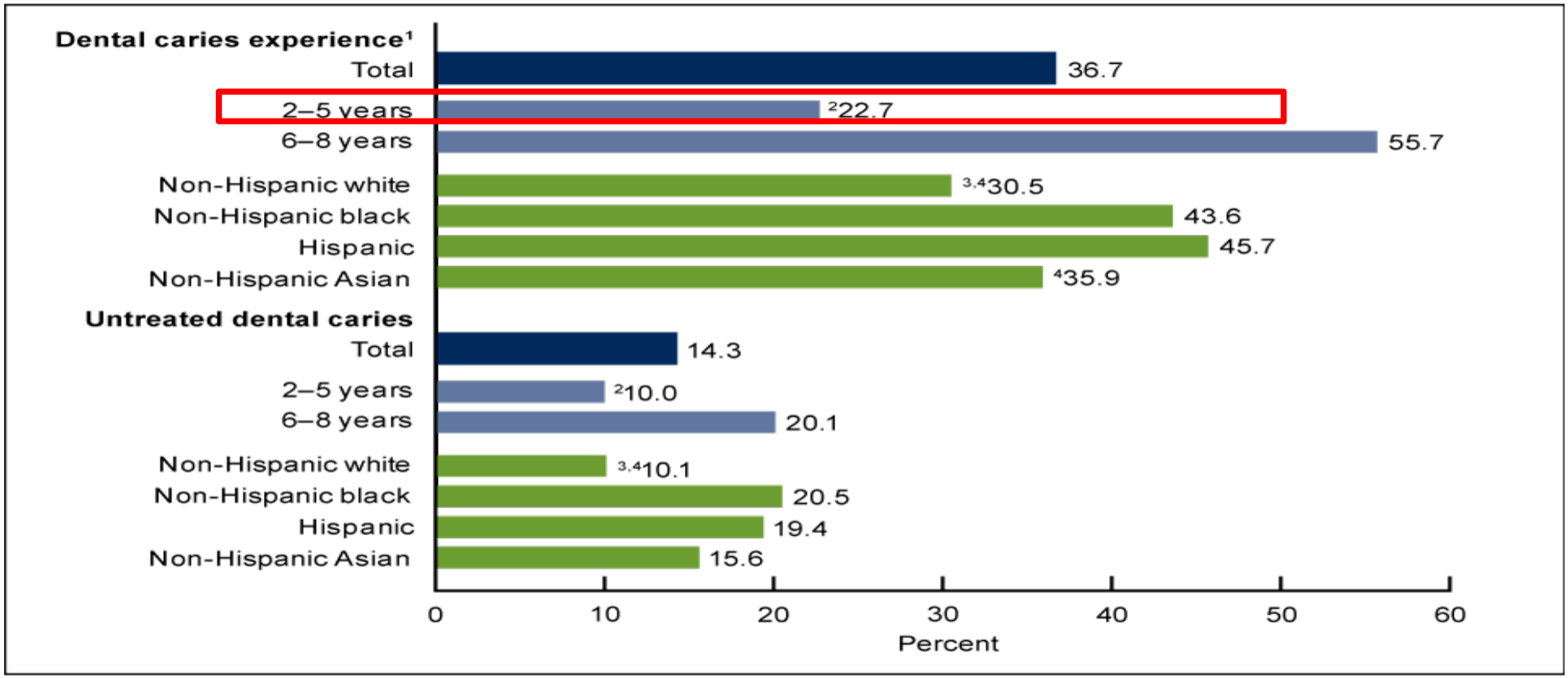
Courtesy of Dr. J. Xiao

Severe Early Childhood Caries (S-ECC)- treatment in the OR

Courtesy of Dr. Sean McLaren

Data Brief on dental caries in primary teeth of US children, NHANES 2011-2012

Figure 1. Prevalence of dental caries in primary teeth, by age and race and Hispanic origin among children aged 2–8 years: United States, 2011–2012



[1]Includes untreated and treated (restored) dental caries.
[2]Significantly different from those aged 6–8 years, $p < 0.05$.
[3]Significantly different from non-Hispanic black children, $p < 0.05$.
[4]Significantly different from Hispanic children, $p < 0.05$.
NOTE: Access data table for Figure 1 at: http://www.cdc.gov/nchs/data/databriefs/db191_table.pdf#1.
SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey, 2011–2012.

Feasibility study

- 50 Head Start enrollees from an inner city day care center were examined by a trained and calibrated dental hygienist

•By using an intraoral camera, the health aide from the day care center recorded computer images of children's teeth

•Six dental images were taken of each child's Teeth using Camscope intraoral camera

•Digital images were sent to the remote dental site and were read by the dental hygienist

•The number of decayed, missing and filled surfaces was calculated for both methods and compared by means of kappa statistics

Austin Head-Start Daycare Center
Rochester, NY

Traditional hands-on exams

Intraoral camera (Doctor Camscope) screening

Digital images of anterior teeth

Digital images of upper posterior teeth

Digital images of lower posterior teeth

How good were these images?

Diagnostic qualities of images obtained with the intraoral camera were superior to traditional dental examinations conducted with a dental mirror and a spot light

Kopycka-Kedzierawski DT, Billings RJ, McConnochie KM. "Dental screening of preschool children using teledentistry: a feasibility study". Pediatr Dent. 2007; 29(3): 209-13.

Aetna Study and Monroe County Health Department Survey-oral screenings via asynchronous modality

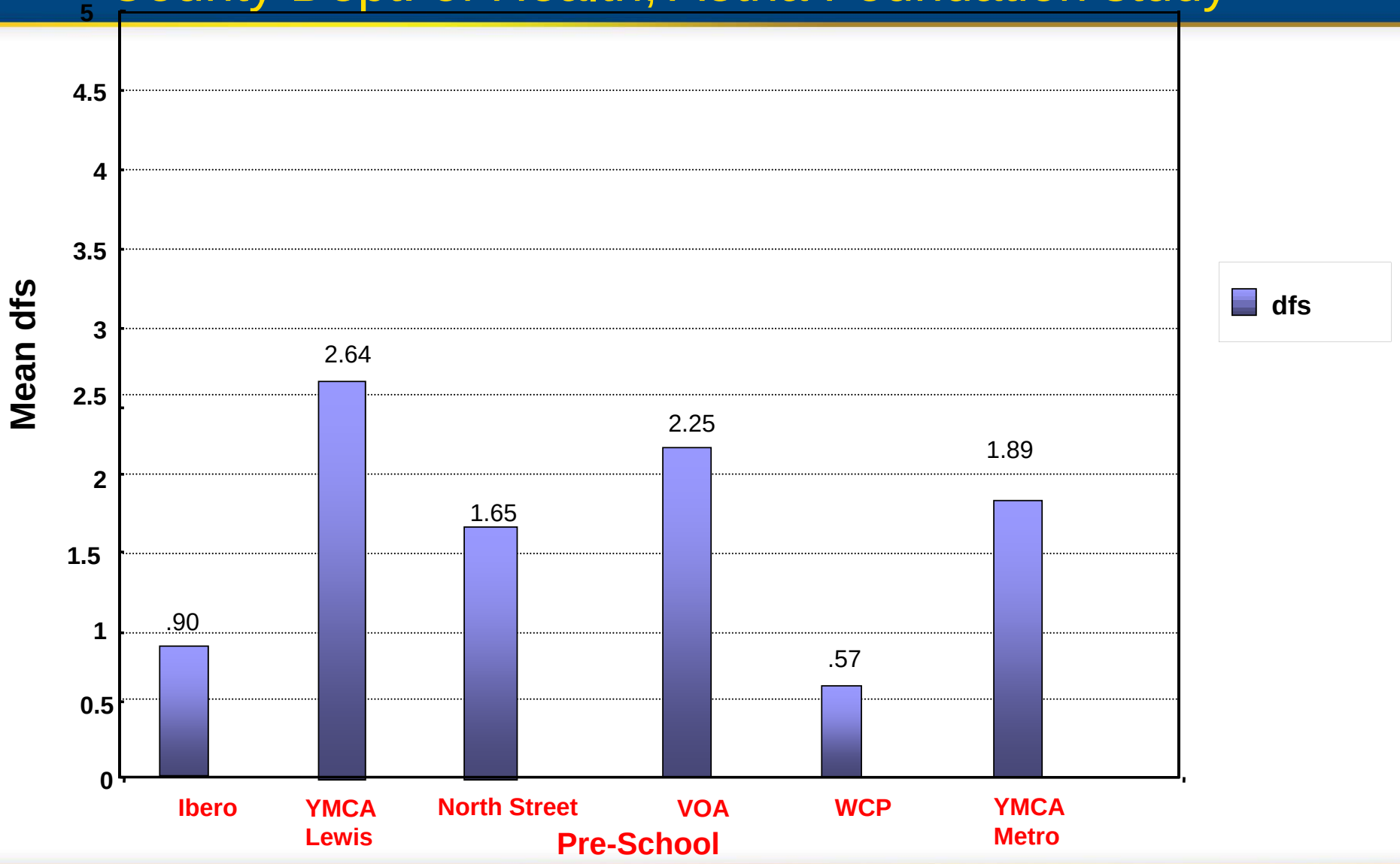
Mean and Standard Deviation (SD) Caries Scores for All Children Examined

	Number of Children= 201			
	Mean	SD	Min	Max
dfs	1.72	3.23	0.00	20.00
dft	1.20	1.96	0.00	10.00

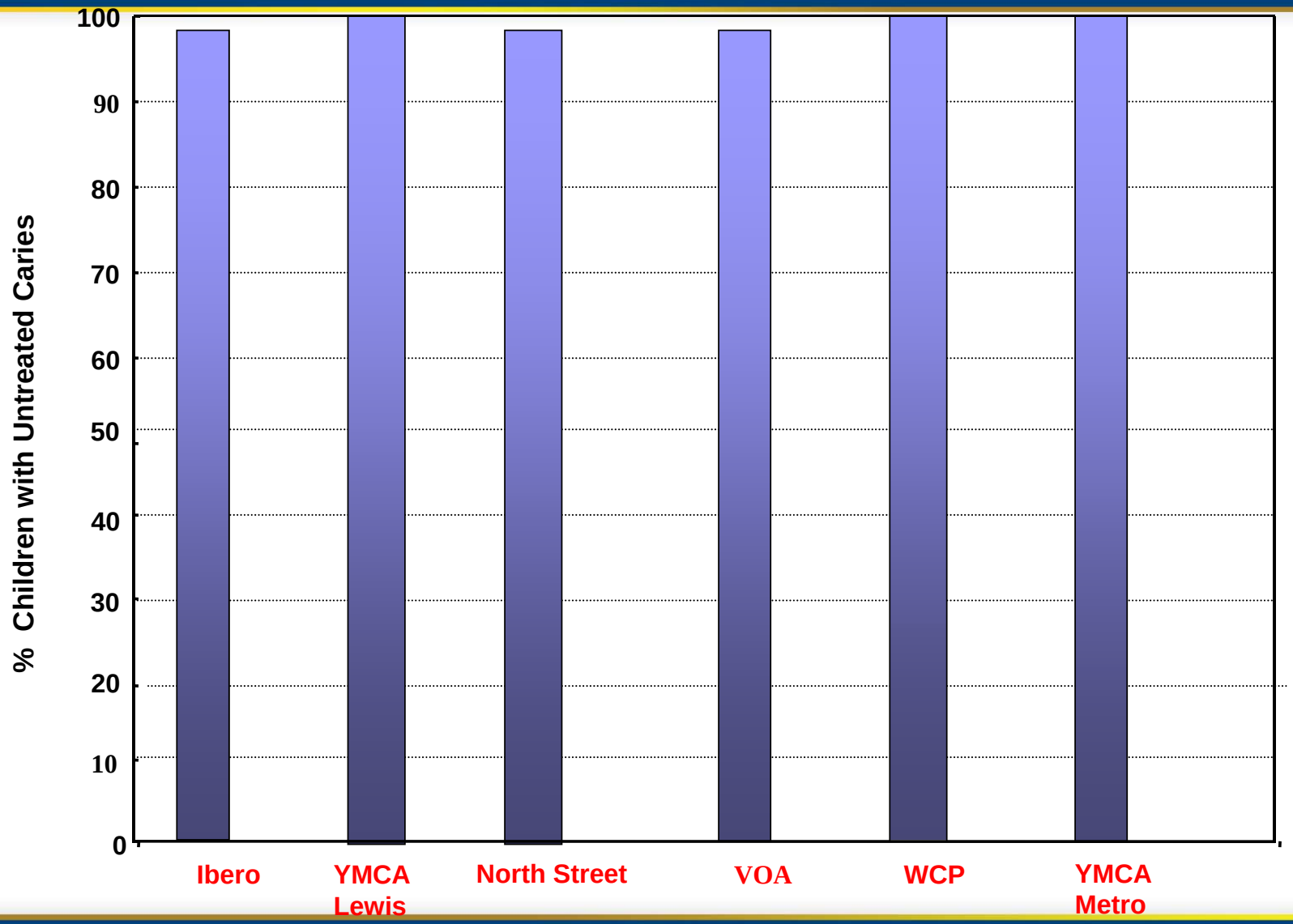
Mean and Standard Deviation (SD) Caries Scores by Age

	Number of Children= 201									
	1		2		3		4		5	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
dfs	0.16	0.63	1.23	3.40	1.67	3.32	2.06	2.93	3.63	4.21
dft	0.13	0.49	0.94	2.21	1.17	2.08	1.53	1.73	2.26	2.26

Mean dfs of preschool inner-city children, 2006-2007 Monroe County Dept. of Health, Aetna Foundation study



Prevalence (%) of Untreated Dental Caries in pre-school inner-city children 2006-2007



Pre-School

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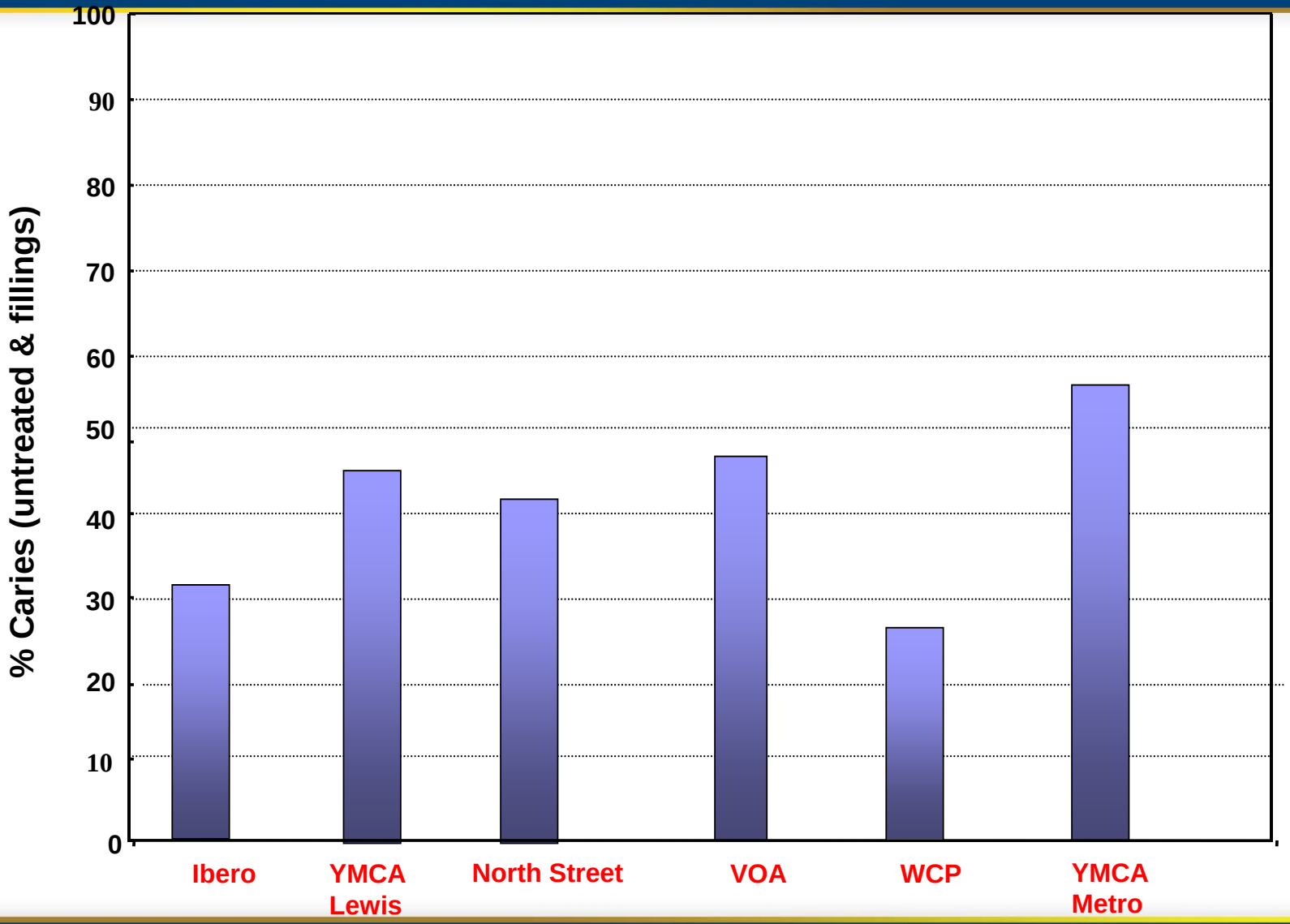
Prevalence (%) of Dental Caries in pre-school inner-city children 2006-2007



Pre-School

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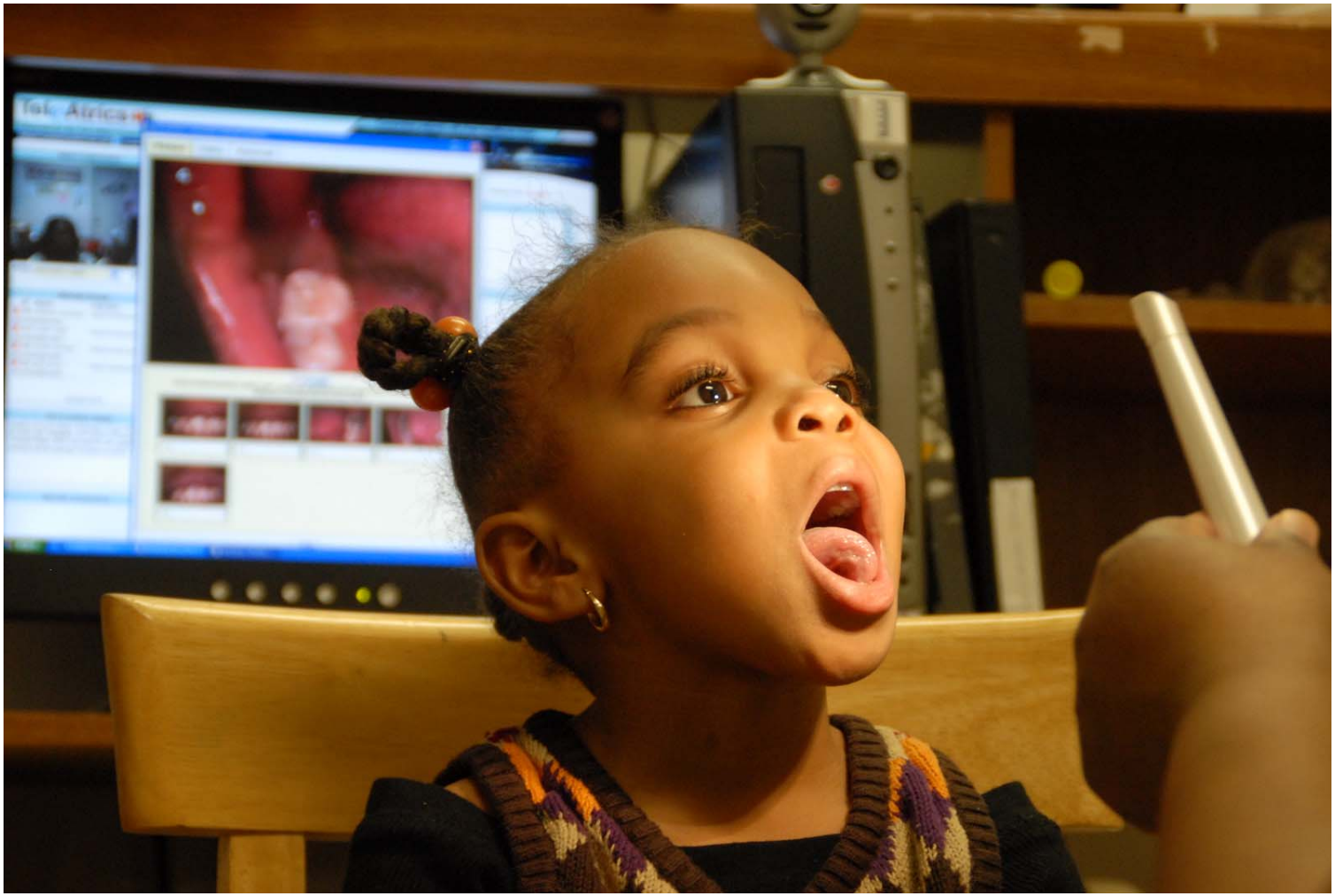
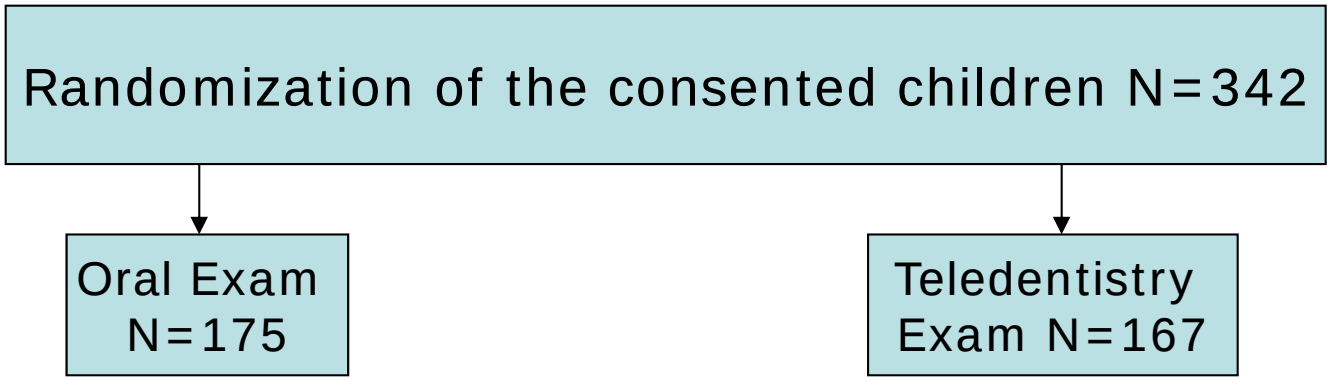
In the field…



Asynchronous modality cont.

Comparing toothbrushes

An asynchronous modality to decrease oral health burden in preschool children from the selected daycare centers, Rochester NY-oral screenings via asynchronous modality (2007-2012)



Follow-up for 12 months with subsequent screenings at 6- and 12 months

Number of children with filled surfaces at baseline and at 12 months by exam modality

- There was no statistical difference among children screen via teledentistry and visual/tactile examination at baseline related to the children with restoration(s) present (Fisher's exact test, p=.3)

- There was a statistical difference in the number of children with restoration(s) present at 12 months by exam type (teledentistry vs. visual/tactile), (Fisher's exact test, p<.001)

- Kopycka-Kedzierawski and Billings, Telemedicine and e-Health, 2013

Baseline questionnaire (N=291)

Parents/Guardians	
Mean Age	27.5 years of age (SD=6.28) Min-Max 16-50
Mean # of children	2.35 (SD= 1.37) Min–Max 1-11
Gender	7% Male 93% Female
Race/Ethnicity	77% A-American 20% White 3% American/Indian 26% Hispanic 74% Not Hispanic
Work Status	61% Currently employed 39% Currently unemployed
Education	5% Middle school 40% High School 22% more than High School 29% College level 3% Post graduate level
Marital status	13% Married 75% Single 9% Separated or Divorced 3% Other
Income	71% $0-19.999 20% $20,000-29,999 9% $30,000-50,000+

Baseline questionnaire cont.

Children	
Dental insurance	68% Medicaid 12% Child Health Plus 17% other 3% None
Medical insurance	65% Medicaid 14% Child Health Plus 19% Other 2% None
Emergency room visit in the last 12 months	22% Yes 78% No
Did you make dental appointment in the last 12 months for your Child with a dentist?	62% Yes 38% **No**
Did you take your child for routine dental visit in the past 12 months?	61% Yes 39% **No**
Are you thinking of taking your child to see a dentist in the next 6 months?	88% yes 12% No
Did you make an appointment for your child to see a dentist in the next 6 months?	52% Yes 48% **No**
In the last year how much of a problem was it to get care for your child that you or your dentist believed was necessary?	3% A big problem 5% A small problem 92% **Not a problem**
Last dental check-up of your child	63% Past 12 months 4% 1-2 years ago 1% More than 2 years ago 32% **Never**
Does your child currently need any dental work?	12% Yes 88% No
Your child's dental health status	46% Excellent, 30% Very Good, 22% Good, 1% fair, 1% Poor

Prognostic ECC model: Decayed, filled, and decayed and filled, surfaces for children who were available for the baseline, 6-month and 12- month follow-up visit

Examination	variable	Mean (SD)	Min-Max	Lower 95% CI	Upper 95% CI	Number of children (N)
Baseline	d_b	0.69 (2.00)	0-11	0.32	1.06	116
	f_b	0.12 (0.80)	0-7	0.03	0.27	
	dfs_b	0.81 (2.17)	0-11	0.41	1.21	
6-month follow-up	d_6	0.84 (2.29)	0-13	0.41	1.27	113
	f_6	0.42 (1.75)	0-26	0.29	1.46	
	dfs_6	1.26 (2.82)	0-26	1.37	3.07	
12-month follow-up	d_{12}	1.34 (3.63)	0-21	0.68	2.01	116
	f_{12}	0.88 (3.18)	0-26	0.29	1.46	
	dfs_{12}	2.22 (4.62)	0-26	1.37	3.07	

Kopycka-Kedzierawski DT, Billings RJ, Feng C. 2018.
Eur Arch Paediatr Dent.

Results from the WGEE model with decayed surfaces (ds) in the primary dentition being an outcome variable

Variable	Level	Estimate	SE	95% CI	P-value
Exam type	0 1 (reference)	-0.190	0.283	-0.745-0.365	0.05
dfs status at baseline	0 (dfs=0) 1 (dfs>0, reference)	-2.953	0.462	-3.871-2.035	<0.0001
Work status	1(Employed) Unemployed (reference)	-0.561	0.343	-1.232-0.111	0.10
Child's Dental Insurance	1 (public) Reference: other	-0.566	0.611	-1.765-0.632	0.35
Child's Medical Insurance	1(public) Reference: other	-0.016	0.586	-1.165-1.133	0.98
Problem in the past 12 months	0(a big problem)	3.283	3.085	-2.763-9.330	0.29
	1(a small problem) Reference: no problem	-0.269	0.686	-1.613-1.076	0.70
Current need of dental work	0 (yes) Reference: no	0.753	0.266	0.240-1.266	0.004

According to the children's parents/caregivers, children who currently needed dental care (the question was asked at baseline) had 0.75 more carious surfaces (ds) in the primary dentition at the end of the study than children who did not need dental care (p=0.004). Additionally, children without decayed primary surfaces at baseline (ds=0) had almost 2.95 fewer carious surfaces at the 12-month follow-up examination.

Kopycka-Kedzierawski DT, Billings RJ, Feng C. 2018. Eur Arch Paediatr Dent.

Results from the WGEE model with decayed and filled surfaces (dfs) being an outcome variable

Variable	Level	Estimate	SE	95% CI	P-value
Exam type	0 (clinical) 1 (teledentistry)	-0.526 0.000	0.406 0.000	-1.322-0.270 0.000-0.000	0.1952 .
dfs status at baseline	0(dfs=0) 1(dfs>0)	-5.493 0.000	0.730 0.000	-6.924--4.062 0.000-0.000	<.0001 .
Child's Dental Insurance	1 (public) 2 (other)	-1.227 0.000	1.074 0.000	-3.331-0.877 0.000-0.000	0.2530 .
Child's Medical Insurance	1 (public) 2(other)	1.395 0.000	1.993 0.000	-0.956-3.745 0.000-0.000	0.2448 .
In the last 12 months how much of a problem, if any, was it to get care for your child that you or a dentist believed was necessary	0(a big problem) 1(a small problem) 2(not a problem)	9.538 -1.125 0.000	7.316 0.645 0.000	-4.800-23.877 -2.382-0.138 0.000-0.000	0.1923 0.0809 .
Does your child currently need dental work?	0 (yes) 1(no)	0.467 0.000	0.408 0.000	-0.333-1.266 0.000-0.000	0.253 .

Children without ECC at the baseline examination (dfs=0) had 5.49 fewer decayed surfaces and filled surfaces (dfs) in the primary dentition at the end of the study than children who had ECC at the baseline examination (dfs>0) ($p<0.0001$).

Kopycka-Kedzierawski DT, Billings RJ, Feng C. 2018. Eur Arch Paediatr Dent.

Study results and conclusions

- Almost 28% of the screened children had caries experience at the baseline examination.
- Teledentistry and clinical examinations at baseline were comparable when screening for dental caries in preschool children.
- Results of the parental questionnaire indicated that 39% of the children had not seen a dentist in the past 12 months and 32% of children had never seen a dentist.
- More children from the Teledentistry group had dental treatment than children from the clinical examination group, as evidenced by fillings for tooth decay.

(Kopycka-Kedzierawski and Billings, EAPD, 2011; Kopycka-Kedzierawski and Billings, Telemedicine and e-Health, 2013)

What are the barriers?

- **Lack of dental insurance reimbursement**
- **Differences in the state laws and licensures**
- **Data security**
- **“Buy in” from medical colleagues**

Future opportunities for Asynchronous modality

- **Screening (Public Health): Currently with Dept. Psychiatry and Einstein School of Medicine**

- **Consultation (Diagnosis and referral)**

- **Patient education (Public Health to enhance access and utilization)**

Thank you

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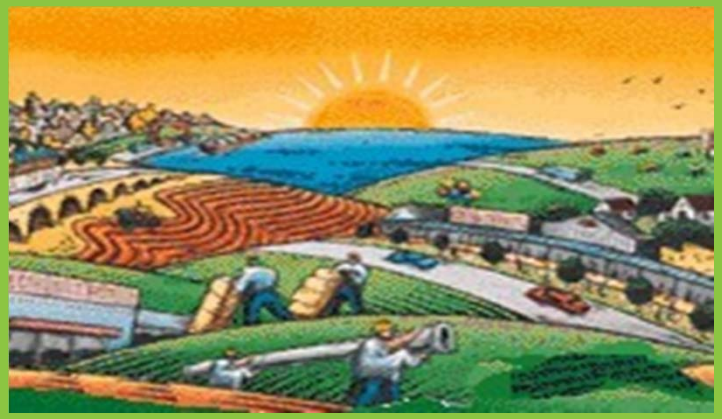
TELE-DENTISTRY
REACHING OUT WITH TECHNOLOGY



ANTHONY MENDICINO DDS, DENTAL DIRECTOR

Objectives For Today

- Why Telehealth?
- Key elements to a successful telehealth program.
- Using teledentistry to provide access to dental care.

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A Little Bit About Finger Lakes Community Health

- Community & Migrant Health Center (FQHC)
  - Serving mostly rural communities
  - Providing comprehensive medical, dental, mental health, SUD, Nutrition, Care Management, Advocacy services to the communities we serve.
- Agricultural Worker Voucher Program in 42 Counties of NYS
- 8 Full Time Health Center Sites
  - Community Portable Dental (schools, Head Starts, Jails)
  - Mobile Medical Program (22 Counties)
  - Extensive Care Management Services
- 2018 Stats (UDS):
  - 28,123 Total Users
  - 9,013 Ag Workers
  - 63% of patients want to be seen in a language other than English

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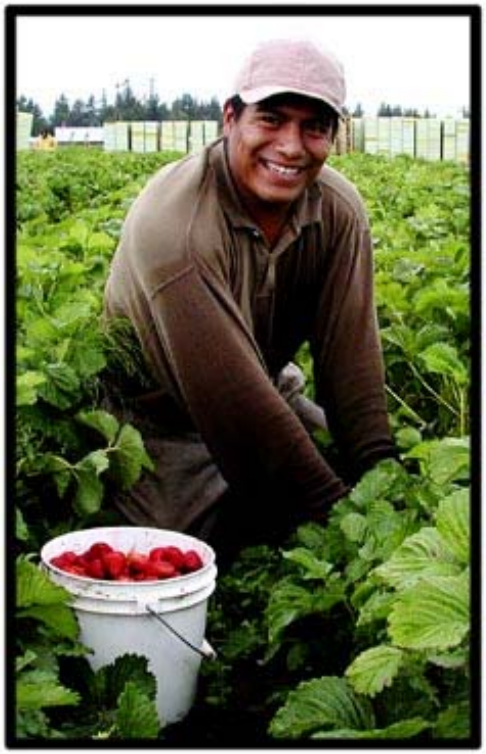
Who We Serve



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Challenges in Rural Communities

- Language differences
- Cultural beliefs
- Cost of health care services
- Uninsured/Underinsured
- Lack of trust in health care system
- Poverty
- Stigma
- Transportation barriers

"In any given year, 3.6 million Americans miss at least one medical appointment because of transportation problems."
(WSJ 2017).

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Why Telehealth?

Integrating telehealth technologies into our model of care allows us to:

- Eliminate geographical barriers by bringing many specialty care providers into our health centers virtually
- Addresses workforce shortages
- Reduce stigma (Integration of BH into FQHC's using telehealth)
- Allows for more collaborative care between primary care team and specialists. New relationships between providers/specialists
- Extensive educational opportunities for our providers
- An important tool in Value Based Care
- **Will be a key player in sustainability of FQHC's!**

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Telemedicine will become the core methodology of healthcare delivery in the future. That is where we are going to get the efficiencies we need to provide affordable care.

Yulun Wang, Past President American Telemedicine Association

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Are You Ready for the Millennials?

- Biggest generation (born 1980 – 1995)
- Make up 25% of the U.S. population
- 27% of consumer discretionary purchases (over 1 trillion $$)
- 37% of millennials state that they are willing to purchase a product or service to support a cause they believe in, even if it means paying a bit more
- Millennials are more than 2.5 times more likely to be early adopters of technology than any other generation
- 56% of millennials report that they are among the first group to try out new technology
- For millennials, new technology must serve a purpose in order to be considered

millennialmarketing.com

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Our Experiences with Telehealth

- Telehealth must be integrated fully into your existing clinical processes in order to be sustainable, both financially and clinically.

- Our work in telehealth has helped us to develop some great partnerships with other healthcare providers and organizations.

- Our data shows that providing care using telehealth technologies has led to:
  - Better patient outcomes, with more access to care outside our own walls
  - Our providers have developed added skills by learning from specialists
  - Reduced costs for care by keeping our patients in the primary care setting
  - Care management and technology are our “sweet spot”!

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Cost Benefit Analysis for Telehealth

For Patients/Community:

Decreased:

*transportation issues/costs
*lost work/unpaid time
*Emergency Dept. visits
*time to treatment
*Stigma

Increased:

*Continuity of care
*Access to behavioral health services
*Simultaneous communicate with PCP and Specialist
*Access to Language Services via video
* High patient satisfaction!

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4 Buckets to Consider…

- **Broadband (Internet):** Do you have enough? What other processes are utilizing your broadband?

- **Equipment:** what platforms are available to connect, what peripherals will you want/need?

- **Program Development:** This is where you'll spend the most time and effort as it is the most critical piece to a successful telehealth program. Are you prepared to make the appropriate commitments of staff and investment of time?

- **Legal/Regulatory:** What does your state licensure allow? What are the rules of the road in terms of reimbursement? Are there federal implications?

Broadband

Equipment

Program Development

Legal

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Best Practice: Organizational Assessment

Perform an organizational assessment to determine your readiness in the adoption of telehealth technologies…

Be sure that:

- There is ‘buy in’ from your leadership team
- There is a commitment to the additional work involved in developing your capabilities
- You know what your State licensure allows
- You have appointed a Team Leader that understands their role as an agent of change
- You understand that it will take time to build telehealth technologies into your clinical process
- Telehealth forces change…make sure your team is on board!

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Best Practice: Plan, Plan, Plan

Set measurable goals for your telehealth program that include program design, equipment needs, staffing requirements, financial costs, and program outcomes.

- Start small! Build a program that allows you to “pilot” it at one site, work out the issues, and then when that site is successful, roll it out. Every clinical site operates a bit differently, even within one organization.
- Technology can be challenging to staff. Plan to have staff continually practice their skills with the equipment to keep them up to speed.
- Build a strong training program that is continual. A “one and done” approach just doesn’t work.
- Plan to make your electronic health record system an integral part of your program so that data can be tracked effectively.
- Understand HIPPA privacy and security rules!!!

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Best Practice: Know Your "Why"

What services are most needed in your organization? Make sure that your choices of telehealth programs are in line with your particular goals and objectives. Will your choices reflect your mission and vision?

- Learn about the various telehealth modalities…visit other providers/practices using telehealth. This is a good opportunity to learn from others in order to minimize problems in your own implementation.

- Makes sure your team is on board with the choices made.

- Understand any legal or regulatory issues when choosing what telehealth programs you might choose. There are different rules for live telemedicine (synchronous) visits versus "store and forward" visits (asynchronous).

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Some Organizational Challenges

- Teaching providers/staff how to use a high definition video camera and software as well as peripherals (digital otoscope, exam camera, stethoscope, etc.).
- Integrating telemedicine into the daily routine of the health center.
- Importance of a ”Provider Champion”.
- Keeping everyone sane while adding more tasks for clinical staff. Staff needs to “buy in” to use of telehealth for better access.
- Physical setup of equipment and usage is very important! Needs to be easily accessed and consistent throughout your health system

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Uses For Teledentistry

- Screenings
- Exams
- Urgent Care
- Specialty Care Consults
- Pre and Post-Operative Care
- Follow-up
- Distance Learning

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FLCH TelePeds Dental – The Problem

- **Identify the problem:** FLCH patients from 3-10 yrs old were referred, but not able to access Pediatric dental services in Rochester (Eastman Dental). Several barriers to care.
- **Baseline data:**
  - Our data showed that about 38% of children in Head Start & school based dental programs that we served had caries, many with severe decay.
  - Initially, we found that there was a **15% completion rate** of treatment on children referred to pediatric dentistry program in Rochester.
  - Wait time from consult with Eastman to treatment day was 7-8 months
  - Transportation was a major barrier to accessing care at Eastman Dental.

What strategies would address this problem and help get these children treatment?

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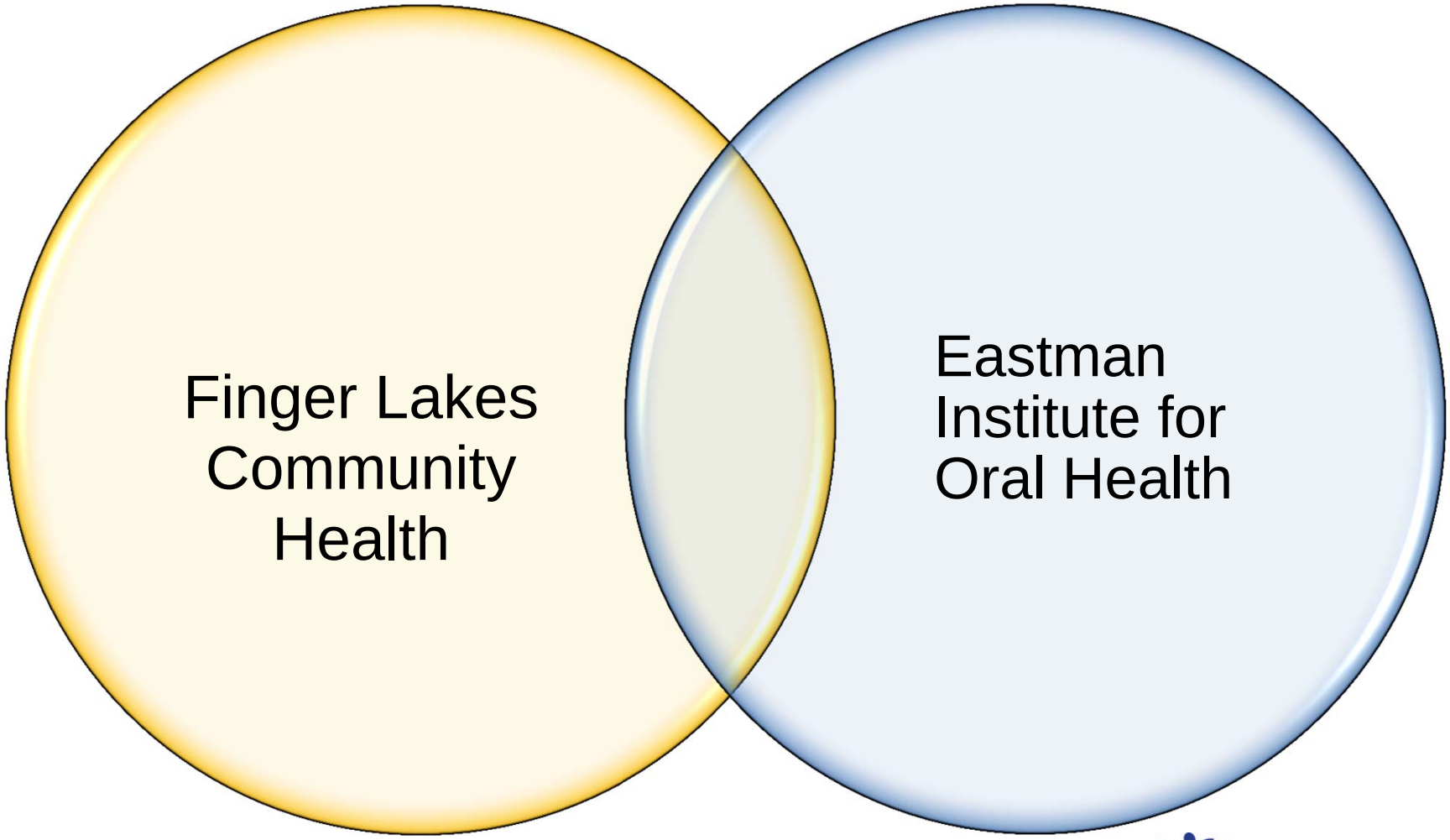
TelePeds Dentistry



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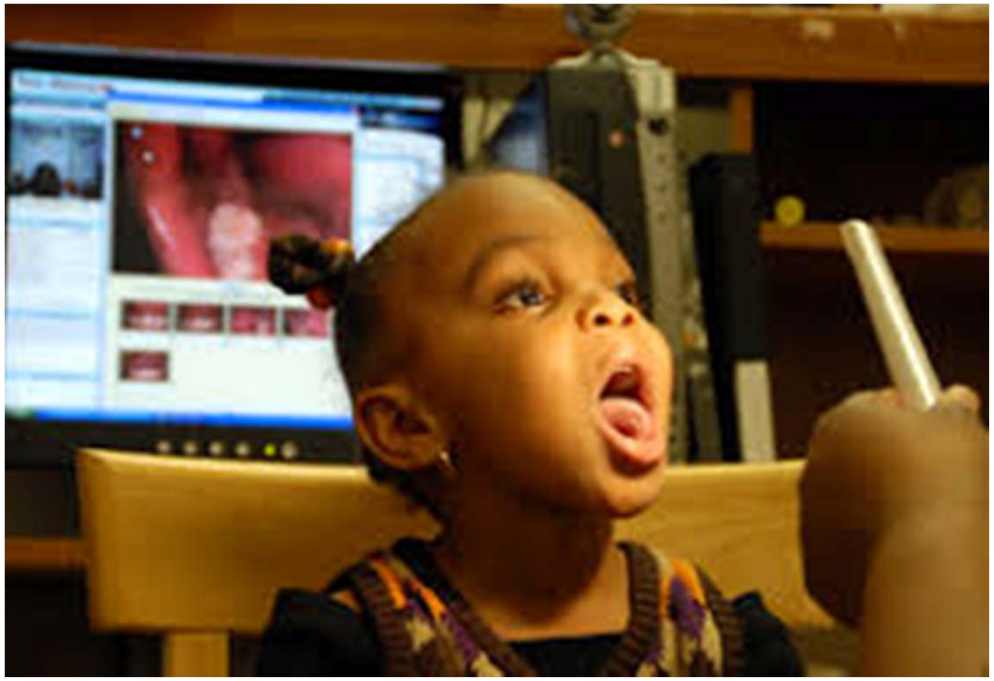
Purpose of TelePeds Dental Consult

- Compile medical history
- Assess child behavior and temperament
- Observe child's response to surroundings and non-invasive oral procedures
- Assess parental style
- Discuss findings with family
- Plan future treatment with behavior guidance.



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Behavior Strategies With Dentistry

- **Non-Pharmacologic Strategies**
  - *(Tell show do, positive reinforcement, modeling, imagery, desensitization, voice control, parental presence)*
- **Nitrous oxide / Oxygen inhalation**
- **Office-based Sedation**
- **General Anesthesia**
  - Surgery Center
  - Hospital

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Our Approach…

- ✓ Dental consults done through telemedicine
- ✓ A Community Health Worker (CHW) was assigned to each patient:
  - Assisted with scheduling of appointments
  - Followed up with parents when children missed appointments
  - Assisted with navigating between different health systems
  - Provided interpretation services if needed
  - Provided insurance enrollment and assistance
  - Provided referral to, or actual transportation to Rochester for care
- ✓ Monthly case conferences with Eastman Dental, our Dentist and CHW's.
- ✓ Use of a dental registry to track data and outcomes.

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Teledentistry at Finger Lakes

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More Components For A Successful Program

Care Coordination:

- Scheduling
- Pre-Visit Requirements
- Concurrent Chart Review
- Coordinate with PCMH Team/Specialty Team
- Quality Assurance Reports

Case Conferencing:

- Providers
- Care Managers
- Patient Navigators

Quality Improvement Activities:

- Data Collection
- Monitor and Report Outcomes
- Continuous Quality Improvement
- Regularly Evaluate Program

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Benefits of Care Management on Team

- Assess and address barriers to care
- Outreach
- Assist with navigating health care system
- Arrange/provide transportation
- Language/cultural interpretation
- Education
- Case management

Relationships = Trust

Finger Lakes
COMMUNITY HEALTH

FLCH Outcomes for TelePeds Dental Program

- Reduced the number of visits to Pediatric Dental Center from 4 or 5 visits down to 1 or 2 visits.
- Current wait time for treatment – about 3 weeks.
- Our dental team has increased its ability to treat children in house due to coaching and peer to peer learning through this program.
- **Most importantly - Children with completed treatment plans now at 93%.**

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Patients Seen for TelePeds Dental

2010: 10 children total

2011: 61 children total

2012: 65 children total

2013: 110 children total

2014: 122 children total

2015: 118 children total

2016: 151 children total

2017: 205 children total

Total Number of Kids who have COMPLETED Treatment: 706

168 children in process - 2018

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Challenges Continue in Telehealth Adoption

- **Reimbursement**, both government and private, continues to create the most significant obstacles to success, accounting for the top four unaddressed challenges to telemedicine.
- Challenges related to EMR systems also create significant obstacles to success.
- In spite of the ongoing challenges related to reimbursement and EMR systems, healthcare providers continue to actively plan, implement and expand telemedicine programs.

2017 U.S. Telemedicine Benchmark Survey - REACH

Finger Lakes COMMUNITY HEALTH

Challenges to Telehealth Sustainability

- Lack of consistent telehealth reimbursement policies between Federal, State and private payers
- Difficulty in developing clinical and staff champions within the program, must see the benefits of the program for patients.
- Lack of State-supported Telemedicine Infrastructure
- Seamless integration of Layer 1 – Broadband, Layer 2 – Systems & Equipment and Layer 3 – Applications and Program Development into a cohesive and sustainable model
- Legal Considerations

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COMMUNITY HEALTH

Some Lessons Learned…

- The largest expense with telehealth technology is the initial investment in the equipment needed – **beware of consultants, as they are very eager to spend your money on things you may not need!**
- Conduct extensive due diligence about what is needed for a successful program **(learn from others who have adopted telehealth programs or form a collaborative)**
- **Patients give high satisfaction scores for services via telehealth**. They like to convenience and reduction of time spent in a waiting room.
- **Our patients are becoming more empowered consumers**. With higher out of pocket costs, patients will demand better quality, high value, convenient care and a good patient experience.
- **In a value based world, telehealth will be an important tool for improving quality and access to care.**
- **Don't wait for reimbursement for telehealth to be in place…in a value based world, it won't matter.**
- **TELEHEALTH WILL HELP FQHC's REMAIN COMPETITIVE!**

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WXXI – Need To Know Segment

WXXI Go Public.

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Remember…

- Don’t practice until you get it right. Practice until you can’t get it wrong.

- Telehealth is not about fancy equipment and technology. It's a **tool** used to improve access and enhance quality of care.

- Implementing telehealth is a **process**, not a destination.

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COMMUNITY HEALTH

Thank You!

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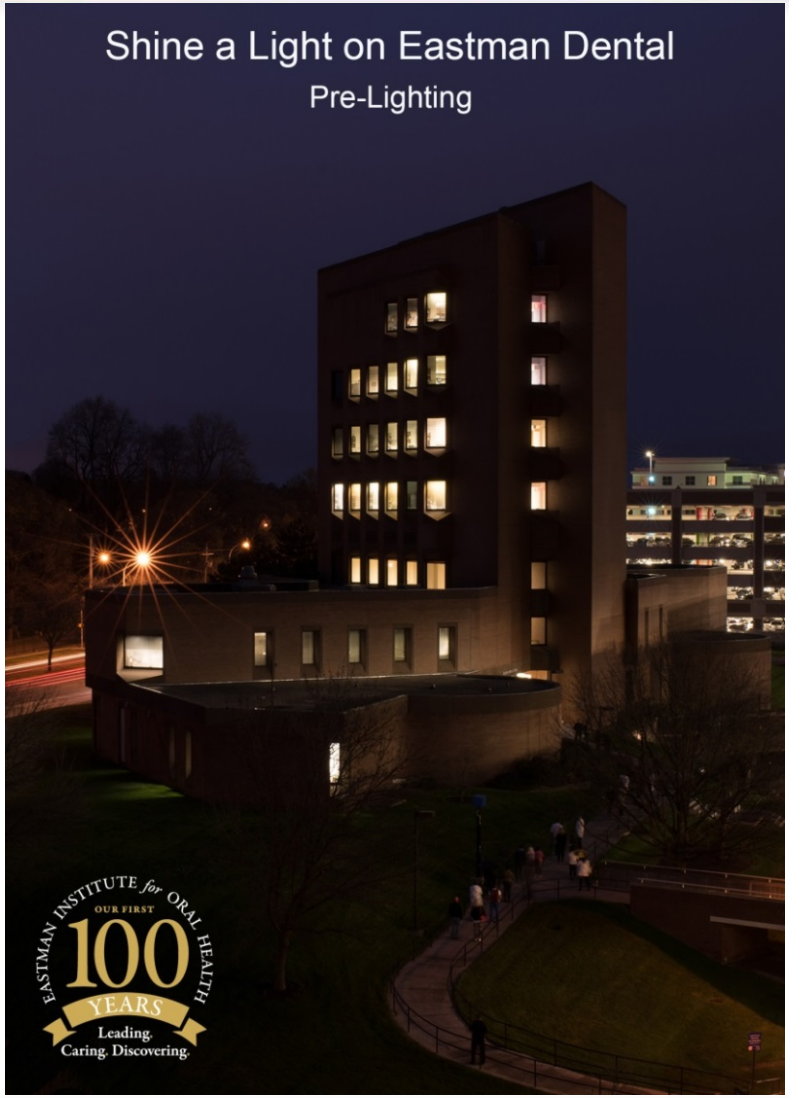
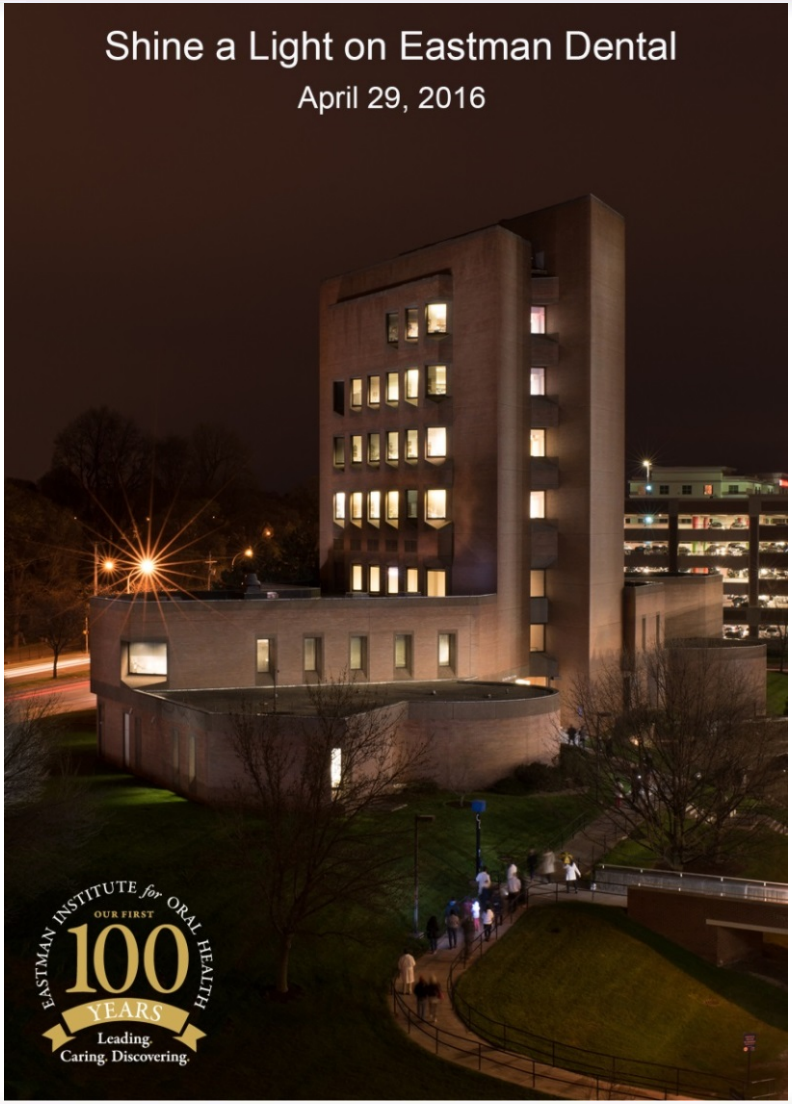
Application of Synchronous Modality to Establish a Dental Home for Underserved Rural Children

Sean McLaren, DDS
Chairman Pediatric Dentistry
Eastman Institute for Oral Health
University of Rochester





A T
D A
American
TeleDentistry
Association

UR MEDICINE | EASTMAN INSTITUTE FOR ORAL HEALTH
MEDICINE of THE HIGHEST ORDER

Eastman Institute for Oral Health

Division of Pediatric Dentistry

- 14 GME funded residents
- ~21,000 patient visits a year in resident clinic
- ~6,000 outreach visits
- 5 Full time faculty
- 2 .6 FTE's and 5 other part time faculty
- Serve as a safety net provider for large part of New York State

New York State Pediatric Dentistry Residency Programs:

1 Buffalo
1Rochester

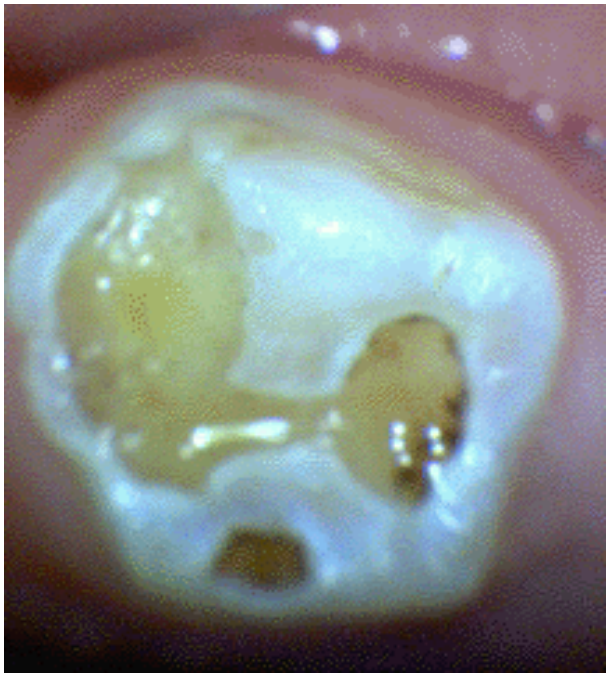
18 New York City Metropolitan Area

Synchronous Teledentistry Modality at EIOH

- Teledentistry collaboration between FLCH and EIOH initiated and started in April 2010
- A telepresenter and patient are at a remote site and pediatric dentist is at EIOH

Original Videoconferencing Equipment

Intraoral Images



Synchronous Teledentistry

Synchronous Teledentistry

A Relaxed Atmosphere…….

Treatment completion for complex dental cases

- An internal chart review of children seen through the mobile dental van program from 2003-2011 was completed by FLCH (n=158).
- A 15% treatment completion rate was observed for children referred for complex dental treatment.

Synchronous Teledentistry Visits

- A live-video teleconference appointment is set up when a child has been identified as having extensive dental needs by general dentists at FLCH.
- The live-video teleconference modality (synchronous teledentistry) is used rather than a store and forward modality (asynchronous teledentistry) because the pediatric dentist is also trying to assess patient behavior.

Synchronous Teledentistry Visits

- On day of appointment a live-video connection is established between remote site and EIOH (written consent obtained prior to live-video conferencing).
- Patient and family are introduced to pediatric dentist through webcam.
- Medical history is reviewed with parents.

Synchronous Teledentistry Visits

- All questions/concerns addressed by pediatric dentist to parents.
- Live-video feed switched from webcam to intraoral camera and oral exam begins.
- Telepresenter manipulates intraoral camera at request of pediatric dentist.

Synchronous Teledentistry Visits

- Live-video feed switched back to webcam.
- Observations discussed with parents.
- Treatment modalities discussed with parents.
- Treatment modalities: in-office treatment, treatment with nitrous oxide, treatment with oral sedation, treatment in operating room, treatment consultation.

Setting up an appointment for dental care

- Appointment set up for treatment at EIOH (joint effort with patient's guardians, FLCH community health worker and EIOH staff)
- Community health workers aid patients/their families with appointment attendance, H and P appointments if needed, transportation, and follow-up.

Review of the Program

- RSRB approval from University of Rochester obtained for retrospective chart review.
- Retrospective chart review completed for 251 patients seen in the synchronous teledentistry program from 4/2010-12/2013.

Patients Age

Number of Subjects	Mean age in years	Median age in age	Standard deviation	Min age	Max age	95%LCI	95%UCI
251	4.77	4.00	2.36	1.00	19.00	4.48	5.06

More than 70% of the children were 5 years of age or younger

Distribution of Treatment Modalities and Treatment Completion

Dental treatment recommended	Number of children with that recommendation	Number of children who completed recommended treatment	Number of children who completed some of the recommended treatment	Number of children who did not complete recommended treatment	Percentage of children who completed the recommended treatment
Office tx in EIOH	4	4	0	0	**100**
Tx with nitrous oxide sedation	110	62	19	48	**56**
Tx with oral sedation	15	13	0	2	**87**
Tx in the OR	112	104	0	8	**93**
Consultation	10	9	0	1	**90**

The compliance rates for all treatment modalities were not significantly different (Fisher's exact test, $p>0.05$).

Results of the Review

- Results show that 93% of children initially identified for treatment in operating room completed their treatment.
- 87% completion rate for children initially identified for treatment using oral sedation.
- 56% completion rate for children requiring N2O/O2, however 19 of the remaining 48 patients completed some of the treatment recommended

Results of the Review

- The high completion rates observed for children requiring operating room services may be attributed to all treatment being completed in 1 trip to Rochester.
- Treatment modalities (N2O/O2) requiring multiple trips to Rochester resulted in decreased completion rates.

Logistical considerations and challenges

- Dissimilarities and conflicts in state and federal laws
- Limited reimbursement, logistical encounters, and concerns about data quality and security
- Differences in payment and coverage for teledentistry services in the public and private sector, as well as different policies across states
-

State policies

- States have enacted various policies related to Medicaid and in several cases, private payers
- State policy typically determines what constitutes telehealth, including teledentistry; the types of technologies, services and providers that are eligible for reimbursement; where teledentistry is covered and how.

State policies cont.

- With technology's ability to cross state borders, provider licensure transferability is a key issue that states are examining to expand access and improve efficiency in the existing workforce
- Ensuring safe teledentistry encounters for patients and privacy and data security has become an increasingly important issue as teledentistry has grown

Potential solutions???

- With the establishment of a well-adjusted and thoughtful framework for the practice, use, and reimbursement of teledentistry in a mainstream clinical dentistry operation, patients, dental providers, and oral health care systems will be able to realize the full potential of teledentistry.

Future Plans

- To demonstrate that Teledentistry examinations for oral disease are a feasible alternative to oral examinations of small children and have the potential to be especially useful in rural areas where access to care may be difficult or unavailable.

- To promote Teledentistry in day care centers and in primary and secondary schools.

- To assess the cost-effectiveness of Teledentistry as an alternative to oral health examinations of school children in public health surveys at the federal (NHANES), state (NYSOHS) and local level (MCOHS).

- To explore the potential utility of Teledentistry for rural community dwelling older adults who may lack access to oral health care, as well as home bound adults and adults in long-term care facilities.

Acknowledgments

- Drs. Ronald Billings, Kenneth McConnochie, Jeff Karp
- Pediatric residents from EIOH
- Staff from the FLCH
- Funding agencies:
- NIDCR
- Department of Agriculture
- HRSA, *This project is supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) as part of an award totaling $3,400,000. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by HRSA, HHS or the U.S. Government."*

Questions

Thank you

Teledentistry and Virtual Dental Homes: On the Road to Value in Health Care and Oral Health Care

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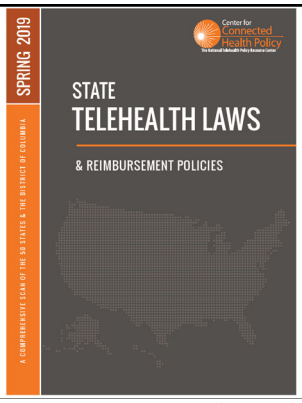
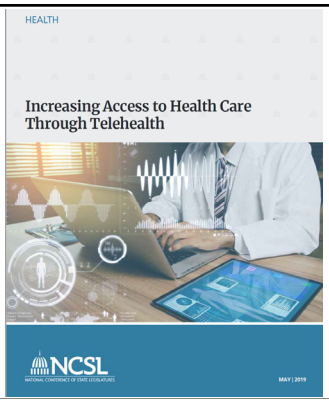
Disclosures

The presenter has consulting arrangements with the following entities:

- DentaQuest Impact, Inc.
- The Colgate-Palmolive Company
- Virtual Dental Care
- Idaho Department of Health
- Rhode Island Department of Health
- Multiple dental care providers



Center for Connected Health Policy. State Telehealth Laws. Spring 2019.https://www.cchpca.org/sites/default/files/2019-05/cchp_report_MASTER_spring_2019_FINAL.pdf



National Conference of State Legislatures (NCSL). Increasng Access to Health Care Through Telehealth. May 2019. http://www.ncsl.org/Portals/1/Documents/Health/Healthcare-Access_Telehealth_v03_web.pdf

2019 Telehealth Reports: Highlights

- 50 states + Washington DC reimburse for some form of live video in Medicaid fee-for-service.[1]
- 11 state Medicaid programs reimburse for store-and-forward. 5 others have laws but no mechanism yet. [1]
- 8 states have policies specific to teledentistry.[2]
- Very few states have a policy environment that fully supports the range of possibilities to improve health and care using teledentistry.

1. Center for Connected Health Policy. State Telehealth Laws. Spring 2019.https://www.cchpca.org/sites/default/files/2019-05/cchp_report_MASTER_spring_2019_FINAL.pdf
2. National Conference of State Legislatures (NCSL). Increasng Access to Health Care Through Telehealth. May 2019. http://www.ncsl.org/Portals/1/Documents/Health/Healthcare-Access_Telehealth_v03_web.pdf

Center for Connected Health Policy
The National Telehealth Policy Resource Center

What is Telehealth?

What is Telehealth?

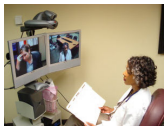
Telehealth is a collection of means or methods for enhancing health care, public health, and health education delivery and support using telecommunications technologies.

http://cchpca.org/what-is-telehealth

What is Telehealth?

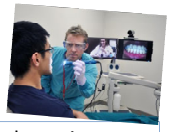
Telehealth Modalities

- Live Video (synchronous)
- Store-And-Forward (asynchronous)
- Remote Patient Monitoring
- Mobile Health (mHealth)



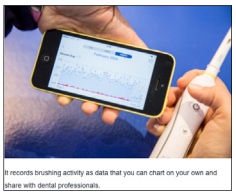
Teledentistry

Sending dental X-rays: why email should not be your option



- Dentist to dentist interactions: share records, patients
- Real time video consultation – dentist to dentist/patient
- Store-and-forward record review
- Patient to dentist interactions
- Real time video surgical support
- mHealth data collection
- Telehealth-connected team delivery systems

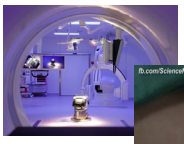
mHealth



BUSINESS INSIDER SCIENCE

Dentists in China successfully used a robot to perform implant surgery without human intervention

SCMP Alice Yan, South China Morning Post
Sep. 21, 2017, 10:08 PM 3,251



http://www.businessinsider.com/dentists-in-china-used-a-robot-to-perform-implant-surgery-2017-9

ADA Policy on "Teledentistry"

Proposed Comprehensive ADA Policy Statement on Teledentistry

Teledentistry refers to the use of telehealth systems and methodologies in dentistry. Telehealth refers to broad variety of technologies and tactics to deliver virtual medical, health, and education services. **Telehealth is not a specific service, but a collection of means to enhance care and education delivery**.

Teledentistry can **include patient care and education delivery** using, but not limited to, the following modalities:

- **Live video** (synchronous): Live, two-way interaction between a person (patient, caregiver, or provider) and a provider using audiovisual telecommunications technology.
- **Store-and-forward** (asynchronous): Transmission of recorded health information (for example, radiographs, photographs, video, digital impressions and photomicrographs of patients) through a secure electronic communications system to a practitioner, who uses the information to evaluate a patient's condition or render a service outside of a real-time or live interaction.
- **Remote patient monitoring** (RPM): Personal health and medical data collection from an individual in one location via electronic communication technologies, which is transmitted to a provider (sometimes via a data processing service) in a different location for use in care and related support of care.
- **Mobile health** (mHealth): Health care and public health practice and education supported by mobile communication devices such as cell phones, tablet computers, PDAs.

ADA Policy on "Teledentistry"

- Patient Rights
- General Considerations
- Quality of Care
- Supervision of Allied Dental Personnel
- Licensure
- Reimbursement
- Technical Considerations

The Era of Accountability

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Drivers of the Quality Movement in the U.S. Health Care System

1. the skyrocketing cost of health care unrelated to improvement in health outcomes,
2. increasing understanding of the harm and unwarranted variability our fragmented health care system produces,
3. evidence of the profound health disparities that still exist in the population in spite of scientific advances in care, and
4. increasing awareness of these problems in the age of consumer empowerment.

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Drivers of the Quality Movement
#1 – The Cost of Health Care

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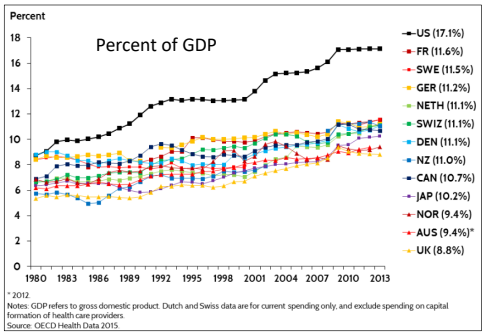
Health Care Spending 1980-2013



http://www.commonwealthfund.org/publications/issue-briefs/2015/oct/us-health-care-from-a-global-perspective.
Data: OECD Health Data 2015.

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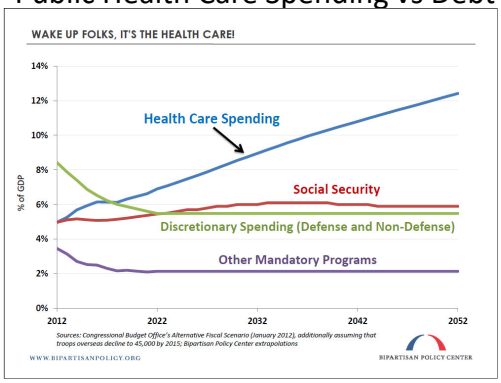
Public Health Care Spending vs Debt



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Health Care Spending

"Medical costs are the tapeworm of American economic competitiveness"

New York Times. May 6, 2017

New York Times: Warren Buffett, at Berkshire Meeting, Condemns Republican Health Care Bill. 5/6/17.
https://www.nytimes.com/2017/05/06/business/dealbook/warren-buffett-berkshire-health-care.html?action=click&contentCollection=Europe&module=Trending&version=Full&region=Marginalia&pgtype=article

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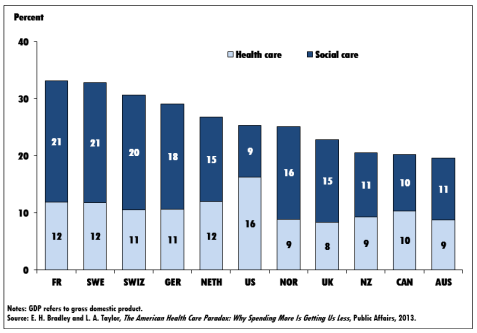
Health Care and Social Spending as a Percent of GDP 2013



The Commonwealth Fund
U.S. Health Care from a Global Perspective: Spending, Use of Services, Prices, and Health in 13 Countries
http://www.commonwealthfund.org/publications/issue-briefs/2015/oct/us-health-care-from-a-global-perspective.

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Social Determinants of Health

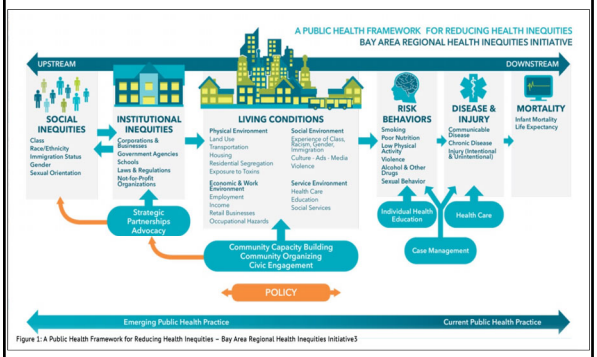

Figure 1: A Public Health Framework for Reducing Health Inequities – Bay Area Regional Health Inequities Initiative3

Let's Get Healthy California. Social Determinants of Health. https://letsgethealthy.ca.gov/sdoh/

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The Quadruple Aim

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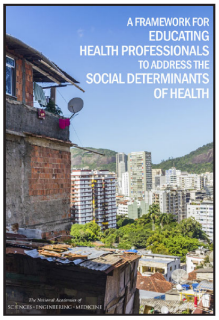
REPORT IN BRIEF
MARCH 2016
Institute of Medicine

A Framework for Educating Health Professionals to Address the Social Determinants of Health



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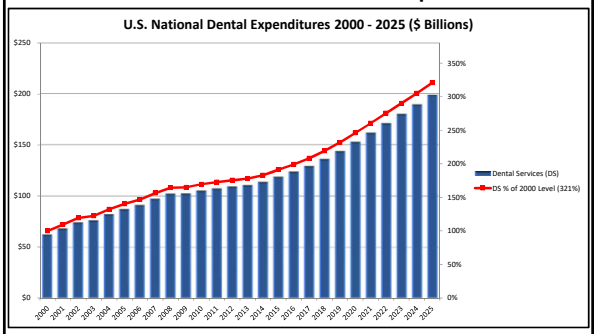
National Oral Health Expenses



Source: CMS National Health Expenditure NHE Historical and projections,
http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsHistorical.html
http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsProjected.html

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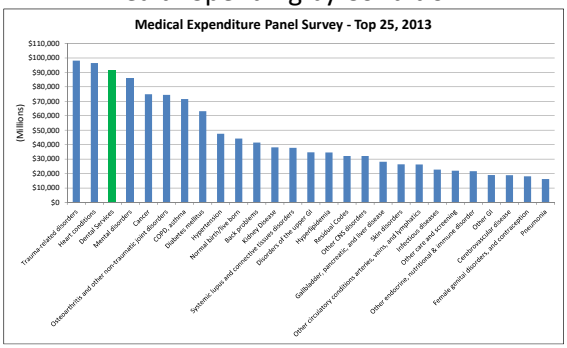
Health Spending by Condition



General Health: MEPS: Expenditures by Medical Condition 2013, Table 3
http://meps.ahrq.gov/data_stats/tables_compendia_hh_interactive.jsp?_SERVICE=MEPSSocket0&_PROGRAM=MEPSPGM.TC.SAS&File=HCFY2013&Table=HCFY2013%5FCNDXP%5FC&_Debug=
Dental Health: MEPS: Expenditures per Person by Health Care Service 2012, Table 3
http://meps.ahrq.gov/mepsweb/data_stats/tables_compendia_hh_interactive.jsp?_SERVICE=MEPSSocket0&_PROGRAM=MEPSPGM.TC.SAS&File=HCFY2013&Table=HCFY2013%5FPLEXPD%5FB&VAR1=AGE&VAR2=SEX&VAR3=RACETHSC&VAR4=INSURCOV&VAR5=POVCAT13&VAR6=REGIONHE&VAR7=HEALTH&VARD1=4&VARD2=1&VARD3=1&VARDR=1&VARD5=1&VARD6=1&VARD7=1&_Debug=

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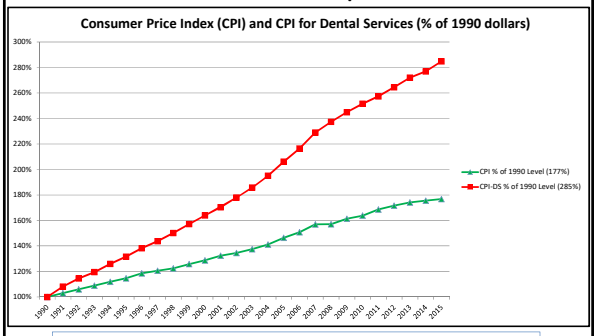
Oral Health Expenses



Source: Bureau of Labor Statistics: Consumer Price Index
http://www.bls.gov/cpi/cpi_dr.htm

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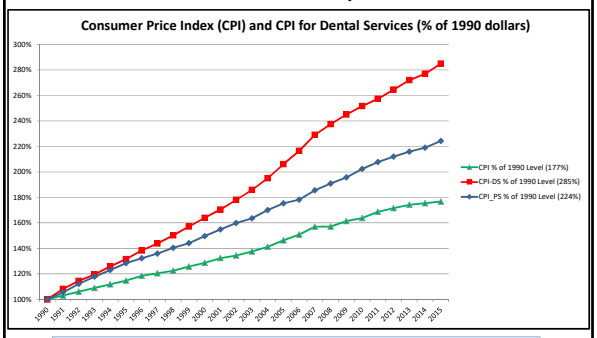
Oral Health Expenses



Source: Bureau of Labor Statistics: Consumer Price Index
http://www.bls.gov/cpi/cpi_dr.htm

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ADA American Dental Association®
America's leading advocate for oral health

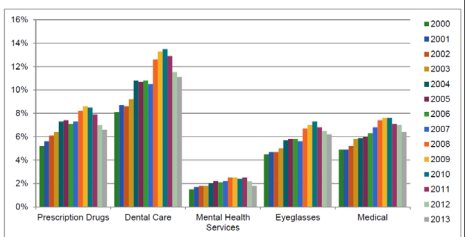
Health Policy Resources Center
Research Brief

Fewer Americans Forgoing Dental Care Due to Cost

October 2014

Authors: Thomas Wall, M.A., M.B.A.; Kamyar Nasseh, Ph.D.; Marko Vujicic, Ph.D.

Figure 1: Percentage of the Population Who Needed But Did Not Obtain Select Health Care Services during the Previous 12 Months Due to Cost, 2000-2013



Source: National Health Interview Survey, National Center of Health Statistics. **Notes:** Changes from 2000 to 2010 for all services were statistically significant at the 1% level. Changes from 2010 to 2013 for all services were statistically significant at the 1% level. Changes from 2012 to 2013 were not statistically significant.

The Virtual Dental Home

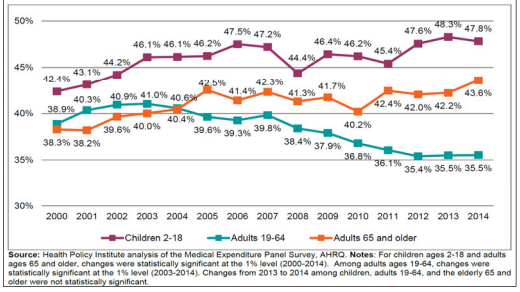
HPI Health Policy Institute
ADA American Dental Association®

Research Brief

Dental Care Utilization Steady Among Working-Age Adults and Children, Up Slightly Among the Elderly

Kamyar Nasseh, Ph.D.
Marko Vujicic, Ph.D.
October 2016

Figure 1: Percentage of the Population with a Dental Visit in the Year, 2000-2014



Source: Health Policy Institute analysis of the Medical Expenditure Panel Survey, AHRQ. **Notes:** For children ages 2-18 and adults ages 65 and older, changes were statistically significant at the 1% level (2000-2014). Among adults ages 19-64, changes were statistically significant at the 1% level (2003-2014). Changes from 2013 to 2014 among children, adults 19-64, and the elderly 65 and older were not statistically significant.

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Dental Care Utilization in US

Age Group	Total Population	% Utilization	Utilizers
2-18	69,916,504	48.5%	33,909,504
20-64	195,794,862	36.0%	70,486,150
65+	47,760,852	43.7%	20,871,492
Total Utilizers	313,472,218	40.0%	125,267,147
Total Non-Utilizers		**60.0%**	**188,205,071**

Most non-utilizers are low income and have significantly more disease than utilizers!

Population Data: US Fact Finder: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

The Virtual Dental Home

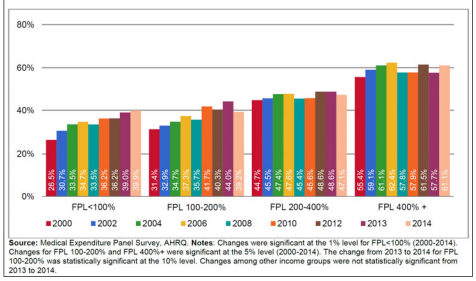
HPI Health Policy Institute
ADA American Dental Association®

Research Brief

Dental Care Utilization Steady Among Working-Age Adults and Children, Up Slightly Among the Elderly

Kamyar Nasseh, Ph.D.
Marko Vujicic, Ph.D.
October 2016

Figure 3: Percentage of Children Ages 2-18 with a Dental Visit in the Year for Select Income Groups, 2000-2014



Source: Medical Expenditure Panel Survey, AHRQ. **Notes:** Changes were significant at the 1% level for FPL<100% (2000-2014). Changes for FPL 100-200% and FPL 400%+ were significant at the 5% level (2000-2014). The change from 2013 to 2014 for FPL 100-200% was statistically significant at the 10% level. Changes among other income groups were not statistically significant from 2013 to 2014.

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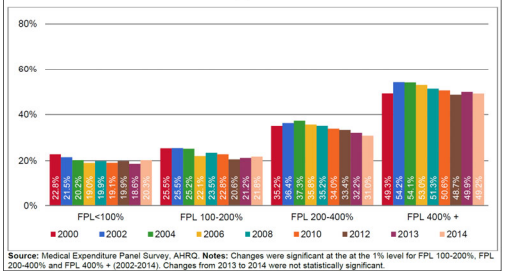
Research Brief

Health Policy Institute
ADA American Dental Association®

Dental Care Utilization Steady Among Working-Age Adults and Children, Up Slightly Among the Elderly

Kamyar Nasseh, Ph.D.
Marko Vujicic, Ph.D.
October 2016

Figure 4: Percentage of Adults Ages 19-64 with a Dental Visit in the Year for Select Income Groups, 2000-2014



Source: Medical Expenditure Panel Survey, AHRQ. **Notes:** Changes were significant at the at the 1% level for FPL 100-200%, FPL 200-400% and FPL 400% + (2002-2014). Changes from 2013 to 2014 were not statistically significant.

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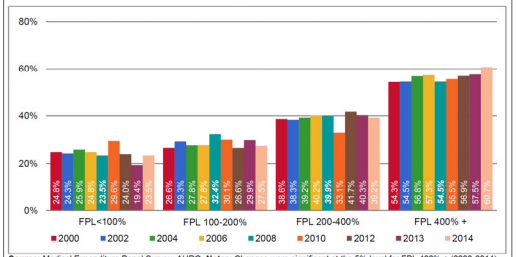
Research Brief

Health Policy Institute
ADA American Dental Association®

Dental Care Utilization Steady Among Working-Age Adults and Children, Up Slightly Among the Elderly

Kamyar Nasseh, Ph.D.
Marko Vujicic, Ph.D.
October 2016

Figure 5: Percentage of Adults 65 and Older with a Dental Visit in the Year for Select Income Groups, 2000-2014



Source: Medical Expenditure Panel Survey, AHRQ. **Notes:** Changes were significant at the 5% level for FPL 400% + (2000-2014). Changes from 2013 to 2014 were not statistically significant for any income group.

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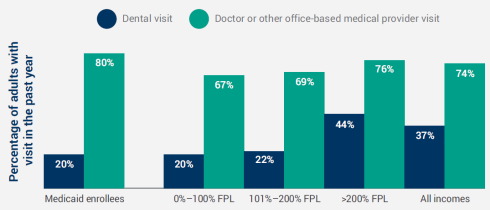
FIGURE 2-3. Percentage of Adults Age 21 and Older Who Had a Dental Visit Versus Doctor or Other Office-Based Medical Provider Visit in Past Year, 2012



Notes: FPL is federal poverty level. This chart shows utilization for adults beginning at age 21 because the Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) benefit requires coverage of dental services for 19- and 20-year-old Medicaid enrollees. The Medicaid enrollees category includes adults regardless of income level and reflects those with at least one month of Medicaid coverage. (Estimates for enrollees with full-year coverage may differ.) Income groups include all adults regardless of coverage status.

Source: MACPAC analysis of AHRQ 2012.

Medicaid and CHIP Payment and Access Commission (MACPAC) June 2015 Report to Congress on Medicaid and CHIP. Chapter 2. Coverage of Medicaid Dental Benefits for Adults.
https://www.macpac.gov/publication/june-2015-report-to-congress-on-medicaid-and-chip/

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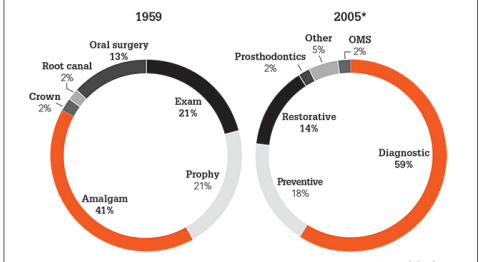
DE DENTAL ECONOMICS

The future of dental practice: Demographics
April 10, 2015
By Eric Solomon, DDS, MA

FIGURE 2—Procedures completed in the dental office



* General dentists

Solomon S. The future of dental practice: Demographics. April 15, 2015. http://www.dentaleconomics.com/articles/print/volume-105/issue-4/macroeconomics/the-future-of-dental-practice-demographics-patients-professionals-and-procedures.html

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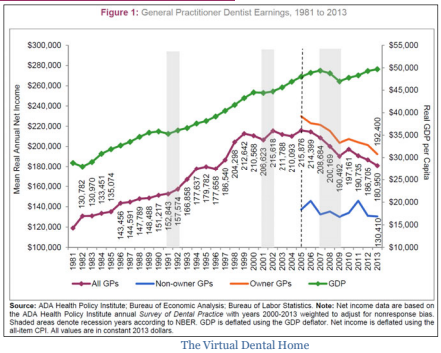
Research Brief

Health Policy Institute
ADA American Dental Association®

Dentist Earnings Not Recovering with Economic Growth

Authors: Bradley Munson, B.A.; Marko Vujicic, Ph.D.
December 2014

Figure 1: General Practitioner Dentist Earnings, 1981 to 2013



Source: ADA Health Policy Institute; Bureau of Economic Analysis; Bureau of Labor Statistics. **Note:** Net income data are based on the ADA Health Policy Institute annual *Survey of Dental Practice* with years 2000-2013 weighted to adjust for nonresponse bias. Shaded areas denote recession years according to NBER. GDP is deflated using the GDP deflator. Net income is deflated using the all-item CPI. All values are in constant 2013 dollars.

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The current dental care system primarily serves the wealthiest and healthiest segments of the population

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HEALTH POLICY PERSPECTIVES

Practice ownership is declining

Marko Vujicic, PhD

690 JADA 148(9) http://jada.ada.org September 2017

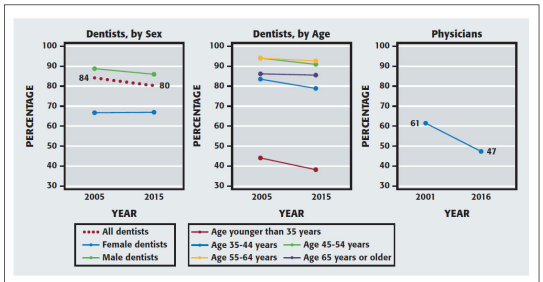

Figure. Percentage of dentists and physicians who are practice owners. Note: For dentists, percentages are for dentists in private practice. *Sources: ADA Health Policy Institute analysis of Distribution of Dentists, 2005 and 2015; American Medical Association, 2013[3] and 2017.[1]*

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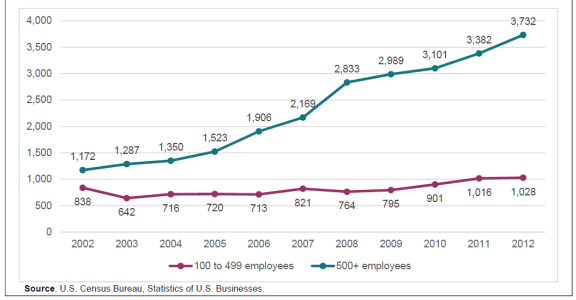
Health Policy Institute
ADA American Dental Association

Research Brief

Very Large Dental Practices Seeing Significant Growth in Market Share

Authors: Thomas Wall, M.A., M.B.A.; Albert H. Guay, D.M.D. August 2015

Figure 2: Total Number of Establishments by Dental Firm Size Category



Source: U.S. Census Bureau, Statistics of U.S. Businesses.

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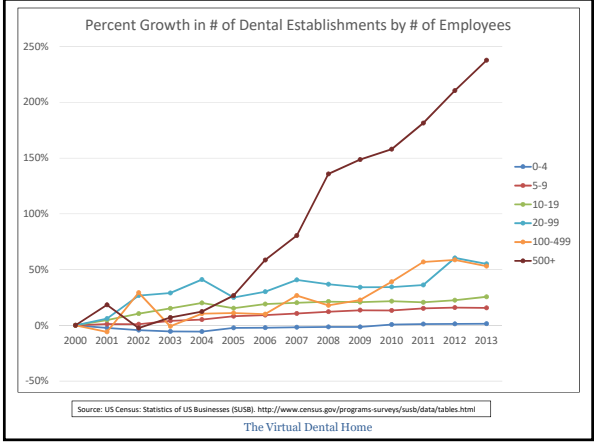

Source: US Census: Statistics of US Businesses (SUSB). http://www.census.gov/programs-surveys/susb/data/tables.html

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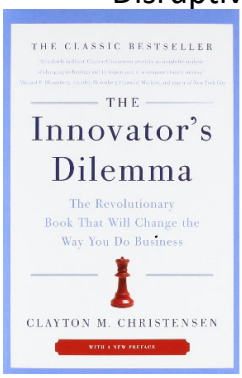
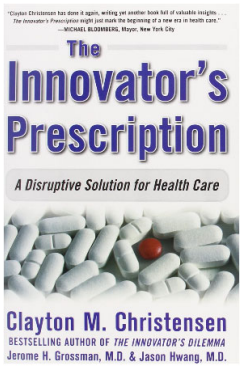
Disruptive Innovation





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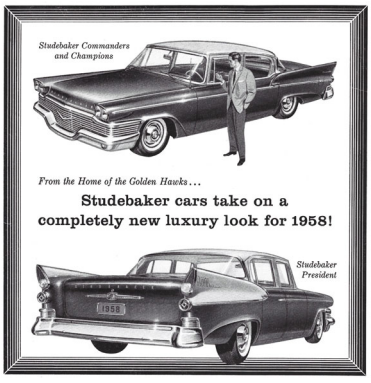
National Geographic Magazine, 1958



Studebaker-Packard CORPORATION

When pride of Workmanship comes first!

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U.S. Automobiles 1960s -> Luxury, Sophistication

Cadillac

Buick

Pontiac

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Japanese Automobiles 1960s -> Basic Transportation

Toyota

Disruptive Innovation

- Disruptive innovation, describes a process by which a product or service takes root initially in simple applications at the bottom of a market and then relentlessly moves up market, eventually displacing established competitors.

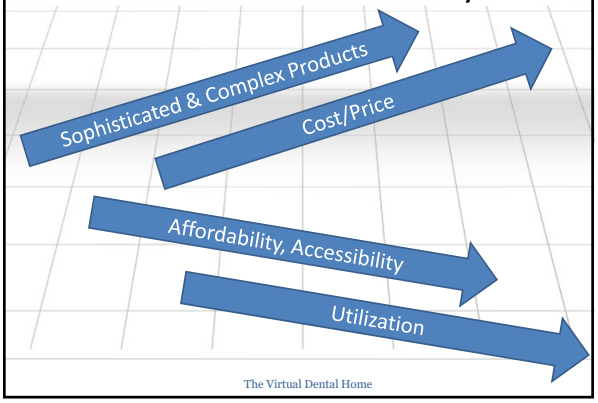
Disruptive Innovation

- Companies tend to innovate faster than their customers' needs evolve
- Their products or services become too sophisticated, too expensive, and too complicated for many customers in their market.
- Historically the greatest profitability has been achieved by charging the highest prices to their most demanding and sophisticated customers at the top of the market.

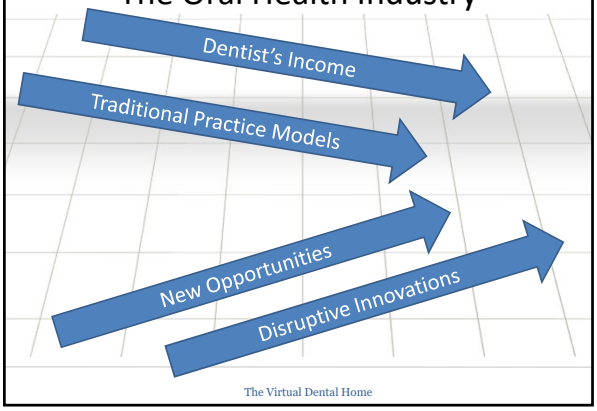
Disruptive Innovation

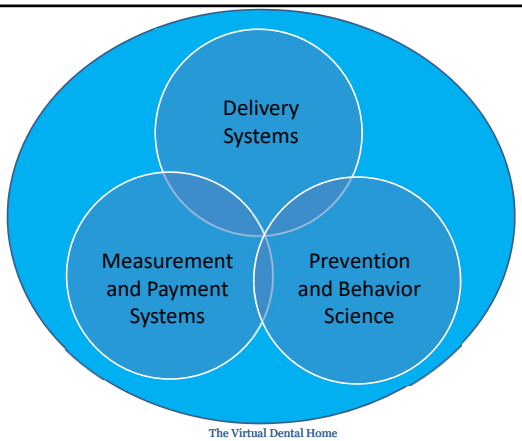
- However, by doing so, companies unwittingly open the door to "disruptive innovations" at the bottom of the market.
- An innovation that is disruptive allows a whole new population of consumers at the bottom of a market access to a product or service that was historically only accessible to consumers with a lot of money or a lot of skill.

The Oral Health Industry



The Oral Health Industry





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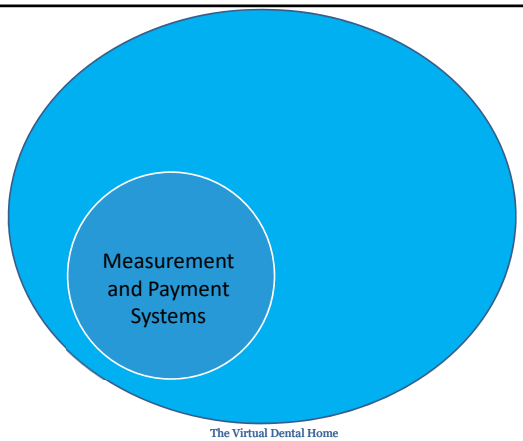

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- DQA
- Payers
  - Dental Benefit Companies
  - Public Payers
- HRSA: Health Center system
- Group Practices

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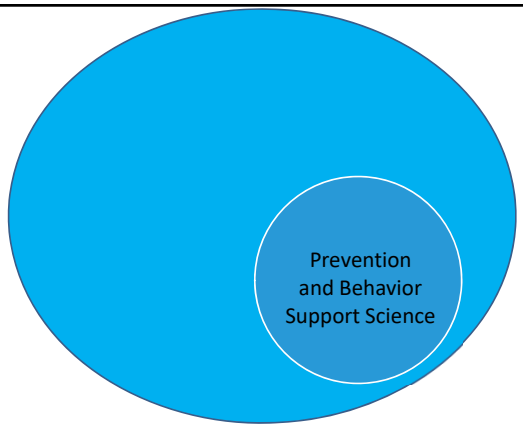

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Sealing Occlusal Dentin Caries in Permanent Molars: 7-Year Results of a Randomized Controlled Trial

V. Qvist[1], M.K. Borum[2], K.D. Møller[3], T.R. Andersen[4], P. Blanche[5], and A. Bakhshandeh[1]

Conclusion

We conclude it is possible to postpone restorative intervention of occlusal dentin caries lesions in young permanent teeth by non-invasive sealing and thereby improve tooth longevity. Although all lesions required restorative treatment at baseline, more than half of the sealed lesions still did not require restoration after 7 years.

Qvist V, Borum MK, Moller KD, et. al. Sealing Occlusal Dentin Caries in Permanent Molars: 7-Year Results of a Randomized Controlled Trial. JDR Clinical & Translational Research. January 2017:2(1):73-86

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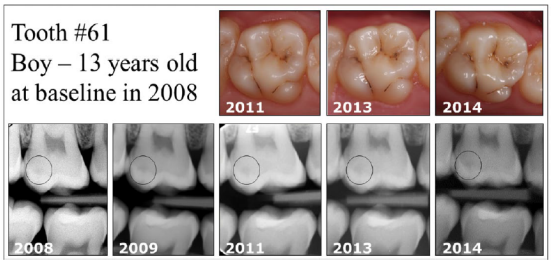
Figure 1. Patient case. Registrations at baseline in 2008. Clinical assessment: dentin lesion without cavity formation in distal fossa of tooth #61. No clinical photo available. Radiographical assessment: less than one-third in dentin. Treatment after randomization: resin sealing. Registrations during 6 y follow-ups. Clinical assessments: intact sealing. Radiographical assessments: no caries progression. Treatment: none.



Qvist V, Borum MK, Moller KD, et. al. Sealing Occlusal Dentin Caries in Permanent Molars: 7-Year Results of a Randomized Controlled Trial. JDR Clinical & Translational Research. January 2017:2(1):73-86

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Incomplete Caries Removal

ULTRACONSERVATIVE AND CARIOSTATIC SEALED RESTORATIONS: RESULTS AT YEAR 10

EVA J. MERTZ-FAIRHURST, D.D.S.; JAMES W. CURTIS JR., D.M.D.; JANET W. ERGLE, C.D.A.; FRED A. RUEGGEBERG, D.D.S., M.S.; STEVEN M. ADAIR, D.D.S., M.S.

JADA, Vol. 129, January 1998 55

- This 10-year study evaluated bonded and sealed composite restorations placed directly over frank cavitated lesions extending into dentin vs. sealed conservative amalgam restorations and conventional unsealed amalgam restorations.
- The results indicate that both types of sealed restorations exhibited superior clinical performance and longevity compared with unsealed amalgam restorations.
- Also, the bonded and sealed composite restorations placed over the frank cavitated lesions arrested the clinical progress of these lesions for 10 years.

Figure 1B. At year 6, there is no evidence of progress of the lesions shown in Figure 1A.

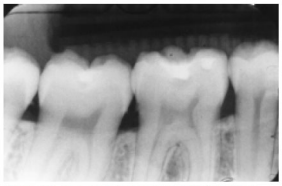


Figure 1C. At year 10, the lesions in Figure 1A are well-delineated and not progressing, the distance between the carious lesions and the pulp is not decreasing and the pulp is not in danger in either tooth no. 30 or 31.

Incomplete Caries Removal

CLINICAL REVIEW

F. Schwendicke*, C.E. Dörfer, and S. Paris

Department for Conservative Dentistry and Periodontology, Christian-Albrechts-University, Arnold-Heller-Str. 3, 24105 Kiel, Germany; *corresponding author, schwendicke@konspar.uni-kiel.de

J Dent Res 92(4):306-314, 2013

Incomplete Caries Removal: A Systematic Review and Meta-analysis

- Increasing numbers of clinical trials have demonstrated the benefits of incomplete caries removal, in particular in the treatment of deep caries.
- Teeth treated with incomplete caries removal showed risk reduction for both pulpal exposure and pulpal symptoms.

Incomplete Caries Removal

THE COCHRANE COLLABORATION®

Operative caries management in adults and children (Review)
Ricketts D, Lamont T, Innes NPT, Kidd E, Clarkson JE
The Cochrane Library. 2013, Issue 3

- Teeth treated with incomplete caries removal had half to two-thirds fewer pulp exposures compared to teeth treated with complete caries removal
- Partial caries removal and sealing into the tooth leads to the systematic and progressive arrest of the carious lesion.

The Changing Standard of Care[1]

- 1923 Frye vs United States (community standard)
  - Supreme Court ruling - "Locality rule" - originated in the late 1800s, accommodated clinicians living in rural and urban areas who had differing education, training and access to information.
- 1993 - Daubert v Merrell Dow Pharmaceuticals Inc
  - Required judges to act as gatekeepers to ensure that only sound scientific knowledge is admitted in court
  - Scientific knowledge, in this context, derives from human clinical trials that involve implementation of the Baconian scientific method to identify valid and reliable outcomes. Furthermore, sound scientific knowledge is not excluded simply because it may not be accepted by the local community.
- Conclusion: Clinicians who do not know, or do not follow, practices based on the best evidence-based guidelines may be placing themselves at risk.

1. Niederman R, Richards D, Brands W. Guest Editorial: The Changing Standard of Care. JADA 2012:143(5):434-437.

The Declining Role for the Dental Drill

Remineralization

Buffering Agents

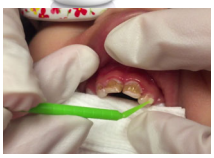
Caries Arresting Medications

Sealing Caries

Toothpaste, School brushing, Iodine, Argenine,

Fluoride Varnish

Silver Diamine Fluoride



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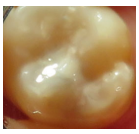
Sealing Caries

Dental Sealants

Interim Therapeutic Restorations



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Care for Chronic Oral Diseases

Acute Care/ Surgical Intervention

Chronic Disease Management

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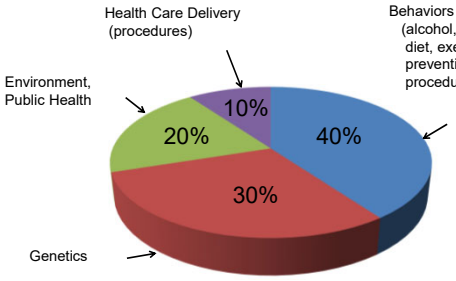
Total Health: How Long and How Well We Live



McGinnis JM & Foege WH. Actual Causes of Death in the United States. JAMA 1993; 270(18):2207-12 (Nov 10). McGinnis JM, Williams-Russo P, Knickman JR. The case for more active policy attention to health promotion. Health Affairs 2002; 21(2):78-93 (Mar).

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Behavior Change Principles

- Messages delivered by trusted members of the community
- Multiple people delivering the same message
- Small incremental behavior changes
- Ongoing reinforcement, coaching
- Peer support

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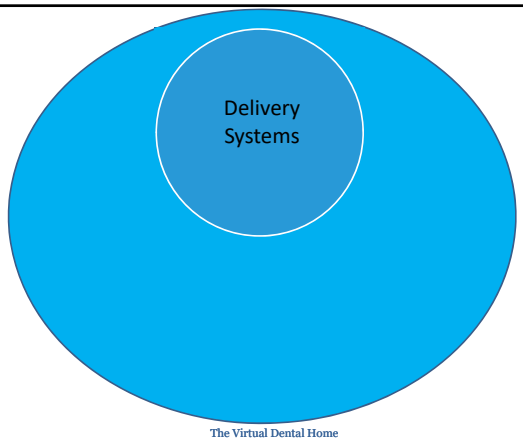

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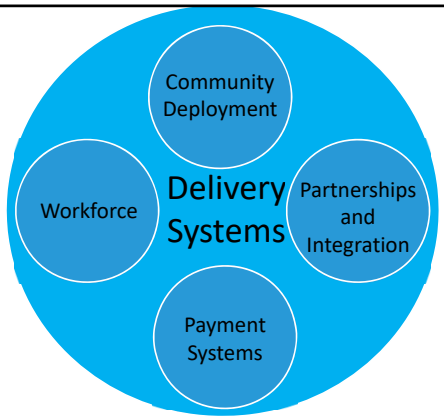

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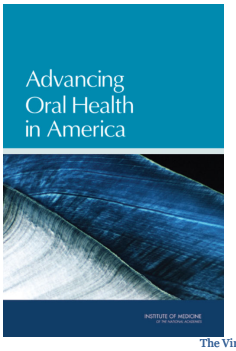
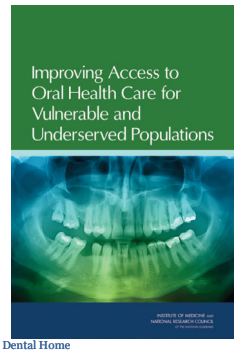
The 2011 IOM Reports on Oral Health





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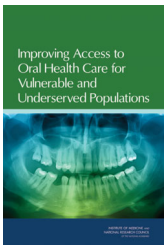
IOM – Workforce Recommendation



"..support the creation of a diverse workforce that is competent, compensated, and authorized to serve vulnerable and underserved populations across the life cycle."

The Virtual Dental Home

Workforce

- Allied dental personnel
  - Community dental health coordinator
  - Expanded function dental assistants
  - Public/expanded function health dental hygienists
  - Dental therapists
- Non-dental personnel/interprofessional integration
  - Community-health workers
  - General health professionals – physicians, nurses, etc.
  - Social service professionals
  - Educational system personnel – family advocates, teachers, etc.

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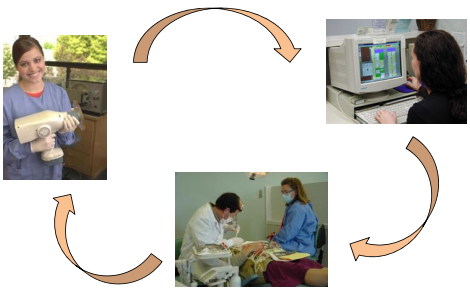

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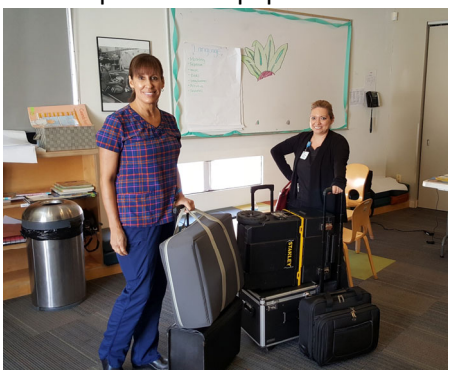
Space and Equipment



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Space and Equipment

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EHR: Radiographs

The Virtual Dental Home

EHR: Photographs

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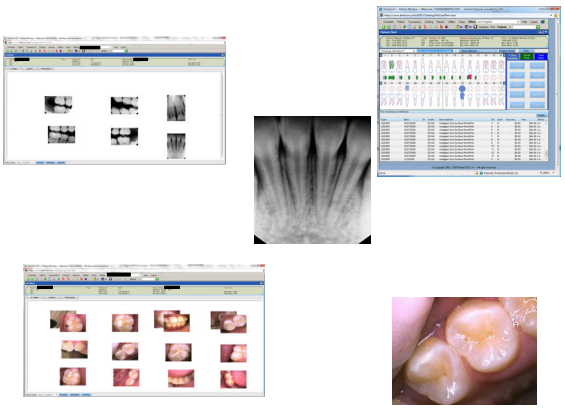

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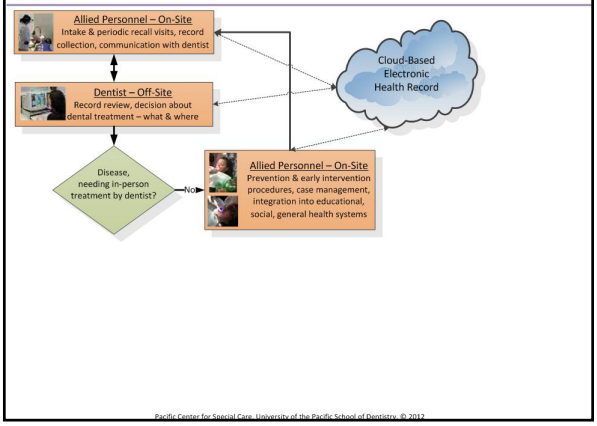
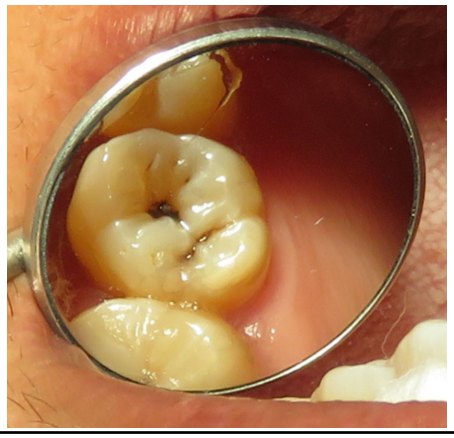
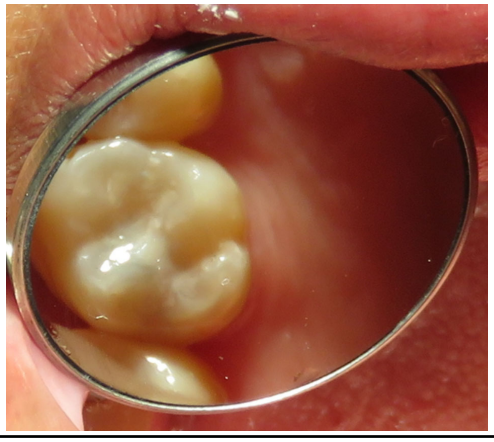
The Virtual Dental Home Concept Model



Community-based Prevention and Early Intervention Procedures

The Virtual Dental Home





The Virtual Dental Home Sites

Oral Health Systems for Underserved Populations

Telehealth-Connected Teams

Telehealth-Connected Teams and Virtual Dental Homes Key Outcomes

- Reach people, emphasize prevention, and lower costs
- Majority of people kept and verified healthy on-site
  - About 2/3 of children had all needed services completed by dental hygienist
- Continuous presence
- Community organization integration
- Dentist integration

The Virtual Dental Home Current Trainees

- 8- DentalQuest Learning Collaborative
- 19- DHCS Dental Transformation Initiative
- 1- Delta Dental
- 5- HRSA
- 1 – CA Wellness
- 2 – Regional Centers
- 2 – Hawaii
- 3 – Oregon
- 5 - Colorado

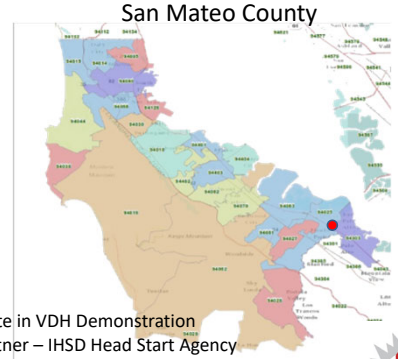
Total = 46 entities

The Virtual Dental Home Current Trainees

- 8- DentalQuest Learning Collaborative
- 19- DHCS Dental Transformation Initiative
- 1- Delta Dental
- 5- HRSA
- 1 – CA Wellness
- 2 – Regional Centers
- 2 – Hawaii
  3 – Oregon
  5 - Colorado

Total = 46 entities

San Mateo County



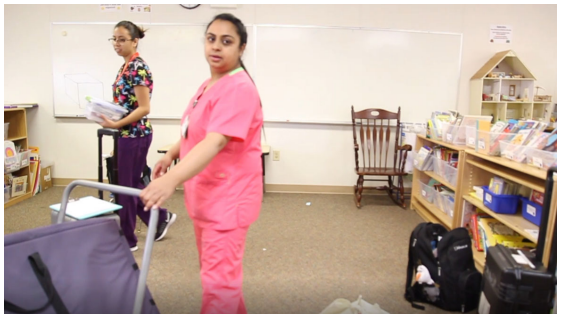
2010
- 1 site in VDH Demonstration
- Partner – IHSD Head Start Agency
- 1 part time community team
- East Palo Alto

Ravenswood Family Health Center

Ravenswood Family Health Center

Ravenswood Family Health Center

Ravenswood Family Health Center



Ravenswood Family Health Center

Ravenswood Family Health Center

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Ravenswood Family Health Center

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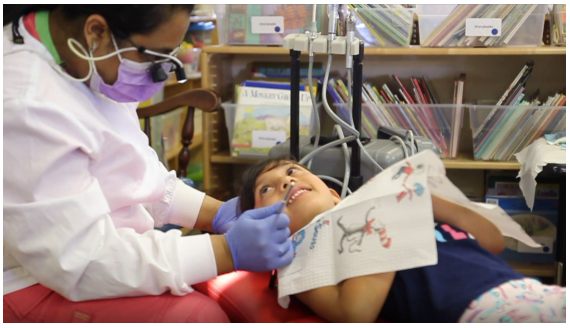
Ravenswood Family Health Center



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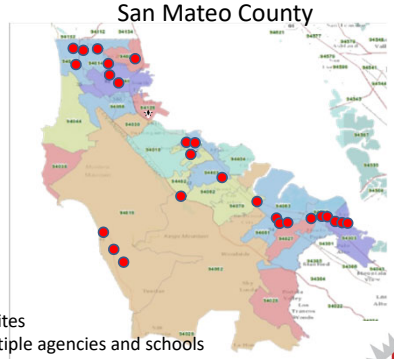
San Mateo County



2018
- 27 sites
- Multiple agencies and schools
- 2 full time community teams
- Across San Mateo County

Ravenswood Family Health Center

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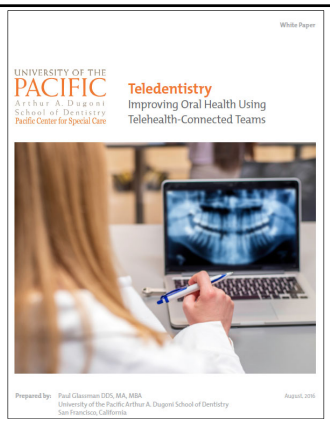

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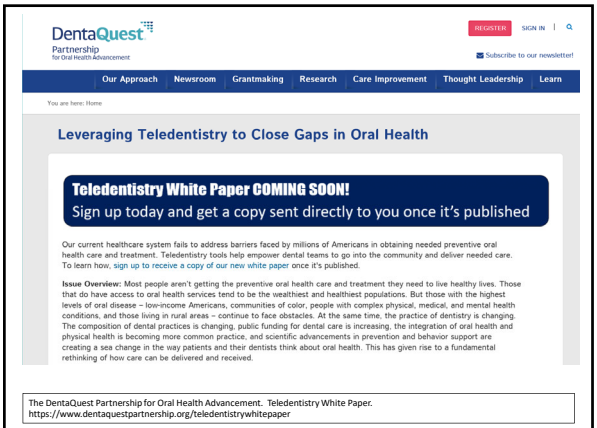

The DentaQuest Partnership for Oral Health Advancement. Teledentistry White Paper.
https://www.dentaquestpartnership.org/teledentistrywhitepaper

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The Legal and Regulatory Environment

There are a number of legal and regulatory issues to consider when designing or implementing a telehealth-connected system of care. These issues are briefly described here.

Legal and Regulatory Environment

Ability to use telehealth

- Telehealth Parity
- Scope of practice laws, regulation, interpretation
  - Ability of allied personnel to collect diagnostic records prior to a patient being seen by a dentist
  - Ability of allied personnel to perform procedures in locations separate from dentists
  - Understanding that dentists can develop a diagnosis and treatment plan without an in-person visit with the patient

Legal and Regulatory Environment

Ability to be paid for services performed using telehealth technologies

- Telehealth Parity
- Principle: consider telehealth technologies as communication tools, distinct from the health services that are being provided.
- Require payors to pay for covered services whether performed in-person or with the use of telehealth technologies
- Include store-and-forward as well as real time

Legal and Regulatory Environment

Ability to be paid for services performed using telehealth technologies

- Telehealth Parity
- Suggested language:
- "face-to-face contact between a health care provider and a patient is not required for services performed using real time or store-and-forward teledentistry."

Community Engaged Dental Care System




Dental Care is a Team Sport



What is a dental practice?

High cost surgical suite

Low cost community site

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Economic Calculations in Dental Practice

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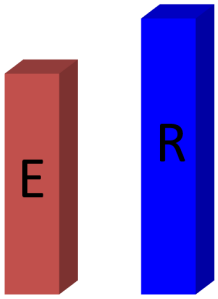
Economic Calculations in Dental Practice



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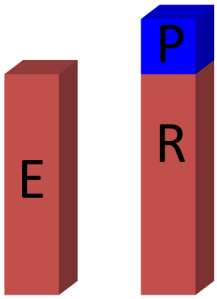
Economic Calculations in Dental Practice



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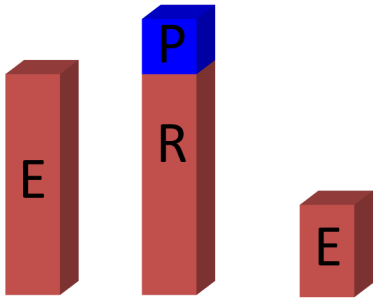
Economic Calculations in Dental Practice



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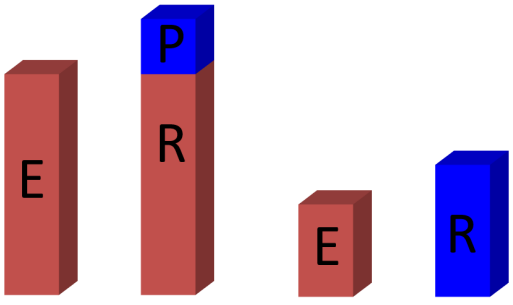
Economic Calculations in Dental Practice



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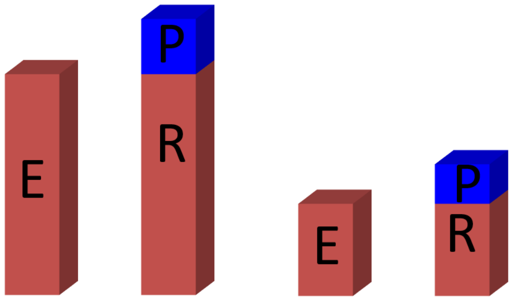
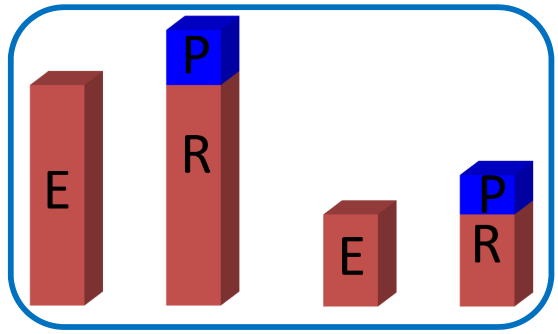
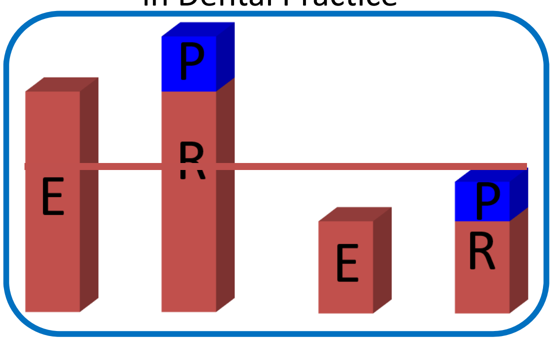
Economic Calculations in Dental Practice



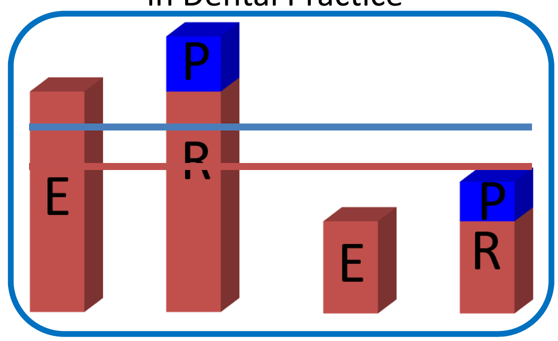
Economic Calculations in Dental Practice



Economic Calculations in Dental Practice



Economic Calculations in Dental Practice

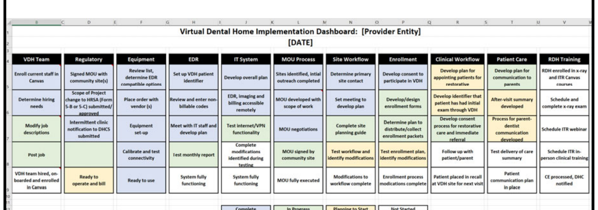


What is a dental practice? Linked Community/Clinic System

High cost surgical suite

Low cost community site

Telehealth-Connected Teams: Training



Virtual Dental Home Implementation Dashboard: [Provider Entity]
[DATE]

VDH Team	Regulatory	Equipment	EDR	IT System	MOU Process	Site Workflow	Enrollment	Clinical Workflow	Patient Care	RDH Training
Enroll current staff in Canvas	Signed MOU with community site(s)	Review list, determine EDR compatible options	Set up VDH patient identifier	Develop overall plan	Sites identified, intial outreach completed	Determine primary site contact	Develop consent to participate in VDH	Develop plan for appointing patients for restorative	Develop plan for communication to parents	RDH enrolled in x-ray and ITR Canvas courses
Determine hiring needs	Scope of Project change to HRSA (Form 5-B or 5-C) submitted/ approved	Place order with vendor (s)	Review and enter non-billable codes	EDR, imaging and billing accessible remotely	MOU developed with scope of work	Set meeting to develop plan	Develop/design enrollment forms	Develop identifier that patient has had initial exam through VDH	After-visit summary developed	Schedule and complete x-ray exam
Modify job descriptions	Intermittent clinic notification to DHCS submitted	Equipment set-up	Meet with IT staff and develop plan	Test internet/VPN functionality	MOU negotiations	Complete site planning guide	Determine plan to distribute/collect enrollment packets	Develop consent process for restorative care and immediate referral	Process for parent-dentist communication developed	Schedule ITR webinar
Post job		Calibrate and test connectivity	Test monthly report	Complete modifications identified during testing	MOU signed by community site	Test workflow and identify modifications	Test enrollment plan, identify modifications	Follow up with patient/parent	Test delivery of care summary	Schedule ITR in-person clinical training
VDH team hired, on-boarded and enrolled in Canvas	Ready to operate and bill	Ready to use	System fully functioning	System fully functioning	MOU fully executed	Modifications to workflow complete	Enrollment process modications complete	Patient placed in recall at VDH site for next visit	Patient communication plan in place	CE processed, DHC notified

Complete | In Progress | Planning to Start | Not Started

Telehealth-Connected Teams: Training

Regulatory	Equipment	EDR
Signed MOU with community site(s)	Review list, determine EDR compatible options	Set up VDH patient identifier
Scope of Project change to HRSA (Form 5-B or 5-C) submitted/ approved	Place order with vendor (s)	Review and enter non-billable codes
Intermittent clinic notification to DHCS submitted	Equipment set-up	Meet with IT staff and develop plan
	Calibrate and test connectivity	Test monthly report
Ready to operate and bill	Ready to use	System fully functioning

Complete | In Progress | Planning to Start | Not Started

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Telehealth-Connected Teams: Training

IT System	MOU Process	Site Workflow
Develop overall plan	Sites identified, intial outreach completed	Determine primary site contact
EDR, imaging and billing accessible remotely	MOU developed with scope of work	Set meeting to develop plan
Test internet/VPN functionality	MOU negotiations	Complete site planning guide
Complete modifications identified during testing	MOU signed by community site	Test workflow and identify modifications
System fully functioning	MOU fully executed	Modifications to workflow complete

Complete | In Progress | Planning to Start | Not Started

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Telehealth-Connected Teams: Training

Enrollment	Clinical Workflow	Patient Care
Develop consent to participate in VDH	Develop plan for appointing patients for restorative	Develop plan for communication to parents
Develop/design enrollment forms	Develop identifier that patient has had initial exam through VDH	After-visit summary developed
Determine plan to distribute/collect enrollment packets	Develop consent process for restorative care and immediate referral	Process for parent-dentist communication developed
Test enrollment plan, identify modifications	Follow up with patient/parent	Test delivery of care summary
Enrollment process modications complete	Patient placed in recall at VDH site for next visit	Patient communication plan in place

Complete | In Progress | Planning to Start | Not Started

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Dental Care in the Future

- Dental Practice =
  - Geographically distributed
  - Telehealth enabled
  - Oral health teams
- Chronic disease management
  - using biological, medical, behavioral, and social tools
- Integrated with general health, educational, and social service systems
- Interacting with the majority of the population
- Focused on oral health outcomes in the ***Era of Accountability***

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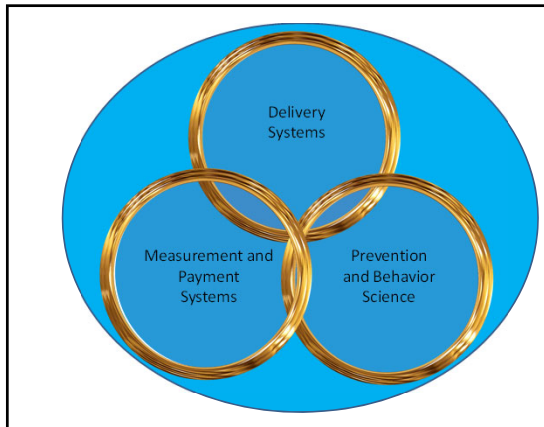

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Teledentistry and Virtual Dental Homes : On the Road to Value in Health Care and Oral Health Care

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