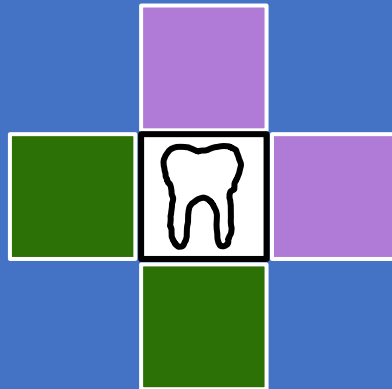# INTEGRATED ELECTRONIC MEDICAL AND DENTAL RECORDS (iEMDR)

Presenters

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No Conflicts of Interest

Neither I nor my immediate family have any financial interests that would create a conflict of interest or restrict my independent judgment with regard to the content of this course.

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"Try this—I just bought a hundred shares."

First some poll questions…

EMR and Clinical Practice

Objectives and Presentation Overview

- Review history of electronic medical records (EMR) and discuss existing models for electronic dental records (EDR)

- Outline the benefits and drawbacks of using integrated medical records

- Overview transition to digital records

- Demonstrate the use of integrated medical records in clinical practice and education

History of EMRs

- EMRs have been part of medicine since the 1960s and 1970s
- Slow adoption in medicine due to several barriers
  - Cost
  - Ease of using legacy paper charts
  - Lack of user knowledge of computers
  - 'Clunky' user interface
- True drive for digital records in early 2000s
  - 2004 goal was set for 2014 implementation
- Resistance due to ROI concerns, physician autonomy
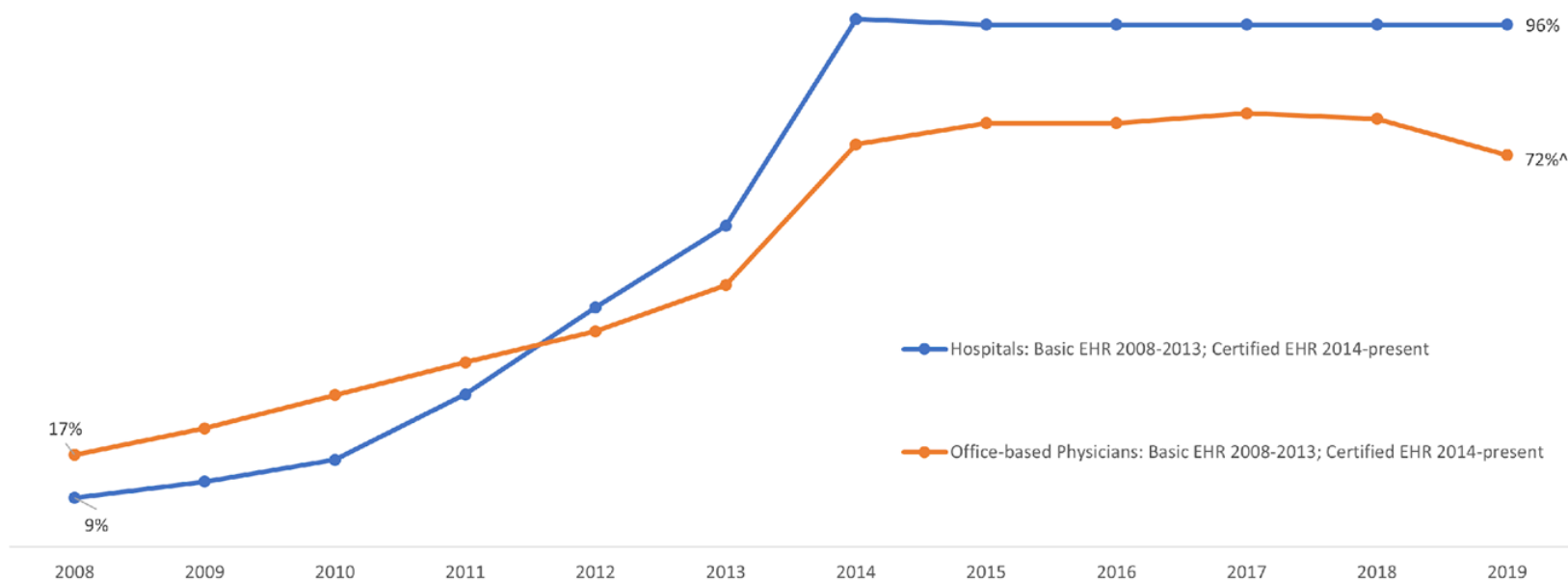- HITECH in 2009 created financial benefit (30 billion) to move to electronic records (meaningful use)

History of EMRs

Trends in Hospital & Physician EHR Adoption

96%

72%^

Hospitals: Basic EHR 2008-2013; Certified EHR 2014-present

Office-based Physicians: Basic EHR 2008-2013; Certified EHR 2014-present

17%

9%

2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019
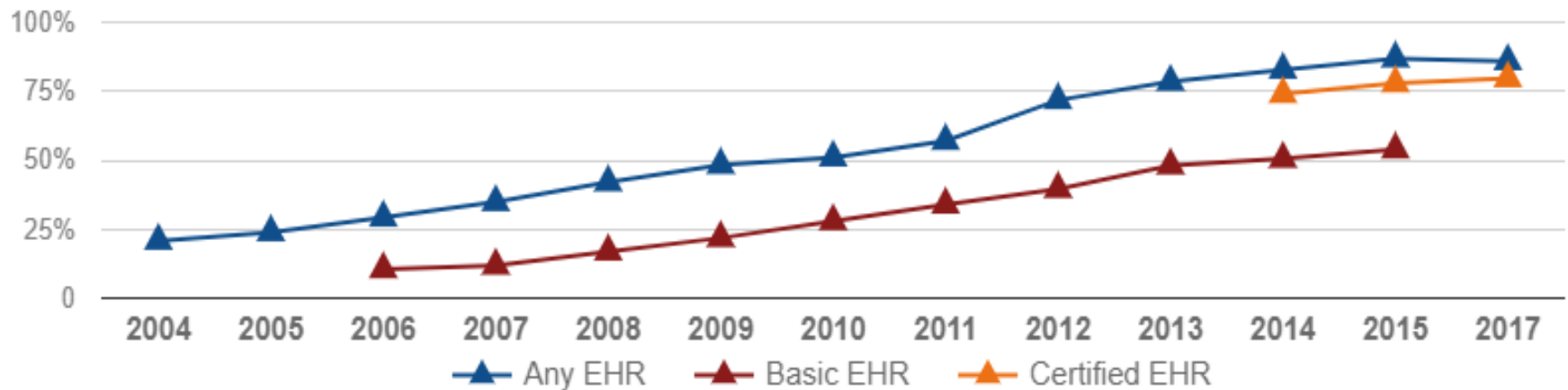
HealthIT.gov, 2019

History of EMRs

Adoption of Electronic Health Records by Hospital Service Type 2019-2021

HealthIT.gov, 2021
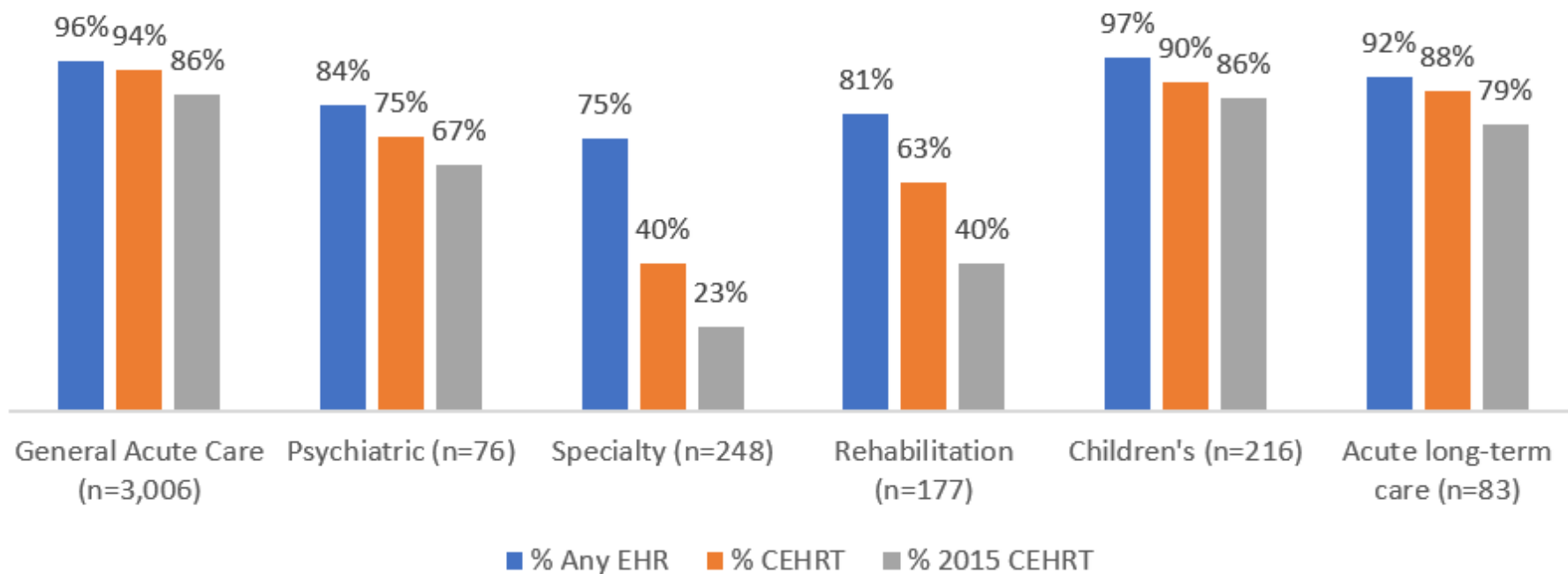
History of EMRs

- Survey of office-based physicians


HealthIT.gov, 2019

History of EDRs

- Dentistry lagged (and still does lag) behind medicine

- Nature of dental charting lends itself better to paper

- Long-standing "tradition" of having separate charts for dentistry

- Recent initiatives to integrate medical and dental records

Adoption of EDRs

- Areas of Accounting/Billing and Appointments have high adoption

- Medical history, testing, exams, patient education, progress notes and charting still lag behind (<50% digital-only)

- Acharya, A., et al; *Clinical medicine & research. 2017*
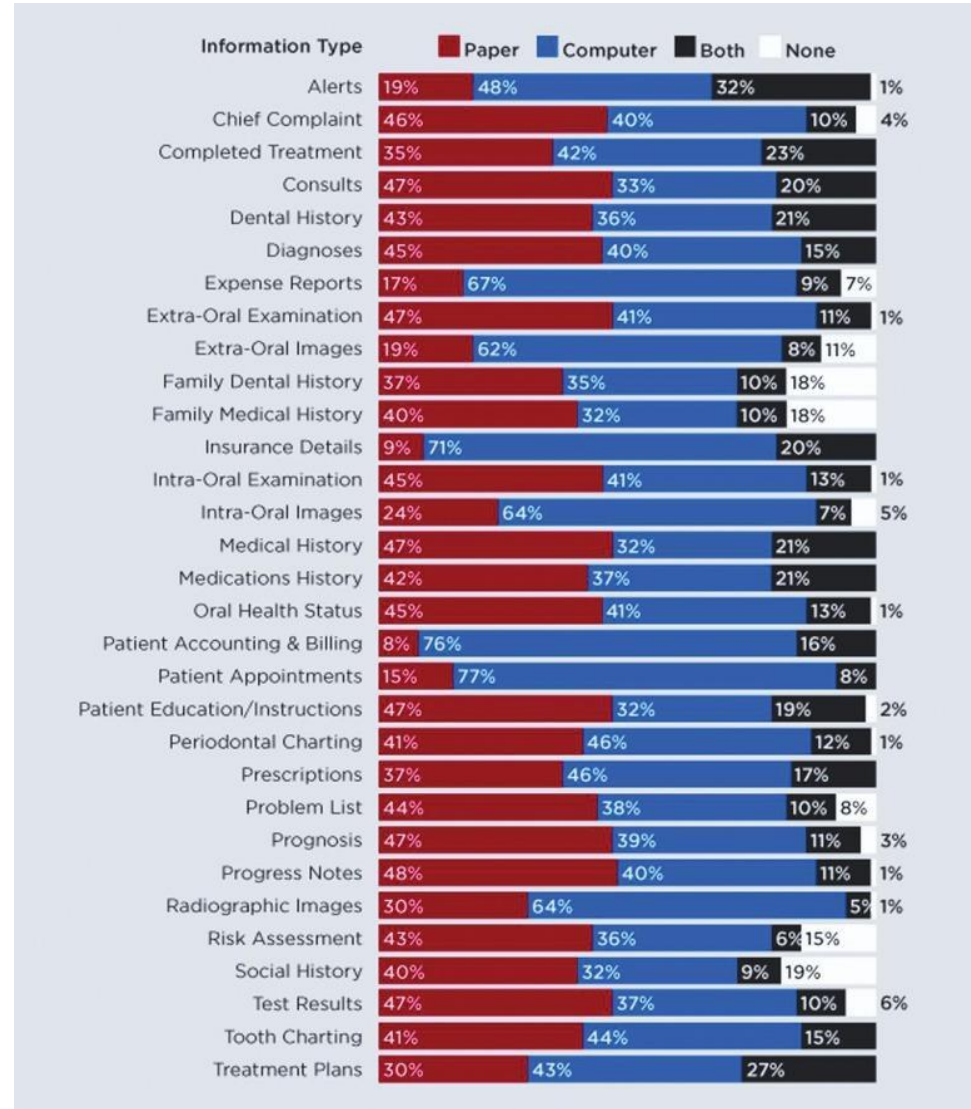
Existing Models of EMRs & Dentistry

- Private practice dentistry frequently uses standalone EDRs without integration or no EDR

- Hospitals are moving towards integrated EMRs, however some still use separate EDRs or paper dental charts

- Dental schools mainly use large-enterprise non-integrated EDRs

Kristy Parri
Female, 55 yo, 12/15/1964
MRN: 20618
Code: Not on file (no ACP docs)

🔍 Search

Marie Edwards
Dentist

COVID-19: Unknown
Primary Cvg: Blue Cross Blue Shi...
Allergies (3)

6/5 OFFICE VISIT
6 MI D2335, D1110
☐ Visit in Progress

PREV: 3/19 DENTAL IMAGING
D0330

CARE GAPS
1 awaiting completion

NO SHOW: 0 %

DENTAL PROBLEMS (1)
Caries involving multiple surfaces of tooth
Other problems (2)

Start Review

Integrated Electronic Medical and Dental Records (iEMDR)

Electronic Medical Records

Electronic Dental Records

Integrated Electronic Medical Dental Records

Health Informatics

Amit Acharya · Valerie Powell
Miguel H. Torres-Urquidy
Robert H. Posteraro
Thankam Paul Thyvalikakath
Editors

Integration of Medical and Dental Care and Patient Data

Second Edition

Springer
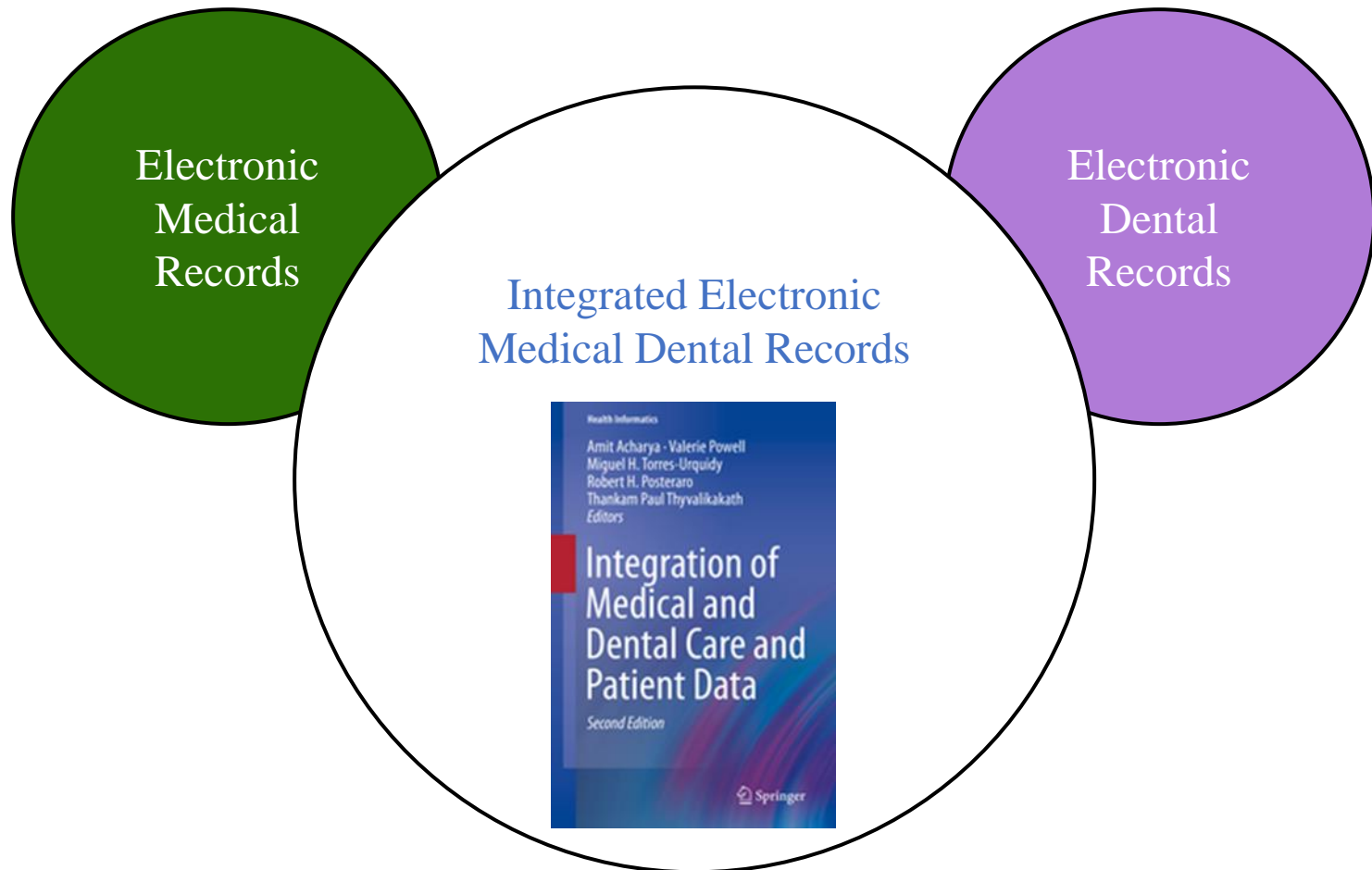
The Case for iEMDR

- Patient safety
  - Medications
  - Allergies
  - Medical history
  - Documentation

- Communication
  - Between providers
  - Between institutions
  - Between patient and provider

- Research
  - Data mining
  - Relating medical and dental
  - Data to drive patient care
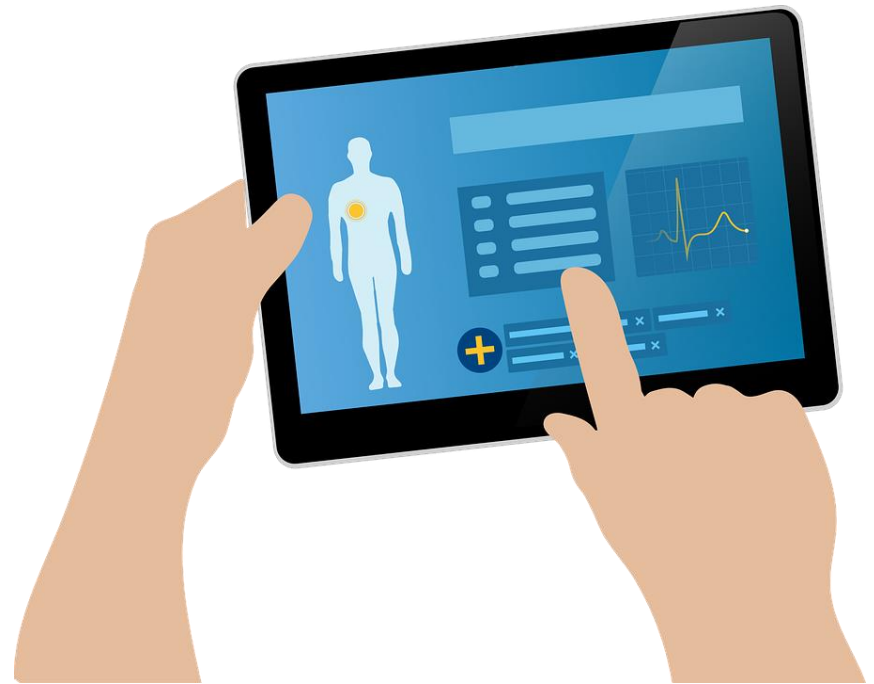
The Case for iEMDR—Patient Safety

Kovalesky MB, Unkel JH, Reinhartz J, Reinhartz D. Discrepancies Between Dental Parent-Derived Health Histories and Medical Electronic Health Records. Pediatr Dent. 2019 Sep 15;41(5):371-375.

Claman DB, Molina JL, Peng J, Fischbach H, Casamassimo PS. Accuracy of Parental Self-Report of Medical History in a Dental Setting: Integrated Electronic Health Record and Nonintegrated Dental Record. Pediatr Dent. 2021 May 15;43(3):230-236.

Adibi S, Li M, Salazar N, Seferovic D, Kookal K, Holland JN, Walji M, Farach-Carson MC. Medical and Dental Electronic Health Record Reporting Discrepancies in Integrated Patient Care. JDR Clin Trans Res. 2020 Jul;5(3):278-283.

Our Experience with iEMDR

- Hospital moved to Epic starting in 2005—a few services at first

- Dentistry moved to home-created Epic charting in 2011

- Incremental improvements from Epic and internally

- Moving to Epic Wisdom this year

- Quick talk about cost…

EMR Tutorial

- Schedules
  - Show OR and clinic schedule
- Storyboard
  - Show pertinent and important information at a glance
- Snapshot
  - Show customized patient snapshot
- Chart review: medical history, labs, media, and imaging
  - Show ability to review complex patient medical record
- Customization of view and Smart text
  - Show how we can create our own text templates
- Secure chart and in-basket
  - Show ease of in-EMR communication
- Care Everywhere
  - Show charting access from outside providers

Benefits of EMDR

- Integrated patient health-related information including e-prescriptions
- Connectivity to other providers and staff for interdisciplinary care
- Internal referrals
- Inter-institution communication
- Protection of healthcare information
- Ability to report to the Department of Health and Human Services
- Move to easier mining and analysis for research and QI
- Connectivity for patients
- Mobile connectivity
- Provider input and building

Limitations for use of EMDR

- Complexity of EMDR systems
- Cost of system and support
- Shortage of health informatics personnel
- Lack of coordination between agencies
- Inadequate training of healthcare providers
- Developing educational frameworks
- Lack of competency assessments
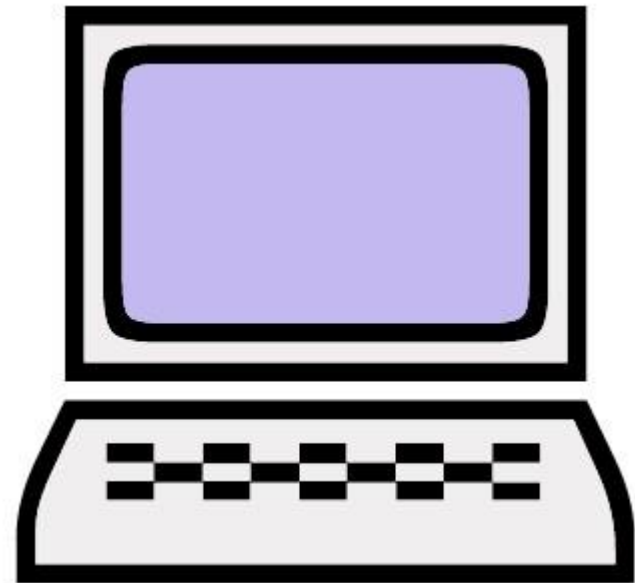
One last plug…

- Provider involvement in…
  - Development
  - Maintenance
  - Improvement
  - Research
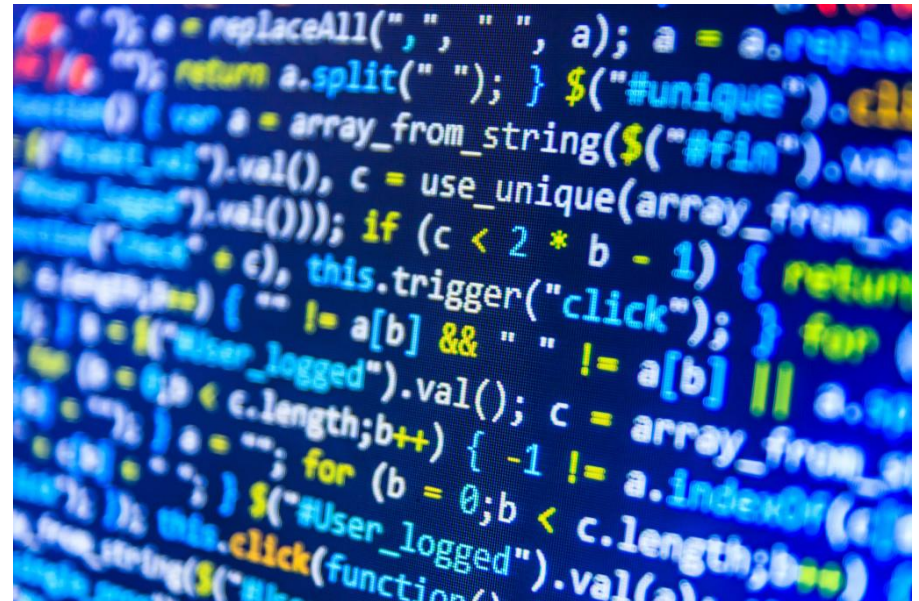
EMR and Education

EMR and Medical Education

- Integration for EMR in medical education

- Effective and responsible use of EMR

- Competency assessment models proposed for medical and nursing students

- No adaptation of competencies yet!

- Dental follow medical colleagues… but we can lead too?

iEMDR and Dental Education

- iEMDR feed well into a problem-based learning component

- Integration of various basic and clinical sciences

- Higher level of functioning

- Consultations and referrals

- Realistic simulations
  - Resident oral board preps
  - Student iNBDE preps

Cardiac and Vasculature
PFO (patent foramen ovale)
LSVC (persistent left superior vena cava)

ENT
Congenital choanal atresia
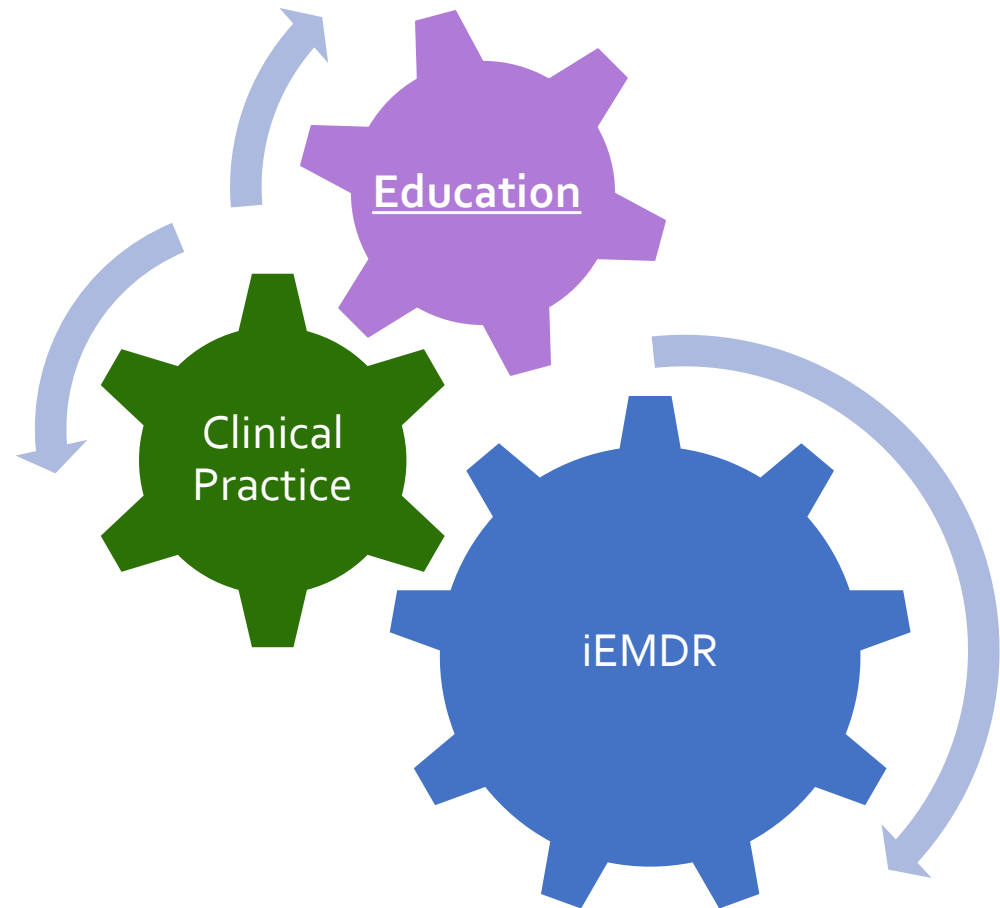Pyriform aperture stenosis
Chronic nonsuppurative otitis media, bilateral
Other dental procedure status
Conductive hearing loss, bilateral
Other recurrent acute nonsuppurative otitis media of both ears
Fluid level behind tympanic membrane of left ear
Patent pressure equalization (PE) tube on right side
Tympanostomy tube check
ETD (Eustachian tube dysfunction), bilateral
Atelectasis of right middle ear

Gravid and Perinatal
Premature infant
Teratogen exposure

Pulmonary and Pneumonias
Chronic lung disease
Chronic respiratory disease arising in the perinatal period
Lung nodule

Symptoms and Signs
Feeding difficulties and mismanagement

American Board of Pediatric Dentistry

JCNDE JOINT COMMISSION ON NATIONAL DENTAL EXAMINATIONS

iEMDR in Dental Education

- No standards to determine student or resident competency for iEMDR

- No written policies regarding student documentation in EMR EDR

- iEMDR integration in education would require
  - Core competencies and learning objectives
  - Assessments of student learning
  - Simulation-based training for students

"Another advantage of switching to electronic health records is that it will make your indecipherable handwriting obsolete."

iEMDR in Education: Data safety

- Limited access to students
- Limited functional use and competence
- Medical Dean's recommendations: Limited access prevents learning
- Unrestricted access to case is vital
- Reasonable oversight can be exercised by adding safety checks with in iEMDR

Overview of the Integrated Electronic Medical-Dental Records (iEMDR) Competency Assessment Model For Predoctoral Dental Students

Core competency	Responsible use of EHR	Data access and review	Quality care	Service tracking	Effective communication
Learning objectives	Ability to maintain accountability	Ability to review patient information for care	Ability to complete medical-dental care forms	Ability to complete and track dental services	Ability to communicate with patient and care team
Sample grading criteria	-Knowledge about EHR functionality -Securing station while stepping away	-Review medical and dental histories -Formulate treatment plan	-Completion of forms (caries risk assessment) -Longitudinal tracking of risks	-Completion of billing codes -Completion of tracking codes	-Provide prescription authorizations -Send referrals -Provide after visit summary
Sample Critical Error	Not securing iEMDR station when stepping away	Pre-medications not recommended, when needed	Allergies and medical alerts not reviewed during care	Billing codes not added for the date of service	Did not provide referral, when warranted
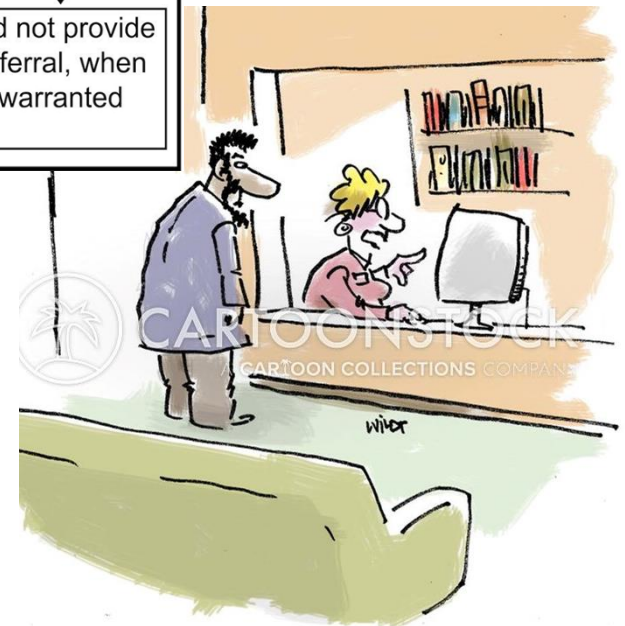
"Thank's for your patience as we transition to electronic filing...Mrs. McGillicuddy."

Mapping the Components of Integrated Electronic Medical and Dental Records (iEMDR) Training and Assessment Model to the Commission on Dental Accreditation Competency Statements

Specifics in the iEMDR Model	CODA Statements
A course competency goals and learning objective were defined by the predoctoral program director and communicated to the students and communicated in a syllabus	2-1
Students were provided a self-assessment and voluntary survey regarding learning perceptions and preparedness after iEMDR training and competency	2-11
Students were given unrestricted access to iEMDR and were expected to review systemic findings, general medical care and social history notes for each patient before dental care encounter plan for patient. Students were trained in medico-legal responsibilities including note-writing and compliance with regulatory agencies. Students were trained in responsibilities of care provider, ethics of patient care, informed consent, transparency of records, and care documentations in accordance with regulatory agencies. Students were expected to apply their knowledge and critical thinking for planning of wholistic dental care for patients consistent with systemic findings including but not limited to consultation with medical provider, delivery of dental care in conjunction with non-pharmacological or advanced behavior management, referral, and writing lab script. Students were expected to communicate their findings and anticipatory guidance to the patients and families from diverse age, gender, medical, social, cultural, or ethnic backgrounds.	2-10, 2-13 to 2-23
Implementation of iEMDR and development of competencies was done with defined learning objective and assessment criteria. The iEMDR knowledge and application is vital for training of students for a patient-centric model of dental practice, and reduce charting errors	5 - 2

CODA

Commission on Dental Accreditation

Overview of Training and Assessment of Integrated Electronic Medical-Dental Records (iEMDR) in Pediatric Dentistry Clinical Course

Predoctoral dental students scheduled for Pediatric Dentistry clinical rotation

▶

Assignment of self-paced iEMDR simulated training before clinical rotation

▶

Knowledge assessment and self-evaluation through self-paced exercises

▼

In-person or remote iEMDR training with a designated trainer and addressal of questions

◀

Completeness of student work evaluated by a designated iEDMR trainer

◀

Students email snapshot of exercises for evaluation of iEMDR learning progress
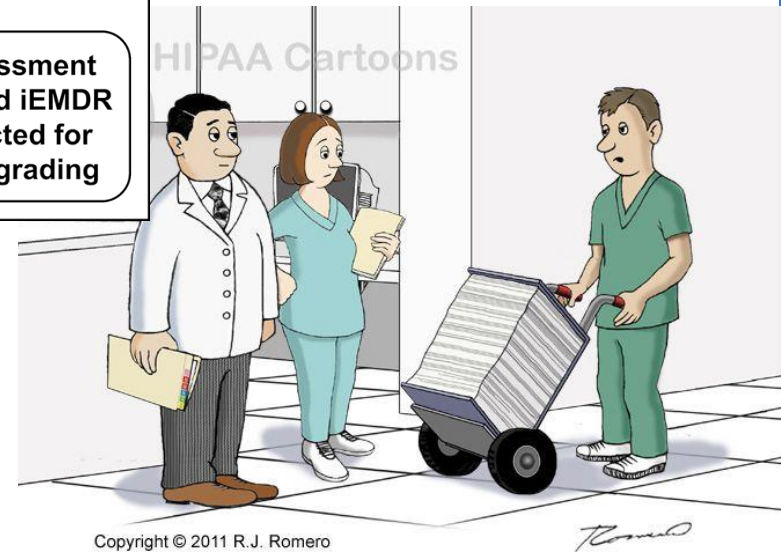
▼

Student takes test before the start of the rotation for learning assessment

▶

Student are evaluated for iEMDR performance during delivery of clinical dental care

▶

Student assessment test scores and iEMDR scores collected for analysis and grading
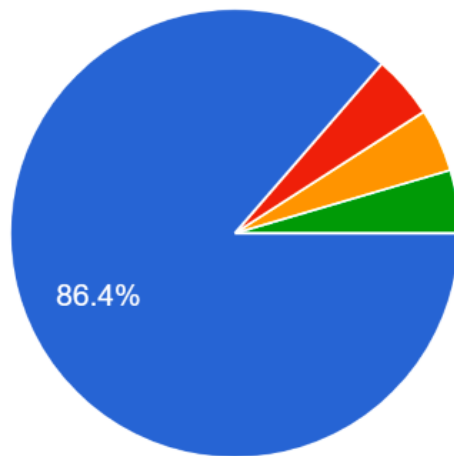

HIPAA Cartoons

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"We just got an update to the user manual for our Electronic Medical Record system. Where do you want it?"

Competency assessment and HIPAA and FERPA

For competencies and/or any other clinical grading, are any grades being stored in axiUm?

22 responses

86.4%

- ● Yes, all or at least some grades are stored in axiUm using Evaluations module
- ● No, all grades are in a third party platform outside of axiUm
- ● We're in the process of migrating assessments to AEFIS
- ● All didactic course grades are NOT stored AxiUm, competencies are

it@consortiumedr.org

iEMDR Performance

Dental Student Grading

Dental Student Grading and Competencies

Documentation accurate and complete	Met standard in the initial attempt	Met standard after the initial attempt
All forms/odontogram accurate/complete	Met standard in the initial attempt	Met standard after the initial attempt
Note finished at the end of visit	Met standard in the initial attempt	Met standard after the initial attempt
Billing entries accurate/complete	Met standard in the initial attempt	Met standard after the initial attempt

Faculty: _____ Date: _____ Done

Grade Total 0

- Effectiveness for using iEMDR for each patient encounter

- Standards of behavior for responsible use of iEMDR

- The student grading is HIPAA and FERPA compliant (*SmartForm* as discrete data point)

- Translatable report without patient information

- Student data not included in patient chart

iEMDR Competencies

Diagnosis, Treatment Planning and Preventive Care Competency

SODM Competency Statements 2, 4, 8, 9, 14, 15, 16

Bold points are the critical sections, failure to meet these will result in not passing the competency

Criteria		Student		Faculty	
1. Preparation		Met	Not Met	Met	Not Met
a. Patient histories reviewed (medical, dental, social)	b. Patient verification completed				
c. Informed consent obtained	d. Height/weight				
2. Radiographs		Met	Not Met	Met	Not Met
a. Indication appropriate	b. Diagnostic	c. Properly mounted			
3. Clinical/radiographic assessment and diagnosis		Met	Not Met	Met	Not Met
a. Presence/absence: incipient or carious involvement	b. Missing teeth/restorations, tooth defects				
c. Head and neck cancer screening, risk assessment	d. Oral mucosal and osseous disorders				
e. Periodontal assessment: gingival bleeding, plaque control, calculus, bone height	f. Malocclusion/space assessment, (Angle class, profile, asymmetries)				
g. Habits, TMD					
4. Health promotion and disease prevention		Met	Not Met	Met	Not Met
a. Caries risk level and prevention plan documented					
b. Prevention plan					
i. Recall frequency					

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"Somehow our new EHR system accidentally emailed your test results to a veterinarian."

Study Overview to Understand the Impact of Training Modalities on Integrated Electronic Medical and Dental Records (iEMDR) competency

Formulation of Integrated Electronic Medical-Dental Records (iEMDR) Competency for Dental Students

Assignment of self-paced (asynchronous) iEMDR training and exercises one month before clinical Pediatric Dentistry rotation

Control group
Synchronous In-person Training

Test group
Synchronous Remote Training

Assessment score (AS) to measure knowledge of iEMDR before clinical rotation

Performance score (PS) to measure iEMDR knowledge application during clinical rotation

iEMDR training self-perception of preparedness

Submitted to the Journal of Dental Education

a.bacall

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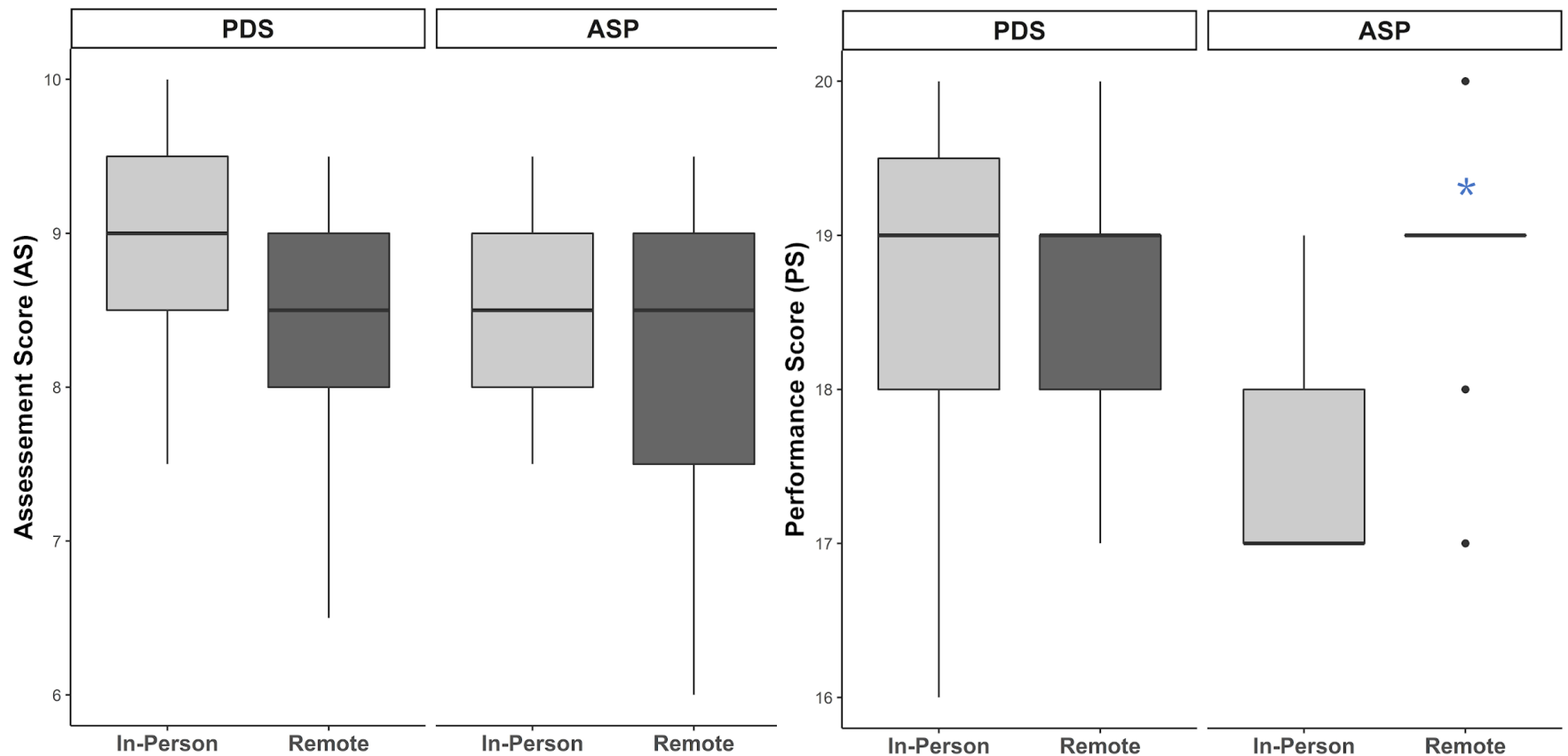Search ID: aban843

"Somebody should tell our office manager that a motorized filing cabinet does not qualify as an electronic health record system."
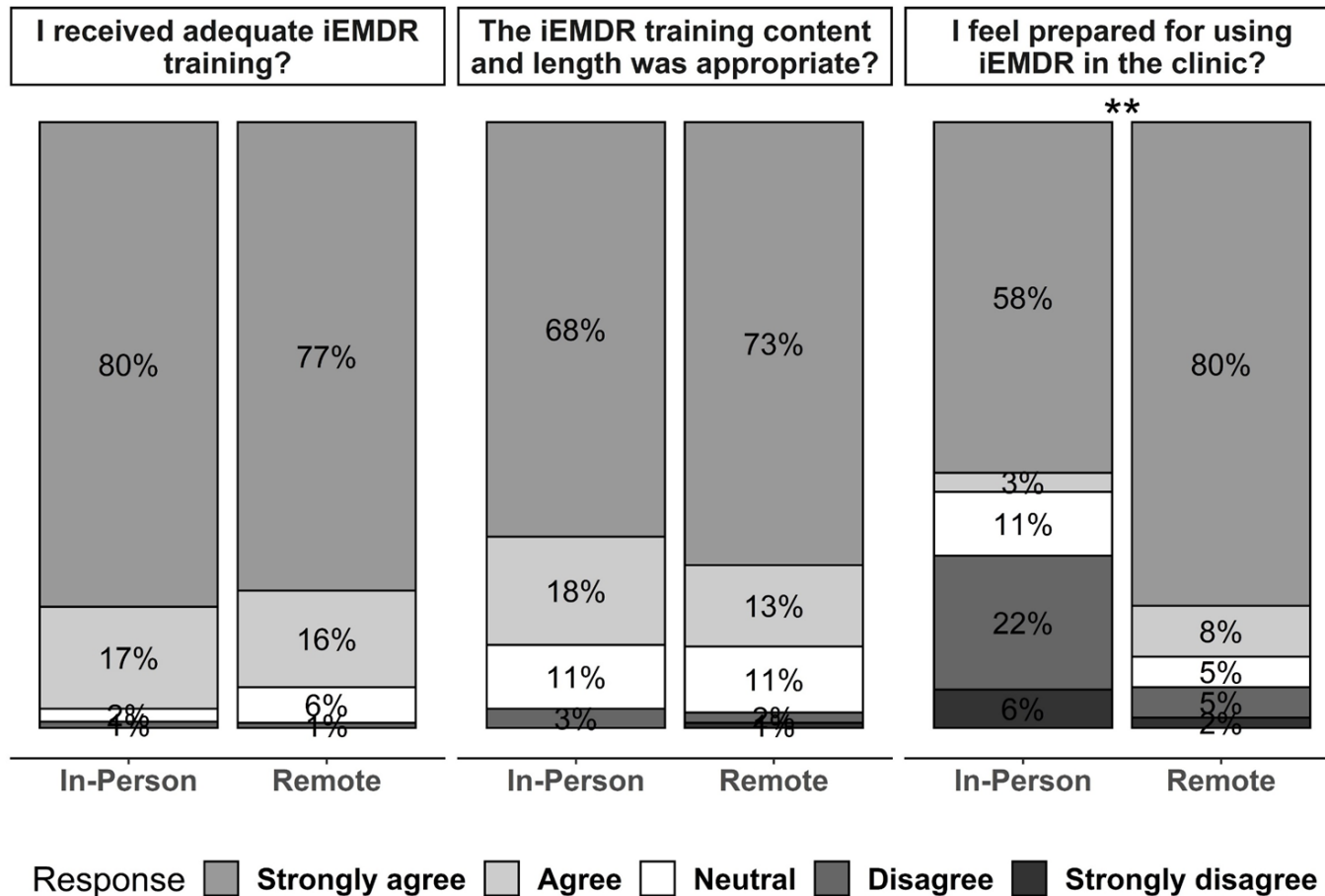
iEMDR

Knowledge   Performance

Note: PDS: predoctoral dental students, ASP: advanced standing program

* *P*<0.05, 95% power with n=120 in each group

Self-perception survey

Note: Data from predoctoral dental students and advanced standing program
** *P*<0.001

Conclusions

- iEMDR provides a value tool for integrated, holistic and patient-centered care
- iEMDR competencies in education has not been used in dentistry in the past
- Training modality of iEMDR does not affect learning
- The proposed model of competency is valuable for student assessment

Thank you and Questions

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daniel.claman@nationwidechildrens.org

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"Doc, it's the best thing since fire: the Engraved Medical Record. Our EMR is portable, durable, and fully compatible with other systems."