

# Dentistry 2035

Advancing Oral Health Throughout the Lifespan

Will you be:  
the **Disruptor** or the **Disrupted**?

What will healthcare/dentistry  
look like in 10-15 years?

What would revolutionize your worlds?

Will you survive or thrive?

J Oxman | Retired Corporate Scientist, 3M Oral Care  
November 19, 2024



Many thanks

*The National  
Academies of* | SCIENCES  
ENGINEERING  
MEDICINE

Dr. Mike Helgeson

# Innovation Culture

Curiosity

Customers

Contemplation

Collaboration

Creation

Commercialization

Clinical Success!

Shifting Paradigms for  
Advancing Oral Health Across the Lifespan

*The National  
Academies of*

SCIENCES  
ENGINEERING  
MEDICINE



# Innovative Technical Solutions

## What if?



Opportunity

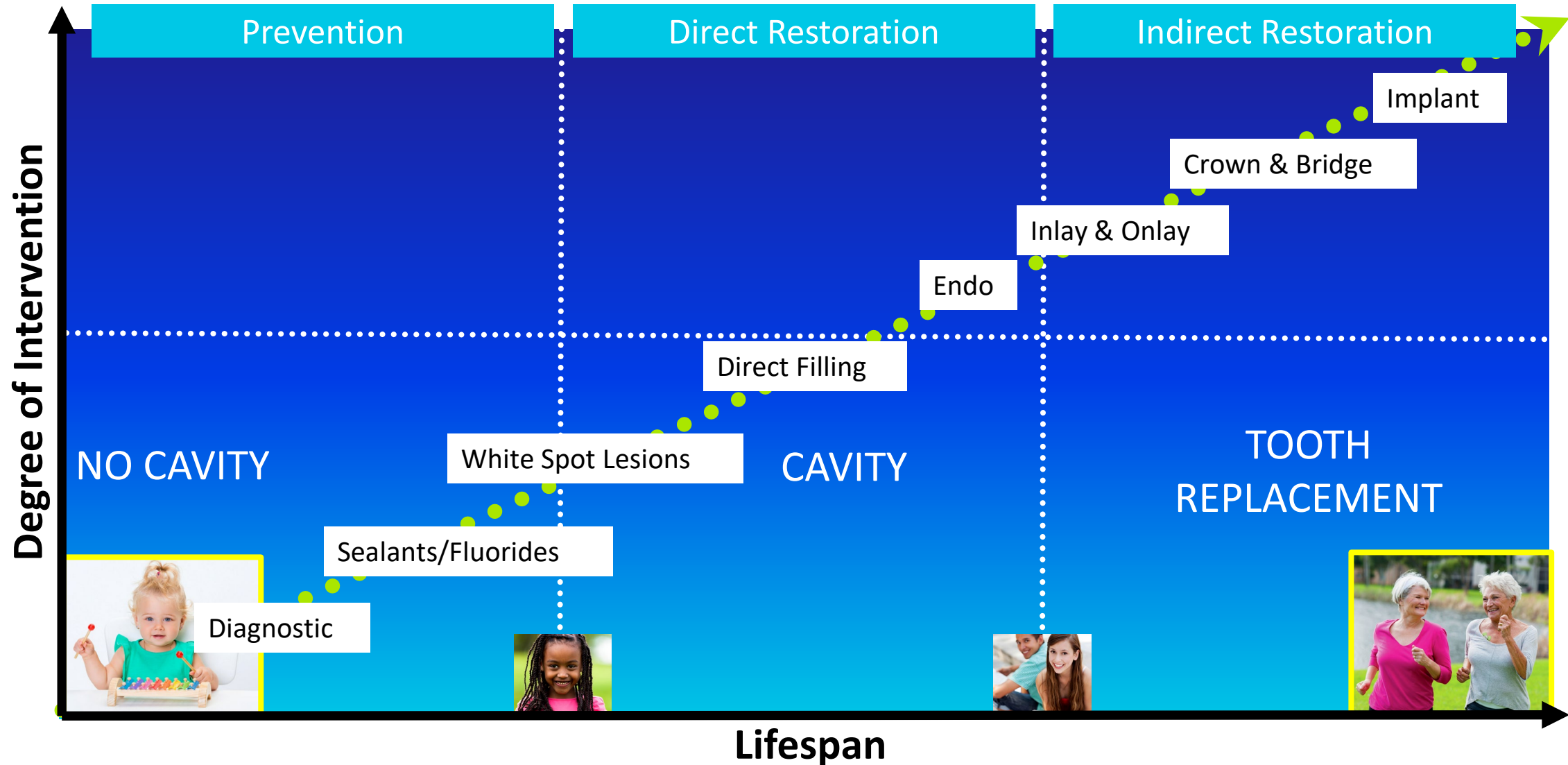
## What's possible?



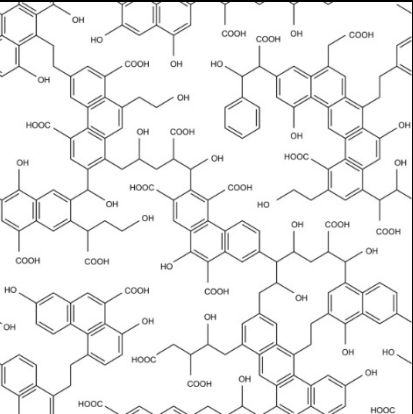
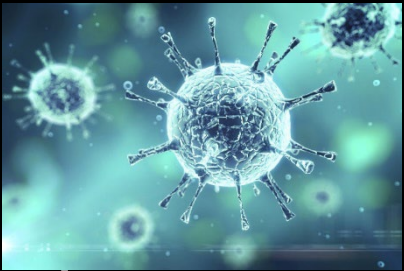
Solution

# Where is oral care headed?...pediatric to geriatric

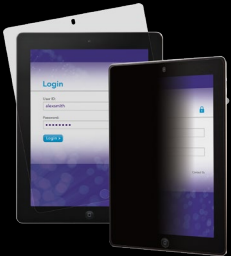
***Trained to be a tooth surgeon... What would you wish for your loved ones?***



# Disruptive Oral Care Markets and Technologies of the Future



Ab Abrasives													
Ad Adhesives	Em Electronic Materials											Di Display Components	Hd Healthcare Data Management
Bi Biomaterials	Fi Films	Nw Nonwovens							Ms Modeling & Simulation	Ac Acoustic Management	Ec Energy Components	Lm Light Management	
Ce Ceramics	Fl Fluoro-materials	Pm Performance Materials	Am Additive Manufacturing	Pc Precision Coating & Web Processing	Rp Radiation Processing	An Analytical Science	Pr Process Design & Control	Cv Computer Vision	Ro Advanced Robotics	Bd Biodetection & Microbial Management	Eg Engineered Graphics	Mf Mechanical Fasteners	
Co Advanced Composites	Mm Metamaterials	Po Porous Materials & Membranes	Mo Molding	Pd Particle & Dispersion Processing	Su Surface Modification	Cp Converting & Packaging	Sd Sustainable Design	Ds Data Science & Analytics	Se Sensors	Cs Connected Systems	Fe Flexible Electronics	Sw Skin & Wound Management	
Do Dental & Orthodontic Materials	Nt Nano-technology	Rm Release Materials	Mr Micro-replication	Pp Polymer Processing	Tf Thin Film & Plasma Processing	In Inspection & Measurement	We Accelerated Weathering	Es Electronic Systems	Ss Software Solutions	Dd Drug Delivery	Fp Filtration & Purification	Tm Thermal Management	

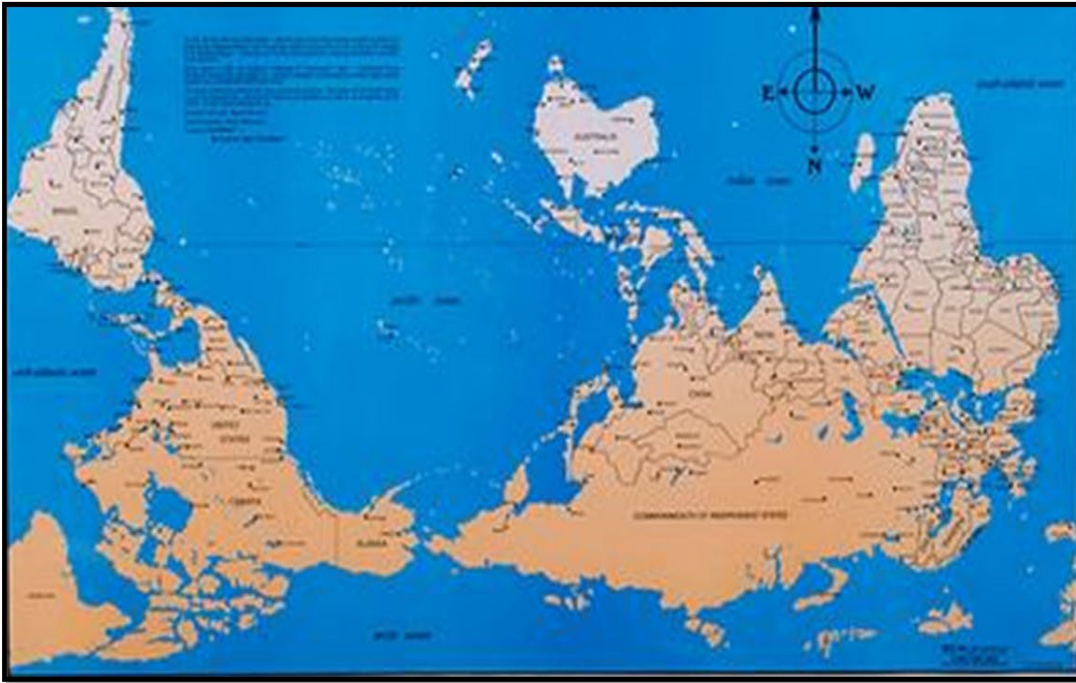




# Anticipate and Create the Future...

## Markets and Technology

Dare To Look at the World a Different Way!

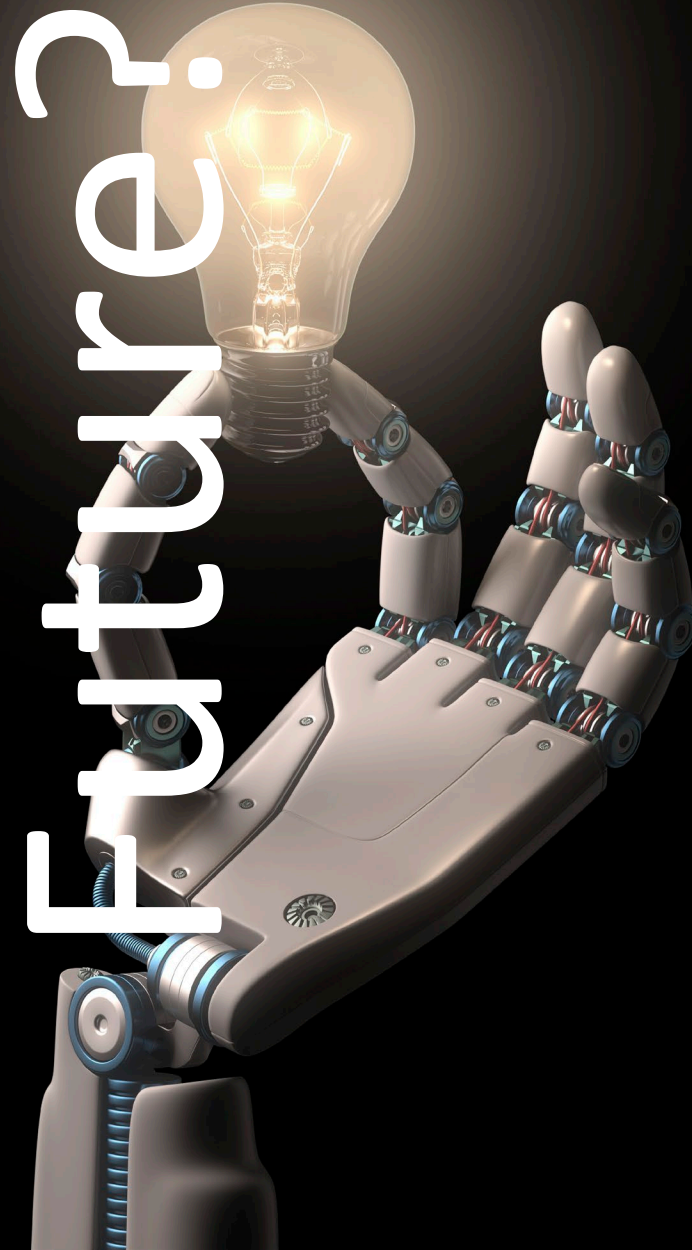
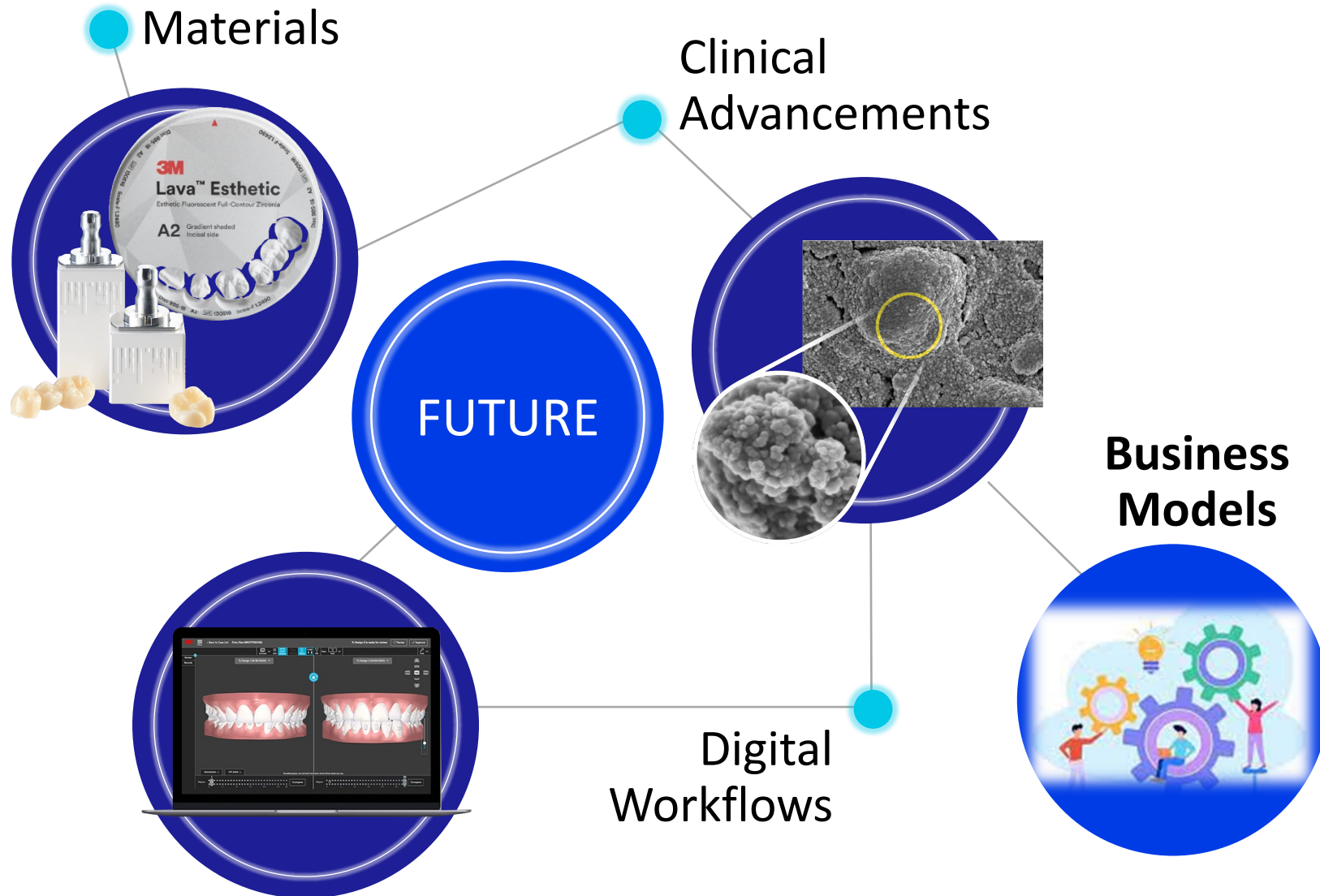


7/28/2011



Could this be  
**you?**

# What if's of tomorrow



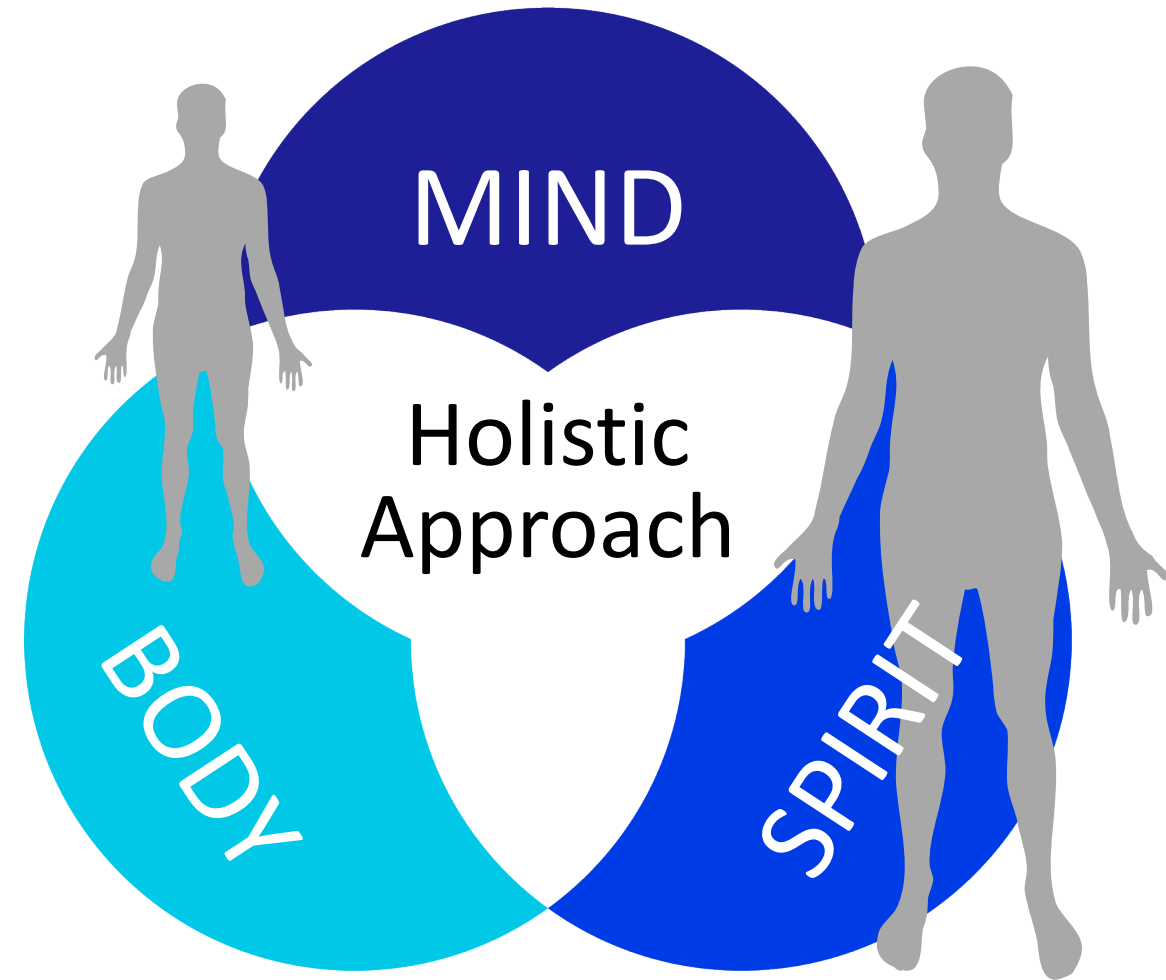
What if “Drill, Fill and Bill” Disappears?



# Will we have a Plan “B”?

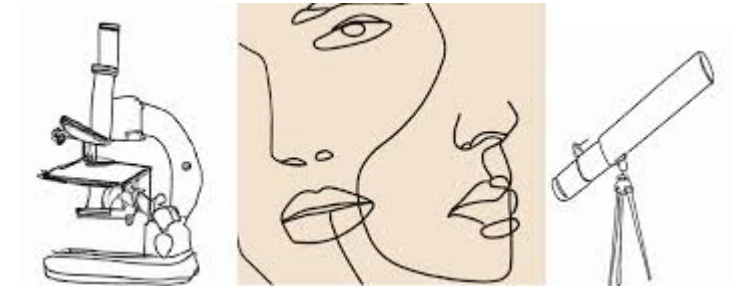
Tomorrow:

“DDH” Dr. of Dental Health





# Several Global Megatrends... Forces that May Impact Dentistry



Aging  
Population



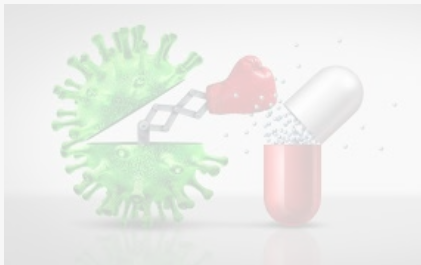
Climate  
Change



Pace of Technology  
Change



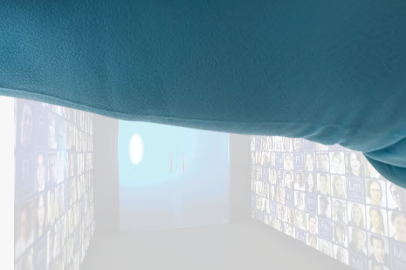
Antibiotic  
Resistance



Economic  
Hangover



Hyper-Connect



Emerging  
Diseases



# Healthcare Mega-Trends

1

Personalization

2

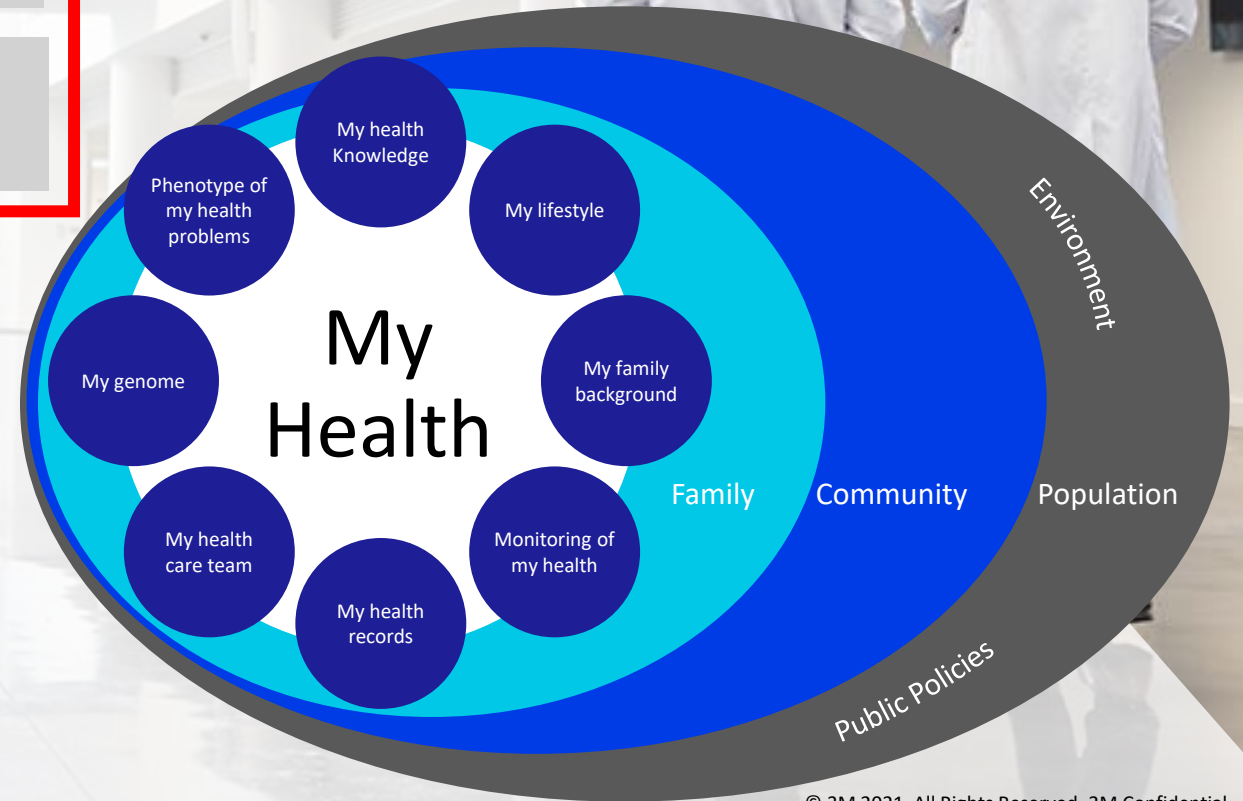
Business Model Disruption

3

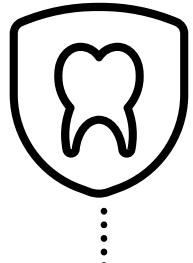
Consolidation

## Healthcare Provider Consolidation

In order to provide higher quality care at lower costs, hospitals are being acquired by major healthcare organizations and physicians are joining these larger organizations.



# ADA Health Policy Institute: Inaugural Dental Industry Report (2019).....*Key Trends*



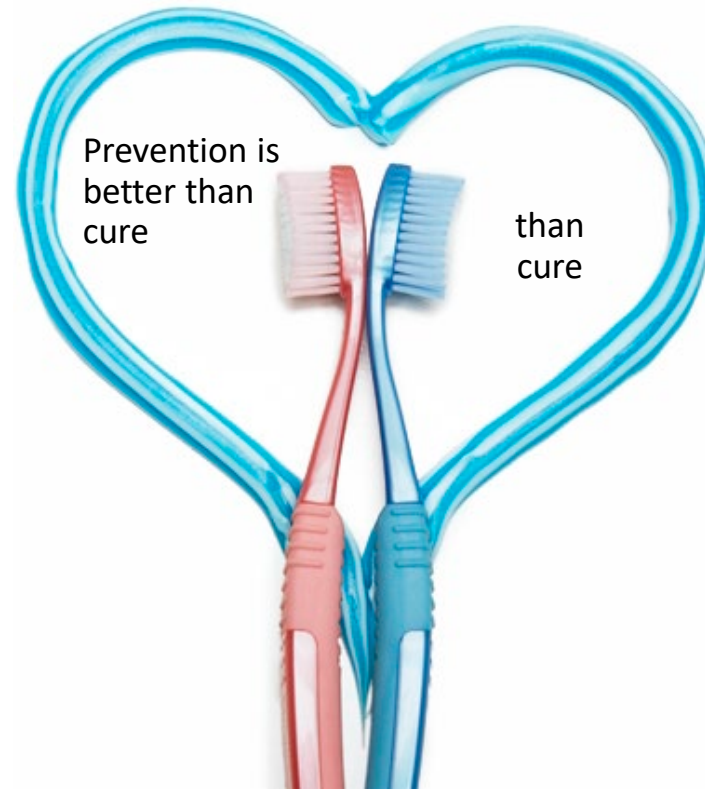
Solo dental practices  
declined:

83%  
to 78%  
(last 10 yrs)

Group practices  
increased



Shifts in  
**Preventive** and **diagnostic**  
dental procedures



Patient landscape  
becoming more  
consumer driven

**More \$\$\$ conscious**  
and  
**Emphasizes convenience**



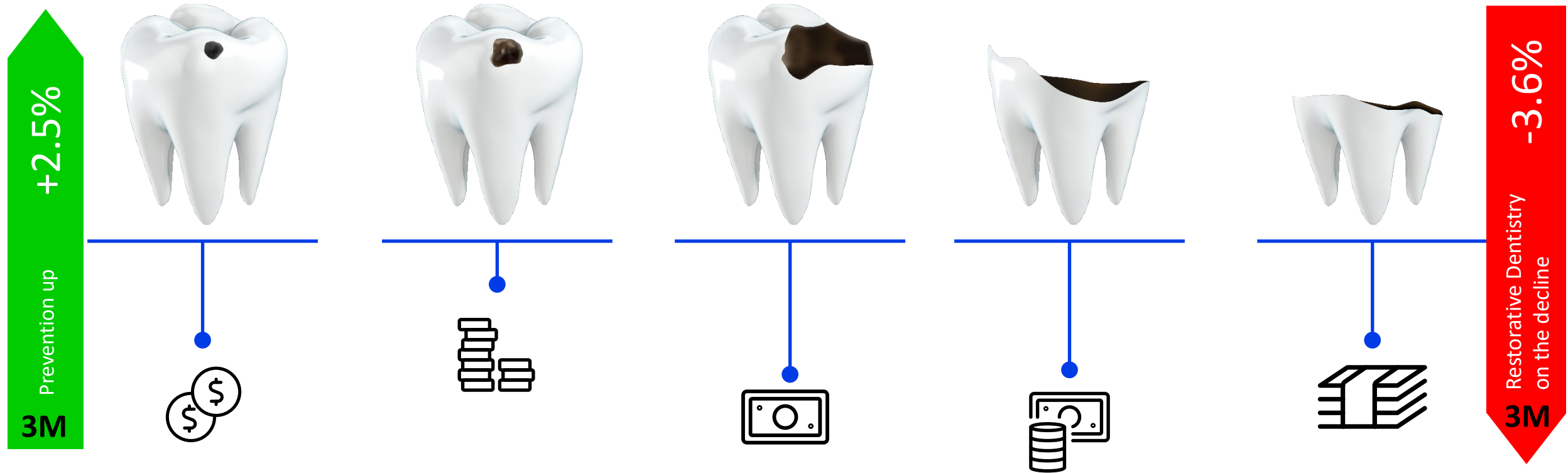


You can

# PAY NOW

Or you can

# PAY LATER!



**Value-based preventive healthcare is coming!**

# Value Over Price is Winning!

- Faster, easier, good enough products & services
- Digitization, Big Data, Analytics, AI, will drive: Procedural predictivity, precision, efficiency!
- Rapid growth of **DSO's and HMO's**
- **BOTH the medical and dental data within?**

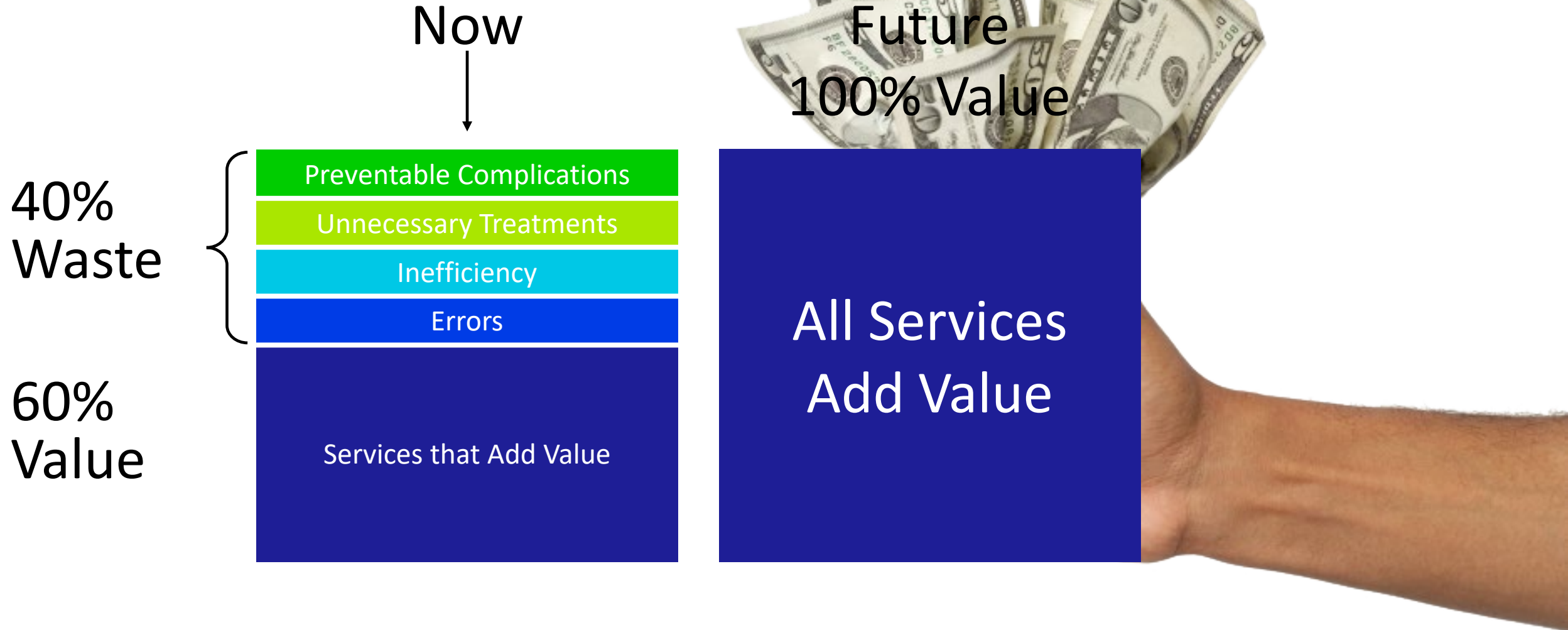


THE  
IMPACT

October 2021 CHICAGO— Aspen Dental, the largest branded network of dental offices in the U.S., celebrated a major milestone with the opening of its 700<sup>th</sup> office in Nokomis, Florida. This opening brings the total number of Aspen Dental locations in Florida to 100.

Aspen Dental Opens 700<sup>th</sup> Office

# What if Medical/Dental Costs Could be Contained?





# Cost Cutting Trends with Benefits?

1. Insurance & governments require more prevention procedures to reduce costs!

- Fewer restorative procedures!



2. Insurance provides patient incentives

How will this change the world of dentistry?



# What if “*your*” *business model* is disrupted?

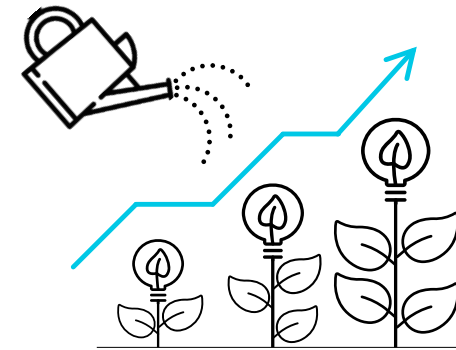
## Dentistry: Increasingly Competitive!



## *Decline in specialists...more generalists!*

### Entrepreneurial dentistry and new business models will win!

- ✓ Offer treatment solutions rather than treatment plans
- ✓ Treatment is an investment rather than a cost
- ✓ Offer new dental services and treatments



What if unexpected business models become reality?



Who could have **BOTH** the medical and dental data?

## “Millennial Minute Clinic”

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Faster, more convenient solutions

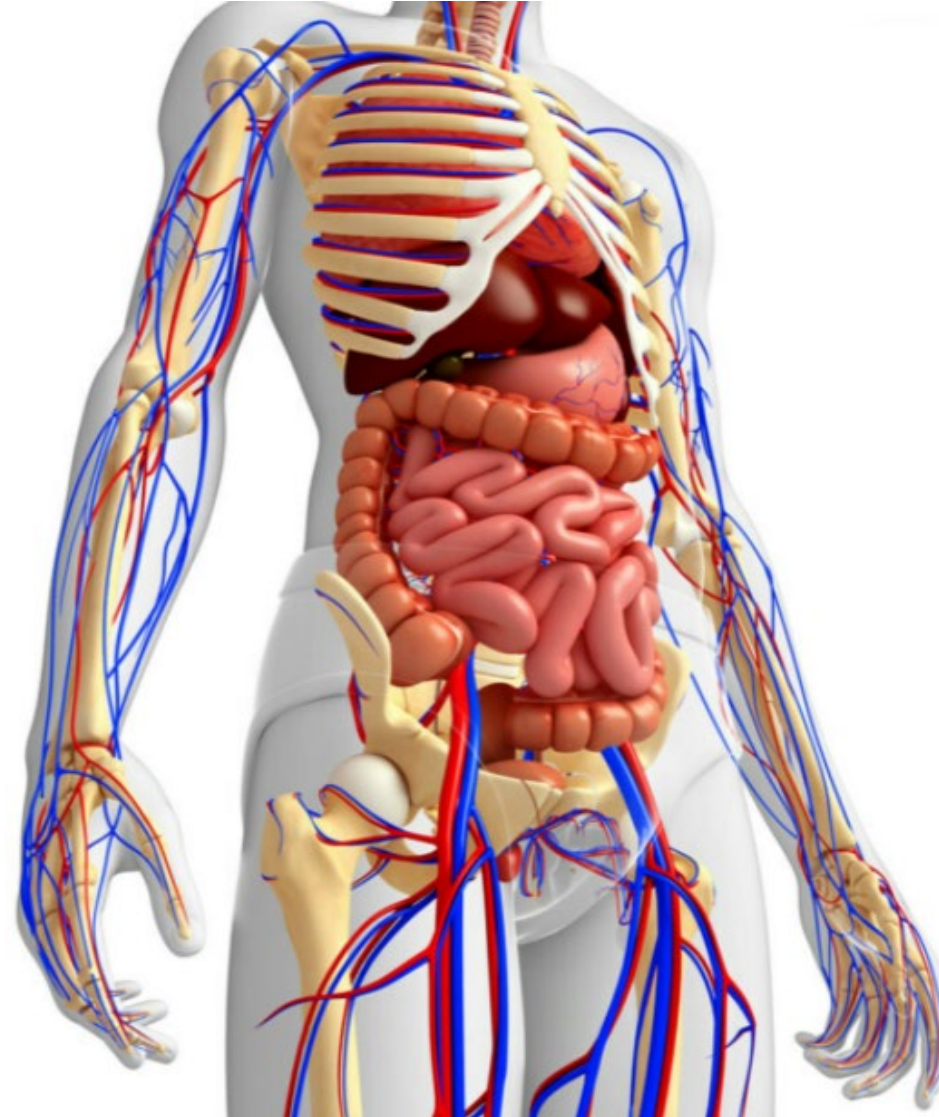
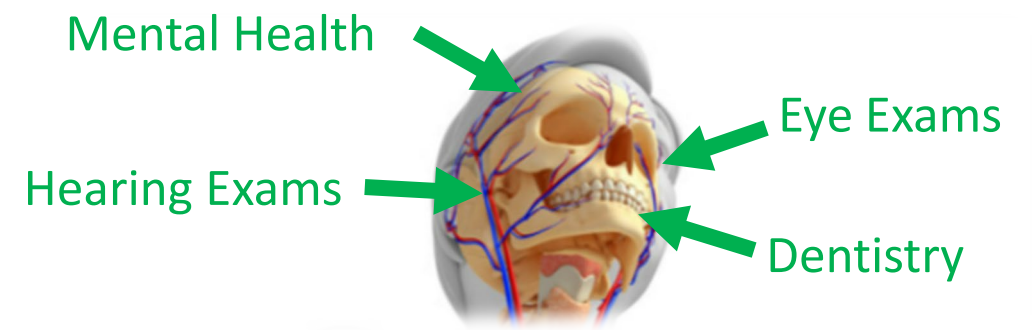


“Health care continues to evolve as patients demand more choice, greater value, and better access”

Expect the Unexpected!!!



Oh by the way...



# Oral Health...Systemic Health

What **conditions** could poor oral health cause?

8/20/2020

Gum disease associated with higher gastrointestinal, colon cancer risk | News | Harvard T.H. Chan School of Public Health



**HARVARD T.H. CHAN**  
SCHOOL OF PUBLIC HEALTH

## News

Gum disease associated with higher  
gastrointestinal, colon cancer risk

Received: 13 April 2020 | Revised: 13 June 2020 | Accepted: 26 June 2020  
DOI: 10.1111/jcpe.13341

CLINICAL PERIODONTOLOGY

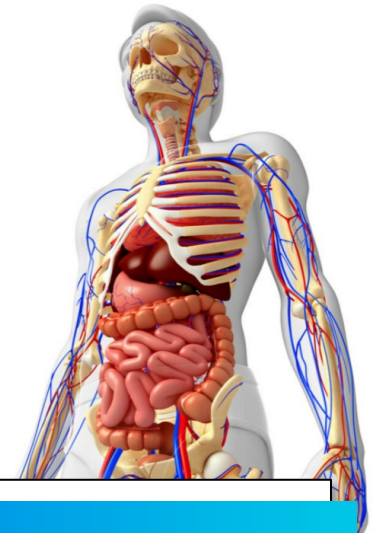
Journal of Clinical  
Periodontology WILEY

Association between periodontal disease, tooth loss and liver  
diseases risk

X. Gao<sup>1</sup>, Y. Li<sup>1</sup>, Y. Zhang<sup>2</sup>, B. Li<sup>3</sup>, Z. Li<sup>3</sup>, G. Li<sup>3</sup>



**MEDICAL  
DENTAL**



## Who owns these healthcare conditions? Dentists or Physicians or ?

developing  
factors," s  
and nutriti

activation of integrin/FAK signaling and  
therapeutically reversible by a probiot  
bacteriocin

Pachiyappan Kamarajan<sup>1,2</sup>, Islam Ateia<sup>3</sup>, Jae M. Shin<sup>4,5</sup>, J. Christopher  
Charles Le<sup>1</sup>, Ling Zhan<sup>1</sup>, Ana Chang<sup>7</sup>, Richard Darveau<sup>6</sup>, Yvonne L. Kapi

1 Department of Orofacial Sciences, School of Dentistry, University of California, San Francisco, CA, United States of America, 2 Department of Periodontics and Oral Medicine, School of Dentistry, University of Michigan, Ann Arbor, MI, United States of America, 3 Department of Oral Medicine and Periodontology, Mansoura University, Mansoura, Egypt, 4 Department of Cariology, Restorative Sciences, and Endodontics, School of Dentistry, University of Michigan, Ann Arbor, MI, United States of America, 5 Department of Epidemiology, School of Public Health, University of Michigan, Ann Arbor, MI, United States of America, 6 Biologic and Materials Sciences, School of Dentistry, University of Michigan, Ann Arbor, MI, United States of America, 7 Department of Periodontics, Oral Health Sciences, School of Dentistry, University of Washington, Seattle, WA, United States of America

Wenzhou Medical University, 201100 Wenzhou  
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Email: zhangxiwmu@163.com

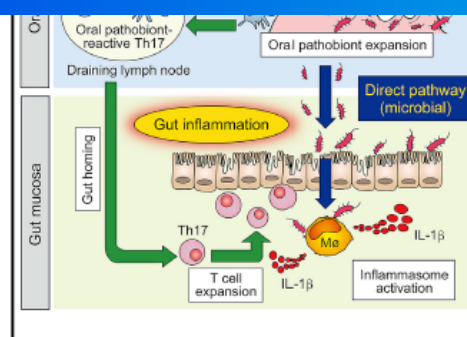
Funding information  
Wenzhou Basic Research Project, Grant/  
Award Number: Y20180851

Increment in tooth loss was associated with  
95% CI = 1.01 – 1.10) with a linear relation  
tendency towards liver cirrhosis risk (OR = 2  
was no statistical significance.

Conclusion: Periodontal disease and tooth lo  
eases including NAFLD, elevated transamin

**KEYWORDS**  
cirrhosis, liver cancer, non-alcoholic fatty liver di

Bad Breath



### In Brief

Periodontitis leads to expansion of pathobiont members of the oral microbiota, which promote colitis via colonization of the gut as well as induction of migratory Th17 cells, constituting a dual microbiome and immune mechanism linking oral and gut health.

Hear  
Diseas

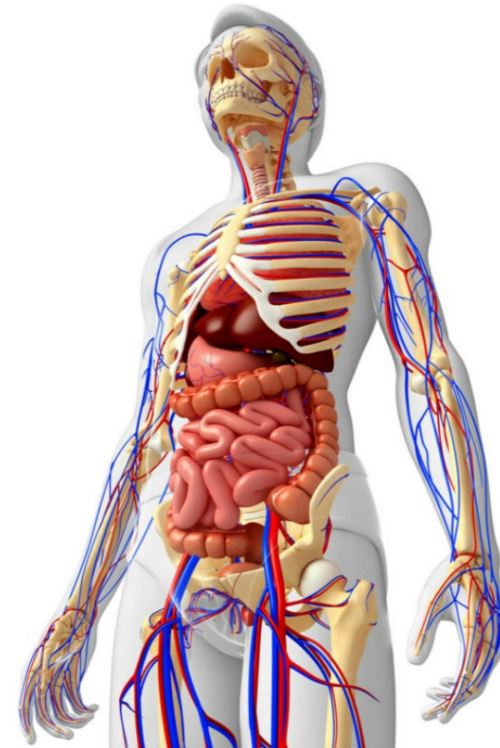
# Medicine and Dentistry: How to Undo an Illogical 150-Year Divide?

Sachin H. Jain **Forbes**: November 2018

## Imperatives for Integrating Dental and Medical Care

1. A new mindset
2. New clinical practice models.
3. New payment models
4. Improved “shared” information systems
5. Improved outcomes measurement

How to accelerate and remove barriers?



**Forbes**



# Integration of Dental Care and Medical Care: **When, Where?**

Who could have BOTH the medical and dental data?



*Inside Dentistry*, April 2021,  
Volume 17, Issue 1  
Published by AEGIS



## What are potential motivations and implications?



# Brings Shared Dental-Medical Health Record overcoming a key barrier!



- Columbia University Irving Medical Center has implemented Epic: 1<sup>st</sup> time that dental records for patients at the [College of Dental Medicine](#) will be part of an institution's electronic health record.
- *This single EHR means patients will have the most comprehensive look into their overall health.*
- Providers will deliver care to patients using an integrated medical-dental record that offers a full view medical history, allergies, medications, etc

**What are the possible  
implications and motivations?**

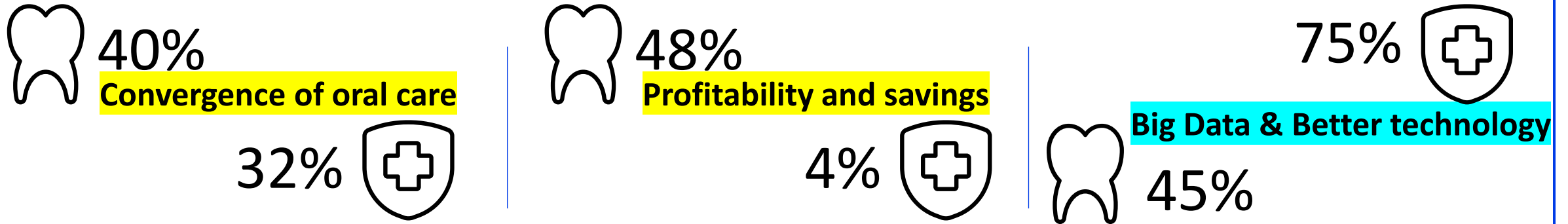




Survey: Embedding dental benefits in medical plans is on the way

### Driving Forces

What will drive the embedding of dental into health benefits?



96%

Of health care executives believe that embedding dental benefits in medical plans “is already happening or will happen eventually

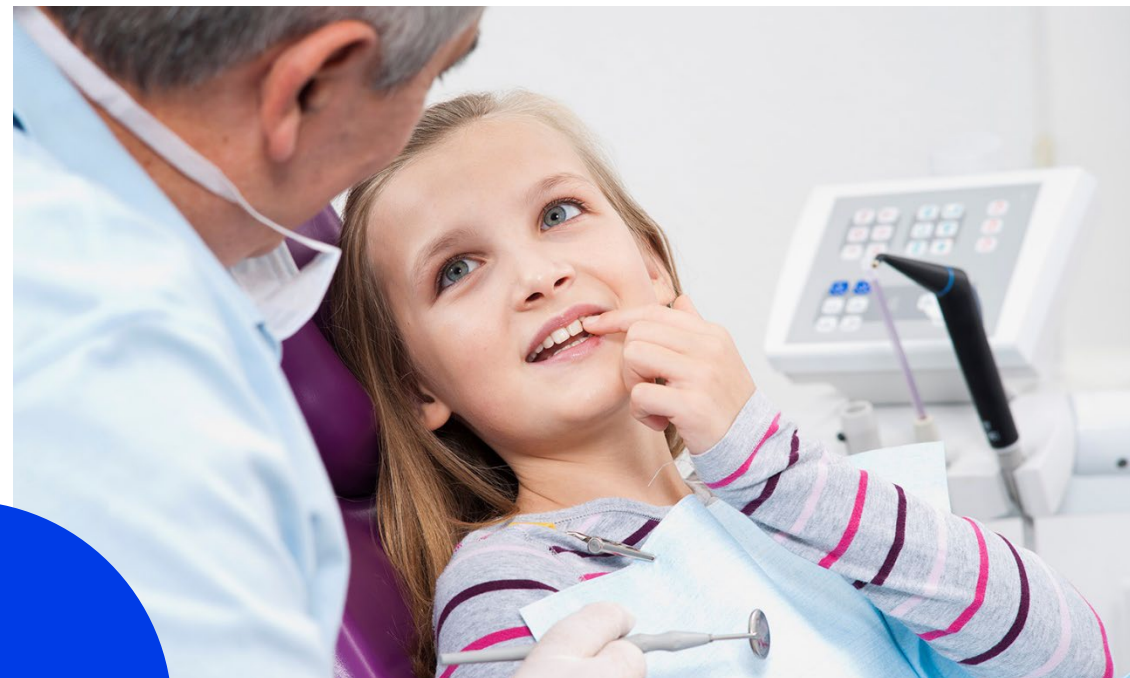


Oh by the way...



89% of young children see a pediatrician

VS.



1.5% dental professionals

What if ?

# Pediatrician a Hero for Kids' Dental Health

Dr. Amos Deinard, University of Minnesota Medical School

**StarTribune**

November 18, 2015

- Tooth decay is a silent epidemic in this country
- It doesn't kill a lot of people
- Kids miss school due to an infected tooth, pain so bad they can't study

## Pediatric Medical Groups Using Fluoride Varnish

- 20 HealthPartners clinics have offered fluoride varnish 6+ years
- 38 Fairview Health Services offer it
- Allina Hospitals and Clinics started offering it about a year ago
- HealthEast
- Mayo Clinic

Dr. Amos Deinard, University of Minnesota Medical School





# Aging and Medicated Population

## Oral conditions with aging population

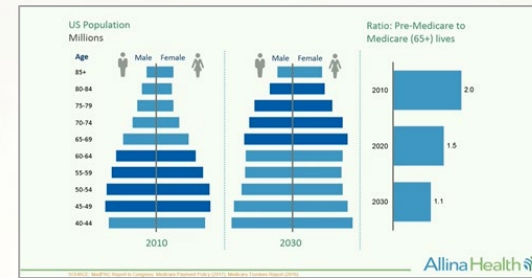
- Xerostomia
- Periodontal disease/Gingivitis
- Roots caries
- Halitosis
- Sensitivity
- Cracked tooth
- Oral cancer

## Need for alternative delivery models (products and services)

- Assisted living
- Caregiver/family
- Home care
- Mobile dental care

**Need for faster, easier caregiver friendly delivered products**

**Are these dental or medical issues?**



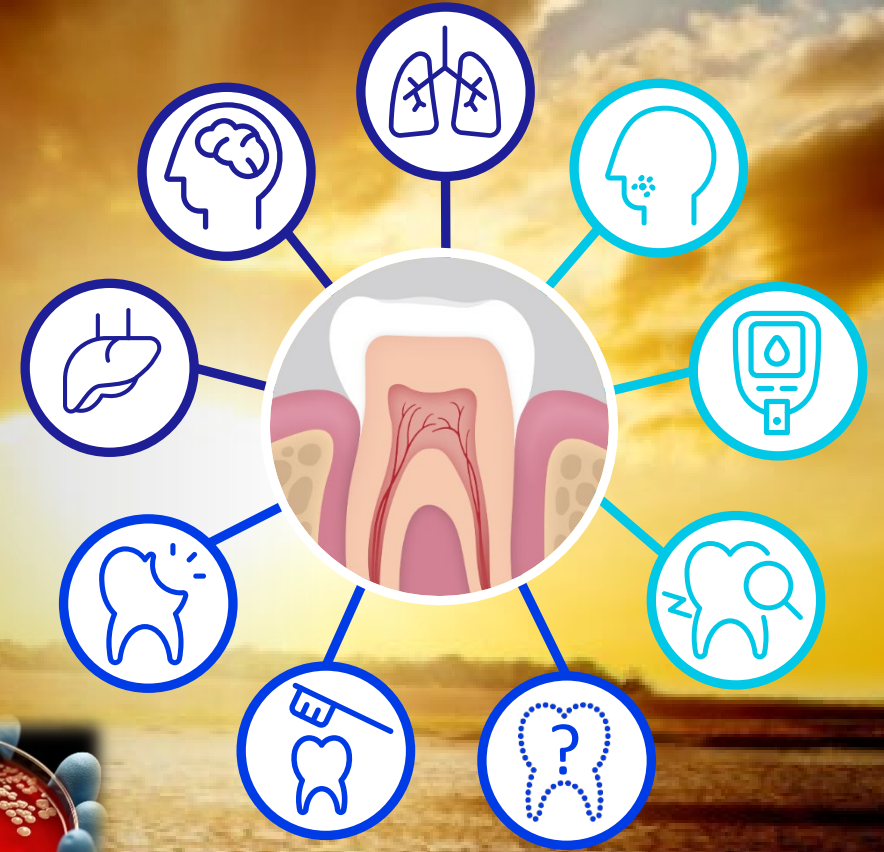


# Climate change and oral health?

D.M. Hackley, Int. Dent. J. Sept 2020

Harvard: Instructor in Oral Health Policy and Epidemiology

- Excessive heat exposure
- Poor air quality
- A lack of clean, safe water and food
- Extreme weather
- Vector-borne diseases
- Social factors
- Infectious disease (drug resistance)



What will be the unintended consequences?

# Aerosols in Dentistry....do we need to be concerned?

## How soon we forget!

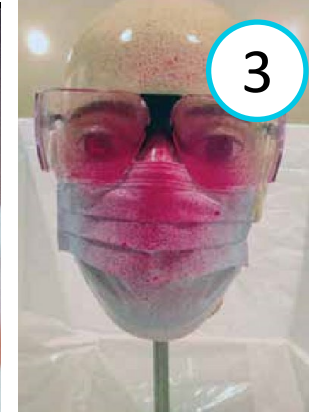
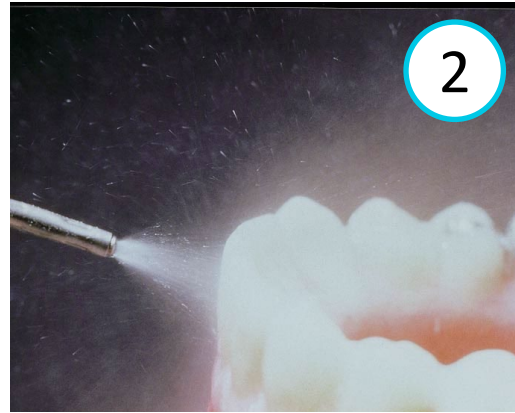
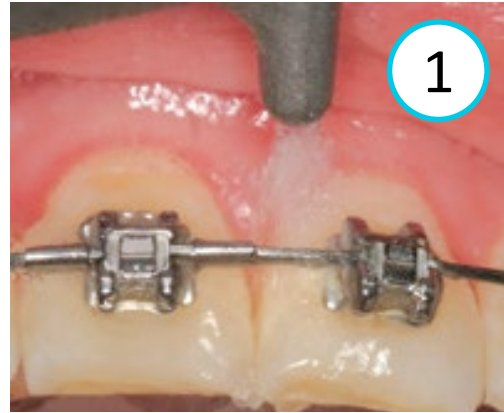
- Viruses
- Bacteria
- Fungi

## Interactions?



2/3 of dental services involve an aerosol procedure –

Mainly Fillings, Crowns and Hygiene Procedures<sup>1</sup>



Dental handpieces, ultrasonic scalers, air/water syringes and other high-speed instruments



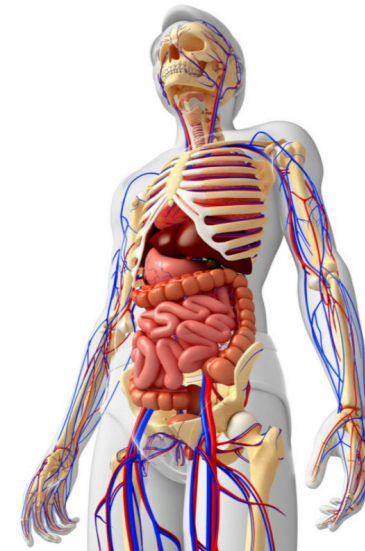
Figures: 1. Air polishing of braces 2. Air-water unit 3. Simulated dental procedure spatter<sup>2</sup> 4. Dental drill 5. Air-water unit 6. Ultrasonic scaler

# Five Trends That Will Impact Dentistry

May 2019, R Gawel



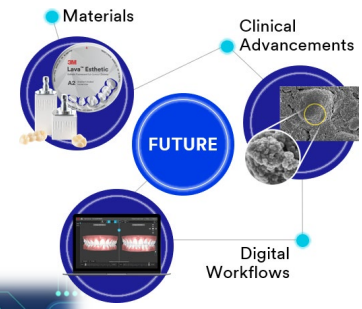
1. The Aging Population
2. Corporate Dentistry
3. The Dental-Medical Connection
4. Risk-Based Models: New models are emerging...**emphasizing preventive care**
5. A Focus on Quality and Value





# 10 Technologies that will shape the future of dentistry

The Medical Futurist, April 2022



1. Artificial Intelligence
2. Smart Toothbrush
3. Augmented reality
4. Virtual Reality
5. Teledentistry
6. Computer Assisted Design and 3D Printing
7. Intra-oral Camera
8. Regenerative Dentistry
9. CRISPR
10. Robotics
11. ????????????????????



“Growth and Comfort Cannot Co-Exist!”

Will You be the  
**Disruptor** or the **Disrupted**?

The National  
Academies of | SCIENCES  
ENGINEERING  
MEDICINE

What should you be doing to  
create your future?



