Advancing Oral Health for Older Adults

Report for 90-day Innovation Cycle

April – June 2019

Institute for Healthcare Improvement

westhealth

Intent & Aim

The West Health Institute (WHI) has conducted valuable research on the evolving market landscape for dentistry as well as the current state of dental training and practice specific to older adults. These efforts have surfaced important gaps in awareness, readiness, and capacity among dental providers to deliver high quality oral health care for older adults. The Institute for Healthcare Improvement (IHI) is honored to partner with WHI to delve more deeply into these gaps, identify high leverage opportunities to address them, source promising approaches currently underway, and create a "theory of change" that can be tested in the field.

This 90-day Innovation Cycle aimed to:

- Evaluate the oral health landscape for older adults;
- Identify opportunities to improve quality with a specific focus on the dimensions of safety, patient-centeredness, and equity;
- Surface exemplars and promising practices in the field; and
- Develop a potential set of recommendations (a sub-set of which will be built out in the next 90-day Innovation Cycle)

Background

America is aging with over 50 million adults aged 65+ currently living in the United States. By 2035, older adults will outnumber children for the first time in history.[1] By many standards, older adults experience better overall oral health status compared to previous generations. Fluoridation in water supplies began in earnest in 1944, and adults born after this time have benefited from the protection provided by fluoride.[2] Adults are reaching age 65 with more of their natural teeth than 65-year-olds in previous decades.[3] Life expectancy continues to trend upwards for adults who reach 65.[4] At the same time, the prevalence of chronic disease in older adults has increased.[5] The relationship between overall health and oral health status is well established – especially when considering the links between chronic oral infections and diabetes, heart and lung disease, and stroke.[6]

WHI and IHI decided to use a macro, meso, and micro level conceptual framework to structure the scope of inquiry. At the macro level, research focused on the opportunities and challenges presented by policy and payment. At the meso level, research focused on how oral health care is currently delivered to older adults. And, at the micro level, research focused on the experiences and behaviors of individual patients.

On a macro level (related to policy and payment), insurance coverage for older adults' oral health is limited. Older adults have access to preventive and chronic health care management through Medicare for health needs related to: inpatient hospital care, skilled nursing facilities, hospice care, lab tests, surgery, and home health through Part A; and doctor and other health care providers' services and outpatient care through Part B.[7] Medicare does not cover the majority of dental care – including preventative cleaning, fillings, tooth extractions, dentures,

dental plates, and many other dental services and supplies. Medicare does provide coverage for some medically necessary dental treatments (ie. tooth extractions are covered if extractions are necessary as part of a Medicare beneficiary's jaw reconstruction related to a car crash). [8] As a result, 65% of adults on Medicare do not have dental coverage and 50% have not seen a dentist in the previous year. [9]

The number of older adults living on low incomes who are dually eligible for Medicare and Medicaid is growing. [10] This population often has limited access to care and is living with generally poorer health status, including their oral health. [11] Medicaid plans, administered by states, are federally required to provide dental benefits for children, while coverage for older adults is optional. [12] This optional coverage for adults and older adults varies by state, with 14 states providing emergency-only coverage (relief of pain under defined emergency situations), 17 states providing limited coverage (fewer than 100 diagnostic, preventative, and restorative procedures; per-person annual expenditure capped at $1,000), and 17 states providing extensive coverage (comprehensive mix of services; more than 100 diagnostic, preventive, and restorative procedures; annual expenditure cap at least $1,000). [13] Taken together, a large majority of older adults who have limited means to pay for needed oral health care rely on out-of-pocket spending for their oral health needs or forego care altogether. [14]

On a meso level (related to the capability of practices and providers to deliver oral health care), the lack of adequate insurance coverage and reimbursement mechanisms is frequently noted as a major impediment for the dental delivery system to optimally address the oral health needs of older adults. Ensuring providers feel capable of attending to the oral health needs of older adults also seems ripe for improvement. Oral health students report feeling unprepared to adequately care for older adults' oral health needs, and there is a shortage of current dental providers with adequate skills to care for older adults. [15] Academic programs for geriatric dentistry are limited with less than 25% of dental schools in the US offering postdoctoral geriatric dentistry programs. [16]

As new care providers enter the workforce, many also cite the burden of student loan debt as an impediment to pursue career pathways outside of fee-for-service private practice.[17] Debt exceeding $100,000 at the time of dental school graduation was the most influential factor in the decision to enter private practice immediately after graduation.[18] Immediately after graduation, nearly 48% of graduating dental students plan to join a private practice, nearly 37% pursue a dental residency or internship, and only 2.5% plan to join Federally Qualified Health Centers.[19]

Once in practice, initial research by the West Health Institute concluded that comprehensive and holistic clinical guidelines for oral health care delivery to older adults do not exist. While some basic guidelines describing practice protocols for older adults exist, they do not provide adequate guidance related to older adults' clinical needs, such as how teeth change as adults age and the relationship between periodontal disease and medical comorbidities. [20] [21] There are some guidelines that aid providers in developing an oral health plan for older adults without providing specific guidance on care delivery. [22] The two most cited, OSCAR (Oral and dental needs, Systemic factors, Capability, Autonomy, and Reality) and the Seattle Care Pathway, were

developed to help providers consider a patient's functional status and how their ability to care for themselves outside of the clinic affects their care plan.[23] While limited information exists in the literature evaluating the utilization rate and effectiveness of these guidelines, there is a meaningful degree of belief amongst experts that they are useful tools to improve care for older adults.

The challenges presented by macro and meso level factors affect individuals at the micro level (related to the individual beliefs and practices of older adults and their caregivers). For older adults, advancements in population health management (i.e. water fluoridation) and improved medical care and maintenance (i.e. having access to dental benefits through private insurance before age 65) have created a need for on-going oral health care not seen by previous generations. In earlier eras, older adult dental care primarily involved denture care. Now, older adults are reaching age 65 with more of their natural teeth than ever before, and they have oral health needs related to maintaining a healthier mouth.[24] This maintenance is complicated by the fact that older adults are living with multiple comorbidities often involving several medications and treatment plans. For example, many medications increase the likelihood of experiencing dry mouth through limited saliva production which increases the risk of advancing tooth decay and oral infections.[25]

As older adults age, declining health and mobility as well as increasing social isolation all play an important role in the individual's ability to care for themselves.[26] Dependence on family or other caregivers in the home or in long term care facilities is common amongst older adults. Knowledge about oral health needs and required routine maintenance is vital for older adults to maintain good oral health.[27] Older adults recognize the importance of oral health as it relates to their overall health and often place meaningful value on the social impact of having a healthy and cosmetically appealing mouth. [28] Yet, impediments to accessing and navigating the dental delivery system and difficulty in maintaining overall health at home or in community settings leaves many older adults with fear or embarrassment which may keep them from engaging with the dental delivery system.[29]

Based on the macro, meso, and micro conceptual model, the IHI research team worked closely with the WHI team on the first of two 90-day Innovation cycles, the results of which are described in detail below.

Description of Work to Date

Between April and June 2019, the WHI and IHI teams collaborated to answer the following questions:

1) What are the major assets and opportunities to advance oral health care for older adults?
2) Where might WHI and IHI wish to focus in terms of the development of a results-oriented pilot initiative?

The IHI team engaged in the following activities in collaboration with WHI:

- A review of the peer reviewed and gray literature.
- Expert interviews with 25 individuals representing 18 organizations in various roles related to oral health (Table 1).
- The development of an initial driver diagram to articulate a theory of change to advance oral health for older adults.
- The development and execution of an expert meeting at the IHI on June 20th to test the initial theory of change and recommendations. A list of attendees is included in Appendix A.
- Regular conference calls to check in on progress as well as discuss and refine evolving theories.

Table 1. Expert Interviewees

Name	Organization
Karen Lewis, BS, CHES, Senior Program Officer **Dianne Riter**, MPH Senior Director, Strategy and Evaluation	Arcora Foundation
Michael Helgeson, DDS CEO	Apple Tree Dental
Talbot Fucci, DDS Dentist	Dental Aid (comprehensive, reduced-fee oral health provider)
Douglas Berkey, DMD, MPH, MS Professor Emeritus	University of Colorado School of Dental Medicine
W. Michael Boyson, MHA Colorado State Program Director	Telligen Quality Innovation Network-Quality Improvement Organization
Judith Jones, DDS, MPH, DScD Emeritus Professor of General Dentistry Assistant Dean for Faculty Development Director of Center for Clinical Research	Boston University Henry M. Goldman School of Dental Medicine

Prasida Khanal, BDS, MPH State Oral Health Director **Linda Maytan**, DDS, MPH Dental Policy Director	Minnesota Department of Health
Paul Mulhausen, MD, FACP, AGSF Chief Medical Officer	Telligen Quality Innovation Network-Quality Improvement Organization
John Yamamoto, DDS, MPH Vice President, Professional Services	Delta Dental of California
Ethan Kearns, DDS Chief Dental Officer Dentist	Salud Family Health Centers (FQHC)
Leslie Pelton, MGA Senior Director, Innovation Lead, Age-Friendly Health Systems	Institute for Healthcare Improvement
Andrew Scholnick, MA Senior Legislative Representative	AARP
Irene Hilton, DDS, MPH Dental Consultant Staff Dentist	National Network for Oral Health Access Dental Consultant (FQHC)
Kristen Simmons, RDH, MHA Chief Operating Officer Registered Dental Hygienist	Willamette Dental
Andrea Hight National Director, Community Health	Henry Schein Special Markets
Ed Hedblom, PharmD Director, Evidence and Access **Matt Cooper**, MD, MBA, FACS Global Senior Medical Director Director, Patient Safety	3M
Eric Farrell, MS Senior Director of Marketing **Nathan McHugh** Marketing Manager	Stryker-Sage
Kedar Mate, MD Chief Innovation and Education Officer **John Whittington**, MD Senior Fellow Faculty **Pat Rutherford**, RN, MS Vice President	Institute for Healthcare Improvement

Summary of Learnings from 90-day R&D Cycle

Overview

Opportunities exist at the macro, meso, and micro level to enable the dental delivery system to better meet the needs of older adults. As noted above, the macro level is defined as working within existing policy and payment systems. The meso level is defined as the ways oral health care is currently delivered to older adults. And, the micro level is defined as working with the experiences and behaviors of patients.

The current dental delivery system was neither planned nor designed – it evolved over time as a reactive approach to treat existing problems.[30] This approach does not effectively address the care needs of many populations, especially older adults, and results in profound inequities in oral health access and outcomes nationally that leave racial and ethnic minorities as well as people living on low incomes behind. Due to limited insurance coverage and payment options, dental providers are not easily incentivized to provide care and older adults have limited options in seeking care at the appropriate time. Additionally, specialized education and training in geriatric dentistry is limited and the existing oral health care workforce is significantly under-prepared to care for the unique needs of older adults.

There are several opportunities to improve the way older adults access and receive oral health care including: working with the oral health providers to increase familiarity and comfort working with older adults, understanding and spreading best practices in care delivery, and increasing the education and capability of older adults in maintaining their oral health. These improvements may require care to be delivered by more flexible care teams and in more flexible environments as well as changes at the macro, meso, and micro levels.

Macro Level

Nearly 65% of people age 65 and older do not have dental insurance.[31] Most older adults lose dental coverage as they transition from private, employer-based insurance to Medicare, which does not provide comprehensive or preventive dental coverage. Some older adults can enroll in one of many Medicare Advantage plans through Medicare Part C. These plans are designed and offered by private insurance companies that determine the extent of oral health coverage in their plans.[32] If older adults opt-in to a Medicare Advantage plan with dental coverage, they must pay out-of-pocket to cover the plan's monthly premium.[33] Over 20 million older adults are enrolled in a Medicare Advantage plan, and 62% of them have access to some form of a dental benefit.[34]

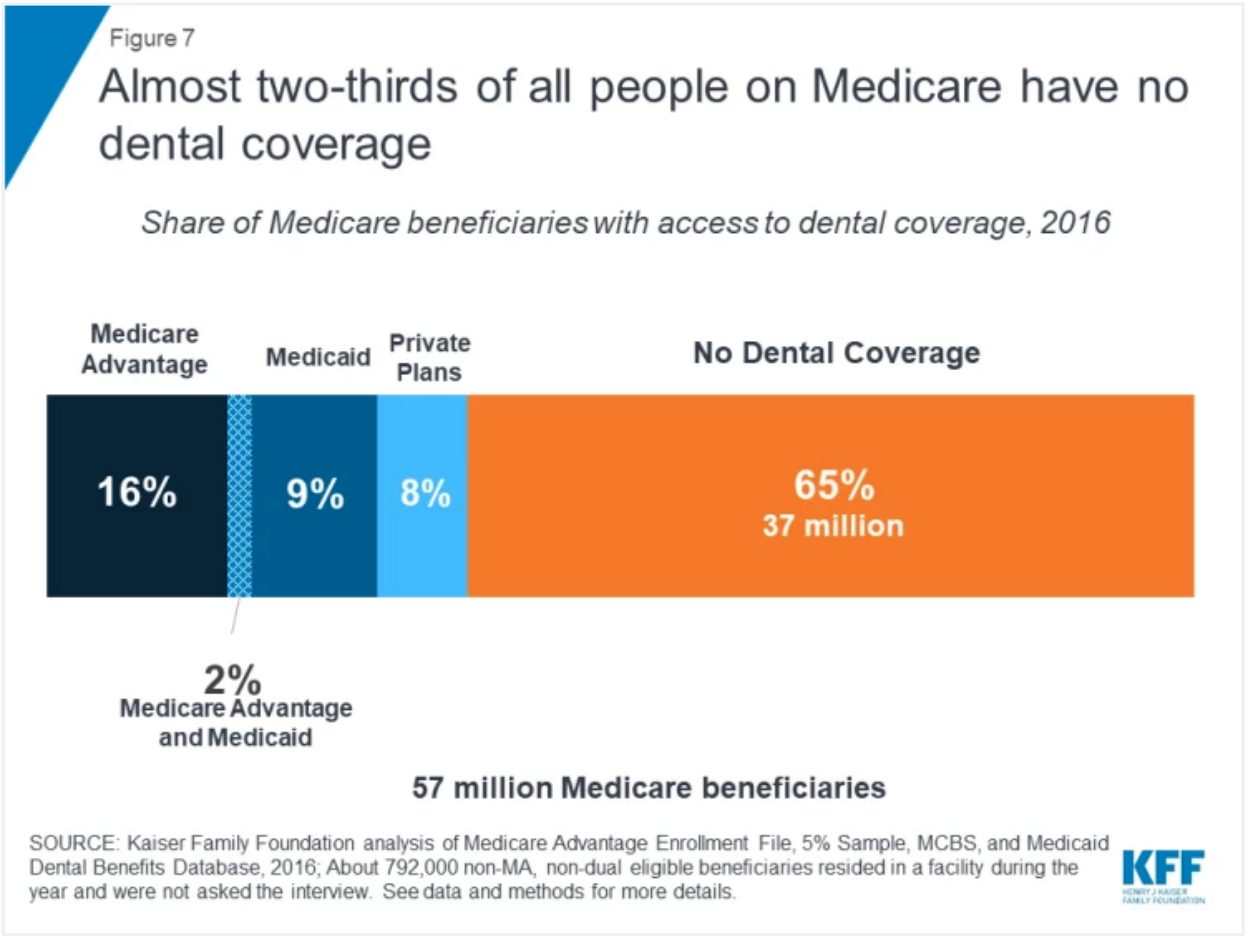


Figure 7: Almost two-thirds of all people on Medicare have no dental coverage

This lack of coverage has a meaningful impact on patient behavior – half of older adults have not seen a dentist in the previous 12 months,[35] and older adults rely on emergency departments for preventable or non-emergency oral health needs.[36] When stratified by race and ethnicity, income, or health status, the situation worsens and reflects significant inequities in access and utilization. The figure below shows that, while half of the overall population of Medicare beneficiaries did not visit a dentist in the previous 12 months, 71% of black beneficiaries and 65% of Hispanic beneficiaries did not have a visit compared to 43% of white beneficiaries. For Medicare beneficiaries living on annual incomes less than $10,000, 70% did not have a dental visit while only 27% of beneficiaries living on more than $40,000 did not have a visit. Finally, 63% older adults with poor or fair health status did not visit a dentist in the past year compared to 37% of beneficiaries with very good or excellent health status.[37]

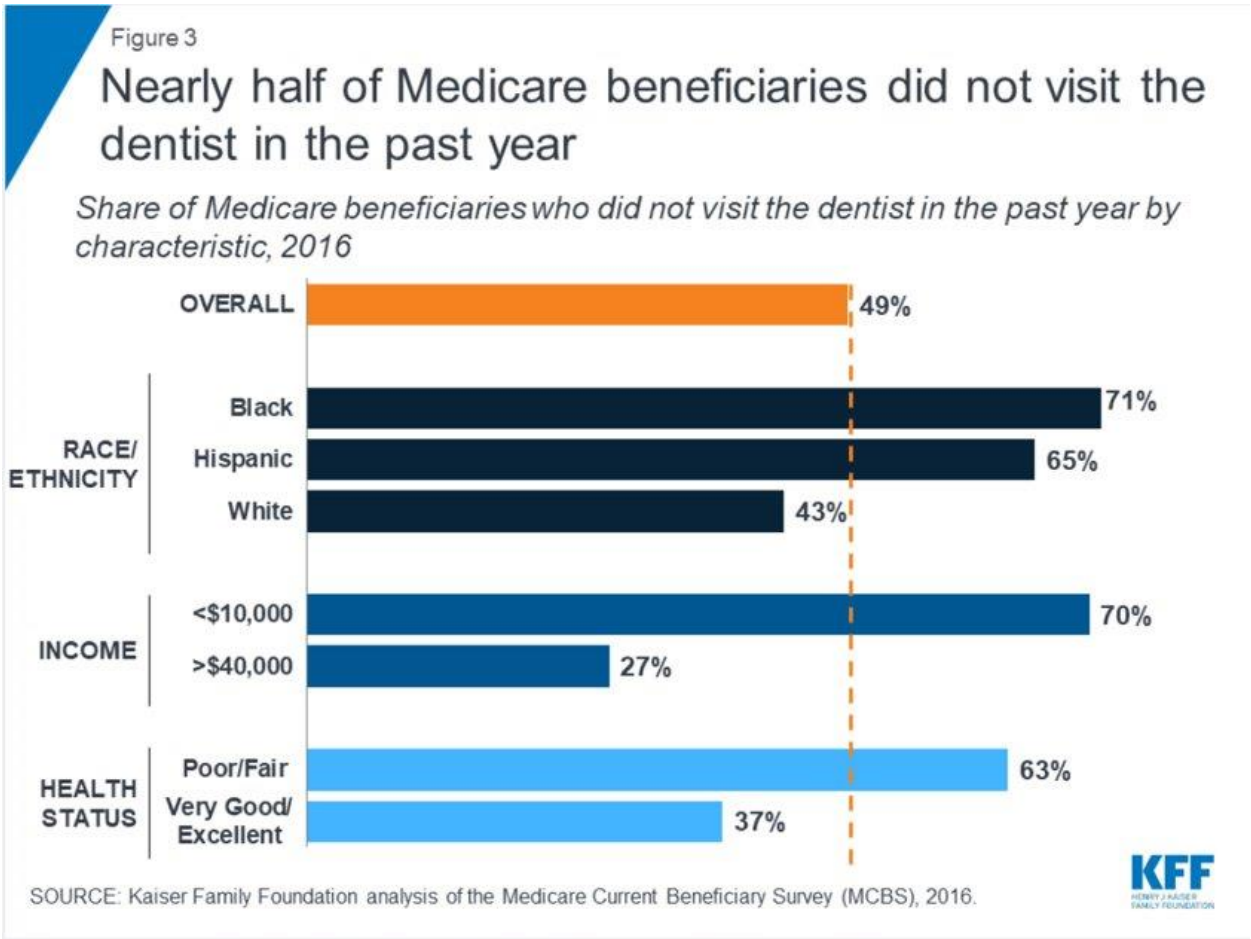


Figure 3: Nearly half of Medicare beneficiaries did not visit the dentist in the past year

Adding dental benefits to Medicare coverage requires statutory changes within the Social Security Act at a regulatory level (i.e. changing the law), and there is a growing coalition of organizations interested in supporting a legislative change.[38] Some advocates see an opportunity to expand the definition of “medically necessary” to provide some additional coverage for dental services that are not currently considered “medically necessary” by the Centers for Medicare and Medicaid Services. Expanding the definition of "medically necessary” to include preventive oral health care for dental conditions related to other health needs (i.e. addressing dental infections and oral bacteria associated with increased risk of sepsis after cancer treatments; managing periodontal infections associated with diabetes management) could save nearly $64 billion dollars over ten years in Medicare spending.[39] [40]

For adults who qualify for both Medicare and Medicaid (i.e. adults older than 65 who generally receive Supplemental Security Income), approximately 62% have access to some dental coverage. However, adults who are only eligible as partial duals (i.e. adults older than 65 who access a Medicare Savings Program based on income between 100% and 200% of the Federal Policy Limit) have no coverage at all.[41] [42] If coverage is provided, states determine the dental benefits covered through Medicaid.[43] This coverage varies as seen in the table below – 14 states provide emergency only coverage for the Medicaid Base Population (MBP) and 6 of those 14

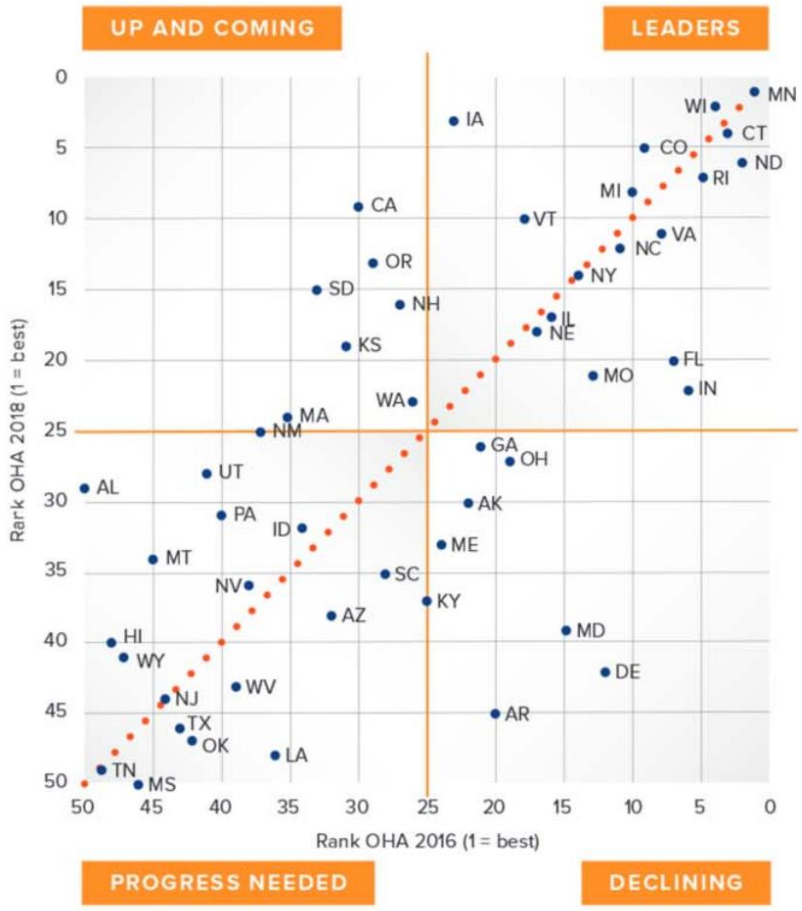
states provide emergency only coverage for the Medicaid Expansion Population (MEP); Limited coverage is provided for MBP in 17 states and for MEP in 10 of those 17 states; and Extensive coverage is provided for MBP in 17 states and for MEP in 14 of those 17 states.[44] With each state determining what services are covered, determining utilization and outcomes patterns for the Medicaid population must be undertaken on a state by state basis.

EXHIBIT 1: State Medicaid Coverage of Adult Dental Benefits by Type of Beneficiary Population (Base or Expansion)[16]

Dental Benefits Category	Offered to Medicaid Base Population	Offered to Medicaid Expansion Population
No dental benefits	3 states: AL, **DE**, TN	2 states: DE, ND
Emergency-Only	14 states: **AZ,** FL, GA, **HI**, ID, ME, **MD**, MS, **NV**, **NH**, OK, TX, UT, **WV**	6 states: AZ, HI, MD, NV, NH, WV
Limited	17 states: **AR**, **CO**, **IL**, **IN**, KS, **KY**, **LA**, **MI**, **MN**, MO, NE, **PA**, SC, SD, **VT**, VA, WY	10 states: AR, CO, IL, IN, KY, LA, MI, MN, PA, VT
Extensive	17 states: **AK**, **CA**, **CT**, **DC**, **IA**, **MA, MT**, **NJ**, **NM**, **NY**, NC, **ND**, **OH**, **OR**, **RI**, **WA**, WI	14 states: AK, CA, CT, DC, IA, MA, MT, NJ, NM, NY, OH, OR, RI, WA
Notes: Bolded states expanded Medicaid eligibility under the ACA. DC is included as a state. North Dakota offers different categories of benefits to its Medicaid base vs. expansion populations. Idaho offers limited Medicaid dental benefits beyond emergency care to pregnant woman and adults with disabilities and/or other special health care needs. Maryland's contracted managed care organizations provide a limited dental benefit to adult Medicaid beneficiaries who are enrolled in managed care.		

Source: Center for Health Care Strategies, Inc. January 2018

Given the limited support in the form of Medicare insurance coverage for older adult oral health at the federal level, state approaches to policy and payment provide a meaningful source for comparing macro approaches to advancing oral health for older adults. Oral Health America (OHA) provided state-level analysis over time for state level approaches to oral health for older adults.[45] Over the last 16 years, OHA has published four volumes of *A State of Decay* comparing the status and approach to oral health for older adults between states. States were ranked on three policy elements (existence of a State Oral Health Plan; inclusion of SMART Objectives – specific, measurable, achievable, realistic, and time-scaled; and existence of a developed Basic Screening Survey). These policy measures were combined with population health statuses measured on three variables (individual data on severe tooth loss; dental visits in the last year; community water fluoridation) with consideration for socioeconomic variables. By tracking the performance of states over time, there are key learnings from states that consistently perform well as well as from states that make significant improvements over time.



Source: Oral Health America, 2018 – Comparison of state rankings in 2016 and 2018 based on Oral Health America's *A State of Decay* evaluation.

For example, Alabama ranked at the bottom of all states in the previous studies conducted in 2013 (tied for 48th) and 2016 (50th). Between 2016 and 2018, Alabama jumped to 29th by developing a State Oral Health Plan with SMART objectives in 5 areas: increasing access to oral health care, improving professional education and integration, improving health literacy, capturing better data and surveillance capabilities, and focusing on prevention of oral disease. To increase access, the state engaged several stakeholders and used grant funding, to bring portable dental equipment to meet the needs of the most underserved patients where they were – in homes for bedbound patients and in communities and rural environments for areas with limited oral health facilities. Moreover, these efforts intentionally engaged dental students to deliver care in rural senior centers across the state to provide oral health education, dental screenings, and cleanings. These efforts stressed the importance of connecting older adults to appropriate care at the appropriate time as well as exposing dental students to the needs and care for older adults early in their careers.

Oral Health America makes specific macro-policy level recommendations for improved oral health for older adults. Their recommendations include:[46]

- Reinstate, establish, or maintain an extensive adult Medicaid dental benefit
- Integrate comprehensive dental coverage in Medicare
- Sustain or expand community water fluoridation
- Conduct basic screening surveys of older adults in all states
- Include specific objectives for older adults in all state oral health plans.

States that adopt the recommendations proposed by Oral Health America tend to see improvements in their rankings relative to other states.[47] Establishing an understanding of the status quo within a state – through State Oral Health Plans and Basic Screening Surveys – gives departments of health a baseline to set goals for improvement. Based on tracking of state's performance over time by Oral Health America, and verified by experts in the field, these changes result in improvements at the population level.[48] This is especially true for rural populations as seen in the efforts of Alabama who focused their efforts to improve access on getting mobile care to communities in need.

Additionally, organizations like the Oral Health Progress and Equity Network (OPEN) serve as a convening entity to bring stakeholders together in pursuit of improved oral health for all populations with a specific goal to include a dental benefit in publicly funded health coverage through Medicare and increasing the number of states offering an extensive dental benefit through Medicaid to 30. OPEN partnered with DentaQuest in pursuit of establishing enhanced benefits for older adults and has brought together key national organizations including the American Dental Association, Center for Medicare Advocacy, Families USA, Justice in Aging, and the Sante Fe Group to describe what an extensive benefit might look like and how it might be financed.[49] This coalition continues to seek legislative partners to achieve their goal.

Given the influence of macro level factors on the ability of older adults to access and receive oral health care, WHI may wish to consider ways in which their substantial policy and research efforts can assess, highlight, and amplify payment and policy related improvements at both the state and federal level associated with improved oral health for older adults.

Meso Level

Factors at the meso level reflect the conditions that enable or inhibit both oral health care providers and the systems within which they deliver care to be optimized to care for older adults. Exploration as to the extent to which providers are knowledgeable and capable of caring for this population suggest opportunities for improvement.

As described above, students receive limited exposure and training on the unique oral health needs of older adults during dental school and residency, which may influence the direction oral

health professionals take early in their careers.[50] While 100% of dental schools offer some form of didactic geriatric curricular content, the typical dental program only offers an elective didactic course on geriatric dentistry taught by a faculty member with an interest in aging.[51] Additionally, the faculty teaching geriatric dentistry have varied training and clinical experiences and the curricula across programs varies significantly – over 30% of programs report no geriatric clinical component in their available curriculum.[52] For those that do include clinical components, the most common approach includes visiting a nursing home for oral cancer screenings, basic oral examinations, or denture adjustments for residents in the facility.[53] Comprehensive clinical training for older adult oral health needs is uncommon. Enabling providers to better care for the unique and evolving oral health needs of older adults would benefit from improving positive perceptions of older adults through increased proximity and tailored training. [54]

The University of Iowa first offered an elective geriatric dentistry program in 1973 and has grown their program for the last 46 years which is now an integrated component of the dental curriculum. Based on its history, the University of Iowa recommends several concepts that can be adapted by any dental education program:[55]

1. Geriatric dentistry is multidisciplinary in nature. Geriatric dentistry programs should be managed by representatives from multiple departments within a university.
2. Didactic geriatric content needs to be integrated into all relevant clinical departments as part of an aging curriculum
3. Senior leadership should manage the direction of undergraduate dental programs leading in to graduate level programs.
4. Students need adequate educational preparation regarding the biological, psychosocial, and medical aspects of older adults
5. Students must display competency on technical dental skills before engaging with older adults
6. Students must have sufficient clinical time with older adults to gain skills in assessing needs and developing appropriate care plans
7. Faculty who teach in these clinics need both academic expertise and clinical experience with older adults. Faculty training should include at least 1 year of clinical fellowship in geriatric dentistry

Many dental care practices are reluctant to care for the older adult population in their clinics because of limited comfort dealing with the care needs unique to older adults, citing concerns related to their ability to adequately assess chronic illness, and adjust treatment based on physical health conditions.[56] Many providers are less familiar with the unique circumstances facing older adults in their oral health maintenance. Older adults take more medications which often complicate oral health, older adults' ability to engage in daily care may be affected by chronic conditions like arthritis, and the general oral health status and condition of teeth for older adults are all meaningfully different than a younger population.[57] Care needs that are unique to older adults also include:[58]

- Nutrition and how it relates to oral care – poor oral health can make eating difficult, which makes it difficult to maintain overall health through appropriate caloric intake. This is especially complicated for older adults who are dependent, living with comorbidities, and are missing many teeth.
- Changes in salivary glands and secretion – aging is correlated with decreased saliva production. The decline can be accelerated by medications that include dry mouth as a side effect.
- Changes in oral mucous membrane – the oral mucous membrane performs essential protective functions for overall health, and the membrane naturally declines as people age.
- Changes to teeth as people age – wear and attrition affect the health and form of teeth, and appearance changes take place over time.
- Periodontal disease – frequency of disease increases with age and the ability of the body to resist oral infection and disease development decreases over time

And, in addition to these physiological issues, socio-demographic factors (ie. place of residence, education, income, race, gender, etc.) play a meaningful role in older adults' interactions with the dental delivery system.

Beyond the comfort and capability of an individual provider, effectively caring for older adults requires a team approach to ensure appropriate and comprehensive care for patients with complex medical and dental needs. Many dental care practices are reluctant to care for the older adult population in their clinics because of limited comfort dealing with the care needs unique to older adults, citing concerns related to their ability to adequately assess chronic illness, and adjust treatment based on physical health conditions. Additionally, dentists are highly trained technical experts with a focus on providing the highest quality of care to each of their patients. Often, this results in treatments that are designed to best serve a patient population that reflects the activity level, expected years of life remaining, and payment options of younger, healthier, and more active adults. This "gold standard" approach is far removed from a more "functional standard" of care delivery that takes into consideration the context of an older adult's life in terms of activity level and their individual goals and resources.

Nationally, the PACE program may present an opportunity for meeting the oral health needs for many older adults. PACE provides integrated and coordinated care to adults older than 55 who are enrolled in Medicaid, are certified to need nursing home care, and can live safely in the community. As of March 2019, there are 260 PACE centers operated by 126 sponsoring organizations. Nearly 50,000 older adults are enrolled for PACE services, [59] and nearly 90% of participants are dually eligible for Medicare and Medicaid.[60] As a service delivery mechanism, PACE centers do not reach all available enrollees that could be served by the system as there are at least 7 million older adults on Medicaid who may be eligible for enrollment in a PACE program.[61]

A representative sample of PACE participants showed that 89% of all dental and medical visits at a PACE site were for basic, routine care – only 8% were for urgent issues and only 3% were for

emergent issues.[62] However, the National PACE organization does not mandate oral health care as part of the service package and not all centers provide oral health care. There is evidence that incorporating dental services into PACE centers results in better experience and oral health for older adults.[63]

At the On Lok PACE center in San Francisco, California, a multidisciplinary team cares for the members of the program.[64] This team includes primary care providers, registered nurses, pharmacists, social workers, a dietitian, and dentists, among many others. The On Lok PACE center provides services covering all dental procedures, and outside referrals to specialists when deemed necessary. These services are covered by the monthly capitated payments from CMS to the PACE center. Their approach places a strong emphasis on preventive and restorative care, including frequent follow-up, which results in a relatively low percentage of dental visits for urgent and emergent needs.[65] The approach relies on:

- An initial assessment of each PACE participant within 3 months of enrolling in the program
- Annual dental evaluations
- Standard dental evaluations made by the interdisciplinary team at routine visits for non-dental care
- Home-care workers, transportation, and care aides available to ensure patients have access where they are or transportation where they need to be.
- When urgent and emergent care needs arrive, the interdisciplinary team triages to the appropriate service team within the PACE center. If care needs require treatment outside of the PACE environment, the interdisciplinary team facilitates transportation and coordination of the appointment for the PACE participant.

Through this approach, PACE participants at On Lok have an improved experience of care related to oral health needs and avoid unnecessary emergency department visits to address acute oral health needs.[66]

The Seattle Care Pathway provides another promising approach to advancing oral health for older adults.[67] In 2013, over 100 clinicians and researchers across multiple areas of health care joined a conference to review, assess, and update evidence for maintaining the oral health of older adults. The conference participants developed a set of recommendations describing a care pathway for oral health and older adults. This pathway relies on an approach that is responsive to specific segments of the older adult population defined by their level of frailty. Generally, the concept of frailty refers to a "state of increased vulnerability to stressors due to age."[68] To make this concept more meaningful, the pathway describes frailty through levels of dependency:

- no dependency (levels 1 and 2)
- pre-dependency (level 3)
- low dependency (level 4)
- medium dependency (level 5)
- high dependency (levels 6 and 7)

The pathway then describes a sequence of actions that can be taken with specific instructions at each level of dependency. These actions are divided into four categories: Assessment, Prevention, Treatment, and Communication. Given the number of contributors and the areas of health care represented in developing this pathway, an opportunity exists to increase adaptation of the pathway to provide clinicians with a conceptual framework to approach older adult oral health care. The Seattle Care Pathway is in the early stages of adoption and is strongly endorsed by experts and professionals who have applied it.

The OSCAR approach is another planning tool to develop a tailored care plan for older adults. First described by Kenneth Shay, Director of Geriatric Programs at the Veteran's Administration in the Greater Detroit Area, OSCAR helps oral health care providers get a full accounting of the many factors that could impact an older adult's potential course of treatment.[69] The process addresses:[70]

- **O**ral and dental needs evaluation
- **S**ystemic factors related to age changes, medical diagnosis, medication reconciliation, and interdisciplinary communication
- **C**apability assessment to understand an older adult's ability to participate in self-care and routine maintenance
- **A**utonomy assessment to understand an older adult's cognitive ability to consent to services and treatment plans as well as evaluate an older adult's level of dependence
- **R**eality assessment to understand an older adult's prioritization of oral health, financial limitations, and expectations on functional goals and standards

SMILES Dental Project is a virtual dental home program that operates in four rural and one urban location across Colorado and focuses on reducing or eliminating barriers to care by integrating dental hygienists into community spaces. SMILES deploys portable dental equipment and dental hygienists in the community at locations frequented by older adults, such as PACE, senior centers, and congregate meal sites. Tele-health technology is utilized for communication and review between a remote dentist and the hygienist in the field. Over 24 months, there were 8,228 visits across SMILES sites with 50% of those presenting having zero dental visits in the prior year. 84% of patients successfully completed dental referrals after engaging with the SMILES program. The program was successful in part due to collaboration between and focused training of care providers, setting realistic care plans for older adults, establishing leadership buy-in for the approach, and selecting the partner sites who were interested in trying new approaches to deliver care. The challenges included billing for older adults, setting the right expectations for care teams and clinics, and identifying the right partner sites and advocates for the program.

Another approach, from InterDent, focuses on increasing the ability of dental providers to address social determinants of health through effective case management and care coordination through a program called Capitol Dental. The team is currently piloting a screening program for food insecurity and food bank referrals. Case managers assist members – including older adults and other populations in need – in obtaining housing, increasing access to food, improving

safety and security, increasing access to transportation, and gaining access to education. Providers are also trained and comfortable using Silver Diamine Fluoride, one of the clearest interventions to prevent and arrest caries.[71] Additionally, the Capitol Dental program utilizes registered dental hygienists (RDH) in an expanded practice, teledenistry model. The program is in its early piloting stages and faces barriers to entry in partnering with retirement homes and other long-term care facilities. However, results from Capitol Dental's efforts with children and initial assessment from program stakeholders provide reasons to be optimistic for the direction of this effort.

Each of these examples provides insight into ways the dental delivery system can more appropriately meet the oral health needs of older adults. At the meso level, the most impactful opportunity lies in helping dentists and other oral health providers develop strategies to more effectively accommodate older adults in their care practices and/or to more effectively bring care to older adults in settings where they reside or visit regularly. There are three main takeaways for further consideration:

1. The delivery system must connect with older adults proactively. This can be done with a centralized location delivering routine and preventive care similar to a PACE center, or it can be done by bringing care directly to older adults through virtual dental homes and teledentistry
2. Interdisciplinary care teams are best prepared to effectively address the wide range of needs of older adults.
3. Providers across the interdisciplinary care teams should be trained on older adult oral health needs throughout their education and careers.

Micro Level

At the micro level, beliefs and practices of older adults and their caregivers affect the ability of individuals to effectively manage their oral health. Many adults are unaware of the changes in coverage, health status, and care needs they will face as they enter older adulthood. Generally, older adults have a basic knowledge of routine oral health procedures and recommendations. However, their knowledge of issues related to periodontal disease is limited.[72] This limited understanding, combined with payment related obstacles to accessing care, often leaves older adults relying on emergency department visits to receive treatment that would be better delivered in other settings.[73]

The health status of older adults presents a paradoxical challenge. Baby boomers are the first generation to benefit from water fluoridation and have maintained more of their dentition than previous generations. About 15% of the Medicare population have no natural teeth.[74] This is a considerable improvement compared to previous generations when, for example, in the late 1950s, 55% of adults aged 65-74 were edentulous.[75] While edentulism has decreased, risk to oral health and additional oral health needs have increased for older adults overall.[76] Nearly all adults have had a cavity, 20% have untreated tooth decay, and nearly 70% of older adults have gum disease.[77] Some of this is attributable to longer life expectancy for adults and extended

duration of living with chronic disease. At the same time, many adults are unaware of the changes in coverage, health status, and care needs they will face as they enter older adulthood.

Additionally, as coverage continues through Medicare for medical conditions and not dental needs, many older adults begin forming habits and conceptions about what is and is not necessary to maintain their oral health and overall health as they age. Interacting with older adults while they are healthy and engaging them with education and behavioral coaching can influence their routine care behaviors. Physical conditions common amongst older adults (i.e. osteoporosis, arthritis) make it difficult for older adults to practice good oral hygiene.[78] Many experts recommend adaptive resources such as electric toothbrushes, and easy to use flossers to assist older adults in home care, even as mobility may decline.[79]

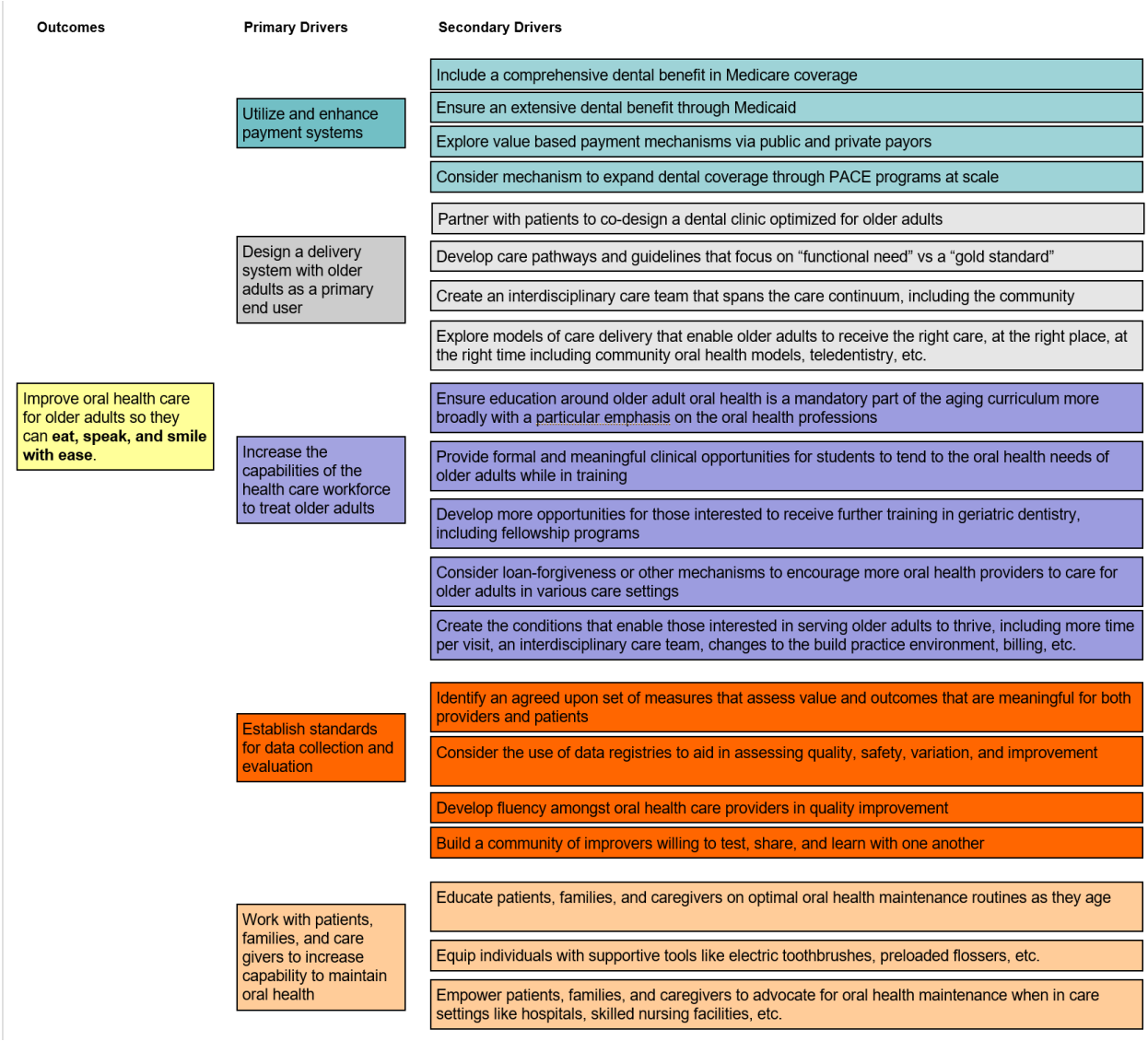
Finally, there appears to be a meaningful connection between aging, declining oral health, and social isolation and loneliness. Older adults with at least one oral health issue were 2.25 times more likely to report feelings of loneliness compared to adults without any oral health issues.[80] This association holds when controlling for demographic and socioeconomic factors like gender, cohabitating status, educational qualification, and wealth. Additionally, the relationship between oral health status and appearance (ie. missing and dis-colored teeth) and social engagement of older adults stood out in several interviews during this research process. Even the application of Silver Diamine Fluoride (SDF), which has one of the strongest evidence bases for use to arrest and prevent caries, can be resisted by patients due to the unavoidable side effect that SDF turns teeth black after application.[81] Any approach to engage older adults should take social isolation, loneliness, and the self-esteem and well-being of older adults in to consideration.

Taken together, the evidence and learning from the literature review, expert interviews, and expert meeting formed the basis of a theory of change and a set of recommendations for the WHI team to consider for prioritization leading in to the second Innovation Cycle with IHI.

Initial Theory of Change

The need to develop a person-centered approach to support older adults with their oral health care needs was a consistent theme in the literature review, interviews, and expert meeting. This was coupled with guidance to move from what may be considered a “gold standard” for certain populations to a “functional standard” that accounts for “what matters most” to older adults. The three primary goals surfaced were related to enabling older adults to eat, speak, and smile with ease. Our initial theory of change, with this aim, is represented in the following driver diagram.

Driver Diagram: Advancing Oral Health Care for Older Adults



The primary drivers – the elements that contribute directly to improving oral health for older adults – relate to payment, delivery system, workforce development, data, and patient and family engagement. Each of these primary drivers is associated with a set of secondary drivers – that are components and natural influencers of the primary drivers – related to the macro, meso, and micro levels with differing degrees.

Underlying the entire theory of change is a desire to build a movement of oral health professionals capable and willing to advance oral health for older adults. This may require macro level changes to broaden insurance coverage and create financial motivators for change. It will require committed and engaged leadership, willing to create the systems, processes, and cultural changes necessary to ensure practices, and the providers within it, are able to receive and care for older adults in the right way, in the right place, and at the right time. And it will

require deeper engagement with older adults and their caregivers to build care pathways based on functional needs and ensure older adults are aware of and capable of attending to their oral health needs over time. For a list of preliminary change ideas, please see Appendix B.

Utilize and Enhance Payment Systems

The biggest obstacle described in the literature, in expert interviews, and during the expert meeting centered around issues of payment. Lack of coverage and services requiring out of pocket payments often prevent older adults from seeking care until the acuity of their condition advances to urgent or emergent status. Limited avenues to reimburse for services from major payors disincentive many practices from making care delivery changes necessary to optimize care for older adults. Yet opportunities exist to better connect older adults to services within the existing payment environment while seeking broader policy and regulatory changes.

Design a Delivery System with Older Adults as a Primary End User

A care delivery system designed to optimize care for older adults requires paying careful attention to the needs, values, and preferences of older adults over time and understanding the best individuals and settings to meet those needs. This may include broadening notions of the care team to include those other than dentists and dental hygienists and considering settings outside of dental practices or clinics. Many of the most promising approaches discussed in this Innovation cycle involve multidisciplinary care teams where individuals who are not necessarily licensed as dentists are intentionally deployed in community- and home-based settings to deliver oral health directly to older adults. Additionally, there are opportunities to engage care providers outside of dentistry and oral health to identify oral health issues early in their development and refer older adults to the appropriate care setting for early intervention. Finally, working with oral health providers to establish comfort with care delivery focused on “functional standards” instead of a “gold standard” of care emerged as one of the most promising shifts in the delivery of care.

Increase the Capabilities of the Health Care Workforce to Treat Older Adults

A common theme across the literature and interviews was the limited familiarity and comfort among the oral health care workforce to address the unique care needs of older adults. While general awareness of challenges facing older adults is common, translating this awareness into age-appropriate care delivery is not straightforward. Improvements to oral health education, may better prepare dental students to deliver appropriate care to older adults including establishing comfort with care delivery focused on “functional standards” instead of a “gold standard” of care emerged as a promising shift in the delivery of care. Current oral health professionals benefit from more focused education and capability building around care delivery, older adult assessments, and personal interactions for older adults. Older adults also work with many care providers across the spectrum of care. Each provider presents an opportunity to

advance older adults' oral health, so improving the comfort and skills of the wider network of health professionals and community care providers could also be beneficial.

Establish Standards for Data Collection and Evaluation

Currently, dentistry does not have clear standards for data collection and utilization – dentists report agreement that data collection and record keeping is essential to care delivery, however agreement does not exist on standard collection practices.[82] Part of this relates to the differences in payment systems, treatment oversight, and accountability in dentistry. It is also related to a culture of care delivery that prioritizes a "gold standard" of treatment instead of a "functional standard." For many oral health care providers, treatment is based on what reimbursable procedures can be delivered to a patient. A new approach that prioritizes functional status will require supplementing existing assessment tools like the Seattle Care Pathway or OSCAR with recommendations of evidence-based, clinical care delivery. Establishing this evidence base is difficult without an agreed-upon and widely used data collection system. Additionally, familiarity with quality improvement and how it can be applied to improve care delivery is low across dentistry.[83] The ability to create improvements at scale within the oral health care delivery system would be greatly aided by agreed upon measures, reliable reporting, a fluency with quality improvement, and systems by which to share and learn with one another in the spirit of continuous improvement.

Work with Patients, Families, and Caregivers to Increase Capability to Maintain Oral Health

Individual oral health care routines, whether they are completed by the older adult, a family member, or member of a care team, are important to maintain overall health status for older adults. As individuals age and experience changes to mobility and cognition, maintaining a regular oral health routine remains important. Many experts described their dismay at the number of older adults living in long term care facilities who are assisted in bathing, feeding, and mobility, yet do not have assistance in caring for their oral health. Opportunities exist to engage directly with patients, their families, and their care teams to establish a reliable system for oral health maintenance.

All of the components of the theory of change have the potential to contribute to an environment more equipped to advance oral health for older adults.

Recommendation and Next Steps for Continued Research in Second 90-day Innovation Cycle

The IHI team is grateful for the opportunity to explore how to advance oral health for older adults. Over the first 90-day Innovation Cycle, the IHI team established a baseline

understanding of the current status and opportunities at the macro, meso, and micro levels related to oral health and older adults.

Looking ahead, the IHI team recommends focusing the second 90-day Innovation Cycle on improvements that can be made at the meso level with special attention to the delivery system and how providers and practice sites can more effectively address the oral health needs of older adults so they can eat, speak, and smile with ease. The primary goal of the second cycle would be to develop a testable pilot to engage providers and/or practices to build the skills and capabilities necessary to advance oral health for older adults.

The WHI and IHI teams will convene in early July 2019 to refine this recommendation and determine the focus of the second cycle of research and development.

After WHI provide guidance on the direction for the second 90-day Innovation Cycle, the IHI will continue with a standard with a focus on:

- Building a more robust evidence base for the specific recommendation selected to challenge existing beliefs and build will;
- Connecting with providers and practices to understand successes, challenges, and opportunities to advance oral health for older adults;
- Connecting with patients to inform the best approach to engage them in their oral health;
- Understanding the appropriate services and how they might be delivered in new and more focused ways; and
- Utilizing innovative delivery models and spreading approaches that best advance oral health for older adults.

Over the course of the following 90-day Innovation Cycle, the WHI and IHI team will work closely to develop an initial draft of what a pilot collaboration might look like and how it might be tested in the near future.

Appendix A: WHI and IHI Advancing Oral Health for Older Adults Expert Meeting Attendees

Name	Organization
Dr. Karen Becerra, DDS, MPH CEO and Dental Director, Co-Founder	Gary and Mary West Senior Dental Center
Dr. Manu Chaudhry, DDS, MS Regional Clinical Director	InterDent
Patrick Finnerty, MPA Senior Advisor for Oral Health Programs	DentaQuest Partnership for Oral Health Advancement
Dr. Michael Helgeson, DDS Co-Founder and CEO	Apple Tree Dental
Dr. Matthew Horan, DMD, MPH Executive Director of Dental Services	Harbor Health Services, Inc.
Karen Lewis, BS, CHES Senior Program Officer	Arcora Foundation
Gary Pickard, MBA Senior Director of Government and Industry Affairs	Pacific Dental Services
Dr. Lowell Reither, DDS, MBA Dentist and Board Member	Park Dental
Dr. John Yamamoto, DDS, MPH Vice President of Professional Services	Delta Dental of California

Appendix B: Collection of possible change ideas considered to advance oral health for older adults

Throughout this innovation cycle, the IHI research team kept a running list of possible change ideas at the macro, meso, and micro level. These ideas are organized based on their primary impact at the macro, meso, or micro level. Each change idea has implications for all three levels.

The following list provides a high-level summary of the ideas that came up most frequently in the literature and were reinforced by feedback from experts in the field. Based on these conversations, a basic evaluation of the resourcing needs and potential impact related to each idea is included. While this represents many of the popular ideas discovered in this cycle, this list is not exhaustive and further research is necessary to more fully establish the evidence base and expected impact of pursuing any of these changes.

Level	Idea	Target Audience	Resourcing	Impact
Macro	Work with National PACE to mandate dental health as part of care team	National PACE Admin	High – effort would require relationship building and advocacy with government agencies	High – making this change would affect all existing PACE locations (currently serving ~50,000 older adults) and also affect future enrollees (goal of ~200,000 PACE members by 2029)[84]
Macro	Work with CMS to expand interpretation of "medically necessary" to cover more dental services	CMS Administration	High – effort would require relationship building and advocacy with government agencies	High – making this change would increase the ability of all adults covered by Medicare to potentially access more oral health care, specifically for older adults living with medical conditions exacerbated by poor oral health including Parkinson's disease, multiple sclerosis,

				endocarditis, and diabetes.[85]
Meso	Work with local PACE centers to increase enrollment	Local PACE centers, prioritize those with dental services	Medium/High – effort would require identifying PACE centers with dental services, understand outreach, and develop improved outreach plan. Efforts would have common themes and require tailoring to local context for individual PACE centers	Medium/High – each PACE center can connect with a higher proportion of eligible older adults in the service area. This would have an impact on local access and utilization to care.
Meso	Develop standard care guidelines for functional care vs. standard care	Dentists working with older adults, other providers working with older adults	Medium – many organizations have training programs and materials (ie. Arcora, Seattle Care Pathways) that have an evidence based, critical mass for buy-in, and a mechanism for delivering the information. Spreading these ideas at scale is limited by size and experience of organizations with best practices.	High – Moving dentistry towards "functional standards" of care would change the culture of treatment between clinicians and older adults. The cost of delivering needed care would potentially decrease as less care would be necessary.
Meso	Engage with academic dental programs and other training programs to develop	Practicing oral health care providers at any stage of career	Medium – existing training programs have shown success;	High – Moving dentistry towards "functional standards" of care

	older adult-related competencies		IHI has long history of engaging providers in educational efforts	would change the culture of treatment between clinicians and older adults. The comfort of delivering needed care would increase for providers.
Meso	Engage with non-dental medical providers to teach identification, triage, and follow-up for older adult needs	Individuals who are part of interdisciplinary care teams	Medium – many best practices exist and community- and home-based care delivery across settings/teams is successfully taking place in other areas of population health management	High – Approximately 8.3 million people receive support from long term care facilities.[86] Establishing standards of care for oral health in those environments could reach a significant proportion of older adults through an already established dental delivery system
Meso	Utilized teledentistry/virtual-dental home to deliver care where older adults reside	Organizations delivering care in the community	Medium – several organizations are engaged in bringing oral health care into community settings through teledentistry and the virtual dental home. These programs show early success at improving health and reducing costs.[87]	Medium – this effort would rely engagement tailored to a community and delivery organization level. Establishing best practices so these efforts could be scaled to different organizations could increase access and utilization for older adults in the community

Meso	Engage with dental hygienists to increase use of scaling and root planning to improve chronic disease management	Dental clinics and dental hygienists	Medium – scaling and root planning are procedures that dental hygienists currently deliver. Evidence shows these procedures have positive impact on oral health and other care conditions like Type II Diabetes, Coronary Artery Disease, Cerebral vascular disease, rheumatoid arthritis, and pregnancy.[88]	Medium/High – More actively connecting older adults to scaling and root planning services can impact their overall health and well-being which helps establish a cycle of health to maintain oral health status for older adults
Meso	Identify existing jurisdictions where procedures like fluoride varnish can be delivered by non-dentists; train non-dentists to deliver treatments	Caregivers who are not currently administering SDF (or other evidence-based care) who have the skills to do so	Medium – regulations determining what licensure is required for SDF (or similar) application varies by state. In states where non-dentists can provide these services, most cost-effective providers can be deployed to arrest caries in older adults.	Medium – this approach is centralized and requires a state by state plan to fully roll out
Meso	Build on IHI's Age-Friendly Health Systems work to develop a "what matters" conversation	Any caregiver working with older adults and oral health	Medium – building on existing work focused on patient engagement can	Medium – this approach would require connecting with care teams and clinics by the dozens to develop

	approach for care teams[89]		help move expectations, motivation, and culture for oral health providers.	age-friendly skills and advance a culture tailored to older adults
Micro	Develop care plans for routine oral health maintenance that care be taught and reinforced across care settings	Patients, family members, caregivers	Low/Medium – best practices for daily oral health care are well established. Many older adults are inhibiting from practicing routine care.[90] Developing plans for patients and their caregivers can be deployed through existing delivery mechanisms.	Medium – reaching a large portion of patients and caregivers could drastically increase the daily health maintenance for older adults to keep healthy teeth healthy.
Micro	Develop older adult personas as a teaching tool to influence perception and behaviors of providers	Care providers working with older adults	Medium – several persona approaches exist for managing care for individuals with complicated care needs.[91] [92] [93] More specifically tailoring these approaches to oral health care and establishing a process to spread a personas tool to more providers can fit with WHI and IHI's strengths.	Medium – Many obstacles prevent care providers from feeling comfort treating older adults. Sharing a reliable tool to become familiar with common issues faced and goals desired by older adults can grow comfort of providers to deliver care.
Micro	Connect older adults with appropriate oral health supplies	Older adults and their caregivers	Medium – the supplies needed are quantifiable	Medium – if older adults can utilize provided supplies

	(ergonomic toothbrushes, electric brushes, easy flossers, etc.)		in terms of costs. The operations of an effort to deliver supplies would account for a significant portion of resourcing.	for routine daily care, they can expect to maintain higher overall oral health status.[94]
Micro	Addressing debt for dentists	Dental students and early career dentists	High – literature and expert interviews revealed the burden of student loans and debt shape career decisions for providers.[95] Financial pressure directs early career dentists into private practice. Minimizing debt, or increasing income potential for care with older adults, would improve the pipeline of oral health providers available for older adults	Medium – for each individual dentist or oral health professional, the impact of debt relief or increased income would be substantial. And, identifying systemic ways providers can develop dental capabilities for older adults would be more impactful and more difficult

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