



# The Impact of Medicaid Expansion on Oral Health Equity for Older Adults: A Systems Perspective

Sara S. Metcalf, PhD; Shirley S. Birenz, MS; Carol Kunzel, PhD; Hua Wang, PhD; Eric W. Schrimshaw, PhD; Stephen E. Marshall, DDS, MPH; and Mary E. Northridge, PhD, MPH

**ABSTRACT** This paper uses a collaborative, interdisciplinary systems science inquiry to explore implications of Medicaid expansion on achieving oral health equity for older adults. Through an iterative modeling process oriented toward the experiences of both patients and oral health care providers, complex feedback mechanisms for promoting oral health equity are articulated that acknowledge the potential for stigma as well as disparities in oral health care accessibility. Multiple factors mediate the impact of Medicaid expansion on oral health equity.

## AUTHORS

**Sara S. Metcalf, PhD**, is a health geographer and systems scientist whose research models policies and social behaviors that promote community health, oral health equity and urban sustainability.  
*Conflict of Interest*  
*Disclosure: None reported.*

**Shirley S. Birenz, MS**, is a seasoned dental hygienist, educator and public health advocate.  
*Conflict of Interest*  
*Disclosure: None reported.*

**Carol Kunzel, PhD**, is a social-behavioral scientist with particular interests in dental community health, access to oral health care, dentist-patient relations and the translation of research findings into practice.  
*Conflict of Interest*  
*Disclosure: None reported.*

**Hua Wang, PhD**, is a communication scientist. Her research focuses on the design, implementation and evaluation of innovative programs for public health promotion and positive social change.  
*Conflict of Interest*  
*Disclosure: None reported.*

**Eric W. Schrimshaw, PhD**, is a social/health psychologist who uses mixed-methods research to understand the influence of social relationships, support, stigma and disclosure on health behaviors and well-being.  
*Conflict of Interest*  
*Disclosure: None reported.*

**Stephen E. Marshall, DDS, MPH**, is a dentist with public health training who has dedicated his career to the design and implementation of community-based programs for underserved populations including

children and older adults.  
*Conflict of Interest*  
*Disclosure: None reported.*

**Mary E. Northridge, PhD, MPH**, is a social epidemiologist devoted to utilizing a range of scientific and participatory approaches for advancing oral health equity at the local, state, and national levels.  
*Conflict of Interest*  
*Disclosure: None reported.*

The U.S. 2010 Patient Protection and Affordable Care Act (ACA) represents an ambitious and historical expansion of health care coverage, with the goal of improving access for millions of Americans. Through universally required health insurance coverage for those meeting income thresholds, the ACA is designed to address health disparities that have grown in recent decades despite increases in medical spending. The ACA is the largest U.S. expansion in recent history and is expected to reduce the number of uninsured Americans by 20 million.<sup>1</sup> A notable aspect of the ACA is expansion of health insurance coverage

through Medicaid for states that elect to participate. The presence of health insurance coverage through Medicaid has a significant impact on health care access and health outcomes, including oral health, for vulnerable populations such as impoverished older adults.<sup>2</sup>

The links between oral and systemic health are increasingly recognized. For example, a recent scientific statement issued by the American Heart Association acknowledges an independent association between periodontal and cardiovascular diseases.<sup>3</sup> The American Academy of Periodontology, having also pointed to this relationship, underscores the importance of periodontal care as a means of bolstering oral health status as well as reducing the risk of heart disease.<sup>4</sup> Furthermore, the scientific evidence also points to a relationship between periodontal disease and diabetes.<sup>5</sup> Given these and other links between oral and systemic health, the expansion of Medicaid offers a unique opportunity for leverage in promoting oral health equity resulting from having adult dental benefits for Medicaid recipients in certain states.

As a contribution to this issue of the *Journal of the California Dental Association* focused on geriatric dentistry, this paper presents a shared perspective that the authors have developed as collaborators on an NIH-funded project aimed at leveraging systems science to promote oral health equity for older adults. Although seniors are commonly defined as individuals aged 65 and older, formerly corresponding to Medicare and retirement eligibility, the present study is concerned with older adults aged 50 years and older because oral health problems are exacerbated for individuals in disadvantaged communities, and the earlier the intervention, the more

likely that preventive procedures will be effective, thus avoiding costly and painful treatment. This broader conceptualization of older adulthood is consistent with research conducted by Griffin and colleagues that is in concert with the way older adults are being defined by the Centers for Disease Control and Prevention Division of Oral Health.<sup>6</sup> Chronic underemployment in disadvantaged communities renders adults less likely to have private insurance and more likely to qualify for Medicaid even

A notable aspect of the ACA is expansion of health insurance coverage through Medicaid for states that elect to participate.

if they are not old enough to qualify for Medicare benefits. Many adults are also eligible for both Medicare and Medicaid. While it is important for patients needing primary care, Medicare does not provide dental health benefits for recipients. Coordination between Medicare and Medicaid is being undertaken in the context of the ACA,<sup>7</sup> but administrative overhead and restrictions on services remain a source of complication and frustration for recipients and providers alike.

This study is informed by observations of the community-based ElderSmile program operated by Columbia University, which offers preventive oral and general health screenings to older adults attending senior centers in underserved

neighborhoods of northern Manhattan (see Evidence from ElderSmile for Diabetes and Hypertension Screening in Oral Health Programs, Page 379 in this issue<sup>8</sup>). In partnership with the ElderSmile program, this systems science study has involved novel methods of group model building to distill insights about oral health problems facing underserved older adults in northern Manhattan. This interdisciplinary collaboration involves hands-on modeling activities designed to facilitate systems thinking. In addition to regular collaborative meetings (with a virtual component, as the team spans three institutions in New York and Buffalo, N.Y.), the research team has conducted two group model-building workshops in 2013 and 2014 using systems science to identify important factors and characteristic trends. The team then drew connections from policy and social factors to their impacts on oral health outcomes at an individual level and their implications for oral health equity at a fundamental or societal level.

The current study builds upon an earlier systems framework that articulated relationships at the individual and interpersonal scales, linking oral health to chronic illness, nutrition and community access.<sup>9</sup> This framework pointed to opportunities for oral health promotion through preventive health screenings, such as those offered by ElderSmile.<sup>10</sup> In addition to the benefits of offering preventive health screenings for disadvantaged older adults, the educational component of ElderSmile outreach addresses common misperceptions about Medicaid adult dental coverage and provides participants with access to a referral network of affordable oral health care providers. Focused on how people are

treated when they have Medicaid, this paper explores the mechanisms by which Medicaid coverage impacts oral health equity, using a whole-systems perspective to examine unintended consequences of limitations, such as inadequate provider reimbursement for oral health care services.

### A Systems Perspective

The dynamic complexity of social institutions that provide health care delivery warrants a systems perspective that acknowledges the interconnectedness of factors. Shi and Singh take such a systems approach in exploring the effects of the ACA on the U.S. health care system.<sup>11</sup> Approaches to systems science include the practice of systems thinking that results in conceptual models such as the causal map presented herein (**FIGURE**), as well as the design of computer simulation models that facilitate virtual policy experiments. In facilitating an understanding of dynamic complexity, systems thinking confers a unique perspective that sharpens one's awareness of the whole and of how its parts interrelate. Systems thinking is distinct from simulation modeling (using a computer model to explore the implications of the defined interactions for behavior over time) in that it does not require a computer, so long as relationships are recognized between factors driving system behavior. In the modeling tradition of system dynamics, systems thinking is used to produce a causal map, which is also known as a causal loop diagram, a causal hypothesis or a dynamic hypothesis. The causal map is a conceptual model that provides a visual representation of links between causes and effects that combine to create complete feedback loops.<sup>12</sup>

Because the direction of causality is often difficult to establish definitively from empirical observations, the causal map is considered a working hypothesis used to develop theory and guide construction of an appropriate computer simulation model that tests effects of alternative assumptions and policy scenarios. Groups working collaboratively to address persistent problems can benefit from the use of systems thinking to render individual assumptions more transparent and therefore open to critique.<sup>13,14</sup>

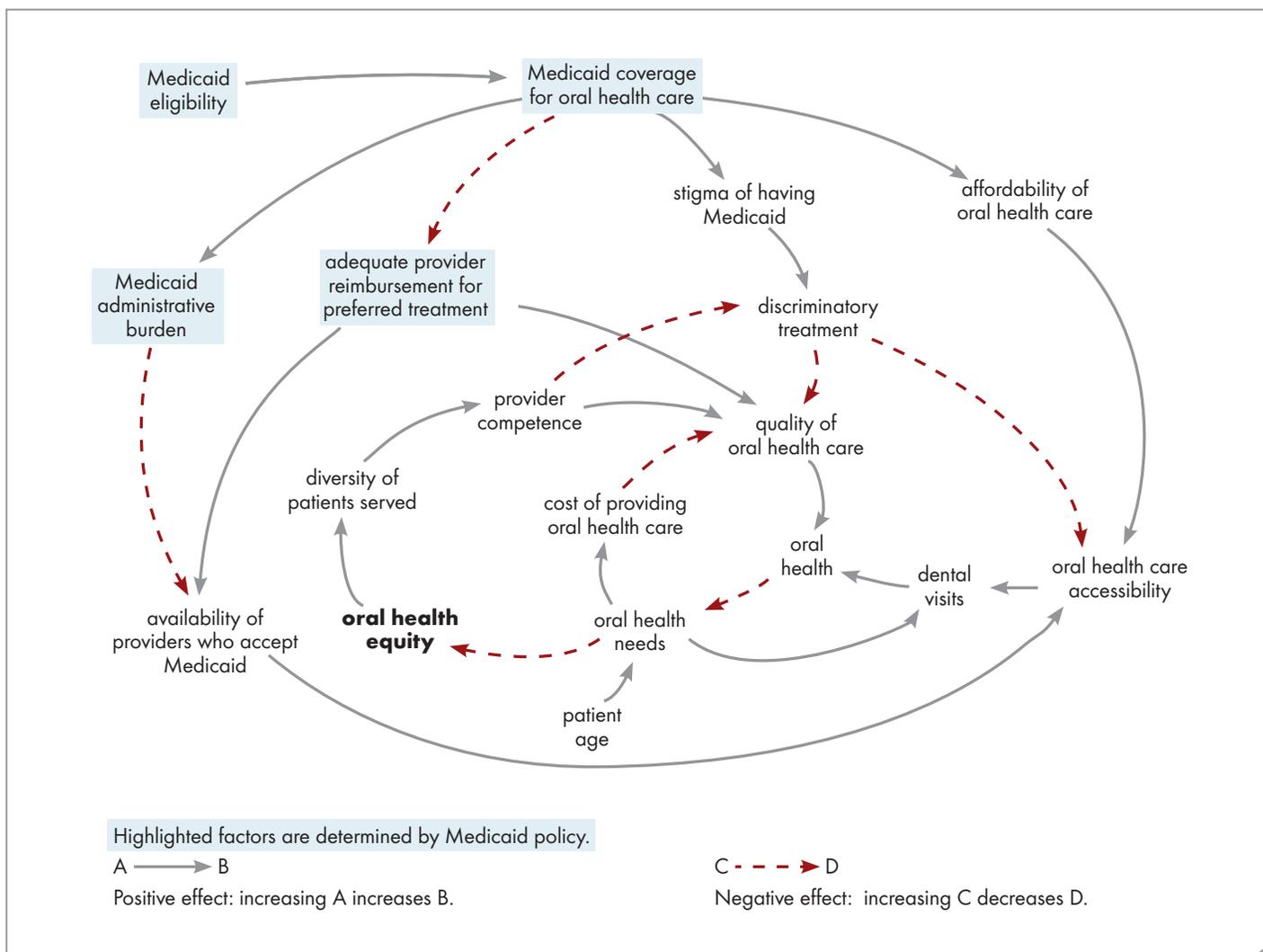
The causal map is a conceptual model that provides a visual representation of links between causes and effects that combine to create complete feedback loops.

Composed of interdisciplinary researchers and oral health care practitioners, the research team began its group model-building activities by considering which factors facilitate or hinder oral health equity for older adults. After characterizing trends for important factors, the group then identified a critical factor for equity as availability of affordable oral health care providers. This concept was disentangled further in subsequent maps of causal pathways between factors that clearly distinguished between the concepts of availability and affordability. Following from the discussion about model structure, as expressed by causal relationships between factors, was a group discussion about which scenarios should be explored using simulation

models. Because many of the adults who participate in the ElderSmile program are poor and therefore qualify for Medicaid, the conversations of the research team frequently returned to the impacts of Medicaid expansion under the ACA. Medicaid expansion under the ACA was complicated by the June 2012 Supreme Court ruling that enabled states to choose whether to expand their Medicaid programs. State-specific implications of Medicaid expansion under the ACA are summarized in a recent report by the Kaiser Commission on Medicaid and the Uninsured.<sup>15</sup> Because New York is an expansion state, the impact of expanded Medicaid eligibility under the ACA was underscored as an important scenario, and the team agreed to use the models developed to explore this shifting policy landscape.

The diagram in the **FIGURE** maps cause-and-effect relationships tracing the mechanisms by which the ACA policy of increased Medicaid eligibility ripples through the oral health care system to affect oral health equity (highlighted in boldface in the causal map). In the **FIGURE**, causal mechanisms for promoting oral health equity are articulated that acknowledge the significance of social stigma for Medicaid patients and point to paths for facilitating greater oral health care accessibility. Complex feedback mechanisms are identified that mediate the impact of Medicaid expansion on oral health equity. Because of the complexity of the relationships depicted in the **FIGURE**, readers are encouraged to have the image available for viewing alongside the text that follows.

Causal relationships are denoted as either positive (changing in the same direction) or negative (changing in the opposite direction) in the



**FIGURE.** This diagram maps cause-and-effect relationships tracing the mechanisms by which the ACA policy of increased Medicaid eligibility ripples through the oral health care system to affect oral health equity.

**FIGURE.** A solid gray arrow indicates a positive causal relationship, such that an increase in amount of the cause increases the amount of the effect (and vice versa, decreasing the amount of the cause decreases the amount of the effect). A dotted red relationship indicates a negative causal relationship, such that increasing the amount of the cause decreases the amount of the effect (and vice versa, decreasing the amount of the cause increases the amount of the effect). When determining the sign or polarity of these causal links, each connection is considered in isolation

for the case in which all other elements and relationships are unchanged.

This notation indicates, at the top of the **FIGURE**, that increasing Medicaid eligibility has the positive effect of increasing Medicaid coverage for oral health care, as indicated by a growing number of people covered under Medicaid relative to the total population. It is important to note that as depicted here, Medicaid coverage for oral health care refers to coverage of the population and not the extent of services provided. Following from the exogenous policy impact of an increase

in eligibility to expanded coverage, the **FIGURE** traces four distinct impacts from increased coverage. The first, traced at the top right of the diagram, is the positive effect of increasing Medicaid coverage on greater affordability of oral health care, which then leads to oral health care accessibility. This positive causal link is consistent with the basic premise of the ACA that having insurance lowers out-of-pocket costs and thus renders health care more affordable for the patient. However, increasing patients with Medicaid coverage is also often associated with

three undesirable effects: increased Medicaid administrative burden on oral health care providers who serve Medicaid patients, less adequate provider reimbursement for preferred treatment relative to that of private insurance plans and more potential patient experiences with social stigma of having Medicaid to cover oral health care costs. The latter effect signifies the fundamental association of Medicaid with low-income populations and the discriminatory treatment that can ensue. With greater numbers of Medicaid enrollees under ACA, one would hope that the stigma associated with it would diminish over time, but the salience of this effect for many Medicaid participants makes it unlikely to go away anytime soon. Elements of the system that are directly determined by Medicaid policy are highlighted in the **FIGURE**: Medicaid eligibility, Medicaid coverage for oral health care, Medicaid administrative burden and adequate provider reimbursement for preferred treatment. Importantly, Medicaid policy also mediates the nature of the relationships between these elements.

As indicated by these relationships, social factors compound the administrative burden and limited provider reimbursement associated with serving Medicaid patients. Those who suffer from economic disadvantage, as reflected in their eligibility for Medicaid, are further subjected to social disadvantage in the form of stigma from reliance on Medicaid for health care. As articulated in the **FIGURE**, such stigma of having Medicaid can lead to discriminatory treatment during visits to the dentist. For racial/ethnic minority older adult populations, discriminatory treatment may involve racism as well as ageism. Such treatment reduces oral health care accessibility as well

as quality of oral health care received by Medicaid patients. Adequacy of access to oral health care poses a particular challenge for older adults in underserved communities. Adequate reimbursement for preferred treatment is also depicted as having a positive effect on the quality of oral health care received by the patient. The way quality is defined is in flux and is of great policy importance. For the present purposes, this factor indicates quality; however, it may be defined so long as it contributes to improved oral health outcomes.

For racial/ethnic minority older adult populations, discriminatory treatment may involve racism as well as ageism.

A key concern of the present inquiry is that some oral health care providers do not accept Medicaid, or limit the number of Medicaid patients, because of the administrative overhead and/or inadequate reimbursement for treatment. Therefore, availability of providers who accept Medicaid is an important component of the causal map in the **FIGURE**. This concept includes the number of providers as well as the number of patients accepted. Although increased Medicaid eligibility effectively expands coverage for vulnerable populations, not all dental providers accept Medicaid. Furthermore, not all dental providers accept older adults. One reason for not accepting Medicaid patients is the additional administrative burden in terms of paperwork required

to facilitate reimbursement, indicated by the solid gray arrow from Medicaid coverage for oral health care to Medicaid administrative burden. Another reason why dentists may be reluctant to accept Medicaid patients is an inadequate reimbursement for needed treatment. As noted by the dotted red arrow from Medicaid coverage for oral health care to adequate provider reimbursement for preferred treatment, an inverse relationship exists between these factors, where increased Medicaid coverage comes with restrictions on reimbursement for dental treatment that would be preferred by the patient. For example, a Medicaid patient may receive coverage for a tooth extraction as opposed to costlier procedures that retain tooth structure. These constraints faced by oral health care providers have the effect of lowering the availability of providers who accept Medicaid. A reduction in either actual or perceived availability of oral health care providers who accept Medicaid then lowers oral health care accessibility, mitigating the benefit derived from making oral health care more affordable to vulnerable populations of older adults.

A reinforcing feedback loop is created when a set of arrows form a complete cycle in which a factor amplifies in the direction of system change with each successive iteration around the loop. In contrast, a balancing or counteracting feedback loop is created when such a cycle causes a factor to change direction with each successive iteration around the loop. One way to determine whether a loop is reinforcing or balancing is to count the number of negative causal links in the loop. Because their effects are multiplicative, if the sum of negative links is even, they cancel each other out and create a reinforcing feedback loop.

If the sum of negative links is odd, the net effect is negative and so the loop is characterized as a balancing feedback loop: an iterative cycle of cause and effect that counters a change in one direction with a push in the opposite direction. Although this odd-even heuristic (guide to investigation) is helpful for distinguishing balancing from reinforcing loops, it should be complemented by a thorough assessment of the logic embedded in each feedback loop during the construction of a causal map.

The causal map in the **FIGURE** shows one balancing feedback loop and four reinforcing feedback loops. The only balancing feedback loop traces a causal pathway counterclockwise from oral health to oral health needs to dental visits, which leads back to improved oral health outcomes. As oral health improves through effective treatment, unmet oral health needs decline, as indicated by the negative link. Since greater oral health needs warrant additional dental visits, a reduction of oral health needs likewise reduces the likelihood of dental visits. According to the heuristic for loop determination, the presence of an odd number (one) of negative causal links signifies that this loop is balancing in nature. The essential operation of this balancing feedback effect is to counteract unmet need with effective treatment. However, oral health needs also increase with patient age and thereby may potentially warrant more frequent dental visits to ensure adequate preventive care and treatment for any oral health conditions.

Three of the reinforcing loops in the **FIGURE** follow from the alleviation of oral health needs through improved quality of oral health care and the consequent oral

health outcomes. Following the first (innermost) reinforcing loop clockwise, increasing the quality of oral health care improves oral health and thus reduces oral health needs. Because unmet oral health needs increase the cost of providing oral health care, and increased costs have a negative effect on quality, a reinforcing feedback loop is completed. From the heuristic for loop determination, identification of the loop as reinforcing is indicated by the even number (two) of negative links whose net effect is positive.

This diversity factor represents both the diversity of health needs and the cultural diversity of underserved populations.

The second reinforcing loop is traced clockwise from the inverse effect of unmet oral health needs on the key problem variable, oral health equity. Because oral health needs likely increase as patients age, challenges to oral health equity arise as adults advance in years. Because oral health equity has a positive link to diversity of patients served, less equity translates to less diversity of patients served. This diversity factor represents both the diversity of health needs and the cultural diversity of underserved populations. Exposure to a diversity of patients is seen as a component of provider competence in terms of knowledge about complex health conditions as well as cultural sensitivity.

The reinforcing feedback effect is completed as provider competence leads to quality of oral health care.

The third reinforcing loop involves all of the same elements as the one just described, with an additional path from provider competence to quality of oral health care that is routed through two negative links to and from discriminatory treatment. As provider competence decreases, discriminatory treatment increases, lowering the quality of oral health care received by the patient.

The fourth and last reinforcing feedback loop in the **FIGURE** follows the negative effect of discriminatory treatment on oral health care accessibility, lowering the likelihood of dental visits, which worsens oral health outcomes and increases unmet need. As described above, increased oral health needs lower oral health equity. These effects ripple through less diversity of patients served, provider competence and discriminatory treatment back to accessibility. Under the heuristic described above for determining loop polarity, the even number (four) of negative links embedded in this loop indicates that their effects cancel out, rendering the loop reinforcing in nature.

The presence of these reinforcing feedback loops can trigger vicious cycles as oral health needs increase with age, hindering oral health equity for older adults. However, if factors are enhanced that facilitate quality of oral health care and oral health care accessibility, the direction of change can be reinforced in a way that promotes equity rather than obstructs it.

## Discussion

The systems perspective developed here has emerged from interdisciplinary interactions and iterations of the conceptual and computational models

that comprise the team's portfolio of work. The causal map in the **FIGURE** is representative of both the substance and method of this interdisciplinary systems science research program. The research team recognizes that the implications of Medicaid go beyond the factors sketched in the **FIGURE**. For example, a particular facet of diversity of patients served is that the gender balance of Medicaid recipients may well be shifting to include more male patients than before in states that are currently undergoing Medicaid expansion. The large number of potential connections that extend from the causal map underscores the value of the team's portfolio approach to systems modeling.

As just alluded to, an important condition for the mechanisms traced in the **FIGURE** is the state-specific context of whether or not Medicaid coverage for oral health care exists and can therefore be expanded under the ACA. New York state experienced significant growth in Medicaid enrollment prior to the ACA and is poised for more as adults become eligible for Medicaid under the new ACA criteria. For New York, the expansion of Medicaid coverage under the ACA means that many previously uninsured older adults are newly eligible for dental health insurance coverage under Medicaid.<sup>16</sup>

The landscape for access to oral health care under Medicaid has been shifting in many states. Like New York, California has expanded Medicaid enrollment under the ACA. However, California's provision of benefits for oral health care under Medicaid in the Denti-Cal program were rolled back from 2009 to 2014, then largely restored in May 2014.<sup>17,18</sup> Crall recently exposed California's performance relative to other states in terms of dental care utilization among enrollees and questioned whether Medicaid expansion has resulted in an

illusion of access due to problems with the way the Medicaid program is structured.<sup>19</sup> Wide and colleagues examined negative ripple effects from the recent limitations on adult Denti-Cal coverage.<sup>20</sup>

Amidst this shifting policy landscape, California residents seeking current information about Medicaid coverage through Denti-Cal can learn more about current policy online, including a companion guide for the Electronic Data Interchange (EDI),<sup>21</sup> frequently asked questions<sup>22</sup> and information about where Denti-Cal providers are located.<sup>23</sup>

The large number of potential connections that extend from the causal map underscores the value of the team's portfolio approach to systems modeling.

For low-income adults in states that do not expand Medicaid coverage for adult oral health care, the effect of decreasing Medicaid coverage would induce the same causal pathways identified in the **FIGURE** but in the opposite direction from the one articulated above. Instead of enhancing oral health equity through greater accessibility, the policy change instead sets off vicious feedback mechanisms that exacerbate oral health equity for already disadvantaged adults.

Other state-specific issues that extend beyond the elements represented in the **FIGURE** relate to the scope of oral health care practice. For instance, California is increasing the availability of oral health care providers through the use of specially trained hygienists

who can provide routine and preventive procedures at a lower cost. Under certain conditions, registered dental hygienists in alternative practice (RDHAP) can open their own practices and collect insurance in California.<sup>24</sup> This situation contrasts with that of New York, where dental hygienists are licensed but generally work under the direct supervision of a dentist. A recent study of insurance-related barriers to dental care for African American adults in New York City suggests that because alternative members of the dental team might be more likely to accept Medicaid, increasing availability of specially trained, alternative providers could increase the number of dental professionals accepting Medicaid, thereby improving access to care.<sup>25</sup> With health care reform and ongoing changes in state scope of practice acts, there are new opportunities to optimize the use of dental hygienists to meet a growing demand for oral health care and address unmet need among older adults.<sup>26</sup> Meeting the needs of the most vulnerable is essential to promoting health equity in U.S. society.

A vision of oral health equity for older adults living in California differs in details, but not in essence, from equity for those living in New York. Both New York and California host large and diverse immigrant populations who experience difficulties accessing care that extend beyond the scope of Medicaid coverage, due to the barriers of things such as citizenship and language. This systems perspective could therefore be adapted to the stressors facing immigrant populations, such as deportation policies and difficulties reading and understanding English that may potentially limit oral health care accessibility or lead to discriminatory treatment. For both California and New York, the systems perspective

presented in the **FIGURE** points to the potential for the increased diversity of patients served through an expanded Medicaid program to lead to enhanced oral health care provider competence. Such competence encompasses cultural sensitivity as well as the expertise derived from serving a greater diversity of complex oral and systemic health conditions. In addition to exposure to a diversity of patients served, oral health care provider competence derives from an ability to confidently implement the latest evidence into their practices.

Because it affects related personal health behaviors, perceived availability of affordable oral health care may be as important as the actual availability of providers. This distinction is worth making explicit, and has been emphasized in other causal maps developed through group model-building activities that are part of the research portfolio. The practice of system dynamics encourages recognition of the salience of perceptions, in that changes in perceptions lag behind changes in the actual state of the system.<sup>27</sup>

In the experience of the research team, many older adults do not know that adult dental benefits exist for Medicaid recipients in New York state. This lack of awareness presents an opportunity for the educational component of oral health outreach programs like ElderSmile.

Beliefs held by Medicaid recipients about expected dental treatment are salient: even where provisions exist for costlier procedures, patients may expect (and fear) a tooth extraction, delaying treatment until the need is so overwhelming that it requires urgent care.<sup>28</sup> Such a prospect may trigger painful memories of previous extractions, concern about reduced attractiveness and employability

from visible tooth loss, or concern about the cumulative effect of tooth loss on the ability to chew food and socialize with friends.

A simplification of this causal map is that it does not differentiate between dental visits that are preventive or urgent in nature. A relevant question is whether the ACA reduces visits to the emergency room for oral pain or other acute conditions.<sup>29</sup> One goal of the ACA is to reduce health care costs through more preventive care in lieu of urgent care at the emergency

Perceived availability of affordable oral health care may be as important as the actual availability of providers.

room. However, a 2007 study by the Kaiser Foundation found that patients insured by public health benefits such as Medicaid and Medicare were more likely than uninsured patients to utilize emergency care.<sup>30</sup> If insufficient incentives exist to utilize preventive oral health care through Medicaid, patients will still be likely to delay receiving care until the problem is urgent in nature, necessitating a visit to the emergency room. In addition to the reasons noted above for deferring treatment, another consideration is the level of confidence that a patient has in the care provided by a hospital versus a dentist, which points to the importance of trust in oral health care providers as a factor affecting Medicaid dental visits.

## Conclusion

Using Medicaid expansion as an example, this study demonstrates how systems science may be used to envision pathways toward oral health equity for older adults. The goal of tracing these causal connections is to clarify a shared argument and locate a compelling start, in terms of a clear feedback mechanism, for the design of a computer simulation model. Both conceptual and computational models comprise the portfolio of the research team.<sup>31</sup> The causal hypothesis developed in this paper considers oral health equity for older adults newly eligible for Medicaid because of the ACA. Pathways toward improved oral health equity involve availability, affordability and quality of oral health care. Because oral health inequity is a salient indicator of fundamental socioeconomic disparities, making oral health care more accessible to vulnerable adults is an important avenue toward public health and social justice.

The shared perspective developed here recognizes that while consequences of the ACA are many and complex, this major policy change has thus far proven to be beneficial to those who are most vulnerable in U.S. society. For states like California, in which Medicaid health insurance coverage may be applied to some oral health care services received by adults, the ACA creates new opportunities for achieving oral health equity. As traced through the causal hypothesis presented in the **FIGURE**, these benefits have a net positive effect on oral health equity, but the extent of the effect is restricted by the administrative burden, limited reimbursement and social stigma that too often accompany the use of Medicaid for health care services.

By shedding light on a very complex

and relevant policy issue, this paper offers a way to think about all of the barriers to oral health equity that others have identified.<sup>32</sup> The same conceptual model can be used to explore unfortunate consequences from reducing or eliminating Medicaid adult dental coverage due to the primary effect of insurance coverage on the affordability and thus accessibility of oral health care for Medicaid patients. This systems perspective suggests that a successful strategy for health reform must be multifaceted, simultaneously ensuring adequate provider reimbursement and lowering the administrative burden involved with using Medicaid to cover health care costs. ■

#### ACKNOWLEDGMENTS

The authors were supported in the research, analysis and writing of this article by the National Institute for Dental and Craniofacial Research and the Office of Behavioral and Social Sciences Research of the National Institutes of Health through the project, "Integrating Social and Systems Science Approaches to Promote Oral Health Equity" (grant R01-DE023072).

#### REFERENCES

- Sparer MS. Health Care Reform and Dentistry. *J Calif Dent Assoc* 2013;41(12):883-886.
- Institute of Medicine (IOM) of the National Academies. Improving Access to Oral Health Care for Vulnerable and Underserved Populations, 2011. [www.iom.edu/Reports/2011/Improving-Access-to-Oral-Health-Care-for-Vulnerable-and-Underserved-Populations.aspx](http://www.iom.edu/Reports/2011/Improving-Access-to-Oral-Health-Care-for-Vulnerable-and-Underserved-Populations.aspx). Accessed April 22, 2015.
- Lockhart PB, Bolger AF, Papapanou PN, Osinbawale O, Trevisan M, Gornik HL, Gewitz, MH, Wilson WR, Smith SC, Baddour LM. Periodontal Disease and Atherosclerotic Vascular Disease: Does the Evidence Support an Independent Association? A Scientific Statement from the American Heart Association. *Circulation* 2012;123:2520-2544.
- Periodontal Disease Linked to Cardiovascular Disease. American Academy of Periodontology, April 18, 2012. [www.perio.org/consumer/AHA-statement](http://www.perio.org/consumer/AHA-statement). Accessed Feb. 5, 2015.
- Lamster IB, Kunzel C, Lalla E. Diabetes Mellitus and Oral Health Care: Time for the Next Step. *J Am Dent Assoc* 2012;143(3):208-210.
- Griffin SO, Jones JA, Brunson D, Griffin PM, Bailey WD. Burden of Oral Disease Among Older Adults and Implications for Public Health Priorities. *Am J Public Health* 2012;102(3):411-418.
- Centers for Medicare and Medicaid Services (CMS). Medicare-Medicaid Coordination Office. [goo.gl/7rTA9e](http://goo.gl/7rTA9e). Accessed Feb. 5, 2015.
- Marshall SE, Schrimshaw EW, Kunzel C, Metcalf SS, Greenblatt AP, De La Cruz LD, Northridge ME. Evidence from ElderSmile for Diabetes and Hypertension Screening in Oral Health Programs. *J Calif Dent Assoc* 2015; this issue.
- Metcalf SS, Northridge ME, Lamster IB. A Systems Perspective for Dental Health in Older Adults. *Am J Public Health* 2011;101(10):1820-1823.
- Marshall SE, Cheng B, Northridge ME, Kunzel C, Huang C, Lamster IB. Integrating Oral and General Health Screening at Senior Centers for Minority Elders. *Am J Public Health* 2013;103(6):1022-1025.
- Shi L, Singh DA. *Delivering Health Care in America: A Systems Approach*, 6th ed. Burlington, MA: Jones & Bartlett Learning, 2015.
- Richardson GP. *Feedback Thought in Social Science and Systems Theory*. Waltham, Mass.: Pegasus Communications, 1991.
- Hovmand PS. *Community Based System Dynamics*. New York: Springer, 2014.
- Black IJ. When Visuals are Boundary Objects in System Dynamics Work. *Syst Dyn Rev* 2013;29:70-86.
- Paradise J. Medicaid Moving Forward. The Kaiser Commission on Medicaid and the Uninsured, March 2015. [kff.org/health-reform/issue-brief/medicaid-moving-forward](http://kff.org/health-reform/issue-brief/medicaid-moving-forward). Accessed April 22, 2015.
- New York State Medicaid Program Dental Policy and Procedure Code Manual, 2013. [www.emedny.org/ProviderManuals/Dental/PDFS/Dental\\_Policy\\_and\\_Procedure\\_Manual.pdf](http://www.emedny.org/ProviderManuals/Dental/PDFS/Dental_Policy_and_Procedure_Manual.pdf). Accessed Jan. 1, 2015.
- Denti-Cal. California Department of Health Care Services. [www.denti-cal.ca.gov/WSI/Default.jsp?fname=Default](http://www.denti-cal.ca.gov/WSI/Default.jsp?fname=Default). Accessed April 22, 2015.
- Medi-Cal Health and Dental Benefits. California Department of Health Care Services. [www.dhcs.ca.gov/services/medi-cal/Pages/Medi-Cal\\_EHB\\_Benefits.aspx](http://www.dhcs.ca.gov/services/medi-cal/Pages/Medi-Cal_EHB_Benefits.aspx). Accessed April 22, 2015.
- Crall JJ. Expanding Public Coverage for Dental Services: Pathway to Improvements or Hollow Promise? *J Calif Dent Assoc* 2014;42(11):769-777.
- Wides C, Rab Alam S, Mertz E. Shaking up the Dental Safety-net: Elimination of Optional Adult Dental Medicaid Benefits in California. *J Health Care Poor Underserved* 2014;25:151-164.
- California Medicaid (Denti-Cal) Electronic Data Interchange (EDI) companion guide. [www.denti-cal.ca.gov/provsrvcs/edi/Denti-Cal\\_EDI\\_Companion\\_Guide.pdf](http://www.denti-cal.ca.gov/provsrvcs/edi/Denti-Cal_EDI_Companion_Guide.pdf). Accessed Dec. 1, 2014.
- Frequently Asked Questions (FAQs) about Denti-Cal for Beneficiaries. [www.denti-cal.ca.gov/provsrvcs/FAQs/Bene\\_FAQs.pdf](http://www.denti-cal.ca.gov/provsrvcs/FAQs/Bene_FAQs.pdf). Accessed Dec. 1, 2014.
- Where to find Denti-Cal providers. [www.denti-cal.ca.gov/WSI/Bene.jsp?fname=ProvReferral](http://www.denti-cal.ca.gov/WSI/Bene.jsp?fname=ProvReferral). Accessed Dec. 1, 2014.
- Dental Hygiene Committee of California. How to Become a Licensed Dental Auxiliary in California, Registered Dental Hygienist in Alternative Practice (RDHAP). [dhcc.ca.gov/applicants/becomelicensed\\_rdhap\\_appinst.shtml](http://dhcc.ca.gov/applicants/becomelicensed_rdhap_appinst.shtml). Accessed April 22, 2015.
- Schrimshaw EW, Siegel K, Wolfson NH, Mitchell DA, Kunzel C. Insurance-Related Barriers to Accessing Dental Care Among African American Adults With Oral Health Symptoms in Harlem, New York City. *Am J Public Health* 2011;101(8):1420-1428.
- Sparer M. U.S. Health Care Reform and the Future of Dentistry. *Am J Public Health* 2011;101(10):1841-1844.
- Sterman J. *Business Dynamics: Systems Thinking and Modeling for a Complex World*. Boston: McGraw-Hill, 2000.
- Siegel K, Schrimshaw EW, Kunzel C, Wolfson NH, Moon-Howard J, Moats HL, Mitchell DA. Types of Dental Fear as Barriers to Dental Care Among African American Adults With Oral Health Symptoms in Harlem. *J Health Care Poor Underserved* 2012;23:1294-1309.
- Mason D. JAMA Forum: The Affordable Care Act and Emergency Care Visits: Why Choose the Emergency Department? [news@JAMA](http://news@JAMA), 2014. [newsajama.jama.com/2014/02/26/jama-forum-the-affordable-care-act-and-emergency-care-visits-why-choose-the-emergency-department](http://newsajama.jama.com/2014/02/26/jama-forum-the-affordable-care-act-and-emergency-care-visits-why-choose-the-emergency-department). Accessed Feb. 5, 2015.
- Peppe EM, Mays JW, Chang HC, Becker E, DiJulio B. Characteristics of Frequent Emergency Department Users. Kaiser Family Foundation, 2007. [kaiserfamilyfoundation.files.wordpress.com/2013/01/7696.pdf](http://kaiserfamilyfoundation.files.wordpress.com/2013/01/7696.pdf). Accessed Feb. 5, 2015.
- Metcalf SS, Northridge ME, Widener MJ, Chakraborty B, Marshall SE, Lamster IB. Modeling Social Dimensions of Oral Health Among Older Adults in Urban Environments. *Health Educ Behav* 2013;40(1 suppl):63S-73S.
- Flynn P, Call KT, Pintor JK, Elmi N. The Projected Effect of the Affordable Care Act on Dental Care for Adult Medicaid Enrollees. *J Health Care Poor Underserved* 2014;25(1 suppl):79-94.

THE CORRESPONDING AUTHOR, Mary E. Northridge, PhD, MPH, can be reached at [men6@nyu.edu](mailto:men6@nyu.edu).