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 FOR HEALTH SERVICES RESEARCH

## Improving Mouth Care in Nursing Homes: Pilot Testing to Pragmatic Trials

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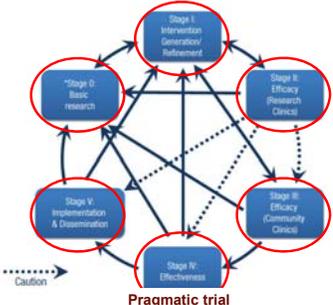

  
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## The Goal of Research

Produce new knowledge or deepen understanding  
 ... to improve well-being


  
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## The NIH Stage Model



Pragmatic trial


  
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REVIEW


**The answer is 17 years. what is the question: understanding time lags in translational research**

Zoë Skote Morris<sup>1</sup> • Steven Wooding<sup>2</sup> • Jonathan Grant<sup>3</sup>  
<sup>1</sup>NIH, <sup>2</sup>NIH, <sup>3</sup>NIH

**The NIH Stage Model** 

**Reenvisioning Clinical Science: Unifying the Discipline to Improve the Public Health**

Lisa S. Onken<sup>1</sup>, Kathleen M. Carroll<sup>2</sup>, Varda Shoham<sup>3</sup>, Bruce N. Cuthbert<sup>4</sup>, and Melissa Riddle<sup>5</sup>

<sup>1</sup>National Institute on Drug Abuse, <sup>2</sup>NIH, <sup>3</sup>NIH, <sup>4</sup>National Institute of Mental Health, and <sup>5</sup>National Institute of Dental and Craniofacial Research

## What's Your Perspective on Mouth Care (Tooth Brushing)?

I brush my teeth every day.

I have taken care of my teeth throughout my life.

If I can't clean my teeth, I hope someone will do it for me.

I know nursing home residents' mouth care is done regularly and well.

### What *is* the status of mouth care for people who are dependent?

**The New York Times** August 4, 2013

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**In Nursing Homes, an Epidemic of Poor Dental Hygiene**  
*By Catherine Saint Louis*

Katherine Ford visited her father, Dean Piercy, a World War II veteran with dementia, at a nursing home in Roanoke, Va., for months before she noticed the dust on his electronic toothbrush ...

... after he complained of a severe, unrelenting headache, she badgered the staff to make an appointment with the dentist. The dentist found that a tooth had broken in two ... and part had lodged in the roof of her father's mouth.



**The New York Times** August 4, 2013

**The Status of Mouth Care In Nursing Homes**

Kansas: 540 residents in 20 nursing homes

- 30% had "substantial oral debris" on two-thirds of their teeth
- more than one-third had untreated decay

Wisconsin: 1,100 residents in 24 nursing homes

- 31% had teeth broken to gums
- 35% had substantial oral debris

New York: residents in 5 nursing homes

- only 16% received any care at all
- among those who did, the average time spent brushing teeth was ... 16 seconds

**The New York Times** August 4, 2013

**The Status of Mouth Care In Nursing Homes**

- Today's residents require more care because more have teeth
- Cavities, gum disease, and cracked teeth result because mouths aren't kept clean
- Aides are swamped with other tasks; tooth brushing falls to the bottom
- Few staff are trained to care for residents who resist care

***"You can measure quality in a nursing home by looking in people's mouths, because it's one of the last things to be taken care of."***

Dr. Judith Jones, Chair, Department of General Dentistry, Boston University

**The New York Times** August 4, 2013

Some of the 207 comments

- Dentist: *"I'm baffled that facilities have designated rooms for licensed hair care but no room for health care. In the picture with the article, the woman is getting treated in a conference room! No privacy, infection control, dignity or HIPPA compliance. Note the other residents watching the procedures being done."*
- Daughter: *"I bought and they lost 3 different electric toothbrushes. The final straw was when I discovered they had been brushing her teeth with her deceased roommate's toothbrush."*



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**Typical Nursing Home Resident Plaque and Gingivitis**



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**Why Isn't Care Better?**

- Lack of knowledge and skill
  - Residents who resist care
  - Products and techniques
- Lack of time
- Fear of injury; distaste for task
- No oversight or accountability

**Not Recognized as a Health Care Priority**

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**Mouth Care and Pneumonia**

- Poor oral health → bacterial pathogens
- Bacteria get inhaled → aspiration pneumonia
- Two-thirds of nursing home residents have bacterial pathogens in their dental plaque



**Mouth Care to Prevent Pneumonia**

Pilot Studies

- Weekly dental hygienist → 42% reduction in pneumonia mortality
- Systematic mouth care after meals → 56% reduction in pneumonia

Up to 50% of pneumonias might be avoided by providing mouth care

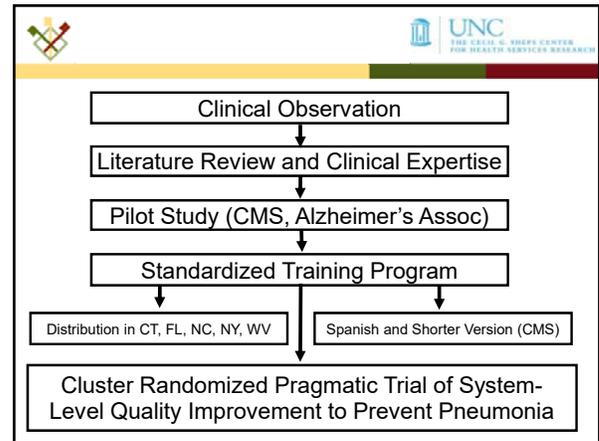
**Mouth Care to Prevent Pneumonia**

Pilot Studies



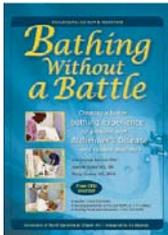
**Background**

**Overview of the University of North Carolina Mouth Care Without a Battle Program**

<http://www.mouthcarewithoutabattle.org/page/dvd>

**Pragmatism: The Name Mouth Care “Without a Battle”**



- Bathing Without a Battle
- Distributed to all nursing homes in the country
- Recognized as an indicator of culture change by the Commonwealth Fund
- Recognized by CMS in their interpretive guidelines

**1. Remove Plaque**

Plaque removal reduces the risk of developing gingivitis and promotes gum health



Mechanical action -- *jiggle, sweep* -- is most important to remove plaque; clean between teeth

**2. Treat Gingivitis**

Inflammation of the gums largely due to bacteria-filled plaques on teeth



Brushing with antimicrobial agents can restore gum health

**3. Prevent Tooth Decay**

Tooth decay is associated with decreased oral intake and reduced quality of life



Daily fluoride use can reduce tooth decay

**4. Clean Dentures and Gums**

Scratched dentures harbor bacteria



Remove dentures; soft brushes and water resist scratches

**5. Meet Behavioral Challenges**

- Refusing to open mouth
- Biting tooth brush
- Refusing to let denture be removed/inserted
- Hitting, yelling, grabbing



Behavioral Symptom	Example Person-Centered Technique
Nonspecific	<ul style="list-style-type: none"> <li>• Focus on the person rather than the task</li> </ul>
Won't open mouth	<ul style="list-style-type: none"> <li>• Sing with the person</li> </ul>
Refuses mouth care	<ul style="list-style-type: none"> <li>• Phase in mouth care (e.g., do front of teeth one day, back the next, interdental brush later)</li> </ul>
Resists care by grabbing	<ul style="list-style-type: none"> <li>• Hand the person the toothbrush and invite to brush</li> </ul>
Bites toothbrush	<ul style="list-style-type: none"> <li>• Insert a smaller brush to work around the toothbrush</li> </ul>
Hits or fights	<ul style="list-style-type: none"> <li>• Check for broken teeth, sore spots, or infection</li> </ul>
Has trouble swallowing or cannot spit	<ul style="list-style-type: none"> <li>• Use a small amount of antimicrobial rinse</li> </ul>

**6. Assess and Monitor Care**

**Oral Care Aide**

**Efficacy Evaluation**

- Three nursing homes
- Two CNAs in each trained as oral care aides
- Total of 97 residents

*Changing the Culture of Mouth Care: Mouth Care Without a Battle*

Sheryl Zimmerman, PhD,<sup>1,2,3</sup> Philip D. Skane, MD, MPH,<sup>1,2</sup> Lauren W. Cohen, MA,<sup>1</sup> and Ann Louise Barrick, PhD<sup>1</sup>

**DENTAL AND ORAL HEALTH**

Effect of a Person-Centered Mouth Care Intervention on Care Processes and Outcomes in Three Nursing Homes

Philip D. Skane, MD, MPH,<sup>1,2</sup> Sheryl Zimmerman, PhD,<sup>1,2,3</sup> Xi Chen, DDS, PhD,<sup>1</sup> Ann L. Barrick, PhD,<sup>1</sup> Patricia Poole, RDH, MS,<sup>1</sup> David Reed, PhD,<sup>1</sup> Madeline Mitchell, MURP,<sup>1</sup> and Lauren W. Cohen, MA,<sup>1</sup>

**Results: Tooth Surface Cleaning**

	Before training	After training
Upper teeth		
Outer surface	96%	97%
Inner surface	44%	95%
Lower teeth		
Outer surface	97%	98%
Inner surface	63%	93%

**Results: Oral Hygiene**

Indicator	Significance
Plaque Index	
8 weeks	p < .001
6 months	p < .001
Gingival Index	
8 weeks	p < .001
6 months	p = .008

**Results: Interdental Cleaning**

	Before training	After training
Upper teeth	0%	88%
Lower teeth	0%	91%



**Results: Staff Attitudes**

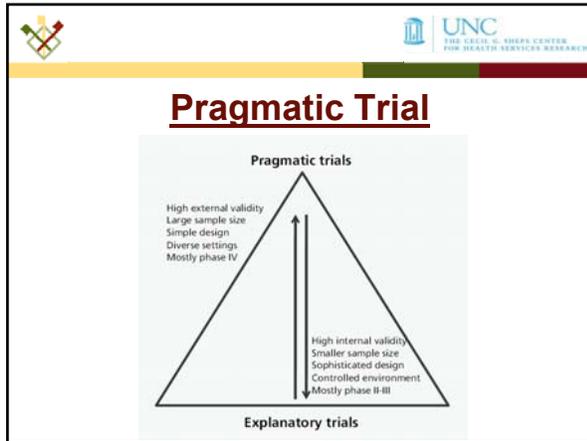
	Before Training	After Training
I have the necessary time to do the job	2.3	3.7
I have sufficient knowledge to do the job	2.7	3.8
I get residents to cooperate with mouth care	2.7	3.8

1 = Strongly disagree; 2 = Disagree; 3 = Agree; 4 = Strongly Agree

**The Goal of Research**

**Produce new knowledge or deepen understanding**

**... to improve well-being**

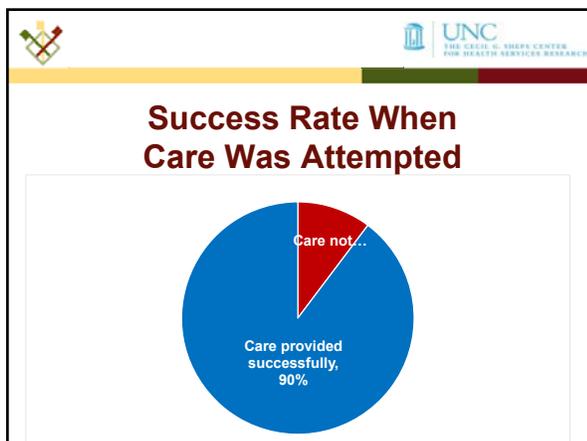
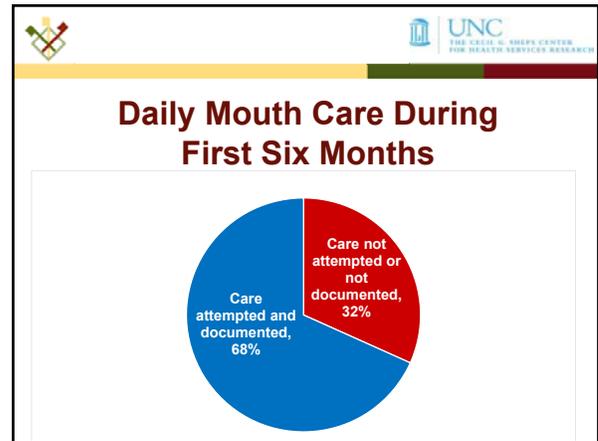


- ### System-Level Cluster Randomized Quality Improvement Trial
- 14 nursing homes involved for two years
    - In counties with proportionately high rehospitalization rates for pneumonia and long-term care residents
    - Matched by size and baseline pneumonia rate
    - Randomized to control or intervention
  - Provided standardized training and ongoing support to oral care aides and all aides
  - Monitored fidelity
  - Assessed oral hygiene, pneumonia, hospitalization, costs

### Percent of Staff Who Attended Three Training Sessions

Staff Type	Site A	Site B	Site C	Site D	Site E	Site F	Site G	Overall
CNAs	35%	48%	61%	39%	57%	42%	37%	46%
Nurses	35%	6%	72%	25%	62%	50%	31%	40%

*Have since developed one integrated training session*



### 24 Month Change in Oral Hygiene (N=219)

	Control (n=98)			Intervention (N=121)			p
	Baseline	24 Month	Δ	Baseline	24 Month	Δ	
Plaque (0-3)	1.60 (.34)	1.67 (.33)	<b>+07</b>	1.65 (.31)	1.26 (.36)	<b>-.39</b>	<b>.032</b>
Gingiva (0-4)	1.42 (.38)	1.73 (.52)	<b>+31</b>	1.54 (.33)	1.19 (.35)	<b>-.35</b>	<b>.015</b>
Denture plaque (0-4)	2.69 (1.00)	2.29 (1.23)	<b>-.39</b>	2.02 (.54)	1.34 (.41)	<b>-.68</b>	<b>.038</b>

Measures: Plaque Index for Long-Term Care, Gingival Index for Long-Term Care, Denture Plaque Index; higher scores indicate worse oral hygiene

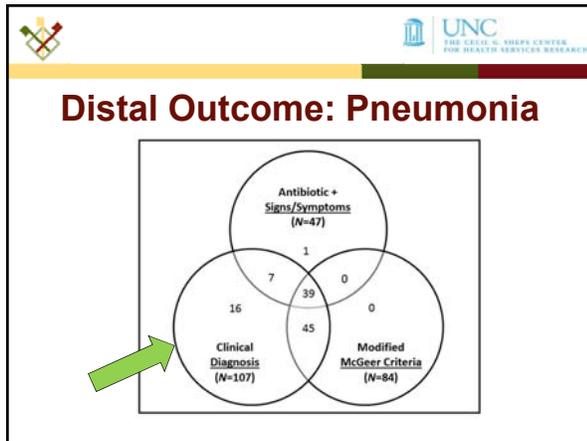
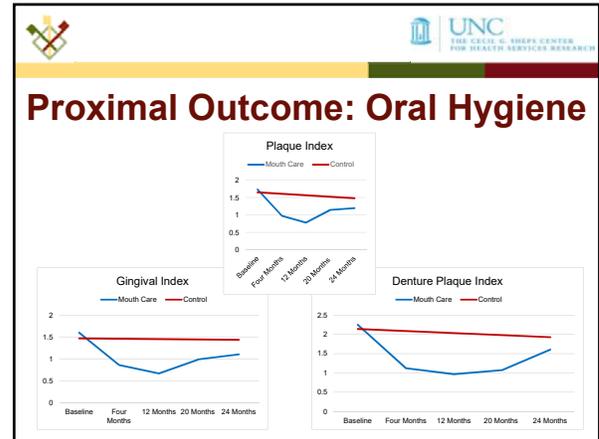
**24 Month Change in Oral Hygiene (N=219)**

JAMDA  
journal homepage: www.jamda.com

Original Study  
**Improving Nursing Home Residents' Oral Hygiene: Results of a Cluster Randomized Intervention Trial**

Jane A. Weintraub DDS, MPH<sup>a,b,\*</sup>, Sheryl Zimmerman PhD<sup>c,d</sup>, Kimberly Ward BA<sup>e</sup>, Christopher J. Wretman PhD<sup>f</sup>, Philip D. Sloane MD, MPH<sup>g,h</sup>, Sally C. Stearns PhD<sup>b,c</sup>, Patricia Poole RDH, MS<sup>i</sup>, John S. Preisser PhD<sup>j</sup>

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<sup>f</sup>Department of Family Medicine, University of North Carolina at Chapel Hill, Chapel Hill, NC



**Pragmatic Considerations: Recruitment**

Concept	Investigator Rating	
	Pragmatism	Comments
<b>Eligibility:</b> Extent to which residents are similar to those receiving usual care	High	<ul style="list-style-type: none"> <li>No exclusionary criteria</li> <li>No need for consent</li> <li>No measurement burden</li> </ul>
<b>Setting:</b> Extent of difference of trial setting from usual care setting	High	<ul style="list-style-type: none"> <li>Nursing homes are largely similar</li> </ul>
<b>Recruitment:</b> Extent of extra effort to recruit residents compared to what would be typical in usual care	High	<ul style="list-style-type: none"> <li>No need to recruit residents in cluster randomized trial</li> </ul>

**Pragmatic Considerations: Intervention Delivery**

Concept	Investigator Rating	
	Pragmatism	Comments
<b>Flexibility in Care:</b> Extent to which flexibility of care delivery is similar to that anticipated in usual care	High	<ul style="list-style-type: none"> <li>Staff were provided tools and encouraged to individualize care</li> </ul>
<b>Flexibility in Delivery:</b> Extent to which flexibility in encouraging and monitoring adherence is similar to that anticipated in usual care	High Moderate	<ul style="list-style-type: none"> <li>Nurses did not promote or monitor adherence</li> <li>Quality improvement requires monitoring</li> </ul>
<b>Organization:</b> Extent to which resources, provider expertise, and organization of care delivery are similar to those in usual care	Low	<ul style="list-style-type: none"> <li>Role of oral care aide is considered critical; provided her salary and mouth care supplies</li> </ul>

**Pragmatic Considerations: Intervention Delivery**

Concept	Investigator Rating	
	Pragmatism	Comments
<b>Flexibility in Care:</b> Extent to which flexibility of care delivery is similar to that anticipated in usual care	High	<ul style="list-style-type: none"> <li>Staff were provided tools and encouraged to individualize care</li> </ul>
<b>Flexibility in Delivery:</b> Extent to which flexibility in encouraging and monitoring adherence is similar to that anticipated in usual care	High Moderate	<ul style="list-style-type: none"> <li>Nurses did not promote or monitor adherence</li> <li>Quality improvement requires monitoring</li> </ul>
<b>Organization:</b> Extent to which resources, provider expertise, and organization of care delivery are similar to those in usual care	Moderate/ High	<ul style="list-style-type: none"> <li>Should we conduct a trial in the current health care environment, or in a context representing the future?</li> </ul>

**Oral Care Aides:  
Critical for System-Level Change**

Arguments in Favor	Arguments Against
<ul style="list-style-type: none"> <li>Mouth care of people who are impaired is complex and specialized</li> <li>Results are better</li> <li>Nothing else has worked</li> <li>People receiving care and their families notice the difference</li> <li>Serves as a career ladder for motivated staff</li> <li>Mouth care aide can train and support other staff</li> </ul>	<ul style="list-style-type: none"> <li>Counter to the universal worker philosophy</li> <li>Supervisory nurses will pull them to fill staff shortages</li> <li>Cost</li> </ul>

**Pragmatic Considerations:  
Follow-Up**

Concept	Investigator Rating	
	Pragmatism	Comments
Follow-Up: Extent to which intensity of measurement and follow-up is similar to that in usual care	Low  High	<ul style="list-style-type: none"> <li><b>Proximal</b> measure of oral hygiene not standard</li> <li><b>Distal</b> measure of pneumonia highly standard and unobtrusive</li> </ul>

**Pragmatic Considerations:  
Determination/Analysis of Outcomes**

Concept	Investigator Rating	
	Pragmatism	Comments
Primary Outcome: Extent to which primary outcome is directly relevant to participants	High	<ul style="list-style-type: none"> <li>Pneumonia is serious and life-threatening</li> </ul>
Primary Analysis: Extent to which all data were included in the analysis of the primary outcome	High	<ul style="list-style-type: none"> <li>Intention-to-treat</li> <li>Little missing data re: pneumonia diagnosis</li> </ul>

**Pragmatic-Explanatory Continuum**

**Mouth Care Without a Battle:  
Summary of a Pragmatic Trial**

- Addresses an important and recognized concern
- Links basic and applied clinical science; clear mechanism of change
- Improves health outcomes
- Developed and able to be conducted in nursing homes
- Model of person-centered quality improvement
- Applicable across settings of care and for all residents; benefits caregivers
- Standardized, easy to disseminate
- Requires buy-in or mandate for implementation*

**Mouth Care Without a Battle**

[www.mouthcarewithoutabattle.org](http://www.mouthcarewithoutabattle.org)