

**Mouth Care Matters:  
Prepare to Care Oral Health Specialty  
Training Evaluation  
(Distribution Copy)**

**September 2016**

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**Suggested Citation:** Richardson, B.; Hayashi, V, McCrory, K. (2016). Mouth Care Matters: Prepare to Care Oral Health Specialty Training Evaluation. Iowa City, IA: The University of Iowa School of Social Work, National Resource Center for Family Centered Practice.

**Disclosure:** This evaluation was funded by the Iowa CareGivers through a grant from the Delta Dental of Iowa Foundation (DDIAF), Mid-Iowa Health Foundation, and the Iowa Department of Public Health through a Centers for Disease Control and Prevention Cooperative Agreement (#DP13-1307), The findings presented in this report represent the authors alone, and do not necessarily express the views of the funding agencies or The University of Iowa, the School of Social Work, National Resource Center for Family Centered Practice.

## Preface

Participants in Mouth Care Matters (MCM) Oral Health Specialty training were Direct Care Professionals (DCPs). The title direct care professionals (DCPs) is used in this report because we found it to be generally preferred by those in the field although many job titles are used such as direct support professional, supported community living worker, home health aide, direct care worker, universal worker, hospice aide, personal assistant and certified nursing assistant. DCP's are paid to provide supportive services and care for those experiencing illness, disability or other health conditions. DCPs work in homes and hospice agencies, hospitals, nursing homes, group homes, assisted living, adult day services, hospice agencies and other community-based settings.

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## Introduction

The Centers for Disease Control and Prevention, Division of Oral Health reports 70 percent of the United States population over 65 has periodontal disease. The American Dental Association has found that poor oral health among the elderly in nursing homes is pervasive and has been linked to aspiration pneumonia among other health problems. The risk of aspiration pneumonia associated with periodontal disease is linked to dental caries and poor oral hygiene further complicated by swallowing disease, feeding problems and poor functional status.

In a study of gum disease and tooth loss conducted over 16 years by researchers at Harvard University, University of San Juan and the Dana-Farber Cancer Institute, tooth loss was associated with pancreatic cancer. Controlling for factors including age, smoking, diabetes, obesity, diet and others, men with a history of gum disease had a 64 percent higher risk of pancreatic cancer than men without a history of gum disease. The authors suggest that chronic infection of the gums could be associated with general inflammation throughout the body, and inflammation could promote the growth of cancer. The American Dental Association found that diabetes may also be associated with periodontal disease and pancreatic cancer. Pancreatic cancer has been linked to tobacco smoking, age and family history; however, these more recent studies indicate there may be a link to gum disease.

Despite the growing attention to oral health care in nursing homes and the association of poor oral health care and systemic inflammation and disease, training of DCPs has been found ineffective according Wang et al. (2015) suggesting that oral hygiene interventions for preventing aspiration pneumonia and general barriers to good oral care in nursing homes is an area needing further study. Some studies indicate perceptions about the adequacy of oral health among nursing home administrators and their perceptions about training for nurses and caregivers for providing effective oral health practices in nursing homes present barriers to the use of knowledge or skills from training by DCPs. The potential cost associated with aspiration pneumonia in nursing homes alone suggests the importance of studies of improving oral health among those working in nursing homes.

Mouth Care Matters (MCM) is one of three major initiatives of the Lifelong Smiles Coalition and led by Delta Dental of Iowa Foundation intended to increase access to and improve oral health care of older Iowans who are homebound or living in nursing homes. MCM was administered by

Iowa CareGivers with financial support from the Delta Dental of Iowa Foundation (DDIAF). Other financial support was provided by Mid-Iowa Health Foundation, Iowa Department of Public Health through a Centers for Disease Control and Prevention Cooperative Agreement (#DP13-1307), and in-kind contributions from Des Moines Area Community College (DMACC), Iowa Dental Hygienists' Association, The University of Iowa Colleges of Dentistry and Nursing and The University of Iowa School of Social Work, National Resource Center for Family Centered Practice and many other stakeholders.

The focus of the evaluation presented in this report is the Oral Health Specialty Curriculum. Specifically, did the curriculum achieve the intended result of providing DCPs with practical content, was the knowledge retained and did that knowledge transfer to practice in the work environment.

The Oral Health Specialty Curriculum was developed and written to be the first specialty training added to the state's Prepare to Care curriculum. Prepare to Care, resulted from recommendations of a legislatively-directed and Governor-appointed Direct Care Worker Task Force. Two key recommendations of the Direct Care Worker Task Force were to: 1) develop a standardized competency-based training curriculum; and 2) provide those in direct care/service opportunities to specialize in various areas including oral health. Iowa was one of six states to receive a Health Resources and Services Administration (HRSA) sponsored Personal and Home Care Aide State Training (PHCAST) Demonstration Program (authorized under Section 5507(a) of P.L. 111-148, the Patient Protection and Affordable Care Act), awarded to the Iowa Department of Public Health (IDPH), and with which the Prepare to Care curriculum was developed and tested. The Mouth Care Matters Oral Health Specialty project grant was awarded to Iowa CareGivers by Delta Dental of Iowa Foundation (DDIAF). Other DDIAF grantees include the Iowa Department of Public Health's I-Smile Silver program, and the establishment of the Office of Education and Training through the University of Iowa's College of Dentistry. A cross site evaluation was also conducted by, California-based, Harder+Company.

### **Curriculum Development and Training of Trainers**

The curriculum was developed by Dr. Anita Stineman, Clinical Associate Professor at The University of Iowa School of Nursing in cooperation with the University of Iowa College of Dentistry and with technical assistance, review, and resource contributions by Dr. Howard Cowen, University of Iowa College of Dentistry. Dr. Stineman was principal author of the Prepare to Care

curriculum and instruction using train the trainer model. A similar train the trainer model was used to train dental hygienists to become curriculum trainers for the oral health specialty module. Iowa CareGivers recruited dental hygienists , resulting in twenty-three (23) applications being accepted, and twenty-three (23) dental hygienists completed instructor training conducted by Drs. Stineman and Cowen.

## Training

The Mouth Care Matters Oral Health Specialty training is intended for individuals who have already completed, either online or in person, the Prepare to Care six-hour core training. The core training provides foundational knowledge and skills needed to perform direct care in many settings and is required before taking Prepare to Care modules or specialties. The Core includes six units of training that include:

1. Professionalism
2. Person-Centered Approach
3. Communication and Interpersonal Skills
4. Infection Control
5. Mobility Assistance and Worker Safety

Sixty-four (64) direct care professionals (DCPs) attended one of six two-day Oral Health Care Specialty trainings held from September 22 to October 23, 2015. Trainings were held in the Des Moines Area Community College service area (Adair, Audubon, Boone, Carroll, Clarke, Crawford, Dallas, Greene, Guthrie, Hamilton, Hardin, Jasper, Lucas, Madison, Mahaska, Marion, Marshall, Polk, Poweshiek, Shelby, Story, and Warren counties). Table 1, below, shows the date, location and number who participated in each training session.

**Table 1: MCM Training by Date, Location and Number of Participants**

Date	Location	Number of Participant
September 22 and 23, 2015	Ankeny	16
September 25 and 26, 2015	Boone	9
October 9 and 10, 2015	Boone	7
October 16 and 17, 2015	Carroll	5
October 16 and 17, 2015	Newton	8
October 22 and 23, 2015	Ankeny	19

## Design and Methods

To evaluate the effectiveness of the curriculum for increasing knowledge, tests were administered prior to and following training (i.e., pre-test post-test design). The tests were constructed by the curriculum author during the development of the material. Tests were administered by trainers in a manner to ensure confidentiality and anonymity (e.g. participants placed tests in an envelope addressed to the evaluation team that was sealed in view of participants and placed in the U.S. Mail).

The evaluation also included participant observation to measure the impact of the training program at nursing homes (Ember, C. & Ember, M., 1986; Glaser, B. & Strauss, A., 1967; Rubin & Babbie, 2008; Spradley, 1979, 1980). Participant observation studies have been conducted in a wide variety of settings, from studies of migrant populations (Hendricks & Richardson, 1982) to homelessness and alcoholism (Spradley, 1970), from oil industry effects on native villages in Alaska (Jorgensen, McNabb, McLeary & Richardson, 1987) to workplace behavior including employee theft (Hollinger and Clark, 1983). The method provides a more in depth understanding of settings, and behavior within those settings, important for understanding the impact of training on day to day practice among DCPs.

The approach includes informal and formal interviews, immersion and observation, analyses of documents and oral histories. Participant observation is generally considered qualitative research, however, quantitative data may also be collected and included (e.g., a survey of staff of agencies could be conducted in conjunction with the observational method). Traditional participant observation is usually undertaken over an extended period of time in order to establish rapport, record observations and conduct interviews. Researchers typically journal observations, thoughts and feelings about the subject of study and these records are used in subsequent analysis.

An extended research time period means that the researcher is able to obtain more detailed and accurate information about the individuals, community, and/or population under study.

Observable details (like daily time allotment) and more hidden details (like taboo behavior) are more easily observed and interpreted over a longer period of time. A strength of observation and interaction over extended periods of time is that researchers can discover discrepancies between what participants say—and often believe—should happen (the

formal system) and what actually does happen, or between different aspects of the formal system. In contrast, a one-time survey on a set of questions might be consistent, but is less likely to show conflicts between different aspects of the social system or between conscious representations and behavior.

## Results

Pre- and post-tests were completed by DCPs before and after training modules were delivered to test knowledge gain. Table 1 provides overall results from the oral health training tests. Paired sample *t*-tests were performed to test whether the number of items correctly answered on the test increased significantly after training. The mean score for the number of items answered correctly increased 2.87 from before training to after training. This is a significant increase ( $t = 8.558$ ;  $df = 63$ ;  $p = .000$ ). Table 2 presents the summary results from the paired *t*-test.

**Table 2: Oral Health Specialty Module Summary of Results**

Test	Mean	Reported Score Range	n	Standard Deviation	Significance
Pre-Test	14.63	7-21	64	3.331	.000
Post-Test	17.50	8-23		3.423	

## Test Validity and Reliability

For the purposes of assessing how well the test questions performed as measures of knowledge gain, the curriculum developer utilized a classic test item analysis procedure (Kelly, 1939). The approach uses two measures, difficulty and discrimination, to assess the validity and reliability of the test.

The difficulty index is the number of participants who answered a question correctly, divided by the number who answered the question. The discrimination index uses the lower 27 percent (lowest 27 percent on the total number of correct answers among all test takers) and the upper 27 percent (highest 27 percent on the total number of correct answers among all test takers). The difference in the percentage among the upper and lower groups of test takers is the discrimination score.

The difficulty index measures how difficult a test item is based on the percentage who correctly answered the question. Where more than 75 percent answer correctly, the question is

determined to be “easy.” Of the 24 questions, 12 (50%) of the questions had a difficulty index score of greater than 75 percent. A difficulty index of less than 25 percent is considered a difficult question; two questions (8.3%; items 12 and 19) had a difficulty index score of less than 25 percent.

The discrimination index ranges from -1 to +1. A high positive index indicates that the upper group had a higher number of correct answers for the question while a high negative index indicates that those in the lower group had more correct answers for the item. One question (item 12) obtained a negative discrimination score which means the participants who scored poorly overall on the test did better on this particular question than the participants who scored very well on the overall test. Table 3 presents the difficulty and discrimination scores for each item.

**Table 3. Test Item Response: Difficulty and Discrimination Indices\***

Item	N	Difficulty Index		Disc. Index
1	64	0.00%	.97	.00
2	64	4.70%	.100	.00
3	64	6.20%	.83	.65
4	64	31.30%	.69	.53
5	64	18.70%	.66	.71
6	64	15.60%	.66	.71
7	64	3.10%	.72	.71
8	64	10.90%	.91	.29
9	64	4.70%	.83	.12

Item	N	Difficulty Index		Disc. Index
10	64	26.60%	.44	.82
11	64	10.90%	.78	.59
12	64	1.50%	.11	-.06
13	64	37.50%	.52	.35
14	64	20.30%	.91	.29
15	64	15.60%	.45	.47
16	64	31.20%	.95	.18
17	64	7.80%	.75	.12
18	64	-9.30%	.56	.06
19	64	10.90%	.17	.06
20	64	34.30%	.73	.18
21	64	32.80%	.84	.18
22	64	34.40%	.97	.06
23	64	23.50%	.31	.59
24	64	10.90%	.92	.24

### Use of Test Items in Evaluation

The use of the test items for evaluation purposes differs from their use in classic test item analysis. For evaluation purposes we compare before and after (pre-post) training responses. In this manner the tests aid in determining to what extent knowledge was gained in specific content areas, measured by the items, among those participating as students. Based on the distribution of the responses, whether lower scores are attributable to the test itself or to the delivery of the curriculum may be indicated. In this manner it is possible to identify areas in

which the curriculum performed well and where it did not. In addition, exploration of the response distribution with accounts by those who took the test may reveal issues attributable to the test itself, the delivery of the content of the curriculum or other issues. The number and percentage selecting each answer for each of the 24 questions is presented in Table 3, below.

**Table 3: Pre- and Post-Test Item Responses with Percent Change in Correct Answers\***

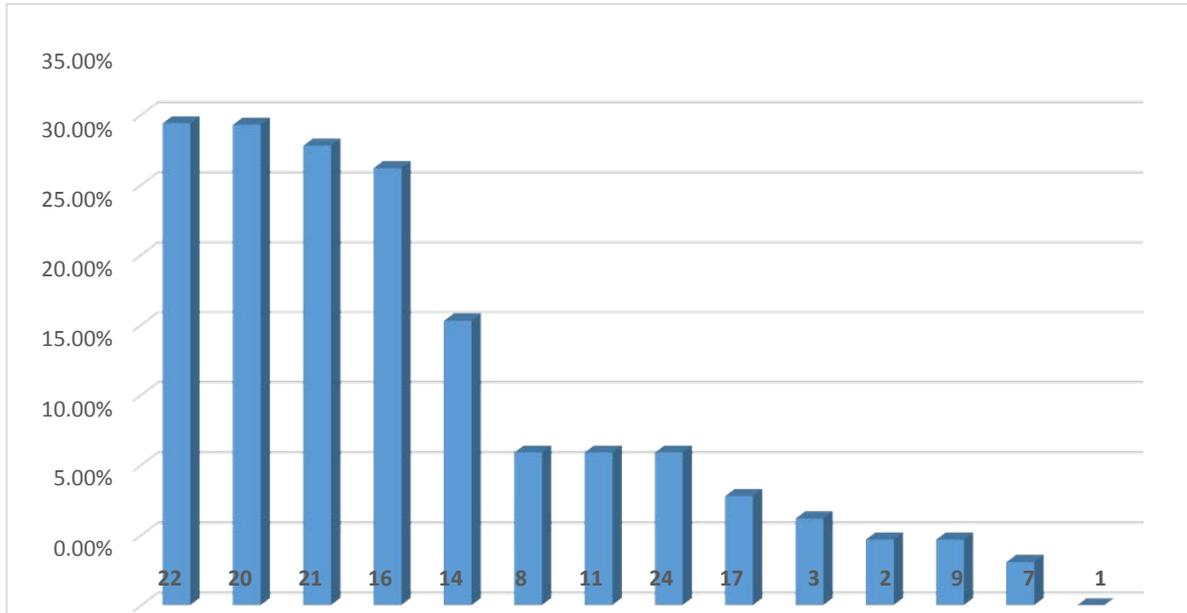
<b>Item</b>	<b>Total</b>	<b>Percent Change Correct</b>
1	64	0.00%
2	64	4.70%
3	64	6.20%
4	64	31.30%
5	64	18.70%
6	64	15.60%
7	64	3.10%
8	64	10.90%
9	64	4.70%
10	64	26.60%
11	64	10.90%
12	64	1.50%

Item	Total	Percent Change Correct
13	64	37.50%
14	64	20.30%
15	64	15.60%
16	64	31.20%
17	64	7.80%
18	64	-9.30%
19	64	10.90%
20	64	34.30%
21	64	32.80%
22	64	34.40%
23	64	23.50%
24	64	10.90%

Following training, 14 of the 24 test items were answered correctly (at post-test) by 70 percent or more of those attending training. Overall, 41 of 64 trained correctly answered 70 percent of the items. We use 70 percent as a threshold number to be consistent with the percentage the curriculum developers determined to be a “passing grade.”

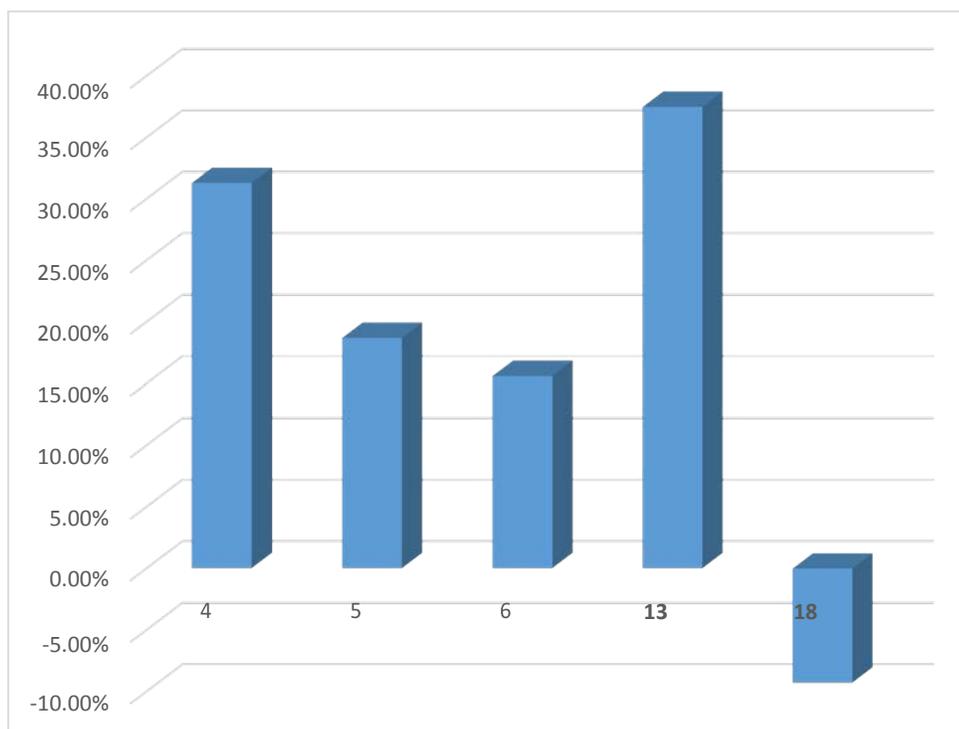
For evaluation it is also important to review the change in percentage along with the percentage correct to understand the effect of the training on knowledge and learning. Figure 1, below, illustrates the percentage increase at post-test compared to pre-test on the items that were answered correctly at 70 percent or more following training.

**Figure 1: Change in Percent Answered Correctly By 70 Percent or More on Post- test**



Five items were answered correctly by 51.6 to 68.8 percent of those attending training. Figure 2, below, illustrates the percentage increase on these five items. On items 4, 5, 6 and 13 percentage increases ranged from 15 to 35 percent. On item 18, there was a decrease of 9 percent, from 65.6 percent correctly answering the question before training to 56.3 percent correctly answering the question after training.

**Figure 2: Change in Percent Correct for Items Answered Correctly By 50 to 70 Percent on Post-test**



Five items were answered correctly by fewer than 50 percent of those attending training. Figure 3, below, illustrates the percentage increase on these five items. Items 10 and 23 obtained increases in the percentage correct by more than 20 percent. Item 15 increased by nearly 15 percent. Item 19 increased by 10 percent. Item 12 increased by 1.5 percent.

**Figure 3: Change in Percent Answered Correctly By Fewer than 50 Percent on Post-test**

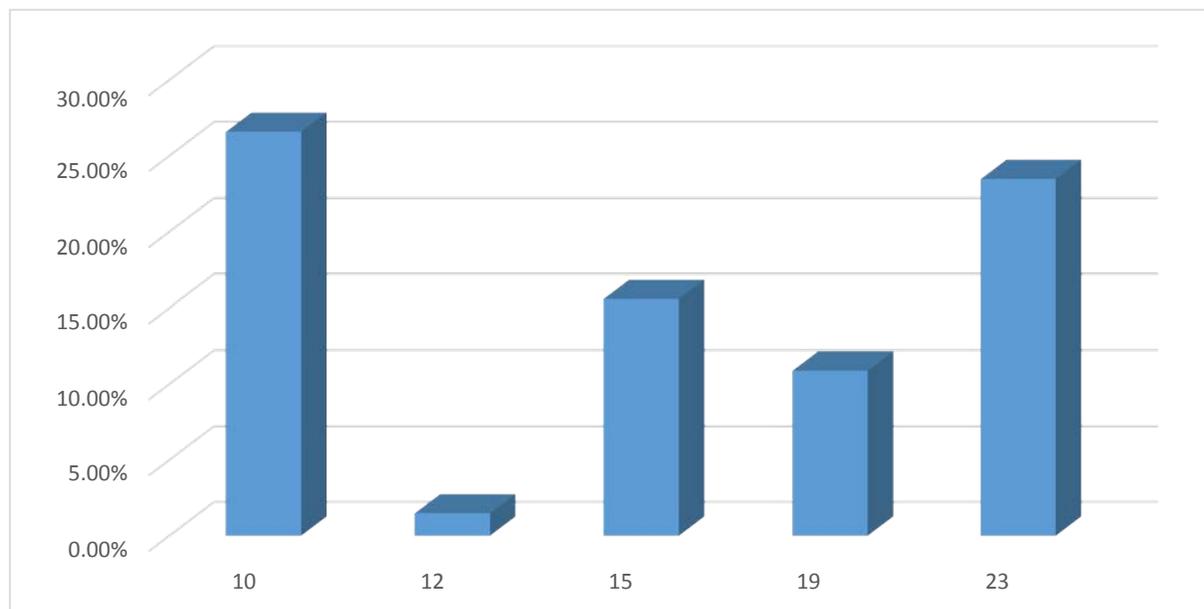


Table 4 presents the results from the test items in a two by two table. The table shows the percent correct divided higher or lower than the 70 percent correct level (*high* and *low*). Change is also divided into higher or lower than 11 percent change (i.e., a standard of difference at more than 10 percent).

The table shows that items in the *high change and high percentage correct* cell were: 8, 11, 14, 16, 20, 21 and 22. These items were answered correctly by more than 70 percent and change from the pre-test knowledge test was greater than 11 percent for each of the items. *The high percentage change and low percent correct* cell includes items 4.5.6, 10, 13, 15 and 24. These item percentage correct changed at a relatively high level although the percentage correct did not meet the standard set by the curriculum developers. *The low percentage change and low percent correct* cell includes items 12, 18 and 19. These items had low percentages correct and changed at a relatively low level. *The low percentage change and high percent correct* cell includes items

1,2,3,7,9,17 and 23. While these had high percentages correct, the change in the percentage correct was relatively low.

**Table 4: Change in Percent Correct By Fewer than 50 Percent on Post-test**

		Change	
		<i>Low</i>	<i>High</i>
		< 11 %	> 11 %
Percent Correct	Low (< 70%)	12,18*, 19	4,5,6,10,13,15,24
	High (> 70%)	1,2,3,7,9,17,23	8,11,14,16,20,21,22

\* negative change

### Participant Experience Prior to Training

Information was gathered to provide information on experience as DCPs, time on the job and setting in which the participants in the training worked. The average length of time on the job was 12.8 years (median = 9 years) with a range of from less than one year to 41 years. Settings in which participants worked included nursing homes (64.1%), in home services (31.3%), hospice (15.6 %) and assisted living (14.1%). (Percentages add to more than 100% because some indicated more than one setting).

The post-test also requested respondents to indicate whether they had completed the six-hour Prepare to Care core course; 45 percent completed it in-person and 57 percent completed it online. (Although the core course was a prerequisite, 3.3 percent of respondents reported they had not completed it). Many participants (88 percent) reported that they were interested in taking additional Prepare to Care courses. A preference for in-person training was expressed by 57.6 percent; 28.8 percent reported a preference for online learning (the remaining 13.6 did not prefer one over the other).

### Satisfaction with Training

Nearly two-thirds (66.1 percent) of the participants reported that they were very satisfied with the training; 29 percent were satisfied, 3.2 percent were dissatisfied and 1.6 percent reported that they were unsure. The post-test also included statements about respondents' evaluation of the

training and its applicability to their jobs and learning style. Participants all (100 percent) indicated that they can use the information they learned and the instructors explained it effectively. Ninety-eight percent reported they would recommend the training to a co-worker and 93.3 percent reported the training contributed to the likelihood they will continue working in the direct care field; 91.4 percent reported that it contributes to the likelihood they will remain with their current employer.

### Outreach and Recruitment to Training

Participants were asked the sources of how they learned of the Mouth Care Matters class (more than one could be chosen). Over 50 percent reported hearing about the training from an employer or supervisor. The Iowa CareGivers HUB newsletter was cited by 17.2 percent of respondents and 14.1 percent heard of the class at the annual Iowa CareGivers conference.

**Table 5: How Did You Learn About the Mouth Care Matters Class?**

Source	
Iowa CareGivers HUB Newsletter	17.2% 11
Iowa CareGivers Website	4.7% 3
Employer or Supervisor	64.1% 41
Community College	0.0% 0
Co-worker or Friend	3.1% 2
Prepare to Care Website	3.1% 2
Iowa CareGivers Facebook Page	3.1% 2
Email	6.3% 4
Iowa CareGivers Conference	14.1% 9
Direct Care Workforce Initiative E-news	6.3% 4
Other	
Iowa CareGivers Council	4.7%
Daughter	3
Director of Nursing at work	

### Post-Test Open-Ended Questions

The post-test included three open-ended questions for participants to share their comments about the training. When asked what they liked most about the training, participants cited the hands-on

and interactive activities, the content presented and the instructors. A complete list of the verbatim comments is attached in Appendix B.

When asked what they liked least about the class, participants mentioned the content and volume of information delivered, the pace of delivery, repetition and the focus being more on nursing home care. Participants also cited the Prepare to Care Core course requirement as being a least liked aspect of the training as well as being required to sit which was unusual for DCPs who are more accustomed to being on their feet on a regular basis. Comments about the format and length of training indicated that some experienced the two day training as “too long” while others suggested it was not long enough. More breaks were also suggested. Other comments participants provided included appreciation for the training, compliments for the instructors and thanks to the Iowa CareGivers and Delta Dental of Iowa Foundation.

### **Observation of Oral Health in Nursing Homes**

Observations and interviews were conducted at two nursing homes, guided by an observation checklist and standard set of questions. Position-specific questions were designed for administrators, directors of Nursing (DoNs), and DCPs. Observations were conducted prior to the beginning of trainings and again six months following completion of all trainings to assess the impact of the MCM training on oral health. Interviews with administrators were conducted, focusing on policies, procedures attention to oral health and the quality of oral health care provided. Manuals were reviewed with administrators and standard charting was discussed including a review of forms used for the charts of individuals served.

Interviews with the DoN and DCPs (as a group) were conducted separately. On-site observations of floors where resident rooms were located allowed the evaluation to gain first-hand experience with the day to day operation and the place oral health held in routine care. During this time the observation checklist was completed.

All DCPs interviewed during the follow-up visit attended one of two trainings. In one nursing home, 28 attended training, six of whom worked in the nursing home observed and five participated in the group interview. In the other facility, 15 DCPs attended training and four participated in the group interview.

The focus of the interviews with DCPs was on the overall training experience, recall of new or important information from the training, new techniques learned, suggestions for improving the

training and perceptions improvements in oral health care since the training and organizational factors that functioned as facilitators or barriers to improvements in oral health care were discussed.

Overall, the DCPs who attended training from both nursing homes reported the training was informative and the instructors were effective using methods that made learning easy. Instructors were described as enthusiastic and knowledgeable about the subject matter. Vivid recollections were reported about oral diseases and the photographic images provided (e.g., “hairy tongue”) which made it easier to identify conditions at work that require attention or referral. One example of the use of the information provided at training is captured in the following description:

*"Not long after the training I noticed one of our residents was not eating. I suspected oral problems and it turned out that she had an infection in her mouth. She was prescribed antibiotics and it helped. Without the training, I probably would not have known to look for anything like that."*

During the interviews, some of the questions on the tests were asked to refresh memories and also as a way to gain insight into a few questions that did not obtain good results. In the discussion of the training and the questions on the test, the three questions indicated in the results to have low change and low percentage of correct answers, were specifically discussed. For each of these questions, insightful explanations about why incorrect responses might have been selected were provided. For item 12, participants indicated that the information may have been learned but the response sets may account for the higher than expected number of incorrect responses. Item 18 was acknowledged as one item where participants may have answered incorrectly because the information was not internalized. In addition, the information presented represents a departure from what many consider a common practice. Item 19 also represents a departure from what could be considered a common practice.

Those interviewed reported that toothbrushes at training were not the same as those in the nursing home. This is a barrier to employing the skills learned in training (“brushes are not usually soft and the handles were different”). For those with many years of experience working in long term care the use of other item such as swabs is a common practice. These explanations are valuable for the curriculum developers and instructors for upcoming training sessions because the information suggests that placing more emphasis on some content is needed and revising test response categories on one test item may be needed.

Both nursing homes indicated an interest in tracking individual level data on health related to oral care (e.g., pneumonia, especially aspiration pneumonia); however, those data were not available during the time of this report. Staff at one nursing home reported that the dentist who treats their residents said, “He could see improvement in the condition of the teeth of residents that he has seen in recent months.” While the training was considered review for many of the attendees, they note more emphasis and understanding of oral hygiene has a “benefit to residents in both the short and long-term.”

The impact of the training beyond those who were trained was reported at both nursing homes. Staff who attended training reported sharing what they learned with co-workers at the nursing home who had not attended training. As mentors, those who attended training reported incorporating their new and refreshed knowledge into the key information to be provided through mentoring. Staff at both nursing homes also described follow-by Iowa CareGivers to plan oral hygiene trainings and campaigns at their facilities. In one nursing home there is a plan to record on-site training for use as a mandatory in-service training that will include passing an internally-developed quiz. Demonstrating techniques in addition to communicating information through the usual lecture style was reported to be especially important for oral health techniques such as bridging and how to handle combative or unconscious residents.

In further discussion, participants reported that a barrier to the use of the information and skills from training was that the tools that were used in training, some of which were provided in the take home bags they were given, are not the same as those in use at the workplace. Having the same tools at the nursing home as used during training is one way to further support the use of the training information.

The DCPs who attended the training provided accounts of the training experience. The two-day length of training was reported to be “about the right amount of time for the material covered;” however, some said that it could be done in one day for those with more experience.

Suggestions for improvement included “more hands-on demonstrations” and “a bit less content on diseases.” A mix of lecture format and activities on both days was suggested because “direct care staff are used to being on their feet all day and find sitting for long periods of time to be difficult.” The training was, without exception, reported to be helpful in reinforcing the need for regular oral care and its impact on overall health. The training was perceived as: “more appropriate for newer workers than experienced workers.”

At both nursing homes, the participants reported there had been no formal changes in policies or procedures. Oral care has always been a part of the morning and evening routine, however, awareness has increased since training. While oral care is an expected part of morning and evening care, “there's no way to fully document it other than a check-off” at either nursing home. At one nursing home it was reported that a more detailed documentation of oral care was being considered that could also serve as a quality assurance tool. Further work with the Iowa CareGivers to increase awareness and outreach is viewed, with great enthusiasm, as a way to further highlight the importance of oral health care to staff, residents and families. Staff from both nursing homes noted that “the emphasis on oral health care would not have happened had they not participated in the Mouth Care Matters project.”

## Findings

Background research indicates that the elderly have high levels of untreated dental disease and nearly 75 percent of those in long term care have gingivitis, “an important marker of poor oral hygiene among elders that may indicate a need for assistance with oral hygiene” (Griffin et al., 2011). Poor oral health is an indicator for quality of life and “oral health (e.g., dentate status and untreated dental disease) of nursing home residents and the homebound is markedly worse than that of the younger elderly living independently” (Griffin et. al, 2011). Advancing age is a risk factor for a number of oral health problems and their concomitant effects on overall health (e.g., aspiration pneumonia, stroke, heart attack and diabetes).

Findings from the Oral Health Specialty training tests indicate:

- A high level of knowledge among participants, following the training, is found in 14 content areas in which they were trained.
- Substantial increases in knowledge were found in seven areas. Suggestions were provided by participants about how the curriculum and testing could be improved.
- Three items were specifically identified where both the curriculum and the test would benefit from modification.

Findings from observation show:

- Increased levels of attention to oral health care at nursing homes where staff were trained.
- Evidence of regular oral care delivery based on observations at nursing homes.

- The training highlighted and renewed attention to the importance of oral care on overall health
- Indications are present that oral care improved as a result of training.

## Recommendations

There is growing evidence of the importance of oral health in caring for older adults in nursing homes and in-home care settings. Poor oral health has been associated with systemic diseases including pneumonia and respiratory infections. The current evaluation found significant gains in knowledge about oral health among DCPs trained through the MCM project. The evaluation also underscores the need, not only to continue to evaluate the effects of training for direct care workers, but also to evaluate how the results of training translate into practices in the workplace, especially nursing homes and home health. The following recommendations are provided as specific steps MCM could take to improve oral health care in nursing homes and the homes of individuals served.

There is growing evidence of the importance of oral health in caring for older adults in nursing homes and in-home care settings. Poor oral health has been associated with systemic diseases including pneumonia and respiratory infections. The current evaluation found significant gains in knowledge about oral health among DCPs trained through the MCM project. The evaluation also underscores the need, not only to continue to evaluate the effects of training for direct care workers, but also to evaluate how the results of training translate into practices in the workplace, especially nursing homes and home health. The following recommendations are provided as actions that could be taken to improve oral health care for individuals served:

- Review and revise the curriculum, training, testing, or measures as indicated from analysis of results; this includes training which takes into account experience level and attention to the lack of availability of some tools in the workplace.
- Conduct focus group discussions with MCM instructors to discuss evaluation findings and recommended changes to curriculum, test, and alternative testing strategies.
- Continue to offer training and collect pre- and post-test data to measure knowledge gain comparing the evaluation results reported here to those of future trainings for continuous quality improvement purposes. Test other training delivery methods to improve DCP access (e.g., online, apps).

- Continue to provide technical assistance to the existing case study sites to help overcome institutional barriers (difficulty in applying new skills, tools used in training not available in their worksite; some techniques taught not consistent with what they had been trained within their work settings; materials in the workplace are not consistent with what was used in training).
- Further support for sustainability could be achieved through developing cost analysis approaches to show cost-effectiveness associated with hospital readmissions and other areas of quality care before and after training.
- Provide opportunities for case study sites to enroll additional DCPs in oral health specialty training to achieve the critical mass needed to change the organizational culture so that oral health is a higher priority.
- Conduct a longitudinal study of changes related to the number of aspiration pneumonia cases, hospital readmissions and reasons for readmissions at case study sites to demonstrate any impact in these areas of quality care.
- Conduct surveys (based on the pre-test) of all staff in nursing homes or home care to determine a general baseline of knowledge and the secondary impact of training that may have occurred.
- Explore the feasibility of developing more standardized oral health protocols in all health and long-term service settings.
- Utilize findings from this evaluation and additional data gathered (e.g., other local studies related to oral health) to inform strategies for future work and to address oral health based on the growing body of evidence of the importance of oral health care for general health and what the most effective practices are currently.
- Explore the feasibility of developing more standardized oral health protocols in all health and long-term service settings.

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