

Final Progress Report June 2th 2012

Project Statement:

This project will increase blood pressure control and reduce tobacco use through system and policy changes in dental practice, and expand heart disease and stroke prevention and quitline services to individuals in an underutilized setting. Lessons learned will be used to guide continuing education and curricula development for dental health professionals in assessment of blood pressure and tobacco use, and to promote educational standards incorporating screening, assessment and referral of high blood pressure and tobacco use statewide.

Introduction

The project goals outlined in the statement above were addressed in 3 phases as follows:

Phase 1: Pilot Study which included recruitment of dental offices and patient assessment

- To conduct an educational project with 5 Iowa dental practices.
- To demonstrate feasibility of assessing blood pressure and tobacco use among patients and making appropriate referrals for intervention by dental health professionals.
- To train dental health professionals to screen and refer their patients for high blood pressure and tobacco use by providing appropriate materials.
- To collect patient data at baseline, 6- and 12-months so as to assess changes in blood pressure and tobacco use status.

Phase 2: Hygiene Program Curriculum Assessment

- To evaluate/improve the curricula at the College of Dentistry and the five dental hygiene programs in Iowa regarding blood pressure and tobacco use screening and referral.

Phase 3: Continuing Education for Practitioners

- To present practitioners with an overview of the dental office pilot study
- To provide a rationale and training for screening and referral for hypertension and tobacco use to practitioners statewide

Phase 1 of this project generated a considerable amount of data including patient blood pressure and tobacco use data, the practices and knowledge of the practitioners in our study and an assessment of the screening process. The following information was collected:

1. Blood pressure and tobacco use patient data at baseline, 6 months and 12 months
2. Dental office practices and knowledge prior to training, “Pre-test” survey
3. Dental office practices and knowledge after completion of project, “Post-test” survey
4. Assessment of screening process before collecting 6 month patient data
5. Assessment of screening process before collecting 12 month patient data
6. Assessment of screening process after collecting 12 month patient data

This data will be presented in 3 parts for Phase 1: Part 1) Office recruitment and patient assessment, Part 2) Assessment of Dental Practices, and Part 3) Assessment of Practices Before and After Collecting Patient Data.

Phase 1: Part 1, Office recruitment and patient assessment

1. Recruitment of five dental practices into the project

Dental offices were selected in the Eastern portion of the state of Iowa (Appendix 1, Figure 1), within easy driving distance of Iowa City according to the following criteria:

- 1) Offices with more than one dentist, if possible, so as to maximize the number of patients available.
- 2) Offices where there was an existing relationship with the practitioner, as a past graduate of the Iowa dental program or active in collegiate activities and perceived to be prevention-oriented practices.

The first office visit to provide training and information to start the project was made on September 22, 2009 and the last office signed up by January 14, 2010. It is interesting to note that the second office that we visited for training had actually made changes in their practice and began screening all of their patients for hypertension two weeks prior to our initial training visit; they stated that they had made this change partially due to our initial contact with them as to participation in our project.

All members of the dental team, including dentists, hygienists, assistants and office staff were involved in the training and were asked to complete a pre-test (Appendix 1, pp 3-5) to assess their current knowledge and practices regarding blood pressure and tobacco use screening and referral. A half day training/continuing education program was provided to each office (see file: Training ppt presentation.pdf) beginning with an overview of the association of tobacco use and systemic and oral disease as the number one cause of preventable death in the United States. It also included a discussion of how undiagnosed or uncontrolled hypertension puts patients at risk for cardiovascular disease. It was emphasized that systematic screening by health care professionals can play an important role in identifying people in need of prevention strategies for these diseases. Finally, a demonstration of the blood pressure monitor was given and all participants were encouraged to try blood pressure measurement on a partner. Every practice was provided with sufficient automatic digital blood pressure monitors for every operator (these

were purchased with a separate grant from Delta Dental of Iowa). If the practice did not routinely take blood pressure measurements, they were asked to do so for all patients in this project.

The office was left with baseline patient forms (Appendix 1, pp 6-9), a procedure document with simple instructions on measuring blood pressure and assessing tobacco use screenings, Quitline fax referral forms and informational brochures (Appendix 1, pp 10-13). After reviewing the forms, the office staff generally discussed how to incorporate them into their unique practice and record keeping procedures. All individuals were given a certificate indicating that they had gained 2 hrs of University of Iowa continuing education credit at no cost.

The training program was completed by 35 dental healthcare providers and staff. The 5 practices represented 7 dental practitioners and staff as indicated below.

Stonecreek Dental, Dyersville

Dr. Brian James

Monticello Family Dentistry

Dr. Brian James

2 dental hygienists, 4 assistants

North Liberty Dental

Dr. Debra Carneol,

Dr. Lori Fridrich,

Dr. Nancy Hart,

Dr. Kristen Waldschmidt

6 dental hygienists, 5 assistants

Coralville/Iowa City

Dr. John Strief

2 dental hygienists, 1 dental assistant

Columbus City

Dr. William Wever

2 dental hygienists 2 assistants

2. Office visits/Collection of patient data forms

A second visit was made to the dental offices to collect the baseline patient surveys and initiate the 6 months recall of patients; 6 month recall patient forms (Appendix 1, pp 6-9) and a procedure protocol for collecting 6 month recall patient data (Appendix 1, p 14) were left with the offices. The dental office health care providers and other staff were asked to complete a questionnaire, *Assessment of Practices Before Collecting 6 Month Data* (Appendix 1, pp 16-17), to determine how the practices were coping with implementation of the patient screening protocol.

Another visit was made to collect 6 month patient data and distribute the 12 month recall patient forms (Appendix 1, pp 6-9) and procedure protocol for collecting 12 month recall patient data (Appendix 1, p 15). The participants were given preliminary results of the baseline patient data collected to date. At that time participants were asked to complete another questionnaire, *Assessment of Practices Before Collecting 12 Month Data* (Appendix 1, pp 18-20), to determine how the patient screening was proceeding. That same questionnaire, now titled *Assessment of Practices After Collecting 12 Month Data*, was given again to the office participants when collecting the 12 month recall patient data to determine how the participants accomplished the patient screening and how they viewed the screening process now that the project had ended.

As there was a staggered start to patient data collection from the 5 dental offices, the baseline, 6 month and 12 month data continued to accumulate for almost the 3 years of the project. During year 3, a final visit was made to the practices to present preliminary findings from the patient data already collected, to request the practitioners and staff complete the post-test questionnaire (Appendix 1, pp 21-28) to assess changes in their knowledge and practices, as compared to the pre-test administered before presentation of the educational program, and to collect 12 month patient data.

3. Patient screening Procedures

Baseline procedures

Blood pressure measurements: those with readings above 140/90 (hypertension) or with readings above 120/80 (pre-hypertension) were asked whether they are aware of the condition and had sought advice from a physician. If unaware, those with hypertension were referred to their physician. If they were aware and had not sought advice, they were urged to contact their physician. If they had sought advice and were being treated (e.g. modifications of diet, exercise, drugs) they were asked about

compliance. If not complying, they were advised to comply. All information was recorded by means of a standardized questionnaire.

For monitoring tobacco use, dental practices used the three step A,A,R model (ask, advise and refer). All patients were asked about tobacco use and information recorded by means of the standardized questionnaire. All patients who reported tobacco use were advised, assessed and, if appropriate, referred by fax to the Iowa Quitline.

Recall procedures

At 6 and 12 months after the initial screening, patients were recalled and the same questionnaire administered again. Blood pressure was again measured and appropriate counseling provided depending on readings and tobacco use status. At these times, the investigators again visited each of the offices to review progress and answer any questions from the staff.

The final patient data was collected in February 2012, bringing the total number of participants answering the baseline survey to 1677. The proportion of data collected from the five dental offices is as follows:

- North Liberty Dental 67%
- Monticello Family Dentistry 13%
- Integrity Dental 10%
- Stone Creek Dental 6%
- Dr. John Strief 4%

All five practices experienced turnover of staff during the project which meant that new staff were not always trained by us. One of the offices (Dr John Strief) ceased to see patients after the start of our project resulting in only 73 baseline patient surveys and no recall visit surveys being received from that office.

Statistical Methods

Univariate descriptive statistics were calculated for all individual study variables. Mantel-Haenszel test statistics was used to test the null hypothesis of no association between the response variable and the repeated time points or conditions within each participant (that is, interchangeability).

McNemar's test was used to test the difference in binary outcome between two repeated measures at baseline, 6 month, and 12 month recalls. When the measured outcome variable has more than two categories, Bowker's Test of Symmetry was adapted to detect the difference between two repeated responses between baseline, 6 month and 12 month. A p-value of less than 0.05 was used as a

criterion for statistical significance. SAS for Windows (v9.3, SAS Institute Inc, Cary, NC, USA) was used for the data analysis.

Statistical comparisons were made on the matched patient data only, that is, the patients that answered all 3 surveys, baseline, 6 month and 12 month recall. Responses for the larger, unmatched patient population for the 3 surveys are shown and discussed separately as they represent interesting information on blood pressure and tobacco use, but as they are not repeated measures they cannot be statistically compared in a meaningful way.

Measurements of systolic and diastolic blood pressure

Blood pressure is expressed using paired measurements of systolic/diastolic pressure such as 120/80 and 140/90. The Seventh Report of the Joint National Committee (JNC 7) and the American Heart Association have established categories for blood pressure measurements to identify healthy readings and those at risk for cardiovascular disease using ranges of systolic and diastolic blood pressure measurements.^{1,3} For example, pre-hypertension is considered to be 120-139 systolic or 80-89 diastolic and high blood pressure stage 1 is considered to be 140-159 systolic or 90-99 diastolic. In reality, the systolic reading for an individual can be in the high stage 1 category but the corresponding diastolic reading can be in the pre-hypertensive category which makes formal analysis of these paired measurements impractical. Comparison of the systolic and diastolic blood pressure ranges in Figures 5a,b,c and 6a,b,c (Appendix 2, pp 10-11) show that the diastolic measurement consistently categorizes more patients in the normal group than the systolic measurement, which puts more patients in the pre-hypertensive group.

Additionally, JNC 7 emphasizes the importance of systolic blood pressure as a risk factor for cardiovascular disease, especially in those over age 50.³ This report therefore focuses on the changes in the patient population over time based on the systolic blood pressure measurement.

4. Patient population and responses

Please note that all Tables and Figures referred to in the following discussion concerning patient screening for hypertension and tobacco use (through page 13) can be found in Appendix 2.

Individuals participating in this study were adult (18yrs or older) patients of record seeking treatment at the dental practices. The total number of patients in the study was 1677, 56% female and 44% male (Table 1). There were 1677 patients in the baseline survey, 676 patients with 6 month recall

data and 447 patients with 12 month recall data, the percentage distribution of the responses for the total patient population is shown in Tables 2 and 3. There were 437 patients that answered all 3 surveys, 41% female and 59% male (Table 4): there was a majority of males in this matched data set as compared to the entire survey population, which had a female majority. The percentage distribution of the survey responses for the matched patient population is summarized in Tables 5 and 6.

Summary of data from the total patient population

Blood pressure measurements

- The number of patients with systolic blood pressure in the normal group decreased from 45% at baseline to 29% at the 6 month and 25% at the 12 month recall visits, those with normal diastolic blood pressure was higher at baseline (58%) than that of the systolic group but also decreased slightly at the 6 and 12 month recall visits (Figures 1 and 2, Table 2).
- The number of individuals with pre-hypertensive systolic blood pressure increased from 38% at baseline to 48% at 6 month and 49% at 12 month recall visits, those with pre-hypertensive diastolic blood pressure increased from 26% to 31% and 34% at the 6 and 12 month recalls (Figures 1 and 2, Table 2).
- There was little change in the proportion of patients classified with stage 1 and stage 2 hypertension over the 3 time points for either systolic or diastolic blood pressure readings (Figures 1 and 2, Table 2).

Patient behavior

- Patient awareness

At baseline, 23% of the patients were aware of their blood pressure status. There was an increase in the patients' awareness of their blood pressure with recall; those responding that they knew they had high blood pressure increased from 23% at baseline to 40% at the 6 month recall and to 43% at the 12 month recall (Table 2).

- Physician awareness

For the total patient population surveyed, those with blood pressure considered pre-hypertensive or stage 1 and stage 2 hypertensive were asked if their physician was aware.

Affirmative responses increased from 60% at baseline to 72% at both 6 month and 12 month recalls (Table 2).

- **Treatment and Compliance**

A majority of the patients that were being treated for hypertension (81%) were complying with their treatment (99%) at baseline. Similar numbers were recorded for 6 month and 12 month recalls; see Table 2.

Comments: Summary/Lessons learned

The proportion of this population with hypertension (stage 1 and stage 2 high blood pressure combined) is below the national average and those with pre-hypertension are below that of the matched patient population (discussed in the next section). This could be due to the young mean age of this group (44 yrs for all patients) with only a small percentage (14%) being more than 59 years old, an age when blood pressure tends to be higher. However, 54% of the population at baseline was considered to be pre-hypertensive or hypertensive. Interestingly, 25% of the patients at baseline said it had been more than 6 months since they had their blood pressure checked and 23% of the patients did not know the status of their blood pressure. As a majority of those who knew that they had high blood pressure were being treated and most of those being treated were complying, identifying and addressing undiagnosed pre-hypertension and hypertension in the general population might lead to those individuals taking steps to reduce their blood pressure.

Tobacco use

- At baseline, 71% of patients had never used tobacco, 12% were current, and 17% were former tobacco users. The 6 month and 12 month recall numbers were very similar; see Table 3.
- At baseline, 92% of current tobacco users were interested in quitting, 98% had made 1-4 quit attempts and 77% said that it had been greater than 1 year since their last quit attempt was made. Most tobacco users smoked cigarettes (70%), while 23% used smokeless tobacco and few smoked cigars or pipes (7%); see Table 3.
- When current tobacco users were asked if they were interested in quitting at the present time, 40% responded in the affirmative, this number dropping by about half at the 6 month and 12 month recall visits; see Table 3.

- Few patient responses were entered for the two questions concerning Quitline; of the 73 patients who were interested in making a quit attempt, 48 affirmative responses were recorded for the question “Did provider make a fax referral to Quitline?” and 47 responded affirmatively to the question “Is patient interested in talking to Quitline?”. Of those interested in a quit attempt, 34% said they would like to contact Quitline themselves; see Table 3.

Comments: Summary/Lessons learned

The number of tobacco users in this group is small but most of them stated that they would like to quit, and of those wishing to quit, a majority stated that they were interested in a quit attempt at the time of the visit. This suggests that encouragement to quit and referral to Quitline is a worthwhile activity in the dental office.

Summary of data from patients who responded to all 3 surveys (matched data)

Systolic blood pressure measurements

- At the baseline visit, 65% of patients had pre-hypertension (121-139), 21% had stage 1 hypertension (140-159), 7% had stage 2 hypertension (≥ 160) and 7% were considered to have normal blood pressure (≤ 120) (Figure 3, Tables 5).
- The proportion of patients with pre-hypertension (systolic) at the 6 month recall visit dropped to 47% and remained similar at the 12 month recall visit at 49% (Figure 3, Tables 5).
- The proportion of patients with stage 1 and stage 2 hypertension (systolic reading) at the 6 month and 12 month recall visits remained similar to the corresponding baseline readings whereas the percent of those in the normal group increased from 7% at baseline to 28% and 24% at the 6 month and 12 month recall visits respectively (Figure 3, Table 5).

The overall change in responses over the 3 time points was statistically significant ($p < 0.0001$) between the baseline and 6 month recall and between baseline and 12 month recall but no significant difference was found between the two recall groups (Table 7).

Diastolic blood pressure measurements

- The proportion of patients in the normal diastolic blood pressure category (39%) was much larger than that for the normal systolic reading (7%) at baseline, but the increased to 51% and 49% at the 6 month and 12 month recal visits respectively (Figure 4 and Table 5).
- The proportion of patients with diastolic blood pressure readings in the pre-hypertensive category at baseline (34%) was considerably less than that for the pre-hypertensive systolic reading at baseline (65%) and, unlike the decrease seen for patients in this category for the systolic reading, the proportion did not change much at 6 month and 12 month recall visits for the diastolic pre-hypertensive group (Figure 4 and Table 5).

The overall change in responses over the 3 time points was statistically significant ($p < 0.0001$) between the baseline and 6 month recall and between baseline and 12 month recall but no significant difference was found between the two recall groups (Table 7).

Patient behavior

- Patient awareness

There was a significant increase ($p < 0.0001$) in the patients' awareness of their blood pressure with recall; those responding that they knew they had high blood pressure increased from 36% at baseline to 44% at the 6 month recall and to 43% at the 12 month recall (Table 5). This increase in awareness is very evident in the group of patients identified as pre-hypertensives. Of the 283 patients in the pre-hypertensive group at baseline, only 91 participants (24%) were aware of their blood pressure status. At the 6 month recall, 98 of the 205 pre-hypertensive patients (48%) were aware of their blood pressure status and at 12 month recall, 97 of the 214 pre-hypertensive patients (45%) stated they were aware (Table 8).

- Physician awareness

If a patient's blood pressure was in the pre-hypertensive or hypertensive range, they were asked whether their physician was aware. Affirmative responses significantly increased ($p < 0.0001$) from 61% at baseline to 74% at 6 month recall and to 73% at 12 month recall visits (Tables 5 and 9).

- Treatment

A majority of the patients who knew they had high blood pressure were being treated for the condition. This proportion was consistent between baseline and 6 month recall at 79% and 78%

respectively, but was significantly greater than both ($p < 0.05$) at the 12 month recall, at 84% (Table 5).

- Compliance

If patients were being treated for hypertension, 99% were complying with that treatment at all time periods (no significant difference between groups) (Table 5).

Comments: Summary/Lessons learned

The most notable finding was the large number (65%) of pre-hypertensive patients identified in this study. While this might be attributed to a transient phenomenon, such as ‘white coat hypertension’, this is unlikely because there was a subsequent decrease in the values recorded at 6 and 12 months when blood pressure was measured in the office under the same conditions. However, the average age of this population (48 yrs) is such that higher blood pressure might be anticipated. Remarkably, there was a significant decrease in the number of pre-hypertensives identified at 6 and 12 months. It is tempting to suggest that this decrease is the result of patient awareness of their condition leading to a modification of life-styles or seeking treatment that led to a reduction in blood-pressure, and there is some evidence to support this supposition:

- the remarkable decrease in pre-hypertension patients over the 12 months of the study was accompanied by an almost corresponding increase in normotensive patients over this period, and not by any progression to hypertension, the proportion of which decreased numerically at 12 months.
- there was an increase in the patients reported awareness of their blood pressure values at the 6 and 12 months recall compared to baseline.
- there was an increase in the proportion of patients reporting that their physicians were aware of their blood pressure values at the 6 and 12 months recall compared to baseline.

The data discussed above provides considerable support for the value of blood pressure monitoring in the dental office, not only because of the possibility of detecting true hypertension but because a knowledge of blood pressure values apparently leads to important behavior modification by the patient.

Tobacco use

The following results are presented in Table 6:

- At baseline, most tobacco users were cigarette smokers (70%) followed by smokeless tobacco users (24%) with relatively few cigar smokers and no pipe smokers. These numbers did not change significantly at the two recall visits. Most of the smokers reported very light use, 94% stating they smoked 5 or less cigarettes per day.
- At the 6 month and 12 month recall visits there was a slight decrease in the number of current tobacco users compared to baseline; this difference was only significant between the baseline and 12 month recall groups($p=0.0003$).
- Most of the current and former tobacco users at all 3 dental visits stated that they had made between 1 and 4 attempts to quit, with a few making 5 or more attempts.
- About 11% stated that they had made these attempts within the last 6 months and another 11% within the past year. Most former tobacco users had quit several years prior to our surveys.
- The number of patients interested in quitting decreased from 31% at baseline to 23% at the 6 month recall and to 21% at the 12 month recall. This slight decrease parallels that in the number of current tobacco users but was not significant.
- There were few responses to the 2 questions concerning Quitline; 21 patients were interested in making a quit attempt but only 13 responses were recorded for the question “Did provider make a fax referral to Quitline” and 13 responses to the question “Is patient interested in calling Quitline?”. Of those expressing an interest in a quit attempt, 46% said they would like to contact Quitline themselves.

Comments: Summary/Lessons learned

The data on tobacco use and cessation reflects changes in tobacco use in the State. Smoking prevalence in Iowa has been significantly reduced over the past decade, with a current prevalence of approximately 16%. The slight decrease over the period of the study in those who stated that they were interested in quitting must be considered in terms of the slight decrease in current users, which could indicate that the patients not interested in quitting are very addicted to their tobacco habit. Consequently, we may be dealing with the core population of nicotine addicts, sometimes referred to as the ‘hardened’ population⁴. Cessation thus becomes increasingly difficult and those who refuse Quitline referral but state that they prefer to make the contact individually are probably unlikely to

do so. The other possibility is that these smokers have made great strides toward quitting as 94% of them reported smoking 5 cigarettes or less. The number of quit attempts noted for most users also reflects the level of addiction – it is generally accepted that smokers can make up to seven attempts before being successful. With each quit attempt, they might decrease the number of cigarettes they smoke. They may also feel that they know how to quit – as they have tried several times – and therefore do not need the help of quitline. It is important to discuss quitting at each dental visit because it at least makes the patient think about one more quit attempt. The clinician may say the one thing that helps the patient make another attempt – perhaps a successful one.

Overall Comments: Summary/Lessons learned

The marked difference in outcomes between the matched group of patients and the total population justifies some comment. The total population is very heterogeneous, with the majority of individuals not being represented in all three time periods, making comparisons less reliable. There are also differences in gender, with the matched group having a majority of males whereas the overall population had a majority of females. Similarly, there are differences in age; the mean age at baseline is 48yrs for the matched group and 44yrs for all patients; given the tendency to hypertension with increasing age, this might account for the higher proportion of pre-hypertensives in this population. At the subsequent time periods, the proportion of pre-hypertension is more similar and so are the average ages; mean age at the 6 month recall is 48yrs for the matched patients and 47yrs for all patients and at 12 months, the average age is 49 for both populations.

Phase 1: Part 2: Assessment of Dental Practices

1. The Role of Dental Health Professionals in Blood Pressure Screening and Tobacco Cessation

This part of phase 1 evaluated the practices of the oral health professionals and staff of the dental offices in our study in regard to blood pressure and tobacco cessation screening at the time of our training visit and compared them to behaviors after completion of the project. The 5 dental offices that were visited and trained in blood pressure and tobacco use screening were given a 10 question survey before collecting the baseline patient data (pre-test survey, see Appendix 1, pp 3-5). A more comprehensive survey containing 15 questions (including 9 of those included in the pre-test) was

given to these same practitioners after collecting the 12 month patient data (post-test survey, see Appendix 1, pp21-28) to determine if their practices had changed and how they would handle screening in the future. A 28 question survey was also given to oral health professionals who attended our training sessions given at dental meetings throughout the state. This asked for a description of the dental offices and the procedures in place for blood pressure and tobacco use screening in their practices and included 9 questions from the pre-test described above; Appendix 5, pp 2-3.

Seventeen individuals from the staff of the four practices that answered both the pre-test and post-test surveys and the responses were statistically compared to determine whether the procedures in place before training significantly changed after participating in this project. The statistical methods and results for the matched pre-test and post-test responses are presented first, followed by the results and discussion of responses to the 9 questions in common among the three surveys (pre-test, post test and state wide meeting survey) , and finally the entire 15 question post-test survey responses are presented and discussed. The responses to the entire 28 question survey given at state meetings are presented in a later section of this report, Phase 3. Continuing education and training- state practitioners.

Statistical methods: matched pre-test and post-test responses

Frequency distributions for the nine questions were generated. The Kappa statistic was used as a measure of strength of agreement between pre-test and post-test survey responses obtained on the same subject (SAS for Windows (v9.3, SAS Institute Inc, Cary, NC). The closer the Kappa value is to zero, the lesser agreement (and therefore more change) between the two correlated responses. The closer the kappa value is to one, the greater the agreement (and therefore less change) between the two correlated responses. The following is an approximate guide for interpreting level of an agreement that corresponds to a kappa coefficient:

- i. 0= No agreement
- ii. 0.01 – 0.20 = Slight agreement
- iii. 0.21 – 0.40 = Fair agreement
- iv. 0.41 – 0.60 = Moderate agreement
- v. 0.61 – 0.80 = Substantial agreement
- vi. 0.81 – 0.99 = Strong (or almost perfect) agreement

vii. 1.00 = Perfect agreement

Seventeen subjects who answered both pre-test and post-test surveys were included in the data analysis. Table 1 (Appendix 3) reports the frequency distributions of responses for questions 1 through 9, while Table 2 (Appendix 3) presents the changes in frequency distributions of those responses.

A response of 'Routinely' is the desired response to the questions asked as it indicates that the respondents are screening for hypertension and tobacco use most of the time. A change of response from 'Sometimes' or 'Seldom' to 'Routinely' or a change of response from 'Seldom' to 'Sometimes' or 'Routinely' for this analysis was considered an *improved* response while a response change to 'Seldom' was considered a *worse* response.

Results of matched pre-test and post-test responses

Question 1 had a Kappa value of 0.37, question 5 had a value of 0.77 and all other questions had a value of 0. This indicates substantial changes between post-test and pre-test responses for 7 of the questions, fair agreement (slight change) for question 1 responses and strong agreement (little change) for question 5 responses.

Table 1 shows that there is considerable increase in respondents answering 'Routinely' with the exception of questions 1 and 5. The response of 'Seldom' is lower post-test than pre-test for all but questions 4 and 5. The proportion of responses that remained the same or improved was 76% or higher for 8 of the 9 questions (see columns 3 and 4, Table 2, Appendix 3). This indicates that there was a positive change in behaviors regarding screening and advising for hypertension and tobacco use. In other words, the practitioners were asking about, measuring, recording and advising on the adverse effects of hypertension and tobacco use more frequently at the end of the study project than at the beginning. Advising patients to see their physician about hypertension occurred quite frequently before the start of the project so there was little change in this parameter, but there was considerable improvement in the frequency with which patients using tobacco were advised to contact Quitline and cessation counseling.

Results of 9 questions from all three surveys:

The frequency and percentage distributions of responses to the 9 questions in common among the pre-test, post-test and state meeting surveys are shown in Tables 3, 4 and 5, Appendix 3. These

results represent all participants that completed a survey, and would reflect personnel changes in the practice over the course of the project so it is therefore not matched data.

Dental assistants and dental hygienists comprised most of the respondents for all groups (71% pre-test, 78% post-test, 56% state meeting) while dentists comprised 20% of the pre-test and 23% of both the post-test and state meeting respondents. “Other staff” completing surveys represent 9% in the pre-test group and 3% in the state meeting group.

The following statements compare pre-test responses to post-test responses in the unmatched group shown in Tables 3, 4 and 5, Appendix 3. The proportion of providers who routinely and sometimes asked blood pressure related questions increased slightly while the proportion who seldom asked about blood pressure declined. The proportion of providers who responded that they did measure and record blood pressure also increased while those responding that they seldom measured or recorded blood pressure declined substantially from 41% to 17% for both questions. The proportion of providers who routinely advise patients as to the ill effects of high blood pressure almost doubled while those responding seldom declined. The percent of providers willing to advise a patient with high blood pressure to see a physician remained about the same.

The proportion of providers who routinely asked and recorded tobacco use increased substantially while those responding they seldom did substantially declined. Those willing to advise patients of the ill effects of tobacco did not change but there was an increase in the proportion of providers who advised patients to contact quitline or other cessation counseling.

The responses to the 9 questions discussed above from those individuals attending the state meetings was unexpected in that they reported a higher frequency of blood pressure and tobacco use screening than the offices participating in our study. A greater proportion of this group routinely asked about, measured, and recorded blood pressure and advised patients as to the ill effects of high blood pressure. They also asked about and recorded tobacco use and advised as to the ill effects of tobacco use at a greater rate than the study office providers. The proportion that advised contacting a physician when detecting high blood pressure was similar to the pre-test and post-test groups and the proportion that advised contacting quitline or other tobacco cessation counseling was similar to the post-test group but higher than the pre-test group.

Results of 15 question post-test survey:

The responses for the 15 question post-test survey presented as a percentage of total responses are shown on pages 6 through 10, Appendix 3. The majority of respondents for the post-test survey were dental assistants (43%) followed by dental hygienists (35%) and dentists (22%) with no other staff responding to the post-test survey.

The additional questions that were included in the post-test survey were concerned with the providers' willingness to continue the blood pressure and tobacco use screening after completion of the project, the changes needed in the practices to accomplish this, the comfort level with screening techniques involved and the overall views about the project relevance and feasibility.

The providers indicated that most are willing to continue with blood pressure and tobacco use screening by asking questions, measuring and recording BP and tobacco status and advising of the ill effects of both high BP and tobacco use. But while most are willing to refer patients with high blood pressure to their physicians, only about one third indicate they are willing to use quitline fax referral or provide quitline information to patients ready to quit.

This reluctance to deal with quitline emerges again in the next section of the questionnaire containing questions regarding comfort level. Most are again comfortable asking about blood pressure, taking and recording blood pressure measurements and advising and referring to physicians. Similarly, most are comfortable asking about tobacco use, recording status, advising of the ill effects of tobacco use and following up on the status of tobacco users. However, many participants indicated that they are uncomfortable or only somewhat comfortable using quitline fax referral (65%) and providing quitline information to patients ready to quit (39%).

A majority of the participants do not anticipate barriers while conducting blood pressure (82%) or tobacco (64%) screening and already have space for both on their patient records (74%). About half of those without space in the health history form plan to include it in future and have established a mechanism to identify and track hypertension and tobacco use. For those who replied they do not have or are unsure of a mechanism to identify and track these patients, only one third plan to use patient identifiers for high blood pressure and tobacco use and over one half are unsure about doing this.

Over 65% of the participants did not encounter problems on recall visits and 70% did not have problems managing and arranging patient forms. Almost all (96%) responded that the BP monitors were useful and easy to use and that it will be useful and relevant to incorporate BP and tobacco use

screening and referral services in busy dental practices (95%). All participants responded that they would recommend other dental practices to adopt screening and referral services as well.

Comments: Summary/Lessons learned

These results show that there was a marked increase in screening patients for high blood pressure and tobacco use after the initial training and implementation of screening procedures into the dental office practices involved in this project. Continued effort could be geared to make providers who seldom address blood pressure and tobacco use more comfortable with the screening process.

The practitioners who attended the state meetings and completed the survey seem to be already doing better than the dental practices in our study were doing after completion of the project. One explanation for this could be that as a result of our study there is a greater awareness about blood pressure and tobacco use screening in dental offices but it is more likely that this reflects the fact that those who attend continuing education sessions and dental meetings are a self-selected group of professionals who are more progressive in overall health care issues. In addition, a high percentage of state meeting participants are dental hygienists who, according to survey results, tend to take most of the patient health histories for all dental visits as well as make most of the fax referrals. Even if dental offices are already screening for high blood pressure and tobacco use, there is room for improvement in advising patients who use tobacco and in referring them to tobacco cessation programs. The low proportion willing to use quitline fax referral or provide quitline information to patients ready to quit is of concern and may reflect the greater resistance to quitting encountered among the decreasing number of patients who still use tobacco. This has already been referred to above in Phase 1, Part 1.

Phase 1: Part3: Assessment of Practices Before and After Collecting Patient Data

Dental professionals and office staff in the dental offices involved in patient data collection were asked to respond to a questionnaire before and after we collected patient data (Appendix 1, pp 16-20). The questions were intended to determine how the dental practitioners felt about administering the patient surveys, how much time and effort was involved in filling out the paperwork, any difficulties or concerns when using the blood pressure monitors and how often they advised and referred patients with regard to blood pressure status and tobacco use.

A total of 31 individuals in the project returned questionnaires; 24 completed before taking 6 month patient data (B6M), 21 completed before taking 12 month patient data (B12M), and 11 completed after taking 12 month patient data (A12M). The questionnaire was answered by dentists (20%), dental hygienists (33%), dental assistants (37%) and other office staff (10%). The proportions of questionnaires returned from the dental offices were as follows: North Liberty Dental (58%), Monticello and Stone Creek Family Dentistry (26%) and Integrity Dental (16%).

Results

Too few completed questionnaires were returned to warrant formal statistical analysis. But some general observations can be made from the responses for which frequency and percentage distributions were calculated (data presented in *Assessment of Practices Before and After Collecting Data*; Appendix 3, pp 11-15).

The amount of time it took for health care providers to complete the patient surveys decreased over the 3 time points. It took an average of 6.3 minutes to complete a patient survey before collecting 6 month patient data, 5.8 minutes before collecting 12 month patient data, and 4.0 minutes after collecting the 12 month patient data.

The providers did not routinely give out tobacco cessation and hypertension brochures. However, those responding that they “sometimes” gave out brochures increased from 18% at B6M to 80% A12M. A majority of the brochures given to people at the B6M time point were to those who stated they were ready to quit within 30 days and were seeking quitting information. Only half as many were given to those stating they were ready to quit in 3-4 months. The providers stated they seldom used the fax referral forms at all 3 time points although a few routinely provided quitline information for patients willing to quit. The fax referrals were most often done by staff at the front desk. Almost all providers stated that there were no issues concerning the fax referrals, one person commented that some patients preferred to send it in themselves.

The use of blood pressure monitors was not a concern for most providers and a few commented they worked very well.

About 18% of the providers reported adverse responses to monitoring at B6M and 21% at B12M, decreasing to 10% at A12M. Most comments concerned patients being irritated or defensive about

the questions. Some thought blood pressure readings were inaccurate due to white coat hypertension or because of problems using blood pressure monitors over thick winter clothing.

A majority of the providers felt that there were benefits from the trial, commenting that patients were made aware of unknown hypertension, educated as to blood pressure status, and some stating that patients sought help for tobacco use cessation.

When asked if too much paperwork or time was involved in taking the patient surveys, most providers replied “no” with the exception of the B12M time point. Comments at that point were that some questions seemed repetitive, it took more time than expected to complete the survey, particularly if running behind schedule, and sometimes finding patient records from previous visits was problematic.

When asked if there were any patient concerns, about a third responded “yes” at the B12m and A12M. Comments included patients asking the relevance of the study, patients concerned about confidentiality, patients not understanding the “head attached to body” concept that was presented to the offices in training.

The providers who routinely encouraged patients to see physician for high blood pressure indicated both at B12M and at A12M that most patients reported back to the them that they had visited their physician and only a few patients reported back that they were unable to see their physician with explanations such as ‘they forgot’, ‘didn’t have time’ or ‘just didn’t go’. One provider stated that when dental treatment was not given because of high blood pressure, all patients followed through by visiting their physician.

There were very few responses to questions asking whether patients had contacted quitline. Reasons given for not contacting quitline included ‘the patient changed their mind’, that they had tried prescription pharmacotherapy in the past and didn’t like to use them, and that ‘quitline was no longer in operation’!

Comments: Summary/Lessons learned

The responses to the questionnaire suggest that once the provider is familiar with the patient survey, it takes very little time to complete it and therefore implementing blood pressure and tobacco screening into practice should not burden dental offices. It is encouraging that more providers responded they ‘sometimes’ rather than ‘seldom’ handed out tobacco cessation and hypertension brochures at A12M There were few issues with the fax referrals but as most fax referrals were done by front desk personnel, it is imperative to have them involved in the screening and referral practice.

Few providers reported patient concerns or adverse outcomes and most felt that there were benefits to this screening in regard to patient awareness, particularly concerning high blood pressure. Providers were very willing to refer patients to their physicians for suspected high blood pressure but more hesitant to address tobacco cessation. This could point to the fact, already emphasized, that the small number of patients still using tobacco are unwilling to quit and very resistant to advice about quitting. Additionally, health care providers often view hypertension as a health concern but tobacco use cessation as only a behavior modification even though controlling hypertension requires behavior modifications as well as medication. They might feel that they are interfering with a personal habit and therefore be reluctant to address tobacco cessation and referral.

Phase 2. Hygiene and dental school training programs assessment

During the period Feb-Nov 2011, site visits were made to each of the five dental hygiene programs in Iowa and to the University of Iowa Dental School to assess their educational programs regarding the monitoring of patient hypertension and tobacco use. At each visit we provided the U.S. Department of Health and Human Services Clinical Practice Guideline on Treating Tobacco Use and Dependence, Iowa Quitline Brochures, American Cancer Society Brochures, the US Department of Health and Human Services Report on Prevention, Detection, Evaluation and Treatment of High Blood Pressure, and a bookmark handout for patients on blood pressure from the American Heart Association. Automatic, digital blood pressure monitors were also provided free of charge when needed.

Based on the responses from faculty to a questionnaire on program curricula (hygiene faculty, Appendix 4, pp 2-6; U of I dental faculty, Appendix 4, pp 7-11), we presented our observations on the individual programs and made suggestions for improvements. Summary qualitative appraisals are provided below; quantitative survey responses are presented at the end of this section.

Dental Hygiene Programs

Kirkwood Community College: February 21, 2011

The curriculum regarding hypertension screening and referral appears to be adequate. Students are provided with didactic lectures as well as clinical instruction on the application of skills learned in clinic with patients. The guidelines are appropriate to National guidelines for referral of patients with hypertension. The only concern identified was that there were inadequate numbers of blood

pressure monitors available on the clinic to make the taking and recording of blood pressure a streamlined process.

The curriculum regarding tobacco screening and referral appears to be adequate. The students read a comprehensive article on tobacco cessation efforts in the dental office and complete a test following the reading. They also present posters to other Kirkwood Community College students that are evaluated. The clinical portion of the curriculum provides screening for tobacco use by means of the electronic health record used at the College of Dentistry.

Observations and suggestions for improvements:

A total of 12 new blood pressure monitors were provided to the College of Dentistry's preventive and operative department. This department is where the Kirkwood Dental Hygiene students provide their clinical care to patients. The location of monitors was reviewed with the faculty so as to determine the location that is best to record blood pressure readings so that a history of past readings could be easily accessed. The forms available and codes available through the electronic record were also reviewed with the faculty. FAX referral options for tobacco cessation as well as referral to Nancy Slach for counseling were also reviewed. They appeared to be open to these options. Concern was expressed by certain faculty members about the transition of these skills to the clinical practice of dental hygiene when the students leave school. We discussed the need to encourage these skills at each visit so it doesn't appear to be an addition to what a dental hygienist does and that it would be an asset to bring up in an interview with a dentist when applying for a job in practice.

Iowa Western Community College: April 29, 2011

The curriculum regarding hypertension screening and referral is very comprehensive and appears to follow National guidelines. Each student is required to purchase their own blood pressure monitor and they have several large and small cuffs available in the clinic.

The curriculum regarding tobacco cessation screening and referral is very comprehensive. The students create a tobacco cessation program and implement it with a clinical patient. They use the information that they were taught didactically to develop this program. A faculty member observes the student's dialog with their patient and provides feedback, the experience is also recorded by the student writing a four page report and sharing it orally with their classmates. This further reinforces the screening and referral process. The National Quitline rather than a state quitline is used, possibly because they have patients from both Nebraska and Iowa that attend their clinic.

Observations and suggestions for improvements:

This program does a great job of teaching the subjects didactically and clinically. The faculty appears to be informed and apply research to the clinical teaching and practice of dental hygiene. It was notable that the only two faculty members that did not attend our session were the dentists. This could be a similar problem to that expressed by the Kirkwood program that dentists were not as supportive of a screening and referral process involving hygienists. It would also be beneficial if the program were to use both Iowa and Nebraska State Quitlines for direct referral rather than the National Quitline.

Hawkeye Technical College: August 19, 2011

The curriculum regarding hypertension screening and referral is very comprehensive. Hypertension is not a solitary topic, but is discussed in the first semester of the program in several courses as well as in all clinical sessions. Every patient is screened at the beginning of treatment. Students are educated on taking vitals and the guidelines concerning hypertension, the medical effects of hypertension and also on pain control.

The curriculum regarding tobacco screening and referral is very comprehensive. They teach tobacco cessation didactically in the third semester of the program. They utilize information from Esther Wilkins, Mayo Clinic and Seminars that they have attended, focusing on the five A's. They also have had a guest speaker from their college student health clinic talk about tobacco cessation and the Quitline.

They have recently updated their facility and the improvements were impressive. It is a very nicely furnished clinic with the latest equipment.

Observations and suggestions for improvements:

We provided a copy of our Medical Consultation Request Form that we use at the University of Iowa. This is a simple form and the patient takes it with them to the physician and the physician can mail it back or send it back with the patient after the questions have been answered.

They were going to make changes in their clinic organization and teaching as follows:

- Increase the number of blood pressure monitors available – and possibly purchase more of the automated type monitors – we left four with them. There was discussion as to whether it

was better for students to use the automated cuffs or to learn on the manual ones – it was decided that it would be more standardized if they were to use the automated monitors. We received feedback that the students like the ones that they have. The automated monitors also have the capability to record pulse and irregular heartbeat in addition to blood pressure.

- They currently have a Risk Factor Assessment sheet – we suggested that they add a question as to patient interest in stopping tobacco use which was not included.
- They also were going to evaluate and make changes to their health history form.

Des Moines Area Community College: September 30, 2011

The curriculum regarding hypertension screening and referral is very comprehensive. They have adequate blood pressure monitors, one per dental unit. The students are taught how to take blood pressures and know the values that are considered hypertensive. They do take blood pressure on every patient. If the blood pressure is over 179/109, they do not treat, but refer to a physician.

The curriculum regarding tobacco cessation screening and referral is very comprehensive. They consider screening for tobacco use as one of the five vital signs, and screen for tobacco use at each visit. They ask about what type of tobacco is used, how often, assess their interest in quitting and provide information on quitlines and prescriptions for cessation products. They also teach the relationship between tobacco use and oral disease.

Observations and suggestions for improvement:

This program does a great job of teaching both hypertension and tobacco cessation didactically and clinically. One suggestion would be to lower the threshold at which they do not treat and refer the patient to a physician. According to the American Heart Association's Guidelines, when the Systolic blood pressure is ≥ 160 or the Diastolic blood pressure is ≥ 100 , the patient should not be treated and should be referred to their physician, and this was brought to their attention. It is excellent that they take blood pressure on every patient and were excited that we recommended the electronic blood pressure monitors; we gave them several newer monitors. We also suggested use of the FAX referral system for the Quitline. They were not familiar with the Medicaid program or the general FAX referral. We provided them with forms and resources for getting more forms for the future. They believed that more patients would be willing to use

the Quitline if they didn't have to make the call themselves, and they appreciated the support of the Medicaid program in providing NRT and medications.

Iowa Central Community College: November 3, 2011

The curriculum regarding hypertension screening and referral is very comprehensive. They have 10 operatories in use at any time and have 15 adult cuffs, 3 large adult cuffs, 1 child cuff, and 1 wrist monitor with an advanced positioning sensor. They include a question on the health questionnaire regarding high blood pressure, take blood pressure readings at each visit, and have guidelines for hypertension and modifications in treatment based on the American Heart Association guidelines.

The curriculum regarding tobacco screening and referral is extremely comprehensive. The program director, Renee Piper, completed her master's thesis on tobacco cessation, so she has specific knowledge and interest in this topic. They include questions on their health questionnaire regarding tobacco use and interest in quitting and they were the only program that included FAX referral to the quitline. They utilize the stages of change theory to assess the patient's willingness to consider tobacco cessation.

Observations and suggestions for improvement:

Prior to us leaving a student came in the room and started talking about some of her experiences counseling patients to quit using tobacco. It was clear she was knowledgeable and her enthusiasm was contagious. We shared our Medical Consultation Request Form that we use here at the University of Iowa; this is a simple form and the patient takes it with them to the physician who can mail it back or send it back to us with the patient after the questions have been answered.

Dental Programs

University of Iowa College of Dentistry: August 15, 2011

The curriculum regarding hypertension screening and referral is very comprehensive. This is a large institution and the students are taught during their first year how to take blood pressure readings and provided with the guidelines for referral to a physician.

The curriculum regarding tobacco screening and referral is also very comprehensive as Nancy Slach is the Director of the Tobacco Cessation Program for the College of Dentistry.

Observations and suggestions for improvement:

Through discussion with various departments and with students, it was determined that there is not a universal institutional guideline as to when to take a patient's blood pressure. A presentation was made at the All College Conference on August 15th 2011 which most Faculty, Staff, and Graduate students attend. A separate presentation was recorded and assigned as mandatory for all graduate students to watch. As a result of the education process, there were requests for more blood pressure monitors in the building. They were distributed as follows: Orthodontic and Pediatric Dentistry clinics: 2, Endodontic and Special Care clinics: 2, Family Dentistry clinic: 4, Faculty General Practice: 2, Periodontics and Prosthodontics clinics: 5, and Preventive and Operative clinics: 12. Some clinics are listed together because they share a dispensary and both departments would use the monitors. These were the numbers of additional monitors that were added to existing monitors that departments already had. The Faculty General Practice also purchased some additional monitors for dental hygienists in the department to use.

Survey Responses and Interpretation – Dental Hygiene Faculty

The frequency and percentage distributions of survey responses are shown in Appendix 4, pp 12-17. A total of 31 surveys were completed by the faculty at the five dental hygiene programs throughout the state of Iowa. A majority of the faculty were dental hygienists (84%) with the remaining faculty made up of dentists (16%). Overall, 94% teach in the clinic, while 46% teach in the classroom, 42% teach in the pre-clinic or simulation clinic and 35% teach in the lab.

When asked about assisting dental hygiene students in regard to tobacco cessation services in the clinics over the past year, more than half (60% asked or reminded students to provide tobacco cessation service in the clinic routinely or sometimes; 56% asked or reminded students to enter tobacco cessation information on the health history form; 53% asked or reminded students to provide tobacco intervention educational materials to their patients. The percentage of faculty checking on student use of quitline referral was very low, only 28% asked or reminded the students to use quitline fax referral sheets routinely or sometimes, a majority 72% seldom or never.

Most faculty indicated that they routinely or sometimes checked to see if the students documented tobacco use status on the health history form (67%), and updated progress notes regarding tobacco use status for recall patients (70%). However, the faculty rarely checked to see if students recommended tobacco cessation medications, 37% indicating that they routinely or sometimes checked on students and a majority (63%) seldom or never checked on students. They checked for completion of fax referrals even less frequently, with 14% routinely or sometimes and 87% seldom or never checking on student fax referral use.

The most common factor that interfered when faculty were guiding students in the clinics regarding tobacco cessation services was ‘inadequate knowledge about tobacco cessation counseling’; 65% indicated that this was a factor sometimes, half the time, often, or almost always while 21% indicated it was never a factor. Most faculty also indicated that they had time to check student’s activities regarding tobacco intervention services, had a tracking system on the health history, had fax referral sheets in the clinic, and had adequate tobacco cessation related educational materials.

Comments made regarding tobacco cessation were that hygienists cannot perform these tasks if dentists do not allow it, and that the tobacco cessation protocol can be unclear from year to year, particularly if faculty are only teaching once per month on the clinic.

When asked about assisting hygiene students regarding blood pressure monitoring in the clinic in the past year, most (90%) indicated that they routinely or sometimes asked or reminded hygiene students to assess blood pressure in the clinics and most (76%) enter it on the health history form. When asked about checking on dental hygiene students’ activities , most (90%) indicated that they routinely or sometimes checked that the students documented blood pressure status on health history for all the patients , updated information on health history for recall patients, and advised patients with high blood pressure to see their physician . The minority of faculty who checked N/A for statements in this category might be the instructors that did not teach in the clinics.

There was not a dominant factor that interfered with faculty guiding students in the clinics regarding blood pressure monitoring as was the case for tobacco cessation services. The faculty indicated that they had adequate knowledge and time to check students, a formal tracking system was in place and adequate blood pressure monitors were available at least 50% of the time. Lack of blood pressure education materials was a minor factor that might interfere in blood pressure monitoring.

Comments made regarding blood pressure monitoring were that it also needs to be a high priority when educating dental students so that they understand that their hygienists can perform this task if they allow it. Faculty felt that they could use more pamphlets to give to patients, that they did well with blood pressure monitoring, and were appreciative of the value of automatic blood pressure monitors.

Survey Responses and Interpretation – Dental School Faculty

The survey given to hygiene school faculty was also given to the dental faculty at the University of Iowa College of Dentistry. The frequency and percent of survey responses are shown in Appendix 4, pp 18-23. A total of 60 surveys were completed, 93% answered by dentists and 5% answered by dental hygienists and 2% by one other person (profession unspecified). Most were full time faculty 72%, the next largest group was adjunct faculty 19%; 84% teach in the clinic and 79% teach in the class room.

When asked about assisting dental hygiene students in clinics in regard to tobacco cessation services in the clinics over the past year, a majority of the dental faculty indicated that they seldom asked or reminded students to provide tobacco cessation services (52%), to enter tobacco cessation info on health history form (52%), to provide tobacco intervention educational materials (64%), or to use quitline fax referral sheets (69%). Forty percent also indicated that they seldom checked whether the hygiene students documented tobacco use status, 55% seldom updated progress notes for recall patients, 64% seldom recommended tobacco cessation medications and 88% seldom completed fax referral forms.

The dental faculty was more helpful in assisting dental hygiene students in regards to high blood pressure services as 72% routinely asked or reminded students to assess blood pressure and 67% routinely entered blood pressure info into health history. When asked if they checked on the hygiene students' activities, 54% indicated that they routinely checked to see if students documented blood pressure, 50% routinely updated progress notes for recall patients and 80% routinely advised patients with high blood pressure to see their physicians.

When asked to indicate to what extent various factors interfered in their guidance of hygiene students in the clinics, 30% of the dental faculty indicated that they had inadequate knowledge about

tobacco cessation counseling and 11% had inadequate knowledge about blood pressure monitoring. The faculty indicated that they had adequate time, a formal tracking system, adequate numbers of blood pressure monitors and quitline fax referral sheets, and sufficient education materials available to guide students in tobacco cessation services and high blood pressure control.

In terms of student assessment, students are not graded 96% of the time regarding tobacco cessation in didactic lectures and 81% of the time regarding tobacco cessation in clinical work. For blood pressure monitoring, they are not graded 89% of the time in didactic lectures and 55% of the time in clinic.

Comments from dental faculty concerning tobacco cessation counseling included statements that they were adjunct faculty, so exposure to students was minimal, that most patients decline help, and that Nancy Slach does an excellent lecture for first year dental students on this topic.

As far as blood pressure control is concerned, faculty comments included the need for more blood pressure monitors – there should be one in each unit, and that perhaps students should buy blood pressure monitors. It was noted that Karen Baker, the pharmacist, provides excellent lectures on this topic for first year dental students. It was suggested that it would be desirable to have literature available in each clinic; at present it is only provided in the Admissions Clinic, the Operative & Preventive Clinic and the Periodontics Clinic. The comment was made that there needs to be a better referral protocol, including where to refer a patient with high blood pressure readings who does not have a physician.

Comments: Summary/ Lessons Learned

The dental hygiene schools appear to have implemented tobacco use and hypertension screening training into their curriculum. They routinely ask and remind students to assess, record, advise, and offer educational materials and refer patients to physicians regarding high blood pressure as well as ask and remind students to assess, record and offer educational materials for tobacco use. They do not, however, routinely ask or remind students to use quitline fax referral or to recommend tobacco cessation medication. They expressed an ‘inadequate knowledge about tobacco cessation counseling’ as the major interference in guiding students in these activities.

The University of Iowa dental school faculty indicated that they rarely asked or reminded students about tobacco cessation services although they were more helpful to students in regards to high blood pressure services.

From comments made by dental hygiene faculty at the dental school, it appears that the faculty that teach the information to the students didactically, also need to update the clinical faculty so they too feel that they have adequate knowledge about tobacco cessation counseling. *Hopefully, our educational program that was presented to the faculty will do this and increase the confidence and knowledge of the clinical faculty.*

A comment made by dental school faculty that students buy their own blood pressure monitors was discussed with the Dean of Clinics but it was considered to be too expensive as dental students are already paying a lot for their education.

As to the comment by dental college faculty that there needs to be a better protocol for referring patients with high blood pressure, this was discussed with the Dean of Clinics and he would like to continue to have each department set their own protocol.

Overall, the responses from hygiene and dental faculty indicate that they are willing to assist hygiene students in blood pressure and tobacco screening and referral, but most would like more support to accomplish this, including more education about tobacco cessation counseling, access to information concerning hypertension and tobacco cessation, and protocols to follow. Providing instruction and information on motivational interviewing techniques would benefit the faculty and students in addressing both of these major health problems with their patients. Since controlling hypertension and quitting tobacco use require behavior changes on the part of the patient, motivational interviewing skill are often necessary to get the patient to act.

Phase 3. Continuing education and training- state practitioners

Continuing education for practitioners began in the second year of the project with a table clinic presentation at the Iowa Dental Association annual meeting and continued through the final year of the project. Training was given with aid of a PowerPoint presentation which provided practitioners with an overview of the patient pilot study and rationale for screening for hypertension and tobacco use to practitioners statewide. The participants were given a variety of

informational handouts and forms for physician and tobacco cessation referrals (Appendix 5, pp 8-13).

The nine Dental Hygiene Local Component groups, some of which are not very active or do not typically present continuing education at their meetings, and ten Dental Districts Groups were all contacted twice and asked to include a continuing education training session during their meeting. It is important to note that dental hygienists and dental assistants often attend the dental district meetings due to the fact that their dentist pays for them to attend. The presentation was given at several district dental meetings throughout Iowa and to a dental hygiene school in Illinois at the suggestion of one of our participating dentists. The sites for continuing education sessions were as follows:

- 1) Iowa Dental Association annual meeting, Coralville, June 7th 2011.
- 2) Broadlawns Health Center, Des Moines, January 10, 2012.
- 3) Linn County Dental Society, Cedar Rapids, January 13, 2012.
- 4) Iowa City Dental Hygienists Local Component, January 18, 2012.
- 5) Northwest Dental Hygiene Local Component, Council Bluffs, February 7, 2012.
- 6) Carl Sandburg College in Galesburg, Illinois, February 8, 2012.
- 7) Iowa Central Dental Hygiene Local Component, Ankeny, February 21, 2012.
- 8) Iowa-Illinois Dental Study Club, Davenport, May 7, 2012.
- 9) Iowa Dental Association annual meeting, Des Moines, May 5th 2012.

Results of the questionnaire administered at the State continuing education meetings

As described earlier in Phase 1 of this report, participants at these state meetings were asked to complete a 28 question survey titled “Role of dental Health Professional in Blood Pressure Screening and Tobacco Cessation” (see Appendix 5, pp 2-3) which described their dental offices and the procedures in place for blood pressure and tobacco use screening. The frequency and percent distributions of the responses shown in Appendix 5, pp 4-7, are discussed here.

The state meeting survey respondents were mostly dental hygienists (38%), followed by dentists (23%) and dental assistants (17%). There were also several students who filled out a survey (19%). In terms of the offices represented, the number of dentists per practice ranged from 1 to 8, operatories from 2 to 20 and blood pressure monitors from 0 to 30, the high numbers reflecting that some of the state meeting participants were from hygiene schools.

The patient information from the practices was recorded electronically (38%), on paper (23%), or both (39%). Health history forms had a space to record blood pressure for new patient visit (57%),

for recall visits (50%) and a space to record tobacco use for new patient visits (90%) and recall visits (71%). Dental hygienists generally took most of the blood pressure readings at patient visits with dentists taking blood pressure readings 10% or less of the time. The participants routinely asked about blood pressure, measured blood pressure and recorded readings and advised patients as to the adverse effects of high blood pressure over 50% of the time and advised patients to see their physician and referred patients to their physicians over 70% of the time.

The responses to questions on tobacco use screening were very different from those concerning blood pressure screening. Providers asked about, recorded and advised patients about tobacco use over 70% of the time but they only routinely referred patients to quitline or to a physician at a much lower rate (36%). When a fax referral was made, it was handled by dental hygienists or other staff.

Comments: Summary/Lessons learned from state meeting surveys

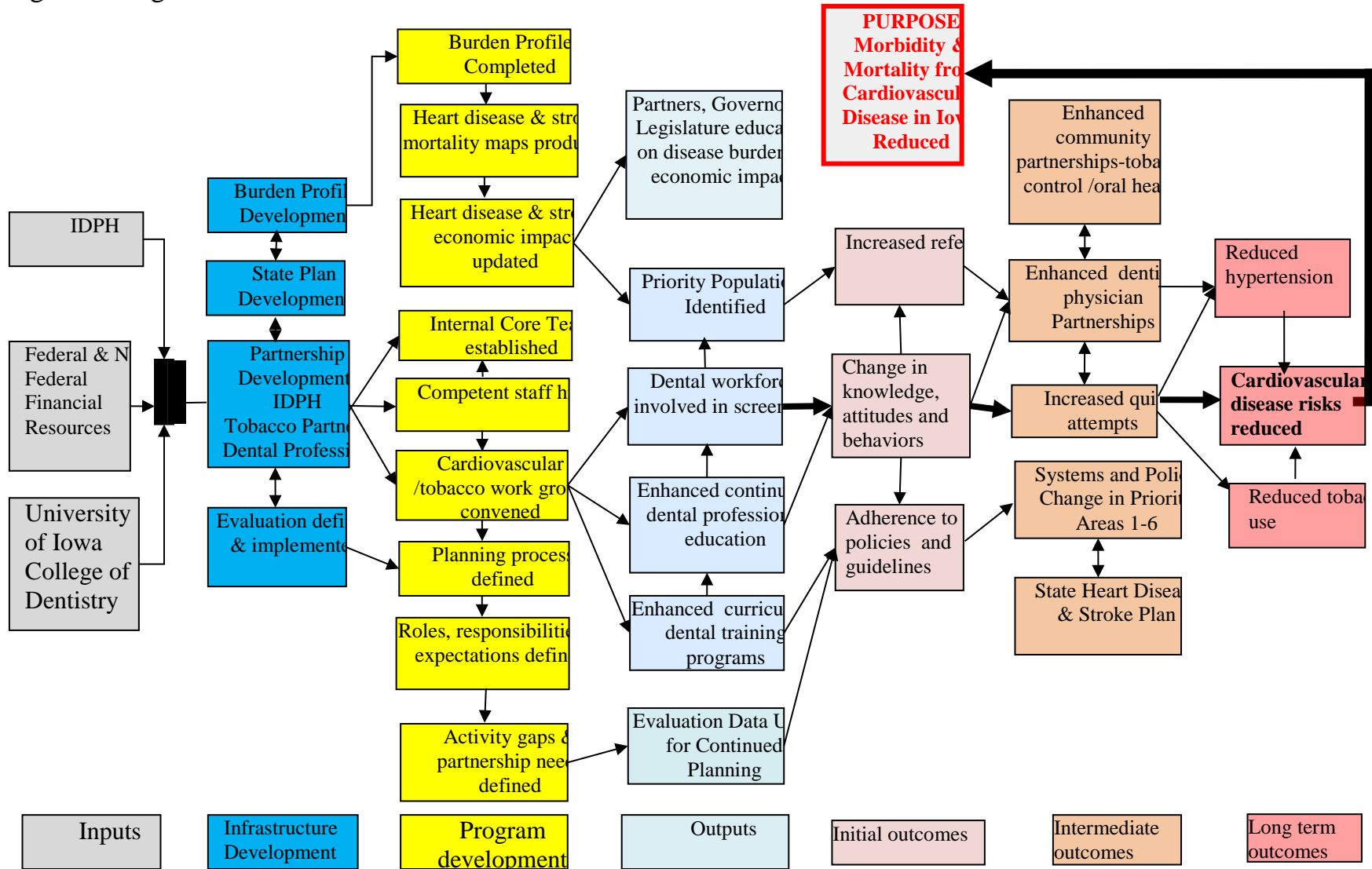
The data that we obtained from surveys of those attending our continuing education sessions will reflect knowledge and behaviors of a self selected group that are interested in improving their professional skills. Thus, they may not be representative of the majority of practitioners in the State. However, the results from the group we surveyed is encouraging and suggests that a majority of them already are screening patients for high blood pressure and tobacco use and their record systems are set up to record the data for initial and recall visits. Of interest is the fact that a greater proportion of this group routinely asked about, measured, and recorded blood pressure and advised patients as to the ill effects of high blood pressure than did the dental offices in our patient screening study. They also asked about and recorded tobacco use and advised as to the ill effects of tobacco use at a greater rate than the office providers. However, the proportion that advised contacting a physician when detecting high blood pressure and advised contacting quitline or other tobacco cessation counseling was similar to that in our dental office group, and we have already speculated on the reason for this in an earlier section.

Final Outcomes/Future directions

Review of logic model

A logic model was developed at the beginning of this project that outlined the development of an educational program through collaboration of the IDPH and the University of Iowa College of Dentistry with an end goal of reducing cardiovascular disease risks in Iowa by reducing hypertension and tobacco use. The model is shown in Figure 2 below. The data from our office surveys together with that from the continuing education programs suggests that, in terms of initial outcomes, we have achieved some change in knowledge, attitudes and behaviors among providers, increased referral, particularly in terms of hypertension, and better adherence to policies and guidelines. In terms of intermediate outcomes we have enhanced dentist-physician partnerships, and made some modest gains in quit attempts. Surprisingly, we have probably contributed to our long term goal of reduced hypertension by reducing the proportion of pre-hypertensives in the patient population.

Figure 2. Logic Model



Presentation of project outcomes at national and local meetings:

1. C.A. Squier , B. Pendharkar, and N. Slach. Monitoring Blood Pressure and Tobacco Use in the Dental Office, Table clinic presentation at the Iowa Dental Association Annual Meeting in Coralville, June 7th 2011.
2. B. Pendharkar, Dental Health Professionals, Blood Pressure and Tobacco Use Screening, CDC's National Heart Disease & Stroke Prevention Practitioners Training; Decatur, GA Sept 12-15, 2011
3. B. Pendharkar, C.A. Squier , and N. Slach, , Blood Pressure and Tobacco Screening: Overview of a pilot training program in Iowa dental practices. American Public Health association 139th Annual Meeting, Crystal City, DC Oct 29 – Nov 2, 2011.
4. C.A. Squier , B. Pendharkar, N. Slach. Monitoring Blood Pressure and Tobacco Use in the Dental Office – a Pilot Program in 5 Iowa Practice. Society for Public Health Education 62nd Annual Meeting, Arlington, VA, Oct 27 – 29, 2011.
5. N. Slach and C.A. Squier. Screening for Hypertension and Tobacco Use in the Dental Office, Iowa Dental Association Annual Meeting in Coralville, May 5, 2012.

Articles published:

Squier CA, Slach N, Pendharkar, B. Tobacco and hypertension screening and referral-implications for dental professionals. Iowa Dent J 2012: 98, 62-65.

Future work

This pilot project has succeeded in creating interest in the concept of improving overall patient health by implementing blood pressure and/or tobacco use screening into the dental visit. Work in this project will continue through:

- 1) Nancy Adrianse, Bsdh, Oral Health Manager, Iowa Primary Care Association, asking about the process of initiating a pilot project into one of their FQHC dental clinics; and by
- 2) Meghan O'Brien, Bureau of Nutrition and Health Promotion, IDPH, asking for useful information about the instruments and patient surveys we used for a developing project.
- 3) Possible funding of an NIH dental practice network proposal (NDPBRN) involving Nancy Slach who is presently writing a proposal template. Addition of brief motivational interviewing techniques in this very similar project.

4. This Dental Office Pilot Project provides the basis for A Community Transformation Grant project which will run from September 2012 to September 2016. The goal would be to increase the number of dental practices having systems in place for blood pressure and tobacco use screening and referral from 5 to 31. Practices in Southeast Iowa with high stroke mortality would initially be targeted for participation with practices in other Iowa areas sought later. Simultaneously, Community Health Center dental clinics will be offered blood pressure and tobacco use screening and referral training to reach low-income and uninsured populations. Finally, statewide, system-level changes would be investigated.

References:

1. Roger VL, Go AS, Lloyd-Jones DM, et al; American Heart Association Statistics, Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2012 update: a report from the American Heart Association. *Circulation*. 125(1):e2-e220, 2012.
2. West MM, Lynch CF, McKeen KM, et al; 2012 Cancer in Iowa, A Focus on Lung Cancer. State Health Registry, http://cph.uiowa.edu/shri/pubs/pdf/Cancer_2012.pdf
3. Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC7), U. S. Department of Health and Human Services. National Institutes of Health National Heart, Lung, and Blood Institute. 2004.
4. Docherty, F and McNeill, A. The hardening hypothesis: does it matter? *Tob Control*. 21:267-268, 2012.