SECONDARY STROKE PREVENTION AND THE USE OF A QUALITY IMPROVEMENT TOOL

by

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2005
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APPROVAL BY THESIS DIRECTOR

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Associate Professor of Nursing
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Words cannot express my thanks to my husband, Ralph and children, Michael, Christopher and Vincent. They have sacrificed right beside me during this project and assisted me with my homework during graduate school.

Without family, friends and the support of instructors and staff at the College of Nursing I would not be where I am today. Thank you and God bless you.
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Abstract

Current research suggests that improving stroke patient outcomes requires an integrated emergency response system, acute stroke teams, early intervention, designated stroke units, written protocols, establishment of primary stroke centers and the use of treatment guidelines. Aggressive treatment of risk factors for stroke also has been demonstrated to improve the risk of sustaining a second stroke. A national pilot project named Get With The Guidelines – Stroke tm (GWTG-S) was initiated by the American Stroke Association (ASA) in 2001. The purpose of the GWTG-S project was to test the effects of a guideline-based patient management tool on stroke patient outcomes. Currently, stroke guidelines are available but are not consistently used in caring for the stroke patient in national or local hospital settings. Therefore the purpose of this project was to utilize the GWTG tool in a Tucson, AZ hospital to examine the secondary prevention measures of stroke care: 1) stroke/TIA patients discharged on antithrombotics, 2) stroke/TIA patients with atrial fibrillation discharged on anticoagulation therapy, 3) rate of prescription of different types of anti-hypertensives at discharge for stroke/TIA patients, 4) stroke/TIA patients who have Diabetes Mellitus and are discharged on diabetic medication, 5) patients with LDL>100mg/dl discharged on cholesterol reducing drugs, 6)patients who are smokers and receive smoking cessation advice or medication at discharge and 7) patients with BMI>25kg/m2 who receive advice for reducing weight and/or increasing activity at discharge. When examining the use of the tool at the Tucson hospital we found that stroke patients discharged with antithrombotics, hypertension
medications, diabetic and cholesterol therapy compared favorably with the national standard. We also found that compared to the suggested standards care of stroke patients with atrial fibrillation, smoking and obesity could be improved. In conclusion, the use of performance measures has the potential to improve the care of stroke patients and to provide guidelines to decrease the risk of future cerebrovascular event.
Chapter I

Introduction

Stroke is the leading cause of mortality, adult neurological disability and accounts for the greatest number of hospitalizations for neurological disease (Bonita, 2001). Current statistics from the American Stroke Association list stroke as the third leading cause of death in the United States with only 50 – 70% of stroke survivors regaining functional independence, and 20% are institutionalized within three months (Goldstein, 2001). The American Stroke Association’s Statement and Vision document outlines their mission to reduce death and disability from stroke by increasing awareness of early recognition and intervention.

The following steps reflect their mission:

1. Prompt recognition of symptoms
2. Timely access to the 911 system
3. Immediate response and evaluation by EMS team
4. Prompt transport to appropriate hospital
5. Accurate triage and initiation of diagnostic procedures
6. Appropriate medical interventions if the patient meets the criteria.

The necessary tools for providing education and improving stroke treatment have been provided by research efforts. A report from the AHA/ACC Scientific Forum begins with the statement; “the importance of measuring and monitoring healthcare quality is no longer in doubt and the ability to assess quality depends on the development of performance standards” (Adams, et al, 2003). The stroke work group identified several
measures to evaluate care for the stroke patient. Performance measures are specific standards of care for a patient population against which the clinical care for the population is deemed appropriate.

The work group on stroke identified six domains to better evaluate performance measures. Each one represents a goal of stroke care:

1.) Coordination of care
2.) Prompt diagnosis
3.) Preservation of neural tissue
4.) Prevention of complications
5.) Initiation of secondary prevention and
6.) Restoration of function

Coordinating these goals of care should include early access to care, training of pre-hospital providers and an emergency dispatch system familiar with practice guidelines. Diagnosis is dependent on clinicians with core knowledge of stroke and its management, institutions with a plan in place for the care of stroke patients and brain imaging. Preservation of neural tissue is achieved with expertise from neurologists and/or neurosurgeons. Although few therapies exist for decreasing damage to tissue, several measures were identified that have been shown to improve outcomes (Bednar, 1999). The use of aspirin within 48 hours of admission, treatment of fever and not using sublingual nifedipine because of the resultant precipitous drop in blood pressure, which can increase ischemia. Prevention focuses on the recognition and early treatment of risk factors along with antithrombotic drug therapy if no contraindications exist. Restoration of function
includes physical occupational and speech therapy. Early initiation of the rehabilitation plan can help to improve discharge planning.

*Purpose*

The purpose of this project was to examine how a Tucson Arizona hospital participated in the GWTG-Stroke™ quality improvement program. The project examined specific quality measurements currently used to improve delivery of stroke care and explore how risk factors or secondary prevention measures are documented and treated after stroke diagnosis. The seven performance measures examined were:

1. Stroke/TIA patients discharged on antithrombotics
2. Stroke/TIA patients with atrial fibrillation discharged on anticoagulation therapy
3. Rate of prescription of different types of anti-hypertensive medications at discharge for Stroke/TIA patients
4. Stroke/TIA patients who have Diabetes Mellitus and are discharged on diabetic medication
5. Patients with LDL>100mg/dl that are discharged on cholesterol reducing drugs.
6. Patients who are smokers and receive smoking cessation advice or medication at discharge
7. Patients with BMI>25kg/m2 and receive advice for reducing weight and/or increasing activity at discharge

These performance measures were compared to other participating hospitals nationally and locally in the state of Arizona.
Significance to Nursing

Advance practice nurses (APN) have been recognized as pioneers in primary care roles and have evolved to provide care to specific populations including; family, adult, pediatric, geriatric, women’s health and mental health. These roles have evolved over time as the abilities of the APN to address the needs of varied populations have been recognized by the medical community and healthcare consumers. In particular, the primary care nurse practitioner has played an important role in increasing access to care for underserved patient populations and have come to be recognized as cost effective providers of quality primary care (Hamric, 1996). Along with increased responsibility to patient care is the increased visibility as role model and mentor for fellow nurses and becoming actively involved in research related to improved patient care.

The data collected in the GWTG-Stroke™ quality improvement project will serve as an instrument on which to structure continuing education and research for APNs and other providers caring for stroke patients. APNs in the hospital setting will be part of the team implementing the guidelines for the acute phase of treatment. They will play a crucial role in the initial assessment of the patient, following protocols for diagnostic procedures and assuring that thrombolytics will be administered safely within the three-hour window. APNs working with the patients admitted to the hospital will be responsible for coordinating medications, treatments, physical and occupational therapy and discharge planning. These healthcare providers will be responsible for keeping
current on the latest advances and recommendations for acute treatment and will rely on the latest research data to guide their treatment plans.

A majority of APNs who practice in the primary care setting are often the providers designated to promote preventive patient teaching. Programs within the office or clinic setting which address risk factors associated with stroke and how to decrease them may include smoking cessation, weight reduction and exercise, nutrition with healthy eating strategies and medication management particularly for hypertension and diabetes. Patient teaching is often second nature to nursing and can be accomplished during an office visit or by establishing programs within the office that are accessible to patients at risk. Community education regarding risk factors is another area in which APNs can be proactive. Health Fairs and neighborhood center meetings can be utilized to get the information to the public in a non-threatening venue. Education for pre-hospital providers is another area for APNs to promote current guidelines and treatment protocols. The utilization of current guidelines for stroke care in the APN’s healthcare and health promotion practice will serve as an example for other providers and assist them to implement the guidelines.
Chapter II

Stroke Background

The AHA defines stroke as a syndrome characterized by neurological deficits with a gradual or rapid onset that is consistent with a reduction or absence of blood flow to a recognized vascular territory and is present 24 hours or more. A transient ischemic attack (TIA) is defined as a temporary decrease of blood to the brain resulting in deficits that last less than 24 hours. Most TIAs present as abrupt onset of symptoms with gradual resolution, many of which last only 15 minutes. Approximately 30% of TIAs proceed to stroke with the highest risk period in the first few weeks. (Ingall, T. 2000). The World Health Organization (WHO), defines stroke as the rapidly developing clinical signs of focal or global disturbance of cerebral function with symptoms lasting 24 hours or longer, where no other explanation is apparent other than a vascular cause (WHO Task Force on stroke and other neurological disorders, 2000).

Strokes are further classified as ischemic or hemorrhagic. Ischemic strokes account for 75%-80% of strokes and are described according to origin being thrombus or embolus. The mechanism of a thrombotic stroke involves an atherosclerotic blood vessel from which a thrombus travels until it reaches a small vessel in the brain and causes occlusion. It occurs commonly after a TIA and usually involves a patient with a more complex group of syndromes. This includes lacunar strokes, which are caused by small thrombus and are seen typically with hypertensive and diabetic individuals. (AHA: Stroke Statistics, 2002). The embolic stroke is most commonly seen in the cardiac patient where there is a history of atrial fibrillation, recent MI, septal defects, prothetic valves,
cardiac surgery or cardiac interventions that leave the patient at risk for embolus to the brain.

Hemorrhagic strokes involve intraparenchymal bleeding usually a result of hypertensive crisis and subarachnoid hemorrhage from aneurysm rupture. The patient presentation for this type of stroke is commonly more acute. Symptoms may include severe headache, vomiting, systolic blood pressure > 220, and decreased level of consciousness or coma. The ability to distinguish a clot from a bleed requires a diagnostic CT scan of the head and a properly trained radiologist to interpret the images.

**Acute Treatment**

A large portion of stroke treatment has followed on the heels of cardiac research including the use of tissue plasminogen activator. The National Institute of Neurological Disorders and Stroke published a multi-site study in 1995 that included 500 patients. The trial was in two parts; the first looked at patients 24hrs after t-PA the second evaluated those three months after the intervention. The conclusions were that clinical outcomes improved after three months. The risk of cerebral hemorrhage did not overcome the benefits to the patients in the study. These and other trials have attempted to promote physician use of t-PA in the three hour window.

In 1996, after a detailed review of the NINDS and other data, the U.S. Food and Drug Administration approved t-PA use for a stroke caused by a blocked blood vessel within three hours of symptom onset. After approval of the use of t-PA for ischemic stroke, other interventions for the treatment and management of stroke were tested in
clinical trials and the data is reflected in the ASA Scientific Statement (Adams et al, 2003). Their summary emphasized that the management of the stroke patient is multifaceted and indications for therapies vary among patients. The goal of their statement is to provide guidance to physicians for the early treatment of patients and the prevention of further stroke or neurological complications.

Although treatment of stroke has the potential of reducing death and disability, it is likely that prevention, which focuses on treatable risk factors, will more effectively reduce the ravages of stroke.

**Risk factors**

Control of risk factors is important for prevention of a first stroke and after ischemic stroke and TIA has occurred. A patient with symptomatic cerebrovascular disease is likely to have other cardiovascular conditions, which would indicate increased risk factors. These would include: coronary heart disease with angina, prior myocardial infarction, valvular heart disease, congestive heart failure, left ventricular hypertrophy and atrial fibrillation (Wolf, et al, 1999).

Other modifiable risk factors for heart disease and stroke are also similar: hypertension, diabetes, elevated cholesterol, obesity, smoking, alcohol consumption, physical inactivity, atherosclerotic heart disease and carotid stenosis. Risk factors that are not modifiable include age, sex, race, heredity and previous stroke (Dundas et al, 2000).
Nadarershvilli studied risk factors for stroke and cardiac disease in 500 patients with carotid stenosis and then selected 106 that had been followed for five years or more. This mainly retrospective study took place in a large teaching hospital in Toronto, Canada. They conclude that the long term risk of stroke in patients with carotid artery stenosis was low compared to the risk of other cardiovascular events and therefore surgical intervention is not likely to benefit this group. The authors also felt that prevention should concentrate in the larger area of cardiovascular risk prevention and encouraged more research by their colleagues.

The resources of a twenty-year study “The Rochester Epidemiology Project” allowed Whisnatt et al access to 1,397 stroke patients of similar age and ethnicity. The risk factors were identified and a list of variables was compiled. When matched with time onset variables the risk factors were narrowed to four; transient ischemic attack, congestive heart failure, ischemic heart disease and atrial fibrillation. By analyzing the data, the authors were able to estimate odds ratios for the risk factors for that stroke risk patient group. Identifying early risk factors for stroke will assist providers to initiate treatment plans for vulnerable patients.

Interviewing stroke survivors helped other researchers (Redfern et al, 2002) understand how the delivery of preventive care impacted the outcomes of stroke patient prognosis. Data was collected from 717 stroke patients three months after their diagnosis by using a questionnaire. They studied patients who received follow up treatment for their risk factors, where they received treatment and what treatment they received. The authors were able to identify a disparity among stroke treatment plans despite identifying
the accessibility of services for follow up care. This study emphasizes the need for the utilization of research-based standards of care among providers working with stroke patients.

In a similar project, researchers (Vickery et al, 2002) studied 1,631 stroke patients from a managed care plan. They compared stroke, anterior MI and peripheral artery disease, related them to the occurrence of secondary events, and found a relationship. This data also points out the need for more outcomes driven research in at risk populations.

Gorelick (2002) provides information about new stroke prevention therapies. His search came out of the realization that atherosclerosis is an inflammatory disease and therefore inflammation is a risk factor for stroke. He suggests that statin agents, angiotensin converting enzyme inhibitors and vitamins along with current treatment, may help reduce inflammation and stabilize the vulnerable atherosclerotic plaque.

**Healthcare quality**

Donabedian was an early and tireless proponent of developing conceptual frameworks for evaluating quality in healthcare. The acquisition of data is meaningless until it is organized and disseminated in an understandable format. Donabedian defined quality assurance as “actions taken to establish, protect, promote and improve the quality of healthcare”. He also acknowledges that one can not assure or guarantee quality, only increase the probability that care will be “good” or “better” (Donabedian, 2003) His quality components of structure, process and outcomes have become the building blocks
for many data collecting tools and was utilized by the AHA/ACC stoke forum work group in 2000. Healthcare quality can be divided into three parts:

1) Structure or the healthcare system

2) Process which refers to the use of diagnostics and therapeutics and

3) Outcomes or the result of interventions.

Developing measures for each of these components is dependent on the area of care being evaluated, the resources available and the number of trained personnel involved. Healthcare quality can be measured utilizing Donabedian’s components. Structure refers to the components of the healthcare system including:

1) Material resources as in supplies and facilities

2) Human resources as in numbers, qualifications and training of personnel and

3) Organizational resources as in the teams of medical staff

Also included in these components should be methods of supervision for the medical teams along with performance reviews as well as reviewing reimbursement from payers for the care provided. Process acknowledges activities that constitute healthcare including diagnosis, treatment, rehabilitation, prevention, patient education and provider education (Donabedian, 2003).

Measuring performance outcomes for stroke

Some in the field of neurology have suggested establishing Stroke Centers to improve the delivery of care to these patients. Alperts and his group (2000) did a review of literature for the Brain Attack Coalition concerning the availability of resources to
treat stroke patients. They found many inconsistencies among institutions and noted lack of education in the evolving treatment of stroke as a hindrance to care. They suggested a model similar to Trauma Centers where resources, personnel and services could be focused. An improvement in outcomes of trauma patients has been well documented in the literature according to the authors. The authors also make note that the delivery of care is one of the essential components for stroke treatment, and that establishing ways to measure that care is imperative.

Wilson and Harrison (2002) asked the question “What is clinical practice improvement?” In their article, they explored several models to help answer the question one of which is the Plan-Do-Study-Act cycle used by many types of businesses. These models help them to the conclusion that improvement methods based on process improvement are more likely to yield positive results than punitive methods. They also recognize the need for more research into the implementation of these process improvement plans in the healthcare arena.

Many healthcare institutions use quality assurance/improvement groups to assist them in their annual progress reports for certification. The data collection presents many difficulties for institutions including personnel, financial and patient selection. In addition, to be a useful measure of quality a motivated group of providers must be willing to improve performance. Labresh and Tyler (2003) have put forth a model, which encourages collaboration among hospital teams and the use of a patient management tool. They suggest an approach that will increase the use of well-defined guidelines for stroke treatment. These authors note that the dichotomy between knowledge and intervention on
the one hand and practice behavior on the other suggests that a change in systems of care rather than more education is needed to improve outcomes.

LaBresh and Tyler’s model provides hospitals with an approach to improve care and follow established guidelines utilizing the Get With The Guidelines-Stroke™ patient management tool. Hospitals in Massachusetts were asked to incorporate this web-based program to collect data on stroke patients. Initially 24 hospitals tested the program after an invitation from the AHA. Included with the program were volunteer consultants to help train personnel who would be using the tool.

This early pilot focused on data collection in the areas of initial treatment and secondary prevention. This collaboration with the hospitals using the tool demonstrated significant improvement of providers utilizing secondary prevention guidelines in their treatment plans.

**Quality Improvement Tool**

Many hospitals and Emergency Medical Services systems have joined with the ASA to track stroke patients entering the healthcare system within the three-hour window for administration of thrombolytics. The Department of Neurology in a local Tucson, Arizona medical center has been participating in collecting data using this tool. Get With The Guidelines-Stroke™ is a hospital-based program, which focuses on the initial treatment and secondary prevention for stroke patients. This program works by identifying individuals within an institution to lead, develop and mobilize teams to implement treatment plans and discharge protocols for patients in hospitals with acute
care capabilities. These protocols are based on American Stroke Association’s treatment and prevention guidelines that measure the performance and timing of the following acute and secondary interventions:

- Time of symptom onset to appropriate intervention/therapy
- Patient arrival at ED to initial work up (brain imaging)
- Patient arrival at ED to thrombolytic therapy
- Smoking cessation counseling
- Lipid lowering therapy
- Weight and exercise recommendations
- Atrial fibrillation management
- Antiplatelet agents
- Alcohol consumption advice
- Diabetes management
- Blood pressure treatment

It is the expectation of the ASA that institutions providing care to stroke patients will achieve a benchmark of 90% or greater on each of the performance measures.

The ASA has provided support for several scientific studies presented at the recent ASA International Stroke Conference 2005 demonstrating the use of quality improvement measures and monitoring patient progress through data measurement tools does improve patient outcomes. The Stroke Patient Management Tool is a web-based prospective data collection tool, which provides information for tracking purposes. The tool is a user-friendly form customizable to the clinical and research needs of the
institution utilizing it. The data collected in the web based program begins with patient demographics; age, race, gender and arrival mode. This is followed by date/time of onset of symptoms, how determined i.e.; witnessed or self-reported, arrival time to hospital, score from NIH stroke scale, date/time of brain imaging and time/interpretation of brain imaging. Then questions regarding the administration of thrombolytics are addressed. Was thrombolytic therapy administered within the three-hour window, if not then which criteria were not met, were there complications because of thrombolytics? When and how was DVT prophylaxis initiated, when was lab work documented, was lipid panel and A1C addressed during hospitalization, was consultation for swallow study and physical therapy documented, and was the patient’s medical history included.

Discharge data includes questions regarding patient functional status, destination, follow-up care/instructions, medications and lifestyle modifications. The data entered remains the property of each institution and the ASA has access to aggregate data with no patient identifiers. The use of on-line data collection tools and current research will assist all health care providers by contributing to the understanding of outcomes based stroke treatment and secondary prevention.

In summary, stroke continues to be a leading cause of death and disability in the United States. Treatments for stroke have improved, but these benefits are dependent on the evidence-based use of existing therapeutic interventions. Acute stroke guidelines are now available, but are not being consistently used in the hospital setting. While it is recognized that use of guideline based tools improve outcomes, research on how these tools benefit the care of stroke patients remains under explored.
Chapter III

Data Collection / Methods

The strength and accuracy of any data that is collected is dependent on the knowledge and coordination of the persons collecting the data. This early retrospective investigation of stroke patient documentation at the Tucson hospital lacked a long term group of coordinated data collectors. The person reading the patient records and entering the information into the data bank is responsible for making the entry decisions, which allows for possible bias in the data collection. The specific performance measures that were evaluated in this project are part of a larger tool; Get With The Guidelines – Stroke™. This web-based program is produced for the ASA by Outcome Sciences to track specific measures related to the care of hospitalized stroke patients. The data presented in this project reflects the data collected in my role as a graduate student from October 2002 to June 2004 at local hospital in Tucson, Arizona.

The hospital is a 350 bed tertiary care and teaching medical center with Level I Trauma designation and fulltime Neurology/Neurosurgery coverage. The author assisted the Stroke Team/Neurology Department in identifying patients entering the Emergency Department exhibiting stroke symptoms. In order to be included in the database the patient had a diagnosis of ischemic stroke or transient ischemic attack. The project includes a retrospective initial chart audit of 100 charts. This retrospective audit was part of the Department of Neurology’s quality improvement project for stroke that included participation in the Arizona GWTG-ST™ pilot project. The total number of patients in the
database at the time of this project was 305, with some of the documentation still being entered.

GWTG-S™ initiative is an electronic checklist of evidence-based standards of stroke care. It was implemented by the ASA in a pilot study period from April 2003 to April 2004. Data on the patients’ care was collected from hospital team meetings and chart reviews using a web based instrument called the Patient Management Tool (PMT). Hospitals used the tool to track key timelines against AHA/ASA benchmarks which included improving the appropriate use of thrombolytics, decreasing the time to CT and other diagnostics, decreasing the initial physician evaluation period and the administration of thrombolytics in the acute phase.

The seven performance measures that I have included in my project are:

1.) Percent of patients discharged on antithrombotic medication
2.) Percent of patients with atrial fibrillation discharged on anticoagulants
3.) Percent of patients discharged with anti-hypertensive medication
4.) Percent of diabetic patients discharged with diabetic medication
5.) Percent of patients with elevated LDL discharged with lipid reducing medication
6.) Percent of smokers who receive smoking cessation advice/medication at discharge
7.) Percent of overweight patients who receive weight reduction advice at discharge
Data Analysis

The following data regarding the performance measures is presented in graph format. Each table describes one of the seven measures and indicates the percent of compliance for each measure in this project. The graphs compare performance measures data from the Tucson hospital, the Arizona hospitals and all hospitals in the national pilot. Numerators and denominators used in the data collection from each of the groups are also included in the tables. The data collected represents the number of patients whose charts contained the information necessary to be included in the performance measure. The data from each of the performance measures is then plotted to show the percent of compliance at the Tucson hospital and how it compared to the AHA/ASA benchmark for each measure. These quality performance measures focus within the area of secondary prevention for patients discharged with a primary diagnosis of stroke or transient ischemic attack. The AHA/ASA recommended percentage of compliance for each of the seven measures presented here ranges from 90% -100%.

The first graph presented below is measure #1 patients discharged on antithrombotics. The Tucson hospital had 106 documented patients for this measure and 103 were discharged with antithrombotic medications or 97.2% compliance. The AHA/ASA recommended benchmark for this measure is 100% compliance and the comparisons are discussed under the graph.
Performance Measure #1

Patients discharged on antithrombotics. Tucson hospital 97.2

Arizona hospitals 95.8

All hospitals 96.3

Figure 1  At the Tucson hospital 103 out of 106 patients (97.2%) were discharged with antithrombotic medication, which was similar to the Arizona hospitals (95.8%) and all hospitals (96.3%). These percentages are favorable when compared to the AHA/ASA benchmark of 100%.
Performance Measure #2

<table>
<thead>
<tr>
<th>Patients with atrial fibrillation discharged on anticoagulants</th>
<th>Tucson hospital</th>
<th>Arizona hospitals</th>
<th>All hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>66.7</td>
<td>92.2</td>
<td>94.7</td>
</tr>
</tbody>
</table>

Figure 2  The Tucson hospital had only three documented patients with atrial fibrillation. Of these 3 patients, 2 were discharged on anti-coagulation therapy. When compared to the AHA benchmark for this measure of 95% it is obvious that the number of patients for this measure was well below the others in the database.
Performance measure #3

This measure is broken down into five classifications of anti-hypertensive medications prescribed at discharge. Many patients require more than one medication to control their symptoms, but this measure did not look at combinations of medications at discharge. The five classifications are: ace inhibitors, beta blockers, calcium channel blockers, diuretics and other. The total of documented patients from the Tucson hospital was 108, the Arizona hospitals total was 1624 and all hospitals in the data base totaled 48857 patients. The expected compliance for anti-hypertensive medication at discharge for stroke patients diagnosed with hypertension is 100%. The expected compliance was not broken down into each medication classification.

Performance measure # 3a

<table>
<thead>
<tr>
<th>Different types of anti-hypertensives at discharge:</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tucson hospital</td>
<td>46.6</td>
</tr>
<tr>
<td>Arizona hospitals</td>
<td>50.9</td>
</tr>
<tr>
<td>All hospitals</td>
<td>52.1</td>
</tr>
</tbody>
</table>

Figure 3    The number of patients from the Tucson hospital discharged on ace inhibitors was 41 this correlates to 46.6% of the total 88 patients documented in this performance measure and compares favorably with the AZ hospitals and all hospitals in the project. The AHA/ASA benchmark is 100% for all types of anti-hypertensive medications prescribed at discharge.
Performance Measure #3b

Anti hypertensives at discharge:
Beta blockers

<table>
<thead>
<tr>
<th>Hospital Type</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tucson hospital</td>
<td>42</td>
</tr>
<tr>
<td>Arizona hospitals</td>
<td>41.8</td>
</tr>
<tr>
<td>All hospitals</td>
<td>46.5</td>
</tr>
</tbody>
</table>

Figure 4   Beta blockers are the second most prescribed medication for the treatment of hypertension. Of the 88 Tucson hospital patients entered into the data base 37 were given beta blockers at discharge. This 42% also compares favorably with the other hospitals in the project.
Figure 5  Calcium channel blockers are not the most prescribed medication for this patient population. Of the 88 Tucson hospital patients 9 were treated with this class of anti-hypertensive. This 10% was below the other hospitals in the project and may represent regional physicians’ medication preferences.
Performance Measure #3d

Antihypertensive at discharge:
Diuretics

<table>
<thead>
<tr>
<th></th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tucson hospital</td>
<td>18.2</td>
</tr>
<tr>
<td>Arizona hospitals</td>
<td>23.7</td>
</tr>
<tr>
<td>All hospitals</td>
<td>27.3</td>
</tr>
</tbody>
</table>

Figure 6    Diuretics are perhaps the oldest medication treatment for hypertension and are not as popular now that newer medications are available. This medication is very effective for many patients and is still the first line drug therapy for newly diagnosed hypertension and used in combination drug therapy. At the Tucson hospital 16 patients or 18.2% were given this medication at discharge which was only slightly lower when compared to the Arizona hospitals 23.7% and all hospitals 27.3%.
### Performance Measure #3e

**Antihypertensives at discharge:**

<table>
<thead>
<tr>
<th></th>
<th>Tucson hospital</th>
<th>Arizona hospitals</th>
<th>All hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent</td>
<td>5.7</td>
<td>12.9</td>
<td>13.4</td>
</tr>
</tbody>
</table>

Figure 7: The medications under the heading of “other” were not identified in the data base. It is assumed by this data collector that the medications were those that did not fit into the previously discussed categories. Here again the number of patients from the Tucson hospital was less than the other hospitals in the project. Therefore the 5.7% was much lower than the Arizona hospitals 12.9% and all hospitals 13.4%.

The choice of which anti-hypertensive to prescribe for a patient after stroke or TIA is dependent on patient history and recovery during hospitalization. The Tucson hospital did a very good job with the final numbers of patients discharged on medications for their hypertension. The percentages were comparable to the AHA benchmarks for each drug classification.
Performance Measure #4

Diabetic patients discharged on diabetic medication

<table>
<thead>
<tr>
<th></th>
<th>Tucson hospital</th>
<th>Arizona hospitals</th>
<th>All hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent</td>
<td>81.6</td>
<td>74.4</td>
<td>78.1</td>
</tr>
</tbody>
</table>

Figure 8  The Tucson hospital had 38 documented patients with Diabetes Mellitus. Of these patients 31 or 81.6% were discharged on diabetic medication. This percentage was slightly better than the Arizona hospitals 74.4% and all hospitals 78.1% but below the AHA benchmark of 95%.
Performance Measure #5

Patients with LDL>100mg/dl discharged on cholesterol reducing medication

<table>
<thead>
<tr>
<th>Percent</th>
<th>Tucson hospital</th>
<th>Arizona hospitals</th>
<th>All hospitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>60.6</td>
<td>66.1</td>
<td>74</td>
<td></td>
</tr>
</tbody>
</table>

Figure 9 At the Tucson hospital 71 patients had documented LDL>100mg/dl, 43 patients were discharged with cholesterol reducing medications. This 60% was below the Arizona hospitals 66.1% and all hospitals 74%. The documented results of this measure did not meet the expected AHA benchmark of 95%.
Performance Measure #6

<table>
<thead>
<tr>
<th>Smokers who receive smoking cessation advice or medications at discharge</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tucson hospital</td>
<td>35.7</td>
</tr>
<tr>
<td>Arizona hospitals</td>
<td>50.9</td>
</tr>
<tr>
<td>All hospitals</td>
<td>57.8</td>
</tr>
</tbody>
</table>

Figure 10   Smokers identified at the Tucson hospital totaled only 14. Of these patients, five received smoking cessation advice and/or medication. This 35.7% was below the Arizona hospitals 50.9% and the other hospitals 57.8% of patients documented. This measure did not compare well to the AHA expected benchmark of 90%.
Performance Measure #7

Patients with BMI > 25 kg/m² who receive weight reduction/activity recommendations at discharge

<table>
<thead>
<tr>
<th>Hospital Type</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tucson hospital</td>
<td>25</td>
</tr>
<tr>
<td>Arizona hospitals</td>
<td>19.5</td>
</tr>
<tr>
<td>All hospitals</td>
<td>30.8</td>
</tr>
</tbody>
</table>

Figure 11  The total number of documented patients with BMI > 25 kg/m² at the Tucson hospital was 8 and only 2 received discharge instructions for weight reduction and/or increasing activity. When compared to the Arizona hospitals this 25% was better but less than the other hospitals 30.8%. This performance measure is below the AHA expected benchmark of 90%.
Chapter IV

Discussion

Stroke continues to be a leading cause of death and significant disability. Research has resulted in guidelines and care standards to improve treatment of stroke but these benefits are dependent on implementation. The Institute of Medicine (IOM) defines clinical practice guidelines as systematically developed standards to assist practitioner and patient decisions about appropriate healthcare for specific clinical circumstances. The purpose of clinical practice guidelines is: 1) assist clinical decision making to promote positive patient outcomes, 2) educate individuals and groups, 3) assess and ensure quality of care, 4) guide allocation of resources for healthcare and 5) reduce the risk of legal liability for negligent care (Heinemann, et al. 2002).

The purpose of this project is to investigate how quality measures related to secondary prevention of stroke are documented. Addressing secondary prevention measures is part of comprehensive stroke treatment. For this project the secondary prevention measures that were examined included:

1. Patients discharged on antithrombotics
2. Patients discharged on anticoagulation therapy
3. Anti-hypertensive prescription at discharge
4. Patients discharged on diabetic medications
5. Patients discharged on cholesterol reducing medications
6. Patients discharged with smoking cessation advice
7. Patients discharged with weight reduction recommendations
The results of this project indicate that there are areas of stroke care which require improvement as well as areas where the Tucson hospital documented care is similar to other hospitals. Specifically data from measures that examined stroke/TIA patients discharged on anti-thrombotic medication, anti-hypertensive medication, diabetic patients discharged with diabetes medications and those discharged with cholesterol reducing drugs provide good evidence of addressing secondary prevention and were within 5% of the expected AHA/ASA benchmark. These measures which addressed medication therapies showed good compliance percentages because these are conventional standards of care for the disease processes. For example the JNC VII guidelines for the treatment of hypertension are the accepted standard nationwide. These measures provided good percentages because this study took place in a teaching hospital where the emphasis is on utilizing evidence based standards of care and established guidelines to provide patient care. The promotion of evidence based practice is inherent in the teaching hospital’s mission.

In the performance areas which focused on life style modifications such as smoking cessation, diet and exercise advice, the Tucson hospital was greater than 5% from the ASA benchmark and there is room for improvement in these areas of stroke secondary prevention. This type of secondary prevention is more difficult to measure as it involves individual needs and expectations. The physical abilities of the stroke patient at discharge will greatly influence the discharge activity plans. Many hospitals have physical and occupational therapy departments which provide individualized rehabilitation programs for stroke patients. Often the coordination of these activities is
not found in the patient chart and then appears that the performance measure is not being addressed.

Health care providers need to be familiar with current evidence based treatment guidelines, knowledge and utilization of the Get With The Guidelines-Stroke™ tool can provide them with a proven method to track stroke treatment and improve patient outcomes. Further work to improve the use of the guideline's tool in the Tucson hospital could be in the form of staff education sessions. Data can be reported to and utilized by the hospital quality assurance department to track patient care outcomes. Ultimately, the use of such a tool may reduce death, disability, and cost of stroke.

The primary goal of any scientific research or study in the medical arena is to stimulate healthcare providers to apply recommendations in their clinical practice. This process is based on the scientific merit and measurable data collected by knowledgeable researchers. The data collected in the GWTG-Stroke™ quality improvement project will serve as an instrument on which to structure continuing education for advance practice nurses and other providers caring for stoke patients. The main goal of my project was to assess outcomes as a measure of the quality of stroke care delivery. Advance Practice Nurses in the hospital setting will be part of the team formalizing the stroke center designation. This formalization of the stroke center would involve assessment of the stroke care process from pre-hospital to rehabilitation. This process will also involve gaining monetary support from administration in order to provide for the infrastructure of the stroke center.
Future Implications and Advance Practice

The Advance Practice Nurse (APN) will play a crucial role in the initial assessment of the patient, following protocols for diagnostic procedures and assuring that thrombolytics will be administered safely within the three-hour window. APNs working with the patients admitted to the hospital will be responsible for coordinating medications, treatments, physical and occupational therapy and discharge planning. The activities in a formal stroke center will increase awareness of stroke care guidelines and strengthen stroke care outcomes. Today’s healthcare providers are responsible for keeping current on the latest advances and recommendations for acute stroke treatment and will rely on the latest research data to guide their treatment plans.

A majority of APNs who practice in the primary care setting are often the providers designated to promote preventive patient teaching. Programs within the office or clinic setting which address risk factors associated with stroke and how to decrease them may include smoking cessation, weight reduction and exercise, nutrition with healthy eating strategies and medication management particularly for hypertension and diabetes. Patient teaching is often second nature to nursing and can be accomplished during an office visit or by establishing programs within the office that are accessible to patients at risk. Community education regarding risk factors is another area in which APNs can be proactive. Health Fairs and neighborhood center meetings can be utilized to get the information to the public in a non-threatening venue. Education for pre-hospital providers is another area for APNs to promote current guidelines and treatment protocols. The utilization of current guidelines for stroke care in the APN’s healthcare and health
promotion practice will serve as an example for other providers and assist them to implement the guidelines.

The APN is in a position to work with future research efforts, which focus on stroke treatment. Some of these efforts may focus on the development of quality of care indicators for patients with ischemic stroke along with the interests of family, caregivers, hospitals, payors and society. These efforts may be devoted to the development of the concept of a center of excellence for stroke care at a particular institution and expanding its role in stroke care locally and regionally. The APN can also help to develop systems, which will ensure patients at hi-risk for stroke are appropriately identified, screened and treated according to the latest guidelines. Other systems could involve improving techniques for capturing; analyzing and presenting quality data that will be used to improve stroke quality outcome measures.

Future research areas that will be evolving and which APNs will be included are assessment of care patterns for secondary prevention in hi-risk patients, with the goal of determining whether there are gaps between actual care and evidence based recommendations for stroke care that can be bridged through quality improvement programs. After stroke, hi-risk groups should continue to be targeted to prevent stroke recurrence. Different behavioral risk factors are associated with specific sociodemographic groups within the stroke population. However, the relationship between sociodemographic characteristics and lifestyle changes remain unclear. More research is needed in the human process of change to find out how to best intervene to
improve secondary prevention. The role of the APN fits the description of the researcher who is familiar with the cultural, physical and spiritual issues of the stroke patient.

Conclusions

Use of a patient management tool to improve the quality of stroke care was successful in the national GWTG-Stroke™ program. The national program proved that the outcomes for stroke patients improved dramatically within a year when hospitals utilized the GWTG program. Participating providers viewed the patient management tool as a resource for better documentation and improved stroke care (Moyer, 2005). Quality of health care varies throughout the U.S. and does not always meet professional standards or expected standards of care. Stroke patients do not always receive care based on the current evidence-based standards of practice during acute treatment or secondary prevention. The development of performance measures and the utilization of these measures to promote change is an effective way to improve the delivery of stroke care.

The results of this project support the national GWTG-Stroke™ study results. We found that while documentation of care for stroke patients with atrial fibrillation, smoking and obesity could be improved, documentation of care regarding antithrombotics, hypertension, diabetes and cholesterol confirmed that stroke care in these areas met national standards. Advance practice nurses can serve as a member of hospital stroke teams that utilize stroke quality improvement tools. Subsequently, the use of these tools can improve stroke care, and decrease mortality from this disabling condition.
### Appendix A: Patient Management Tool Document (pg 1)

<table>
<thead>
<tr>
<th>Patient ID:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Admit Date:</td>
<td>/ /</td>
</tr>
<tr>
<td>Discharge Date:</td>
<td>/ /</td>
</tr>
</tbody>
</table>

#### Location
- O Neurology – Stroke Unit
- O Neurology – Other Location
- O Other Unit w/ Stroke Consult
- O Other Unit w/o Stroke Consult

#### Demographic
- Arrival Mode to your hospital: O EMS from scene
- O EMS hospital transfer
- O Private transport/walk-in
- O No documentation
- O Did not present via ED

#### EMS to your hospital pre-notification?
- O Yes
- O No/ND
- O N/A

#### Age
- years
- Gender: O Male
- O Female
- (multi-select)
  - O White/Caucasian
  - O African American or Black
  - O Asian or Pacific Isl.
  - O American Indian or Alaska Native
  - O Other

#### Pre-admission Risk Assessment Score Pre-Admission
- O 0
- O 1
- O 2
- O 3
- O 4
- O 5
- O Not documented

#### Primary Stroke Diagnoses
- O Ischemic stroke
- O Transient ischemic attack (≤ 24 hours)
- O Subarachnoid Hemorrhage
- O Intracerebral Hemorrhage
- O Stroke of uncertain type
- O Thrombosis stroke subtypes: embolic (or embolic and thrombotic)
- O cardioembolism
- O small-vessel occlusion
- O large-artery atherosclerosis
- O stroke of other determined etiology
- O stroke of undetermined etiology

#### Primary Stroke ICD-10 Codes
- O Able to ambulate alone w/o w/o device
- O Able to ambulate w/o assist from other person(s)
- O Not able to ambulate
- O Not documented

#### Discharge Destination
- O01 - Discharged to home care or self care (routine discharge)
- O02 - Discharged/transfered to another short term general hospital for inpatient care
- O03 - Discharged/transfered to skilled nursing facility (SNF) with Medicare certification
- O04 - Discharged/transfered to an intermediate care facility (ICF)
- O05 - Discharged/transfered to another type of institution for inpatient care
- O06 - Discharged/transfered to home care of organized home health service organization
- O07 - Left against medical advice or discontinued care
- O08 - Discharged/transfered to home care of a home IV drug therapy provider

- O20 - Expired (or did not recover-Christian Science Patient)
- O41 - Expired in medical facility, such as hospital, SNF, ICF or freestanding hospice (Hospice)
- O50 - Hospice - home
- O51 - Hospice - medical facility
- O61 - Discharged/transfered within this institution to hospital-based Medicare approved swing bed
- O62 - Discharged/transfered to an inpatient rehabilitation facility (IRF) including rehabilitation distinct part units of a hospital
- O63 - Discharged/transfered to a Medicare certified long term care hospital (LTCH)
- O64 - Discharged/transfered to a nursing facility certified under Medicaid but not certified under Medicare

#### Date/Time of Onset of Stroke Symptoms:
- O Date: ND
- O Time: ND
- O Documented as "Unknown Onset"

#### How determined?
- O Witnessed
- O Self-reported onset
- O ND

#### Is "time of onset" when patient was last known normal?
- O Yes
- O No

#### Date/Time of Patient Arrival at your ED:
- O Date: ND
- O Time: ND
- O N/A, Did not arrive via ED

#### NIH Stroke Scale: Initial
- O Initial: (refer to web program for questions)
- O ND

#### Date/Time Initial Brain Imaging Completed at your hospital:
- O Date: ND
- O Time: ND
- O Outside brain imaging prior to transfer
- O ND

#### Interpretation of first brain imaging after symptom onset, date of any facility
- O Hemorrhage
- O No Hemorrhage
- O Not available

#### Was thrombolytic therapy for Stroke Administered? (check all that apply)
- O Not administered at all/ND
- O Intra-arterial – started at outside hospital
- O Intra-arterial – started at my hospital
- O Intravenous – started at outside hospital
- O Intravenous – started at my hospital

#### If IV-tPA started at outside hospital, document date and time started:
- O Date: ND
- O Time: ND
- O N/A

#### Date/Time of Thrombolytic Administration started at your hospital:
- O Date: ND
- O Time: ND
- O None given at my hospital (even if t-PA given at outside hospital)
- O Research use of t-PA beyond conventional time windows
- O Other investigational therapy

#### Complications of GWTG Thrombolytic Therapy (check all that apply):
- O Symptomatic intracranial hemorrhage
- O Life threatening, serious systemic hemorrhage
- O None
- O N/A
# Appendix B: Patient Management Tool (pg 2)

<table>
<thead>
<tr>
<th>If No IV Thrombolytic Therapy Administered in this GWTG facility, Possible Reason(s) Why Not:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delay in patient arrival (&gt;3 hr)</td>
</tr>
<tr>
<td>Delay from CT ordered to CT done</td>
</tr>
<tr>
<td>Delay from CT done to CT read</td>
</tr>
<tr>
<td>Other time delay</td>
</tr>
<tr>
<td>Uncontrolled hypertension</td>
</tr>
<tr>
<td>Rapid improvement</td>
</tr>
<tr>
<td>O CT findings</td>
</tr>
<tr>
<td>O Stroke severity – Too Mild</td>
</tr>
<tr>
<td>O Stroke severity – Too Severe</td>
</tr>
<tr>
<td>O Seizure at onset</td>
</tr>
<tr>
<td>O Recent surgery/trasmas (&lt;15 days)</td>
</tr>
<tr>
<td>O Recent IC surgery, head trauma or stroke (in past 3 months)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Web any of the above reasons documented? (circle one)</th>
<th>Yes</th>
<th>No</th>
<th>Not documented but inferred by abstracter</th>
</tr>
</thead>
</table>

## Additional Comments

### What does the patient's medical history include?

<table>
<thead>
<tr>
<th></th>
<th>✔ Atrial Fib</th>
<th>✔ Atrial Fib during current admission</th>
<th>✔ Prosthetic heart valve</th>
<th>✔ Previous Stroke/TIA</th>
</tr>
</thead>
</table>

### Lipids (all patients), AIC (if diabetic)

<table>
<thead>
<tr>
<th></th>
<th>Total Chol: mg/dL</th>
<th>Triglycerides: mg/dL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LDL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LDL Goal Documented:</th>
<th>&lt; 100mg/dL</th>
<th>&lt; 130mg/dL</th>
<th>&lt; 160mg/dL</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIC:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Height/Weight:

<table>
<thead>
<tr>
<th>Height/Weight:</th>
<th>inches/cm (circle one)</th>
<th>Wgt: lbs/kg (circle one)</th>
<th>BMI:</th>
</tr>
</thead>
</table>

### Dysphagia Screening:

<table>
<thead>
<tr>
<th>Dysphagia Screening:</th>
<th>Yes</th>
<th>No</th>
<th>NPO</th>
<th>ND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient ambulating without assistance (no help from another person) on 2nd hospital day?</td>
<td>Yes</td>
<td>No</td>
<td>N/A</td>
<td>ND</td>
</tr>
</tbody>
</table>

### DVT Prophylaxis:

<table>
<thead>
<tr>
<th>DVT Prophylaxis:</th>
<th>Yes</th>
<th>No</th>
<th>N/A (patient ambulating)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did patient have DVT prophylaxis initiated by 2nd hospital day?</td>
<td>Yes</td>
<td>Hepinins, heparinoids, other anticoagulants, pneumatic compression devices</td>
<td>No</td>
</tr>
</tbody>
</table>

## Discharge Medications

### Antithrombotic Tx

<table>
<thead>
<tr>
<th>Antithrombotic Rx</th>
<th>✔ None prescribed/ND</th>
<th>✔ ASA/dipyridamole (Aggrenox)</th>
<th>✔ ticlopidine (Ticlid)</th>
<th>✔ Contraindication:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>✔ Aspirin (75-325 mg)</td>
<td>✔ clopidogrel (Plavix)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Taking any antithrombotic prior to admission?</th>
<th>Yes</th>
<th>No</th>
<th>ND</th>
</tr>
</thead>
</table>

### Atrial Fibrillation Tx

<table>
<thead>
<tr>
<th>Atrial Fibrillation Tx</th>
<th>✔ None prescribed/ND</th>
<th>✔ Ace Inhibitors</th>
<th>✔ Beta Blockers</th>
<th>✔ Disects</th>
<th>✔ Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>✔ None - contraindicated</td>
<td>✔ ARB</td>
<td>✔ Ca++ Blockers</td>
<td>✔ Other anti-hypertensive</td>
<td>Anti-hypertensive</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Taking any anti-hypertensive prior to admission?</th>
<th>Yes</th>
<th>No</th>
<th>ND</th>
</tr>
</thead>
</table>

### Cholesterol Reducing Tx

<table>
<thead>
<tr>
<th>Cholesterol Reducing Tx</th>
<th>✔ None prescribed/ND</th>
<th>✔ Statin</th>
<th>✔ Low cholesterol diet</th>
<th>✔ Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>✔ None - contraindicated</td>
<td>✔ Fibrate (TLC diet or equal)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Taking any cholesterol lowering prior to admission?</th>
<th>Yes</th>
<th>No</th>
<th>ND</th>
</tr>
</thead>
</table>

### Diabetic Tx

<table>
<thead>
<tr>
<th>Diabetic Tx</th>
<th>✔ None prescribed/ND</th>
<th>✔ None – contraindicated</th>
<th>✔ Insulin</th>
<th>✔ Oral agents</th>
<th>✔ ADA diet</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Taking any diabetic medication prior to admission?</th>
<th>Yes</th>
<th>No</th>
<th>ND</th>
</tr>
</thead>
</table>

### Anti-Smoking Tx

<table>
<thead>
<tr>
<th>Anti-Smoking Tx</th>
<th>✔ None prescribed/ND</th>
<th>✔ None – contraindicated</th>
<th>✔ Counseling</th>
<th>✔ anti-smoking medication</th>
</tr>
</thead>
</table>

### Other Lifestyle Interventions

<table>
<thead>
<tr>
<th>Other Lifestyle Interventions</th>
<th>Reducing weight and/or increasing activity recommendations</th>
<th>Yes</th>
<th>No/ND</th>
<th>N/A</th>
</tr>
</thead>
</table>
References


