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Implementation of a Vestibular Disorder Screening Tool in an Urgent Care

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Abstract

Problem: Vestibular disorders disrupt everyday living and can cause reduced quality of life. Guidelines developed to screen for vestibular disorders are not efficient to use in the emergency department and are not utilized by some providers due to lack of confidence and training. Patients who present to the emergency department with vestibular disorder symptoms are often left undiagnosed, therefore leading to lack of referrals for vestibular therapy (VT).

Methods: A vestibular screening tool (VST) was introduced to a convenience sample of providers working in an urgent care setting. This quality improvement project analyzed quantitative descriptive data, both retrospective and prospective, comparing the number of VT referrals in patients with a vestibular disorder diagnosis. This project also compared provider confidence levels to diagnosis and refer patients with vestibular disorders.

Results: Comparison of the number of VT referrals made from the retrospective ($n=121$, 30.58%) and prospective ($n=126$, 34.92%) data suggest no significant relationship. There was a significant difference in the mean rank for provider confidence level from before and after the VST was introduced ($U=838$, $z = -1.98$, $p = 0.047$).

Implications for Practice: Introduction of a VST in an urgent care setting can increase provider confidence level in diagnosing patients with a vestibular disorder and referring to VT.

Vestibular disorders are described as a loss of control of balance and eye movements that cause dizziness, vertigo, and imbalance. Common diagnoses of vestibular disorders include, but are not limited to, benign paroxysmal positional vertigo, vestibular migraine, labyrinthitis, and Meniere's disease (Vestibular Disorders Association, 2016). When the sensory information from the inner ear and brain is distorted due to disease or injury, it can cause dizziness and lead to an imbalance (Vestibular Disorders Association, 2018). Benign positional vertigo is the most common vestibular disorder causing imbalance and affects people of all ages but is more common in those over the age of 60 (Baydan, et al., 2020; Jahn, 2019).

The consequences of untreated vestibular disorders at any age can cause serious injuries due to falls and can have both direct and indirect economic burdens. A systematic review of literature by Kovacs et al. (2019) evaluated and compared both the direct and indirect economic burdens of vertigo. The researchers described the direct impact to include a high rate of emergency room visits utilizing expensive diagnostic tools, specialty consults and hospitalizations. When left untreated, vertigo's indirect burden disrupts everyday living and leads to loss of days at work, anxiety, and reduced quality of life (Kovacs et al., 2019; Ozdemir et al., 2021). These consequences highlight the need for accurate diagnoses and treatment for vestibular disorders.

Emergency room visits with a chief complaint of vertigo or dizziness make up 4% of annual emergency room visits (Saber Tehrani et al., 2018). Unfortunately, when vertiginous patients visit the emergency room, one in seven leave without a diagnosis, directions for follow up care or a referral for vestibular therapy (Muller et al., 2020). Patients seek care in the emergency room because they consider their medical need is

urgent, that they will get higher quality care or due to lack of access to a primary care provider (Vogel et al., 2019). Chiao et al. (2022) discovered when patients seek care for dizziness, they do not have confidence in the provider's ability to correctly diagnose and treat their dizziness. Maihoub et al. (2020) uncovered data to support these patients' concerns after analyzing emergency room discharge diagnoses that show only 26% of vertiginous patients received a correct diagnosis and 24% did not receive a correct diagnosis. These studies place emphasis on the question of why there is a low percentage of correct diagnoses or no diagnoses at all.

Provider training and confidence are the prominent reasons for misdiagnosing or simply not diagnosing vestibular disorders (Muller et al., 2020; Stephan et al., 2018). Stephan et al. interviewed primary care providers and found the common themes included lack of training and skills to correctly diagnose a vestibular disorder but also cited the lack of clear and concise formal guidelines. Recent research has revealed that even emergency room providers, who have more training and diagnostic tools, have a low accuracy of diagnosing vestibular disorders after ruling out deadly etiology due to lack of efficient guidelines (Muller et al., 2020). Stewart et al. (2022) implemented and evaluated vertigo clinical pathways in the emergency department which significantly improved efficiency and quality of care but did not ensure outpatient follow-up. Stewart et al. (2015) also developed a vestibular screening tool to be used in the emergency department that was more concise and efficient compared to the exceedingly long and detailed questionnaire utilized in an inpatient setting. The vestibular screening tool (VST) is a 4-item verbal questionnaire developed to identify a vestibular disorder and will indicate, based on the score, if the patient qualifies for a vestibular therapy referral.

Currently there is no screening tool being utilized in the urgent care setting to correctly identify vestibular disorders in adults who present with dizziness, therefore leading to a lack of referrals to vestibular therapy. The purpose of this project was to implement the VST in the urgent care setting to identify vestibular disorders and use the score to prompt a referral to vestibular therapy. The Plan-Do-Study-Act (PDSA) was the theoretical framework that guided this quality improvement project (Institute for Healthcare Improvement [IHI], 2022). The aim of the project was to implement the VST to identify vestibular disorders and increase the number of referrals to vestibular therapy by 50% over 8 weeks.

Primary outcome measures included the number of times the VST was used in the urgent care in patients who presented with a chief complaint of dizziness who received a diagnosis of a nonemergent vestibular disorder and how many referrals were made to vestibular therapy. Secondary outcome measure was the confidence level of the urgent care providers to correctly identify a nonemergent vestibular disorder before and after implementation of the VST. The study question used to guide the literature review: What is the effect of implementing a VST in an urgent care?

Literature Review

PubMed, Medline, CINAHL, and Ovid were used to complete a search of the most recent evidence and research involving vestibular disorder screening tools and barriers to vestibular therapy. Peer reviewed journal articles from 2017-2022 were searched using keywords and Boolean operators *vestibular disorder OR vertigo OR dizziness AND screening tools OR test OR assessments AND emergency room OR emergency department.* A total of 1,489 articles were found and after including adult only

focus and in the English language, 534 articles were found and filtered to include only articles from peer reviewed journals which resulted in 185 articles that were reviewed by the abstracts with 11 of those articles selected for final inclusion (Appendix A).

Research themes found in the literature search pertaining to vestibular symptoms and disorders suggest there are more patients presenting for care in the emergency room with vestibular disorders than once thought. A large body of studies suggest that providers who treat these patients face barriers and have a low confidence level in diagnosing a vestibular disorder. Consequently, research also indicates patients are leaving the emergency room with a misdiagnosis or no diagnosis and no referrals vestibular therapy. Fortunately, research shows there are interventions and screening tools to assist providers and patients with correctly identifying and treating vestibular disorders.

Goelding et al. (2019) performed a retrospective study and discovered patients (n=2596/23,608) who present to the emergency department with vestibular symptoms are three times more frequent than previous studies indicated. Further investigation revealed only patients with the main complaint of a vestibular symptom were being counted and those who had a complaint with a subsequent vestibular symptom were not included. The researchers' concluded strokes were the predominant cause of the vestibular symptoms with 25% being life-threatening (Goelding et al., 2019). They point to provider inexperience and lack of clinical skills as the culprits to misdiagnosing and highlight the need for better recognition of vestibular symptoms.

Unfortunately, even when vestibular symptoms are recognized patients are leaving the emergency room undiagnosed. A retrospective one-year, single-center, cross-

sectional study revealed one in seven patients who present to the emergency room with a vestibular symptom are not given a diagnosis at discharge (Muller et al., 2020). Patients' emergency room records were audited (n=1599) and grouped to include charts with vestibular diagnoses and charts with vestibular symptoms with unknown origin (VUO). Despite the chance of reporting bias due to the retrospective design of study, patients with VUO consumed a higher amount of emergency room resources than patients with non-VUO diagnoses (Muller et al., 2020). The result of this research reveals additional training in recognizing vestibular symptoms, detailed history and symptom targeted exams is needed to make an accurate diagnosis and can reduce unnecessary emergency room resources. In tandem, Maihoub et al. (2020) found by interviewing vertiginous patients (n=308) seen in the emergency room that only 25% of patients in their study received a correct diagnosis but no follow up care. The researchers, after looking at the data, also stress the importance of a detailed history and exam to make a correct diagnosis. When a diagnosis is made referrals can be made for adjunct therapy.

Dunlap et al. (2019) compared the approach to diagnosis and treatment of dizziness in an ambulatory setting between physicians in different specialties. The result of this retrospective cross-sectional study reports an actual decrease in patients presenting with dizziness in an ambulatory care setting. Patients who saw a neurologist for dizziness were more likely to have costly imaging ordered and are more likely to be referred to physical therapy (Dunlap et al., 2019). This accounted for 13% of the population who were diagnosed with BPPV by the neurologist, leaving a large majority of undiagnosed dizziness patients without referrals to physical therapy. The authors emphasized the need for more referrals for treatment of vestibular disorders.

A recent retrospective observational study focusing on the treatment of benign positional vertigo (BPPV) in the emergency department revealed providers infrequently followed best-practice guidelines (Lloyd et al., 2020). The result of this was a diagnosis of undifferentiated dizziness given to 67% of patients (n=64/96) who presented with a dizziness complaint. This was attributed to providers not following the evidence-based practice guidelines. This study did not investigate the barriers or why providers were not using clinical guidelines in their practice. Other documented studies identify barriers providers disclose that keep them from adhering to clinical guidelines.

Studies suggest providers face barriers preventing them from correctly diagnosing, treating, and giving proper referrals in patients with vertigo symptoms. Providers in different specialties of practice have indicated the need for more efficient guidelines and screening tools for patients with vestibular symptoms (Stephan et al., 2018; Ulyte et al., 2019). Stephan et al. published the results of a qualitative semi-structured interview with primary care providers used to identify barriers to diagnosing and treating patients with the complaint of dizziness or vertigo. Despite selection bias of the physicians interviewed, the primary themes found through the interviews were time constraints during an office visit and inefficient guidelines that are not feasible to be used in a primary care setting. Ulyte et al. Studied diagnosing and treating BPPV specifically. Providers, from three different specialties, were compared by the diagnosing and use of canalith repositioning techniques (CRP) for BPPV. Lack of knowledge and time to perform CRP were the most frequent reasons reported. These findings are important in developing guidelines and screening tools in assisting providers in the diagnosing and treatment of vestibular disorders.

Research studies testing screening tools and interventions in the treatment of vestibular disorders was an important theme found for this study. Stewart et al. (2022) evaluated the use of clinical pathways and assessments by physiotherapists to manage vertigo in the emergency department and if there was a difference in length of stay (LOS) in the emergency department and hospital stays. This retrospective cohort study analyzed data pre and post implementation of the pathway looking at quality of care, efficiency of care, and if vestibular physiotherapy assessment had an impact on quality and efficiency of care. Results show that despite the decrease in LOS in the emergency department and improved quality of care with clinical pathways, assessments completed by a physiotherapist increased admission rates and length of stay. The use of clinical pathways had a positive effect with LOS in the emergency department, however they found there were still 35% of patients with vestibular symptoms discharged home without a specific diagnosis despite the use of a physiotherapy evaluation. This study did not evaluate if those discharged home received referrals for vestibular therapy.

Many different screening tools have been utilized in the assessment and diagnosis of vestibular disorders. There are screening tools that were developed for specific areas of practice but do not translate to all areas of practice. A self-administered questionnaire was developed for patients with BPPV. The questionnaire was designed to help patients self-diagnose, choose the best CRP and determine the affected ear (Kim et al., 2020). Although the self-administered questionnaire has a sensitivity of 87% and specificity of 90%, its limitation is it cannot be used in an acute setting and it is not validated.

Yu et al. (2022) set out to develop and validate a questionnaire-based machine learning model that would predict a diagnosis of a vestibular disorder. Patients (n=1693)

from seven different ENT offices were given an electronic version of a survey via a tablet or smartphone. Nine candidate machine learning methods were compared by their ability to accurately diagnosis a vestibular disorder based on the patient's answers to the questionnaire. In this prospective cohort study, a light gradient boosting machine was found to be most accurate in predicting a vestibular disorder. However, this study's limitation includes a lengthy 23-item questionnaire which would not be feasible in an acute setting. Regardless, the screening tool has a remarkably high predictive ability for BPPV, vestibular migraine, Meniere disease and sudden sensorineural hearing loss with vestibular disfunction (Yu et al., 2022).

A landmark study by Stewart et al. (2015), developed and validated a vestibular screening tool (VST) to be utilized in the emergency department. The VST was developed to identify vestibular disorders based on a verbal 4-question screening tool (Appendix B) designed to identify the presence of a vestibular disorder. If the patient meets the threshold, any score 4 or greater indicates a vestibular disorder and referral to vestibular therapy (Stewart et al., 2015). In this study the VST had an 83% sensitivity and an 84% specificity. Consequently, this screening tool demonstrated 89% predicative value in the emergency room and could be a valuable tool in this project due to its transferability of use to the urgent care setting.

The evidence-based practice (EBP) framework Plan-Do-Study-Act (PDSA) was used to direct this study. The PDSA is a four-stage problem solving process that is used as a model for improving and carrying out changes in a rapid-cycle improvement. This allows for implementing new interventions, observing the results, and making changes based on the results (IHI, 2022).

Research points to an increase in vertiginous patients presenting to the emergency department for treatment. Unfortunately, a common theme found in the research indicates a sizable percentage of these patients are being discharged home without a vestibular disorder diagnosis and therefore no referral to vestibular therapy. Multiple studies indicate the treating providers face many barriers that contribute to unclear diagnoses and proper referrals. This quality improvement project evaluated if implementing the VST in an urgent care setting affected the number of vestibular disorder diagnoses made in vertiginous patients and the number of referrals to vestibular therapy. Provider confidence in diagnosing vestibular disorders, before and after implementation of the VST, was also examined.

Methods

Design

This quality improvement project analyzed data both retrospective and prospective with a descriptive, comparative design. Quantitative, descriptive data was collected from electronic medical records (EMR) to compare vestibular therapy (VT) referrals made in patients with a diagnosis of dizziness 8 weeks prior to implementing a vestibular screening tool (VST) with the data collected during the 8 weeks of implementation of the VST. This project also compared provider confidence in diagnosing vestibular disorders and referring for VT before and after the VST was implemented.

Setting

This project was implemented in 23 urgent care settings that serve a Midwestern metropolitan region. The privately owned urgent care centers serve over 9,000 patients a week (460,000/year) and include both pediatric and adult populations.

Sample

This project used a convenience sample of ninety-eight providers who provided care in the centers and consisted of a mixture of physicians, physician assistants and nurse practitioners, all with varying years of experience. Data collected from the EMR included visits of patients 18 and older with a chief complaint of dizziness. Anyone under the age of 18 was excluded. Charts with dizziness as the complaint with an emergent cause were excluded.

Intervention/Procedures

The introduction of the validated VST to guide diagnosing and referring patients with vestibular disorders to VT in an urgent care was a QI project led by the Doctor of Nursing Practice (DNP) candidate who is the project director (PD). An email (Appendix C) was sent to the providers, one week prior to data collection, that included an invitation asking them to participate in a survey (Appendix D) and included a link to the pre-survey created by the PD on a Qualtrics platform. The survey was anonymous, did not collect any IP computer addresses and did not ask for any identifying demographics. The providers were asked to submit their responses before or on the day data collection started. The data collected included their role in the urgent care, the number of years they have been practicing in this role, and a 5-point-Likert scale question asking their comfort level on diagnosing a vestibular disorder and referring to VT. On the same day, a text

message (Appendix C) was sent to the providers reminding them to check their email and take the pre-survey. The providers had one week to complete the pre-survey before the survey was disabled on the first day of data collection. Three days prior to data collection, an email (Appendix C) was sent to the providers introducing the VST. The email included education explaining how to score the VST and what score indicates a referral to VT. A copy of the education email and the VST tool (Appendix C) was also posted on the provider resource page of the employee portal. The email provided an explanation for how to use the VST in a patient with vertigo or dizziness that is not due to an emergent condition. The assessment tool directed the provider to assess the patient by asking them 4 questions and scoring their responses. A score of 4 or greater out of 8 possible points indicated the need for VT. The providers were directed to select a VT referral source in the referral section of the plan included in the patient's chart.

On the same day, three days prior to the data collection, providers were sent an additional text message (Appendix C) to check their email for the VST education, a reminder to complete the presurvey and announcing the start of the data collection. On the first day of data collection, the providers were sent a third text message (Appendix C) announcing the start of data collection and a final reminder to complete the pre-survey. At the end of the eight weeks and again one week later, the providers were sent an email (Appendix C) with a link to a post-survey, identical to the pre-survey, to reassess confidence in diagnosing and referring to VT. They were given two weeks to complete the survey.

Data Collection/Analysis

The EMR data reports were collected from the 8 weeks before the first provider email was sent out and from the first 8 weeks after implementing the VST. A total number of 121 charts were reviewed from the first 8 weeks. Weekly reports were generated by the director of IT and collected on an Excel spreadsheet. Reports from the EMR included two columns of data that included the patients' visit numbers who had an ICD-10 diagnosis code that began with H81 or R42 and the second column listed the ICD-10 code. The weekly reports were given to the PI of this study via an encrypted email. Each of these patients' charts with an ICD-10 code with H81 or R42 was reviewed and counted. From the chart review, any patient who received a referral to VT was identified. All charts with an emergent cause were excluded. Emergent causes included stroke, neurological emergency, or a cardiac condition. An Excel spreadsheet was used to collect the data (Appendix E). No patient HPI or treating provider information was collected. The reports did not include any identifying patient information.

Data was collected from a survey given to the providers one week before and eight weeks after the VST was implemented (Appendix D). Both pre and post VST survey questions asked the role of the provider in the urgent care, the number of years in this role and a 5-point-Likert scale formatted question that asked the provider to describe their comfort level diagnosing a vestibular disorder and referring to VT. The roles to select included physicians, physician assistants, and nurse practitioners. The number of years practicing was categorized as 0-5 years, 6-10 years, 11-15 years, 16-20 years, 21 years or more. The 5-Point-Likert scale was scored using the following answers: 1. Extremely uncomfortable, 2. Somewhat uncomfortable, 3. Neutral, 4. Somewhat

comfortable, and 5. Extremely Comfortable. The survey was uploaded to Qualtrics

platform and used to collect the provider's answers. The survey was anonymous and no

identifying information or computer IP addresses were collected. The data from the

survey was transferred to an Excel spreadsheet, stored on a password protected thumb

drive, and kept in a locked desk.

A current version of the Intellectus Statistics Software (ISS) program was used to

analyze data from this study. Chi-squared test was used to explore the relationship

between a diagnosis of a vestibular disorder with a referral to VT in both the

retrospective and prospective data. A Chi-square Test of Independence was conducted to

examine whether VT referrals and Primary or Secondary Diagnosis were independent in

the pre-VST or post-VST education groups. A Chi-squared test was used to explore the

relationship between the provider's confidence level, their role in the urgent care, and

years' experience. A two-tailed Mann-Whitney two-sample rank-sum test was used to

compare the results of the provider's confidence level before and after implementing the

VST.

Approval Processes

Written approval was attained from the chief medical officer of the urgent care

centers where this project was implemented. The project was reviewed by the University

of Missouri-St. Louis Institutional Review Board and deemed a quality improvement

project not requiring IRB approval prior to this project's implementation. Risk included

asking providers to answer a question about their comfort level recognizing and

diagnosing a vestibular disorder. Benefits included improved recognition of a vestibular

disorder which will increase referrals to VT. Completion of the provider survey was strictly voluntary.

Results

Table 1 shows the frequency of vestibular disorder diagnosis and VST referral in the pre and post education periods. Primary vestibular disorder was the most common in both groups. No referral was the most common in both groups. Chi-square Test of Independence was conducted to examine whether there were differences in either of these variables between the Pre and Post groups. No statistical difference was found.

Table 1

VT and Diagnosis Pre and Post Groups

Variable	Pre (n=121)	Post (n=126)	Statistic
VT Referrals			
Yes	37 (30.6%)	44 (34.9%)	$X^2(1)= 0.53, p=.467$
No	84 (69.4%)	82 (65.1%)	
Primary or Secondary Diagnosis			
Primary	80 (66.1%)	90 (71.4%)	$X^2(1)= 0.81, p=.368$
Secondary	41 (33.8%)	36 (28.65%)	

Chi-square Test of Independence were conducted to examine whether VT referrals and Primary or Secondary Diagnosis were independent in the pre-VST or post-VST education groups. The results of the Chi-square test in the pre-VST education group were significant, $\chi^2(1) = 5.33$, $p = .021$. The results of the Chi-Square test in the post-VST education group was significant, $\chi^2(1) = 12.57$, $p<.001$. The results suggest that VT referrals and diagnosis are related to one another in both groups. Table 2 represents the results of the Chi-square test

Table 2

VT Referrals and Primary or Secondary Diagnosis Pre and Post Groups

Variable	Primary (n=121)	Secondary (n=126)	Statistic
Pre VT Referrals			
Yes	30 (24.5%)	7 (12.4%)	$\chi^2(1) = 5.33, p = .021$
No	50 (55.5%)	34 (28.5%)	
Post VT Referrals			
Yes	40 (31.4%)	4 (12.6%)	$\chi^2(1) = 12.57, p<.001$
No	50 (58.6%)	32 (23.4%)	

Table 3 shows the frequency of the provider's years of experience and the provider's role in the pre and post education periods. The most common years of experience in both groups was 0-5 years. The most observed provider role in both groups was Physician Assistant. Chi-square Test of Independence was conducted to examine whether there were differences in either of these variables between the Pre and Post groups. No statistical difference was found.

Table 3

Provider Years Experience and Role Pre and Post Groups

Variable	Pre (n=73)	Post (n=30)	Statistic
Years Experience			
0-5	36 (49.3%)	14 (46.7%)	
6-10	18 (69.4%)	6 (20%)	
11-15	9 (12.3%)	6 (20%)	$\chi^2(4) = 1.37, p = .850$
16-20	4 (5.4%)	1 (3.3%)	
>21	6 (8.2%)	3 (10%)	
Provider Role			
Physician	11 (15.1%)	4 (13.3%)	$\chi^2(2) = 0.31, p = .857$
Physician Assistant	37 (50.7%)	14 (46.7%)	
Nurse Practitioner	25 (34.3%)	12 (40%)	

A two-tailed Mann-Whitney two-sample rank-sum test was conducted to examine whether there were significant differences in Provider Comfort Level between the Pre and Post Survey. There were 73 observations in the Pre group and 30 observations in the Post group. The result of the two-tailed Mann-Whitney U test was significant, $U = 838$, $z = -1.98$, $p = .047$. This suggests that the distribution of Provider Comfort Level for the Pre group was significantly different from the distribution of the Post group. The mean for the Pre group (48.48) was significantly lower than the mean for the Post group (60.57). Table 4 presents the result of the two-tailed Mann-Whitney U test.

Table 4

Two-Tailed Mann-Whitney Test for Provider Comfort Level by Pre and Post Group

Variable	Pre VST		Post VST				
	Mean Rank	*n*	Mean Rank	*n*	*U*	*z*	*p*
Provider Comfort Level	48.48	73	60.57	30	838.00	-1.98	.047

Discussion

The implementation of a VST in an urgent care setting did not affect the frequency of referrals to vestibular therapy. However, VT referrals were more frequent when a vestibular disorder was the primary diagnosis. Provider comfort level in diagnosing a vestibular disorder and referring to VT prior to the implementation of the VST did improve compared to their comfort levels prior to using the VST.

A significant limitation of the study was not documenting a VST score in the patient's chart to show that the provider used the VST with patients diagnosed with a vestibular disorder. Not having the score documented in the patient's chart makes it impossible to correlate an increase in VT referrals with the use of the VST. Providers had to access the intranet to utilize the VST therefore they did not have the VST readily available to them during their clinical shift. This was done to avoid provider burden by not having the provider carry a reference card with a printed VST. There was also a change in the response rate between the Pre and Post VST groups. With an attrition rate of 59% it is difficult to detect significant relationships and it affects the internal validity of this quality improvement project.

The findings in this project did not reflect the findings in the literature review. Stewart et al. (2022) studied the use of a vertigo clinical pathway, including the VST, that

was documented in the patient's chart presenting to the emergency department with complaints of dizziness. The pathway was used to guide the care of the vertiginous patient that presented to the emergency department. The results of the study indicate an increase in physiotherapy follow up and overall improved quality of care and efficiency. The use of the VST was repeated in an urgent care setting but the score was not included in the patient's chart. No significant change in VT referrals was made with the implementation of the VST. Stephan et al. (2018) highlighted provider confidence as a barrier to making a correct diagnosis in vertiginous patients. Providers in this study had an improvement in their confidence level when diagnosing a vestibular disorder and referring to VT despite the attrition rate and not having the VST readily available. The findings of this quality improvement project suggest that the introduction of the VST was not successful.

Recommendations for the next PDSA cycle include providing each provider with a laminated pocket version of the VST. In addition, documenting the VST score in the patient's chart so a correlation can be made with frequency of vestibular disorder diagnoses and referring to VT. This could also be accomplished if the provider was able to populate the VST in the EMR when a patient presented with a complaint of dizziness. The attrition rate could be improved by sending a text with the reminder emails to complete the post survey and leaving the survey available for a longer time period. Recommendations also include repeating the study with a larger sample size and looking at the VST utilization rate and comfort level by provider role.

<div align="center">**Conclusion**</div>

This QI project did not see any increase in the number of referrals for VT with the implementation of a VST. Although there was improvement of provider's perception of their overall comfort level in diagnosing vestibular disorders and referring to VT despite the attrition rate and not having the VST readily available.

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Stewart, V., Mendis, M., Rowland, J., and Choy, N. (2015). Construction and validation of the vestibular screening tool for use in the emergency department and acute hospital setting. *Archives of Physical Medicine and Rehabilitation*, 96(12), 2153-2160.

Stewart, V., Rosbergen, I., Tsang, B., Hoffman, A., Kwan, S., & Grimley, R. (2022). Do vestibular physiotherapy and a clinical pathway in the emergency department improve management of vertigo? *American Academy of Otolaryngology Head and Neck Surgery*, 6(3), 1-9. doi: 10.1177/2473974X221119163

Ulyte, A., Valancius, D., Masiliunas, R., Paskoniene, A., Lesinskas, E., Kaski, D., Jatuzis, D., & Ryliskiene, K. (2019). Diagnosis and treatment choices of suspected benign paroxysmal positional vertigo: current approach of general practitioners, neurologist, and ENT physicians. *European Archives of Otorhinolaryngology*, 276(4), doi.org: 10.5167/uzh-165644

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Appendix A

Literature Matrix

CITATION	Level of Evidence	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
Dunlap, P.M., Khoja, S.S., Whitney, S.L., & Freburger, J.K. (2019). Assessment of health care utilization for dizziness in ambulatory care settings in the United States. *Otology & Neurotology*, 40(9), e918-e924. doi: 10.1097/MAO.00000000 00002359	V	Purpose was to describe patient and physician characteristics and treatment recommendations by the physicians for dizziness in the United States. Outcome measures include: patient, clinical and physician characteristics. Physician diagnostic and treatment recommendations.	Ambulatory clinic visits in the United States including patient's 18 years and older with vestibular diagnoses (n=20.6million).	Cross-sectional analysis extracting data from 2015-2018 from a National Center for Health Statistics survey and data extracted from the medical charts including patient and physician characteristics.	Results: rate of dizziness visits 8.8million but 75% were dx as unspecified dizziness with a greater portion 51.9% being seen by primary care physicians. Only 12.9% were referred to physical therapy. Strength: A large sample. Weakness: The diagnosis code for dizziness that was pulled from the medical charts did not specify if it was the primary diagnosis or the 2nd or 3rd. Limitations: The retrospective analysis used ICD-9 codes that were not a complete list of vestibular disorders. Some of the estimated results had a standard error of 30% so caution should be used when interpreting the results. Recommendations: There is a small percentage of referrals to physical therapy for vestibular disorders.
Goelding, M., Gaschedn, J., Kammer, C., Comolli, L., Bernasconi, C.A., Spiegler, R., Bassetti, C.L., Exadaktylos, A.K., Lehmann, B., Mantokoudis, G., Kalla, R., & Fischer, U. (2019). Frequency, aetiology, and impact **of** vestibular symptoms in	V	To analyze the incidence of vestibular symptoms that present in the emergency room. Outcome measures: prevalence of vestibular symptoms as the main complaint in the ER over a 1-year period	A large Swiss tertiary care and stroke center that serves a community of 1 million. Medical records of ED visits in 2013 patients 16 years and older who presented in the ED with vestibular	1year retrospective study looking at medical records from the ED with the primary complaint of vestibular symptoms.	Results: 11% of ED visits were for vestibular symptoms, three times more frequent than previously reported. 12.5% of these visits were due to a cerebrovascular event, 23.8% were other life-threatening conditions, and 13.7% were not given a diagnosis. Strength: the very thorough screening method using MRI, the high number of patients screened and the detailed reporting of underlying etiology. Weakness: The use of MRI in the ED therefore the results are difficult to compare incidence of strokes in a similar setting

CITATION	Level of Evidence	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
the emergency department: a neglected red flag. *Journal of Neurology*, 266(12), 3076-3086. doi.org/10.1007/s00415-019-09525-4		and frequency of strokes or other life-threatening diagnoses.	symptoms over a course of 1 year. (n=2596/23,608)		in the US due to the highly sensitive MRI results compared to the not as sensitive CT used in the US. Limitations: The retrospective study which may provide underestimated parameters or reporting bias. This was a cross-sectional study so no follow up data were collected. Since it was a large tertiary ED, the data for rare life-threatening data may be higher. Recommendations: There is a need for more accurate detection of life-threatening diseases due to the danger with misdiagnosing or underestimating vestibular symptoms that present in the ED.
Kim, H.J., Song, J.M., Zhong, L., Yang, X., & Kim, J.S. (2020). Questionnaire-based diagnosis of benign paroxysmal positional vertigo. *Neurology*, 94(9), e942-e949. doi: 10.1212/WNL0000000000008876	III	To develop a simple questionnaire to self-diagnosis benign paroxysmal positional vertigo (BPPV)	Dizziness clinic in Seoul National University Bundang Hospital Between 2016-2017 (n=578) patients, 18 and older, with BPPV	Prospective study comparing the patient's answers on the questionnaire to the results of a Video-oculography and neuro exam.	Results: The sensitivity, specificity, and precision of the questionnaire was found to be 87%, 89.8% and 80.0%. Strengths: The questionnaire can be used in a general patient care clinic. Weakness: The study did not include a test-retest reliability and interrater reliability for a diagnosis of BPPV. Limitations: The questionnaire was used in a single center and was referral based so it would be difficulty to generalize the results to use it in an acute care setting like the ED. Recommendations: That the results show an acceptable accuracy of diagnosing BPPV with the questionnaire for self-diagnosing.
Lloyd, m., Mackintosh, A., Grant, K., McManus, F., Kelly, A.M., Karunajeewa, H., & Tang, C.Y. (2020). Evidence-based	IV	To determine if the patients who present to the ED with BPPV are managed with best practice guidelines and if	Three Australian Hospital EDs Adult patients 18 and older who presented with dizziness, vertigo	Retrospective observational study auditing electronic medical records for patients presenting to the ED with dizziness or vertigo	Results: Use of evidence-based guidelines for treatment of BPPV was only 26%. Strengths: The study was completed in 3 different hospitals suggesting the underutilization of these guidelines can be generalized to multiple health systems. Weakness: The role of physiotherapist is only

CITATION	Level of Evidence	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
management of patients with vertigo, dizziness, and imbalance at an Australian metropolitan health service: an observational study of clinical practice. *Physiotherapy Theory and Practice*, 36(7), 818-825. Doi.org/10.1080/095939 85.2018.1511020		physiotherapist were included in their care. Secondary outcomes: how many patients were seen by a physiotherapist, primary diagnosis, number of patients presenting with a fall/fall related injury, proportion of patients admitted to hospital and which specialty floor and number of patients who are repeat visits in the past 6 months with the same symptoms.	or imbalance symptoms (n=96/158) over 21 consecutive days		used in the ED so the results cannot be generalized to other health care settings. Limitations: The data collected was retrospective and some data were from handwritten medical records which leads to an open interpretation of the data pulled from the charts. There is also an issue if guidelines were used, were they correctly documented. Recommendations: Further study to look at barriers to using guidelines. Also, the need for strategies to increase the utilization of physiotherapist in the management of patients with BPPV in the ED to see if it increases the use of evidence-based guidelines and thus improves outcomes.
Maihoub, S., Molnar, A., Csikos, A., Kanizsai, P., Tamas, L., & Szirmai, A. (2020). What happens to vertiginous population after emission from the emergency department. *Clinical Neuroscience*, 73(7-8), 241-247. *doi: 10.18071/isz,73.0241*	IV	The purpose of this study is to evaluate what happens to patients who present with dizziness after they leave the ED. Outcome measures are the most frequent diagnosis, how many days after	Semmelweis University Emergency Department Sample: patients who present to the ED with vertigo or dizziness (n=308/879) were sent a survey	Retrospective observational study analyzing data from a questionnaire sent to patients seen the ED for vertigo or dizziness from 2017-2019.	Results: Central vestibular lesion (n=71), dizziness (n=64), and BPPV (n=51) were the most frequent diagnosis. Patients were seen after discharge for a follow up exam and 24% of patients did not receive a proper diagnosis and only 25.8% got a proper diagnosis. Strengths: Results of the study are similar to those found in other studies completed in other countries. Weakness: Almost half of the returned surveys were from women (n=198/308) Limitations:

CITATION	Level of Evidence	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
		discharge before they were re-examined, and how many received a correct diagnosis at discharge.			Study was retrospective which leads to potential reporting bias. Recommendations: Follow up is an important factor in an accurate diagnosis and treatment in dizziness or vertigo.
Muller, M., Goeldlin, M.B., Gaschen, J., Sauter, T.C., Stock, S., Wagner, F., Exadaktylos, A., Fischer, U., Kalla, R., & Mantokoudis, G. (2020). Characteristics and resource needs in patients with vestibular symptoms: A comparison of patients with symptoms of unknown versus determined origin. *BMC Emergency Medicine,* 20(1), 70. https://doi.org/10.1186/s12873-020-00361-8	IV	The purpose of this study to identify clinical characteristics in patients with VUO who are evaluated in the ED and what resources were used during their visit. Patients with vestibular symptoms were grouped by discharge diagnosis of VUO or non VUO. Data on risk factors, clinical characteristics, management and ED resources were extracted from the EMR.	Bern University Hospital Switzerland ED All patients who presented to the ED with vestibular symptoms (n=1599)	Retrospective, cross-sectional study This study assessed ED consultations with patients whose chief complaint was vestibular symptoms. The consultations for dizziness were put into two groups, vestibular symptoms of unknown (VUO) origin or non VUO. The two groups were compared by ED resources used using multivariable analysis.	Results: There were more ED resources used in patients with VUO (n=229) in terms of radiology studies compared to the non VUO patients (n=1370). Risk factors consistently found in VUO patients were <65 and neurological comorbidity. Strengths: It was conducted in a large interdisciplinary ED and had broad inclusion criteria. Weakness: There is a referral bias due to the large volume in a tertiary center which could lead to more severe or rare disorders. Limitations: Reported symptoms might have been underestimated due to reporting bias that occurs in retrospective studies. Recommendations: One of seven patients with vertigo is classified as VUO leave the ED without a cause despite the use of higher resources in the ED.
Stephan, A.J., Kovacs, E., Phillips, A., Schelling, J., Ulrich, S.M., & Grill, E. (2018).	V	The study's goals were to look at challenges and barriers primary	Primary care providers (n=12/77) from Munich and	Qualitative semi-structured theory-based interviews using the theory of	Results: The two most common challenges to management of vertigo are making the correct diagnosis and an acceptable and applicable guideline for a primary care setting. Strengths:

CITATION	Level of Evidence	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
Barriers and facilitators for the management of vertigo: A qualitative study with primary care providers. *Implementation Science,* 13(1), 25. doi: 10.1186/s13012-018-0716-y		care providers (PCP) face when diagnosing and treating patients who present with vertigo or dizziness, specifically facilitators and barriers of implementing proven guidelines for vertigo and dizziness.	surrounding counties in Bavaria were invited via mail.	capability, opportunity, and motivation for behavior change with primary care providers on which guideline characteristics and interventions affect the relationship between the PCP's perceived capability, opportunity and motivation including how they manage vertigo patients.	The theory of capability, opportunity and motivation used to develop the interview structure provided a wide theoretical basis that allowed the interviewers to capture the important aspects of vertigo and dizziness management by PCPs. Weakness: Selection bias because the PCPs recruited had already shown interest in the topic. Limitations: it was a very small sample group. Recommendations: The development of any future guidelines on the management of vertigo and dizziness in a primary care setting should be developed under the guidance of the PCP community ensuring the guidelines are applicable to this practice setting.
Stewart, V., Mendis, M., Rowland, J., and Choy, N. (2015). Construction and Validation of the Vestibular Screening Tool for Use in the Emergency Department and Acute Hospital Setting. *Archives of Physical Medicine and Rehabilitation*, 96(12), 2153-2160.	IV	To develop a new vestibular screening tool to assist in diagnosing vestibular disorders and identifying when referral to vestibular therapy is needed. Outcome measures: three vestibular screening tools (3, 4, and 5	This study was completed in the emergency departments of two metropolitan hospitals. Adults >18 (n=114) who presented to the ED with complaints of dizziness.	Methodologic study Patients were grouped as vestibular disorder or nonvestibular disorder by a physiotherapy vestibular diagnostic assessment. The same groups were then given the three	Results: The 4-item vestibular screening tool is 83% sensitive and 84% specificity for identifying vestibular disorders and showed a high intrarater. Strengths: The positive predictive value of the VST is 89% meaning these patients will receive referrals for further management. Weakness: The interval between the two patient assessments was short which may skew test-retest reliability. Limitations: The VST is not designed to exclude strokes or another life-threatening cause. Therefore, does not distinguish between central or peripheral vestibular disorders. Recommendations: The researchers suggest

CITATION	Level of Evidence	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
		item questions) were investigated.		VST test and the results were compared.	further testing of the VST in other hospital or community settings.
Stewart, V., Rosbergen, I., Tsang, B., Hoffman, A., Kwan, S., & Grimley, R. (2022). Do vestibular physiotherapy and a clinical pathway in the emergency department improve management of vertigo? *American Academy of Otolaryngology Head and Neck Surgery*, 6(3), 1-9. doi: 10.1177/2473974X2211 19163	IV	This study aims to use vertigo/dizziness clinical pathways in the emergency department to see if it affects quality and efficiency of care. Data extracted will include time from ED presentation to assessment, hospital admission rates, and ED and total hospital length of stay.	The study used two Australian EDs to review charts of adults, who presented with vestibular disorder symptoms. The groups were prepathway cohorts (n=214), postpathway cohorts (n=329) and no vestibular physiotherapy assessments (n=150).	Retrospective study to compare differences in cohorts before and after utilizing the clinical pathway for vertigo/dizziness with groups who received an assessment by a physiotherapist and a group who did not receive an assessment by a physiotherapist.	Results: Postpathway groups, compared to prepathway groups, were more likely to have physiotherapy assessments, reduced wait times until they were assessed, and shorter ED length of stays. When the group who were not given a vestibular physiotherapy assessment with the group assessed by a physiotherapist, the results show they were given a specific diagnosis more often, but they were admitted to the hospital more often and had longer hospital stays. Strengths: The ED vertigo/dizziness pathway did show improvement in reduced ED wait times and improved quality of care. Weakness: The study took place in an Australian ED so the pathway developed and implemented may not be applicable to other countries. Limitations: It was a retrospective design by collecting data from medical records which is dependent on the person recognizing and documenting vestibular signs and symptoms correctly. Recommendations: The researchers recommend vestibular physiotherapy be an addition to management of the vertigo/dizziness patient in the ED or hospital setting.
Ulyte, A., Valancius, D., Masiliunas, R., Paskoniene, A., Lesinskas, E., Kaski, D.,	IV	This study investigates benign paroxysmal positional vertigo	A convenience sample of Lithuania neurologist (n=97)	Cross sectional survey The survey included questions	Results: Years of experience was a negative predictor of CRP performance and frequent reasons for not performing them were time taken to perform, fear of making the symptoms worse,

CITATION	Level of Evidence	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
Jatuzis, D., & Ryliskiene, K. (2019). Diagnosis and treatment choices of suspected benign paroxysmal positional vertigo: current approach of general practitioners, neurologist, and ENT physicians. *European Archives of Otorhinolaryngology*, 276(4), doi.org: 10.5167/uzh-165644		(BPPV) and the lack of utilization of therapeutic canalith repositioning procedures (CRPs). Outcome measures include how often diagnostic and therapeutic interventions are used by physicians and potential reasons why these are underused.	ENT (n=85) and general practitioners (n=142) were given a survey during a five specialty medical conferences, workshops and schools in 2016.	asking demographic characteristics, clinical experience, employment and details on visits with BPPV patients. Also, their choice of diagnostic techniques, tests and prescribed treatments.	and lack of knowledge. Strengths: It was a large representative sample of Lithuania physicians that were recruited from medical conferences which minimizes sample bias. Weakness: Although the researchers' sample was representative of the Lithuania physicians, there was no way to do a detailed analysis of external validity due to the limited available information. Limitations: It was a self-evaluation and there was no way to determine if the physicians were correctly performing the CRP maneuvers. Recommendations: Education for the physicians and the patients in addition to devices and technologies to assist with the diagnosis and therapeutic maneuvers could help physicians meet guideline standards of care for the patient with BPPV.
Yu, F., Wu, P., Deng, H., Wu, J., Sun, S., Yu, H., Yang, J., Luo, X., He, J., Ma, X., Wen, J., Qiu, D., Nie, G., Liu, R., Hu, G., Chen, T., Zhang, C., & Li, H. (2022). A questionnaire-based ensemble learning model to predict the diagnosis of vertigo: model development and validation study. *Journal of Medical Internet*	IV	The objective of this study is to develop and validate a questionnaire-based machine learning model that predicts diagnosis of vertigo.	Seven ENT and vertigo clinics from August 2019-March 2021 Sample included adults who presented with vertigo (n=1693)	Prospective cohort study with a 2-month follow-up. Patients were given a survey via tablet or smart phone on their 1st visit. Then 9 candidate machine learning methods were compared to determine the best performance to predict common	Results: Of the 9 candidate machine learning methods, the model of light gradient boosting machine was the most successful predicting common vestibular disorders. Strengths: The patients were from ENT and vertigo clinics, so there was a wide variety of different vestibular disorders. The questionnaire required no additional tools or equipment, so it is suitable across all different clinic settings. Weakness: Excluding patients with an undetermined diagnosis was a potential source of bias. Limitations: The uneven distribution of diagnoses made it difficult for the model to give accurate predictions of rare diagnoses. Recommendations:

CITATION	Level of Evidence	PURPOSE / BACKGROUND	PARTICIPANTS / SETTING	METHODS / DESIGN	RESULTS / LIMITATIONS / RECOMMENDATIONS
Research, 24(8), e34126. doi: 10.2196/34126				vestibular disorders.	The researchers recommend using a larger sample size and adding the use of a neurologist to help assess the generalization and robustness of this particular machine learning method.

Appendix B

A score of 4 or greater is indication for referral to vestibular therapy

Vestibular Screening Tool

Vestibular Screening Tool	Yes (2)	Sometimes (1)	No (0)
1.Do you have a feeling that things are spinning or moving around?			
2.Does bending over and/or looking up at the sky make you dizzy?			
3.Does lying down and/turning over in bed make you feel dizzy?			
4.Does moving your head quickly from side to side make you feel dizzy?			
Total		/8	

Stewart, V., Mendis, M.D., Rowland, J., & Choy, N.L. (2015). Construction and validation of the vestibular screening tool for use in the emergency department and acute hospital setting. *Archives of Physical Medicine and Rehabilitation*, 96(12), 2153-2160.

Appendix C
Provider Communication
Email to providers <u>1</u> week prior to data collection with link to survey

Dear fellow providers,

      This letter serves as an explanation and invitation to participate in my Doctor of Nursing (DNP) project. I am a doctoral candidate at the University of Missouri-St. Louis (UMSL) and have chosen a quality improvement project with the objective to implement a vestibular screening tool (VST) that will improve the recognition of nonemergent vestibular disorders and will increase referrals to vestibular therapy. I will also ask to collect information from you that include what your role is in the urgent care, how long you have been in this role and your confidence level on recognizing vestibular disorders and referring to vestibular therapy. This is an anonymous survey and your participation is strictly voluntary. No identifying information or IP addresses will be collected. After collecting 8 weeks of data, you will receive the same anonymous survey. Again, your participation is strictly voluntary.

Please find the link to the survey here _____.

Thank you for your participation,

Kathleen (Kat) Probst

Text Message <u>1</u> week prior to data collection

Team, please see Kat's email about the exciting vestibular screening project she is conducting. Please fill out the initial survey (link in Kat's email) before this project officially launches next week on 2/8/23.

Email 3 days prior to data collection
Posted on the resource page of employee portal

Dear fellow providers,

This letter serves as an explanation and invitation to participate in my Doctor of Nursing (DNP) project. I am a doctoral candidate at the University of Missouri-St. Louis (UMSL) and have chosen a quality improvement project with the objective to implement a vestibular screening tool (VST) that will improve the recognition of nonemergent vestibular disorders and will increase referrals to vestibular therapy. I will also ask to collect information from you that include what your role is in the urgent care, how long you have been in this role and your confidence level on recognizing vestibular disorders and referring to vestibular therapy. This is an anonymous survey and your participation is strictly voluntary. No identifying information or IP addresses will be collected. After collecting 8 weeks of data, you will receive the same anonymous survey. Again, your participation is strictly voluntary.

The link to the study that constructed and validated the VST can be found here.file:///Users/kathleenprobst/Downloads/Construction%20and%20validation%20of%20the%20vestibular%20screening%20tool.pdf

Thank you for your participation,
Kathleen (Kat) Probst

The VST is a 4-question scale used in your assessment of a patient who presents with the chief complaint of dizziness. (A VST can be found at the end of this email.) This is after all nonemergent causes have been excluded. Their response score will be out of 8, and any score 4 or higher will indicate a referral to vestibular therapy. Document the score in the procedure notes in the patient's chart. After you have selected their diagnosis, you will find vestibular therapy referrals in our database of referrals located in the plan section of the EMR. Their vestibular disorder diagnosis does not have to be their primary diagnosis. The data I will be collecting will include how many patients present with a chief complaint of dizziness and how many referrals are made to vestibular therapy for these patients. This data collected from charts will include the 8 weeks prior to the implementation of the VST and data from the first 8 weeks of implementing the VST. I will also collect the data from the pre/post provider survey and compare confidence levels, years of experience and the provider's role in the urgent care.

Vestibular Screening Tool
Score of 4 or greater is indication for vestibular referral

Vestibular Screening Tool	Yes (2)	Sometimes (1)	No (0)
1.Do you have a feeling that things are spinning or moving around?			
2.Does bending over and/or looking up at the sky make you dizzy?			
3.Does lying down and/turning over in bed make you feel dizzy?			
4.Does moving your head quickly from side to side make you feel dizzy?			
Total		/8	

Stewart, V., Mendis, M.D., Rowland, J., & Choy, N.L. (2015). Construction and validation of the vestibular screening tool for use in the emergency department and acute hospital setting. *Archives of Physical Medicine and Rehabilitation*, 96(12), 2153-2160

Text 3 days prior to data collection

Team, please see Kat's email from today introducing the vestibular screening tool and education. Please fill out the initial survey (link in Kat's email) before this project officially launches on 2/8/23.

Text Message first day of data collection

Team, this is a reminder that today is the day Kat's Vestibular Screening Tool (VST) project starts. Please use the VST, found on the provider resource page, with your dizzy/vertigo patients. If you have decided to participate in the study, please remember to complete your anonymous survey.

Email after 8 weeks of data collection
Link to post survey

Dear Team,
Data collection for the Vestibular Screening Tool (VST) has been completed. If you participated in the project and took the pre VST survey, please complete the post survey here_____.
Again, your participation is anonymous and strictly voluntary. No identifying information or IP addresses will be collected.

Thank you for your participation,
Kathleen Probst

Appendix D

Provider Pre/Post Survey

What is your role in the urgent care?

Physician
Physician Assistant
Nurse Practitioner

How long have you been in this role?

1. 0-5 years
2. 6-10 years
3. 11-15 years
4. 16-20 years
5. > 21 years

How comfortable are you recognizing and diagnosing a vestibular disorder and then referring the patient to vestibular therapy?

1. Very uncomfortable
2. Uncomfortable
3. Neutral
4. Comfortable
5. Very comfortable

Appendix E

Collection of Retrospective and Prospective Data Tool

Excel Spreadsheet

Dates	Number of patients with ICD-10 Codes H81 & R42	Yes or NO for referrals to vestibular therapy from these patient's charts
Week 1		
Week 2		
Week 3		
Week 4		
Week 5		
Week 6		
Week 7		
Week 8		