Partnered Implementation of Evidence Based Best Care Practice for Benign Paroxysmal Positional Vertigo: A Stepped Wedge, Randomized Controlled Clinical Trial.

[Medical Provider Component]

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*Not applicable*

(Any modification to the protocol should be annotated on the coversheet or in an appendix. The annotation should note the exact words that are changed, the location in the protocol, the date the modification was approved by the Executive Committee, and the date it became effective.)

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Listing of changes

Version 2.0:
Addition of the provider checklist
Update of post intervention survey (Appendix A)
Delete Appendix B (Written certification exam)
Update incentive schedule and incentive amounts.
1 STUDY OBJECTIVES

1.1 Primary Objective

The primary objective of this study is to characterize the use of educational tools for medical providers caring for patients with dizziness in the emergency department. In addition, we aim to optimize the tools by collecting feedback information.

2 BACKGROUND

2.1 Rationale

Benign paroxysmal position vertigo (BPPV) is the most common peripheral vestibular disorder with a lifetime prevalence of 2.4%.1 BPPV accounts for 8% of individuals with moderate or severe dizziness.1 “Benign” is a misnomer in the label of “Benign Paroxysmal Positional Vertigo”. BPPV patients experience substantial inconveniences and disabilities during symptomatic periods.1,2 Nearly 1 in 4 BPPV patients stop driving a car, 1 in 3 miss work, and more than 3 in 4 seek medical consultation.1

BPPV processes – the Dix-Hallpike Test (DHT) and the Canalith Repositioning Maneuver (CRM) – have an evidence base that is at the clinical practice guideline level (See Section 2.2).3,4 The DHT is the gold standard test for DHT and the CRM is supported by numerous randomized controlled trials, and systematic reviews.5-12

The problem is that BPPV processes are substantially underutilized. Evidence from our work and others indicates substantial underutilization of the DHT and CRM.1,13 Prior epidemiological studies indicate that less than 10% of BPPV patients are treated with the CRM.1 Our preliminary studies indicate that 78% of patients diagnosed with BPPV in the emergency department (ED) did not have the DHT and 96.1% did not have a CRM. The reasons for the underuse of these processes has not been systematically studied and is likely to be complex, involving several constructs including knowledge gaps, clinical inertia, and low provider self-efficacy. The Dix-Hallpike test (DHT) is used to identify BPPV.

2.1.1 Identification of BPPV: The Dix-Hallpike Test (DHT)

The DHT is the gold standard test for BPPV.3,4 It is a simple bedside test. A positive test is indicated by up-beating and torsional nystagmus lasting about 10-20 seconds. Even when physicians use the DHT, there is the possibility that they may not interpret the results correctly.14-16 Common errors include calling the test positive for symptoms (rather than nystagmus), and making a BPPV diagnosis when there is any pattern of nystagmus observed.17 Clinicians must be aware
that different patterns of positional nystagmus can be triggered by other disorders. For example, patients with vestibular neuritis have horizontal and persistent (not transient) nystagmus that may become most apparent during positional testing. Central disorders can also cause positional nystagmus, typically persistent -- not transient -- down-beating nystagmus.

2.1.2 Treatment of BPPV: The Canalith Repositioning Maneuver (CRM)

The Canalith Re-positioning Maneuver (CRM) is the treatment for BPPV. The CRM is used to move the canaliths from the inferior portion of the involved posterior canal back into the central chamber of the inner ear. In this location, the positional vertigo no longer occurs. The first two steps of the CRM are the same as the DHT. If the DHT is positive on the right side, then there are only three more steps that are used to move the particles out of the canal.

2.1.3 Setting

The setting for this study is the six, hospital affiliated, emergency departments in Nueces County, Texas. The largest city in Nueces County is Corpus Christi. We have extensive experience performing research regarding both dizziness and stroke visits to the Corpus Christi emergency rooms from a prior National Institutes of Health K23 award (PI, Kevin Kerber) and the on-going Brain Attack Surveillance in Corpus Christi (BASIC) project (Multiple PIs, Lewis Morgenstern, Lynda Lisabeth). The community of Corpus Christi was initially identified as an ideal location for these population-based studies because of the geographic isolation from other cities and the focus on “real world” practice. These characteristics mean that the majority of acute illness presentations by Nueces County residents will occur within the Nueces County medical facilities and the medical care provided will be more generalizable to other communities than the care that is provided at large tertiary care referral centers. Given our extensive prior work in Nueces County, we have also developed long-standing relationships with providers, administrators, and other persons in Nueces County. The University of Michigan has a field office in Corpus Christi with approximately 10-15 full time employees.

2.1.4 Relevance and priority for this study

The topic is high impact in terms of the number of patients affected (BPPV lifetime prevalence is 2.4%\(^1\)), efficacy of the CRM,\(^3,4\) and healthcare efficiencies.\(^1,13,19-21\) We bring together investigators of multiple disciplines – including emergency medicine (academic and community practice), neurology, otolaryngology, general medicine, behavioral science, and implementation science -- with the goal of helping physicians address a problem they have declared to be a top priority for decision support and which is associated with high frequency of unnecessary testing and low frequency use of evidence-based practices.\(^1,13,19-22\) It is expected that this project will have a direct positive impact on the effectiveness and efficiency of care for BPPV presentations, and others.

Frontline physicians want support for vertigo. A survey of ED physicians about priorities for the development of clinical decision support (1,150 respondents) ranked vertigo as the #1 topic in adult ED presentations.\(^22\) The lowest hanging fruit in the opportunity to achieve meaningful im-
provements in dizziness presentations is BPPV. BPPV is common, and readily identifiable and treatable at the bedside. No laboratory or imaging studies are needed, and in fact these are explicitly discouraged in guideline statements. ED physicians have strongly advocated for the use of BPPV processes (even stopping an ED-based trial for ethical reasons given the effect size at interim analysis), and our survey (preliminary studies) indicates high demand for BPPV intervention.

2.2 Supporting Data

Two Evidence-Based Guidelines support the Dix-Hallpike Test (DHT) and the Canalith Repositioning Maneuver (CRM) to diagnose and treat BPPV. Evidence-based guidelines supporting the DHT and CRM were published in 2008 by the American Academy of Otolaryngology-Head and Neck Surgery and the American Academy of Neurology. Additional systematic reviews also support the DHT and CRM. The primary RCTs demonstrate the resolution of BPPV symptoms (outcomes measured at 1 day to 4 weeks) in patients treated with the CRM. In these studies, 61% to 80% of treated patients had resolution after just one treatment compared with 10% to 48% of untreated patients. These effect sizes translate in to a number-needed-to treat ranging from 1.4 to 3.7, which is among the most substantial effects achievable in clinical medicine. In the study assessing outcome at 24-hours, 80% of treated patients were cured versus only 10% of controls. Substantial benefit has also been demonstrated in RCTs from primary care settings.

It is also possible that the intervention could change physician ancillary test ordering practice patterns. For example, a physician who typically orders a head CT in patients with dizziness may order these tests less frequently after learning to identify and treat BPPV. If providers reduce their typical test ordering, it is possible that a diagnosis that may have been made if the test was ordered would be missed. This is unlikely, and discussed further in section 10 (risks and protections against risks).

3 STUDY DESIGN

This is a partnered best-practice implementation study, meaning that the local providers will be engaged in the intervention components. The current application is for provision of the educational intervention and collection of data from the health care providers. A separate IRB application for collection of patient level data has been submitted. The unit of randomization is the hospital. After an initial observation period, the six hospitals will undergo the intervention in five waves (the smallest two hospitals will be paired). The order that each hospital receives the intervention will be randomized. The intervention will be provided as a complete package during the month each hospital is randomized to. Further detail about the intervention is given in Section 4.

The focus of the intervention is on health systems and frontline medical providers.
Health care providers involved in the study will be informed of the voluntary nature of this re-
search and will not be required to use any tools or attend any educational sessions provided by
this team.

4 SELECTION AND ENROLLMENT OF SUBJECTS
Health Care Providers. The health care providers will be included as subjects so that the project
can obtain information from them such as their attitudes and beliefs.

4.1 Inclusion Criteria for Health Care Providers

4.1.1 Staff emergency physician in practice at included ED

4.1.2 Nurse practitioner or physician assistant in practice at included ED

4.1.3 Emergency medicine resident in practice at included ED

4.1.4 Interested family medicine or internal medicine staff or resident physicians can at-
tend educational content. Care delivered during ED visits will be attributed to
staff emergency physician.

4.1.5 Interested emergency medicine nurses and techs/paramedics can attend educa-
tional content. Care delivered during ED visits will be attributed to staff emergen-
ocy physician.

4.2 Exclusion Criteria

4.2.1 Medical providers who do not deliver care in the ED or hospital

4.3 Study Enrollment Procedures

4.3.1 Identification of medical providers
The local champions will provide a list of all active medical providers meeting the
relevant inclusion criteria above. When new providers are hired, they will be add-
ed to the database.

4.3.2 Consent/assent procedures – health care providers
Health care providers will have the opportunity to opt out of participating in any
of the intervention components.

4.3.3 Intervention group assignment
The hospitals will receive the intervention at a randomly assigned time point as
described below in Section 5.
5 STUDY INTERVENTIONS

5.1 Interventions, Administration, and Duration

The overall educational intervention is delivered at the hospital level. Table 5.1 provides an overview of the hospital level interventions that occur as part of the trial. We describe each in greater detail in sections 5.1.1- 5.1.5. Attendance by medical providers will be tracked to determine utilization. In addition, we will collect feedback on the sessions using the instrument in Appendix A. We may make minor adjustments to the survey instruments based on participant feedback.

Table 5.1. Multi-faceted Preliminary Intervention Overview.

| Implementation strategy components | Component Description |
|------------------------------------|-----------------------|
| 1. Local champions                 | Local champions (ED providers) will be recruited and trained in BPPV testing and diagnosis. Each will participate in CME session, follow-up sustainability session, and commit to help during routine care. |
| 2. Educational sessions. Interactive and hands-on sessions. | Sessions will review BPPV mechanisms and evidence, utilize videos, include hands-on demonstration, and address barriers from aim 1 |
| 3. Decision aid. Multi-media web-based decision aid application | Includes high yield text and videos on the BPPV processes and characteristic exam findings. Audit and Feedback – split out as own row. Will also include individual and group level feedback on dizziness care process delivery over time. |
| 4. Referral resource               | Readily available list of outpatient experienced BPPV providers accepting referrals |
| 5. Follow-up educational sessions  | Sessions, led by local champions, to facilitate adoption, implementation, and sustainability. |
| 6. Partnered development and other resources | Other resources, identified by and developed by the local medical providers may be provided. |

5.1.1 Champion Development

Local ED physician champions will be recruited for each hospital system. These champions will serve as the point person of contact for the local ED physician groups, will receive more focused training on BPPV prior to the CME educational sessions, will be a key participant (instructor) at the CME session, will lead follow-up educational sessions, and be available for questions as needed.
5.1.2 Interactive High Yield, Hands-on Education Session (CME session).

An evidence-based educational session will be developed to be presented by Drs. Kerber, Meurer, and local champions to the Corpus Christi ED physicians, physicians assistants, and residents and will be used to introduce the decision aid. Common barriers will be addressed along with suggestions for overcoming barriers. For example, we anticipate that one barrier in the ED will be small exam gurneys. Throughout the session, videos will be used to enhance learning. Videos will demonstrate the DHT and CRM, the characteristic BPPV nystagmus, and other eye movements that can be misinterpreted as BPPV nystagmus (e.g., eyelid blinks, voluntary movements, and nystagmus patterns of vestibular neuritis, or a central lesion). Descriptions of factors that could lead to misclassification of BPPV cases based on the DHT will be provided, such as extremely slow movements or basing the test interpretation on symptoms rather than the characteristic pattern of nystagmus. A specific part of the session will focus on risks of the BPPV processes and dangerous mimickers of BPPV (See Human Subjects Section). It will be made clear that the processes should be considered contraindicated in patients with known or suspected cervical spine instability until the spine is cleared. Interactive techniques will be incorporated to maximize the probability of outcome success by adhering to principles of adult education: delivering content in a learner-centered, active format, relative to the learner’s needs, which is simultaneously engaging and reinforcing.26 The sessions will target increasing self-efficacy (perception of one’s abilities) and outcome expectancy (belief that a behavior will lead to the desired outcome). High outcome expectancy is associated with an increased likelihood of performing a behavior.27 Hands-on training for the DHT and CRM will also be developed as part of the presentation. Physicians will pair up at tables and perform the DHT and CRM under instructor guidance (i.e., investigators and champions). Models of the semicircular canals will be used to facilitate understanding the basis for the processes. CME credit and a modest incentive $50 will be offered to encourage medical provider attendance. Individual attendance will be recorded. To promote the widest exposure of the educational sessions, the sessions will also be video recorded and made available for post-intervention physicians and medical providers to review on their own time. In addition, individual or small group sessions will be offered for providers not able to attend the primary sessions. To improve later presentations, the project team will review recordings of CME sessions.

5.1.3 Web-based, multi-media real-time decision aid.

We have developed a web-based application in accordance with the findings from physician interviews and environment barrier assessments (www.dizztinct.com). This aid is a tool providers will be able to efficiently use at the point of care. Extensive collaborations with our behavioral scientists and technology developers informed the content and structure of this aid. We plan for providers to be able to use the aid in less than 10 minutes, though it will also include additional resources and information so that more details are available for interested providers. The aid uses videos and includes brief high yield narration, video instructions on the DHT and CRM, and video demonstrations of positive and negative test results. The videos demonstrate dangerous signs of central nervous system
disorders. The aid also highlights potential risks of the processes and BPPV mimickers. Additionally, it states that known or suspected cervical spine instability is a contraindication until the spine is cleared.

The aid will be password protected to each individual’s identity.

The aid will also contain tailored data on the individual’s performance on dizziness care processes. The proportion of eligible dizziness cases receiving the DHT (primary BPPV diagnostic endpoint) and the CRM (secondary BPPV therapeutic endpoint), will be plotted over time. This will be graphically summarized to demonstrate the performance of all health care providers (anonymized to user) at the site over time, and the individual data point corresponding to the user will be noted in a monthly email and within the website. (Note: patient outcome data is covered under separate IRB application).

The aid will also be available in a mobile version for smartphones and tablets

Use data for the web based / mobile resource will be collected by site over time. This data may be fed back to the local champion or the site medical providers to enhance use. We will collect feedback on the website using the format given in Appendix A.

5.1.4 Referral resource

Because our main goal is to get the right treatment to the right patient within a reasonable time frame, we will also establish a list of providers in the community who evaluate and treat BPPV. The goal of this system is to provide ED physicians with a more informed route of referral to appropriate community providers for BPPV treatment. Many providers who see patients with BPPV or probable BPPV would like to make a specific referral to another provider for evaluation, treatment, or subsequent assessment. Our previous survey work of community ED providers found this to be a popular option. To establish this resource, providers in the community who evaluate and treat BPPV will be identified, covering a variety of insurance/payment options. Physical therapists, particularly those with training in vestibular therapy, are likely to be an important resource. We have already been in contact with PTs in the community in this regard. A system will be established to track use of referrals. In general, we will use the existing hospital methodology for referrals; however we may be able to augment this with a list of local providers who are willing and able to quickly see and treat these patients.

5.1.5 Follow up Educational Sessions

Follow-up maintenance sessions will also be developed for the time period after the first CME session. These sessions will be used to facilitate adoption, implementation, and sustainability. Interviews will also be used to assess implementation fidelity. The format of follow-up sessions will be case-based. Providers will be encouraged to express successes and failures. Feedback on BPPV processes utilization will be presented. These sessions may be led by the designated local champion, an interested local medical provider, or the
study team. These sessions may be in person or by telephone or web conference. As with other study educational offerings, we will track attendance and use by medical provider and request evaluation information using Appendix A.

5.1.6 Partnered development and other resources
(Update 12/7/2017) In the course of engaging with providers, they requested an additional website/app component to prospectively collect information related to safety in discharging ED dizziness patients home (Appendix D). We worked with providers to develop a list of items and data collection form. The list of items includes the BPPV specific items and additional items that largely relate to the possibility that the patient might have a stroke as the cause or is high risk for stroke in the short term. Both of these components fit well with our overall intervention which emphasizes both the features of BPPV and also findings that suggest an alternative cause such as stroke. The addition of this component could serve to: 1) increase exposure to the BPPV related items (an additional resource providers may seek out), 2) enhance data capture in a subsample of visits, and 3) build engagement/collaboration with local providers. The new prospective data collection could enhance implementation fidelity measures because this prospective provider-entered data enables an assessment of the consistency of medical record documentation of BPPV assessments. In addition, the new prospective data regarding safety items should enhance secondary analysis regarding the 90-day stroke rate by informing factors that predict stroke (in the subsample with data collected).

In the form, we separate the BPPV items from the safety items to enforce that the BPPV items are established clinical guideline items but that the safety items are not. The form also explicitly states that the safety items are for data collection purposes only. There is no current society clinical guideline regarding safety in discharge of ED dizziness patients. To develop these items, we reviewed the medical literature regarding factors previously shown to predict stroke. The items were then created/edited by our team of investigators (neurologists, emergency medicine, otolaryngology, general medicine) and local ED providers. If the analysis of these safety items indicates they are accurate in discriminating stroke, then future studies (requiring separate IRB application) may be done to test the effect of the list on outcomes in dizziness ED cases (e.g., subsequent stroke event, length of stay in the ED, test utilization).

The form will be available on the website/app. Providers can voluntarily complete the form at the point of care. Data can be entered electronically or paper forms can be printed, completed, and inserted into a lock-box in the ED. CHRISTUS Spohn Shoreline already has an available lock-box for several other projects that use a similar method for data collection.

5.2 Randomization
The overall study period will be approximately 18 months. After the 4-month pre-intervention period, the sites will receive the intervention in 5 waves. (The two smallest
hospitals will receive the intervention at the same time.) The order will be determined by using a random number generator.

5.3 **Handling of Study Intervention**

The website will be password protected. Access will only be granted to the local champions, along with the emergency department medical providers (physicians, residents, physician assistants, nurse practitioners) at sites after the time of delivery of the CME intervention. Providers will be notified of the nature of the research study and we will request they not share their passwords or access to the website with other physicians or health care providers in the community or elsewhere.

5.4 **Concomitant Interventions**

The community will be closely monitored for any large secular trend (i.e. a health insurer or malpractice insurer based intervention on the care of dizziness in the emergency department.) The primary analysis will remain unchanged, but secondary analyses will be conducted to estimate the impact of this change within hospitals that have and have not received the intervention by the time of the event.

5.5 **Adherence Assessment**

Attendance at CME and other educational sessions will be taken. In addition, the use of the educational app and/or website will be tracked at the user level. No patient data will be collected in the website or educational app. Attendance and conduct of follow up educational sessions will also be tracked over time.

5.6 **Plan for maximizing adherence**

The study will provide an incentive of $50 for viewing the website. The study team will track individual level attendance among the medical providers at each site. We will attempt to provide the information in the CME presentation to interested providers using other methods (video teleconference or recording) if they are not able to attend in-person sessions. In the post-intervention period, providers will receive a $5 incentive for each dizziness checklist they complete. The dizziness checklist incentive will be capped at $250 (50 completed checklists).

Incentives will be provided either as cash, check or gift card (from Amazon.com or similar retailer).

6 **CLINICAL AND LABORATORY EVALUATIONS**

6.1 **Timing of Evaluations –Medical Provider Level**
6.1.1 Medical Provider Surveys
Approximately one month after the intervention, we will send an email, web based survey (Appendix A), to the list of medical providers who attended a CME or signed up for website. Approximately three attempts will be made to get responses to the web based survey. The website and CME intervention will also have brief questionnaires administered to gather user preference data and feedback. These will be similar to Appendix A.

6.1.2 Project Artifacts
Various project artifacts, such as locally developed protocols and discharge instructions, will be collected by the study team, time-stamped and archived in a secure database.

6.1.3 Process data collection
Additional tools and resources will be developed in partnership with the local medical providers. The timing and content of these tools and resources will be collected.

7 STATISTICAL CONSIDERATIONS

7.1 General Design Issues
We will collect data on utilization of the educational interventions. This will be correlated with data from patient level use of dizziness care processes.

7.2 Sample Size and Accrual
Providers: Including emergency department physicians, residents, and mid-level providers, there are approximately 150 eligible medical providers in practice at the included hospitals. Some turnover is anticipated so our current maximum sample size for enrolled medical providers is 360. (Given some sites are small, we doubled the expected number of providers and added 10 to arrive at this maximum).

Table 7.2 – Anticipated and Maximum Enrollment by Site and Type

| Site                | Expected Providers | Maximum Providers |
|---------------------|--------------------|-------------------|
| Spohn Shoreline     | 30                 | 70                |
| Spohn Memorial      | 50                 | 110               |
| Spohn South         | 20                 | 50                |
| CCMC – Doctors      | 20                 | 50                |
8 DATA COLLECTION

8.1 Records to Be Kept

We will collect information on website / mobile app usage, attendance at CME sessions and responses to surveys. Coded identifiers will be used. We will retain the linkage file until the end of data analysis. Limited access, HIPPAA compliant databases on secure servers will be utilized for all data storage and collection.

9 HUMAN SUBJECTS

In general, the research team will adhere to the following principles:

- We will protect and safeguard HIPAA defined Protected Health Information.
- We will respect the confidentiality of the medical providers and health care facilities.
- There will not be public disclosure of identifiable medical provider performance.
- There will not be disclosure or publication of identifiable hospital level performance.
- Identities (patient, provider, and hospital) will be coded in research databases with the linkage file being removed after data analysis.

9.1 Risks

9.1.1 Data risks

The main potential risk to providers in this study is breach of confidentiality of datasets with their healthcare behaviors identified and survey responses that could result in psychological distress or harm to reputation.

The likelihood of this risk is estimated to be rare. The seriousness to the subject is estimated to be low. We have methods in place to prevent this occurrence. Data obtained for participants will be held strictly confidential in locked facilities and password protected computers. Trained abstractors will enter pertinent information into the database using REDCAP or similar secure online database. Each abstractor is restricted to only the data they collect or have a need to access.
Paper forms of the provider checklist will be entered into the secure REDCAP database. PHI will be redacted from the scanned versions that will be retained in the database. The online version of the provider checklist will not collect PHI. Checklists filled out online will be linked back to visits when applicable in our database by determining which provider filled it out and the time that a relevant, included dizziness visit occurred on that day.

**Risk of missed or delayed diagnosis**

Learning of a delayed diagnosis may induce psychological distress within medical providers. This risk is rare. In addition, there is an extremely rare risk of litigation. The educational intervention is designed to encourage guideline concordant evaluation and treatment of dizziness.

### 9.2 Adequacy of Protection Against Risk

#### 9.2.1 Waiver of documentation of written informed consent for survey procedures –

Prior to educational session, we will provide a notice (written and/or by email and/or verbally) regarding the research procedures (Appendix C.) The study team will collect information on CME session attendance, web resource use, and other study activities. In addition, the study team will collect information directly from the medical providers in the form of surveys. This research is minimal risk. See Appendices A, B, and C.

#### 9.2.2 Protection from loss of confidentiality / psychological distress

Data obtained for participants will be held strictly confidential in locked facilities and password protected computers. All information will be kept in a password protected database such as REDCAP with secure servers used to transfer data between study sites. Computers will be locked or kept with the study team member at all times. Each study team member will be restricted to only the data they collect or have a need to access. We do not anticipate adverse effects to subjects during this study.

### 9.3 Subject Confidentiality / Data Retention

Medical providers in the community will have information (regarding clinical care from medical chart, and survey responses) identified using a medical provider ID code assigned by the study. The master code list linking specific providers to the codes will be removed after data analysis is completed.

The information we collect regarding utilization of and opinions regarding the educational intervention is not sensitive. Therefore, this still falls under an exempt setting for research. Identifiers to the medical providers are needed to correlate educational material
Hospitals: An internal code will be used to link visits to specific hospitals.

All records will be kept in a locked file cabinet or on secure computer systems. Clinical information will not be released without written permission of the subject, except as necessary for monitoring by IRB, the FDA, the NIDCD, the OHRP, the sponsor, or the sponsor’s designee. In accordance with NIH regulations, we will create a permanent de-identified, public use database. We will remove linkages to protected health information, hospital identifiers and patient identifiers. The purpose of the retention of this data is for future research and to comply the NIH regulations for datasets created during the conduct of NIH funded research grants.

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Appendix A: Intervention Component Survey [Prototype]

We need your help!

We would greatly appreciate your feedback regarding the dizztinct.com website, app, and the in-person Continuing Medical Education session.

This should only take a couple minutes of your time.

Have you used the dizztinct.com website?
- No
- Yes

How would you rate the usefulness of the dizztinct.com website to your ability to identify and treat benign paroxysmal positional vertigo?
- 0 Not useful at all
- 1
- 2
- 3
- 4
- 5 Neutral
- 6
- 7
- 8
- 9
- 10 Extremely useful

How would you rate the usefulness of the dizztinct.com website to your ability to evaluate and treat dizziness in general?
- 0 Not useful at all
- 1
- 2
- 3
- 4
- 5 Neutral
- 6
- 7
- 8
- 9
- 10 Extremely useful
Have you used the dizztinct app?

- No
- Yes

How would you rate the usefulness of the dizztinct app to your ability to identify and treat benign paroxysmal positional vertigo?

- 0 Not useful at all
- 1
- 2
- 3
- 4
- 5 Neutral
- 6
- 7
- 8
- 9
- 10 Extremely useful

How would you rate the usefulness of the dizztinct app to your ability to evaluate and treat dizziness in general?

- 0 Not useful at all
- 1
- 2
- 3
- 4
- 5 Neutral
- 6
- 7
- 8
- 9
- 10 Extremely useful

Did you attend a dizztinct Continuing Medical Education in-person session?

- No
- Yes
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How would you rate the usefulness of the dizztinct Continuing Medical Education session to your ability to identify and treat benign paroxysmal positional vertigo?

- 0 Not useful at all
- 1
- 2
- 3
- 4
- 5 Neutral
- 6
- 7
- 8
- 9
- 10 Extremely useful

How would you rate the usefulness of the dizztinct Continuing Medical Education session to your ability to evaluate and treat dizziness in general?

- 0 Not useful at all
- 1
- 2
- 3
- 4
- 5 Neutral
- 6
- 7
- 8
- 9
- 10 Extremely useful

Please list the things that you liked BEST about the dizztinct website, app, or Continuing Medical Education session.

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

Please list the things that you liked LEAST about the dizztinct, website, app, or Continuing Medical Education session.

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

What else should be done to make the dizztinct website, app, or Continuing Medical Education session better?

____________________________________________________________________
____________________________________________________________________
As a result of the distinct resources (website, app, and/or CME session), how confident are you in using/interpreting the Dix-Hallpike test and/or the Epley maneuver?

- 0 Much LESS confident (resources made you less confident)
- 1
- 2
- 3
- 4
- 5 Neutral (resources did not influence your confidence)
- 6
- 7
- 8
- 9
- 10 Much MORE confident (resources made you more confident)

As a result of the distinct resources (website, app, and/or CME session), how likely is it that you will use the Dix-Hallpike test and/or the Epley maneuver in future patients who might have benign paroxysmal positional vertigo?

- 0 Much LESS likely (resources made you less likely to use)
- 1
- 2
- 3
- 4
- 5 Neutral (resources did not influence your use)
- 6
- 7
- 8
- 9
- 10 Much MORE likely (resources made you more likely to use)
Appendix C: Consent Script/Template for Survey Procedures

We are conducting a research study involving the clinical care of patients with dizziness. Your participation in educational sessions and surveys is voluntary, and you can choose not to participate. Those who complete relevant surveys and educational sessions may be eligible to receive an incentive of approximately $20-$50 depending on the session. The researchers will be using information about you and the clinical care you provide to dizziness patients. We will code this data and at the end of the study, we will remove links to the identifiers we have used. The research is funded by the National Institutes of Health, and we are partnering with emergency physicians from your groups to conduct this research. If you have further questions or concerns you can contact the research team at the University of Michigan: Principal Investigators (William Meurer, MD, wmeurer@umich.edu 734-615-2766 or Kevin Kerber, MD, kakerber@umich.edu).
Appendix D: Provider Checklist
Preliminary wording -- minor revisions may occur in finalized document

Apply patient sticker here

Please enter account # if sticker is not available

*Please complete both Parts 1 & 2 by circling the appropriate response (Yes or No) as applicable*

### Part 1. BPPV Items:

|   |   |
|---|---|
| 1) Spontaneous or gaze nystagmus is absent (video link) | Yes*   | No |
|     | AND |
| 2) Triggered, transient nystagmus on Dix-Hallpike Test is present (video links) |   |   |

*Consider Epley maneuver (video link).

If patient improves and there are no other deficits:
BPPV is likely and serious pathology is unlikely

### Part 2. Safety Items

Indicate whether or not the following are present by circling yes or no:
New focal neurologic deficits on exam or by report, such as:
- Dysarthria
- Visual field defect
- Ptosis
- Coordination problem
- Sensory loss
- Weakness

| Yes | No |
|-----|----|

Vertical nystagmus when sitting still and looking straight ahead or to the side

| Yes | No |
|-----|----|

Direction-changing nystagmus (left-beat looking to left, and right-beat looking to right)

| Yes | No |
|-----|----|

Newly required assistance from another person or device to safely walk 10 feet (3 meters)

| Yes | No |
|-----|----|

**Two or more** of the following:
- Age >= 60
- Initial SBP >=140, or DBP >=90
- Diabetes

| Yes | No |
|-----|----|

*Please note: Safety items are for research purposes only. Decisions about further testing and disposition should be made using your clinical judgment.*