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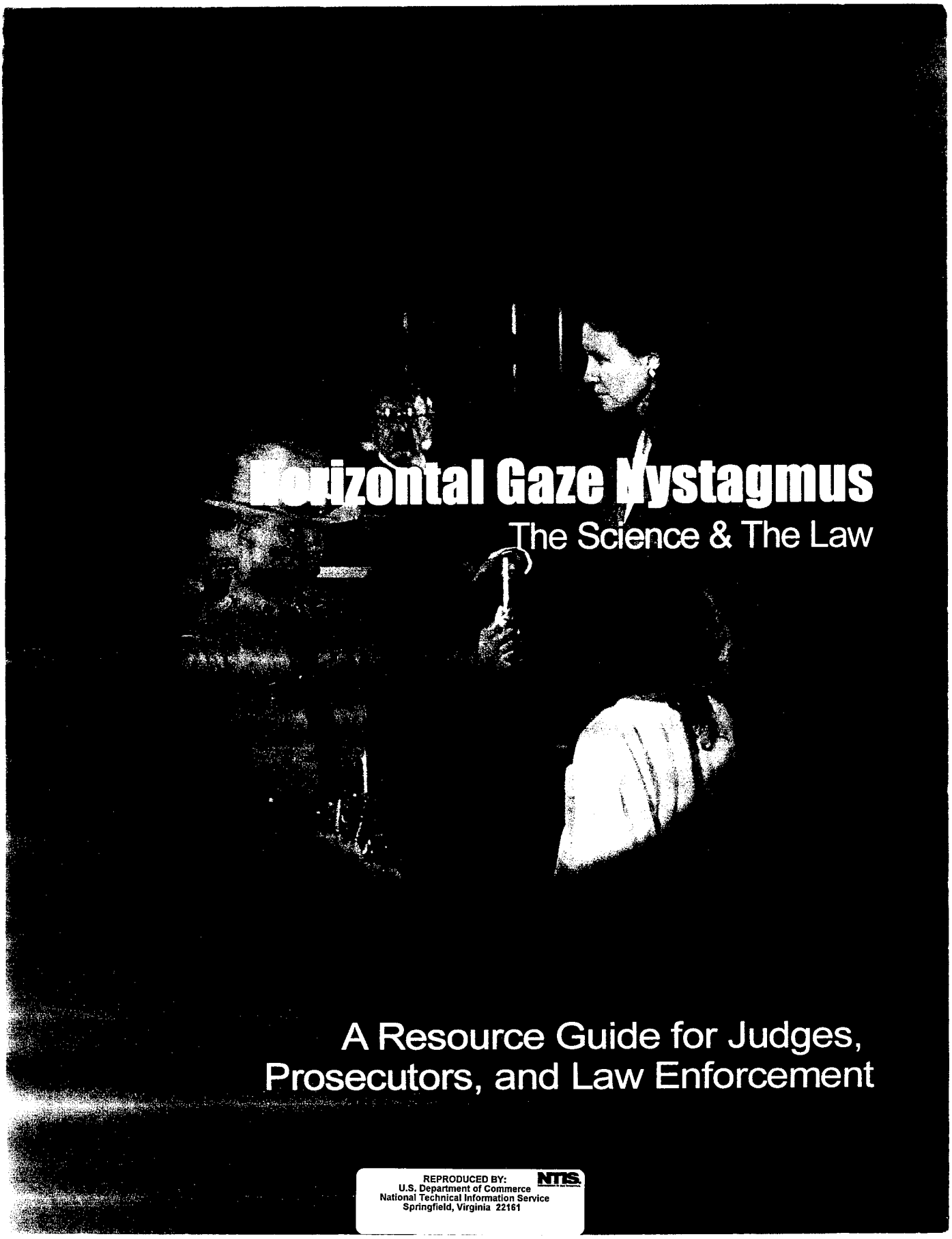

Horizontal Gaze Nystagmus

The Science & The Law

A Resource Guide for Judges, Prosecutors, and Law Enforcement

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AMERICAN PROSECUTORS RESEARCH INSTITUTE

NATIONAL TRAFFIC LAW CENTER

HORIZONTAL GAZE NYSTAGMUS: THE SCIENCE AND THE LAW

A RESOURCE GUIDE FOR JUDGES, PROSECUTORS AND LAW ENFORCEMENT

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AMERICAN PROSECUTORS RESEARCH INSTITUTE

National Traffic Law Center

The American Prosecutors Research Institute's National Traffic Law Center (NTLC) is a resource designed to benefit prosecutors, judges, and others in the justice system. The mission of NTLC is to improve the quality of justice in traffic safety adjudications by increasing the awareness of highway safety issues through the compilation, creation and dissemination of legal and technical information and by providing training and reference services.

When prosecutors deal with challenges to the use of breath test instruments, blood tests, horizontal gaze nystagmus, crash reconstruction, and other evidence, the NTLC can assist with technical and case law research. Likewise, when faced with inquiries from community groups about getting impaired drivers off the road, NTLC can provide research and statistics concerning the effectiveness of administrative license revocation, ignition interlock systems, sobriety checkpoints and much more.

NTLC has a clearinghouse of resources including case law, legislation, research studies, training materials, trial documents and a directory of professionals who work in the fields of crash reconstruction, toxicology, drug recognition and many others. The information catalogued by the center covers a wide range of topics with particular emphasis on impaired driving and vehicular homicide issues.

The professional staff at NTLC includes experienced trial attorneys and research staff. Assistance is specifically provided in all areas of trial preparation, including methods to counter specific defenses. NTLC facilitates the direct exchange of information among prosecutors, judges and other criminal justice professionals in the field to prevent duplication of effort.

NTLC was created in cooperation with the National Highway Traffic Safety Administration (NHTSA) and works closely with NHTSA and the National Association of Prosecutor Coordinators to develop and deliver prosecutor training programs, such as: *Prosecution of Driving While Under the Influence*, *Prosecuting the Drugged Driver*, and *Lethal Weapon: DUI Homicide*. Each course incorporates substantive legal presentations by faculty with skill building sessions where participants participate in a mock trial. The participants are critiqued and videotaped to assist in improving their trial skills.

NTLC is a program of the American Prosecutors Research Institute (APRI), the non-profit affiliate of the National District Attorneys Association. APRI's principal function is to enhance prosecution in America by providing training, technical assistance and research support to local prosecutors. Among others, APRI provides services in the following areas: asset forfeiture, child abuse, parental kidnapping, domestic violence, violence against women, stalking, community prosecution, DNA, drugs, environmental crime, hate crimes, juvenile justice, telemarketing fraud, and victim/witness programs.

For additional information contact APRI, 99 Canal Center Plaza, Suite 510, Alexandria, Virginia, 22314 (phone) 703-549-4253, (fax) 703-836-3195, www.ndaa-apri.org.

PREFACE

Despite its history of use and the endorsement of the Department of Transportation's National Highway Traffic Safety Administration, the horizontal gaze nystagmus (HGN) field sobriety test is not fully understood. What is nystagmus? How does the presence of horizontal gaze nystagmus reflect alcohol impairment? How does the police officer test for HGN? What conclusions can reasonably be drawn from the presence of HGN?

In an effort to provide accurate information regarding the use of the HGN test in impaired driving enforcement and dispel the continuing controversy around HGN, the American Prosecutors Research Institute (APRI) is proud to provide criminal justice practitioners nationwide with ***Horizontal Gaze Nystagmus - The Science and the Law: A Resource Guide for Judges, Prosecutors and Law Enforcement***. Among other things, this guide provides an overview of the science supporting the HGN test as a valid indicator of impairment, distinguishes between HGN and other forms of nystagmus, and provides the necessary tools to establish admissibility of the HGN test in court.

APRI is grateful to the Department of Transportation National Highway Traffic Safety Administration for its financial support which made this guide possible. In particular, we would like to thank Glenn Karr for his expert advice in recognizing the need for this publication in the criminal justice field.

APRI is committed to assisting criminal justice practitioners in their efforts to increase public safety in their communities. APRI hopes that this guide will promote increased training, use and acceptance of the HGN test as a valid and reliable tool in detecting, prosecuting and adjudicating impaired drivers.

Newman Flanagan
President
American Prosecutors Research Institute
Executive Director
National District Attorneys Association

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FOREWORD

by Marcelline Burns, Ph.D.

Although significant gains in traffic safety have been achieved over the last decades, it can be predicted with certainty that thousands of individuals will be the victims of alcohol-involved crashes in 1999 and, unfortunately, probably for many more years to come. Whenever we venture into the driving environment, as driver, passenger, cyclist, or pedestrian, we place ourselves at risk of becoming a victim. No matter how skilled and prudent we may be, there is no guarantee that we will be able to protect ourselves (or those we care about) from alcohol-impaired drivers. Since this amounts to an equal-opportunity potential for injury and death, one might expect all responsible adults to wholeheartedly support efforts to deter DUI drivers through sound programs. Unfortunately, such is not the case. Witness the persistent and vigorous efforts to prevent use of Horizontal Gaze Nystagmus (HGN) as a roadside sobriety test. To the extent those efforts succeed, traffic officers will have been denied a valid and reliable tool. That will not be a small loss since police officers are a vital link in the chain of events that removes impaired drivers from the roadway. If they are not allowed to use HGN and perform their duties with maximum effectiveness, we all will be more at risk than need be.

This HGN resource guide is a "good news" document, not only for the judges, prosecutors and law enforcement officers to whom it is addressed, but for all safety-minded citizens. The guide brings together a scientific and pragmatic approach to understanding HGN. Not only does it present sound information, it also provides a road map for the effective use of that information. Perhaps it will short-circuit the inaccurate and self-serving view of HGN that is propounded by defense counsel. Just possibly, the false arguments will subside, and traffic court time can be devoted to meritorious issues.

Lest the foregoing seem too harsh an indictment of the HGN challenges (and the challengers), consider the following. First, a very simple fact is often overlooked, perhaps because its simplicity belies its significance. The simple fact is that within a short time a traffic officer *must* warn, cite, arrest, or release every motorist who is stopped. Making no decision is not an option, nor is deferring the decision to a later time. The officer *must* make the often difficult decision, basing it on observations of driving, the driver's general behavior, appearance, and statements, and performance of roadside tests. The goal is (or ought to be) the release of non-impaired drivers and the arrest of DUI drivers. Given that goal, common sense dictates the use of roadside tests that have been shown in scientific studies to be the "best." Common sense also asks, "If not these best tests, then what?" It is telling in the extreme that the challengers to HGN offer no alternatives. Their argument is not, "Use Test X , which is a better test, instead of HGN." It is simply, "Do not use HGN."

Secondly and importantly, HGN was selected and recommended as one test within a battery, and officers are trained to use it in that context. It is a sensitive and accurate index of alcohol impairment, but for a skilled traffic officer, it is only one of multiple

sources of information. Yet, arguments against it proceed as though it were the only evidence available to the arresting officer. It is true that circumstances occasionally prevent the administration of psychophysical tests, but even then HGN is not the only evidence. The consumption of alcohol may also be revealed from a suspect's demeanor and speech, as well as the odor of alcohol on the suspect's breath. Other factors include the time and place at which the suspect is stopped. (What are the odds of alcohol involvement when a violation is by an elderly parishioner leaving Sunday morning services vs. a young adult in the vicinity of a bar at 0200?). It approaches absurdity to suggest that officers will be able to check suspects' eyes but unable to make any other observations.

Finally, consider validity. If a test measures what it purports to measure, it is a valid test. The claim that HGN occurs in the presence of alcohol or other depressants, inhalants, and phencyclidine and is reliably associated with impairment by those substances has been validated repeatedly by breath, blood, and urine tests. In fact, except for individuals who refuse to provide a specimen, an officer's observation of HGN is routinely subjected to validation. The question which begs to be answered then is, "Why would officers confidently rely on HGN if their observations were not validated?" It is difficult to imagine that they would continue to use a test which repeatedly leads to decision errors.

HGN is not a magic bullet, but it is an excellent tool of investigation. It will be a boon for traffic safety and good fortune for all who use the roadways if police officers are trained and encouraged to use it at roadside. I am hopeful..... no, I am confident, that this resource guide, seriously studied and considered, will serve that objective.

HORIZONTAL GAZE NYSTAGMUS: THE SCIENCE & THE LAW

A Resource Guide for Judges, Prosecutors and Law Enforcement

INTRODUCTION

Nystagmus is an involuntary jerking or bouncing of the eyeball that occurs when there is a disturbance of the vestibular (inner ear) system or the oculomotor control of the eye. Horizontal gaze nystagmus (HGN) refers to a lateral or horizontal jerking when the eye gazes to the side. In the impaired driving context, alcohol consumption or consumption of certain other central nervous system depressants, inhalants or phencyclidine, hinders the ability of the brain to correctly control eye muscles, therefore causing the jerk or bounce associated with HGN. As the degree of impairment becomes greater, the jerking or bouncing, i.e. the nystagmus, becomes more pronounced. This is assessed in the horizontal gaze nystagmus test.

The horizontal gaze nystagmus test is one of three field sobriety tests that comprise the standardized field sobriety test (SFST) battery (the other two tests are the walk-and-turn test and the one-leg-stand test). Scientific evidence establishes that the horizontal gaze nystagmus test is a reliable roadside measure of a person's impairment due to alcohol or certain other drugs.[1]

Despite the strong correlation between alcohol consumption and HGN, some trial courts across the country still do not admit the results of the HGN test into evidence. Although the scientific evidence to prove this correlation exists, due to lack of knowledge, inadequate preparation, or limited proffers, the evidence prosecutors have presented to courts has at times been insufficient to satisfy the courts' evidentiary standards for admitting scientific or technical evidence. As a result, law enforcement officers in a number of jurisdictions use the HGN test

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[1] Humphrey Belton, *Lateral Nystagmus: A Specific Diagnostic Sign of Ethyl Alcohol Intoxication*, 100 N.Z. Med. J. 534, 535 (Aug. 1987).

only for purposes of establishing probable cause if at all, without securing admission of the test results into evidence at trial. Ultimately, the factfinder never hears the results of the most reliable field sobriety test.

Legal and law enforcement communities need to better understand that HGN is the most reliable and effective indicator of alcohol impairment and that ample evidence is available to prove that reliability. The challenge is in conveying the strong correlation between the HGN test and impairment to the factfinder and showing how to effectively use the available evidence to prove the HGN test's validity and reliability in court.

This guide is designed especially to assist judges, prosecutors and law enforcement personnel in gaining a basic understanding of HGN, its correlation to alcohol and certain other drugs, other types of nystagmus, the HGN test's scientific validity and reliability, its admissibility in other jurisdictions, and the purposes for which it may be introduced. Specifically:

- Law enforcement officers will be able to understand why prosecutors ask questions regarding their training and experience in administering the HGN test, will be able to anticipate the types of questions that will be raised, and will be better prepared to respond to defense questions about the extent of their knowledge of the HGN test.
- Prosecutors will be better able to establish the scientific reliability of the HGN test under either the *Frye*[2] or *Daubert*[3] standard, to successfully articulate the HGN test's value to the factfinder, and to build a strong trial record to appeal adverse trial court rulings.

[2] *Frye v. United States*, 293 F. 1013 (D.C. Cir. 1923).
[3] *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993).

- Judges will have a guide to evaluate and resolve issues regarding the reliability of the HGN test and the invalidity of arguments against the HGN test's admissibility.

Many issues addressed throughout this publication, such as the scientific reliability of the HGN test, may not apply to routine testimony in impaired driving cases once the state's appellate court accepts the HGN test. Nevertheless, all sections are helpful to the judge, prosecutor, and law enforcement officer who is unfamiliar with the subject matter or in need of review. For example, issues that may be applicable to every case include specifically how HGN occurs, how the test is administered, the qualifications and experience of the officer administering the test, and the purposes for which the HGN test result may be used.

This guide examines the use and application of the HGN test outside of the context of the SFST battery because courts may examine the issue of HGN as an independent test not related to other tests conducted by law enforcement officers. Although the HGN test is the most effective and reliable roadside sobriety test, law enforcement officers have not made arrest decisions and prosecutors have not obtained convictions based solely on the HGN test. The test should be used in the context for which it was developed: as one of the three roadside tests that make up the standardized field sobriety test battery.

The ultimate goal of this guide is to assist prosecutors and law enforcement officers in every jurisdiction to lay the foundation for the admissibility of the HGN test, and to encourage judges to accept the results of a properly administered HGN test as relevant evidence of impairment. The HGN test is the most effective roadside weapon against alcohol-impaired driving. It is not effective, however, if law enforcement officers and prosecutors do not use it or courts do not accept it.

THE SCIENCE

Section I: What is "Nystagmus"

"Nystagmus" is a term used to describe a "bouncing" eye motion that is displayed in two ways: (1) pendular nystagmus, where the eye oscillates equally in two directions, and (2) jerk nystagmus, where the eye moves slowly away from a fixation point and then is rapidly corrected through a "saccadic" or fast movement.[4] HGN is a type of jerk nystagmus with the saccadic movement toward the direction of the gaze. An eye normally moves smoothly like a marble rolling over a glass plane, whereas an eye with jerk nystagmus moves like a marble rolling across sandpaper. Most types of nystagmus, including HGN, are involuntary motions, meaning the person exhibiting the nystagmus cannot control it.[5] In fact, the subject exhibiting the nystagmus is unaware that it is happening because the bouncing of the eye does not affect the subject's vision.[6]

Section II: Alcohol and Nystagmus

There are several types of nystagmus. Alcohol causes two types: alcohol gaze nystagmus, which includes HGN, and positional alcohol nystagmus. Although alcohol causes both, alcohol gaze nystagmus and positional alcohol nystagmus are very different and easily distinguishable. Testing for positional alcohol nystagmus is not a part of the standardized field sobriety test battery. Defendants sometimes claim or attempt to confuse matters by arguing that

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[4] Raymond D. Adams & Maurice Victor, *Principles of Neurology*, ch.13, "Disorders of Ocular Movement and Pupillary Function," 117 (4th ed. 1991).

[5] C.J. Forkiotis, *Optometric Exercise: The Scientific Basis for Alcohol Gaze Nystagmus*, 59 Curriculum II, No. 7 at 9 (April 1987); Gregory W. Good & Arol R. Augsburger, *Use of Horizontal Gaze Nystagmus as a Part of Roadside Sobriety Testing*, 63 Am. J. of Optometry & Physiological Optics 467, 469 (1986).

[6] There have been some studies that suggest that HGN due to alcohol impairment may affect the ability of a person to see clearly. *See* June M. Stapleton, et al., *Effects of Alcohol and Other Psychotropic Drugs on Eye Movements: Relevance to Traffic Safety*, 47 Q.J. Stud. on Alcohol 426, 430 (1986).

the nystagmus the officer saw was actually positional alcohol nystagmus and not alcohol gaze nystagmus.

For purposes of clarification the characteristics of both are described below.

Alcohol Gaze Nystagmus (AGN)

Gaze nystagmus is a type of jerk nystagmus where the eye gazing upon or following an object begins to lag and has to correct itself with a saccadic movement toward the direction in which the eye is moving or gazing.[7] Gaze nystagmus is due to disruptions within the nervous system. Alcohol gaze nystagmus (AGN) is gaze nystagmus caused by alcohol. AGN occurs as the eye moves from looking straight ahead (called resting nystagmus), to the side (called HGN), or up (called vertical nystagmus or VGN). The effect of alcohol on eye movement has been described as follows:

> Alcohol is a central nervous system depressant affecting many of the higher as well as lower motor control systems of the body. This results in poor motor coordination, sluggish reflexes, and emotional instability. The part of the nervous system that fine-tunes and controls hand movements and body posture also controls eye movements. When intoxicated, a person's nervous system will display a breakdown in the smooth and accurate control of eye movements. This breakdown in the smooth control of eye movement may result in the inability to hold the eyes steady, resulting in a number of observable changes of impaired oculomotor functioning.[8]

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[7] *See* Forkiotis, *supra* note 5, at 9.

[8] Jack E. Richman & John Jakobowski, *The Competency and Accuracy of Police Academy Recruits in the Use of the Horizontal Gaze Nystagmus Test for Detecting Alcohol Impairment*, 47 New Eng. J. Optometry 5, 6 (Winter 1994).

Positional Alcohol Nystagmus (PAN)

Positional nystagmus occurs when a foreign fluid, such as alcohol, is in unequal concentrations in the blood and the fluid contained in semi-circular canals in the vestibular (inner ear) system. The vestibular system controls a person's balance, coordination and orientation. The eyes depend on the vestibular system to stabilize them against any head movements.[9] Disruptions in the vestibular system will have an adverse effect on the messages sent to the eyes when the head moves.[10] Positional nystagmus manifests itself as jerk nystagmus in which the direction of the saccadic movement depends on head movement.[11]

Positional alcohol nystagmus (PAN) occurs when alcohol is the foreign fluid. There exist two types of PAN. In PAN I, the alcohol concentration is higher in the blood than in the vestibular system fluid and occurs when a person's blood alcohol content (BAC) is *increasing*. In PAN II, the alcohol concentration is lower in the blood than in the vestibular system fluid and occurs when a person's BAC is *decreasing*.

Nausea, dizziness, vertigo and vomiting accompany PAN I and PAN II, which indicate high doses of alcohol.[12] High intensity PAN is evident when a subject's eyes are open, but open eyes block lower intensity PAN.[13] As a result, PAN is most easily recorded when the subject is lying down, head to the side with the eyes closed.[14]

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[9] David A. Robinson, *Eye Movement Control in Primates*, 161 Science 1219 (Sept. 1968).
[10] *See* L. Goldberg, *Effects and After-Effects of Alcohol, Tranquilizers and Fatigue on Ocular Phenomena*, Alcohol and Road Traffic 123, 125-28 (1963).
[11] *Id.* at 128.
[12] *Id.* at 126.
[13] *Id.*
[14] Eye movements with the eyes closed were recorded with electro-oculography, which utilizes electrodes placed at the outer corners, under and over the eye. *Id.* at 124.

AGN and PAN Compared

In comparing AGN and PAN it is evident that both are caused by alcohol, yet their origins and manifestations are very different.[15] AGN is a neurological nystagmus while PAN is a vestibular system nystagmus.[16] Unlike AGN, PAN manifests itself only when the subject is lying down, with the head turned to the side and the eyes closed.[17] At low intensities, PAN stops when the eyes are open.[18] Furthermore, PAN changes direction depending on the position of the head while the direction of AGN depends on the direction of the gaze.[19] Because of these differences, officers conducting the HGN test are not likely to confuse AGN and PAN indicators.

Section III: The HGN Test

Development of the Standardized Field Sobriety Test Battery

Law enforcement officers have used field sobriety tests (FST) to detect impairment and to develop probable cause to arrest.[20] Most FSTs test coordination, balance and dexterity, all of which diminish as a person reaches higher and higher BACs. Many FSTs also test a person's ability to perform simple tasks simultaneously because impairment limits the ability to divide attention among several activities at once. All FSTs assess to some degree the extent of a person's impairment. In 1977, law enforcement officers throughout the country were using different tests in a variety of ways with no scientific evidence of their effectiveness in detecting impairment. One of these tests was the HGN test.

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[15] Gunnar Aschan, *Different Types of Alcohol Nystagmus*, 140 Acta Oto-laryngol 69, 76 (Sweden 1958); Goldberg, *supra* note 10, at 128.
[16] National Highway Traffic Safety Administration, U.S. Department of Transportation, *Development and Field Test of Psychophysical Tests for DWI Arrest*, No. DOT-HS-805-864 at 79-83 (March 1981) [hereinafter *1981 NHTSA Study*].
[17] Goldberg, *supra* note 10, at 124-28.
[18] *Id.*
[19] Aschan, *supra* note 15,at 76-77.
[20] Field sobriety tests encompass any exercise a law enforcement officer asks an impaired driving suspect to perform along the roadside to test for impairment. The standardized field sobriety test battery consists only of the horizontal gaze nystagmus test, the walk-and-turn test and the one-leg-stand test.

Estimates of impaired driving rates and alcohol-related traffic injuries and fatalities prompted the National Highway Traffic Safety Administration (NHTSA) in 1977 to commission the Southern California Research Institute (SCRI) to determine the best methods of detecting impaired drivers using field sobriety tests. An underlying premise was that better detection methods would lead to more impaired driving arrests, higher conviction rates and ultimately lower incidents of impaired driving.

The 1977 SCRI study validated earlier observations regarding the relationship between HGN and alcohol consumption and found that the HGN test, along with the walk-and-turn (WAT) test, and the one-leg-stand (OLS) test, were easy FSTs to administer at roadside and the most accurate in detecting impairment.[21] Once the researchers identified the most accurate tests, they turned their attention to standardizing the administration of the tests in 1981.[22] Through standardization, the SCRI researchers ensured that law enforcement officers everywhere could administer the tests quickly, easily, effectively, and uniformly.[23] At that time, the researchers also found that when all three test results (HGN, WAT and OLS) were combined, it was possible to accurately determine whether an individual's BAC was .10 or higher eighty-three percent of the time.[24]

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[21] National Highway Traffic Safety Administration, U.S. Department of Transportation, *Psychophysical Tests for DWI Arrests*, No. DOT-HS-802-424 at 39 (June 1977) [hereinafter *1977 NHTSA Study*].
[22] *1981 NHTSA Study*, *supra* note 16, at 3.
[23] *Id.*
[24] *Id.* at 2. A later field study, using standardized procedures for administering the three FSTs, showed that ninety-three percent of the decisions to arrest and eighty-six percent of the decisions to arrest or release were correct. Colorado Department of Transportation, *A Colorado Validation Study of the Standardized Field Sobriety Test (SFST) Test Battery*, 14 (Nov. 1995) [hereinafter *A Colorado Validation Study*].

Defendants often challenge the validity and the reliability of the HGN test. Validity is whether the test measures what it claims to measure. The validity of the HGN test can be established through the multitude of scientific articles, including the 1977 NHTSA study, that establish a correlation between HGN and the presence of alcohol. Reliability is whether the test repeatedly and consistently measures what it claims to measure. The 1981 NHTSA study tested the reliability of HGN and found that HGN occurs repeatedly and in multiple subjects as examined by multiple officers when alcohol is present.[25]

After standardization, NHTSA funded a third study in 1983 to further corroborate these findings. Using data from the 1981 SCRI laboratory study, the NHTSA researchers determined that the HGN test was seventy-seven percent accurate in detecting whether an individual's BAC was .10 or higher.[26] The WAT test was found to be accurate sixty-eight percent of the time.[27] However, the NHTSA researchers found that when the results of the HGN and WAT test data were combined, the two tests were eighty percent accurate in detecting whether an individual's BAC was .10 or higher.[28] (See Appendix A for a copy of the matrix law enforcement officers use to combine HGN and WAT test scores.) Finally, the researchers predicted that the OLS test alone accurately indicated impairment sixty-five percent of the time.[29] NHTSA researchers then conducted a field study and confirmed the tests' ability to "effectively discriminate between

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[25] A measure of HGN reliability requires multiple measurement. For test-retest reliability, the same officers must examine the same subjects at the same BAC on a second occasion. For inter-officer reliability, two or more officers must examine the same subjects independently.

Reports of officer accuracy in percentages are not measures of reliability. They are important measures in that they serve to validate the test battery. That is, if officers make a high percentage of correct decisions based on the test battery, then it is valid.

Validity and reliability are linked. An unreliable test (one that gives varying results from one time to another) cannot be a valid test. Note that reliability is measured with coefficients in the range of -1 (no reliability) to +1 (perfect reliability).

[26] National Highway Traffic Safety Administration, U.S. Department of Transportation, *Field Evaluation of a Behavioral Test Battery for DWI*, No. DOT-HS-806-475 at 4 (Sept. 1983) [hereinafter *1983 NHTSA Study*]. NHTSA research found that HGN may be evident when a person's BAC reaches approximately .06 BAC. *1977 NHTSA Study*, *supra* note 21, at 7. Some studies have found that horizontal gaze begins to break down at even lower BAC levels. *See* I.M.S. Wilkinson et al., *Alcohol and Human Eye Movement*, 97 Brain 785, 791 (1974) (finding that smooth pursuit begins to break down at .04 BAC); Good & Augsburger, *supra* note 5, at 468 (stating that some changes in horizontal gaze begin at .03 BAC).

[27] *Id.*

[28] *Id.*

[29] *Id.*

drivers with BACs less than 0.10% and drivers with BACs equal to or over 0.10%."[30] The field study also concluded that the HGN test was the most "powerful" of the three tests.[31]

While these initial studies showed the accuracy of the HGN test, more recent studies demonstrate that the HGN test is even more accurate when administered by law enforcement officers trained and experienced in the administration of the HGN test. A 1986 study found the HGN test ninety-two percent accurate in detecting impairment.[32] A 1987 study found that experienced law enforcement officers were correct ninety-six percent of the time in determining a .10 BAC or more using the HGN test.[33]

The result of these studies was the standardized field sobriety test (SFST) battery used by law enforcement officers almost everywhere.[34] The purpose of the SFST battery, and especially the HGN test, is to increase the ability of law enforcement to: (1) identify drivers with BACs in the .08-.12 range that make up the bulk of the impaired drivers who do not necessarily exhibit exaggerated characteristics of impairment;[35] and (2) detect impairment in alcohol-tolerant drivers who may not display any gross coordination and balance problems.[36]

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[30] *1983 NHTSA Study*, *supra* note 26, at 11.
[31] *Id.*
[32] Good & Augsburger, *supra* note 5, at 471.
[33] Forkiotis, *supra* note 5, at 4. *See also A Colorado Validation Study*, *supra* note 24, at 14 (finding that experienced law enforcement officers were accurate ninety-three percent of the time in deciding to arrest when using the SFST battery).
[34] Marcelline Burns, *The Use of Horizontal Gaze Nystagmus as a Field Sobriety Test*, Proceedings, 35th International Congress on Alcoholism and Drug Dependence, Oslo, Norway at 1 (1988) [hereinafter Burns, *The Use of HGN*]. The HGN test is also part of the twelve-step drug recognition evaluation protocol, which law enforcement uses to detect drivers under the influence of drugs other than alcohol.
[35] *See id.* at 1.
[36] *See A Colorado Validation Study, supra* note 24, at 19.

Administering the HGN Test[37]

The HGN test is very easy to administer.[38] The officer must administer the test in a way that ensures that the subject's eyes can be seen clearly, i.e., in a well lit area or by use of a flashlight to illuminate the subject's face. The subject should not face toward the blinking lights of a police cruiser or passing cars, which may cause optokinetic nystagmus.[39] The subject does not have to be standing but can be sitting down. The law enforcement officer informs the subject "I am now going to check your eyes." The officer is not "testing" the subject's vision, as an ophthalmologist or optometrist would, but instead, the officer is "checking" the eyes for the physical manifestation of HGN.

Before checking the subject's eyes, the officer asks the subject to remove eyeglasses or inquires whether the subject is wearing hard or soft contact lenses. While the removal of the eyeglasses makes it easier for the officer to observe eye movement, glasses do not effect the HGN test results. Early concerns that contact lenses, especially hard contact lenses, may affect the HGN test result led some to provide for the subject to remove the lenses.[40] However, contact lenses, hard or soft, do not affect the test in any way. While hard contact lenses may pop out when the eye moves as far to the side as it will go, officers are not taught to have subjects remove contact lenses.[41] However, officers are taught to note whether the subject is wearing contacts and which type on the HGN Guide (shown on page 13).

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[37] Description of the administration of the HGN test is taken from National Highway Traffic Safety Administration, U.S. Department of Transportation, *DWI Detection and Standardized Field Sobriety Testing Student Manual* VIII-14 - 18 (1995) [hereinafter *Student Manual*].

[38] *Cf.* Belton, *supra* note 1, at 535 (advocating the teaching of HGN to the public through repeated demonstrations on television).

[39] Optokinetic nystagmus is evident when an object that the eye fixates upon moves quickly out of sight or passes quickly through the field of vision, such as occurs when watching utility pools pass by while in a moving car. See *infra* note 47 and accompanying text (defining optokinetic nystagmus).

[40] *1981 NHTSA Study, supra* note 16, at 7.

[41] *Student Manual, supra* note 37, at VIII-15.

The officer also asks the subject whether he or she has any medical impairment that would either prohibit the subject from taking the test or that would affect the test results. The officer should note on the HGN Guide any condition that prohibits the taking of the test and then move on to the remaining SFSTs. If the subject claims to have a natural nystagmus or any other condition that may affect the test result, but does not prohibit the taking of the HGN test, the officer should note the condition but still perform the test.

The subject does not have to see the object clearly to perform the HGN test. The subject just has to see the object well enough to be able to follow it with his eyes. Blurry vision is not a medical condition that prohibits the subject from taking the test or performing satisfactorily.

The HGN test requires only an object for subjects to follow with their eyes, such as a pen or the tip of a penlight.[42] The officer places the object approximately twelve to fifteen inches from the subject's face and slightly higher than eye level.[43] Placing the object above eye level opens the subject's eyes further and makes their movement easier to observe. (See Appendix B, Picture 1.)

The officer instructs the subject to follow the object with the eyes and the eyes only – the head should remain still. If subjects have difficulty keeping their head still during the test, the officer is taught to have subjects hold their own head still by pressing the palms of their hands to their cheeks or to hold their own chin. The officer should try to avoid holding the subject's chin

[42] Research has shown that the characteristics of the stimulus used, including size, shape and brightness, have no affect on the HGN test results. Forkiotis, *supra* note 5, at 11.

[43] There are several state appellate court cases that incorrectly include "covering one eye" as part of the administration of the HGN test. *See, e.g., State v. Superior Court (Blake)*, 718 P.2d 171, 173 (Ariz. 1986); *State v. Clark*, 762 P.2d 853, 856 (Mont. 1988). Subjects were asked to cover one eye in the initial NHTSA study. *1977 NHTSA Study, supra* note 21, at 13. However, when the test was standardized this requirement was dropped. *1981 NHTSA Study, supra* note 16, at 85. NHTSA's research showed that "monocular versus binocular fixation" was an "unimportant variable." *Id.* at 7. Other research demonstrates that the angle of onset occurs much sooner when one eye is covered. *See* Aschan, *supra* note 15, at 73. Therefore, NHTSA recommends that the HGN test not be performed on subjects with abnormal eye disorders or a glass eye. *Student Manual, supra* note 37, at VIII-14.

or using a flashlight as a chin rest because it brings the officer into contact with the subject and compromises officer safety. The officer then asks if the subject understands all the instructions.

After positioning the object, but before conducting the test, the officer checks for signs of medical impairment. First, the officer checks for "equal tracking" by moving the object quickly across the subject's entire field of vision to see whether the eyes follow the object simultaneously. The officer then checks for equal pupil size. Lack of equal tracking or equal pupil size may indicate blindness in one eye, a glass eye, a medical disorder or an injury. If the subject exhibits these characteristics, the officer should discontinue the HGN test and may need to seek medical assistance for the individual if a medical disorder or injury appears to exist.

While conducting the test, the officer looks for six "clues," three in each eye, that indicate impairment. The officer should record the clues on the HGN Guide. The left eye is checked for the clue, and then the right eye. The clues are:

HORIZONTAL GAZE NYSTAGMUS

	N	Y	hard	soft
Contact Lenses?	☐	☐	☐	☐
Equal Tracking?	☐	☐		
Equal Pupil Size?	☐	☐		

	LEFT	RIGHT
1. Lack of smooth pursuit?	☐	☐
2. Distinct nystagmus at maximum deviation?	☐	☐
3. Onset prior to 45 deg.?	☐	☐

NOTES:_____

- LACK OF SMOOTH PURSUIT – The officer moves the object slowly but steadily from the center of the subject's face towards the left ear. The left eye should smoothly follow the object, but if the eye exhibits nystagmus, the officer notes the clue. The officer then checks the right eye. (See Appendix B, Picture 2.)
- DISTINCT NYSTAGMUS AT MAXIMUM DEVIATION – Starting again from the center of the suspect's face, the officer moves the object toward the left ear, bringing the eye as far over as possible, and holds the object there for four seconds. The officer notes the clue if there is a distinct and sustained nystagmus at this point. The officer holds the object at

maximum deviation for at least four seconds to ensure that quick movement of the object did not possibly cause the nystagmus.[44] The officer then checks the right eye. This is also referred to as "end-point" nystagmus. (See Appendix B, Picture 3.)

- ANGLE OF ONSET OF NYSTAGMUS PRIOR TO FORTY-FIVE DEGREES – The officer moves the object at a speed that would take about four seconds for the object to reach the edge of the suspect's left shoulder. The officer notes this clue if the point or angle at which the eye begins to display nystagmus is before the object reaches forty-five degrees from the center of the suspect's face. The officer then moves the object towards the suspect's right shoulder. For safety reasons, law enforcement officers usually use no apparatus to estimate the forty-five degree angle. Generally, forty-five degrees from center is at the point where the object is in front of the tip of the subject's shoulder. (See Appendix B, Picture 4.)

The officer also checks for vertical nystagmus. The officer checks for vertical nystagmus by raising the object several inches above the subject's eyes. Vertical nystagmus is not one of the HGN clues nor is it a part of the SFST battery. However, vertical nystagmus is a good indicator of high doses of alcohol, other central nervous system (CNS) depressants or inhalants, and the consumption of the drug phencyclidine (PCP). The officer should note the result and take precautions if vertical nystagmus is evident.

After the HGN test is complete, the officer will conduct the WAT test and the OLS test. Then the officer will make the decision to arrest, release or take other action, such as seeking medical assistance for the subject. The officer may use a preliminary breath test to determine the individual's alcohol level. Ultimately, if the officer follows all of these clear procedures, the

[44] This type of nystagmus is called "optokinetic nystagmus." *See infra* note 47 and accompanying text (describing optokinetic nystagmus).

HGN test will be instrumental in giving the officer the information needed to make an accurate arrest decision.

Defense attorneys who specialize in impaired driving cases know the SFST training manual as well as if not better than some law enforcement officers and many prosecutors, so any deviation from the manual, however slight, will be highlighted on cross examination, damaging the officer's, the prosecutor's and the HGN test's credibility.

Section IV: Other Types of Nystagmus

There exist several non-alcohol related types of nystagmus caused by neural or muscle activity. These other types are due to a variety of causes, such as other vestibular system (inner ear) and nervous system disturbances and pathological disorders. Many times defendants will suggest that the nystagmus the law enforcement officer saw was actually caused by something other than alcohol or other drugs. However, a properly trained law enforcement officer will not mistake other types of nystagmus, natural or otherwise, with HGN when taking into account all of the facts that contribute to the arrest decision.

Nystagmus Caused by Non-Alcohol Related Disturbance of the Vestibular System

Rotational nystagmus is caused by a disturbance in the inner ear fluid when a person spins around. The nystagmus lasts only as long as the person is being spun. If an observer could see a person's eyes while that person was spinning, a distinct jerking of the eye would be evident. *Post-rotational nystagmus* occurs after the person stops spinning. The nystagmus lasts for several seconds and can easily be seen.[45]

Caloric nystagmus is caused by the movement of the inner ear fluid due to a difference in temperature of the fluid between the left and right ear. One way this can occur is if warm water is

[45] John Leigh & David S. Zee, *The Neurology of Eye Movements*, ch. 9, "Diagnosis of Central Disorders of Ocular Motility," 192 (2nd ed. 1983).

poured in one ear and cold water is poured in the other.[46] Obviously this is an implausible scenario at roadside.

Nystagmus Caused by Neural Activity

Some types of nystagmus are caused by neural or muscle activity. *Optokinetic nystagmus* occurs when the eyes fixate on an object that moves quickly out of sight or passes quickly through the field of vision, such as occurs when a subject watches utility poles pass by while in a moving car. Optokinetic nystagmus also occurs when the eyes watch an object displaying contrasting moving images, such as black and white spokes on a spinning wheel.[47] In either case, because the nystagmus is caused by the eye trying to catch up with the moving object, it lasts only as long as it takes for the object to stop moving, for the object to pass out of the field of vision, or for the eye to catch up to the object. *Epileptic nystagmus* is also a jerk nystagmus caused by neural activity that occurs primarily during epileptic or other types of seizures.[48]

In addition, some people will exhibit a slight eye tremor when the eye moves to maximum deviation. This tremor is due mostly to eye strain rather than to any type of alcohol impairment or medical condition. When the HGN test is administered properly, a law enforcement officer cannot confuse this eye tremor with HGN due to alcohol impairment for several reasons. First, the eye tremor lasts only briefly and law enforcement officers are taught to hold the eye at maximum deviation for at least four seconds to ensure that the jerking is sustained. Second, the officer is looking for a *distinct* nystagmus, not a *slight* eye tremor. And

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[46] Adams & Victor, *supra*, note 4, at 111. Note that caloric nystagmus does not occur when a person is seated in a heated car with the window open, allowing cold air into the vehicle.

[47] *Id.* There is research that has found that barbiturates suppress or eliminate optokinetic nystagmus while causing HGN. M.B. Bender & F.H. O'Brien, *The Influence of Barbiturate on Various Forms of Nystagmus*, 29 Am. J. Ophthalmology 1541, 1552 (1946).

[48] Peter W. Kaplan & Ronald Tusa, *Neurophysiologic and Clinical Correlations of Epileptic Nystagmus*, 43 Neurology 2508, 2513 (Dec. 1993).

finally, distinct nystagmus at maximum deviation is only one clue among the three the officer is looking for when checking for HGN.

Nystagmus Due to Pathological Disorders

Nystagmus may occur in people with brain damage, brain tumors or inner ear diseases. These disorders and others like them occur in a small number of the general population and even less often in drivers. Many of these alternative causes are so severe that it is unlikely that persons afflicted with the disorders would be driving, would not know they have the disorder or would be unaware of the effect the disorder has on their body. In addition, these types of nystagmus may be pendular rather than jerk nystagmus.

One claim of impaired drivers exhibiting HGN is that fatigue and not alcohol is the cause of their impairment. NHTSA studies show that fatigue has no significant effect on the manifestation of HGN.[49]

Natural Nystagmus

The defense may argue that the nystagmus the law enforcement officer detected was actually a naturally occurring nystagmus rather than the result of alcohol impairment or any of the conditions listed above. As outlined below, the differences between any type of naturally occurring nystagmus and HGN are many and a properly trained officer will have no trouble distinguishing between the two at roadside.

Research indicates that a very small number of people exhibit a visible natural nystagmus.[50] Those who have natural nystagmus generally know they have it and will most likely tell the officer before the test is administered. Visible natural nystagmus is evident only at particular angles of gaze, but not before or beyond that point.[51] However, when administering the

[49] *1981 NHTSA Study, supra* note 16, at 10-11.
[50] *Id.* at 9; Forkiotis, *supra* note 5, at 11.
[51] Forkiotis, *supra* note 5, at 11.

HGN test, the law enforcement officer is looking for not only nystagmus at a particular angle of gaze, but smooth pursuit and end-point nystagmus as well. Furthermore, in making the ultimate decision of whether the subject is impaired, the law enforcement officer is continually taking into account other facts, such as the subject's performance on the other SFSTs, that suggest the subject is impaired by alcohol or other drugs. The law enforcement officer will never base an arrest decision solely on the results of the HGN test.

Physiological Nystagmus

Physiological nystagmus exists in every person's eye in order to keep the eye from tiring when fixated on one point. This nystagmus occurs so that light entering the eye will continually fall on non-fatigued cells of the retina. Physiological nystagmus cannot be seen with the naked eye and is controlled by a part of the brain system other than that affected by alcohol impairment. Because the officer can easily see HGN caused by alcohol with the naked eye, there is virtually no chance that a law enforcement officer could confuse physiological nystagmus with HGN.

The HGN test is designed to check the eyes for one type of nystagmus – horizontal gaze nystagmus. Its results are not invalidated by virtue of the fact that other types or causes of nystagmus exist. As shown above, the various types of nystagmus manifest themselves in different ways. Law enforcement officers will not confuse HGN with any other type of nystagmus if the HGN test is conducted correctly. Research shows that the HGN test is a valid and reliable indicator of alcohol impairment and is the most effective roadside test for impaired drivers.

Although HGN is the most effective and reliable field sobriety test, do not allow the trial to turn into a referendum on HGN. The HGN test is only one of many pieces of evidence that the prosecution has available to prove that the defendant was impaired.

THE LAW

Section V: HGN in the Courtroom

HGN finds its way into the courtroom as one of the SFSTs. Besides chemical blood and breath tests, the HGN test is the best evidence that the defendant ingested alcohol.[52] However, the HGN test provides the best evidence only if the factfinder (either the judge or jury) understands that the test result correlates with a degree of impairment.

There are several issues that may affect the admissibility of HGN test results:

1. Whether the HGN test is characterized as scientific or as simply an observation of a physical trait;
2. If HGN is deemed scientific, whether it is reliable;
3. Whether the law enforcement officer is properly trained to administer the HGN test;
4. Whether the officer properly administered the test in the particular case; and
5. The purpose for which the HGN test result will be used.

Observation of a Physical Characteristic or Scientific Test

Jurisdictions treat the HGN test in one of two ways: (1) as an observation of a physical characteristic like other SFSTs or (2) as scientific evidence. Where there is no precedent, the prosecutor may advocate that the results of the HGN test are not scientific evidence, "extracted from empirical testing conclusions,"[53] but rather observations by the law enforcement officer of a physical characteristic of a subject.

Determination of HGN as Observation of a Physical Characteristic

When at all possible, the prosecution should convey to the trial court that the HGN test is

[52] *See supra* notes 30 - 36 and accompanying text (detailing the accuracy of the HGN test).
[53] *United States v.Everett*, 972 F. Supp. 1313, 1319 (D.Nev. 1997)(emphasis added).

a method for the law enforcement officer to observe a physical characteristic of the subject, i.e., an involuntary jerking of the eyeballs. This position is preferable for the prosecution because it focuses on the law enforcement officer's ability to observe a suspect's physical characteristics, and to interpret those characteristics on the basis of the officer's training and experience. Some state courts have taken this position and held that the HGN test is similar to the other two SFSTs in that HGN is a physical manifestation of alcohol impairment, like a staggering gait, that can be readily observed by a law enforcement officer.[54] These state courts found that the HGN test is "objective in nature and does not require expert interpretation," just like the WAT and OLS tests.[55] These courts also distinguish the HGN test from scientific tests, like polygraph tests, in that the HGN test does not require a measuring or recording instrument.[56]

To qualify HGN evidence as a physical observation, the prosecution should show that the HGN test operates on the same physiological principles as the other SFSTs, i.e. alcohol impairs muscle control. The only foundation required is a showing of the officer's training and experience in administering the test, and a showing that the test was in fact properly administered.[57] The law enforcement officer must establish his or her proficiency in conducting the test in order to make the correct observations. To do this, the law enforcement officer testifies about his or her training and experience with the HGN test (e.g., When and where trained? How many classroom hours? Did the officer perform the test on sober and impaired subjects in the classroom and how many times? How many times has the officer given the HGN test in the field?). The officer must also testify that the HGN test was properly administered in

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[54] *See id.* at 158; *City of Fargo v. McLaughlin*, 512 N.W.2d 700, 706 (N.D. 1994); *State v. Nagel*, 506 N.E.2d 285, 286 (Ohio Ct. App. 1986); *State v. Sullivan*, 426 S.E.2d 766, 769 (S.C. 1993); *Salt Lake City v. Garcia*, 912 P.2d 997, 1000 (Utah Ct. App. 1996); *State v. Peters*, 419 N.W.2d 575, 578 (Wis. Ct. App. 1987). While numerically this is a minority, in cases where the HGN test is accepted as scientific evidence, it was offered as such.
[55] *See, e.g., Murphy,* 451 N.W.2d 154, 157 (Iowa 1990); *Nagel,* 506 N.E. 2d at 286.
[56] *See, e.g., McLaughlin*, 512 N.W.2d at 707; *Nagel*, 506 N.E.2d at 286.
[57] *City of Fargo v. McLaughlin*, 512 N.W.2d 700, 708 (N.D. 1994).

accordance with his or her training. In other words, the prosecutor lays the same foundation as if the law enforcement officer was testifying about the WAT or OLS. With that foundation, the HGN test results are admissible as evidence of impairment. The prosecutor may also argue that it is common knowledge that alcohol affects muscle control based on the physical observations of the suspect.

While no expert testimony is needed to get the HGN test admitted into evidence at trial, as a practical matter, some demonstration to the fact finder of the HGN test's reliability as an indicator of impairment may be needed. When the HGN test is admitted as a physical observation, the law enforcement officer can establish this reliability. The officer would explain that, based on the officer's training and experience in the interpretation and administration of the HGN test to impaired subjects, the officer can accurately identify that a subject is impaired when he or she performs unsatisfactorily on the HGN test.[58] For example, the officer may testify that he or she has observed people impaired by alcohol on many occasions and in various settings, and has noted a strong correlation between alcohol consumption and HGN.[59] To be persuasive to the fact finder, at trial the officer should take the opportunity to communicate evidence of the HGN test's reliability. Otherwise, the significance of the HGN test as the most reliable of SFST of alcohol impairment will be lost.

Determination of HGN as a Scientific Test

The majority of state courts hold that the HGN test is a scientific test, resting upon the scientific principle that there is a relationship between alcohol consumption and HGN rather than

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[58] *See Garcia*, 912 P.2d at 1001.
[59] *Id.*

it being simply an observation or common knowledge.[60] (See Appendix C for a chart summary and Appendix D for a textual summary of each state's HGN case law.) In jurisdictions with no appellate decisions on HGN test evidence, trial courts must make the determination of whether the HGN test meets certain evidentiary standards and the trier of fact must accept the test. Initially, the trial court has the role of "gatekeeper."[61]

> In performing its role as "gatekeeper," the trial court ensures that the trier of fact does not attach an undue aura of reliability to "scientific" evidence that is not scientifically valid. Evidence that purports to be based on science beyond the common knowledge of the average person that does not meet the judicial standard for scientific validity can mislead, confuse, and mystify the jury.[62]

Procedurally, the trial court may perform this "gatekeeper" role by holding an evidentiary hearing.[63] At that hearing, it is within the discretion of the trial court to determine what scientific evidence the jury will hear.

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[60] *State v. Witte*, 836 P.2d 1110, 1121 (Kan. 1992). *See also Malone v. City of Silverhill*, 575 So.2d 106, 107 (Ala. 1990); *State v. Superior Court (Blake),* 718 P.2d 171, 178 (Ariz. 1986); *People v. Joehnk*, 35 Cal. App. 4th 1488, 1507-08, 42 Cal. Rptr. 2d 6, 38 (Cal. Ct. App. 1995); *State v. Ruthardt*, 680 A.2d 349, 356 (Del. Super. Ct. 1996); *State v. Meador*, 674 So. 2d 826, 834 (Fla. Dist. Ct. App. 1996); *Manley v. State*, 424 S.E.2d 818, 819 (Ga. Ct. App. 1992); *State v. Garrett*, 811 P.2d 488, 490 (Idaho 1991); *People v. Buening*, 592 N.E.2d 1222, 1227 (Ill. App. Ct. 1992); *State v. Armstrong*, 561 So. 2d. 883, 887 (La. Ct. App. 1990); *Schultz v. State*, 664 A.2d 60, 62 (Md. Ct. Spec. App. 1995); *State v. Berger*, 551 N.W.2d 421, 424 (Mich. Ct. App. 1996); *State v. Klawitter*, 518 N.W.2d 577, 584 (Minn. 1994); *Young v. City of Brookhaven*, 693 So.2d 1355, 1360-61 (Miss. 1997); *State v. Hill*, 865 S.W.2d 702, 703 (Mo. Ct. App. 1993), *rev'd on other grounds*, *State v. Carson*, 941 S.W.2d 518, 520 (Mo. 1997); *State v. Clark*, 762 P.2d 853, 856 (Mont. 1988); *State v. Borchardt*, 395 N.W.2d 551, 556 (Neb. 1986); *State v. Torres*, 1999 N.M. Lexis 55 (N.M. 1999); *People v. Quinn*, 580 N.Y.S.2d 818, 826 (Dist. Ct. 1991), *rev'd on other grounds*, 607 N.Y.S.2d 534 (App. Div. 1993); *State v. Helms*, 490 S.E.2d 565 (N.C. 1997); *Yell v. State*, 856 P.2d 996 (Okla. Crim. App. 1993); *State v. O'Key*, 899 P.2d 663, 670 (Or. 1995); *Commonwealth v. Miller,* 532 A.2d 1186, 1188 (Pa. Super. 1987); *State v. Murphy*, 953 S.W.2d 200 (1997); *Emerson v. State*, 880 S.W.2d 759, 763 (Tex. Crim. App. 1994); *State v. Cissne*, 865 P.2d 564, 569 (Wash. Ct. App. 1994); *State v. Barker*, 366 S.E.2d 642, 644-45 (W. Va. 1988).

[61] *Daubert v. Merrell Dow Pharmaceuticals, Inc.,* 509 U.S. 579, 588 (1993). *See also Kumho Tire Co. v. Carmichael*, 119 S. Ct. 1167 (1999).

[62] *O'Key*, 899 P.2d at 678 n.20.

[63] *See infra* notes 96-97and accompanying text (discussing the evidence presented in an evidentiary hearing for HGN).

The two most common evidentiary standards for scientific evidence are (1) the *Frye* standard and (2) the Federal Rules of Evidence (FRE) or *Daubert* standard. Which standard a court applies depends on the law of the individual jurisdiction. The primary purpose of each of these standards is to ensure that the evidence is reliable and not junk science. The principal difference between them is how each measures that reliability.

Frye Standard

In 1923, the Court of Appeals for the District of Columbia held in *Frye v. United States*[64] that for new or novel scientific evidence to be admissible, it must "have gained general acceptance in the particular field in which it belongs." This standard came to be known as the *Frye* standard.[65] Technically there are two prongs to the *Frye* standard:

1. identifying the "particular field" or relevant scientific community; and
2. demonstrating that novel scientific evidence (such as the HGN test) is generally accepted in that community.

Combined, both prongs provided a measure of the reliability of the scientific evidence.[66]

In 1986 in the seminal case of *State v. Superior Court (Blake)*, the Arizona Supreme Court examined which fields of science constituted the relevant scientific community required by *Frye* before determining that the HGN test was generally accepted in that community. The court first found that "the work of highway safety professionals and behavioral psychologists who study effects of alcohol on behavior is directly affected by the claims and application of the HGN

[64] 293 F. 1013 (D.C. Cir. 1923). In *Frye*, the Court of Appeals affirmed a lower court ruling excluding the results of a polygraph test offered by a defendant charged with second-degree murder. *Id.* at 1013-14.
[65] *Id.* at 1014.
[66] *See State v. Merritt*, 647 A.2d 1021, 1024 n.3 (Conn. App. Ct. 1994); *State v. Witte*, 836 P.2d 1110, 1117 (Kan. 1992).

test, so that both these groups must be included in the relevant scientific community."[67] The court also found that the relevant scientific community should include the fields of neurology and criminalistics, but to a lesser extent because neither of those fields focus specifically on HGN and alcohol.[68] Other courts have agreed with the *State v. Superior Court (Blake)*'s conclusions.[69]

One or more witnesses must be called regarding general acceptance in the relevant community. Before any witness can testify about general acceptance, however, the court must qualify the witness as an expert. There is no bright line test under *Frye* governing when a court must qualify a witness as an expert. The expert must impart to the jury knowledge within the scope of the expert's special skill and experience that is otherwise unavailable to the jury from other sources.[70] Courts measure the quality of the witness's special skill and experience in terms of years of study and work experience, degrees and other accolades received, research performed and publications written, among other things. How to use witnesses to prove general acceptance of the HGN test in these communities is addressed below.

It is important to point out that although evidence may rest on scientific principles, *Frye* only applies to scientific evidence that is "new or novel." At least one state court that applied a relevancy standard for determining the admissibility of scientific evidence found that the HGN test was not novel for the purpose of showing some indication of alcohol.[71] The court admitted the HGN test in conjunction with the results of the other SFSTs. This is a minority position, however.

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[67] *State v. Superior Court (Blake),* 718 P.2d 171, 180 (Ariz. 1986).
[68] *See id.*
[69] *See also People v. Joehnk*, 35 Cal. App. 4th 1488, 1507, 42 Cal. Rptr. 2d 6, 17 (1995); *State v. O'Key*, 899 P.2d 663, 685-86 (Or. 1995).
[70] *United States v. Jackson*, 425 F.2d 574, 576 (D.C. Cir. 1970); *State v. Tran*, 847 P.2d 680, 686 (Kan. 1993).
[71] *Whitson v. State*, 863 S.W.2d 794, 798 (Ark. 1993).

In recent years courts and commentators alike have criticized the *Frye* standard as being too likely to exclude relevant evidence, too difficult to apply, too vague and undefinable.[72] Some courts have rejected *Frye* altogether to allow in more relevant evidence.[73] However, in those states that still adhere to it, the *Frye* standard remains essentially unchanged.

Federal Rules of Evidence or *Daubert* Standard

In 1993, the United States Supreme Court held in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*[74] that the Federal Rules of Evidence (FRE), specifically Rule 702, replaced the common law *Frye* standard as the evidentiary basis for admitting scientific evidence[75] in federal courts.[76] The Supreme Court found that Rule 702 does not incorporate the general acceptance requirement of the *Frye* standard, as a prerequisite for the admission of expert scientific testimony.[77] The result is a more liberal standard, which allows the factfinder to hear scientific evidence conditioned upon testimony indicating that the evidence to be admitted is both relevant to the issues involved at trial and reliable.

As with the *Frye* standard, a trial court using the FRE standard must qualify a witness to testify about the evidence at issue. Similar to the *Frye* standard, under the FRE standard a witness may testify about scientific or technical evidence based on "knowledge, skill, experience, training, or education" if this "will assist the trier of fact to understand the evidence or to

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[72] *E.g.* Paul C. Gianelli, *The Admissibility of Novel Scientific Evidence: Frye v. United States, a Half-Century Later*, 80 Colum. L. Rev. 1197, 1223-28 (1980).
[73] *See infra* notes 75 - 81 and accompanying text (discussing the *Daubert* alternative to the *Frye* test).
[74] 509 U.S. 579 (1993). In *Daubert*, the Supreme Court ruled that the plaintiffs, children born with birth defects, could introduce expert testimony on the issue that the defendant's product, Bendectin, caused the birth defects even though the expert's theory of causation was not generally accepted in the relevant scientific community. *Id.* at 598.
[75] Fed. R. Evid. 702. Rule 702 states:

> Testimony by Experts – If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

[76] *Daubert*, 509 U.S. at 592.
[77] *Id.*

determine a fact in issue…."[78] If the witness satisfies these requirements, the prosecution can refer to the witness as an expert on the evidence. Unlike the *Frye* standard, however, the court does not make a specific determination of the relevant scientific community under the FRE standard. Instead, the court incorporates that determination into its decision of whether the testimony to be offered is scientific knowledge that will assist the trier of fact in understanding the evidence or issue.

FRE and Frye jurisdictions look at the same measures of expertise to qualify experts, i.e., years of study and work experience, degrees and other accolades received, research performed and publications written. Keep in mind that even though a court may qualify a witness as an expert, the defense is still free to attack the witness's qualifications and damage the witness's credibility as an "expert."

As part of its assessment of whether the evidence should be admitted, the trial court must assess whether the reasoning or methodology underlying the testimony is scientifically valid and whether the reasoning or methodology can be applied to the facts in issue. The *Daubert* Court did not endorse any one method of determining the reliability of scientific evidence under the FRE.[79] However, the Court did suggest several factors which, among others, may be relevant in this determination. The first is whether the theory or technique applied "can be (and has been) tested."[80] The second is whether the theory or technique has been published and subjected to peer review.[81] The third is whether there is a "known or potential rate of error" and whether there are standards to control the operation of the technique.[82] Finally, the Court stated that *Frye*'s "general acceptance in the scientific community" standard is still a consideration, but relegated it

[78] *Id.*
[79] *Id.* at 593; *State v. O'Key*, 899 P.2d 663, 678 (Or. 1995).
[80] *Daubert*, 509 U.S. at 593.
[81] *Id.* at 594.
[82] *Id.*

to one factor among many to consider in determining the reliability of a scientific theory or technique.[83]

Keep in mind that a court's "new or novel" determination is a threshold question only in states using the *Frye* standard.[84] It is not a requirement in the FRE standard.[85] In *Daubert* the Supreme Court explained that:

> Although the *Frye* decision itself focused exclusively on "novel" scientific techniques, we do not read the requirements of Rule 702 to apply specially or exclusively to unconventional evidence. Of course, well-established propositions are less likely to be challenged than those that are novel, and they are more handily defended. Indeed, theories that are so firmly established as to have attained the status of scientific law, such as the laws of thermodynamics, properly are subject to judicial notice under Fed. Rule Evid. 201.[86]

Considering this language, courts may find that scientific evidence that is not "new or novel" already comes with a large degree of reliability, so that no further inquiry is needed. However, some FRE states have taken the *Frye* standard's "new or novel" requirement to determine whether to apply *Daubert*.[87]

The Supreme Court in *Daubert* clearly indicated that the FRE standard applies only to federal trials involving scientific evidence, and did not preempt the states from following the standard they choose.[88] In *Kumho Tire Co. v. Carmichael*, the Court extended *Daubert's*

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[83] *Id. See also State v. Pennell*, 584 A.2d 513, 515 (Del. Super. Ct. 1989); *O'Key*, 899 P.2d at 679; *Commonwealth v. Sands*, 675 N.E.2d 370, 373 (Mass. 1997).
[84] *See supra* notes 64 - 73 and accompanying text (describing the *Frye* standard).
[85] *See supra* note 75 and accompanying text (describing the Federal Rules of Evidence Standard).
[86] *Daubert*, 509 U.S. at 593.
[87] *Prater*, 820 S.W.2d 429, 433 (Ark. 1991); *State v. Pennell*, 584 A.2d 513, 515 (Del. Super. Ct. 1989).
[88] *Daubert*, 509 U.S. at 587.

"gatekeeping" obligation to all expert testimony.[89] Most states that did not adopt the FRE continue to follow the *Frye* standard.[90] Many of the states that adopted the FRE follow the *Daubert* rationale.[91] Other FRE states disagree with the *Daubert* rationale and continue to follow the *Frye* standard.[92] Still other states, regardless of whether they adopted the FRE or not, have established their own scientific standards.[93] (See Appendix E for chart summarizing the scientific standards for each state.)

Meeting the Scientific Standard of the Jurisdiction

To date the courts have determined that HGN evidence does meet *Frye* and is, therefore, admissible at trial; with one exception.[94] Some courts have held that the prosecution failed to

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[89] *Kumho Tire Co. v. Carmichael*, 119 S. Ct. 1167 (1999).

[90] *People v. Leahy*, 882 P.2d 321 (Cal. 1994); *Jones v. United States*, 548 A.2d 35 (D.C. App. 1988); *Smith v. Deppish*, 807 P.2d 144 (Kan. 1991); *People v. Hughes*, 453 N.E.2d 484 (N.Y. 1983); *Commonwealth v. Zook*, 615 A.2d 1 (Pa. 1992).

[91] *State v. Coon*, 1999 Alas. Lexis 28 (Alaska 1999); *State v. Prater*, 820 S.W.2d 429 (Ark. 1991); *State v. Pennell*, 584 A.2d 513 (Del. Super. Ct. 1989); *State v. Crea*, 806 P.2d 445 (Idaho 1991); *Steward v. State*, 652 N.E.2d 490 (Ind. 1995); *State v. Hall*, 297 N.W.2d 80 (Iowa 1980); *Cecil v. Commonwealth*, 888 S.W.2d 669 (Ky. 1994); *State v. Foret*, 628 So.2d 1116 (La. 1993); *State v. Williams*, 388 A.2d 500 (Me. 1978); *Commonwealth v. Lanigan*, 641 N.E.2d 1342 (Mass. 1994); *State v. Clark*, 762 P.2d 853 (Mont. 1988); *Santillanes v. States*, 765 P.2d 1147 (Nev. 1988); *State v. Alberico*, 861 P.2d 192 (N.M. 1993); *State v. Pennington*, 393 S.E.2d 847 (N.C. 1990); *State v. Williams*, 446 N.E.2d 444 (Ohio 1983); *Taylor v. State,* 889 P.2d 319 (Okla. Crim. App. 1995); *State v. Brown*, 687 P.2d 751 (Or. 1984); *State v. Wheeler*, 496 A.2d 1382 (R.I. 1985); *State v. Hofer*, 512 N.W.2d 482 (S.D. 1994); *State v. Johnson*, 717 S.W.2d 298 (Tenn. Crim. App. 1986); *Kelly v. State*, 824 S.W.2d 568 (Tex. Crim. App. 1992); *State v. Crosby*, 927 P.2d 638 (Utah 1996); *State v. Brooks*; 643 A.2d 226 (Vt. 1993); *State v. Woodall*, 385 S.E.2d 253 (W. Va. 1989); *State v. Walstad*, 351 N.W.2d 469 (Wis. 1984); *Rivera v. State*, 840 P.2d 933 (Wyo. 1992).

[92] *State v. Bible*, 858 P.2d 1152 (Ariz. 1993); *Fishback v. People*, 851 P.2d 884 (Colo. 1993); *Flanagan v. State*, 625 So.2d 827 (Fla. 1993); *State v. Montalbo*, 828 P.2d 1274 (Hawaii 1992); *People v. Baynes*, 430 N.E.2d 1070 (Ill. 1981); *Reed v. State*, 391 A.2d 364 (Md. 1978); *People v. Young*, 340 N.W.2d 805 (Mich. 1983); *State v. Jobe*, 486 N.W.2d 407 (Minn. 1992); *Polk v. State*, 612 So.2d 381 (Miss. 1991); *State v. Davis*, 814 S.W.2d 593 (Mo. 1991); *State v. Reynolds*, 457 N.W.2d 405 (Neb. 1990); *State v. Vandebogart*, 616 A.2d 483 (N.H. 1992); *State v. Spann*, 617 A.2d 247 (N.J. 1993); *State v. Brown*, 337 N.W.2d 138 (N.D. 1983); *State v. Martin*, 684 P.2d 651 (Wash. 1984).

[93] *State v. Porter*, 698 A.2d 739 (Conn. 1997) (creating a standard based on *Daubert* and emphasizing scientific validity); *Harper v. State*, 292 S.E.2d 389 (Ga. 1982) (creating a standard even more liberal than the FRE); *State v. Ford*, 392 S.E.2d 781 (S.C. 1990) (creating a less restrictive standard than the *Frye* standard but different from the FRE, which the state has adopted); *O'Dell v. Commonwealth*, 364 S.E.2d 491 (Va. 1988) (adopting a standard that focuses on reliability).

[94] *Young v. City of Brookhaven,* 693 So.2d 1355, 1358 (Miss. 1997). The court did allow law enforcement to use HGN test evidence for probable cause determinations. *Id.* at 1360.

present sufficient evidence for the trial court to make findings as to the scientific reliability of the HGN test.[95] In these cases, the prosecution generally relied solely on the testimony of the arresting officer to establish the reliability of the HGN test.

To demonstrate that the HGN test meets the scientific standard of the jurisdiction, a prosecutor can ask that the trial court take judicial notice of the validity and reliability of the HGN test as found in case law from other jurisdictions.[96] This allows the prosecution and the defendant to avoid the cost of expert testimony. If required, the prosecutor will present evidence at an evidentiary hearing. There are two types of evidence the prosecution should use: expert testimony and scientific studies. The prosecution should use both types of evidence to show that the HGN test is valid, reliable, and meets the appropriate scientific standard. Moreover, more than half of the states have admitted HGN test results either to establish probable cause in a criminal case or as substantive evidence of intoxication. The prosecution should also make these cases available to the trial court. (See Appendix C.)

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[95] *See, e.g., State v. Armstrong*, 561 So.2d 883, 885 (La. Ct. App. 1990). The admissibility of the HGN test in the courts of California, a *Frye* state, is a good example of the effectiveness of expert testimony and existing literature about the HGN test. In *People v. Loomis*, 156 Cal. App. 3d Supp. 1, 7, 203 Cal. Rptr. 767, 771 (1984), the appellate court reversed a defendant's conviction on two grounds. First, the state failed to lay the proper foundation to establish the scientific reliability of the HGN test. The police officer and no experts testified. Second, the police officer attempted to quantify the defendant's BAC. *Id.* at 8, 203 Cal. Rptr. at 773. In *People v. Leahy*, 882 P.2d 321, 34 Cal. Rptr. 2d 663 (Cal. 1994), the state relied solely on the police officer and again the court reversed the conviction for failure to establish the scientific reliability of the HGN test. *Id.* at 323, 34 Cal. Rptr. 2d at 665. The court finally admitted HGN test results in *People v. Joehnk*, 35 Cal. App. 4th 1488, 42 Cal. Rptr. 2d 6 (1995). In that case, the state presented three experts who testified about the acceptance of the HGN test in relevant scientific communities, as well as studies to show its reliability. *Compare State v. Reed*, 732 P.2d 66, 69 (Or. Ct. App. 1987) (rejecting HGN when state presented arresting police officer's testimony only) *with State v. O'Key*, 899 P.2d 663, 682 n.34 (Or. 1995) (admitting HGN when state presented testimony of four experts and arresting police officer).

[96] *See Hawkins v. State*, 476 S.E.2d 803, 808-09 (Ga. Ct. App. 1996) (court judicially noticed that HGN test is a reliable scientific test); *People v. Buening,* 592 N.E.2d 1222, 1227 (Ill. App. Ct. 1992) (judicially noticing decisions of other courts to hold that HGN test meets the *Frye* standard); *State v. Taylor*, 694 A.2d 907, 912 (Me. 1997) (court took judicial notice of the reliability of the HGN test to detect impaired drivers); *Schultz v. State*, 664 A.2d 60, 74 (Md. Ct. Spec. App. 1995) (holding that the HGN test is a reliable indicator of alcohol impairment and of its acceptance in the relevant scientific community). *But see People v. Kirk*, 681 N.E.2d 1073, 1077 (Ill. App. Ct. 1997) (criticizing the court in *People v. Buening, supra*, for judicially noticing decisions of other courts); *State v. Helms,* 490 S.E.2d 565, 568 (N.C. Ct. App. 1997) (declining to take judicial notice of the HGN test's reliability based on the record before it); *State v. Cissne*, 865 P.2d 564, 569 (Wash. Ct. App. 1994) (same).

Although a minority of courts have been willing to take judicial notice of the HGN test's reliability, the better and safer practice may be to move for an evidentiary hearing. Do not wait for the defense to file a motion challenging the admissibility of the test results.

HGN at the Evidentiary Hearing

Scientific Studies and Case Law

Initially, a prosecutor should comply with the requirements of the local jurisdiction such as, filing a motion requesting an evidentiary hearing and asking the court to set a briefing schedule. In addition, the prosecution should file a memorandum of points and authorities prior to the hearing with sufficient opportunity for the court to become familiar with the scientific literature on HGN and its use as a field sobriety test.

Appellate courts will not consider new issues or evidence on appeal that the prosecution did not present to the trial court. Make sure that all evidence is admitted and preserved for the record.

Provide the original studies conducted for NHTSA by the SCRI and subsequent validation studies to the court. In addition, append articles from the scientific literature. It is helpful to include scientific literature from disciplines other than law enforcement, particularly when arguing for admissibility under *Frye* to establish general acceptance. (See Appendix F for a bibliography of studies and articles on HGN and related topics.)

The most important studies regarding the validity and reliability of HGN are the three original NHTSA studies establishing the SFST battery. At a minimum these studies should be provided to the court. Subsequent validation studies, such as the Colorado validation study conducted in 1995 by SCRI, should also be included. Also, scientific articles on HGN and other types of nystagmus are helpful in explaining and defining scientific terms. Contact the National Traffic Law Center for copies of many of the studies and articles listed in Appendix F.

Although courts have found law enforcement to be part of the relevant scientific community under existing case law, the court is more likely to accept HGN if the prosecution can show a wider acceptance.

Frye requires the proponent of the evidence to prove general acceptance in the relevant scientific community. In *Daubert*, the Court stated in dicta that evidence that satisfied *Frye* would also satisfy the requirements of FRE 702.[97] Therefore, cases that hold that the HGN test is scientifically reliable under *Frye* are relevant to an inquiry under the FRE or other state standard. However, cases decided under a different standard may be irrelevant to prove reliability under *Frye*.

Defendants often file motions to suppress the HGN test results with cites to secondary authorities criticizing the HGN test. Usually these cites are to defense-oriented journals or manuals written by attorneys, not to scientific articles. The prosecution should cite primary authority, such as the NHTSA studies or medical journals. Do not cite to articles written by attorneys, either defense or prosecution.

Expert Witnesses

The purpose for calling expert witnesses is to establish that:

1. there is a correlation between alcohol impairment and HGN;
2. the HGN test is a valid test for alcohol impairment;
3. the test is reliable;
4. a police officer can be trained to accurately administer and interpret the test results;
5. officers are unlikely to mistake alcohol-induced nystagmus for other forms of nystagmus.

Regardless of the scientific standard at issue, if an expert is required, the officer who administered the test will rarely be qualified to testify about the relation of alcohol to nystagmus (except for his or her observations), comment on the NHTSA studies or the scientific literature,

[97] *See Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 587 (1993).

or establish general acceptance or the relevant scientific community.[98] At the evidentiary hearing, the court will confine the officer's testimony to training and experience in administering the test, administration of the test to the defendant, and the defendant's test results. The court should allow the officer to testify that he or she has administered the test to impaired and unimpaired persons and identify the differences in the test results. In the context of this discussion, since the court has not yet deemed HGN admissible, the decision to arrest the defendant is largely irrelevant at this point. See (Appendix H for predicate questions for the arresting/SFST officer.)

The scientific standard at issue will largely determine the type(s) of expert(s) the prosecution will call. There is no magic number of experts nor is there a particular type or combination of experts the prosecution must use. The following examples are based on cases in which the HGN test was subjected to an evidentiary hearing.

Dr. Marcelline Burns, a research psychologist and Director of the Southern California Research Institute, often testifies on challenges to the HGN test. The SCRI conducted the original research for NHTSA to identify the most effective field sobriety tests. Further testing by SCRI resulted in the selection of the HGN test as one of the SFSTs. Dr. Burns continues to be involved in additional validation studies on the merits of the HGN test.

Dr. Burns' field of study is the effects of alcohol and drugs on behavior and performance. A witness such as Dr. Burns can establish the scientific validity of the HGN test, its selection as one of the SFSTs and its reliability. It is helpful for the witness to testify as to the ability of police officers to effectively use and interpret HGN test results. The testimony of a professional

[98] *See Leahy*, 882 P.2d at 323, 34 Cal. Rptr. 2d at 665 (1994). *But see State v. Ruthardt*, 680 A.2d 349, 361-62 (Del. Super. Ct. 1996) (holding that a police officer may be qualified to testify about the underlying scientific principles that correlate HGN with alcohol).

within the scientific research field is also important in establishing the relevant scientific community. (See Appendix I for predicate questions at an evidentiary hearing and at trial.)

Although not essential, often the prosecution's case is advanced by testimony of a medical expert. This is particularly important in a *Frye* jurisdiction to establish general acceptance. The prosecution can call an expert from any number of professions to testify regarding the reliability of HGN as a test for alcohol impairment. For example, an optometrist, ophthalmologist, neurologist, emergency room or urgent care physician may all be qualified to discuss the effect of alcohol on eye movements. The expert should be able to distinguish alcohol-induced nystagmus from other types of nystagmus, including natural nystagmus. The expert should also have an opinion about whether an officer can be trained to administer and interpret HGN results. Other experts the prosecution may call are toxicologists or pharmacologists. These individuals often have expertise in the effects of alcohol on the human body.

The American Optometric Association has passed a resolution endorsing the HGN test as an effective test for alcohol impairment. If using an optometrist as a witness, have a copy of the resolution available. It will enhance the credibility of your witness. The resolution will also tend to diminish the credibility of a defense optometrist who opposes HGN. (See Appendix G for a copy of the American Optometric Association's resolution).

It may be important to have a witness from the law enforcement community. This expert should have special expertise in the use of the HGN test. Typically this witness would be an instructor in the SFSTs or a Drug Recognition Expert who has received specialized training in detecting impaired drivers. The officer should be able to testify about the training officers receive in administering the test and about the reliability of the test. Many officers maintain an HGN log where they record the results of the test and the actual chemical test results. This information is helpful to the court on the issue of reliability and an officer's ability to correctly administer and interpret the test results.

Not all medical professionals have studied the effects of alcohol on humans nor routinely encounter patients who are under the influence. An expert who has studied the effects of alcohol, who actually uses nystagmus testing and is familiar with the protocol specified for HGN in the standardized field sobriety testing manual is the best expert. It is beneficial if the expert has seen a law enforcement officer administer the test to impaired subjects. At a minimum, the expert should review the protocol and be able to give an opinion as to its validity as a test for alcohol impairment and whether a properly trained officer is capable of administering the test and interpreting the results. The expert should also be able to discuss acceptance of the HGN test in his or her particular field. The prosecutor and the expert witness must thoroughly prepare to ensure that the expert's testimony is clear, concise, and conveys to the factfinder the high degree of validity and reliability of the HGN test. (See the appendices for examples of predicate questions for various experts, including a SFST/DRE instructor (Appendix J), an optometrist (Appendix K), and an emergency room physician (Appendix L).)

In many jurisdictions a prosecutor's time is short and funding is limited. Gathering experts together to testify about HGN may not be feasible. However, in jurisdictions with no precedent, courts that deem the HGN test scientific will require expert testimony unless they are willing to take judicial notice of the HGN test's validity and reliability. Prosecutor's should make every effort to select a test case, secure the necessary funding and provide expert testimony required by the court to get the HGN test admitted in their state.

It is highly recommended that someone of similar background and experience to Dr. Burns be called as an expert in HGN test cases. Experts from other fields, such as ophthalmology or toxicology, can also be called to testify about the NHTSA studies and the validity and reliability of the HGN test. All experts:

1. *must read and be familiar with the NHTSA studies*; and
2. *should be trained in the use of the HGN test.*

Contact the National Traffic Law Center for more information about possible experts and funding options for expert witnesses.

HGN at Trial

In addition to meeting standards for admissibility, most jurisdictions require the prosecution to lay some foundation before the factfinder can hear the evidence. The foundation often consists of two parts: establishing a correlation between alcohol impairment and HGN, and the qualifications of the police officer that administered the test.

The prosecution may call the same types of experts who testified at the evidentiary hearing at trial to establish this correlation, although it is unnecessary for the prosecution to present the same extensive testimony at trial as may be presented at the evidentiary hearing. However, the evidence needs to be sufficient to persuade the trier of fact that a correlation exists between alcohol impairment and HGN and to withstand appellate review.

Once a state's highest court has found the HGN test reliable, it will generally be unnecessary to call expert witnesses at trial to establish the nexus between alcohol impairment and HGN. However, prosecutors may still want to consider using expert testimony. Often an expert can more readily convince the factfinder of the test's validity.

Unless the court qualified the law enforcement officer as an expert on HGN, the officer may not testify about the defendant's impairment in those jurisdictions that require expert testimony concerning the correlation between alcohol impairment and HGN at trial.[99] When an officer testifies about the other tests in the SFST battery, the officer can offer a lay opinion regarding the defendant's sobriety because of the common characteristics of impairment that require no specialized knowledge to understand.[100] However, where HGN is viewed as scientific evidence, the officer can only state the results of the test, not that they correlate with any degree of impairment.

[99] While a court rarely qualifies a law enforcement officer to give this type of testimony, there is nothing prohibiting an officer who is qualified to testify. *Ruthardt*, 680 A.2d 349, 361-62 (Del. Super. Ct. 1996).
[100] *People v. Williams,* 3 Cal. App. 4th 1326, 1332, 5 Cal. Rptr. 2d 130, 134 (1992).

Qualifying the officer to testify about the HGN test results is similar to qualifying the officer to testify about any other FST. The prosecutor should place particular emphasis on the officer's training and experience in administering the test. The officer should describe administering the test under controlled conditions to subjects who were not impaired and those who were and the differences the officer saw. The officer must also testify that the test was administered correctly in the case at trial.[101] For instance, a panel of the Georgia Court of Appeals found that the trial court was correct in permitting a police officer, who had received specialized training in DUI detection and had worked with a DUI task force for two years, to testify about the HGN test results.[102] The Montana Supreme Court found an officer qualified to testify about HGN test results. The Montana Law Enforcement Academy had certified the officer after completing the requisite number of training hours.[103] This training and experience, coupled with testimony that the officer administered the test properly, is enough foundation to enable the officer to testify about the results of the test.[104]

Purpose and Limits of HGN Test Results

Courts have allowed the prosecution to use HGN test results for several purposes. Although not specifically addressed in many jurisdictions, courts generally accept the HGN test as a basis for probable cause to arrest without showing that the test meets the applicable scientific standard.[105] Some states have addressed this issue in the context of administrative license

[101] *Schultz v. State*, 664 A.2d 60, 74 (Md. Ct. Spec. App. 1995) and cases cited therein.
[102] *Manley v. State*, 424 S.E.2d 818, 820 (Ga. Ct. App. 1992).
[103] *State v. Clark*, 762 P.2d 853, 857 (Mont. 1988).
[104] *Id. See also State v. Armstrong*, 561 So.2d 883, 887 (La. Ct. App. 1990); *State v. Bresson*, 554 N.E.2d 1330, 1335-36 (Ohio 1990).
[105] *State v. Grier*, 791 P.2d 627, 631 (Alaska Ct. App. 1990); *State v. Superior Court (Blake);* 718 P.2d 171, 178 (Ariz. 1986); *State v. Merritt*, 647 A.2d 1021, 1026 n.4 (Conn. App. Ct. 1994). *Cf. State v. Ruthardt*, 680 A.2d 349, 354 (Del. Super. Ct. 1996); *State v. O'Key*, 899 P.2d 663, 681 n.30 (Or. 1995).

revocation proceedings, where the standard of proof for revocation is also probable cause to arrest.[106]

Once the court accepts HGN as a reliable indicator of impairment, it is evidence of impairment.[107] Although the HGN test is an excellent indicator of impairment, the test results alone are not used to convince a jury that a defendant was impaired.[108] Combined with other evidence of impairment, such as erratic driving, odor of an alcoholic beverage, glassy or blood-shot eyes or unsatisfactory performance on other SFSTs, HGN is strong evidence of impairment.

The HGN test and other field sobriety tests do not test directly a subject's ability to drive a car. Instead, they measure the mental and physical skills necessary to drive a car safely, such as muscle control and divided attention.

Many law enforcement officers are so experienced in giving the HGN test that they can estimate very closely a person's BAC based on the results, especially by examining the angle of onset. Despite this ability, to date no court has allowed an officer to testify as to a specific BAC based on HGN because the HGN test is not a statutorily approved method of determining a subject's BAC and the angle of onset is estimated without a precise measuring device.[109] However, an expert can testify to the fact that research has verified the reliability of the HGN test in distinguishing between persons with a .10 BAC or higher and persons with a BAC lower than .10. Unless a law enforcement officer is qualified as such an expert, which is rare, the officer cannot testify to this fact.

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[106] *See, e.g., Muscatell v. Cline*, 474 S.E.2d 518, 525 (W.Va. 1996).
[107] *Whitson v. State*, 863 S.W.2d 794, 798 (Ark. 1993); *Sieveking v. State*, 469 S.E.2d 235, 236 (Ga. Ct. App. 1996); *Armstrong*, 561 So.2d at 887; *State v. Hill*, 865 S.W.2d 702, 704 (Mo. Ct. App. 1993), *rev'd on other grounds*; *State v. Carson*, 941 S.W.2d 518, 520 (Mo. 1997); *Bresson*, 554 N.E.2d at 1336.
[108] *See, e.g. State v. Garrett*, 811 P.2d 488, 491 (Idaho 1991) (stating "standing alone [an HGN test result] does not provide proof positive of DUI, because many other factors may cause nystagmus").
[109] *E.g., Middleton v. State*, 780 S.W.2d 581, 583-84 (Ark. Ct. App. 1989); *Howard v. State*, 744 S.W.2d 640, 641 (Tex. App. 1987).

CONCLUSION

Impaired driving detection and prosecution has improved since the initial 1977 NHTSA study, due in large part to the use of the SFST battery by law enforcement on the street and prosecutors in the courtroom. However, efforts to reduce impaired driving in many parts of the United States could not fully benefit from administering the SFST battery because of the exclusion of the HGN test from some impaired driving trials. The effectiveness of the SFST battery to curb impaired driving cannot be achieved to its full potential unless all of the three tests are utilized throughout the country.

To achieve further improvement, the HGN test should be administered by law enforcement in the field, introduced into evidence by prosecutors in the courtroom and accepted by judges as reliable. For this to happen, a basic understanding of both the science and the law behind the HGN test is needed. HGN is based on simple scientific principles and is readily understood. A considerable body of scientific evidence supports its validity and reliability. Once law enforcement personnel, prosecutors and judges understand HGN, they will realize how vital HGN evidence is in detecting, prosecuting and convicting impaired drivers.

GLOSSARY OF TERMS

alcohol gaze nystagmus (AGN) – Gaze nystagmus caused by the effects of alcohol upon the nervous system.

caloric nystagmus – A vestibular system nystagmus caused by differences in temperature between the ears, e.g., one ear is irrigated with warm water and the other irrigated with cold water.

epileptic nystagmus – Nystagmus evident during an epileptic seizure.

field sobriety test (FST) – Any number of tests used by law enforcement officers, usually on the roadside, to determine whether a driver is impaired. Most FSTs test balance, coordination and the ability of the driver to divide his or her attention among several tasks as once. Other tests, such as the horizontal gaze nystagmus test, are used to measure a subject's impairment level.

fixation – ability of the eye to focus on one point.

gaze nystagmus – Nystagmus that occurs when the eyes gaze or fixate upon an object or image. Usually caused by a disruption of the nervous system.

horizontal gaze nystagmus (HGN) – Gaze nystagmus that occurs when the eyes gaze or move to the side along a horizontal plane.

jerk nystagmus – Nystagmus where the eye drifts slowly away from a point of focus and then quickly corrects itself with a saccadic movement back to the point of focus.

National Highway Traffic Safety Administration (NHTSA) – The agency within the United States Department of Transportation that administers traffic safety programs. NHTSA's duties include funding studies on field sobriety tests and training law enforcement officers in the administration of the standardized field sobriety test battery.

natural nystagmus – Nystagmus that occurs without any apparent physiological, vestibular, or neurological disturbance. Natural nystagmus occurs in approximately 2%-4% of the population.

neurological nystagmus – Nystagmus caused by some disturbance in the nervous system.

nystagmus – An involuntary bouncing or jerking of the eye caused by any number of vestibular, neurological or physiological disturbances.

oculomotor – Movement of the eyeball.

one-leg-stand (OLS) test – One of the three tests that make up the standardized field sobriety test battery. This test requires a subject to stand on one leg, look at his or her foot and count out loud to thirty. The subject is assessed on the ability to understand and follow instructions as well as

the ability to maintain balance for thirty seconds.

optokinetic nystagmus – A nystagmus evident when an object that the eye fixates upon moves quickly out of sight or passes quickly through the field of vision, such as occurs when a subject watches utility poles pass by while in a moving car. Optokinetic nystagmus is also caused by watching alternating moving images, such as black and white spokes on a spinning wheel.

oscillate – to move back and forth at a constant rate between two points

pathological disorder – Disruptions of the normal functions of organs of the body due to disease, illness, or damage.

pendular nystagmus – Nystagmus where the eye oscillates or swings equally in two directions.

physiological nystagmus – A nystagmus that occurs so that light entering the eye will continually fall on non-fatigued cells on the retina. Physiological nystagmus is so slight that it cannot be detected without the aid of instruments and it occurs in everyone.

positional alcohol nystagmus (PAN) – Positional nystagmus when the foreign fluid is alcohol.
—*PAN I* – The alcohol concentration is *higher* in the blood than in the vestibular system.
—*PAN II* – The alcohol concentration is *lower* in the blood than in the vestibular system.

positional nystagmus – Nystagmus that occurs when a foreign fluid is in unequal concentrations between the blood and the fluid in the semi-circular canals of the vestibular system.

post-rotational nystagmus – Nystagmus caused by disturbances in the vestibular system fluid when a person spins around. Post-rotational nystagmus lasts for only a few seconds after a person stops spinning.

resting nystagmus – Nystagmus that occurs as the eye are looking straight ahead.

rotational nystagmus – Nystagmus caused by disturbances in the vestibular system fluid when a person spins around. Rotational nystagmus occurs while the person is spinning.

saccadic – Movement of the eye from one fixation point to another.

smooth pursuit – The eye's course as it tracks a moving image.

Southern California Research Institute (SCRI) – A research organization that conducted the first two research studies that eventually produced the standardized field sobriety test battery. SCRI has conducted subsequent field sobriety test validation studies as well as drug recognition evaluation studies.

standardized field sobriety test (SFST) battery – A group of tests selected as the best field sobriety tests to increase the ability of law enforcement officers to detect driver impairment. The results of this battery, usually administered along the roadside, contribute extensively to a law

enforcement officer's decision to arrest a person for impaired driving.

walk-and-turn (WAT) test – One of the three tests that make up the standardized field sobriety battery. This test requires a person to take nine heel to toe steps down a straight line, turn and take nine heel to toe steps back up the line. The subject is assessed on the ability to understand and follow instructions as well as the ability to maintain balance during the instruction stage and walking stage.

vertical nystagmus – nystagmus that occurs when the eyes gaze or move upward along a vertical plane.

vestibular system – The system of fluid-filled canals located in the inner ear that assists in balance, coordination and orientation.

vestibular system nystagmus – Nystagmus caused by a disturbance in the vestibular system.

APPENDIX A
COMBINED TEST SCORING PROCEDURE

Horizontal Gaze Nystagmus Test Score

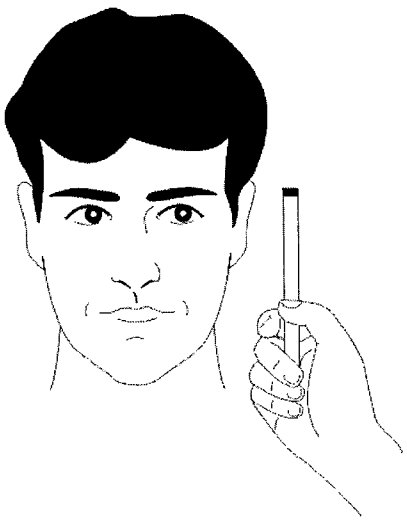
Walk & Turn Test Score	0	1	2	3	4	5	6
0							
1							
2							
3							
4							
5							
6							
7							
8							
9							

The above matrix utilizes the combined test scores for the horizontal gaze nystagmus test and the walk and turn test. If the box at the intersection of a subject's horizontal gaze nystagmus and walk and turn test scores is shaded, a subject's blood alcohol content is predicted to be .10%. Data showed that the accuracy of law enforcement officers correctly classifying subjects as above or below .10% blood alcohol content is 80% using this matrix.

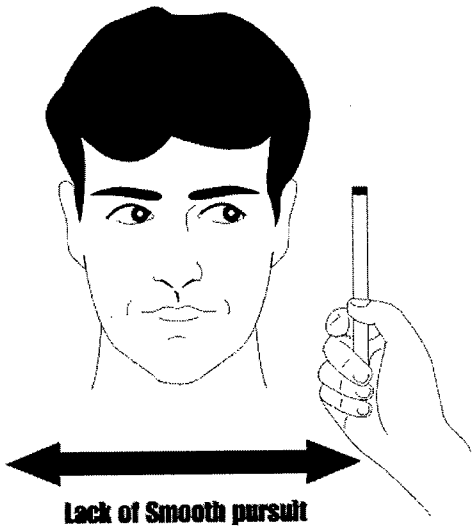
APPENDIX B

ILLUSTRATIONS OF THE HGN TEST

1



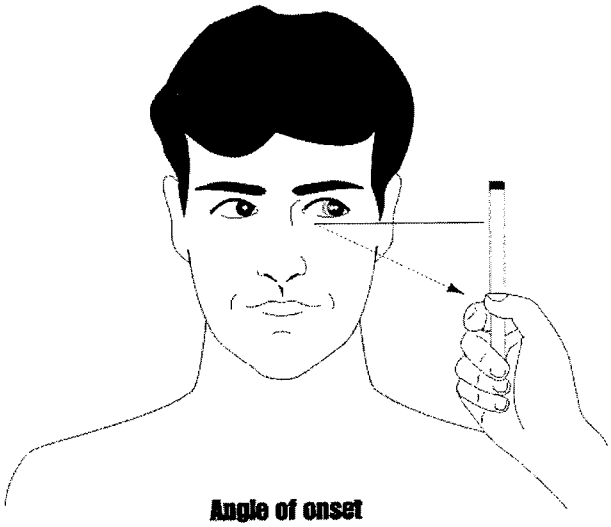
2



3

Nystagmus at maximum deviation

4



Angle of onset prior to 45°

APPENDIX C

HORIZONTAL GAZE NYSTAGMUS STATE CHART SUMMARY

The following chart summarizes the admissibility status of the HGN test in the fifty states, the District of Columbia, and the federal courts. This introduction explains how to use the chart to determine how the appellate court in a given state has ruled regarding the admissibility of the HGN test. The states in **bold** type have appellate court decisions that directly address the admissibility of the HGN test.

The chart is divided into the three main issues regarding the admissibility of the HGN test: evidentiary admissibility, police officer testimony, and the purpose and limits of the HGN test results. Each issue is further divided into sub-issues. An "X" in a row next to an issue indicates the decision of a state court regarding the issue. For example, in Section I, an Arizona court found that the HGN test is admissible as a scientific test and the *Frye* standard applies. Section II indicates that an Arizona court found that police officers may testify about their training and experience with HGN in order to testify about the results of the test. A blank box in Section II indicates that the court has not made specific findings as to that particular sub-issue. Finally, Section III indicates that the Arizona court allows prosecutors to use HGN test results for probable cause and as evidence of impairment. The last column on the last page of the chart contains a total of the number of state courts that have ruled on the sub-issues.

For case law language and citations on each of the issues and sub-issues listed in the chart, please turn to appendices D (State Case Law Summary) and E (State Standards for Admitting Scientific Evidence).

For future updates of Appendix C, please contact the National Traffic Law Center, 99 Canal Center Plaza, Suite 510, Alexandria, Virginia, 22314. Phone: 703-549-4253 Fax: 703-836-3195

Last update: 3/02/99

HORIZONTAL GAZE NYSTAGMUS STATE CHART SUMMARY

	AL	AK	AZ	AR	CA	CO	CT	DE	DC	FL	GA
I. Evidentiary admissibility.											
A. Not a scientific test - admissible as a field sobriety test.											
B A scientific test - scientific standard not applicable.				X						X[1]	
C. A scientific test - meets scientific standard.		X	X		X			X			X
D. A scientific test - does not meet scientific standard.											
E. A scientific test - inadequate evidence presented to determine if HGN meets scientific standard.	X						X				
F. Scientific standard state follows:											
1. *Frye* (general acceptance)	X	X	X		X		X				
2. *Daubert*/FRE (reliability)								X			
3. Other											X
II. Police officer may testify about:											
A. HGN's scientific reliability at admissibility hearing.											
B. Correlation between HGN and alcohol at trial.											
C. HGN test results based on training & experience in administration of test.		YES	YES		YES			YES		YES	YES
III. Purpose and limits of HGN test results.											
A. Probable cause determination in criminal hearing.		X	X				X	X			
B. Probable cause determination in civil hearing.								X			
C. Evidence of impairment.		X	X	X	X			X			X
D. Quantify BAC.											
E. Same evidentiary weight as other field tests.				X							

[1] The 3rd District found HGN to be a "quasi-scientific" test. The court held HGN was established and generally accepted in the relevant scientific community and, therefore, it did not have to meet the *Frye* standard. *Williams v. State*, 710 So.2d 24 (Fla. 3rd Dist. Ct. 1998).

HORIZONTAL GAZE NYSTAGMUS STATE CHART SUMMARY

	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA
I. Evidentiary admissibility.											
A. Not a scientific test - admissible as a field sobriety test.					X						
B A scientific test - scientific standard not applicable.											
C. A scientific test - meets scientific standard.		X	X					X	X	X	
D. A scientific test - does not meet scientific standard.											
E. A scientific test - inadequate evidence presented to determine if HGN meets scientific standard.						X					X
F. Scientific standard state follows:											
1. *Frye* (general acceptance)			X			X				X	
2. *Daubert*/FRE (reliability)		X						X	X		X
3. Other											
II. Police officer may testify about:											
A. HGN's scientific reliability at admissibility hearing.											
B. Correlation between HGN and alcohol at trial.		NO									
C. HGN test results based on training & experience in administration of test.		YES	YES		YES			YES	YES	YES	YES
III. Purpose and limits of HGN test results.											
A. Probable cause determination in criminal hearing.		X	X					X	X		
B. Probable cause determination in civil hearing.			X								
C. Evidence of impairment.		X	X		X			X	X		
D. Quantify BAC.											
E. Same evidentiary weight as other field tests.		X			X						

HORIZONTAL GAZE NYSTAGMUS STATE CHART SUMMARY

	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY
I. Evidentiary admissibility.											
A. Not a scientific test - admissible as a field sobriety test.											
B A scientific test - scientific standard not applicable.					X						
C. A scientific test - meets scientific standard.	X	X		X							X
D. A scientific test - does not meet scientific standard.			X								
E. A scientific test - inadequate evidence presented to determine if HGN meets scientific standard.						X				X	
F. Scientific standard state follows:											
1. *Frye* (general acceptance)	X	X	X	X		X					X
2. *Daubert*/FRE (reliability)										X	
3. Other											
II. Police officer may testify about:											
A. HGN's scientific reliability at admissibility hearing.						NO				NO	
B. Correlation between HGN and alcohol at trial.			NO								
C. HGN test results based on training & experience in administration of test.	YES	YES		YES	YES					YES	
III. Purpose and limits of HGN test results.											
A. Probable cause determination in criminal hearing.			X								
B. Probable cause determination in civil hearing.											
C. Evidence of impairment.	X	X		X	X						
D. Quantify BAC.											
E. Same evidentiary weight as other field tests.											

HORIZONTAL GAZE NYSTAGMUS STATE CHART SUMMARY

	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX
I. Evidentiary admissibility.											
A. Not a scientific test - admissible as a field sobriety test.		X	X					X			
B A scientific test - scientific standard not applicable.											
C. A scientific test - meets scientific standard.					X						X
D. A scientific test - does not meet scientific standard.											
E. A scientific test - inadequate evidence presented to determine if HGN meets scientific standard.	X			X		X				X	
F. Scientific standard state follows:											
1. *Frye* (general acceptance)						X					
2. *Daubert*/FRE (reliability)	X			X	X						X
3. Other										X	
I. Police officer may testify about:											
A. HGN's scientific reliability at admissibility hearing.	NO					NO					
B. Correlation between HGN and alcohol at trial.	YES										
C. HGN test results based on training & experience in administration of test.	YES	YES	YES	YES	YES			YES			YES
II. Purpose and limits of HGN test results.											
A. Probable cause determination in criminal hearing.			X								
B. Probable cause determination in civil hearing.											
C. Evidence of impairment.		X	X		X			X			X
D. Quantify BAC.											
E. Same evidentiary weight as other field tests.		X	X	X				X			

HORIZONTAL GAZE NYSTAGMUS STATE CHART SUMMARY

	UT	VT	VA	**WA**	**WV**	WI	WY	US		**TOTALS**
I. Evidentiary admissibility.										
A. Not a scientific test - admissible as a field sobriety test.	X									5
B A scientific test - scientific standard not applicable.										3
C. A scientific test - meets scientific standard.										16
D. A scientific test - does not meet scientific standard.										1
E. A scientific test - inadequate evidence presented to determine if HGN meets scientific standard.				X	X					12
F. Scientific standard state follows:										
1. *Frye* (general acceptance)				X						
2. *Daubert*/FRE (reliability)					X					
3. Other										
II. Police officer may testify about:										
A. HGN's scientific reliability at admissibility hearing.					NO					
B. Correlation between HGN and alcohol at trial.										
C. HGN test results based on training & experience in administration of test.	YES									
III. Purpose and limits of HGN test results.										
A. Probable cause determination in criminal hearing.										10
B. Probable cause determination in civil hearing.					X					3
C. Evidence of impairment.					X					22
D. Quantify BAC.										0
E. Same evidentiary weight as other field tests.	X				X					9

APPENDIX D
HORIZONTAL GAZE NYSTAGMUS
STATE CASE LAW SUMMARY

INTRODUCTION

The following state case law summary contains the seminal cases for each state, the District of Columbia and the Federal courts on the admissibility of HGN. Three main issues regarding the admissibility of the HGN test are set out under each state: evidentiary admissibility, police officer testimony, and purpose and limits of the HGN test results. The case or cases that address each issue are then briefly summarized and cited.

For a quick reference to court opinions regarding the HGN test in each state, the District of Columbia and the Federal courts, please turn to appendix C (State Chart Summary). For quick reference and case law regarding scientific admissibility, please turn to appendix E (State Standards for Admitting Scientific Evidence).

For future updates of Appendix D, please contact the National Traffic Law Center, 99 Canal Center Plaza, Suite 510,Alexandria, Virginia, 22314.
Phone:(703) 549-4253, Fax: 703-836-3195

Last update: 3/3/99

Alabama

I. Evidentiary Admissibility

HGN is a scientific test that must satisfy the *Frye* standard of admissibility. The Supreme Court of Alabama found that the State had not presented "sufficient evidence regarding the HGN test's reliability or its acceptance by the scientific community to determine if the Court of Criminal Appeals correctly determined that the test meets the Frye standards."
Malone v. City of Silverhill, 575 So.2d 106 (Ala. 1990).

II. Police Officer Testimony Needed to Admit HGN Test Result

Not addressed by court.

III. Purpose and Limits of HGN

Not addressed by court.

Alaska

I. Evidentiary Admissibility

HGN is a scientific test. It is generally accepted within the relevant scientific community.
Ballard v. Alaska, 955 P.2d 931, 939 (Alas. App. 1998).

II. Police Officer Testimony Needed to Admit HGN Test Result

A police officer may testify to the results of HGN testing as long as the government establishes a foundation that the officer has been adequately trained in the test.
*Ballard,*955 P.2d at 941.

III. Purpose and Limits of HGN

HGN testing is "a reliable indicator of a person's alcohol consumption and, to that extent, HGN results are relevant." The court cautioned that the HGN test could not be used to correlate the results with any particular blood-alcohol level, range of blood-alcohol levels, or level of impairment.
Ballard, 955 P.2d at 940.

Arizona

I. Evidentiary Admissibility

HGN is a scientific test that needs to satisfy the *Frye* standard of admissibility. State has shown that HGN satisfies the *Frye* standard.
State v. Superior Court (*Blake*), 718 P.2d 171, 181 (Ariz. 1986) (seminal case on the admissibility of HGN).

II. Police Officer Testimony Needed to Admit HGN Test Result

"The proper foundation for [admitting HGN test results] . . . includes a description of the officer's training, education, and experience in administering the test and showing that proper procedures were followed."
State ex. rel. Hamilton v. City Court of the City of Mesa, 799 P.2d 855, 860 (Ariz. 1990).
See also State ex. Rel. McDougall v. Ricke, 778 P.2d 1358, 1361 (Ariz. App. 1989).

III. Purpose and Limits of HGN

HGN test results are admissible to establish probable cause to arrest in a criminal hearing.
State v. Superior Court (*Blake*), 718 P.2d at 182.

"Where a chemical analysis has been conducted, the parties may introduce HGN test results in the form of estimates of BAC over .10% to challenge or corroborate that chemical analysis."
Ricke, 778 P.2d at 1361.

When no chemical analysis is conducted, the use of HGN test results "is to be limited to showing a symptom or clue of impairment."
Hamilton, 799 P.2d at 858.

Arkansas

I. Evidentiary Admissibility

Novel scientific evidence must meet the *Prater* (relevancy) standard for admissibility. Because law enforcement has used HGN for over thirty-five years, a *Prater* inquiry is not necessary as the test is not "novel" scientific evidence.
Whitson v. State, 863 S.W.2d 794, 798 (Ark. 1993).

II. Police Officer Testimony Needed to Admit HGN Test Result

Not addressed by court.

III. Purpose and Limits of HGN

HGN may be admitted as evidence of impairment, but is not admissible to prove a specific BAC.
Whitson, 863 S.W.2d at 798.

California

I. Evidentiary Admissibility

HGN is a scientific test and the *Kelly/Frye* "general acceptance" standard must be applied.
People v. Leahy, 882 P.2d 321 (Cal. 1994).
People v. Joehnk, 35 Cal. App. 4th 1488, 1493, 42 Cal. Rptr. 2d 6, 8 (1995).

"...[A] consensus drawn from a typical cross-section of the relevant, qualified scientific community accepts the HGN testing procedures...."
Joehnk, 35 Cal. App. 4th at 1507, 42 Cal. Rptr. 2d at 17.

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer testimony is insufficient to establish "general acceptance in the relevant scientific community."
Leahy, 882 P2d. at 609.

Police officer can give opinion, based on HGN and other test results, that defendant was intoxicated. Furthermore, police officer must testify as to the administration and result of the test.
Joehnk, 35 Cal. App. 4th at 1508, 42 Cal. Rptr. 2d at 18.

III. Purpose and Limits of HGN

HGN may be used, along with other scientific tests, as some evidence that defendant was impaired.
Joehnk, 35 Cal. App. 4th at 1508, 42 Cal. Rptr. 2d at 17.

HGN test results may not be used to quantify the BAC level of the defendant.
People v. Loomis, 156 Cal. App. 3d Supp. 1, 5-6, 203 Cal. Rptr. 767, 769-70 (1984).

Connecticut

I. Evidentiary Admissibility

HGN must meet the *Frye* test of admissibility. In this case, the state presented no evidence to meet its burden under the *Frye* test.
State v. Merritt, 647 A.2d 1021, 1028 (Conn. App. Ct. 1994).

HGN satisfies the *Porter* standards and is admissible. (In *State v. Porter,*698 A.2d 739 (1997), the Connecticut Supreme Court held the *Daubert* approach should govern the admissibility of scientific evidence and expressed factors to be considered in assessing evidence.)
State v. Carlson, 45 Conn. Supp. 461, Windham Superior Court (trial motion) (July 28, 1998).

II. Police Officer Testimony Needed to Admit HGN Test Result

Must lay a proper foundation with a showing that the officer administering the test had the necessary qualifications and followed proper procedures.
State v. Merritt, 647 A.2d 1021, 1028 (Conn. App. Ct. 1994).

III. Purpose and Limits of HGN

HGN test results can be used to establish probable cause to arrest in a criminal hearing.
State v. Royce, 616 A.2d 284, 287 (Conn. App. Ct. 1992).

Delaware

I. Evidentiary Admissibility

HGN evidence is scientific and must satisfy the Delaware Rules of Evidence standard.
State v. Ruthardt, 680 A.2d 349, 356 (Del. Super. Ct. 1996).

HGN evidence is acceptable scientific testimony under the Delaware Rules of Evidence.
Ruthardt, 680 A.2d at 362.

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer may be qualified as an expert to testify about the underlying scientific principles that correlate HGN and alcohol. Delaware police receiving three day (twenty-four hour) instruction on HGN test administration are not qualified to do this.
Ruthardt, 680 A.2d at 361-62.

Police officer testimony about training and experience alone, without expert testimony, is not enough foundation to admit HGN test results.
Zimmerman v. State, 693 A.2d 311, 314 (Del. 1997).

III. Purpose and Limits of HGN

HGN test results admissible to show probable cause in a criminal hearing.
Ruthardt, 680 A.2d at 355.

HGN test results admissible to show probable cause in a civil hearing.
Cantrell v. Division of Motor Vehicles, 1996 Del. Super. LEXIS 265 (Apr. 9, 1996).

HGN test results cannot be used to quantify the defendant's BAC. However, they can be used as substantive evidence that the defendant was "under the influence of intoxicating liquor."
Ruthardt, 680 A.2d at 361-62.

Florida

I. Evidentiary Admissibility

The 3rd District Court found HGN to be a "quasi-scientific" test. Its application is dependent on a scientific proposition and requires a particular expertise outside the realm of common knowledge of the average person. It does not have to meet the *Frye* standard because HGN has been established and generally accepted in the relevant scientific community, and has been *Frye* tested in the legal community. The court took judicial notice that HGN is reliable based on supportive case law from other jurisdictions, numerous testifying witnesses and studies submitted. It is "no longer 'new or novel' and there is simply no need to reapply a *Frye* analysis."
Williams v. State, 710 So. 2d 24 (Fla. 3rd Dist. Ct. 1998).

The 4th District Court found HGN to be a scientific test. However, because it is not novel, the *Frye* standard is not applicable. However, "[e]ven if not involving a new scientific technique, evidence of scientific tests is admissible only after demonstration of the traditional predicates for scientific evidence including the test's general reliability, the qualifications of test administrators and technicians, and the meaning of the results." Without this predicate, "the danger of unfair prejudice, confusion of issues or misleading the jury from admitting HGN test results outweighs any probative

value." The state did not establish the appropriate foundation for the admissibility of HGN test results.
State v. Meador, 674 So. 2d 826, 835 (Fla. 4th Dist. Ct. App. 1996), *review denied*, 686 So. 2d 580 (Fla. 1996).

II. Police Officer Testimony Needed to Admit HGN Test Result

"We take judicial notice that HGN test results are generally accepted as reliable and thus are admissible into evidence once a proper foundation has been laid that the test was correctly administered by a qualified DRE [Drug Recognition Expert]."
Williams, 710 So. 2d at 32.

No evidence presented as to the police officer's qualifications nor administration of the HGN test in this case.
Meador, 674 So. 2d at 835.

III. Purpose and Limits of HGN

The HGN test results alone, in the absence of a chemical analysis of blood, breath, or urine, are inadmissible to trigger the presumption provided by the DUI statute, and may not be used to establish a BAC of .08 percent or more.
Williams, 710 So. 2d at 36.

Georgia

I. Evidentiary Admissibility

The HGN test is admissible as a "scientifically reliable field sobriety evaluation" under the *Harper* "verifiable certainty" standard.
Manley v. State, 424 S.E.2d 818, 819-20 (Ga. Ct. App. 1992).

HGN testing is judicially noticed as a scientifically reliable test and therefore expert testimony is no longer required before the test results can be admitted.
Hawkins v. State, 476 S.E.2d 803, 808-09 (Ga. Ct. App. 1996).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer, who received specialized training in DUI detection and worked with a DUI task force for two years, was permitted to testify that, in his opinion, defendant was under the influence.
Sieveking v. State, 469 S.E.2d 235, 219-20 (Ga. Ct. App. 1996).

III. Purpose and Limits of HGN

HGN test can be admitted to show that the defendant "was under the influence of alcohol to the extent that it was less safe for him to drive."
Sieveking, 469 S.E.2d at 219.

Idaho

I. Evidentiary Admissibility

HGN test results admitted under the Idaho Rules of Evidence. Rule 702 is correct test in determining the admissibility of HGN.
State v. Gleason, 844 P.2d 691, 694 (Idaho 1992).

II. Police Officer Testimony Needed to Admit HGN Test Result

Officer may testify as to administration of HGN test, but not correlation of HGN and BAC.
State v. Garrett, 811 P.2d 488, 493 (Idaho 1991).

III. Purpose and Limits of HGN

"HGN test results may not be used at trial to establish the defendant's blood alcohol level . . . . Although we note that in conjunction with other field sobriety tests, a positive HGN test result does supply probable cause for arrest, standing alone that result does not provide proof positive of DUI…."
Garrett, 811 P.2d at 493.

HGN may be "admitted for the same purpose as other field sobriety test evidence -- a physical act on the part of [defendant] observed by the officer contributing to the cumulative portrait of [defendant] intimating intoxication in the officer's opinion."
Gleason, 844 P.2d at 695.

Illinois

I. Evidentiary Admissibility

HGN meets *Frye* standard of admissibility.
People v. Buening, 592 N.E.2d 1222, 1227 (Ill. App. Ct. 1992).

Despite the ruling of the *Buening* appellate court, the Fourth District Court of Appeals declined to recognize HGN's general acceptance without a *Frye* hearing. The court criticized the *Buening* court for taking judicial notice of HGN's reliability based on the decisions of other jurisdictions.
People v. Kirk, 681 N.E.2d 1073, 1077 (Ill. App. Ct. 1997).

II. Police Officer Testimony Needed to Admit HGN Test Result

"A proper foundation should consist of describing the officer's education and experience in administering the test and showing that the procedure was properly administered."
Buening, 592 N.E.2d at 1227.

III. Purpose and Limits of HGN

HGN test results may be used to establish probable cause in a criminal hearing.
People v. Furness, 526 N.E.2d 947, 949 (Ill. App. Ct. 1988).

HGN test results admissible to show probable cause in a civil hearing.
People v. Hood, 638 N.E.2d 264, 274 (Ill. App. Ct. 1994).

HGN test results may be used "to prove that the defendant is under the influence of alcohol."
Buening, 592 N.E.2d at 1228.

Iowa

I. Evidentiary Admissibility

HGN admissible as a field test under the Iowa Rules of Evidence. "[T]estimony by a properly trained police officer with respect to the administration and results of the horizontal gaze nystagmus test are admissible without need for further scientific evidence."
State v. Murphy, 451 N.W.2d 154, 158 (Iowa 1990).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer may testify about HGN test results under Rule 702 if the officer is properly trained to administer the test and objectively records the results.
Murphy, 451 N.W.2d at 158.

III. Purpose and Limits of HGN

HGN test results may be used as an indicator of intoxication.
Murphy, 451 N.W.2d at 158.

Kansas

I. Evidentiary Admissibility

HGN must meet *Frye* standard of admissibility and a *Frye* hearing is required at the trial level. There was no *Frye* hearing conducted and the appellate court refused to make a determination based on the record it had.
State v. Witte, 836 P.2d 1110, 1121 (Kan. 1992).

II. Police Officer Testimony Needed to Admit HGN Test Result

Not addressed by court.

III. Purpose and Limits of HGN

Not addressed by court.

Kentucky

I. Evidentiary Admissibility

HGN test results admitted due to defendant's failure to object.
Commonwealth v. Rhodes, 949 S.W.2d 621, 623 (Ky. Ct. App. 1996).

II. Police Officer Testimony Needed to Admit HGN Test Result

Not addressed by court.

III. Purpose and Limits of HGN

Not addressed by court.

Louisiana

I. Evidentiary Admissibility

HGN meets *Frye* standard of admissibility.
State v. Armstrong, 561 So. 2d 883, 887 (La. Ct. App. 1990).
State v. Regan, 601 So. 2d 5, 8 (La. Ct. App. 1992).
State v. Breitung, 623 So. 2d 23, 25-6 (La. Ct. App. 1993).

The standard of admissibility for scientific evidence is currently the Louisiana Rules of Evidence.
State v. Foret, 628 So. 2d 1116 (La. 1993).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer may testify as to training in HGN procedure, certification in the administration of HGN test and that the HGN test was properly administered.
Armstrong, 561 So. 2d at 887.

III. Purpose and Limits of HGN

The HGN test may be used by the officer "to determine whether or not he [needs] to 'go any

further' and proceed with other field tests."
Breitung, 623 So. 2d at 25.

HGN test results may be admitted as evidence of intoxication.
Armstrong, 561 So. 2d at 887.

Maine

I. Evidentiary Admissibility

Because the HGN test relies on greater scientific principles than other field sobriety tests, the reliability of the test must first be established.
State v. Taylor, 694 A.2d 907, 912 (Me. 1997).

The Maine Supreme Court took judicial notice of the reliability of the HGN test to detect impaired drivers.
Taylor, 694 A.2d at 910.

II. Police Officer Testimony Needed to Admit HGN Test Result

"A proper foundation shall consist of evidence that the officer or administrator of the HGN test is trained in the procedure and the [HGN] test was properly administered."
Taylor, 694 A.2d at 912.

III. Purpose and Limits of HGN

HGN test results may only be used as "evidence of probable cause to arrest without a warrant or as circumstantial evidence of intoxication. The HGN test may not be used by an officer to quantify a particular blood alcohol level in an individual case."
Taylor, 694 A.2d at 912.

Maryland

I. Evidentiary Admissibility

HGN is scientific and must satisfy the *Frye/Reed* standard of admissibility. The Court of Appeals took judicial notice of HGN's reliability and its acceptance in the relevant scientific communities.
Schultz v. State, 664 A.2d 60, 74 (Md. Ct. Spec. App. 1995).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer must be properly trained or certified to administer the HGN test. [NOTE: In *Schultz*,

the police officer failed to articulate the training he received in HGN testing and the evidence was excluded.]
Schultz, 664 A.2d at 77.

III. Purpose and Limits of HGN

Not addressed by court.

Massachusetts

I. Evidentiary Admissibility

HGN is scientific and is admissible on a showing of either general acceptance in the scientific community or reliability of the scientific theory. *See Commonwealth v. Lanigan*, 641 N.E.2d 1342 (Mass. 1994). HGN test results are inadmissible until the Commonwealth introduces expert testimony to establish that the HGN test satisfies one of these two standards.
Commonwealth v. Sands, 675 N.E.2d 370, 373 (Mass. 1997).

II. Police Officer Testimony Needed to Admit HGN Test Result

"[T]here must be a determination as to the qualification of the individual administering the HGN test and the appropriate procedure to be followed." In this case there was no testimony as to these facts, thus denying the defendant the opportunity to challenge the officer's qualifications and administration of the test.
Sands, 675 N.E.2d at 373.

III. Purpose and Limits of HGN

Not addressed by court.

Michigan

I. Evidentiary Admissibility

Court found that HGN test is scientific evidence and is admissible under the *Frye* standard of admissibility.
State v. Berger, 551 N.W.2d 421, 424 (Mich. Ct. App. 1996).

II. Police Officer Testimony Needed to Admit HGN Test Result

Only foundation necessary for the introduction of HGN test results is evidence that the police

officer properly performed the test and that the officer administering the test was qualified to perform it.
Berger, 551 N.W.2d at 424.

III. Purpose and Limits of HGN

HGN test results are admissible to indicate the presence of alcohol.
Berger, 551 N.W.2d at 424 n.1.

Minnesota

I. Evidentiary Admissibility

Court found that HGN meets the *Frye* standard of admissibility.
State v. Klawitter, 518 N.W.2d 577, 585 (Minn. 1994).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officers must testify about their training in and experience with the HGN test.
See generally Klawitter, 518 N.W.2d at 585-86.

III. Purpose and Limits of HGN

HGN admissible as evidence of impairment as part of a Drug Evaluation Examination in the prosecution of a person charged with driving while under the influence of drugs.
See generally Klawitter, 518 N.W.2d at 585.

Mississippi

I. Evidentiary Admissibility

HGN is a scientific test. However, it is not generally accepted within the relevant scientific community and is inadmissible at trial in the State of Mississippi.
Young v. City of Brookhaven, 693 So.2d 1355, 1360-61 (Miss. 1997).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officers cannot testify about the correlation between the HGN test and precise blood alcohol content.
Young, 693 So.2d at 1361.

III. Purpose and Limits of HGN

HGN test results are admissible only to prove probable cause to arrest.
Young, 693 So.2d at 1361.

HGN test results cannot be used as scientific evidence to prove intoxication or as a mere showing of impairment. *Young*, 693 So.2d at 1361.

Missouri

I. Evidentiary Admissibility

Court found that HGN test meets the *Frye* standard of admissibility.
State v. Hill, 865 S.W.2d 702, 704 (Mo. Ct. App. 1993), *rev'd on other grounds*, *State v. Carson*, 941 S.W.2d 518, 520 (Mo. 1997).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer must be adequately trained and able to properly administer the test.
Hill, 865 S.W.2d at 704.

III. Purpose and Limits of HGN

HGN can be admitted as evidence of intoxication.
Hill, 865 S.W.2d at 704.

Montana

I. Evidentiary Admissibility

Court found that HGN is neither new nor novel; thus, Daubert does not apply. Court still finds that HGN must meet the state's rules of evidence which are identical to the Federal Rules of Evidence.
Hulse v. State, 961 P.2d 75 (Mont. 1998).

II. Police Officer Testimony Needed to Admit HGN Test Result

The court held that before an arresting officer may testify as to HGN results, a proper foundation must show that the officer was properly trained to administer the HGN test and that he administered the test in accordance with this training. Before the officer can testify as to the correlation between alcohol and nystagmus, a foundation must be established that the officer has special training in the underlying scientific basis of the HGN test.
Hulse, 961 P.2d 75 (Mont. 1998).

III. Purpose and Limits of HGN

HGN test results admissible as evidence of impairment.
Clark, 762 P.2d 853, 856 (Mont. 1988).

Nebraska

I. Evidentiary Admissibility

Inadequate foundation laid by the state to determine if HGN is a scientifically valid test. One police officer testifying as to HGN testing is inadequate to show scientific validity of HGN.
State v. Borchardt, 395 N.W.2d 551, 557 (Neb. 1986).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer testified as to training in HGN testing, which consisted of attending a seminar taught by another patrol officer, and performing HGN tests on both sober and intoxicated volunteers. Although the court ruled that this was inadequate testimony to determine whether the HGN test was admissible under the Nebraska Rules of Evidence, it did not comment on whether this foundation would have been sufficient to allow the officer to testify about the HGN test results.
Borchardt, 395 N.W.2d at 557.

III. Purpose and Limits of HGN

Not addressed by court.

New Mexico

I. Evidentiary Admissibility

HGN is a scientific test. New Mexico follows the *Daubert* standard which requires a showing of reliability before scientific evidence can be admitted. The court held that a scientific expert must testify to the underlying scientific reliability of HGN and that a police officer can not qualify as a scientific expert. Because the State failed to present sufficient evidence regarding the HGN test's reliability, the court remanded the case stating it would be appropriate for the trial court, on remand, to make the initial determination of whether HGN testing satisfies *Daubert*. In addition, the court found HGN to be "beyond common and general knowledge" and declined to take judicial notice of HGN reliability.
State v. Torres, ____ P.2d ____ (New Mexico 1999), 1999 N.M. Lexis 55.

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officers can qualify as non-scientific experts based on their training and experience. Non-scientific experts may testify about the administration of the test and specific results of the test

provided another scientific expert first establishes the reliability of the scientific principles underlying the test. In order to establish the "technical or specialized knowledge" required to qualify as an expert in the administration of the HGN test, "there must be a showing: (1) that the expert has the ability and training to administer the HGN test properly, and (2) that the expert did, in fact, administer the HGN test properly at the time and upon the person in question."
State v. Torres, ____ P.2d ____ (New Mexico 1999), 1999 N.M. Lexis 55.

III. Purpose and Limits of HGN

Not addressed by court.

New York

I. Evidentiary Admissibility

Quinn held that HGN test results are admissible under *Frye* standard of "general acceptance." However, the case no longer has precedential value as it was later reversed on other grounds.
People v. Quinn, 580 N.Y.S.2d 818, 826 (Dist. Ct. 1991), *rev'd on other grounds*, 607 N.Y.S.2d 534 (App. Div. 1993).

II. Police Officer Testimony Needed to Admit HGN Test Result

Not addressed by court.

III. Purpose and Limits of HGN

Not addressed by court.

North Carolina

I. Evidentiary Admissibility

HGN is a scientific test. It "does not measure behavior a lay person would commonly associate with intoxication but rather represents specialized knowledge that must be presented to the jury by a qualified expert." As a result, "until there is sufficient scientifically reliable evidence as to the correlation between intoxication and nystagmus, it is improper to permit a lay person to testify as to the meaning of HGN test results."
State v. Helms, 504 S.E.2d 293 (N.C. 1998).

II. Police Officer Testimony Needed to Admit HGN Test Result

Testimony of one police officer, whose training consisted of a "forty hour training class dealing with the HGN test", was inadequate foundation for admission of HGN test results.
Helms, 504 S.E.2d 293 (N.C. 1998).

III. Purpose and Limits of HGN
HGN test results are evidence of impairment.
Helms, 504 S.E.2d 293 (N.C. 1998).

North Dakota

I. Evidentiary Admissibility

Court found that HGN test is admissible as a standard field sobriety test.
City of Fargo v. McLaughin, 512 N.W.2d 700, 706 (N.D. 1994).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer must testify as to training and experience and that the test was properly administered.
City of Fargo, 512 N.W.2d at 708.

III. Purpose and Limits of HGN

". . . HGN test results admissible only as circumstantial evidence of intoxication, and the officer may not attempt to quantify a specific BAC based upon the HGN test."
City of Fargo, 512 N.W.2d at 708.

Ohio

I. Evidentiary Admissibility

HGN test is objective in nature and does not require an expert interpretation.
State v. Nagel, 506 N.E.2d 285, 286 (Ohio Ct. App. 1986).

Court determined that HGN was a reliable indicator of intoxication without specifically ruling on whether HGN meets *Frye* or some other standard of admissibility.
State v. Bresson, 554 N.E.2d 1330, 1334 (Ohio 1990).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer need only testify to training in HGN procedure, knowledge of the test and ability to interpret results.
Bresson, 554 N.E.2d at 1336.

III. Purpose and Limits of HGN

HGN can be used to establish probable cause to arrest and as substantive evidence of a defendant's guilt or innocence in a trial for DUI, but not to determine defendant's BAC.
Bresson, 554 N.E.2d at 1336.

Oklahoma

I. Evidentiary Admissibility

HGN test results excluded because state failed to lay adequate foundation regarding HGN's scientific admissibility under the *Frye* standard of admissibility. Police officer's testimony alone was insufficient.
Yell v. State, 856 P.2d 996, 996-97 (Okla. Crim. App. 1993).

The *Daubert* rationale replaces the *Frye* standard as the admissibility standard for scientific evidence.
Taylor v. State, 889 P.2d 319, 328-29 (Okla. Crim. App. 1995).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer testified to training on how to administer HGN test and how the test was administered in this case. Officer also testified as to his training in analyzing HGN test results.
Yell, 856 P.2d at 997.

III. Purpose and Limits of HGN

If HGN testing was found to satisfy the *Frye* standard of admissibility, HGN test results would be considered in the same manner as other field sobriety test results. HGN test results are inadmissible as scientific evidence creating a presumption of intoxication.
Yell, 856 P.2d at 997.

Oregon

I. Evidentiary Admissibility

HGN test results are admissible under the Oregon Rules of Evidence. HGN test results are scientific in nature, are relevant in a DUI trial, and are not unfairly prejudicial to the defendant.
State v. O'Key, 889 P.2d 663, 687 (Or. 1995).

II. Police Officer Testimony Needed to Admit HGN Test Result

"Admissibility is subject to a foundational showing that the officer who administered the test was

properly qualified, that the test was administered properly, and that the test results were recorded accurately."
O'Key, 889 P.2d at 670.

III. Purpose and Limits of HGN

"... HGN test results are admissible to establish that a person was under the influence of

intoxicating liquor, but is not admissible…to establish a person's BAC…."
O'Key, 889 P.2d at 689-90.

Officer may not testify that, based on HGN test results, the defendant's BAC was over .10.
State v. Fisken, 909 P.2d 206, 207 (Or. Ct. App. 1996).

Pennsylvania

I. Evidentiary Admissibility

The state laid an inadequate foundation for the admissibility of HGN under the *Frye/Topa* standard.
Commonwealth v. Moore, 635 A.2d 625, 629 (Pa. Super. Ct. 1993).
Commonwealth v. Apollo, 603 A.2d 1023, 1028 (Pa. Super. Ct. 1992).
Commonwealth v. Miller, 532 A.2d 1186, 1189-90 (Pa. Super. Ct. 1987).

Testimony of police officer is insufficient to establish scientific reliability of HGN test.
Moore, 635 A.2d at 692.
Miller, 532 A.2d at 1189-90.

Testimony of behavioral optometrist did not establish general acceptance of HGN test.
Apollo, 603 A.2d at 1027-28.

II. Police Officer Testimony Needed to Admit HGN Test Result

County detective certified as HGN instructor. Court did not comment on whether this would be enough foundation to allow the detective to testify about HGN test results.
Moore, 635 A.2d 629.

Police officer had one day course on HGN. Court did not comment on whether this would be enough foundation to allow the officer to testify about HGN test results.
Miller, 603 A.2d at 1189.

III. Purpose and Limits of HGN

Not addressed by court.

South Carolina

I. Evidentiary Admissibility

HGN admissible in conjunction with other field sobriety tests. By implication, HGN is not regarded as a scientific test.
State v. Sullivan, 426 S.E.2d 766, 769 (S.C. 1993).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer given twenty hours of HGN training.
Sullivan, 426 S.E.2d at 769.

III. Purpose and Limits of HGN

HGN test results admissible "to elicit objective manifestations of soberness or insobriety . . . . [E]vidence from HGN tests is not conclusive proof of DUI. A positive HGN test result is to be regarded as merely circumstantial evidence of DUI. Furthermore, HGN test shall not constitute evidence to establish a specific degree of blood alcohol content."
Sullivan, 426 S.E.2d at 769.

Tennessee

I. Evidentiary Admissibility

HGN is a scientific test. To be admissible at trial, such evidence must satisfy the requirements of Tenn. Rules of Evidence 702 and 703. State provided an inadequate amount of evidence to allow the court to conclude that HGN evidence meets this standard.
State v. Murphy, 953 S.W.2d 200 (Tenn. 1997).

II. Police Officer Testimony Needed to Admit HGN Test Result

HGN must be offered through an expert witness. To qualify as an expert, a police officer must establish the he is qualified by his "knowledge, skill, experience, training or education" to provide expert testimony to "substantially assist the trier of fact to understand the evidence or determine a fact in issue." Although the court did not rule out the possibility that the officer can be considered an expert, the court set a high level of proof. In this case, the court felt that although the officer had attended law enforcement training in DUI offender apprehension and the HGN test, this training was not enough to establish him as an expert.
State v. Grindstaff, 1998 Tenn. Crim. App. Lexis 339 (March 23, 1998).

III. Purpose and Limits of HGN

Not addressed by court.

Texas

I. Evidentiary Admissibility

HGN admissible under the Texas Rules of Evidence.
Emerson v. State, 880 S.W.2d 759, 769 (Tex. Crim. App. 1994).

II. Police Officer Testimony Needed to Admit HGN Test Result

A police officer must qualify as an expert on the HGN test, specifically concerning its administration and technique, before testifying about a defendant's performance on the test. Proof that the police officer is certified in the administration of the HGN test by the Texas Commission on Law Enforcement Officer Standards and Education satisfies this requirement.
Emerson, 880 S.W.2d at 769.

III. Purpose and Limits of HGN

HGN admissible to prove intoxication.
Emerson, 880 S.W.2d at 769.

Utah

I. Evidentiary Admissibility

HGN test admissible as other field sobriety test. Court reserved judgment as to the scientific reliability of HGN.
Salt Lake City v. Garcia, 912 P.2d 997, 1001 (Utah Ct. App. 1996).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer need only testify as to training, experience and observations when HGN admitted as a field test.
Garcia, 912 P.2d at 1001.

III. Purpose and Limits of HGN

Admissible as any other field sobriety test.
Garcia, 912 P.2d at 1000-01.

Washington

I. Evidentiary Admissibility

"[T]he *Frye* standard applies to the admission of evidence based on HGN testing, unless . . . the State is able to prove that it rests on scientific principles and uses techniques which are not 'novel' and are readily understandable by ordinary persons." The state failed to present any evidence to this fact and the court declined to take judicial notice of HGN.
State v. Cissne, 865 P.2d 564, 569 (Wash. Ct. App. 1994).

II. Police Officer Testimony Needed to Admit HGN Test Result

Not addressed by court.

III. Purpose and Limits of HGN

Not addressed by court.

West Virginia

I. Evidentiary Admissibility

"Because the State did not introduce evidence of the scientific reliability of the test . . . we do not reach the question of whether the HGN test is sufficiently reliable to be admissible." One police officer testifying about HGN is insufficient to establish HGN's reliability. If found to be admissible, HGN evidence would receive the same evidentiary weight as a field sobriety test.
State v. Barker, 366 S.E.2d 642, 646 (W. Va. 1988).

II. Police Officer Testimony Needed to Admit HGN Test Result

Police officer's training consisted of a one-day, eight-hour training session conducted by the state police. Officer testified to giving the HGN test about 100 times. Court did not reach question of whether this would be enough to allow the officer to testify about the HGN test results.
Barker, 366 S.E.2d at 644.

III. Purpose and Limits of HGN

HGN test results admissible to show probable cause in a civil hearing.
Muscatell v. Cline, 474 S.E.2d 518, 525 (W. Va. 1996).
Boley v. Cline, 456 S.E.2d 38, 41 (W. Va. 1995).

"[I]f the reliability of the HGN test is demonstrated, an expert's testimony as to a driver's performance on the test is admissible only as evidence that the driver was under the influence," the same as other field sobriety tests.
Barker, 366 S.E.2d at 646.

United States

I. Evidentiary Admissibility

HGN test was admitted as part of series of field tests. Its admission was not challenged on appeal.
U.S. v. Van Griffin, 874 F.2d 634 (9th Cir. 1989).

II. Police Officer Testimony Needed to Admit HGN Test Result

Not addressed by court.

III. Purpose and Limits of HGN

Not addressed by court.

APPENDIX E
STATE STANDARDS
FOR
ADMITTING SCIENTIFIC EVIDENCE

The following chart indicates the standard by which each state admits scientific testimony into evidence, either *Frye*, the FRE or some other standard. The first column of the chart lists the states and the District of Columbia. The next two columns separate those states into two categories: those that have adopted the opinion of the U.S. Supreme Court in *Daubert* and those states that follow the *Frye* standard (in some instances the decision preceded *Daubert* and its continued validity may be open to question).

Each of those columns are separated further into two more columns. Under the "Follow FRE" column, an "X" under "Adopted FRE" means that the state has adopted an evidence code exactly like or similar to the Federal Rules of Evidence and follows the rationale of the *Daubert* Court by abandoning the *Frye* standard. An "X" under "Did not adopt FRE" means that although the state does not have an FRE-type evidence code, it follows the *Daubert* rationale anyway, unless otherwise noted.

Under the "Follow *Frye*" column, an "X" under "Adopted FRE" means that although the state has adopted an FRE-type evidence code, it continues to adhere to the *Frye* standard despite the *Daubert* ruling. An "X" under the "Did not adopt FRE" indicates the state has not adopted a FRE-type evidence code and continues to follow *Frye*.

The last column gives the case name and cite of the seminal case in that state dealing with the admissibility standard for scientific evidence. You will notice that many of the states that have adopted FRE-type evidence codes but continue to follow *Frye* have cases that may pre-date *Daubert*. Unless otherwise noted, the case cited is the last case in the jurisdiction to address the admissibility of scientific evidence. Until a state court renders a decision either expressly rejection or adopting the *Daubert* rationale, it is assumed that the *Frye* standard remains the scientific standard in that jurisdiction.

For future updates, please contact the National Traffic Law Center, 99 Canal Center Plaza, Suite 510, Alexandria, Virginia, 22314, Phone:(703) 549-4253, Fax: 703-836-3195.

Last update: 3/17/99

STATE	FOLLOW FRE[1] or Daubert rationale		FOLLOW FRYE		CASE
	Adopted FRE	Did not adopt FRE	Adopted FRE	Did not adopt FRE	
ALABAMA			X[2]		Ex Parte Perry, 586 So.2d 242 (Ala. 1991)
ALASKA	X				State v. Coon, 1999 Alas. Lexis 28 (March 5, 1999).
ARIZONA			X		State v. Bible, 858 P.2d 1152 (Ariz. 1993); and *see* State v. Johnson, 922 P.2d 294 (Ariz. 1996) (expressly rejecting Daubert)
ARKANSAS	X				State v. Prater, 820 S.W.2d 429 (Ark. 1991)
CALIFORNIA				X	People v. Kelly, 549 P.2d 1240 (Cal. 1976); and *see* People v. Leahy, 882 P.2d 321 (Cal. 1994) (expressly rejecting Daubert)
COLORADO			X		Fishback v. People, 851 P.2d 884 (Colo. 1993); and *see* Lindsey v. People, 892 P.2d 281 (Colo. 1995) (expressly rejecting Daubert)
CONNECTICUT		X			State v. Porter, 698 A.2d 739 (Conn. 1997)
DELAWARE	X				State v. Pennell, 584 A.2d 513 (Del. Super. Ct. 1989)
DISTRICT OF COLUMBIA				X	Jones v. United States, 548 A.2d 35 (D.C. App. 1988)
FLORIDA			X		Flanagan v. State, 625 So.2d 827 (Fla. 1993); See Hadden v. State, 690 So. 2d 573 (1997) (expressly rejecting Daubert)
GEORGIA		X[3]			Harper v. State, 292 S.E.2d 389 (Ga. 1982)
HAWAII			X		State v. Montalbo, 828 P.2d 1274 (Hawaii 1992)

[1] Federal Rules of Evidence
[2] A state statute specifically mandates that the admissibility of DNA is governed by Daubert.
[3] Georgia has not adopted the Federal Rules of Evidence, nor has it adopted the Frye approach. Instead, it has adopted a standard that is more liberal than the FRE.

STATE	FOLLOW FRE[1] or Daubert rationale		FOLLOW FRYE		CASE
	Adopted FRE	Did not adopt FRE	Adopted FRE	Did not adopt FRE	
IDAHO	X				State v. Crea, 806 P.2d 445 (Idaho 1991)
ILLINOIS			X		People v. Baynes, 430 N.E.2d 1070 (Ill. 1981)
INDIANA	X				Steward v. State, 652 N.E.2d 490 (Ind. 1995)
IOWA	X				State v. Hall, 297 N.W.2d 80 (Iowa 1980)
KANSAS				X	Smith v. Deppish, 807 P.2d 144 (Kan. 1991)
KENTUCKY	X				Cecil v. Commonwealth, 888 S.W.2d 669 (Ky. 1994)
LOUISIANA	X				State v. Foret, 628 So.2d 1116 (La. 1993)
MAINE	X				State v. Williams, 388 A.2d 500 (Me. 1978)
MARYLAND			X		Reed v. State, 391 A.2d 364 (Md. 1978); and *see* Hutton v. State, 663 A.2d 1289 (Md. 1995) (expressly keeping Frye)
MASSACHUSETTS	X				Commonwealth v. Lanigan, 641 N.E.2d 1342 (Mass. 1994)
MICHIGAN			X[4]		People v. Young, 340 N.W.2d 805 (Mich. 1983)
MINNESOTA			X		State v. Jobe, 486 N.W.2d 407 (Minn. 1992)
MISSISSIPPI			X		Polk v. State, 612 So.2d 381 (Miss. 1991)
MISSOURI			X		State v. Davis, 814 S.W.2d 593 (Mo. banc. 1991)
MONTANA	X				State v. Clark, 762 P.2d 853 (Mont. 1988)
NEBRASKA			X		State v. Reynolds, 457 N.W.2d 405 (Neb. 1990); and *see* State v. Carter, 524 N.W.2d 763 (Neb. 1994) (expressly keeping Frye)

[4] MRE 702 differs from FRE 702 in that it requires that the evidence be "recognized."

STATE	FOLLOW FRE[1] or Daubert rationale		FOLLOW FRYE		CASE
	Adopted FRE	Did not adopt FRE	Adopted FRE	Did not adopt FRE	
NEVADA	X				Santillanes v. State, 765 P.2d 1147 (Nev. 1988)
NEW HAMPSHIRE			X		State v. Vandebogart, 616 A.2d 483 (N.H. 1992)
NEW JERSEY			X		State v. Spann, 617 A.2d 247 (N.J. 1993)
NEW MEXICO	X				State v. Alberico, 861 P.2d 192 (N.M. 1993)
NEW YORK				X	People v. Hughes, 453 N.E.2d 484 (N.Y. 1983)
NORTH CAROLINA	X				State v. Pennington, 393 S.E.2d 847 (N.C. 1990)
NORTH DAKOTA			X		State v. Brown, 337 N.W.2d 138 (N.D. 1983)
OHIO	X				State v. Williams, 446 N.E.2d 444 (Ohio 1983)
OKLAHOMA	X				Taylor v. State, 889 P.2d 319 (Okla. Crim. App. 1995)
OREGON	X				State v. Brown, 687 P.2d 751 (Or. 1984)
PENNSYLVANIA				X	Commonwealth v. Zook, 615 A.2d 1 (Pa. 1992)
RHODE ISLAND	X				State v. Wheeler, 496 A.2d 1382 (R.I. 1985)
SOUTH CAROLINA	X[5]				State v. Ford, 392 S.E.2d 781 (S.C. 1990)
SOUTH DAKOTA	X				State v. Hofer, 512 N.W.2d 482 (S.D. 1994)
TENNESSEE			X		*See* Comments to Tenn. Evid. Rule 702 (stating that the Rule is consistent with Frye); State v. Johnson, 717 S.W.2d 298 (Tenn. Crim. App. 1989)
TEXAS	X				Kelly v. State, 824 S.W.2d 568 (Tex. Crim. App. 1992)
UTAH	X				State v. Crosby, 927 P.2d 638 (Utah 1996)
VERMONT	X				State v. Brooks, 643 A.2d 226 (Vt. 1993)

[5] South Carolina has adopted the FRE. Its approach, however, is different from Daubert and less restrictive than Frye.

STATE	FOLLOW FRE[1] or Daubert rationale		FOLLOW FRYE		CASE
	Adopted FRE	Did not adopt FRE	Adopted FRE	Did not adopt FRE	
VIRGINIA		X[6]			O'Dell v. Commonwealth, 364 S.E.2d 491 (Va. 1988)
WASHINGTON			X		State v. Martin, 684 P.2d 651 (Wash. 1984); See State v. Copeland, 922 P.2d 1304 (Wash. 1996) (expressly rejecting Daubert)
WEST VIRGINIA	X				State v. Woodall, 385 S.E.2d 253 (W.Va. 1989)
WISCONSIN	X				State v. Walstad, 351 N.W.2d 469 (Wis. 1984)
WYOMING	X				Rivera v. State, 840 P.2d 933 (Wyo. 1992)
TOTALS	26	3	17	5	

[6] Virginia has expressly rejected the FRE, but it has not adopted Frye. Its approach seems to center around reliability.

APPENDIX F
BIBLIOGRAPHY OF HORIZONTAL GAZE NYSTAGMUS STUDIES AND ARTICLES

PUBLICATIONS FAVORABLE TO HGN

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION (NHTSA) RESEARCH STUDIES

T.E. Anderson, Development of Effective Behavioral Test Procedures for Alcohol-Impaired Driver Identification, Research Notes, NHTSA, U.S. Department of Transportation (Nov. 1983).

Briefly summarizes the NHTSA research on field sobriety testing.

National Highway Traffic Safety Administration, U.S. Department of Transportation, DWI Detection and Field Sobriety Testing Student Manual (1995).

Manual is used to instruct law enforcement in the three phases of impaired driving detection: vehicle in motion, personal contact and pre-arrest screening. Pre-arrest screening includes instruction on the standardized field sobriety test battery.

National Highway Traffic Safety Administration, U.S. Department of Transportation, Pilot Test of Selected DWI Detection Procedures for Use at Sobriety Checkpoints, DOT-HS-806-724 (1985).

National Highway Traffic Safety Administration, U.S. Department of Transportation, Field Evaluation of a Behavioral Test Battery for DWI, No. DOT-HS-806-475 (Sept. 1983).

Study to confirm the effectiveness of the standardized filed sobriety test battery using a larger sample size. Concluded that the HGN test was the most effective of the three tests and that greater accuracy in determining whether a subject's BAC is over .10 can be gained by combining the scores of the HGN and Walk-and-Turn test.

National Highway Traffic Safety Administration, U.S. Department of Transportation, Development and Field Test of Psychophysical Tests for DWI Arrest, No. DOT-HS-805-864 (March 1981).

Study to determine the effectiveness of the sobriety test battery and standardized the administration and scoring of each test. Test battery was subjected to laboratory and field evaluation. Concluded that more field testing needed to be performed, but the study showed that the test battery would be effective in increasing the ability of police officer's to detect impaired drivers.

National Highway Traffic Safety Administration, U.S. Department of Transportation, Psychophysical Tests for DWI Arrest, No. DOT-HS-802-424 (June 1977).

Study to determine the easiest and most effective methods of roadside testing in order to increase the ability of police to detect impaired drivers. Concluded that alcohol gaze nystagmus testing was most effective, along with walk-and-turn and one-leg stand tests.

OTHER RESEARCH STUDIES AND ARTICLES

Raymond D. Adams & Maurice Victor, Principles of Neurology, ch.13, "Disorders of Ocular Movement and Pupillary Function," (4th ed. 1991).

Lists the several varieties of pendular and jerk nystagmus, their manifestations and causative diseases.

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Explores the causes and manifestations of positional alcohol nystagmus (PAN) and how it compares with alcohol gaze nystagmus.

Gunnar Aschan & M. Bergstedt, Positional Alcoholic Nystagmus in Man Following Repeated Alcohol Doses, 80 Acta Oto-laryngol 330 (Sweden 1975).

Gunnar Aschan et al., Positional Alcoholic Nystagmus in Man During and After Alcohol Intoxication, 17 Q.J. Stud. on Alcohol 381 (1956).

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Seeks to examine the possible sources of convergent-divergent oscillation in subjects exhibiting acquired pendular nystagmus.

R.W. Baloh et al., Effect of Alcohol and Marijuana on Eye Movements, 50 Aviat. Space Environ. Med. 18 (Jan 1979).

G.R. Barnes, The Effects of Ethyl Alcohol on Visual Pursuit and Suppression of the Vestibulo-Ocular Reflex, 406 Acta Oto-laryngol 161 (1984).

Jason Barton, Blink- and Saccade-Induced Seesaw Nystagmus, 45 Neurology 831 (April 1995).

Examining the possible causes of seesaw nystagmus manifesting itself after subject blinks.

Humphrey Belton, Lateral Nystagmus: A Specific Diagnostic Sign of Ethyl Alcohol Intoxication, 100 N.Z. Med. J. 534 (Aug. 1987).

Advocating the use of lateral nystagmus test to detect alcohol impairment in drivers because "lateral nystagmus…is the most reliable diagnostic sign in the assessment of alcohol impairment." Article also advocates demonstrations on television "so that lay people may detect intoxication in potential drivers and discourage and prevent impaired motorists from driving."

M.B. Bender & F.H. O'Brien, The Influence of Barbiturate on Various Forms of Nystagmus, 29 Am. J. Ophthalmology 1541 (1946).

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L.H. Blomberg & A. Wassen, The Effect of Small Doses of Alcohol on the "Optokinetic Fusion Limit", 54 Acta Physiol. Scand. 193 (1962).

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Marcelline Burns, The Controversy and the Issues: Horizontal Gaze Nystagmus, 3 The DRE 7 (May/June 1991).

A response to defense articles challenging the validity of the HGN test.

Marcelline Burns, DUI Enforcement Problems at Roadside, 7 Alcohol, Drugs and Driving 215 (1991).

Identifying the various obstacles police officers face in detecting impaired drivers. Advocates the use of HGN to detect drivers that have high alcohol tolerance levels and do not display the typical balance and coordination problems usually association with impairment.

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Marcelline Burns, Recognition of the Drug-impaired Driver by Examination of Behavioral and Physiological Signs, Proceedings, 34th Annual Meeting Human Factors Society, Orlando, FL 1015 (1990).

Describes the drug recognition evaluation procedure (of which HGN is a part), concluding that the procedure is highly effective in identifying drug impairment.

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Study to evaluate the effectiveness of the drug recognition evaluation process, of which HGN is a part. Study concludes that the drug recognition evaluation program is a valid means of drug recognition and detecting drug impairment.

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Harvey Cohen, Prosecution of the Impaired Driver 8A-1 (1989).

Addresses the legal aspects of field sobriety tests, and HGN in particular, and their admissibility in court. Summarizes common criticisms of the HGN test's ability to accurately detect impairment.

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Study conducted by Marcelline M. Burns and Ellen W. Anderson to evaluate the effectiveness of the standardized field sobriety test battery, taking into account variables such as age, sex and weather conditions during testing. The study concluded that the standardized field sobriety test battery, despite these variables, is highly effective.

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Florida Department of Transportation, State Safety Office, A Florida Validation Study of the Standardized Field Sobriety Test (S.F.S.T.) Battery, A1-97-05-14-01 (1997).

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C.J. Forkiotis, Optometric Exercise: The Scientific Basis for Alcohol Gaze Nystagmus, 59 Curriculum II, No. 7 (April 1987).

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George Goding & Robert Dobie, Gaze Nystagmus and Blood Alcohol, 96 Laryngoscope 713 (July 1986).

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APPENDIX G

AMERICAN OPTOMETRIC ASSOCIATION HGN RESOLUTION

American Optometric Association
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HORIZONTAL GAZE NYSTAGMUS AS A FIELD SOBRIETY TEST

WHEREAS drivers under the influence of alcohol pose a significant threat to the public health, safety, and welfare; and

WHEREAS optometric scientists and the National Highway and Traffic Safety Administration have shown the Horizontal Gaze Nystagmus (HGN) test to be a scientifically valid and reliable tool for trained police officers to use in field sobriety testing; now therefore be it

RESOLVED that the American Optometric Association acknowledges the scientific validity and reliability of the HGN test as a field sobriety test when administered by properly trained and certified police officers; and be it further

RESOLVED that the American Optometric Association urges doctors of optometry to become involved as professional consultants in the use of HGN field sobriety testing.

Adopted June 1993
House of Delegates

APPENDIX H
PREDICATE QUESTIONS

ARRESTING/SFST OFFICER

1. State your name for the record.

2. Where are you employed?

3. What is your current assignment with the police department?

4. How long have you been assigned to traffic patrol?

5. Were you on duty _____(date)?

6. Did you stop a _____ (description of car)?

7. When you walked up to the car what did you see?

8. Did you notice anything else about the defendant?

   (There may be a number of foundation questions or questions surrounding the stop that you want to ask the officer. This list of predicate questions is strictly to assist in admitting the HGN test at trial. You will want to develop your own questions for other areas of examination.)

Many officers also have paramedic or emergency medical technician training (EMT). Be sure to ask if they were trained to look for nystagmus as a part of this training. If so, be sure to examine the officer on this training and experience.

9. Did you ask the defendant to perform field sobriety tests?

10. What are field sobriety tests?

11. Were you trained in administering these tests?

12. Officer, I want to ask you specifically about a test known as horizontal gaze nystagmus or HGN. Are you familiar with this test?

13. What part of the body are you observing when you give this test?

14. Have you received specific training in the administration of the HGN test?

15. What is HGN?

16. Where did you receive your training in the administration of the HGN test?

17. How many hours of training did you receive?

18. When did you receive this training?

19. Who were the instructors?

20. Was there an alcohol workshop as part of your training?

21. What is an alcohol workshop?

22. So you know at the workshop that people have probably been drinking. Do you know how much an individual has had to drink before you test him/her?

23. Do all of the subjects at the alcohol workshop drink?

24. Do you know before administering the field sobriety tests whether a particular subject has been drinking or not?

25. Other than the alcohol workshops, have you given the HGN test to persons that you knew were sober?

26. Under what circumstances?

27. What differences have you observed in the eye movements of sober persons vs. impaired persons in doing this exercise?

28. When you learned the HGN test, were you required to pass a practical skills examination?

29. Please describe this examination.

30. As a result of your training, did you receive any certificates?

31. From what organization(s) did you receive this certificate?

32. Do you have this certificate here today?

(If you wish to have the certificate entered into evidence, be sure to have a photocopy to submit. Have the officer bring the original in case there are questions about authenticity,

however, enter the photocopy into evidence. Otherwise, the officer may not get the certificate back for months.)

33. Have you had any additional training in the administration of the HGN test other than that which you have just described?

34. Please describe that training.

35. Approximately how many times have you given the HGN test?

36. Do you keep a log of the times you have administered the HGN test?

    (This is not required and the officer may not maintain a log. Be sure to check this in advance.)

37. What is your purpose in maintaining this log?

38. Officer, based on your training and experience, is the presence of HGN a reliable indicator that a person has consumed alcohol?

39. Is there a standard way in which the test for HGN should be given?

40. Please describe the test.

    (You might offer as demonstrative evidence a videotape of the HGN test. However, some courts may find such evidence too prejudicial.)

41. What specifically are you looking for when you administer this test?

42. Did you give the test to the defendant in the same way that you have described?

43. Did you ask the defendant if s/he understood what s/he was supposed to do?

44. Did s/he indicate that s/he understood?

45. Did the defendant have any difficulty in following your directions?

46. Officer, I would like to ask you about the six clues you previously testified that you are looking for when you give this test. What is the first clue of the HGN test?

    (Lack of smooth pursuit)

47. Can you describe for the jury what you mean by a lack of smooth pursuit?

48. When you gave this part of the test to the defendant, what did you see?

49. What is the second clue of the test?

    (Distinct nystagmus at maximum deviation)

50. How long do you hold the stimulus at the point of maximum deviation?

51. Why?

52. When you gave this part of the test, what did you see?

53. What is the final part of this test?

    (Angle of onset)

54. How is this part of the test done?

55. How do you estimate the angle of onset?

56. When you gave this part of the test to the defendant, what did you see?

57. What did your observations of the defendant's performance on this test indicate to you?

If the court has determined that HGN is admissible only on the issue of probable cause, the officer's testimony will be limited to her observations and opinion that the test results gave her reason to continue with the investigation. However, if the court allows HGN evidence as substantive evidence of impairment and allows the officer to testify about the correlation between HGN and impairment, continue with the following questions:

58. In your experience, is there a connection between horizontal gaze nystagmus and the amount of alcohol a person has consumed?

59. What is that connection?

    (Be clear before trial that you are not asking the officer to tell you that a specific angle of onset equals a specific BAC. The information you are seeking is that people who have been drinking tend to show nystagmus and the more they have had to drink, the easier the nystagmus is to see. You might even have a judge allow the officer to state that the earlier the angle of onset, the higher the BAC but be careful not to sound as if a numeric correlation is being made.)

60. Officer, are the clues you saw when you administered the test to defendant indicative of alcohol impairment?

61. Based on your training and experience, what does the presence of all six clues indicate?

62. And how many clues did you see when you gave the test to the defendant?

Although HGN is the most effective and reliable field sobriety test, do not allow the defense to turn the trial into a referendum on HGN. The HGN test is only one of many pieces of evidence that the prosecution has to prove that the defendant was impaired. It will be a rare case where the police have no evidence other than the results of the HGN test.

APPENDIX I
PREDICATE QUESTIONS

RESEARCHER
in the
Area of Alcohol Impairment

Evidentiary Hearing

Prior to the evidentiary hearing, submit copies of any articles you want the court to consider as part of the Memorandum of Points and Authorities. Be sure that you have copies of any studies or articles that your intend to question the witness about. Mark and submit the NHTSA and other validation studies into evidence through the witness. However, if these studies were submitted previously as part of your memorandum, be sure to note on the record that the studies were submitted as attachments to the memorandum and are part of the court file.

1. Please state your name for the record.
2. What is your occupation?
3. By whom are you currently employed?
4. How long have you been employed in this field?
5. Please explain the nature of your work.
6. Do you specialize in studying a particular subject?
7. What is your educational background?
8. Are you a medical doctor?
9. Do you belong to any professional organizations?
10. Please tell the court what those organizations are.
11. How does one become a member of those organizations?
12. As a result of your research, have you written articles or research studies?
13. Have any of your articles or studies been published?

14. Please name some of your publications and where the material has been published.

    (Mark and offer into evidence the expert's *curriculum vitae* (CV). The CV will generally include a list of publications and presentations. If not, have the expert prepare a list of publications and presentations to attach.)

15. Are these articles peer reviewed before publication?

16. Please explain what it means to have an article "peer reviewed".

17. Have you given presentations on the results of your research findings?

18. Please tell us some of the organizations to which you have given presentations.

19. How long have you been working in your current position?

20. What are your responsibilities?

21. Have you testified in court before on the horizontal gaze nystagmus (HGN) field sobriety test?

22. Have you been qualified as an expert in court on the HGN test?

23. How many times?

24. In what courts or states?

25. Approximately how many times have you testified on HGN?

    (If you have not already done so, move to have the witness recognized as an expert.)

26. Are you familiar with the research that has been done regarding field sobriety testing (FST)?

27. Specifically, are you familiar with the research conducted by the Southern California Research Institute (SCRI) for the National Highway Traffic Safety Administration (NHTSA)?

28. How many studies on FSTs has SCRI conducted for NHTSA?

29. Have your read all of those studies?

30. Are you familiar with the FST known as horizontal gaze nystagmus?

31. What is horizontal gaze nystagmus?

32. How did you become familiar with the HGN test?

33. Were you aware of the use of the HGN test in law enforcement agencies prior to your study of it?

34. Do you know how HGN came into use as a FST prior to SCRI's research?

35. You testified previously that SCRI did three studies for NHTSA on field sobriety tests. When was the first study conducted?

36. What was the purpose of the first study?

(If you have not previously introduced the 1977 NHTSA study into the record, have it marked and entered into evidence as an exhibit. Otherwise, make note on the record that it has been previously submitted.)

37. As a result of this study, was a recommendation made regarding a specific battery of tests that should be given by police officers to determine a suspect's level of impairment?

38. What were the tests recommended by SCRI?

39. Were these tests later adopted by NHTSA as its standard battery of field sobriety tests?

40. Please describe the methods used in determining that these three tests were the best at assessing alcohol impairment.

41. Referring specifically to the HGN test, what were the conclusions about its usefulness as a field sobriety test?

42. When was the second study for NHTSA done?

(Follow the same procedure for admission of the 1981 study as recommended after question 36.)

43. What was the purpose of the second study?

44. What methodology was used in conducting the second study?

45. In the 1981 study, were the officers trained in the use of the HGN test before the study?
46. How were they trained to administer the test?
47. What was the criteria for assessing the results of the study?
48. What were the results of the second study?
49. Could you explain what you mean by a "correct" decision?
50. What was the BAC level that was used in this study to determine if the officer's arrest decision was correct?
51. Would a decision to not arrest a suspect who later tested at a .10 BAC or greater be scored as incorrect under the criteria of the study?
52. Would a decision to arrest someone who was not at a .10 BAC or greater also be incorrect under the criteria of the study?
53. Based on the two studies conducted for NHTSA, were conclusions drawn about the accuracy of the HGN test?
54. What are those conclusions?
55. Was SCRI involved in any other studies for NHTSA regarding the field sobriety tests?
56. Do you know what the purpose of the 1983 study was?
57. Have you read the 1983 study?
58. Are you familiar with the contents of the study?

    (Mark and move for admission the 1983 study as explained above after question 36.)
59. How was the 1983 study conducted?
60. What did the study conclude?
61. Are you familiar with the 1995 Colorado Validation Study? (Mark and move for admission the 1995 Colorado Validation Study as described previously.)

62. What did that study conclude?
63. How is the HGN test administered?
64. Is the procedure for administering the test currently used by police officers the same as the procedure that was tested?
65. What are the specific clues the officer is looking for in administering the HGN test?
66. Please explain what you mean by a "lack of smooth pursuit".
67. What is "maximum deviation"?
68. What is meant by the "angle of onset"?
69. How does an officer determine the angle of onset?
70. Have you been involved with any training programs for officers in administering the HGN test?
71. What has been your involvement?
72. How long does it take to train a police officer to administer and accurately interpret the HGN test results?
73. Are you familiar with the training procedure recommended by NHTSA?
74. Have you seen officers administer the HGN test in the field under actual working conditions?
75. Do you have an opinion about the ability of a police officer to administer the HGN test?
76. What is that opinion?
77. Do you have an opinion about an officer's ability to interpret the HGN test?
78. What is that opinion?
79. Does an officer need to understand the process by which alcohol ingestion creates nystagmus in order to properly administer and interpret the test?
80. Why not?

81. Are people able to voluntarily control nystagmus?
82. Does a person know that he has alcohol induced nystagmus?
83. Does a person's vision, such as nearsightedness, affect the ability to do the test?
84. Does the fact that the suspect may be wearing contact lenses affect the accuracy of the test results?
85. For purposes of clarification, we have been speaking about horizontal gaze nystagmus. Are there other types of nystagmus?
86. How did you become aware of the other types of nystagmus?
87. Could you explain what other types of nystagmus there are?
88. How does alcohol induced nystagmus appear to the observer?
89. What is the relationship of alcohol ingestion to horizontal gaze nystagmus?
90. You have testified previously about other forms of nystagmus. Does nystagmus occur naturally in some people?
91. Would a person with a natural nystagmus exhibit all six clues that the officer is looking for?
92. Have your reviewed the NHTSA manuals regarding the standardized field sobriety tests?
93. Are there conditions under which the HGN test should not be administered?
94. Can the test be given to a suspect who is sitting down?
95. Can it be given to a suspect who is laying down such as an individual who has been in a traffic crash?
96. Do you keep current on the literature involving the use of HGN as a field sobriety test?
97. Are there any studies which refute your findings as reported in the NHTSA studies of 1977? 1981? 1983?
98. Are you aware of any scientific publications which refute the findings?

99. Are there any scientific publications which dispute the connection between alcohol consumption and horizontal gaze nystagmus?

100. Do you have an opinion as to what fields of study or professions would be interested in the use of the HGN test as a measure of alcohol impairment?

101. Are there other drugs in addition to alcohol which cause HGN?

102. Are these also impairing drugs?

Trial

The testimony of the expert at trial does not need to be as extensive as that for the evidentiary hearing. At the evidentiary hearing the court should have ruled on the admissibility of the HGN test. At trial, there should be enough testimony to establish the witness' credibility and foundation for the expert opinion. After laying the foundation, have the expert give her opinion as early as possible. Do not bore the jury with a lot of meaningless detail. Be sure that the testimony of the experts and exhibits from the evidentiary hearing are part of the court record in the event of an appeal.

1. Please state your name for the record.
2. What is your occupation?
3. How long have you been employed in this field?
4. Where are you currently employed?
5. Please explain the nature of your work.
6. What is your educational background?
7. Do you belong to any professional organizations?
8. Please tell us what they are.
9. Have you authored any publications, specifically dealing with the effects of alcohol on the human body?
10. Have you authored any publications on field sobriety testing?

11. What are field sobriety tests?
12. What is their purpose?
13. Have your publications on FSTs been published in "peer reviewed" journals?
14. Can you describe for the jury what it means to have an article published in a "peer reviewed" journal?
15. Have you been asked to give presentations to any professional organizations on the effects of alcohol?
16. Please tell us when and to whom these presentations were given.
17. Have you given presentations on field sobriety testing?
18. Please tell us when and to whom these presentations were given.
19. How long have you been working in your current position?
20. Are you familiar with the research conducted for the National Highway Traffic Safety Administration (NHTSA) regarding field sobriety testing?
21. Who did NHTSA fund to conduct the FST research?
22. What was the purpose of these studies?
23. How many field sobriety test studies were conducted for NHTSA?
24. Please tell us when these studies were conducted.
25. I want to direct your attention to the field sobriety test known as the horizontal gaze nystagmus or HGN test. Are you familiar with this test?
26. How did you become familiar with the HGN test?
27. What is horizontal gaze nystagmus?
28. Was the HGN test being used by law enforcement agencies to determine that a suspect might be under the influence of alcohol before the 1977 NHTSA study was conducted?

29. Do you know how long the test had been in use by law enforcement prior to 1977?

30. How did the HGN test get selected as one of the tests to be studied?

31. What, if any, other studies were conducted by SCRI for NHTSA regarding FSTs.

32. Was the HGN test also researched as part of a 1981 research study?

33. What type of research was done for the 1981 study?

34. What type of research was done for the 1983 study?

(It is unnecessary to have the expert go into a long explanation about the NHTSA studies. Let the defense attorney bore the jury with all the details. What is important is that the expert has extensively studied HGN, is familiar with the connection between alcohol and HGN, the HGN test is a reliable indicator of alcohol consumption, and that police officers are qualified to administer and interpret the test.)

35. Do you know what the National Highway Traffic Safety Administration did with the results of the 1977, 1981, and 1983 studies?

36. Have you been involved in any training programs for officers in the administration and interpretation of HGN test results?

37. Is the HGN test as currently given by the police, the same as the test that was studied by SCRI for NHTSA?

(If you have not already done so, move the court to qualify the witness as an expert. In most jurisdictions, an expert may rely on hearsay evidence in forming an opinion. The expert may also give an opinion about the ultimate issue.)

38. Did any of this training involve observing the officers administering the HGN test out on the roadside under the officer's actual working conditions?

39. How long does it take to train someone to administer and interpret the test?

40. How is the test administered?

41. What specifically are the officers looking for?

42. Please describe what is meant by "maximum deviation".

43. What is meant by a "lack of smooth pursuit"?
44. What is the purpose for determining an angle of onset?
45. How is the angle determined?
46. Can the angle be accurately determined without a measuring device?
47. Does an officer need to know why drinking alcohol causes nystagmus in order to properly administer the test and interpret the results?
48. Why not?
49. Can a person voluntarily control nystagmus?
50. In your experience, is nystagmus visible in persons who have not been drinking alcohol?
51. Do other drugs cause nystagmus?
52. Are these drugs impairing?
53. Do contact lenses have an effect on the HGN test results?
54. Does poor vision have an effect on the HGN test results?
55. Are there other causes of nystagmus?
56. Do some people have nystagmus naturally?
57. Is a natural nystagmus the same as horizontal gaze nystagmus?
58. Would a person with a natural nystagmus exhibit the six clues that the officer is looking for?
59. Do you keep current on the literature involving field sobriety testing?
60. Do you keep current on the literature involving the HGN test specifically?
61. Are you aware of any scientific publications that dispute the validity of the HGN test as a measure of alcohol impairment?
62. Do you have an opinion as to the ability of a properly trained police officer to administer and interpret the HGN test?

63. What is that opinion?

64. Do you have an opinion as to the validity of HGN test as a measure of an individual's impairment by alcohol?

65. What is that opinion?

66. Upon what do you base your opinions?

APPENDIX J
PREDICATE QUESTIONS

SFST INSTRUCTOR

This is a sample of a generic examination of an SFST instructor. Each officer may have slightly different qualifications. The advantage of calling an instructor in addition to the officer who administered the test to defendant is the instructor's ability to talk more extensively about the training and the widespread use of the HGN test.

1. Please state your name for the record.
2. Where are you employed?
3. How long have you been employed as a police officer?
4. What are your specific duties?
5. How long have you been involved in traffic enforcement?
6. Have you had any specialized training beyond that of a regular police officer in impaired driving enforcement?
7. Please describe that training.
8. What are the standardized field sobriety tests?
9. How long has the standardized test battery been in use in this jurisdiction?

   (Check in advance to determine whether the witness knows the answer to this question.)
10. Approximately how many people have you administered the SFSTs to in the past ____ years?
11. Are you certified as a standardized field sobriety test instructor?
12. By whom are you certified?
13. How long have you been an SFST instructor?
14. How many SFST courses have you taught?
15. For whom have these courses been taught?

16. What do you have to do to maintain your certification as an SFST instructor?
17. Is one of the tests that you teach the horizontal gaze nystagmus test?
18. Approximately how many officers have you taught to administer the HGN test?
19. How long have you personally been using the HGN test?
20. What specific training was given to you in administering the HGN test?
21. Are you familiar with the National Highway Traffic Safety Administration (NHTSA) studies regarding the SFSTs?
22. Are you a drug recognition expert (DRE)?
23. What is that?
24. How long have you been a DRE?
25. Are your certified?
26. By whom?
27. What must you do to maintain your certification?
28. Are you also a DRE instructor?
29. How long have you been a DRE instructor?
30. What must you do to maintain your certification as an instructor?
31. For whom have you taught?
32. When were those courses held?
33. Is the HGN test a part of the drug recognition evaluation?
34. Have you testified in court about the HGN test?
35. How many times?
36. Have you been qualified as an expert?
37. In what courts?

(Move to have the witness qualified as an expert.)

38. As an instructor, do you use the Standardized Field Sobriety Test Manual published by NHTSA?

39. Do you teach officers to administer and interpret the HGN test in accordance with the NHTSA instructions?

40. Have you administered the test to persons that your knew were impaired by alcohol?

41. How did you know prior to administering the test that the subject had been drinking?

42. Have you also given the test to persons that you knew had not been drinking?

43. How did you know that they had not been drinking?

44. Do you see any differences in the existence of nystagmus in those who you knew had been drinking as opposed to those you knew had not been drinking?

45. Have you administered the HGN test out on the street when you did not know whether the person had been drinking?

46. How often have you given the test in an actual arrest situation as opposed to a training setting?

47. Do you keep a log of the times you have administered the HGN test with your scoring of the suspect's results?

    (This is not required unless the officer is a DRE. Be sure to check with the witness in advance.)

48. Do you also keep a log of the actual BAC these same suspects had as shown by a chemical test?

    (If the officer has a log, submit a copy into evidence after authenticating the copy. The officer may not get his original back if it is put in the court record. Although the evidence of the log and results should be admissible in the evidentiary hearing, the court may not allow it into evidence at trial as irrelevant and prejudicial. After all, this is not the officer who

administered the test to the defendant.)

49. In your experience, is the HGN test difficult to administer in the field?

50. Please describe how the test is given.

51. How do you estimate the angle of onset?

52. What if the suspect is unable to hold his head still?

53. Have you seen nystagmus in persons who were not impaired by alcohol or other drugs?

54. If a person has alcohol induced nystagmus, does s/he usually know it?

55. Can people voluntarily control nystagmus?

56. Do you have an opinion about whether police officers can be trained to accurately administer the HGN test?

57. What is that opinion?

58. Upon what is that opinion based?

59. Do you have an opinion as to whether police officers can accurately interpret the test results?

60. What is that opinion?

61. Upon what is that opinion based?

62. Do you have an opinion as to whether the HGN test is a reliable indicator of alcohol impairment?

63. What is that opinion?

64. Upon what is that opinion based?

(Many police officers also have training as emergency medical technicians (EMT's) or paramedics. If so, be sure to ask the officer whether the use of the HGN test was taught as part of the training and whether s/he uses the test in his/her emergency medical response.)

APPENDIX K
PREDICATE QUESTIONS

OPTOMETRIST

The testimony of an optometrist will be essentially the same whether at the evidentiary hearing or at trial. Review questions carefully in advance to determine which questions are applicable to your expert. In addition, the witness may suggest questions that should be asked, particularly if he has testified on other cases.

1. Please state your name for the record.
2. What do you do for a living?
3. What education is required for your profession?
4. Where did you go to undergraduate school?
5. What was your course of study?
6. Where did you go to optometry school?
7. Please tell the court about the curriculum in optometry school.
8. Did any of your course work involve the effects of alcohol on the central nervous system?
9. Describe that training.
10. Have you had additional professional training after optometry school on the effects of alcohol on the central nervous system?
11. Please describe that training.
12. Did you learn specifically about the effects of alcohol on eye movements?
13. Where are you employed?
14. What are your specific duties?
15. Does one have to be licensed as a optometrist?
16. By whom are you licensed?

17. Are you a medical doctor?
18. How does an optometrist differ from an ophthamologist?
19. Do you belong to any professional organizations?
20. What are those organizations?
21. Have you received any professional recognition or awards from any of these organizations?
22. Have you done any clinical research into the effects of alcohol and/or other drugs on the central nervous system?
23. Has any of your research focused on the effect of alcohol on eye movements?
24. Have you published the results of your research?
25. Where has it been published?
26. Is that a "peer reviewed" journal?
27. What does it mean to be published in a "peer reviewed" journal?
28. In addition to your research results, have you published other articles?
29. Where have they been published?
30. Are these "peer reviewed" journals?
31. Are you affiliated with any teaching institutions?
32. Please tell the court what those are.
33. Are you involved in any consulting work?
34. What do you consult on?
35. How long have you been doing consulting?
36. Have you lectured on the effects of alcohol and/or drugs on eye movements?
37. To whom have you lectured?

38. When was that?

    If you have not already done so, it would be appropriate to move the court to recognize the witness as an expert.

39. Are you familiar with the term nystagmus?

40. What is nystagmus?

41. Is nystagmus a topic that is covered in the literature relevant to the field of optometry?

42. Is nystagmus a newly discovered phenomenon?

43. Do you check for nystagmus in your practice?

44. Why?

45. What causes nystagmus?

46. How long has it been known that alcohol consumption causes nystagmus?

47. Are there other types of nystagmus?

48. Can they be distinguished from alcohol caused nystagmus?

49. Is nystagmus a phenomenon that occurs naturally in some people?

50. About what percentage of the population would have a naturally occurring nystagmus?

51. Can a person familiar with nystagmus distinguish alcohol induced nystagmus from a naturally occurring nystagmus?

52. How do you test for nystagmus in your profession?

53. To what extent does alcohol consumption affect nystagmus?

54. Is it accurate to say that the more alcohol that is consumed the more pronounced the nystagmus?

55. Is it difficult for someone to administer this test?

56. Does it require medical training to administer and interpret the results of a test for nystagmus?
57. Are there other drugs which cause nystagmus?
58. Would these also be drugs that impair a person's ability to drive?
59. Why do alcohol, central nervous system depressants, inhalants, and PCP cause nystagmus?
60. Are you familiar with the field sobriety test used by police officers known as horizontal gaze nystagmus?
61. What is horizontal gaze nystagmus?
62. How did you become familiar with this test?
63. What is the purpose for administering this test?
64. Have you seen police officers give this test?
65. Under what conditions?
66. Is the HGN test given by police officers similar to the test you use in your profession to test for nystagmus?
67. Do you have an opinion about whether a police officer can be trained to accurately administer and interpret the HGN test results?
68. What is that opinion?
69. On what is that opinion based?
70. What is meant by a "lack of smooth pursuit"?
71. Why would a lack of smooth pursuit be an important observation?
72. What is "maximum deviation"?
73. Is there any significance to the presence of nystagmus at maximum deviation?
74. What is meant by the "angle of onset"?

75. Why is it important to determine an angle of onset?
76. Is it accurate to say that the earlier the angle of onset, the higher the suspect's blood alcohol level is likely to be?
77. Is it difficult to determine an angle of onset?
78. Can a person voluntarily control nystagmus?
79. Does a person know when they have alcohol induced nystagmus?
80. Do contact lenses affect the results of the HGN test?
81. Does poor eyesight affect the ability to do the HGN test?
82. Do you have an opinion as to whether the presence of nystagmus is a reliable indicator of the use of a central nervous system depressant, such as alcohol?
83. What is that opinion?
84. Upon what is that opinion based?
85. Are you aware of any scientific publications that state there is no correlation between alcohol consumption and the presence of nystagmus?
86. Are you a member of the American Optometric Association?
87. What is that organization?
88. Are you familiar with the 1993 resolution "Horizontal Gaze Nystagmus as a Field Sobriety Test" passed by the House of Delegates of the American Optometric Association?
89. Is this a copy of the resolution?
90. Please read it to the court.

APPENDIX L
PREDICATE QUESTIONS

EMERGENCY ROOM PHYSICIAN

Several medical specialties use a form of nystagmus testing in diagnosing patients, for example, emergency room physicians, ophthamologists, neuro-ophthamologists. Although not necessary, the testimony of a medical expert supports the use of the HGN test in the broader community, not just law enforcement, and gives the weight of medicine to the validity of the test. It is preferable to use an expert with an interest in the subject beyond just testifying as an expert and who has actually witnessed officers administering the test.

NOTE: The following examination is intended only as a sample. It is adaptable to any medical expert you intend to call. Be sure to discuss the questions in advance with your expert to determine his ability to answer all questions. Delete those which are not appropriate for your expert. Depending on your expert's experience and training, there are many more questions you could ask to qualify the witness as a expert. Do not diminish your expert's credibility by underplaying the qualifications.

1. Please state your name for the record.

2. What is your occupation?

3. Where did you attend college?

4. What did you study?

5. Where did you go to medical school?

6. When did you graduate?

   (If the witness received any special recognition in medical school, *e.g.* valedictorian, be sure to ask about it.)

7. What is your area of practice?

8. Is emergency room medicine a specialty?

9. Is there a board certification for ER medicine?

10. Are you board certified?

11. How long have you been an ER doctor?

12. Where are you currently employed?

13. How long have you been employed at _____?

14. Please describe what you do as an emergency room doctor?

15. As an ER doctor, are you required to be familiar with symptoms associated with other medical specialties?

16. Why is that?

17. Do you see many patients who are under the influence of alcohol or other drugs?

18. Approximately how many patients a week do you see that are under the influence of alcohol or other drugs?

    (If you have not already done so, this would be an appropriate time to move the court to recognize the witness as an expert. If the witness has testified in court previously about HGN, be sure to ask when, how often, what courts, and whether the witness was qualified as an expert?)

19. What are the symptoms of alcohol impairment?

20. Are you familiar with the term "horizontal gaze nystagmus"?

21. When did you first become aware of HGN?

22. Is HGN a valid medical phenomenon?

23. Please explain what horizontal gaze nystagmus is.

24. Do doctors test for the presence of HGN?

25. How long has HGN testing been in use in the medical community?

26. Do you ever test for the presence of HGN in the emergency room?

27. How often?

28. How do you test for it?

29. Is HGN difficult to identify?

30. What is your purpose in looking for HGN?

31. Are you trained in the effects of alcohol and/or other drugs on the central nervous system?

32. What effect does alcohol have on the presence of HGN?

33. Is it necessary to be a doctor or have medical training to identify HGN?

34. Can non-medical people be trained to identify HGN?

35. Have you ever trained anyone to detect HGN?

36. About how long did it take?

37. Can police officers be trained to test for HGN?

    (Ideally your witness is familiar with the HGN test administered by police through personal observation. If not, be sure that he has had adequate time before the hearing or trial to review the NHTSA training manuals on the standardized procedures for the administration of the HGN test.)

38. Are you familiar with the procedures used by police officers to detect HGN?

39. Have you had the opportunity to review the material in this manual related to the administration and interpretation of the HGN test?

    (Show the witness a copy of the police officer training manual in use in your jurisdiction.)

40. Have you specifically reviewed page ___ through ___ which specifically refer to the HGN testing and interpretation procedure?

41. Is the procedure used by the police a reliable method of testing for the presence of horizontal gaze nystagmus?

42. Is there adequate time in the training for the officer to learn to administer and interpret the test results?

43. Is HGN voluntary?

44. Can a chronic user of alcohol suppress or control the symptoms of nystagmus?

45. Have you seen a police officer administer the HGN test at roadside?

(Only ask this question if the witness has actually seen police officers administer to the test under field conditions to impaired drivers or in a controlled setting such as a DRE evaluation or alcohol workshop.)

46. Do you have an opinion about the ability of a police officer to administer the HGN test?

47. Upon what is that opinion based?

48. What is that opinion?

49. Do you have an opinion about the ability of a police officer to interpret the test results?

50. Upon what do you base your opinion?

51. What is that opinion?

52. Are there other causes of nystagmus?

53. What are some of these causes?

54. Do you see these causes in the emergency room?

55. Are these other causes more or less common than alcohol induced nystagmus?

56. Referring specifically to other causes of nystagmus, does the nystagmus (bouncing of the eyes) appear the same as alcohol caused nystagmus?

57. Do you know the rate of occurrence of nystagmus in the general population of the various pathologic causes of nystagmus that you have just mentioned?

58. How difficult is it to tell the difference between alcohol caused nystagmus and some of the other causes that you have mentioned?

59. Is a police officer who has been trained in the administration of the HGN test using the NHTSA scoring procedure, looking for 6 clues (3 in each eye), likely to mistake alcohol induced nystagmus for other types of nystagmus?

60. Does caffeine cause nystagmus?

61. Does nicotine?

62. Does fatigue?

63. What is the most common cause of horizontal gaze nystagmus?

64. You testified previously about some of the common symptoms of alcohol impairment?

65. What functions of the body does alcohol affect?

66. Can a chronic user of alcohol develop a tolerance to alcohol?

67. Can he learn to compensate for some of the behaviors associated with impairment, such as poor balance?

68. In your opinion, which is a more reliable indicator of alcohol impairment, the presence of HGN or some of the other commonly associated signs such as slurred speech? poor balance? lack of coordination?

69. Why?

70. Would HGN be visible after one drink?

71. By the time HGN is visible, what effect would there be on the suspect's judgment? ability to process information? coordination?

72. Do you have an opinion about the HGN test as a reliable indicator of alcohol impairment?

73. Upon what is that opinion based?

74. What is your opinion?