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Effect of the 0.08% BAC Law on the North Carolina Substance Abuse Assessment Program

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Final Report

UNC/HSRC--95/11/3

University of North Carolina

Highway Safety Research Center

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I. Introduction

In the continuing struggle to control alcohol-impaired driving and the economic and social costs that result, North Carolina continues to be among the leaders in innovative DWI programs. With all individuals convicted of DWI now mandated to be screened for substance abuse, the legal system serves as a way of identifying individuals likely to need treatment of drinking problems. Following this screening, individuals are sent either to treatment or to ADETS (alcohol and drug education traffic school).

It is important that individuals be accurately assessed and sent to the most appropriate program if treatment (or education) is to have the desired effect. Among the potentially useful sources of information about an individual who is being screened is his/her BAC at time of arrest. However, a substantial (and increasing) number of individuals are refusing to take a breath or blood test, and the question arises as to what, if anything, this means about their drinking status and their likelihood of successfully completing treatment or ADETS, as well as the longer term likelihood of their becoming a repeat DWI offender. It is also of interest to know whether BAC at time of arrest is a useful predictor of a person's substance abuse status and the likelihood that he/she will become a repeat offender. This report will examine that issue.

In keeping with its progressive approach to impaired driving, North Carolina reduced the illegal per se BAC limit to 0.08% beginning October 1, 1993. Because all persons convicted of DWI must now be screened for substance abuse problems, this new law will likely bring a large additional number of individuals into the assessment and treatment system. A pertinent question that can now be answered is whether this new law has changed the nature of the client load being handled by the system. An earlier HSRC report (Foss, Stewart, & Martell, 1993) found that persons who were less likely to have alcohol problems were generally more likely to have completed the required assessment process. The possibility exists, then, that with the lowered BAC limit the assessment system may now be dealing with a substantially different population than was the case in the past. Regardless of whether these individuals are either equally or less likely to have drinking problems, there are implications for the assessment and treatment system. To determine how the influx of lower BAC arrestees may be affecting the system, data since enactment of the new law will be examined to see whether, and if so, how these individuals differ from those assessed and treated previously.

This report presents the result of a series of analyses conducted using the most recent available data on DWI arrests in North Carolina since January 1, 1990 when it became mandatory for all persons convicted of DWI to have an assessment for indications of substance abuse. These analyses focused specifically on the following issues:

- **Outcomes of assessment and treatment as a function of BAC at time of arrest**
- **The effect of the 0.08% BAC law on the assessment/treatment process**

II. The Assessment Analysis Data Files

In 1994, HSRC began the process of building a permanent analysis file of all persons who have been convicted of DWI in North Carolina after December 31, 1989. It had become apparent that having a base file to update each year would alleviate the need for extensive data management and file building and allow more of our efforts to go into analysis rather than into file building. Prior to 1994, this had not been economically feasible due to the high cost of mainframe computing.

Central computing services available to HSRC are undergoing extensive changes. These have afforded an even better means of working with the data for this project than was envisioned in 1994. Disk storage space on an available supercomputer has been increased substantially and is scheduled to increase yet again in the near future. This environment has allowed for daytime file building, rather than the previous overnight process. That translates into the possibility of moving several steps forward each day. Previously, at best, only one step in the file management/analysis process could be taken during any 24 hour period.

The greatest benefit of the new computing environment is that it provides the power of interactive analysis. Questions about a large data set can now be answered in a matter of minutes rather than days. The extensive storage capacity has allowed us to interpret and store *all data items* available on a driver history trailer, as can be seen in the list of variables for the four files used for these analyses which is provided in Appendix A.

Assessment Analysis File Development and Structure

The data used for this report were derived by extracting from the 1994 year-end HSRC MED/RATERS file a driver history record for each person who has been convicted of a DWI (code 625) arrest on or after January 1, 1990. Four main SAS files containing data about these individuals were created from the extracted file:

- A **Master file** containing the demographic information found in the driver history header record
- A file of every DWI arrest (code 823) ever recorded
- A file of every DWI conviction (code 625) ever recorded
- A file of every SAA&TE (DHR form 508, code 819) ever recorded

- Several other files not used in the present report.

To avoid overrepresentation of individuals, information for each person recorded by DMV as having used an alias license were collapsed. The first in-state DWI conviction for an arrest after 1989 was chosen as the pivotal event for analyses that examine either prior or subsequent events (such as prior or additional arrests). The other alcohol-related events were then grouped relative to the pivotal event and used as evidence of prior or subsequent behavior. Because there is a period of time between arrest and conviction, there exists a category of 'mid' events, such as a DWI arrest between the pivotal arrest and conviction.

Duplicate Records

Occasionally, duplicate information appears on the driver history record – multiple sets of information about a single event. Unless identified and corrected, these cases confound analyses. Consequently, in the current file duplicate cases have been reduced to a single set of information about each single event. Because a person can be arrested more than once for impaired driving, more than one DWI trailer (a set of information as it appears in the driver history record) can exist for a single individual. We have assumed that if there are multiple trailers for a person and every piece of information on each of those trailers match exactly, those trailers must represent a single event, and we kept only one of those trailers. This situation is easily remedied and is documented in Table 2.1.

Alias Licenses

In dealing with the issue of "alias licenses," where one individual has more than one license under different (alias) names, we forced a duplicate record situation in our files. By assigning the same identifier to two different driver history records, any information that DMV placed in both files would become duplicate information in our files. The resulting changes are documented in Table 2.1 as "alias-generated" duplicates.

Multiple, Duplicate, and Missing Records

Another situation that confounds analyses is not so easily remedied. This is the instance where there should be a single trailer for an event, yet there are multiple trailers containing different sets of information. In the case of the DWI arrest trailer, it is easy to see how such a situation could arise, because different sections of that trailer are completed at different times as the information reaches DMV from different sources. If, when information arrives, the arrest trailer already exists, that trailer is updated with the additional information;

if not a new trailer is generated. Any variation in identifiers, which include date and time of arrest, result in multiple trailers for one event.

For analysis, we needed to be able to select one set of information for an event. For example, one (and only one) arrest trailer must be located for the pivotal conviction to provide a BAC at arrest. To address this need, we combined these multiple trailers with partial information into a single, more complete trailer. In those instances where there was conflicting information we chose larger (BAC) values over smaller, and breath test refusals over other non-BAC codes (such as aiding and abetting) that may occur in this field of the data record. These forced solutions were flagged and can be isolated from the rest of the records. They are documented in Table 2.1, for the four data files that were used for the present report. The multiple trailers were isolated from the rest of the file, reduced to one record per event, and then added back into the file. The flag variable is set to 1 for these forced situations, 0 for all other records.

The process used to take the resulting files, choose a pivotal conviction and classify other data relative to that pivotal conviction is mapped out in Figure 2.1. The main individual-oriented file represented a merge of eleven separate files and contained 89 variables for 199,390 cases.

Table 2.1

Documentation of the Sizes of the Four Files Used for Analysis in the Present Report

	DWI Convictions	DWI Arrests	508 Forms	Demographic Information
File Name	**DWICONV2**	**DWIARR2**	**FORM5082**	**MASTER2**
Original count	302,048	375,787	107,504	202,708
Duplicates	-0	-10	-0	-0
Balance	302,048	375,777	107,504	202,708
Alias-generated duplicates	-293	-139	-169	-89
Balance	301,755	375,638	107,335	202,619
Multiple trailers removed for forced reduction	-5,080	-10,103	-2,170	-1,826
Balance	296,675	365,535	105,165	200,793
Reduced trailer added back to file	+2,343	+4,683	+1,066	+846
Balance	299,018	370,218	106,231	201,639

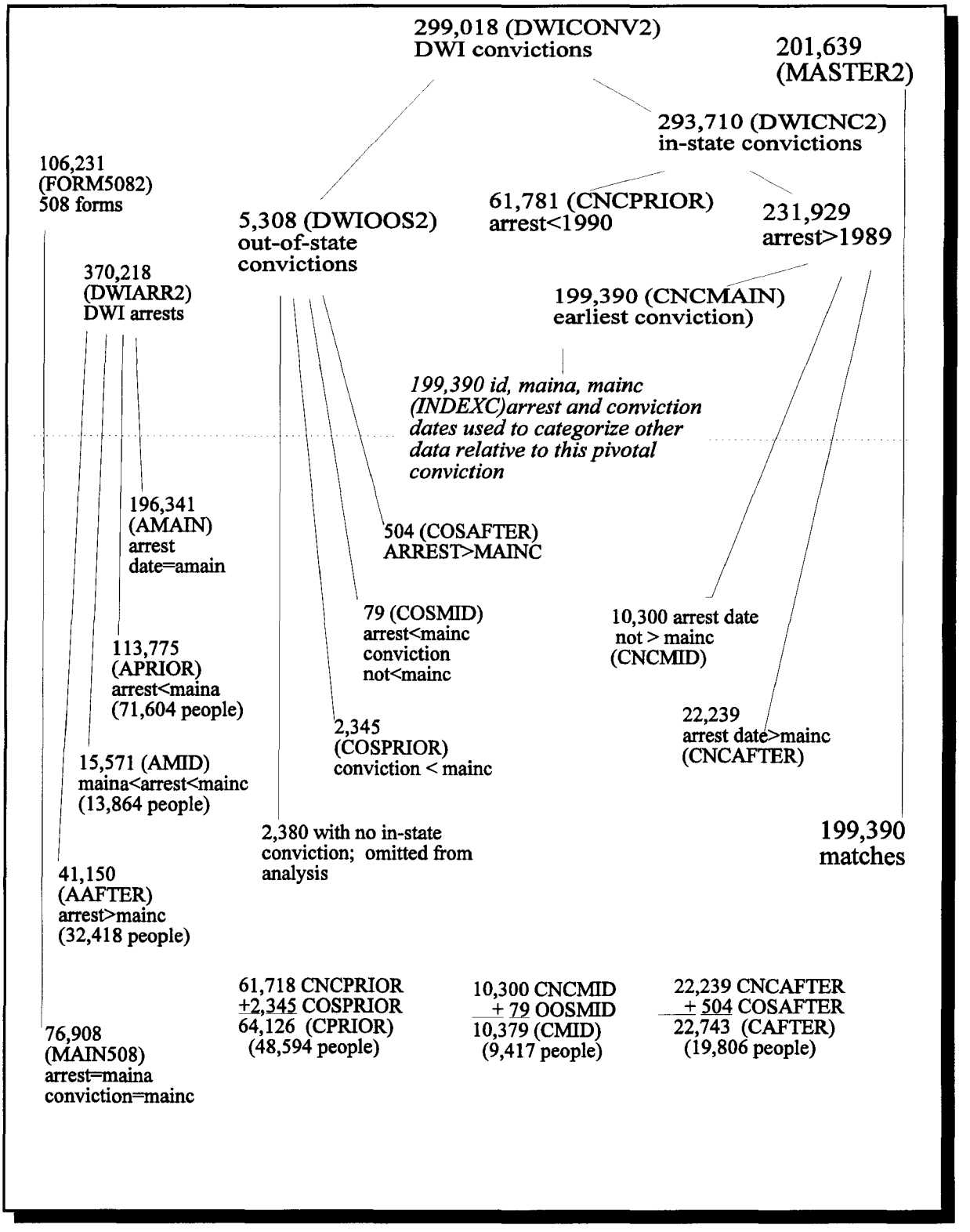

Figure 2.1 Structure of Assessment Analysis File

Number of cases for each of the multiple subfiles are shown, along with all subfile names.

III. Characteristics of the Study Population

The present report examines a small number of variables from among the substantial amount of information available in the Assessment Analysis file. In order to present the basic data upon which these analyses are based, a series of simple analyses were conducted. The following Figures illustrate the characteristics of interest in this report.

BAC at Time of Arrest

Figure 3.1 shows that one half of all persons arrested for DWI had a blood alcohol concentration between 0.12% and 0.19%. A very small number were arrested with BACs below the per se illegal limit (e.g., ≤ 0.07%) and a similarly small number were arrested with BACs in the range covered by the new, lower BAC limit (0.08%-0.09%). It is particularly noteworthy that a substantial number of individuals refused to take the breath test required by the existing implied consent law. This issue is addressed in detail below.

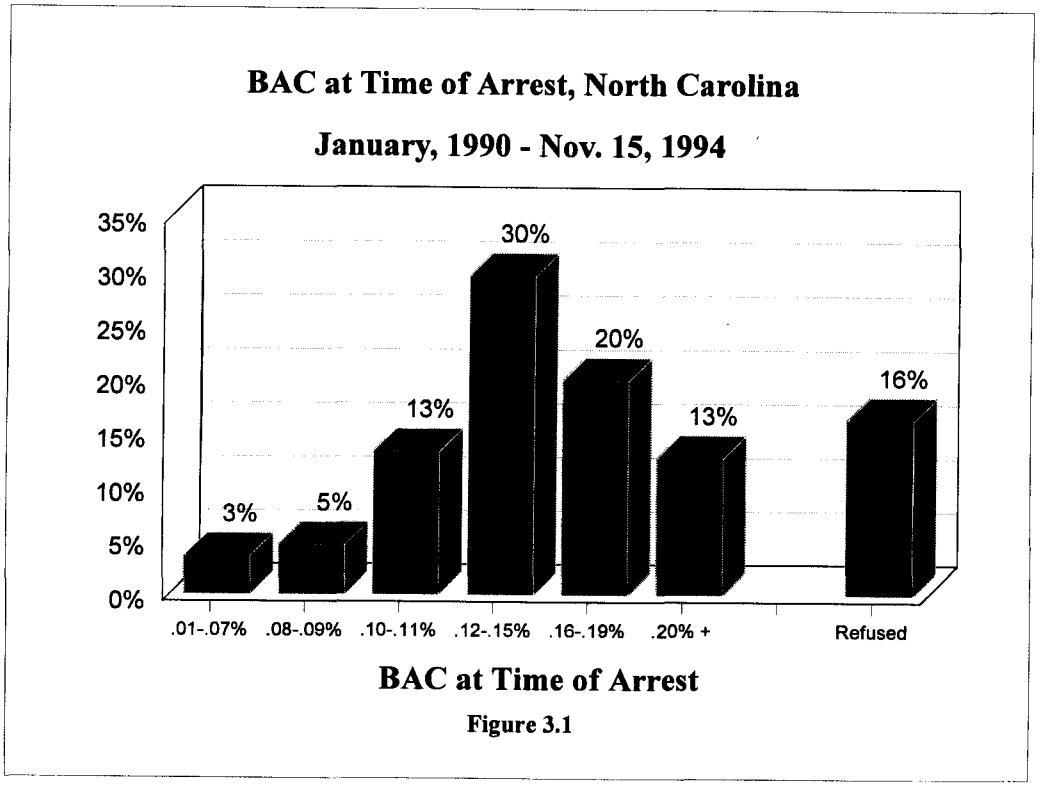

Figure 3.1

Demographic Characteristics of Drivers Arrested Since January 1, 1990

Figure 3.2 presents the basic demographic characteristics of the sample. Although drinking-driving is widely acknowledged to have become more of a problem among women in Canada, Australia, and the U.S. (Beirness, 1989; Foss et al., 1992; Holubuwycz, 1989) – including North Carolina (Popkin, 1991) – the present data indicate that it is still very heavily weighted toward males. More than 86% of all persons convicted of DWI in North Carolina since January 1, 1990 are males.

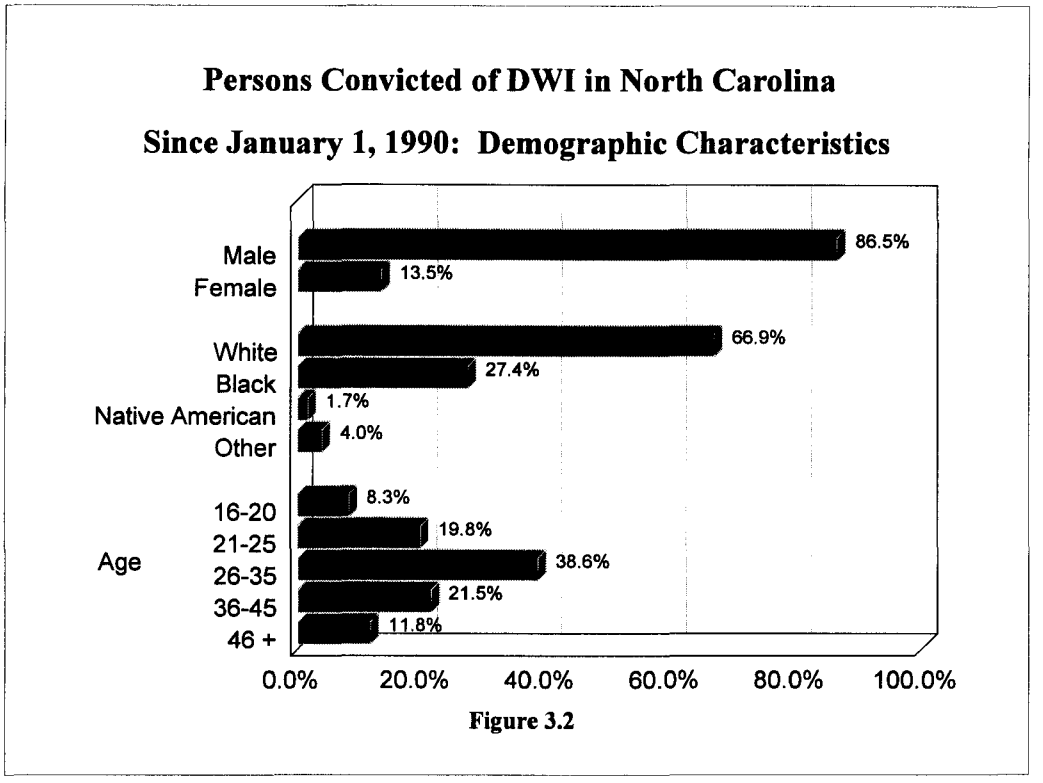

Figure 3.2

The age distribution presented in Figure 3.2 shows that the majority of problem drinking-driving (as reflected by DWI convictions) is largely engaged in by individuals ranging in age from 25 through 45, with the heaviest concentration being among those below age 40.

Finally, it is clear that a large majority of the individuals convicted of DWI in North Carolina during the past several years has been white. Moreover, Native Americans and other races (e.g., not white, black, or Native American) constitute a very small proportion of DWI convictions currently in North Carolina.

Completion of Assessment and Treatment

In order to be eligible for reinstatement of their driving privilege, persons convicted of DWI must complete an assessment and either treatment or ADETS. Ideally, this process would be completed within a one year period after conviction. In practice, for a variety of reasons, a substantial proportion of individuals do not complete this process in a timely manner. The longer it has been since a conviction, the greater the likelihood that a person will have completed this process and become eligible for reinstatement of their license. Hence, rather than showing a simple overall completion rate, Figure 3.3 shows the proportion of individuals who have completed the required assessment and treatment/education process by year of their conviction. For each conviction year, the bar in the figure reflects the percent of individuals who completed the assessment/treatment process within successive one-year intervals. For example, among those persons convicted in 1991, 29% completed the process within the first 12 months following conviction. Another 12% completed the process during the following 12 months, and an additional 4% completed during the next 12 months. Including the additional 1% who finished within the fourth year, a total of 47% of those convicted of DWI during 1991 had completed the assessment and treatment process by the end of 1994.[1]

[1] Each year about one percent of individuals obtain a pretrial assessment. These are not shown in Figure 2.4.

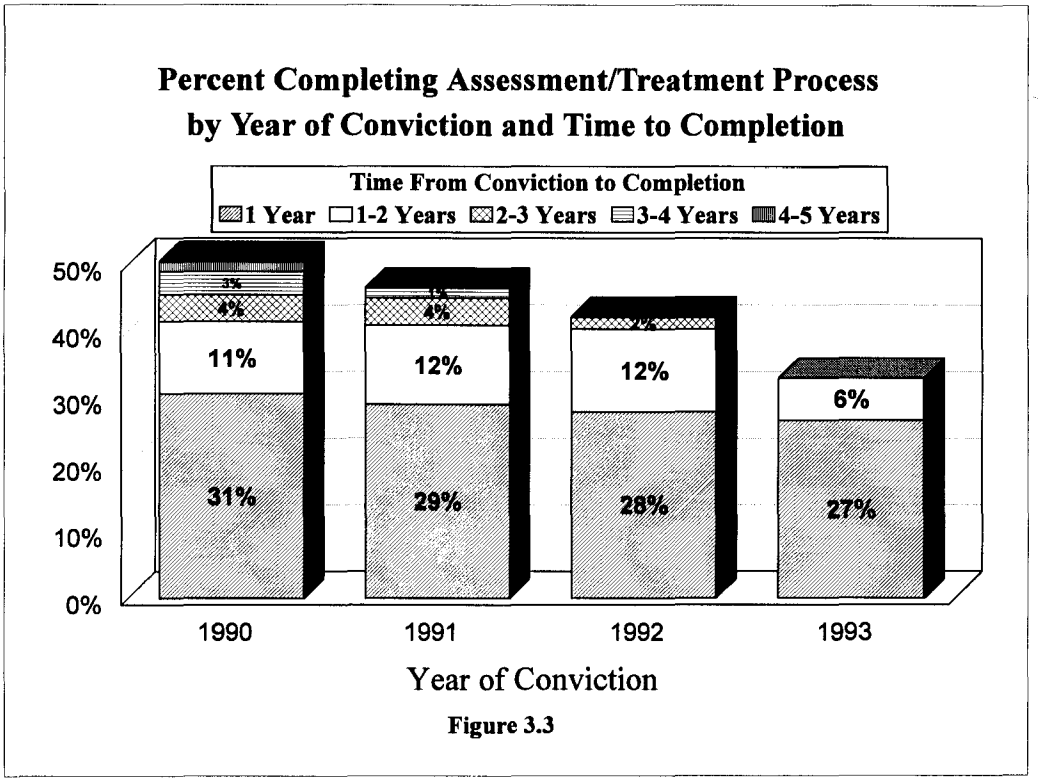

Figure 3.3

Assessment Result

A very large number of individuals have been screened for substance abuse problems since this was first mandated in 1990. Figure 3.4 shows the proportion of all screened individuals who have been judged to have a substance abuse handicap. With rare exceptions, each of these individuals is recommended for treatment of their substance problem. Of the 46% that have been diagnosed with no handicap, virtually all are sent to ADETS.

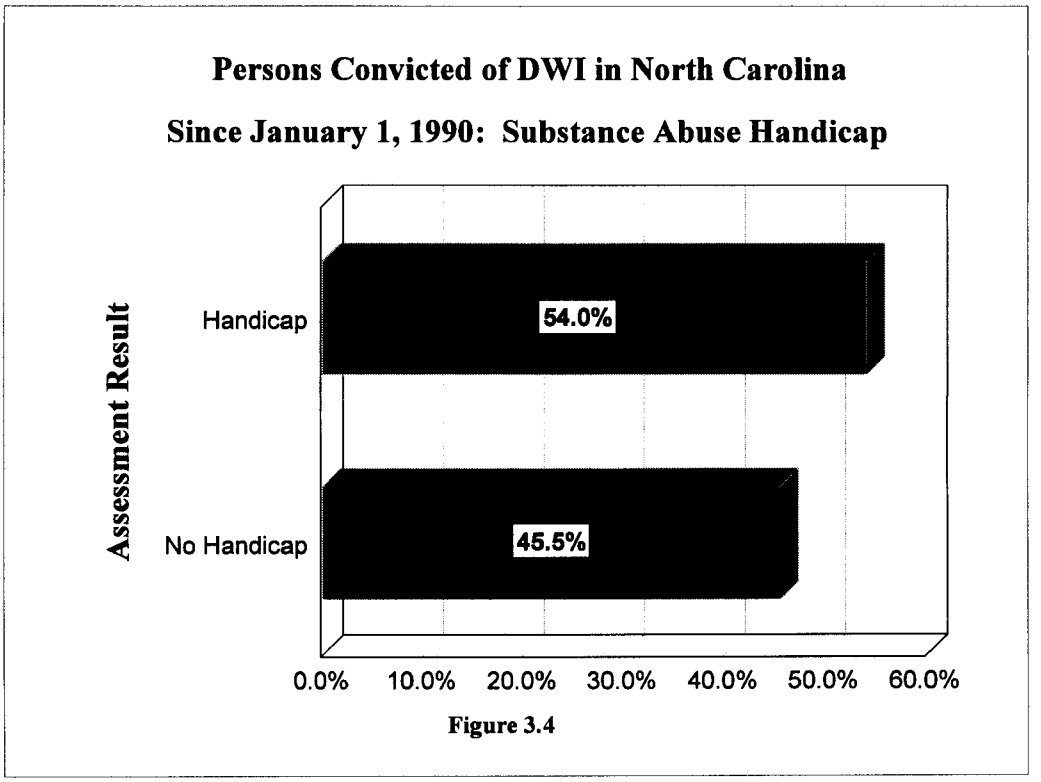

Figure 3.4

BAC at Time of Arrest by Sex, Age, and Race

BAC at time of arrest (and breath test refusal) is a central variable in the following analyses. This characteristic (which reflects drinking behavior) varies somewhat across demographic groups. Accordingly, Figures 3.5 through 3.7 present the distributions of BAC at time of arrest for these various demographic subgroups.

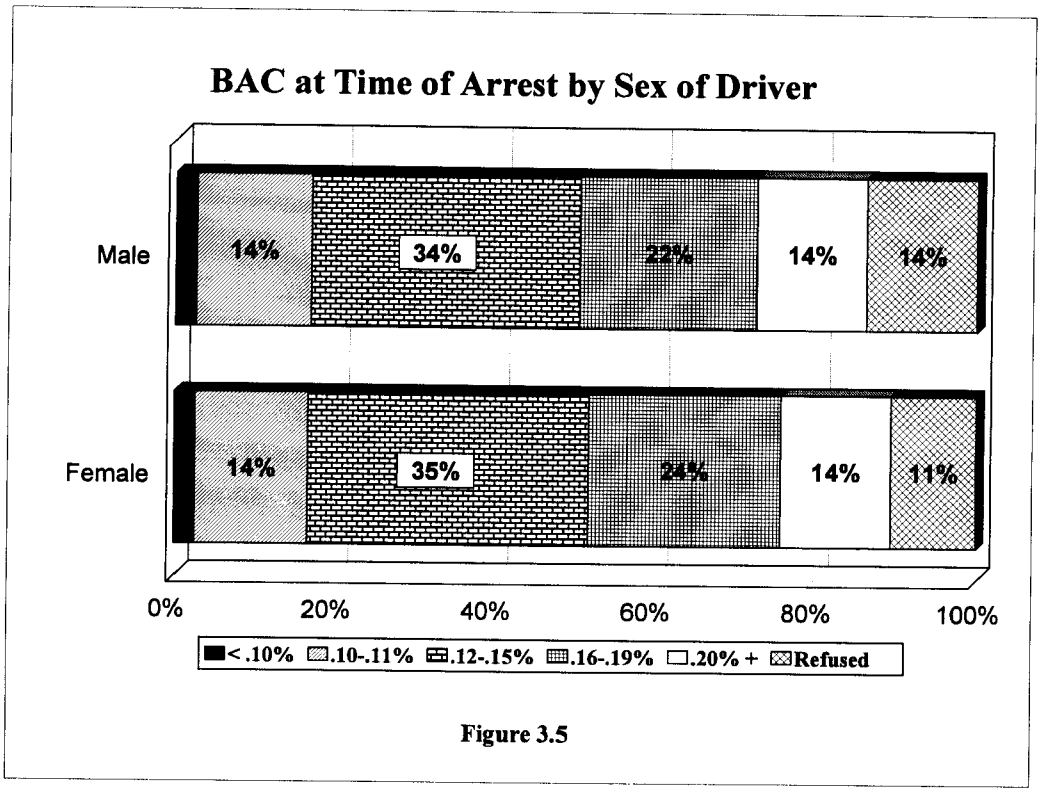

Figure 3.5

Interestingly, females and males did not differ to any meaningful degree in their BACs when arrested (Figure 3.5). The one noteworthy difference is that males were somewhat more likely to refuse the breath test than were females.

Figure 3.6 shows a clear relationship between age and BAC at arrest. Younger drivers have a greater preponderance of lower BACs than do older drivers. Whereas about 28% of 16-20 year-olds had BACs of 0.11% or lower when arrested, fewer than 12% of persons 46 and older has BACs that low. Conversely, only 5% of the youngest age group had BACs in excess of 0.20%, but more than 22% of the oldest drivers were at that level when arrested.

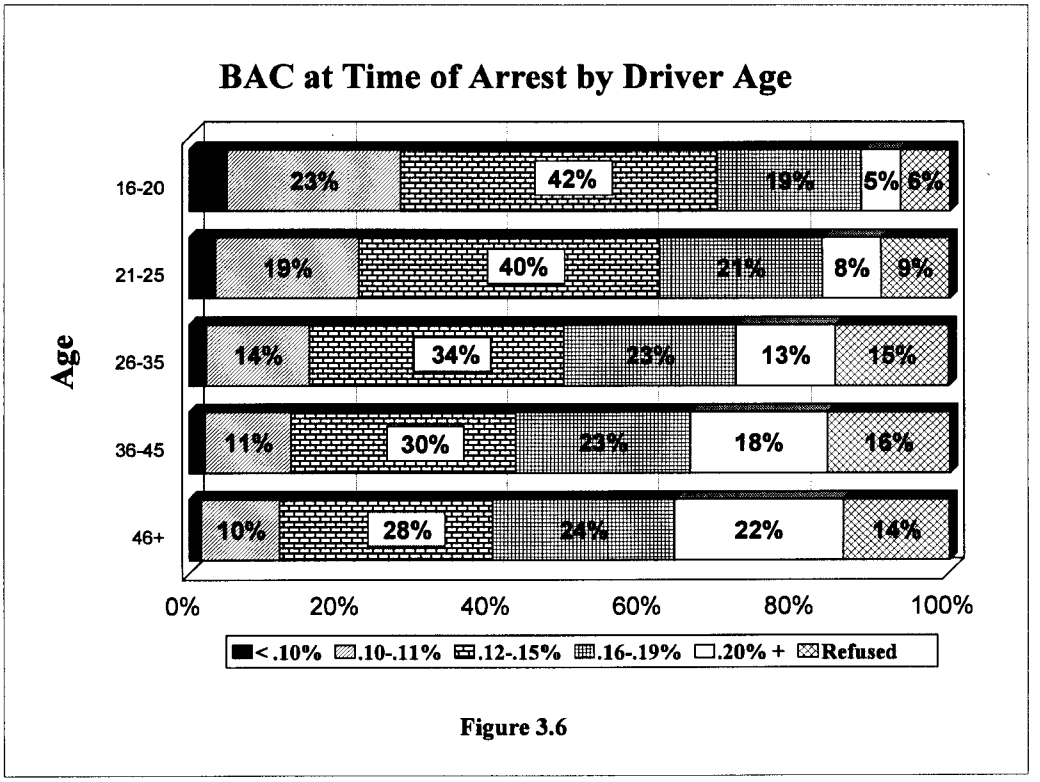

Figure 3.6

As distinct from age differences in BACs, there were no clear patterns across different races (Figure 3.7). Blacks were slightly more likely to refuse the breath test (14.75% vs. the overall refusal rate of 13.21%). Blacks (16.79%) and Native Americans (14.94%) were slightly more heavily represented among the highest BAC group (13.67% overall).

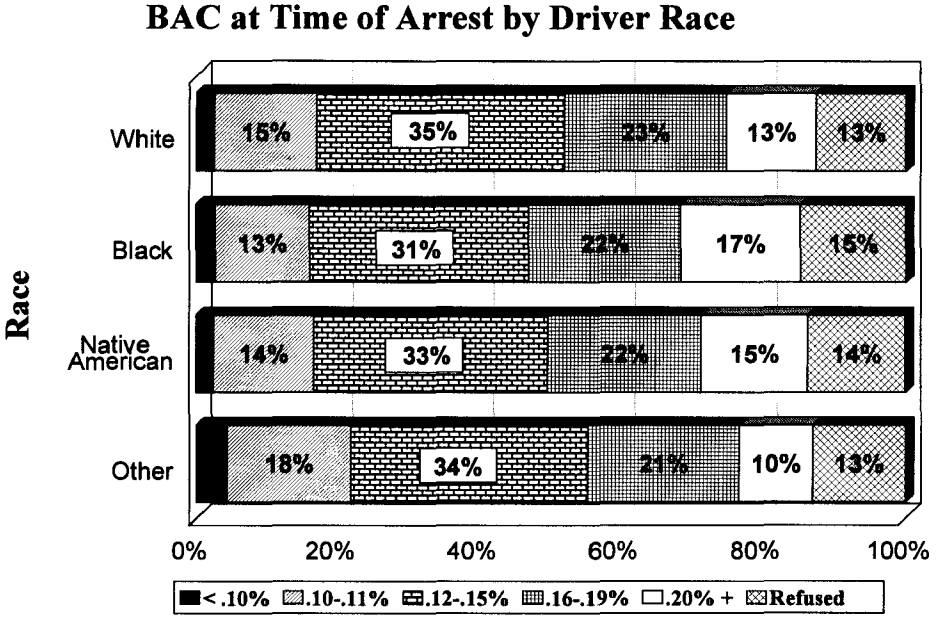
BAC at Time of Arrest by Driver Race
Race
White
Black
Native American
Other
15%
35%
22%
13%
13%
13%
31%
22%
17%
15%
14%
33%
22%
15%
14%
18%
34%
21%
10%
13%
0%
20%
40%
60%
80%
100%
< .10%
.10-.11%
.12-.15%
.16-.19%
.20% +
Refused

Figure 3.7

IV. Outcomes of Assessment and Treatment as a Function of BAC at Time of Arrest

There has been some debate that BAC at time of arrest alone, may not be a particularly useful predictor of the extent or nature of an individual's problem with alcohol (Forman & Florenzano, 1978; Wieczorek et al., 1992). On the other hand the National Council on Alcoholism (NCA, 1972) identifies BAC measured at a single point in time as a central indicator of alcoholism: a person with a BAC of .15% "without gross evidence of intoxication . . . must be diagnosed as being alcoholic." According to Wieczorek et al. (1992) this means that a substantial proportion of persons arrested for DWI must be alcoholic, since they have been performing a complex divided attention task that is inconsistent with "gross impairment."

The evidence upon which particular BAC levels were identified as markers or predictors of alcoholism is not extensive or particularly compelling. Filkins et al. (1973) relied on a small number of studies (6) with small sample sizes in developing the Mortimer-Filkins test. The NCA provided no references to support the assumed relationship between BAC and alcoholism (cf. Fine et al.,1978). Nonetheless, BAC came to be widely accepted as a useful diagnostic tool, and remains so today. Valaske (1985) commented that the "singular value [of BAC] lies in the confidence with which one can diagnose alcoholism in such drivers."

Given the importance of correct identification and treatment of drinking problems in ameliorating alcohol-related crash problems in North Carolina, we examined this issue using the current cumulative file of DWI convictions for arrests since January 1, 1990. This data base is far larger than those employed in any previous research on this issue and as a result should provide some of the most useful data ever obtained on this issue.

A related issue of particular interest is missing data regarding BAC at time of arrest and how this relates to assessment and treatment outcomes. That is, what are the outcomes for persons who refused to take a breath or blood test when they were arrested? This is an interesting subset of persons arrested for DWI and one of increasing importance. The number of individuals who are refusing to take a breath test has increased recently. After hovering at about 13.5% for several years, refusals went to 14.25% in 1992 and 16.75% in 1993, yet little is known about this increasing population. It is suspected that these individuals have had

previous experience with a DWI arrest and that they may have been advised by a lawyer to refuse breath testing during this or any future arrests. It may be that refusing the test is a useful predictor of both assessment result and DWI recidivism.

To determine how an individual's BAC at time of arrest was related to outcome of the substance abuse assessment and treatment process, we examined a variety of relevant outcome variables for individuals. Specifically we looked at each of the following as a function of the BAC level at time of arrest.

- ❑ Whether the process was completed, (i.e., presence of a 508 form on file)
- ❑ Assessment result (adjudged substance abuse handicap)
- ❑ 24-month recidivism (i.e., subsequent DWI arrest)

Arrest BAC and Completion of the Assessment Treatment Process

Figure 4.1 shows the relationship of BAC at arrest to completion of the assessment/treatment process.[2] Surprisingly, this relationship is curvilinear, with persons arrested with moderately high BACs most likely to have completed assessment and treatment. A linear relationship was expected in which persons with higher BACs at time of arrest would be less likely to have completed the process (within a fixed period of time) than persons with lower BACs. However, those with both high BACs ($\geq$ 0.20%) and low BACs ($\leq$ 0.07%) were less likely to have completed assessment and treatment. Persons arrested with BACs ranging from 0.08% to 0.09% were least likely of all groups to have completed the process.

[2] Tables containing data upon which figures were based are included in the Data Appendix.

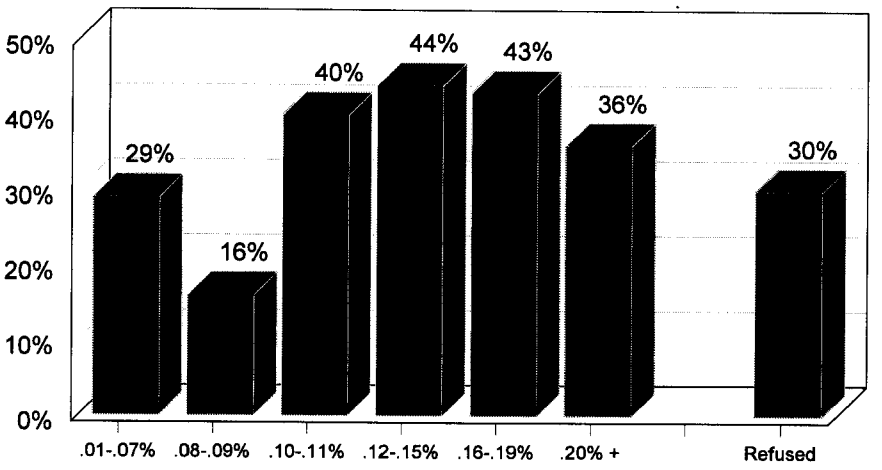

Figure 4.1

The fact that persons arrested with BACs of 0.08%-0.09% were much less likely to have completed the assessment process is at least partly an artifact of the recent reduction in the legal BAC limit. Until October 1993, very few individuals were arrested with such low BACs. What this means for the present analysis is that this particular set of individuals, as a group, has had far less time to have completed the assessment process than all other groups. Only a few of the persons arrested with BACs of 0.08% or 0.09% had even a year to complete the process prior to data collection for the present analysis (recall that the current file includes data only through November 15, 1994).

To control for the length of time available to complete the assessment/treatment process, we examined completion rates by BAC for persons arrested before the BAC limit was lowered and after the limit was lowered. Figure 4.2 shows these results. Persons from the middle BAC values still are most likely to complete the assessment/treatment process but is far less exaggerated. Essentially, completion rates are level for persons with per se illegal

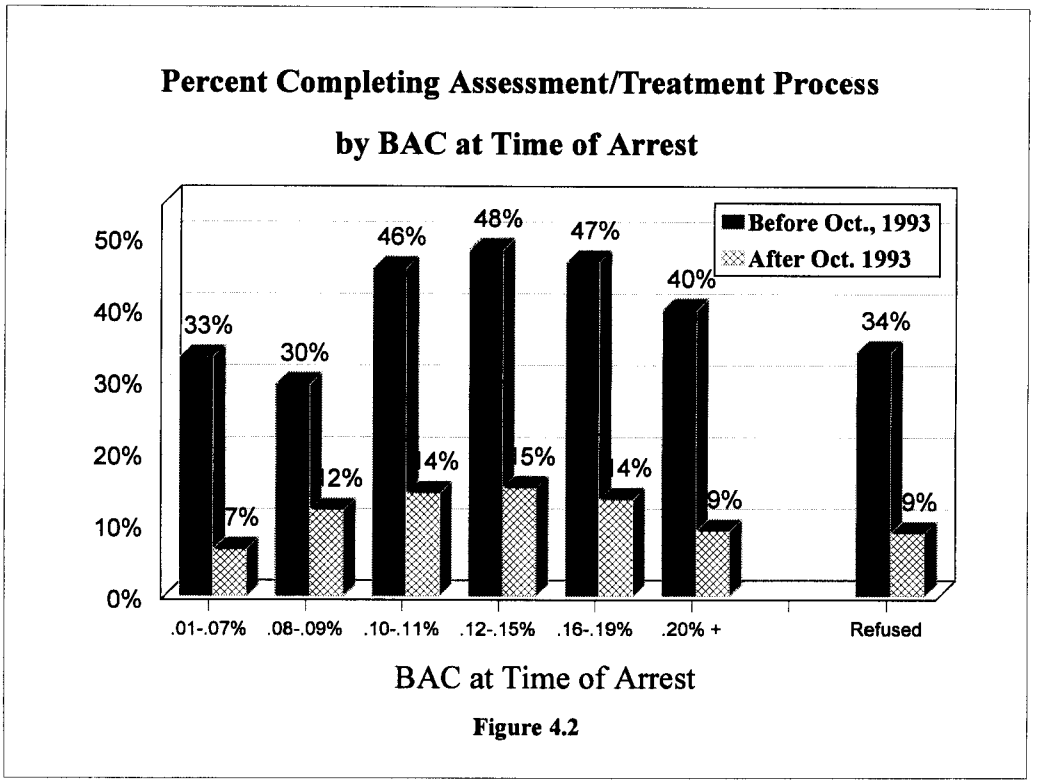

Figure 4.2

BACs at all but the highest level (≥ 0.20%). The major difference is that before the BAC limit was lowered, persons arrested at 0.08% and 0.09% much more closely resembled those with BACs below 0.08%. This is as would be expected since all these individuals were arrested with BACs below the per se limit (see comments on this below). However, after the limit was lowered, this group (0.08-0.09%) consists of a large number of persons who simply fall on the low end of the per se illegal BAC spectrum, rather than being qualitatively different from those with higher BACs. That is, previously these individuals had to be arrested, and convicted, for impaired driving based on evidence other than BAC since they were not in violation of the per se provision in the law.

In summary, within the range of illegal per se BACs, and with the effect of the lowered BAC limit removed, completion of the process tends to be somewhat lower among those arrested with the highest BACs, though not dramatically so. Two other groups stand out as substantially less likely to have completed the assessment/treatment process: those who

refused to take a breath test and those who were arrested and convicted with BACs below the per se illegal limit.

BAC at Arrest and Assessment Result

Figure 4.3 shows the percent of individuals diagnosed as having a substance abuse handicap as a function of their BAC at time of arrest. Information for this table is restricted to those 67,668 individuals who had completed the assessment/treatment process, who had a valid BAC on record, and for whom a valid handicap designation was on file.[3] Contrary to the findings of Wieczorek et al. 1992), there is a clear relationship between BAC and diagnosis of a substance abuse handicap, especially at higher BACs.

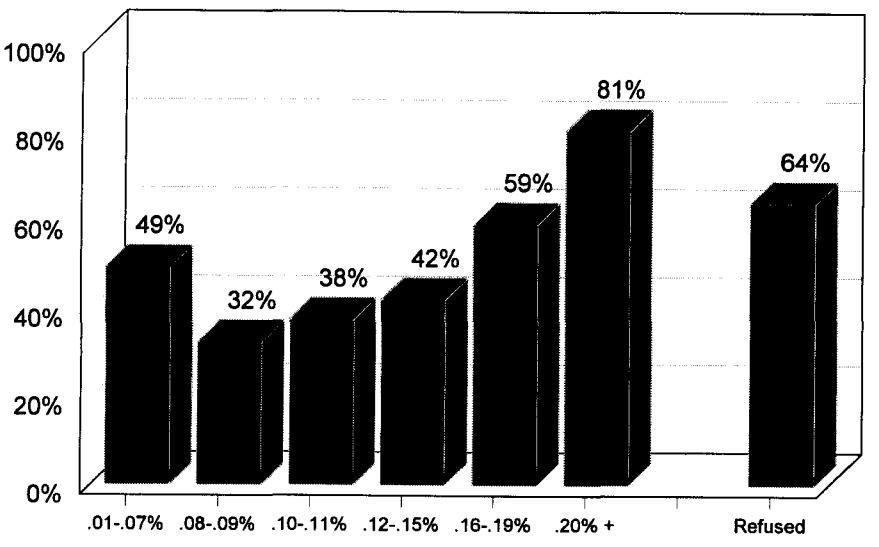

Figure 4.3

[3] 273 individuals who apparently had completed the assessment and treatment process did not have a valid diagnosis on file.

Individuals with higher BACs at time of arrest were much more likely to have been diagnosed as having a substance abuse problem. The differences here are dramatic. Individuals in the highest BAC grouping were more than twice as likely to be diagnosed with a substance abuse handicap as were those whose BAC was 0.10-0.11%. The only exception to this pattern is that persons arrested with particularly low BACs (e.g., < 0.08%) were more likely to have been diagnosed with a substance abuse problem than those with BACs ranging from 0.08% to 0.15%.Persons who refused the breath test were more likely to have a handicap than any but the highest BAC grouping.

Because an individuals' previous driving record is normally consulted when a diagnosis of substance abuse problems is made, there is a degree of autocorrelation to this relationship. That is, because BAC at time of arrest informs the judgment of whether there is a handicap, the two *should* be related as a result of the nature of the assessment process itself. Nonetheless, this matter should be pursued further to determine whether, as it appears, BAC at time of arrest is as useful tool in deciding an individual's degree of substance abuse difficulty. We will address this issue below in view of information to be presented regarding recidivism and prior arrests.

BAC at Arrest and Recidivism

Figure 4.4 presents 24-month recidivism rates[4] by BAC at time of arrest for individuals who did and did not complete the assessment/treatment process. These rates represent the simple percent of individuals in a given cell who have been rearrested, among the total number for whom at least 24 months of follow-up data were available.[5] Thus, for example, of the 343 persons convicted with a BAC of 0.07% or lower and who had not completed the assessment process, 51 (14.9%) had been arrested for a subsequent alcohol-related driving offense with 24 months.

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[4] 24-month recidivism is defined as having been arrested for an additional alcohol-related offense with 24 months of the 'pivotal' offense, that is, the first DWI arrest subsequent to January 1, 1990 in the person's driver history record.

[5] Because the file used for the present analyses was complete as of November 15, 1994 the 109,216 individuals followed for two full years had been arrested between January 1, 1990 and November 15, 1992.

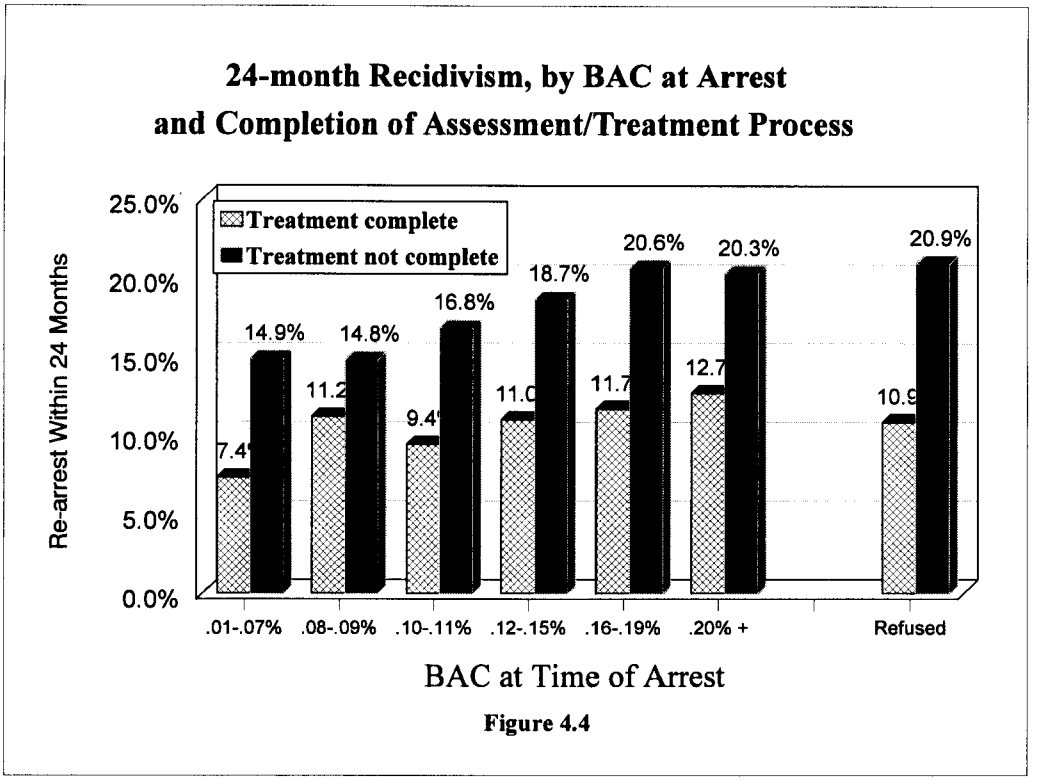

Figure 4.4

The likelihood of re-arrest clearly increases beginning with BAC of 0.10% but levels off at BACs of 0.16% and higher. Among those persons who have completed the assessment process, recidivism rates increase in a more linear fashion. At every BAC level, those individuals who had not completed the assessment process were substantially more likely to have been re-arrested for an alcohol-related offense. Persons who had not completed assessment and treatment, regardless of BAC, were 74% more likely than those who had completed treatment to be re-arrested for DWI within 24 months. This ratio varies relatively little by BAC level (see Table B.2 in the Data Appendix). The notable exceptions are the lowest BAC group and those who refused the breath test. For both these groups, re-arrest with 24 months is about twice as likely for those who did not complete assessment and treatment as for those who did so. That the magnitude of this difference is relatively constant across BAC levels suggests that whether an individual has competed the assessment/treatment process is a much better indicator of the likelihood of committing an additional offense than is BAC at time of arrest. In addition, for no apparent reason those with BACs of 0.08-0.09% who had

completed assessment and treatment had a higher recidivism rate than persons at BACs ranging from 0.10-0.15%, so the percentage difference compared to persons in this BAC range who had not completed assessment were not so great (32%) as for all other BAC levels.

Refusal to Provide Breath Sample

When considering the implications of an individual's BAC at the time of arrest, those persons who refuse to take a breath test when stopped for suspicion of DWI are of particular interest. These refusals have been increasing in frequency in recent years. Accordingly, it is important to know what these individuals are like, especially with respect to driving-related behaviors subsequent to the arrest. As Figure 4.1 shows, they are among the least likely to complete the assessment/treatment process. Those who have completed the process are among the most likely to be judged to have a substance abuse handicap (Fig. 4.3). Figure 4.4 reveals that they also have a recidivism rate that is the highest of any grouping based on BAC. Thus, this is clearly a group of problem drinkers rather than, for example, a group espousing civil libertarian views and refusing to take a breath test on principle. The question remains as to why they refuse to take a breath test and what, if any, demographic characteristics distinguish them from those who agree to the test.

It is suspected that most individuals who refuse to take a breath test when detained by an officer who suspects that they have been drinking may have previously been advised by an attorney to do so. Although one automatically loses his/her driver license for refusing a test, by not providing clear, seemingly incontrovertible evidence of legal intoxication, the individual may stand a better chance of avoiding a DWI conviction. This would appear to be a desirable result given that the ramifications of a DWI conviction are far more extensive than the simple loss of license that automatically results from refusing a breath (and blood) test. Although the data available for the present analyses contain no information about reasons for refusing a test, evidence of previous experience with a DWI charge might be an indicator of having received legal advice about how to deal with subsequent infractions.

Figure 4.5 shows the percent of drivers who had experienced a prior DWI conviction or arrest by BAC at time of the arrest in question (i.e., the first arrest and conviction after January 1, 1990). It is particularly interesting that more than half of those who refused to provide a breath sample had at least one prior arrest. This group was 29% more likely to have been previously arrested than were those individuals with the highest measured BACs (>

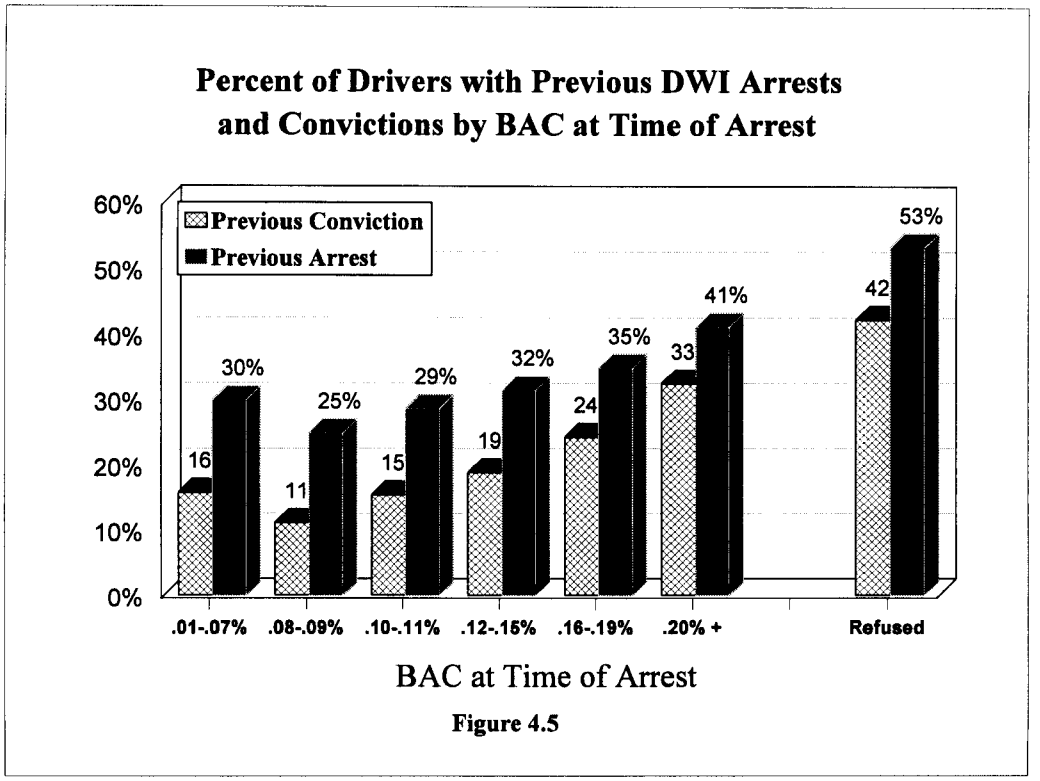

Figure 4.5

0.20%). Although this is not direct evidence, it is certainly suggestive that these individuals may be acting on the advice of an attorney when they refuse to take a breath test when asked to do so by an officer.

Profile of Breath Test Refusers

Comparing those individuals who refused a breath test with all other persons in the file (all of whom have been convicted of the DWI offense in question), the following picture emerges.

As a group, breath test refusers:

- Are more likely to have a previous DWI conviction than those who do not refuse
- Are more likely than all but the highest BAC group (0.20% or higher) to have been diagnosed with a substance abuse handicap

- Are less likely than all but the lowest BAC groups (< 0.10%) to have completed the substance abuse/treatment process
- Are more likely to have been arrested for a subsequent DWI offense with 24 months
- Are older than all other BAC groups
- Are more frequently males (88.3% vs. 85% for non-refusers)
- Differ little by race from non-refusers. Blacks (14.8%) and Native Americans (13.7%) are slightly more likely to refuse than whites or those of other races (12.6%) to refuse.

Discussion of BAC at Time of Arrest

There are several salient features of the relationship between BAC and assessment/outcome factors:

- In general, BAC at time of arrest is predictive of greater problems.
- Those individuals who were arrested (and subsequently convicted) with low BACs appear to represent a particularly problematic group.
- Assessment and treatment appear to yield clear benefits in terms of reduced recidivism.

Each of these issues is discussed briefly below.

Higher BAC Generally Indicates Greater Problems

By several different measures, those individuals with the highest BACs at time of arrest appear to be the greatest problem group. They have higher recidivism rates. They are less likely to have completed the required assessment and treatment process. When they have done so, they are among the most likely to be diagnosed as having a substance abuse handicap. Finally, although this is not necessarily an indication of a greater problem, it is worth noting that as a group, persons with higher BACs at time of arrest are older than those with lower BACs.

Perhaps the most important practical implication of this finding is that, contrary to what other researchers have reported, BAC at time of arrest does appear to be a useful indicator of the extent of an individual's problems with alcohol. Although the fact that the person's BAC at the time of arrest may often be considered in the diagnosis of a substance abuse problem, other independent indicators of drinking problems and their association with BAC suggest that the relationship between BAC at arrest and existence of a substance abuse problem is not merely an artifact of the assessment procedure. In particular, the greater post-conviction recidivism rates and greater likelihood of having a previous DWI conviction as BAC for the 'pivotal' arrest increases, provide some independent confirmation of the notion that BAC is a predictor of a substance abuse problem.

The results on the BAC-substance abuse relationship do appear consistent with the work of Wieczorek et al. (1992) and Fine et al. (1978), in that the relationship is not so strong that BAC provides as great a predictive value as Valaske (1985) and others suggest. The weakness of this relationship, and its disappearance at higher BAC levels, suggests that this piece of information should not be relied upon heavily either in the process of judging the extent of an individual's alcohol-related problems or in shaping broader social policy actions concerning drinking-driving.

Persons Arrested with Low BACs

There is a small group of individuals who are arrested and convicted of DWI with BACs below the per se illegal limit of 0.08%. In order to be convicted with a BAC below 0.08% there must be sufficient behavioral evidence of impairment that a case can be made in the absence of compelling breath test information. These individuals constitute substantially less than one percent of all persons convicted of DWI since January 1990. As such they are not of major concern. Nonetheless, they stand out as an unusual group and may merit further investigation.

Young and therefore less experienced drinkers are more often found among persons convicted with very low BACs. This is consistent with the fact that young and infrequent drinkers are, in general, more strongly influenced by low levels of alcohol than are older and more frequent drinkers (Phelps, 1992; Hurst, 1973). Thus, they may manifest obvious signs of impairment even at BACs below the per se illegal limit.

In addition, a number of these individuals may have been impaired by drugs other than alcohol. This is consistent with the finding of other indicators of substance abuse problems (besides BAC) in this group. For example, these individuals are more likely to have a previous DWI conviction and are more likely to be diagnosed with a substance abuse handicap than are individuals with substantially higher BACs. This low BAC group was more likely to evidence a substance abuse problem than individuals arrested with BACs ranging from 0.12% to 0.15%.

Beneficial Effect of Assessment and Treatment

Particularly noteworthy was the finding that recidivism is substantially higher among those who did not complete assessment and treatment as is proscribed. The recidivism rate among persons who did not complete the assessment/treatment process was nearly double those for persons who did so. Moreover, recidivism rates increased more sharply with BAC among those who did not complete assessment and treatment, compared with those who did so. Even though some of this difference may be due to self-selection, i.e., persons with greater substance abuse problems may be less likely to submit to the assessment process and at the same time more likely to drive after drinking, it is not likely that this alone explains why those who have completed the assessment/treatment process are so much less likely to experience a subsequent DWI arrest.

V. Effect of Lower BAC Limit on the Substance Abuse Assessment and Treatment System

On October 1, 1993 the *per se* illegal BAC limit in North Carolina was reduced from 0.10% to 0.08%. The expected effect of this legislation was that impaired driving would decline. The logic was that more persons would be subject to arrest than had previously been the case and that, as a result of their experiencing the resulting penalties, they would be deterred from driving after drinking in the future. In addition, it was thought that to the extent the general driving public was aware that the illegal BAC limit had been reduced, they would be less likely to drive after drinking the same amounts of alcohol as they had prior to the change in the law.

Because lowering the BAC limit was expected to increase the number of persons arrested and convicted of DWI, it was also to be expected that the substance abuse assessment and treatment system would experience an increase in client loads for screening and for the provision of either ADETS, treatment, or both. Finally, it was expected that the average BAC of persons arrested and convicted of DWI would be reduced by the new law. These potentially extensive changes in the number and collective nature of individuals using assessment and treatment services have implications for the NC counseling community.

The lower BAC limit has been in effect for two years. Accordingly, it is now possible to examine the early effects of the lower BAC limit on the assessment and treatment system. Because of the lag time involved in entering information about DWI into the NC Driver History file, reasonably complete information is available through November 15, 1994. Using these data we examined:

- Whether, and if so by how much, the client load has changed since October 1, 1993
- How the BAC distribution among persons mandated to undergo assessment has changed, i.e., are BACs of persons being convicted of DWI now systematically lower than in the past as a result of more persons with lower BACs being arrested and convicted
- How assessment outcomes (diagnosis of substance abuse handicap vs. no handicap) differ when post-Oct. 1993 arrestees are compared with those arrested prior to the

lowering of the BAC limit, i.e., are persons with the lowest illegal BACs less likely to be judged to have a substance abuse handicap and, consequently, need treatment

- Whether, and if so how, the client load of the assessment/treatment system has changed in other ways beside clients possibly having lower BACs on average (e.g., are clients now younger, older? More or less likely to be females)?

Client Load

Figure 5.1 shows the number of DWI arrests and convictions by month since January 1990.[6] The number of convictions is low in the beginning since these refer only to convictions for arrests subsequent to January 1, 1990 and there is typically a lag of several months between arrest and conviction. Also shown on the figure are the average (mean) number of arrests per month for successive 9 month periods. These summary values both smooth out the monthly variations and provide an indication of the trends in arrests and convictions over time. Since all individuals convicted for DWI arrests after December 31, 1989 are required to undergo assessment, this figure provides an indication of the likely client load.

[6] It is important to note that the file being analyzed here contains data only on persons who have been *convicted* of a DWI offense committed since January 1, 1990. It does not contain information on all alcohol arrests made in North Carolina over that period of time. Even though it is not an exhaustive compilation of arrests, examining arrests as well as convictions in this subset of the overall driving population is instructive.

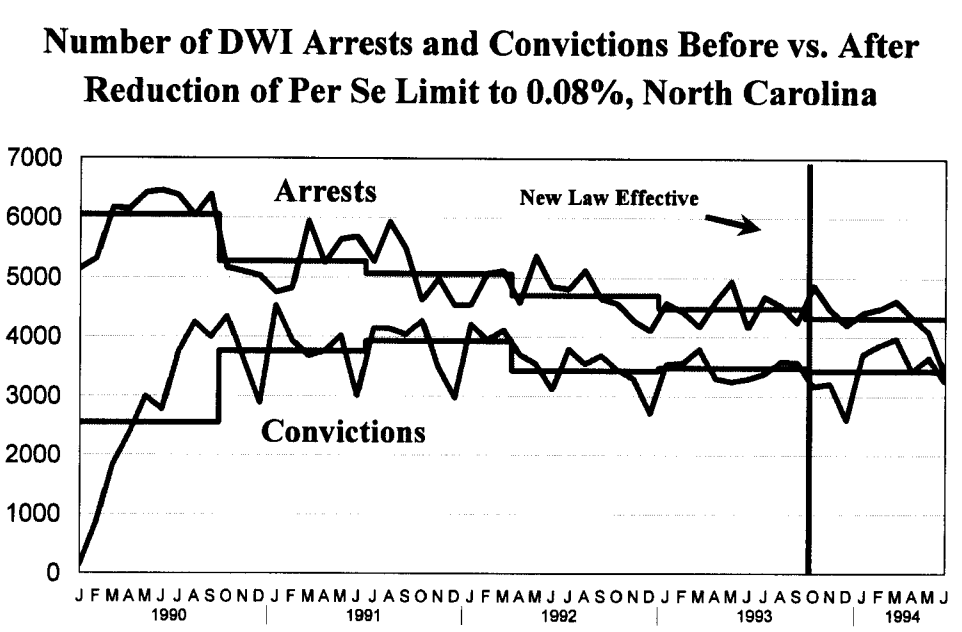

Figure 5.1

It is clear that the number of DWI arrests following the new law is lower, not higher than prior to the new law. However, it is apparent that arrests have declined since 1990, and that general decline clearly preceded enactment of the lower BAC limit. The number of convictions began to decline in early 1992 and remained stable for the 18 months preceding enactment of the 0.08% limit. Following enactment of the 0.08% limit, the number of convictions remained stable. For the period between April 1992 through June 1994, the number of DWI convictions consistently averaged about 3,450 per month.

In summary, it appears that there has been no short term effect of the lower BAC limit on the number of individuals eligible for substance abuse screening and treatment. Using the data currently available, it is not possible to determine whether the actual number of individuals seeking assessment has remained the same, increased, or decreased. Because individuals with lower BACs at the time of arrest are somewhat more likely to comply with the requirement for assessment and treatment, we looked at the distribution of arrest BACs

before and after the new law to obtain a better sense of both the client load and the nature of the clientele after the BAC limit was lowered.

BAC Distribution Among Persons Assessed

Figure 5.2 shows the average (Mean) monthly BACs at time of arrest for all arrests since January 1990. Also included are the mean BAC values for the pre- and post-law period (e.g., before the per se limit was lowered to 0.08%), and the general trend (linear regression line) based on the BAC values prior to the lower limit. Very clearly the average BAC value of arrested drivers decreased immediately upon implementation of the lower limit (from a mean of 0.1494% to 0.1401%). Although there was a slight downward trend during the early 1990s, the effect of the lower limit as distinct from the general decrease is clear.

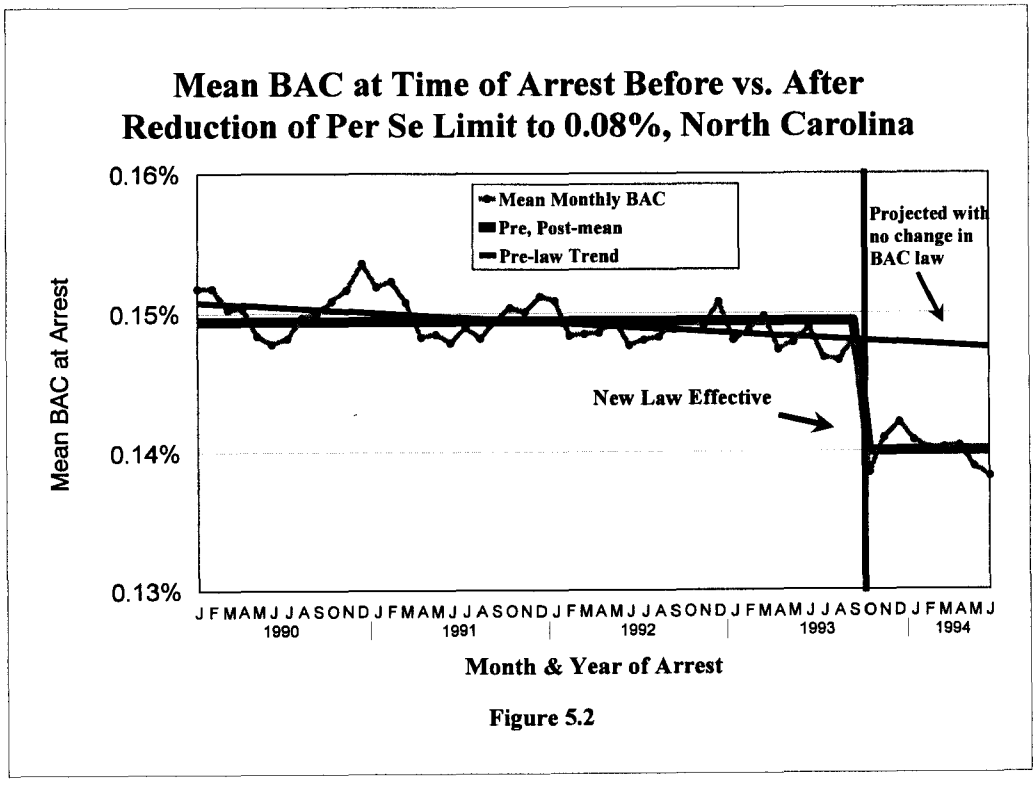

Figure 5.2

Although an average BAC across several thousand individuals is not a particularly good indicator of the client population that providers are dealing with, it does provide a clear

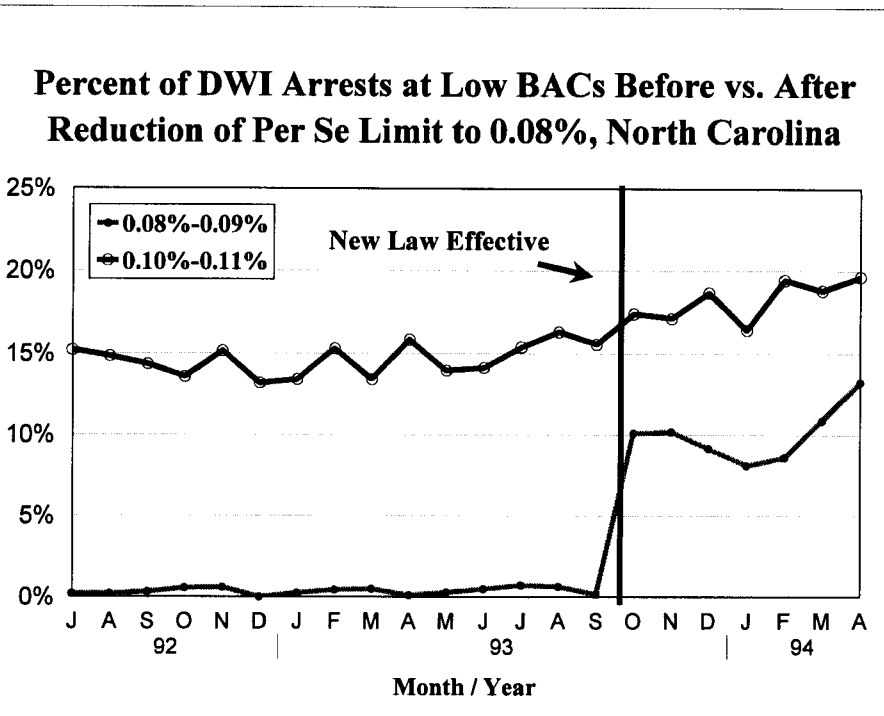

Figure 5.3

indication that there was a change. The nature of that change, with respect to implications of the decisions that are made in individual cases where an individual is assessed is probably conveyed better by an examination of the distribution of BACs across time, rather than merely their average value. Figure 5.3 shows that immediately following the new law, there was a 20-fold increase in the number of individuals arrested with BACs below 0.10%. It appears that the proportion of persons arrested with BACs of 0.11-0.12% may have increased slightly as well. At the same time, the number of DWI arrests did not increase following enactment of the lower BAC limit. Thus, fewer persons at higher BACs were arrested. Whether this indicates that three was an overall downward shift in BACs among the driving public, or merely that time spent arresting lower BAC drivers detracted from time that previously was spent arresting higher BAC drivers can not be determined from these data. For purposes of the present report, which is to examine the effect of this new limit on the substance abuse assessment and treatment system, it does not matter. It is clear that since the lower BAC limit became effective, the client pool being dealt with has become one with a somewhat decreased prevalence of very heavy drinking.

Change in Assessment Results After BAC Limit Lowered

It appears that the client population changed to a significant degree in terms of alcohol consumption following the lowering of the BAC limit. To learn whether that change was reflected in the overall percent of handicap designations (and, hence, in the number of individuals being assigned to treatment rather than ADETS) we examined the decisions counselors made regarding substance abuse handicaps from January 1990 through June 1994.

Figure 5.4 shows the percent of persons assessed by month of arrest since January 1990 judged to have a substance abuse handicap. Besides BAC at time of arrest, the most direct indicator of the changing nature of the client pool following enactment of the new BAC limit is the proportion designated as having a substance abuse handicap. This proportion hovered around 55% from 1990 through 1992, then dropped slightly to about 52%. Following implementation of the lower BAC limit, the proportion of assessed individuals judged to have a handicap dropped sharply to around 42%. Although a number of factors may have entered into these changes, the relative stability until the BAC law changed and brought more low BAC individuals into the system suggests that this change in clientele is the reason that fewer handicap designations are indicated.

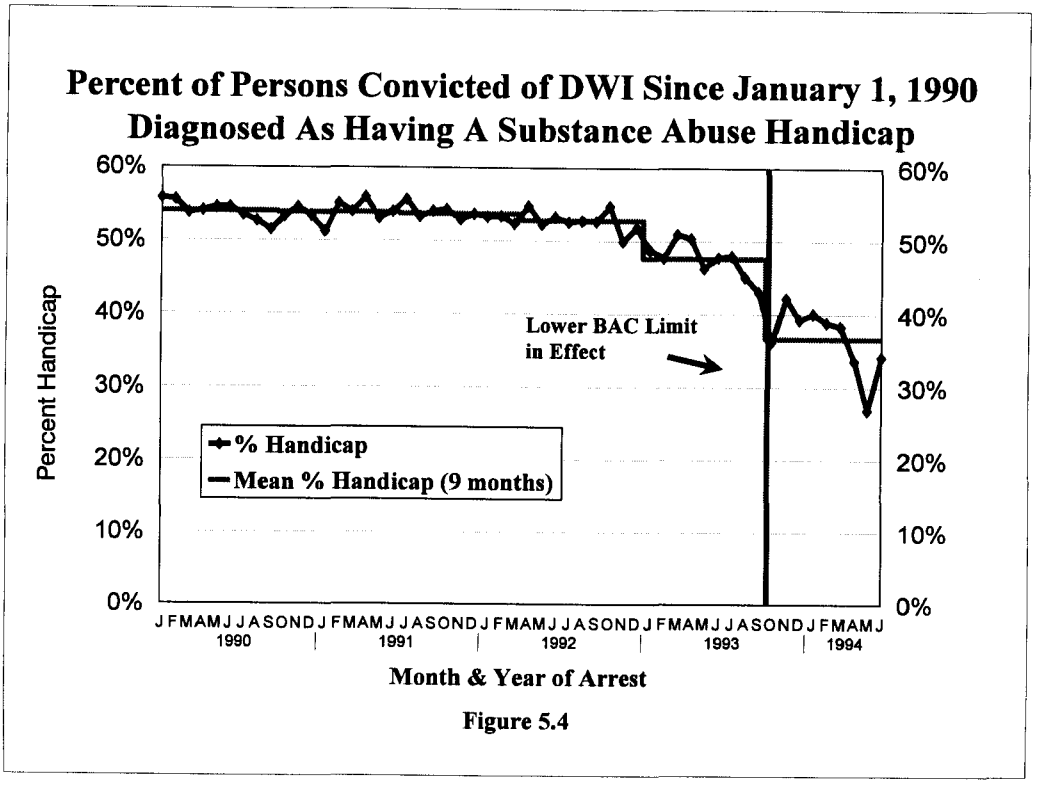

Figure 5.4

Lower BAC individuals are less both less likely to have a substance abuse problem and more likely to complete the assessment process in a timely fashion. That there was an immediate, substantial increase in the number (and percent) of individuals arrested with lower BACs (i.e., 0.08% to 0.09%) after the new law took effect would appear to account for the lower percentage of individuals diagnosed as having a handicap following implementation of the lower BAC limit. We can examine the relative contribution of this factor to the lower percent judged to have a handicap by looking at comparable time periods before and after the new BAC limit took effect.

Figure 5.5 shows the proportion of individuals judged to have a handicap for two groups of individuals: Those arrested after the lower BAC limit took effect (and who in total had up to 13.5 months to complete the assessment/treatment process), and a group of individuals arrested before the lower BAC limit was enacted also followed for 13.5 months. The handicap rate for the former group is the same in Figure 5.5 as in Figure 5.4 (about 37%). For the latter group, however, the handicap rate is substantially lower (42% rather than 48%). It is lower for this group because in Figure 5.5 the group is composed only of those individuals who completed the assessment and treatment requirements fairly quickly – within 13.5 months – making them comparable to that group of individuals who were arrested, convicted, and completed the process after the BAC limit was lowered. In sum what this tells us is that the client population now being seen as a result of mandatory substance abuse assessments for persons convicted of DWI does have a smaller proportion of individuals with a substance abuse handicap than was the case prior to October 1, 1993. The difference is not large – it appears to be on the order of 4 or 5%. Nonetheless, in view of the large number of persons convicted of DWI each year, a 4-5% reduction in the proportion who need substance abuse treatment rather than traffic safety education would appear to be a noteworthy change.

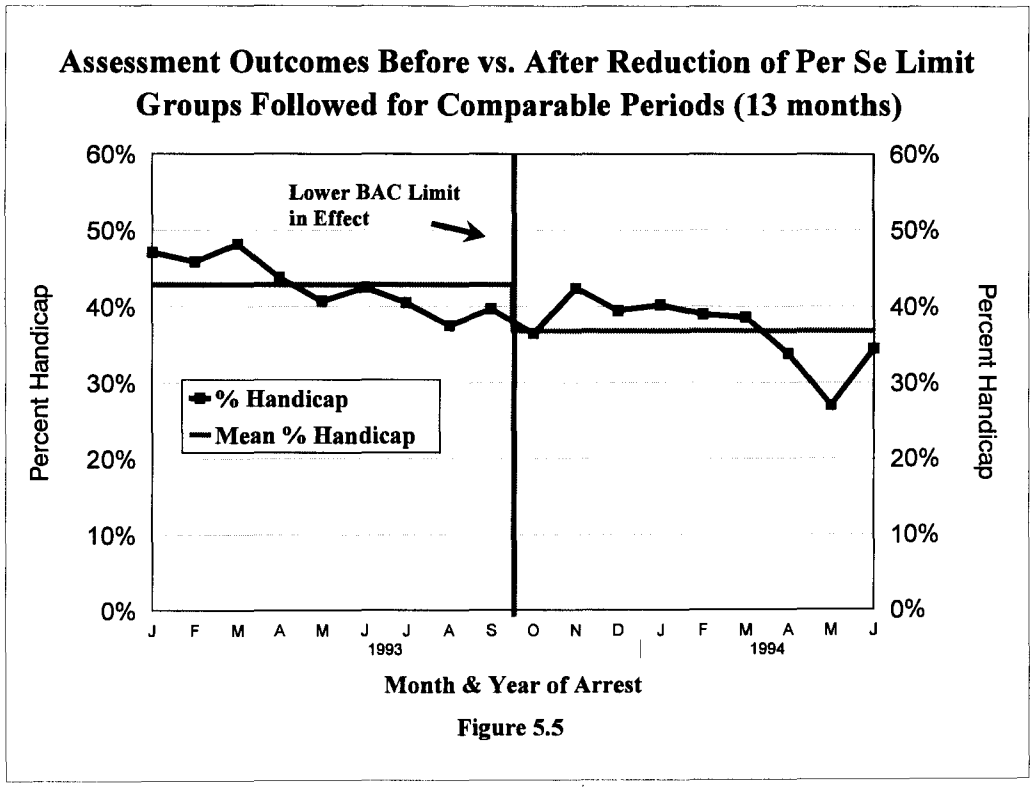
Assessment Outcomes Before vs. After Reduction of Per Se Limit
Groups Followed for Comparable Periods (13 months)
Lower BAC Limit
in Effect
% Handicap
Mean % Handicap
Percent Handicap
60%
50%
40%
30%
20%
10%
0%
J F M A M J J A S O N D J F M A M J
1993
1994
Month & Year of Arrest

Figure 5.5

Difference in Sex and Age of Client Population Since BAC Limit Lowered

Table 5.1 shows the age distribution for all persons arrested for DWI from January 1992 through June 1994 before and after the BAC limit was lowered on October 1, 1993. It is clear that the lowered BAC limit had no effect on the age of persons arrested. Although it might have been expected that a greater proportion of young persons would be arrested after the limit was lowered, this has not been the case. The age distributions of arrested drivers before and after October 1993 are essentially identical.

Table 5.1

Age distribution of arrested drivers before and after lower BAC limit became effective.

	16 - 20 yrs.	21 - 25 yrs.	26 - 35 yrs.	36 - 45 yrs.	46 years or older	Total
Before 0.08%	5,907	16,003	31,700	18,594	9,953	82,157
	7.2%	19.5%	38.6%	22.6%	12.1%	
After 0.08%	2,679	7,794	14,447	8,928	4,811	38,659
	6.9%	20.2%	37.4%	23.1%	12.4%	

Table 5.2 shows the distribution by sex of individuals arrested before and after the 0.08% law became effective. As with age, there has been no change in the kinds of individuals arrested since the lower BAC limit took effect. Females very consistently constitute 14% of those arrested for DWI. Nor has the proportion of males and females completing the assessment and treatment process changed since the BAC limit was lowered. Both before and after the law, about 18-19% of individuals who have completed the process are women.

Table 5.2

Sex distribution of arrested drivers before and after lower BAC limit became effective.

	Male	Female	Total
Before 0.08%	69,359	11,262	80,621
	86.0%	14.0%	
After 0.08%	32,853	5,408	38,261
	85.9%	14.1%	

VI. Summary & Conclusion

In general, a person's BAC at time of arrest does not strongly predict whether the person will complete the assessment and treatment process. However, BAC is strongly related to whether the individual is diagnosed as having a substance abuse handicap. It is somewhat surprising, however, that about one in five individuals arrested with BACs of 0.20% or higher were not found to have a substance abuse handicap. Recent modifications in placement criteria, which became effective September 1, 1994 – after most cases in the present analyses were processed – should preclude this problem in the future.

Persons with higher BACs were generally more likely to be repeat offenders. At every BAC level, persons who had not completed the assessment and treatment process were more likely to have been rearrested. Particularly noteworthy is the fact that those individuals who refused to take a breath test were more likely than persons at any measured BAC level to have a previous DWI arrest or conviction. This duplicates the findings of an extensive study of this issue in Minnesota (Ross et al., 1995) where it was also found that refusers were less likely to be convicted of DWI. Thus, it appears that there is some benefit to be gained by refusing the breath test, even though this results automatically in loss of the driver license for a year (in North Carolina). This finding underscores the wisdom of the recent change in North Carolina law to require breath test refusers to obtain treatment for substance abuse.

Following enactment of the lower (0.08%) per se illegal BAC limit, the client load for the substance abuse assessment and treatment system began to change. There has been a substantial increase in the number of individuals arrested and convicted with BACs ranging from 0.08 - 0.09% and a small increase in persons with BACs between 0.10 - 0.11%. It does not appear that the demographic composition of the client population has changed as a result of the lower BAC limit. There has been a corresponding decrease of about 4% in the proportion of assessed individuals found to have a substance abuse handicap as a result of the changing BAC composition in the client population.

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Appendix A

Contents of Four Main Subfiles Used for Analysis in Present Report

All DWI Convictions for Selected Population

File Contents

Data Set Name:	X.DWICONV2	Observations:	299018
Member Type:	DATA	Variables:	25
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Last Modified:	15:20 Monday, June 5, 1995	Deleted Observations:	0
Protection:		Compressed:	NO
Data Set Type:		Sorted:	YES
Label:			

-----Engine/Host Dependent Information-----

File Size (bytes): 24633344

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4	CITNUM	Num	5	12
5	COURTLOC	Num	3	17
15	COURTYPE	Num	3	47
11	DL47	Num	3	35
3	DWICDATE	Num	4	8
25	FLAGDWI	Num	3	79
23	INEXCESS	Num	3	71
20	JS	Num	3	62
13	LEVEL	Num	3	41
2	MAILDATE	Num	4	4
6	MD	Num	3	20
9	NCCITY	Num	3	29
10	NCPATROL	Num	3	32
24	NEWLIC	Num	5	74
17	NOLOCONT	Num	3	53
19	NPWL	Num	3	59
12	OOSDWI	Num	3	38
18	PJC	Num	3	56
14	POINTS	Num	3	44
8	SPDLMT	Num	3	26
7	SPEED	Num	3	23

-----Sort Information-----

Sortedby:	NEWLIC ARRDATE DWICDATE
Validated:	YES
Character Set:	ASCII
Sort Option:	NODUPREC

All DWI Arrests for Selected Population

CONTENTS PROCEDURE

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15	COST	Num	3	52
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11	COURTYPE	Num	3	40
9	CO_ARR	Num	3	34
7	CRASH	Num	3	28
6	CRASHVEH	Num	3	25
24	DAYNOTOP	Num	3	79
13	DECISION	Num	3	46
21	F2	Num	3	70
22	F3	Num	3	73
23	F4	Num	3	76
14	FINE	Num	3	49
28	FLAGARR	Num	3	94
25	HRSCOMM	Num	3	82
16	JAIL	Num	3	55
2	JUDGE	Char	12	4
18	LEVEL	Num	3	61
17	LIMPRIV	Num	3	58
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-----Sort Information-----

Sortedby:	NEWLIC ARRDATE
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Character Set:	ASCII
Sort Option:	NODUPREC

All 508 Forms for Selected Population

CONTENTS PROCEDURE

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21	NEWLIC	Num	5	70
16	PREPOST	Num	3	55
11	RELEASE	Num	3	40
10	SCHOOL	Num	4	36
9	TFACILTY	Num	4	32
13	TFEE	Num	3	46
7	TRMTCOMP	Num	4	24
19	TRMTREQ	Num	3	64
6	TRMTSTRT	Num	4	20

-----Sort Information-----

Sortedby:	NEWLIC ARRDATE DWICDATE
Validated:	YES
Character Set:	ASCII
Sort Option:	NODUPREC

All Demographic Information for Selected Population

CONTENTS PROCEDURE

Data Set Name:	X.MASTER2	Observations:	201639
Member Type:	DATA	Variables:	9
Engine:	V609	Indexes:	0
Created:	15:40 Monday, June 5, 1995	Observation Length:	36
Last Modified:	15:41 Monday, June 5, 1995	Deleted Observations:	0
Protection:		Compressed:	NO
Data Set Type:		Sorted:	YES
Label:			

-----Engine/Host Dependent Information-----

File Size (bytes): 7315456

-----Alphabetic List of Variables and Attributes-----

#	Variable	Type	Len	Pos
6	ALIAS	Num	3	17
1	CITY_RES	Num	4	0
4	CO_RES	Num	3	11
2	DOB	Num	4	4
3	FLAG1	Num	3	8
5	FLAG2	Num	3	14
9	FLAGMST	Num	8	28
8	NEWLIC	Num	5	23
7	R_S	Num	3	20

-----Sort Information-----

Sortedby:	NEWLIC
Validated:	YES
Character Set:	ASCII
Sort Option:	NODUPREC

Appendix B (Data Appendix)

Table B.1

Percent of Convicted Drivers Who Have Completed the Assessment/Treatment Process by Blood Alcohol Concentration at Time of Arrest

	Blood Alcohol Concentration at Time of Arrest						
Completed Process?	0.01 - 0.07%	0.08 - 0.09%	0.10 - 0.11%	0.12 - 0.15%	0.16 - 0.19%	0.20% and above	Refused
No	71	84	60	56	57	64	70
Yes	29	16	40	44	43	36	30
Total n	842	3,585	24,499	57,901	38,275	23,390	22,574

Table B.2

24-month Recidivism Rates for Drivers Who Have vs. Have Not Completed the Assessment/Treatment Process by Blood Alcohol Concentration at Time of Arrest

		Blood Alcohol Concentration at Time of Arrest						
Completed Process?	Overall	0.01 - 0.07%	0.08 - 0.09%	0.10 - 0.11%	0.12 - 0.15%	0.16 - 0.19%	0.20% and above	Refused
No	19.42 (56,625)	14.87 (343)	14.81 (412)	16.83 (7,464)	18.65 (17,805)	20.63 (12,905)	20.29 (8,942)	20.93 (8,754)
Yes	11.15 (52,591)	7.35 (204)	11.22 (205)	9.44 (7,469)	11.02 (19,646)	11.70 (12,995)	12.71 (6,797)	10.86 (5,275)
Overall	15.44	12.01	13.61	13.13	14.65	16.15	17.02	17.14

Note. n's given in parentheses

Table B.3

Diagnosis of Substance Abuse Handicap
by Blood Alcohol Concentration at Time of Arrest

Handicap?	Blood Alcohol Concentration at Time of Arrest						
	0.01 - 0.07%	0.08 - 0.09%	0.10 - 0.11%	0.12 - 0.15%	0.16 - 0.19%	0.20% and above	Refused
No	50%	67%	62%	57%	40%	19%	35%
Yes	50	33	38	43	60	81	65
Likelihood†	1.00	.49	.61	.75	1.50	4.26	1.86
Total n	243	580	9,983	25,516	16,393	8,462	6,854

† Odds of being diagnosed with a substance abuse handicap. A likelihood of less than one indicates that individuals were more likely to be judged not to have a handicap. A comparison of the likelihoods for any two groupings can be made by dividing the likelihood ("odds") for one group by that for the other.