Background

Laws adopted in the United States to control and reduce alcohol-impaired driving vary considerably among States (NHTSA, 2007). These laws form the legal structure that enables law enforcement to stop drivers on public roads (with reasonable suspicion), arrest them for driving while impaired (DWI) (with probable cause), and prosecute and adjudicate them in a court of law. In every State, it is illegal per se to drive with a blood alcohol concentration (BAC) of .08 grams per deciliter (g/dL) or greater, and it is illegal per se for drivers younger than 21 to drive with any detectable alcohol concentration (e.g., BAC >.02 g/dL). In most States, sanctions for a first-offense DWI conviction typically consist of at least a driver’s license suspension or revocation for a specified period; a fine and other fees; and some time in jail, a period under house arrest, or some minimal hours of community service. Offenders may or may not be placed on probation for a specified period. Typical sanctions for repeat DWI offenders and offenders with high BACs upon arrest (e.g., >.15) include mandatory assessment and treatment for alcohol abuse, longer license revocations or suspensions, community service and/or incarceration, and recently, orders from the court to remain abstinent. Depending on the jurisdiction, alcohol ignition interlocks may be ordered for first, high BAC or repeat DWI offenders.

Arrest and conviction for an impaired-driving offense identifies a high-risk driver and results in the placement of the driver in a government supervised program. If the offender has an alcohol misuse problem, then the offender can be required to attend a treatment/educational program to promote recovery from the alcohol problem and have a sanction imposed that prevents him or her from driving impaired until the alcohol problem has been controlled. Logically, there are three ways to prevent alcohol-impaired driving by known offenders: (a) prevent all driving, (b) prevent all driving after drinking, or (c) prevent all drinking. The third approach, preventing drinking, has the potential to protect the public, against not only alcohol-impaired driving crashes, but also other alcohol-related problems, such as domestic violence, nontraffic injury, and alcohol addiction. Judges frequently sentence offenders to abstinence from alcohol for a DWI offense, and, often, make abstinence a condition of probation. In the past, some courts have attempted to control drinking of offenders by requiring the monitored administration of certain drugs that deter alcohol consumption, such as Antabuse (disulfiram) or by requiring intensive supervised probation programs involving random, surprise breath tests for alcohol use. Most of those efforts have not been evaluated. Monitoring of alcohol use is accomplished also through house arrest with electronically monitored and/or interlock programs. Typically, a house arrest BAC is measured with a breath-test unit that identifies the person providing the test via video images or voice recognition, and the data is transmitted over a telephone line. These units, however, cannot provide such information when the offenders are at work or away from home.

Recently, there has been increased interest in the use of continuous alcohol monitoring in criminal justice programs. DWI courts make the monitoring of drinking through frequent breath testing or electronic devices an important feature of their programs. The National Association of Drug Court Professionals (NADCP) has established the following “10 Guiding Principles” for DWI courts (National Center for DWI Courts, 2011):

1. Determine the population of offenders to be included in the program.
2. Perform clinical assessments in order to establish a clinically sound treatment plan for each offender.
3. Develop the treatment plan.
4. Supervise the offender to protect against future impaired driving.
5. Forge agency, organization, and community partnerships in support of the goals of the DWI court program.
6. Judges take a judicial leadership role to motivate team members and elicit buy-in from various stakeholders.
7. Develop case management strategies for a coordinated and seamless collaboration across the treatment and justice systems.

8. Address transportation issues so offenders can resolve transportation problems without driving while suspended.

9. Evaluate the program to document program effectiveness and identify elements in need of improvement.

10. Ensure a sustainable program, through careful and strategic planning, that will become an integral and proven approach to the DWI problem in the community.

Several DWI courts are currently using continuous alcohol monitoring to ensure abstinence requirements.

Another example of a program using alcohol monitoring is the 24/7 program for multiple DWI offenders, which was established in South Dakota and has since been implemented in other States. This program requires offenders to submit to a breath test twice a day (at 7 a.m. and 7 p.m. at the local police station or sheriff’s office). For many rural offenders, however, this is a difficult requirement to comply with because of the great distances of travel to and from the testing site.

Transdermal alcohol monitoring is a technology that permits the detection of drinking by sensing alcohol that passes through the skin as it is eliminated from the body. As part of the overall monitoring system, alcohol measurements are sent from the transdermal monitoring device to officials who supervise the offender. An advantage of transdermal monitoring over systems involving periodic breath tests is that transdermal measurements are recorded twice each hour, thus it is more difficult to avoid detection. Currently, two transdermal devices are being used in the field to measure alcohol. One of these is the Secure Continuous Remote Alcohol Monitoring (SCRAM) device produced by Alcohol Monitoring Systems (AMS). A second device is the Transdermal Alcohol Detection device (TAD) from BI Incorporated (BI). The SCRAM device has been in use longer and currently has much greater market penetration than the TAD.

Both devices are used as part of a larger monitoring system. Both systems consist of an ankle bracelet that measures transdermal alcohol concentration (TAC), stores data, and uploads data to a modem that transfers the data to computers maintained by the vendor. Data is used to create reports and alerts that are sent to monitoring agencies’ designated case management staff. The bracelets are designed to prevent removal by offenders or tampering with sensor functions. Attempts to remove or tamper with the devices are detected and communicated to the vendor when TAC data is uploaded. If data is not uploaded on schedule, the vendor notifies the designated authorities. Both systems have Web sites that can be used by program staff to view the offender's data and keep track of equipment. The TAD and the SCRAM devices are available with radio frequency (RF) technology. Consequently, they can also be used as house arrest monitors by determining whether offenders are in their homes at designated times.

Objectives

The objectives of this project were to determine how extensively transdermal alcohol monitoring devices are used in the United States and to document examples of experienced and innovative programs through case studies. These case studies can then be used as a resource by States, local communities, courts, and other agencies interested in using this type of technology to monitor offenders. Each case study includes the following:

- The details of each program selected for case study, including the offenders using it; the geographic area of the community; the duration of the program; the number of devices in use (and past use); and the court or agency that administers the program.

- Other elements of the programs, including treatment and rehabilitation, other monitoring of the offender, other sanctions administered, program compliance, and how the transdermal-alcohol-monitoring data is used.

- The benefits, challenges, and lessons learned from users of transdermal alcohol monitoring.

We addressed each of the following key questions for each case study:

- How many DWI offenders are using (or have used) the alcohol-monitoring device? What other types of offenders are using transdermal alcohol monitoring?

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1 BI, Inc., is the official name of the company (i.e., BI is not being used as an abbreviation).
• How long is the device usually worn by DWI offenders?
• What proportion of offenders initially in the program is noncompliant?
• What are the eligibility criteria for offenders being assigned to the device?
• How is the transdermal-alcohol-monitoring program working? Are there any problems or issues with it?
• What proportion of DWI offenders shows drinking events? Tampering with the device? What happens to offenders if they are not compliant?
• Is there evidence that offenders using the device are substituting other drugs for alcohol?
• What other programs are typically used in coordination with transdermal alcohol monitoring (e.g., treatment, interlocks, and intensive supervision)?
• Who pays for the device: the offender, the jurisdiction, or some combination?

Methods

Site Selection Rationale
Our criteria for selection of programs for a case study were:
• Experience of the program with transdermal alcohol-monitoring devices based on longevity and/or volume
• Geographic diversity;
• Diversity of the program structure
• Inclusion of DWI offenders and other offenders
• Innovative use of transdermal alcohol-monitoring devices
• Program has not been the subject of other recent studies

Sites Selected
After a thorough review of numerous potential program sites, NHTSA and PIRE selected the following programs for case studies:
• Colorado—City and County of Denver Electronic Monitoring Program (hereafter referred to as “Denver EMP”)
• Missouri—23rd Judicial Circuit of Jefferson County, Missouri (hereafter referred to as “Jefferson County, Missouri”)
• Nebraska—Nebraska Supreme Court Office of Probation Administration (hereafter referred to as (“Nebraska Supreme Court”))
• New York—New York 8th Judicial District Hybrid DWI Court (hereafter referred to as “New York 8th District”)
• North Dakota—North Dakota Attorney General 24/7 Sobriety Program (hereafter referred to as (“North Dakota 24/7”)
• Wisconsin—Wisconsin Community Services (hereafter referred to as “WCS”)

Data Collection and Analysis
To create case study reports, we combined information from telephone discussions, e-mail exchanges, and site visits using a protocol that helped to prompt discussion of important issues.

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2 The program in North Dakota is based largely on an earlier program in South Dakota. A longer history and larger number of transdermally-monitored offenders would have made South Dakota a more likely candidate for inclusion in this study; however, the South Dakota program had already been included in a NHTSA case study Report No. DOT HS 811 446, An Evaluation of Intensive Supervision Programs for Serious DWI Offenders, and has been the subject of other, more in-depth evaluations and studies.
Case Study Preparation

We prepared the first draft case-study reports from preliminary and follow-up information obtained from the selected sites. These case study reports were sent to the representatives with requests for additional information and clarification. Representatives reviewed the draft, made corrections as necessary, and provided additional information and clarification. We then revised the report and sent it to the program representatives for a second review before submission to NHTSA.

Study of Legal Issues

To better understand legal issues surrounding the use of transdermal monitoring, we conducted a search for legal decisions or challenges regarding transdermal-alcohol-monitoring devices using the Westlaw database. A series of independent searches were run in the case law database for each State of the jurisdictions selected for case study. The search strings used sought to identify cases that included terms relating to alcohol-monitoring devices; and transdermal alcohol detection. All relevant cases were collected (see Appendix A).

Results

Program Histories

Most of the agencies we studied were in operation before they began to use transdermal monitoring. Generally, transdermal monitoring was added to their programs when they became aware of the technology. An exception is the North Dakota 24/7 program, which was modeled after a similar South Dakota program that was using transdermal monitoring. Transdermal monitoring therefore was part of the North Dakota 24/7 program from its inception.


Offenders

The types of offenders typically assigned to transdermal alcohol monitoring are similar across the various programs. They include:

- Impaired-driving offenders with prior impaired-driving offenses (i.e., repeat offenders);
- Serious or felony impaired-driving offenders, where an offense involved a high BAC, or a crash resulting in death or injury
- Assault, domestic violence, or other types of offenders where alcohol was a factor in the offense
- Any offender for whom there is reason to believe the offender has a history of problems related to alcohol
- Youthful offenders with a history of alcohol problems or where alcohol is a factor in their offenses
- Other types of offenders for whom judges, probation officers, or other officials have determined that abstinence from alcohol is needed and monitoring is warranted

Data breaking down the types of offenders on transdermal-monitoring generally was unavailable, as monitoring service providers tend not to keep easily queried records about which agencies referred individual clients, and referring agencies tend to not keep easily queried records about which offenders are assigned to transdermal-monitoring.

Consequences for noncompliance vary from case to case. Generally, across all sites, consequences include:

- An extension of time on the overall program and/or duration of transdermal monitoring;
- A short period of incarceration before being returned to the program; and
- Removal from the program and subsequent incarceration.

In programs that require offenders to pass through various stages to complete the program successfully, noncompliant offenders may be returned to earlier stages.
Sometimes, there is uncertainty about whether a violation occurred. For example, data may suggest a tamper attempt occurred, but the offender has a reasonable explanation and/or the equipment showed no evidence of damage (e.g., the ankle bracelet came loose). Data suggesting that drinking occurred may be blamed on exposure to alcohol vapor for a lengthy time span, such as a bartender might experience. In these cases, offenders are given information on how to avoid such circumstances in the future and warned to comply. Some offenders may be forbidden to engage in activities such as bartending, which result in suspicious alcohol-monitoring data.

Some programs use transdermal alcohol monitoring as a sanction for other types of noncompliance. For example, an offender who must report for breath twice-daily or random breath tests and who provides a positive test, or misses a testing appointment, may be sanctioned with transdermal monitoring as an alternative to incarceration.

In rare cases, offenders may abscond while on the program with or without the transdermal equipment. Consequences for absconding are usually more severe. Commonly, they would involve incarceration. Offenders who lose or damage transdermal-monitoring equipment are responsible for the costs of replacing or repairing it.

None of the sites we studied plan to discontinue the use of transdermal monitoring.

Table 1 shows statistics on compliance and noncompliance of offenders who have completed SCRAM transdermal monitoring in each case-study site. Case study program officials compile limited statistics on transdermal-monitoring offenders. These statistics (supplied by AMS on January 6, 2011) are based on the entire history of each program. Percentages for the compliant and noncompliant rows are for all offenders, and percentages for drinking and tampering violations covers all violations.

**Table 1. Compliance and Noncompliance with Transdermal Alcohol Monitoring**

<table>
<thead>
<tr>
<th></th>
<th>Denver EMP SCRAM</th>
<th>Jefferson Co., MO</th>
<th>Nebraska Supreme Court</th>
<th>New York 8th District</th>
<th>North Dakota 24/7</th>
<th>WCS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Completed</td>
<td>4,080</td>
<td>410</td>
<td>2,876</td>
<td>371</td>
<td>119</td>
<td>4,083</td>
</tr>
<tr>
<td>Compliant</td>
<td>3,253 (80%)</td>
<td>328 (80%)</td>
<td>2,356 (82%)</td>
<td>252 (68%)</td>
<td>96 (81%)</td>
<td>3,583 (88%)</td>
</tr>
<tr>
<td>Noncompliant*</td>
<td>827 (20%)</td>
<td>82 (20%)</td>
<td>520 (18%)</td>
<td>119 (32%)</td>
<td>23 (19%)</td>
<td>500 (12%)</td>
</tr>
<tr>
<td>Drinking Violations**</td>
<td>66 (8%)</td>
<td>5 (6%)</td>
<td>31 (6%)</td>
<td>39 (33%)</td>
<td>1 (4%)</td>
<td>25 (5%)</td>
</tr>
<tr>
<td>Tampering Violations</td>
<td>761 (92%)</td>
<td>77 (94%)</td>
<td>489 (94%)</td>
<td>80 (67%)</td>
<td>22 (96%)</td>
<td>475 (95%)</td>
</tr>
</tbody>
</table>

*Noncompliance is defined as either a confirmed drinking event or a confirmed tamper attempt. **Counts of drinking violations may include participants who have also incurred tampering violations.

**Strengths**

The main strengths of transdermal monitoring systems as reported by officials from case-study sites included the following:

- **Improved Public Safety**
  The transdermal monitoring systems used by case-study officials effectively improved public safety because:
    - Transdermal monitoring is generally effective in deterring offenders from drinking alcohol
    - Information collected through transdermal technology is generally accurate
    - Offenders who drink or are otherwise noncompliant are likely to be identified
Information regarding noncompliance flows quickly to the appropriate officials

- Transdermal monitoring helps enforce abstinence, which in turn helps offenders quit drinking and go into a recovery stage, potentially creating long-term safety benefits for the community

- Continuous transdermal monitoring is a more effective means of monitoring drinking than other techniques and technologies (e.g., periodic or random breath tests, patches, or urinalysis)

• **User Friendliness**
  Officials find the equipment, daily reports, and Web interface easy to use. The user-friendly interface for these tasks simplifies the installation of equipment, education of offenders, and the tracking of inventory and offender data.

• **Cost-Effectiveness**
  Although none of the sites has completed studies of the cost-effectiveness of transdermal monitoring, all thought there had been cost savings over alternatives to transdermal monitoring. These savings resulted from:
  - Reduced jail costs for offenders being monitored as an alternative to incarceration
  - Reduced labor per offender for case workers because of the automated monitoring and reporting and because of the reduction in the number of office visits with offenders
  - Offenders paying much of the costs of transdermal alcohol monitoring

• **Provides Alternatives for Offenders**
  Positive aspects of transdermal monitoring for offenders include the avoidance of incarceration and the reduction in the number of visits to case managers and/or breath- and drug-testing centers.

• **Service**
  Officials believe that the service from vendors has been good. Positive aspects of service include good communication; willingness to address specific needs of individual programs; access to consulting services; and continual work to address problems, upgrade products, and add new features.

**Problems and Barriers**

Barriers to the adoption and effective implementation of transdermal monitoring as reported by program officials include:

- Paying for the costs of the service
- Needing to educate stakeholders
- Depending on landline telephones for uploading data

Another problem encountered by one of the programs was the inability of vendors to confirm low levels of drinking (e.g., BAC <.02 g/dL).

**Conclusions**

Based upon information we gathered from several jurisdictions using transdermal alcohol monitoring, from AMS, and from the six case studies, we concluded that:

1. There is increasing use of transdermal alcohol monitoring, specifically of the SCRAM bracelet. According to the AMS Web site, SCRAM is currently being used in 1,764 courts around the country in 46 States. A total of 162,778 offenders have been monitored by a total of 620,943,819 transdermal alcohol-monitoring tests. BI currently has more than 1,700 TAD units in use at nearly 200 sites

2. Transdermal alcohol monitoring appears to be beneficial in monitoring alcohol use of offenders who are required to be abstinent. Prior monitoring techniques were reported by officials as inadequate.

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3 On October 3, 2011, AMS announced the release of SCRAMx Wireless, allowing downloads of data without landline, cellular line, or Internet access.

4 Jurisdiction-specific BI data that is comparable to the AMS data is currently unavailable.
AMS data show that 1.4 percent of the offenders who had finished SCRAM from the six case study sites had a confirmed drinking event. AMS data also show that 16.9 percent had tamper violations. None of the case-study sites had completed studies of the effects of transdermal monitoring on recidivism rates, nor had they conducted any cost-benefit studies on the use of transdermal monitoring.

There are no insurmountable problems with using SCRAM or TAD systems to monitor offenders. At $5 to $12 a day, compared to significantly lower costs for other technologies (e.g., $2.25 to $2.75 per day for ignition interlocks), the cost of transdermal monitoring is a barrier to its use. In most programs, however, the costs are largely paid by offenders. There is some concern over low-level drinking events that may be occurring but cannot be confirmed by vendors, which may warrant further investigation.

**Recommendations**

For the most part, officials from the six case-study agencies are satisfied with their transdermal alcohol-monitoring program and would recommend it to similar agencies. Because the technology and programs are relatively new, case-study officials learned some lessons that are described in this report. In summary, the key recommendations to officials considering transdermal alcohol monitoring follow:

1. Officials interested in the use of transdermal monitoring should first educate themselves. Obtain first-hand experience with equipment if possible. Then educate all potential stakeholders, again, providing first-hand experience when possible to counter misinformation about transdermal monitoring.

2. Establish a funding mechanism for those offenders who cannot afford transdermal-monitoring services. Ideally, monitoring should be offender paid; however, referring agencies will likely want to assign offenders to alcohol monitoring even if they cannot pay for it.

3. Work closely with vendors to obtain information, voice concerns, and take advantage of the vendors’ resources (e.g., reports, training and consulting for stakeholders).

4. Establish firm guidelines for offenders and enforce them consistently.

5. For noncompliant offenders, assign immediate and appropriate consequences and keep them on transdermal alcohol monitoring for a longer period, until they can sustain abstinence for several months.