



# **Continuous Transdermal Alcohol Monitoring: From Research to Practice**

**Robyn Robertson, M.C.A.**

**Traffic Injury Research Foundation**

**Texas Judicial Conference**

**Houston, Texas**

**September 12<sup>th</sup>, 2006**

**A DRIVING FORCE FOR SAFETY**



**TRAFFIC INJURY  
RESEARCH FOUNDATION**

# Introduction

- Almost all impaired driving offenders are ordered, as a condition of probation, to refrain from consuming alcohol.
- Monitoring, in the form of existing blood, breath and urine protocols, is used infrequently and inconsistently.
- As a result, sobriety among offenders has been notoriously difficult to enforce.



# Introduction

- In the past decade, new, continuous alcohol testing technology has evolved – transdermal alcohol testing.
- This passive, non-invasive test permits the continuous monitoring of offenders for alcohol consumption 24/7 at any location.
- It is currently being used in 36 states.



# Introduction

- This is a secure, continuous, remote, alcohol monitoring device - SCRAM.
- It measures alcohol that is excreted through the skin in the form of constant, insensible perspiration.



# SCRAM



A DRIVING FORCE FOR SAFETY



TRAFFIC INJURY  
RESEARCH FOUNDATION

# Goals

- Overview of technology and features of device.
- Review key research findings.
- Identify key program features and practices.
- Direct you to resources in this area.








# Technology

- To date, SCRAM is the only commercially available transdermal alcohol monitoring system.
- There are 3 components to SCRAM:
  - an 8oz bracelet
  - a modem
  - a secure website (SCRAMNET)



# Technology



## Bracelet:

-  contains an analog and digital component attached to an offender using a durable strap, housing electronic circuitry
-  analog component has an electro-chemical sensor that samples air above offender's skin hourly
-  samples every 30 min. when alcohol is detected
-  same sensor commonly used in other breath testing devices (PBTs, PAS)
-  calibrated every 3-6 months during routine servicing.






# Technology

## Bracelet:

-  digital component has a flash memory chip to store info and monitor various functions
-  transfers info to modem via RF signals at scheduled times.







## Modem:

-  connected to conventional phone line at work or home
-  offender must be within 30 feet at a scheduled time
-  downloads monitoring and reporting schedules to bracelet.



# Technology

## SCRAMNET:

-  receives encrypted data from modem and stores it in a secure database
-  data sets are reviewed by trained and certified AMS staff
-  alcohol positive events are confirmed through interpretation and analysis
-  results are forwarded to appropriate agency
-  authorized users can login from any location using a standard internet browser
-  users can access info about their caseload and receive customized reports.



# Technology

- Customized reports:
  - judicial summary report
  - compliance report
  - client details report
  - client summary for judge
  - court activity report
  - violation report
  - compliance summary by court report
  - usage by court report



# Technology

- Alcohol positive readings:
  - device only registers ethyl alcohol
  - some foods and medical conditions produce endogenous alcohol
  - sufficient quantities to result in a positive reading are unlikely
  - certain substances can also produce a false positive (e.g., perfume, hand sanitizer), acting as an interferant
  - these can generally be distinguished from true positives based on differences in the reading or curve that is produced.
  - notifications only sent for confirmed events.



# Technology

- Anti-circumvention systems:
  - tamper clip or strap
  - obstruction sensor (IR)
  - temperature sensor
  - communication monitoring

# Research

- Measuring alcohol in perspiration:
  - the transdermal excretion of alcohol has been studied and understood since 1936.
  - ingested alcohol diffuses through water in the body
  - it can be measured in blood, breath, urine, and perspiration
  - only about 1% of ingested alcohol crosses the skin as sensible or insensible perspiration.



# Research

- **Measuring alcohol in perspiration:**
  - alcohol in sweat increases with the mean concentration of alcohol in the blood
  - there is a recognized delay in absorption and elimination of alcohol in sweat
  - simultaneous blood and transdermal readings will not produce comparable results at a specific point in time
  - the dynamics of transdermal testing are still not fully understood and can vary between subjects and within subjects
  - this is not unusual in biological testing.



# Research

- Measuring alcohol in perspiration:
  - after 70 years and 22 peer-reviewed studies, it has been clearly established that ingested alcohol can be validly measured in perspiration
  - transdermal testing can qualitatively discriminate between consumption of small, moderate, or large amounts of alcohol, and sobriety.



# Research

- Comparing transdermal testing with other protocols:
  - there is a correlation between BAC, BrAC and TAC
  - principles that govern breath testing also apply to transdermal testing
  - TACs reflect BACs accurately and reliably, but with a measurable delay in absorption and elimination
  - TACs are not intended to provide precise, quantitative estimates of alcohol consumption similar to evidential tests.



# Research

- Comparing transdermal testing with other protocols:
  - collection of sweat is non-invasive and passive
  - testing is automated and can occur anywhere
  - testing is continuous
  - facilitates a greater number of tests at a lower cost
  - provides a quantitative measure and can discriminate between drinking and sobriety.



# Research

- How effective are bracelets?
  - two types of bracelets have been tested in several studies
  - WrisTAS (not commercially available) has shown promising results
  - SCRAM bracelets have been evaluated in three main studies – University of Colorado, Michigan DOC, and Alaska Justice Statistical Center.



# Research

## ■ University of Colorado:

- a peer-reviewed study funded by NIDA, NIMH, and AMS
- involved 44 subjects
- involved laboratory and real-life settings
- study corroborated validity of transdermal testing as a screening method
- showed discriminative power to distinguish between drinking and sobriety
- comfortable for users
- TACs and BACs not equivalent due to delay






# Research

- BETA test by Michigan DOC:
  - select offenders and officers wore bracelet for extended period of time
  - device able to detect circumvention
  - ensures test sample is from correct subject
  - detects drinking episodes around the clock
  - technology easy to use and has benefits over other equipment on the market
  - response from offenders also positive
  - a preferred method of testing due to freedom to maintain work and family schedules



# Research

## NLECTC-NW in Alaska:

-  test turned into full implementation with 176 participants
-  over 200,000 tests conducted during 8,135 monitoring days
-  interviews with officers and agencies confirmed no failures of equipment, even in extreme cold and inclement weather.



# Research summary

- SCRAM is a valid and reliable way of testing for sobriety.
- Technology is not designed to provide a precise BAC at a specific point in time.
- Both officers and offenders in these studies generally approve of the technology and believe it has merit.
- More large-scale quantitative surveys and case-control studies are needed to corroborate findings and answer questions regarding other issues.
- NHTSA evaluation due to be released later this year.



# Program applications

- Principles of sentencing:
  - deterrence from drinking based on constant monitoring and swift intervention
  - facilitate and complement behavior change by providing a continual, independent assessment of progress in treatment
  - has punitive qualities and costs
  - provides positive benefits for community.



# Program applications

- ❖ Evidence-based practices:
  - ❖ criminologists and practitioners are currently developing specially designed implementation guidelines to assist agencies in identifying critical steps
  - ❖ used to develop a comprehensive supervision system
  - ❖ emphasis on accountability, streamlined practices, good communication and info exchange
  - ❖ includes a process and impact evaluation component to improve decision-making.



# Program applications

- ❑ Legislative challenges:
  - ❑ legal challenges are common with any new technology or practice
  - ❑ transdermal testing and the technology has been challenged on multiple occasions in numerous jurisdictions (AK, AZ, FL, GA, MI, PA, TX)
  - ❑ challenges have resulted in evidentiary hearings
  - ❑ unpublished decisions in lower courts
  - ❑ majority of findings supportive of SCRAM and transdermal testing
  - ❑ 20 cases: 1 pending, 16 wins, 3 losses
  - ❑ in latter cases AMS has not always been able to present evidence.



# Program applications

- ❑ Agency objectives:
  - ❑ offender supervision
  - ❑ prison depopulation
  - ❑ supervision of licensed professionals

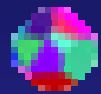
# Program applications

## ❁ Types of offenders supervised:

- ❁ first and repeat impaired driving offenders
- ❁ domestic violence offenders where alcohol is a contributing factor
- ❁ illicit drug offenders being actively tested
- ❁ underage drinking offenders with reckless behavior
- ❁ adults with substance abuse issue who supervise minors
- ❁ licensed, practicing professionals with substance abuse issues.

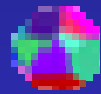


# Program applications



## Pre-trial:

- risk assessment tool
- objective assessment of behavior to guide sentencing decisions



## Probation supervision:

- benefit specialized or mixed caseloads
- tailor testing and reporting schedules
- adjust to different levels of supervision
- identify high-risk probationers
- detect tampering and non-compliance



# Program applications

- ❑ Specialty court:
  - ❑ offenders in these settings require more intensive supervision
  - ❑ offenders generally have a more significant substance abuse issue
  - ❑ monitoring can be an incentive for compliance
  - ❑ can also provide an assessment of progress in treatment/ serve as a tool for treatment professionals



# Program applications

## ▶ Treatment:

- ▶ provides an accurate, objective assessment of compliance
- ▶ conditions can be tailored based on offender's progress
- ▶ serve as a basis for swift intervention

## ▶ Re-entry and parole:

- ▶ identify low-risk offenders
- ▶ monitor alcohol consumption
- ▶ tailor conditions to level of risk posed



# Program applications

- Program length:
  - statutory periods are not recommended
  - performance based approach with length varying based on extent of substance abuse issue and level of compliance
  - AMS typically recommends 90 days based on existing research on deficits in executive cognitive functioning following alcohol use.



# Program costs

- ❖ Programs rely on an offender-pay arrangement.
- ❖ Indigent funding schemes should be organized in cooperation with service provider.
- ❖ Some courts may consider reducing or vacating fines based on compliance as an incentive.
- ❖ All costs are collected by service provider, allowing courts to focus on other activities.
- ❖ Permitting offenders to remain in community and sober has public safety benefits.



# Program costs

- Installation fee for SCRAM averages \$50-100; daily monitoring is \$10-12/daily.
- Installation fee for EM with alcohol testing is \$150; daily monitoring is \$10-15/daily.
- Incarceration costs \$62/daily.



# TIRF initiative

- Develop a package of 3 reports to assist criminal justice professionals.
  - overview of the research, technology and programs related to transdermal testing;
  - a set of implementation guidelines for frontline professionals
  - an agency administrator's handbook.



# Staying informed

[www.tirf.ca](http://www.tirf.ca)

A DRIVING FORCE FOR SAFETY



TRAFFIC INJURY  
RESEARCH FOUNDATION