A DRIVING FORCE FOR SAFETY

TRAFFIC INJURY
RESEARCH FOUNDATION

Continuous Transdermal Alcohol Monitoring: From Research to Practice

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Introduction

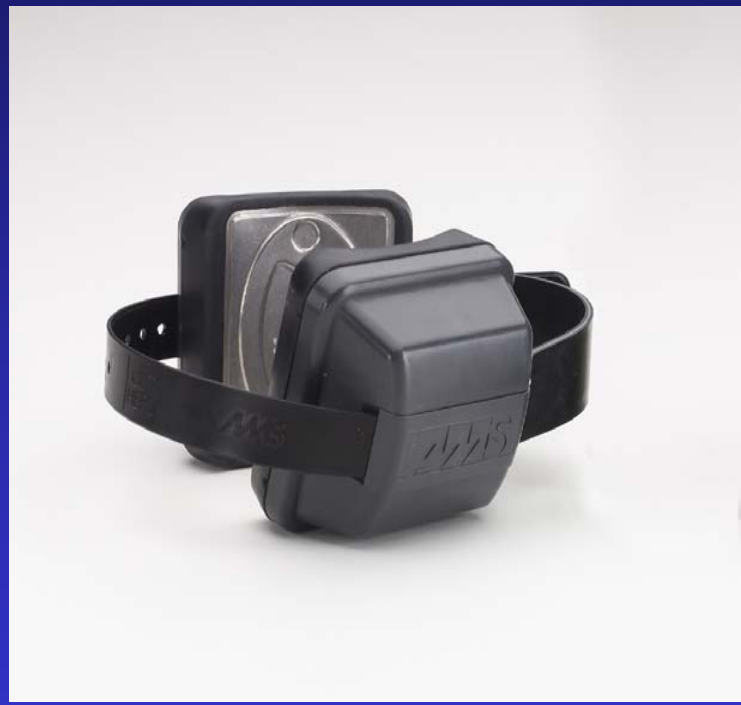
- Almost all impaired driving offenders are ordered, as a condition of probation, to refrain from consuming alcohol.
- Monitoring, in the form of existing blood, breath and urine protocols, is used infrequently and inconsistently.
- As a result, sobriety among offenders has been notoriously difficult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



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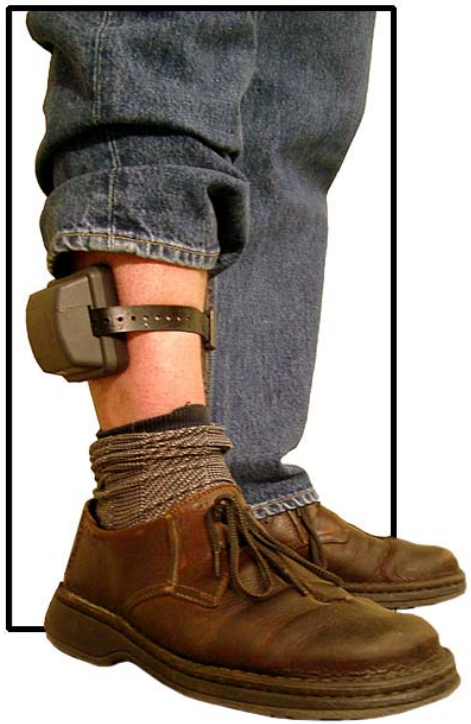
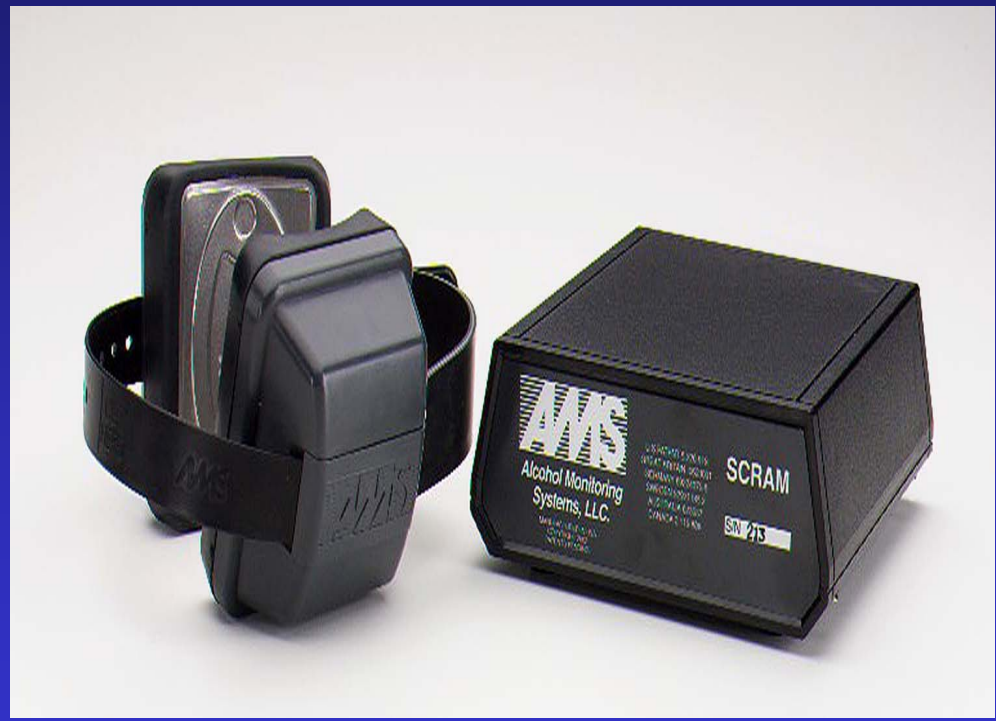
SCRAM





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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

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