# Rehabilitation courses as alternative measure for drink-driving offenders

Please refer to this document as follows: **Slootmans, F., Martensen, H., Kluppels, L., Meesmann, U (2017), Rehabilitation courses as alternative measure for drink-driving offenders, European Road Safety Decision Support System, developed by the H2020 project SafetyCube. Retrieved from www.roadsafety-dss.eu on DD MM YYYY**

*Please note*: The studies included in this synopsis were selected from those identified by a systematic literature search of specific databases (see supporting document). The main criterion for inclusion of studies in this synopsis and the DSS was that each study provides a *quantitative effect estimate*, preferably on the number or severity of crashes or otherwise on road user behaviour that is known to be related to the occurrence or severity of a crash. Therefore, key studies providing qualitative information might not be included in this synopsis.

# 1 Summary

Slootmans, F., Martensen, H., Kluppels, L., Meesmann, U., September 2017

## 1.1 COLOUR CODE: LIGHT GREEN

The most recent studies indicate that rehabilitation courses – if properly performed – can reduce the likelihood of recidivism. There are, however, also studies that did not find an effect.

## 1.2 KEY WORDS

Driving under the influence; offender; rehabilitation; recidivism; alcohol; drugs; behaviour change

## 1.3 ABSTRACT

The main purpose of rehabilitation courses is to reduce recidivism with respect to drink-driving offences. Such a course is educational or psychologically oriented, and typically organised in small groups. Recent studies were analysed. The main outcome variable in all of these studies was recidivism for 'driving under the influence of alcohol' (DUI) in the 2 to 3 years following the course. Participants were compared to non-participants (e.g., DUI-offenders who were charged with a more traditional sentence such as a prison sentence). The results show that rehabilitation courses for DUI-offenders – if properly performed – can reduce recidivism and thus have a positive effect on road safety. Important characteristics of a course are a focus on behavioural change (i.e. concrete plan of what to do when a relapse is imminent) rather than simply providing information. Furthermore, it should be spread over at least several weeks. A meta-analysis of the six most recent studies with an acceptable methodology suggests that rehabilitation courses can reduce recidivism by 40%. The present meta-analysis is more positive than previous ones, as several older studies found no effect or an effect that disappeared very quickly. The difference could be due to an improvement in the courses evaluated in the more recent studies. A general weakness of almost all studies in this area lies in the comparison of programme participants to non-participating DUI-offenders, who did either not qualify for the programme or not volunteer for it. The control group usually has a-priori a higher risk on recidivism which would add to the effect of the course. Matching or statistical methods help to correct for this – but one can never be sure whether all differences have been taken into account.

## 1.4 BACKGROUND

This synopsis focuses on the effectiveness of rehabilitation courses in reducing DUI-recidivism.

- *What is a rehabilitation course?*

Rehabilitation courses were introduced when the idea grew that traditional sentences (prison sentence, fines, licence withdrawal) alone are not the right way to reduce recidivism. Studies indicated that recidivism rates were very high, especially for serious offenders.
There are two approaches to rehabilitation courses: (1) an educational oriented course focused on knowledge and (2) a psychological oriented course in which the emphasis is put on behavioural change.

- *How should a rehabilitation course be organised?*

A couple of directives should be followed for an effective rehabilitation course:

1) multiple sessions spread over several weeks;

2) content and approach adapted to the needs of the participants;
3) participation must be an 'automatic' standard response following the offence;
4) mix of educational and psychological methods;
5) course leaders and methods must be of high quality;
6) differentiation between specific risk groups (e.g. severe recidivist, alcohol and drug driving offenders).

- *How is the effect of a rehabilitation course measured?*

Rehabilitation courses are either evaluated in terms of recidivism or in terms of self-reported behaviour or attitude measurements. This synopsis focuses on effects on recidivism as the more objective measure.
Typically participants and non-participants are evaluated after two to three years. Usually the percentage of recidivists is compared directly between participants and non-participants. Additionally recidivism is also sometimes analysed in a logistic regression analysis or in a cox-regression or survival analysis.

- *What are the challenges in evaluating rehabilitation courses?*

There are a lot of methodological difficulties in setting up a reliable, valid study. A classic experimental design means that participation in a programme depends on coincidence. This is however very difficult to organise in a legal context.
Also, most studies are based on court or police records of recidivism and there is no one-to-one relation between actually (re-)*committing* offenses and being *registered* for them, as the probability of being caught for these offences is extremely variable between countries.
A simple comparison between the 'experimental' and the control group over the same period of time could be very misleading. During an imprisonment and during the withdrawal period, people do not drive and as a consequence they cannot be caught for drink driving. Studies therefore should compare individual participants only during the time they were allowed to drive.

## 1.5 OVERVIEW OF RESULTS

Ten recent studies were coded. All studies concerned a comparison of participants of rehabilitation courses for drink driving offenders to offenders who did not take part in a course.

Six studies used cox- or logistic regression allowing the inclusion of covariates like age, gender, and prior convictions (DUI and other) to correct for a priori differences between the participants and the control group. These studies can be considered methodologically closest to the state of the art, and a meta-analysis of the odds-ratios was conducted. The results indicate that rehabilitation courses can reduce the rate of recidivism by 40%.

Four studies only reported the percentages of recidivism in the treatment versus the control group. Three of these studies found that participants had a lower recidivism rate than non-participants. In one study the effect was not significant and in another one the effect disappeared after 6 months. The fourth study showed a negative effect on road safety. However, while almost all other studies considered here investigated courses with a psychological component focusing on behavioural change, this fourth study investigated the effect of a panel discussion between victims of alcohol related crashes and DUI offenders.

To summarize, it can be concluded that in recent studies, the effect is mostly positive. There are however older studies with less good results which have led to revisions of the courses in a number of lonstanding teams. The good recent results might signify the importance of evaluation and continuous improvement of the courses.

# 2 Scientific overview

## 2.1 THEORETICAL BACKGROUND

### Aim and methods of DUI rehabilitation courses

In several countries all over the world, rehabilitation courses for traffic offenders were introduced a long time ago. The idea was that punishment alone (fines, licence withdrawal or imprisonment) could not be the right answer for traffic offenders. In fact, recidivism rates stay very high, especially for severe offenders (those who were convicted by a court). Blom, Bergman & Wartna (2011) discovered that 30% of traffic offenders in the Netherlands are brought to court a second time within 2 years, following their first conviction. Most of them (77%) had committed the same offence. The recidivism rate was even 56% for DUI-offender specifically. Other studies, like Elvik & Christensen (2007) also give evidence that an increase of the punishment itself would have no influence on recidivism rates.

Traffic psychology indicates that driving behaviour is not always a planned and well-considered behaviour. It's more an amalgam of automatic responses and habits, with a strong influence of the actual circumstances. Drink driving is also partly a habit and more or less linked with alcohol abuse or alcoholism. A more psychological approach is necessary to solve the problem, not only punishment.
In general we distinguish between two kinds of approaches for rehabilitation courses for DUI-offenders:

1) more educational oriented courses whereby the mean objectives are centred around knowledge (of the risks, insight in one's own behaviour, knowledge of the impact of alcohol on the body and mind, ...);
2) psychologically oriented courses in which more emphasis is put on behaviour change (planning the change process, working on relapse prevention, etc.).

Most of the courses are organised in small groups, and in some cases there are pre- and post-interviews held on an individual basis.

### Course effects and influencing factors

Since the beginning of these courses in the early 80s, a lot of research has been carried out on the possible effects (Vanlaar et al. 2003). The results are not always comparable and many studies contradict each other. Wells-Parker and colleagues (1995a) gathered 215 evaluation studies of rehabilitation courses. Their meta-analysis shows that:

1) Good methodological studies indicate that rehabilitation courses lead to a decrease in recidivism rate of 8 to 9%, in comparison with DUI-offenders who are charged with a classical punishment (e.g. imprisonment, fines, withdrawal of the driving licence, or a combination of these measures).
2) There was even a small positive effect on DUI-accidents, meaning that DUI rehabilitation courses were associated with lower accident risk.
3) A higher decrease of recidivism can be achieved by combining a classical punishment with a rehabilitation course.
4) The better the methodology of the effect study, the smaller the difference between control group and experimental group.

Probably the most cited study in Europe, especially in the German speaking countries, was done by Schützenhöfer and Krainz in 1999. In this study DUI-offenders could volunteer to follow a course during their withdrawal period. Recidivism among course participants was less than half of that among those DUI offenders who had not volunteered to take part in this course. This difference

even persisted after 3 years. Part of this large effect is probably due to group differences that existed already before the course and led the offenders to either volunteer for participation or not.

Two big European research projects were devoted to getting more insight into the possible effects of rehabilitation courses (in Europe mostly indicated as 'driver improvement courses'). The Andrea-project (Analysis of driver rehabilitation programmes – Bart, Assailly, Chatenet, Hatakka, Keskinen, Willmes-Lenz, 2002) focuses on the process evaluation of these courses. This study was performed in several European countries and led to two main conclusions:

1) The content and the approach of these courses must be adapted to the specific needs of the participants.
2) Differentiation between specific risk groups is necessary: especially for severe recidivists, the approach must be a more therapeutic one and has to be spread over a longer period of time then e.g. for first time offenders.

The DRUID-project (Driving under the influence of drugs, alcohol and medicines –Bukasa, Braun et al. 2009) was a larger project on several aspects of DUI. One of the work packages was dedicated to rehabilitation courses. It was concluded that, in order for a rehabilitation course to be effective, 5 main directives should be followed:

1) It must be a course consisting of multiple sessions, spread over several weeks.
2) Content and approach must be adapted to the needs of the participants. Some sort of prior diagnostic interview is desirable, to be able to distinguish for example severe DUI recidivists from first time offenders without an addictive disorder .
3) Participation should not be voluntary or the choice of a judge or prosecutor. It must be an 'automatic' standard response following the offence.
4) The approach must consist of a mix of educational and psychological methods. Most important is the focus on the person and his or her ability and motivation to change.
5) Course leaders and methods must be of high quality. Evidence-based methods are a necessity and permanent monitoring of the activities is necessary.

### Challenges in evaluating rehabilitation courses

Although it seems straightforward to compare recidivism rates of groups of offenders, in practice there are a lot of methodological difficulties in setting up a reliable and valid study.

Rehabilitation courses are either evaluated in terms of recidivism or in terms of self-reported behaviour. In the present evaluation it was decided to focus on the effects on recidivism as the more objective measure. It must be noted however, that all reviewed studies are based on court or police records of recidivism and that there is no one-to-one relation between actually (re)committing offenses like speeding and driving under the influence of alcohol, and being registered for them, as the probability of being caught for these offences is extremely variable between countries.

Possible solutions for these aspects could be:

- to spread the research over one country or region where it can be safely assumed that the frequency of police control stays the same over time;
- to spread the research over a longer period of time. Wells-Parker et al. (1995) recommend having a minimum period of two years as follow-up;
- to work with a large number of participants; a minimum of 100 persons in each group. (Wells-Parker, et al. 1995b).

A scientifically valid evaluation of a countermeasure needs a classical experimental design (Mann et al., 1983), whereby the participation in a programme is assigned at random (i.e. without consideration of the offenders' characteristics). This is very difficult to organise in a judicial context. No judge or any other sanctioning body is willing to do this.

A solution for this issue is to make sure the control group is as similar as possible to the 'experimental' group. The matching procedure is extremely important and has to take into account not only the variables concerning the offence (severity of the intoxication, severity of the perceived effects, combination with other offences at the same time) and demographic information (age, sex, socio-economic status, etc) but also variables concerning the (driving and juridical) history of the examined persons. For example, Nochajski et al. (1993) found that the juridical history of a person can be seen as the decisive factor in the success of a rehabilitation course. Recidivists have in general 24 times more chance to relapse, independently of whether they took part in a course or not.
A solution for this problem is the following: for each person in the 'experimental' group, one has to find an identical person (personal characteristics, features of the offence, and features of the juridical history) to include in the control group. An example of such an approach can be found in the recidivism study of Vanlaar et al. (2003).

Additionally, other measures may influence the recidivism rate of both groups. In the USA, most rehabilitation courses were pronounced as an alternative measure to imprisonment, and in Europe, in most cases the period of the withdrawal of the drivers' licence can be decreased by attendance at such a course. In most cases, people do not drive during imprisonment or a licence withdrawal period, and consequently they cannot be apprehended for drink driving during this period. These periods must be taken into account in the research design. A simple comparison between the 'experimental' and the control group over the same period of time could be very misleading. Studies therefore should compare individual participants only during the time they were allowed to drive (Holden, 1983).

The relation between recidivism and the actual occurrence of crashes is unknown. Crashes are a fairly uncommon occurrence, and it would be very difficult to determine the change in accident risk due to rehabilitation courses.

Another problem in evaluating rehabilitation studies concerns the number of completers of each course. With only very few exceptions, analyses of recidivism are limited to participants who completed the course. The percentage of completers is, however, variable and is not routinely evaluated as an aspect of course-quality.

## 2.2 CODED STUDIES

The present evaluation focused on recent studies (since 2007) and was based on a search of SCOPUS and TRID (see supporting document for details). All studies concerned a comparison of participants of rehabilitation courses for drink driving offenders, to drink driving offenders who did not take part in such a course. In one study (Bouffard & Richardson, 2007), methamphetamine-involved offenders who took part in a rehabilitation course were compared to methamphetamine-involved offenders sentenced to prison.

As outcome variable recidivism was selected. Other possible outcomes (not investigated here) are self-reported behaviour (drink driving, drug use, and other offences like speeding) and attitude measurements.

Typically, participants and non-participants are evaluated after two to three years, although some studies followed up participants for up to ten years. The percentage of recidivists is compared directly between participants and non-participants. Additionally, recidivism is sometimes also analysed in a logistic regression analysis (yes or no in a given time-frame) or in a cox-regression or survival analysis, measuring the time passing until an unfavourable event - here recidivism - occurs. The measure of effect in the logistic regression (recidivism yes/no) is an odds-ratio and the measure of effect in a cox regression is a hazard-ratio. Both ratios indicate the relative risk of participant as

compared to non-participant. A ratio below 1 indicates a lower risk for participants and a ratio larger than 1 indicates a higher risk for participants. The regression analyses have the advantage that possible differences between participants can be corrected for. A cox-regression is considered the highest state-of-the art in analysis.

## 2.3 OVERVIEW RESULTS

### 2.3.1 Meta analysis of regression studies

The results from the regression analyses are presented in Figure 1. Horizontally, the resulting Odds- or Hazard- ratio is given. Vertically the inverse standard-error of this estimate is given, this means the higher the point is situated in the graph, the more reliable the estimate.

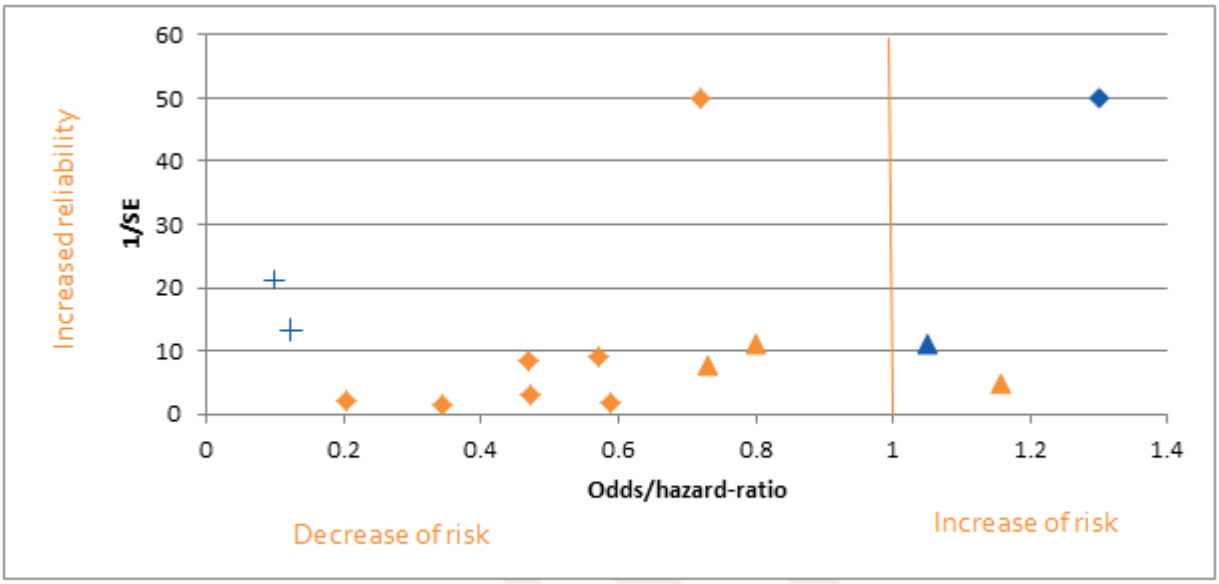


**Figure 1**: Odds/hazard ratio for participants vs. non-participants. Orange: completers; blue: non-completers. +Recidivism after 1 year; ◆ recidivism after 2 years, ▲ recidivism after 3 years.

The studies in Figure 1 – all those that used cox- or logistic regression – were selected for a meta-analysis. The regression analyses allow the inclusion of covariates like age, gender, and prior convictions (DUI and other). In particular prior conviction is an important predictor of recidivism and in many studies the participants and non-participants differ on this variable. By including variables in the regression model, the estimated effect concerns the group differences over and above what the covariates can explain.

A random effects meta-analysis was conducted on the ratios estimated by logistic or cox-regression for completers (see Figure 1). The results are given in Table 1.

**Table 1**: Results of the random effects meta-analysis

| | Estimate | SE | P |
|---|---|---|---|
| Odds/hazard ratio | 0.5892 | 0.107 | <0.0001 |
| Q (df=11) | 10.64 | | 0.474 |
| $\tau^2$ | 0.0232 | 0.0508 | |
| $I^2$ | 17.81% | | |

The results indicate that rehabilitation courses can reduce the rate of recidivism by 40%. The other values in Table 1 (Q, $\tau^2$, and I2) all indicate that the heterogeneity of the results is within the expected range, given the precision of the estimates.

The estimate of 40% reduction is substantially higher than estimates of earlier meta-analyses reporting a reduction around 8% or 9% (Vanlaar, 2003; Wells Parker et al., 1995). One reason for this result could be that the studies that had a satisfactory analysis method (i.e. at least some correction for group differences due to the use of regression analysis) also tended to have the following characteristics:
- focus on behaviour modification and relapse prevention rather than simply providing information
- spreading out sessions over a longer period (at least 4 weeks)

Another reason could be the length of experience with rehabilitation courses. Some of the evaluations stem from programs that have been running for a long time and have been continuously evaluated and improved. Therefore, attendance at these courses during the last ten years was probably more effective than previously.

### 2.3.2 Other studies

Another set of studies simply compared the percentages of recidivists between participants and the control group (usually convicted DUI offenders who had not been referred to this treatment).

The results from simple comparisons of percentages are presented in Figure 2.

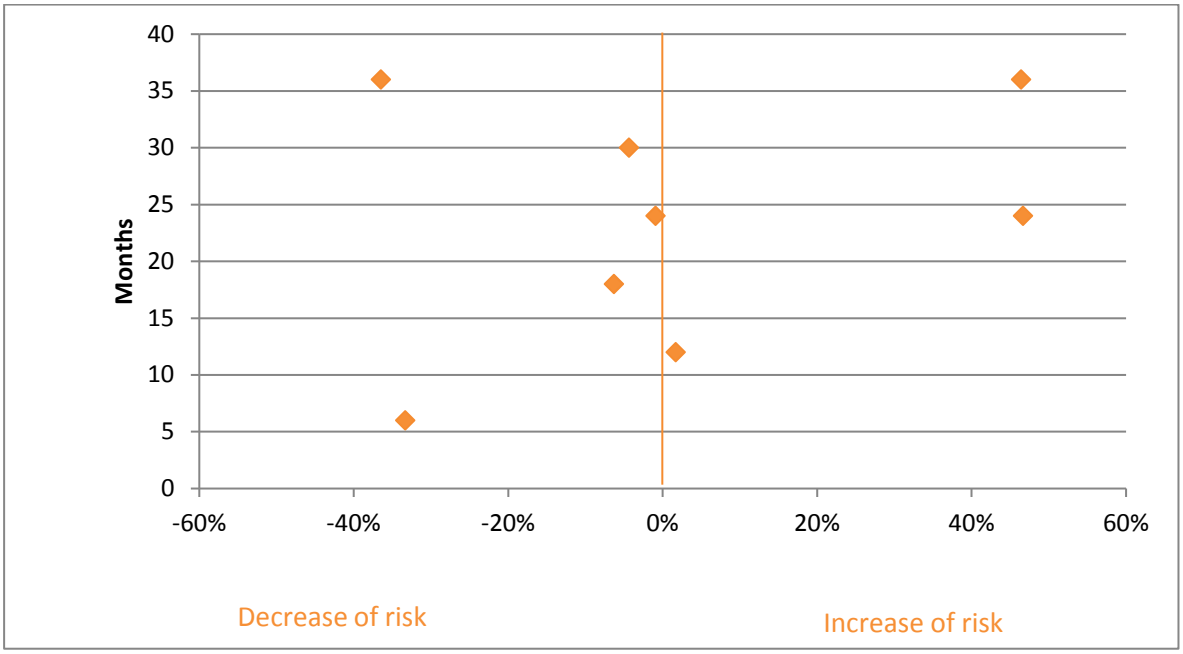


**Figure 2**: Increase of percentage recidivism for participants as compared to non-participants by period of evaluation in Month.

Studies comparing the percentage of recidivists in the participant group with the percentage of recidivists in the control group show a decrease in recidivism of up to 36%. However, two studies also identified an association in the opposite direction, i.e. an increase of recidivism after participation in a rehabilitation course. Vaucher et al. (2016) showed that participants in a one-day series of lectures have a much larger rate of recidivism than convicts who did not take part in the study. Interestingly, the authors of the same study show that a programme of two sessions together with a family member or friend does lower the recidivism rate. The other study that shows strong

negative effects (Crew et al., 2011) evaluates Victim Impact Panes, where victims of alcohol involved crashes relay their story to DUI offenders. The fact that such a treatment does not show positive effects, underlines the need to make the courses focused on behavioural change (Bart et al., 2002; Bukasa et al., 2009) rather than lecturing the participants about the impact of drunk driving.

# 3 Supporting document

## 3.1 LITERATURE SEARCH STRATEGY

### 3.1.1 Research terms and hits

**Database:** Scopus **Date:** 21st and 22nd December 2016

Limitations/ Exclusions:

- Search field: TITLE-ABS-KEY or TITLE
- Published: 1990 to current
- Document Type: ALL

| | search no. | search terms / operators / combined queries | hits |
|---|---|---|---|
| Rehabilitation | Not selected | ( TITLE-ABS-KEY ( drunk OR speed* OR drink* OR aggress* OR offenders OR offenses OR recidivis* OR alcohol OR drug* OR intoxicated OR impaired OR "driving under the influence" ) AND TITLE-ABS-KEY ( rehabilitation OR training OR course OR education OR program OR "driver improvement" ) ) AND PUBYEAR > 1989 | 636,630 |
| | Not selected | ( TITLE-ABS-KEY ( drunk OR speed* OR drink* OR aggress* OR offenders OR offenses OR recidivis* OR alcohol OR drug* OR intoxicated OR impaired OR "driving under the influence" ) AND TITLE-ABS-KEY ( rehabilitation OR training OR course OR "driver improvement" ) ) AND PUBYEAR > 1989 | 349,475 |
| | #1 | ( TITLE ( drunk* OR speed* OR drink* OR aggress* OR offender* OR offense* OR recidivis* OR alcohol OR drug* OR intoxicated OR "driving under the influence" ) AND TITLE ( rehabilitation OR "driver improvement" OR diagnostic OR "fitness to drive" ) AND TITLE-ABS-KEY ( "road safety" OR driv* OR traffic ) ) AND PUBYEAR > 1989 | 84 |
| | #2 | ( TITLE ( drunk* OR speed* OR drink* OR aggress* OR offender* OR offense* OR recidivis* OR alcohol OR drug* OR intoxicated OR "driving under the influence" ) AND TITLE ( training* OR course* OR program* ) AND TITLE-ABS-KEY ( "road safety" OR driv* OR traffic ) ) AND PUBYEAR > 1989 | 435 |

**Database:** TRID **Date:** 27th December 2016

Limitations/ Exclusions:

- Published: 1990 to 2016
- Document source : ALL, Document Type: ALL, Subject area : ALL
- Language: English and French

| | search no. | search terms / operators / combined queries | hits |
|---|---|---|---|
| | #1 | (offender* OR offense* OR recidivis*) AND (rehabilitation OR program*) | 868 |

### 3.1.2 Results Literature Search

| Database | Hits - Rehabilitation |
|---|---|
| **Scopus** | 519 |
| **TRID** | 868 |
| **Total number of studies to screen title** | **1387** |

## 3.2 PRIORITISATION

### 3.2.1 First prioritisation, based on Titles and Abstracts screening

**Principles**

Focus on effectiveness of methods that evaluate the fitness to drive / the rehabilitation measures

- Effectiveness of rehabilitation courses to improve road safety (reducing recidivism)

**Excluded**

- Way to measure/detect/assess alcohol/drug consumption/dependency/sobriety
- Prevention of drink-driving in general (i.e. for primary prevention)
- Prevention programmes (that are not focused on offenders/recidivists) / programmes to reduce DUI
- Effects on the rehabilitation programmes on health-care (costs), on hospital care utilisation, on sick leave, etc.
- How to improve the effectiveness of rehabilitation programmes
- Monitoring of identified offenders
- Proposition of new method (without any test of it)
- Assessment of the methods used in a region
- Programmes to motivate/promote/incentive the use of FDA/ rehabilitation tools
- Profile of recidivist, of persons taking part to FDA/Rehab programmes
- Papers that describe a programmes but do not give information on its effectiveness
- Recommendations, guidelines, best practices
- Duplicates

⇨ 40 selected papers (14 coding priority)

*Coding priority*

- Control group without training
- Comparison in terms of recidivism
- Paper available

## 3.3 INCLUDED STUDIES

| Author(s), Year | Sample and study design | Method of analysis | Treatment group and control group | Outcome indicator | Main result | Effects on road safety | |
|---|---|---|---|---|---|---|---|
| Sloan et al., 2016 | Quasi-experimental study on the effect of ***drug court programs and DUI court programs on DUI recidivism***.<br>There is no information on sample size of the treatment group, the control group consists of 131,340 people convicted of DUI but never referred to a specialty court. | Follow-up of the treatment group and control group during 4 years in order to calculate DUI recidivism within this time frame. The Average Treatment Effect is calculated,to measure differences in recidivism rates between treatment and control groups during follow-up. | Completers versus people never referred for treatment | DUI arrests (yes-no), DUI convictions and number of DUI arrests | Recidivism rates (all three outcome indicators) were lower for completers than for people never referred to a programme in the 4 year follow up period. | ↗ | Average treatment effect :<br>DUI arrest = 0.104<br>DUI conviction = 0.096<br>Nr of DUI arrests = 0.079 |
| Ma et al., 2015 | Quasi-experimental study on the effect of the **'Back-on-Track'** (BOT) programme on recidivism. The Full BOT group received a multi-component treatment, the Edu BOT group received a single component treatment.<br>The Full BOT group consisted of 2738 people, the Edu BOT group of 4410 people and the control group (no BOT) of 19163 people. | Follow-up of the treatment groups and control group during 3 years in order to calculate DUI recidivism within this time frame. | Completers versus people never referred for treatment | DUI recidivism | Both on-time completers and late completers in the Edu BOT group re-offended significantly less than those in the No BOT group, while on-time and late completers in the Full BOT group re-offended significantly less than those from the corresponding Edu BOT sub-groups. | ↗ | Absolute difference:<br>NoBOT vs EduBOT = 3.1%<br>NoBOT vs FullBOT = 1.3% |
| Ekeh et al., 2008 | Quasi-experimental study on the effect of the ***treatment program 'Drive Alive' (DA)***, which targets | Follow-up of the treatment group and control group | Completers versus people never referred for | DUI recidivism | In the treatment group, 28% of the participants had a repeat offence. In | ↗ | Absolute difference = 14.0% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | teenagers, on recidivism.<br>183 adolescents participated in the DA programme, 233 individuals were selected as control group. | during 2.5 years in order to calculate DUI recidivism within this time frame. | treatment | | the control group, 42% re-offended. This result is statistically significant. The difference for re-offending between both groups is not significant after 6 months. | | |
| Crew & Johnson, 2011 | Quasi-experimental study on the effect of the treatment programme '***Victim Impact Panels' (VIP)*** on recidivism.<br>The dataset consisted of 1533 cases and includes information on 657 people who participated in and successfully completed VIP, and 876 who did not. Both participants and non-participants were convicted for driving under the influence of alcohol. | Follow-up of the treatment group and control group during 3 years in order to calculate (DUI) recidivism within this time frame. | Completers versus people never referred for treatment | DUI recidivism, recidivism in general | 12.3% of the offenders who completed VIP received new DUI convictions, but only 8.4% of offenders who did not attend VIP received new DUI convictions. When all criminal charges are included, the relapse rates are 18.2% for non-participants and 22.2% for participants. The differences are statistically significant, but unfortunately the association is in the wrong direction. | ↘ | Absolute difference DUI recidivism = 3.9%<br>Absolute difference recidivism = 4.0% |
| Vaucher et al., 2016 | Quasi-experimental study on the effect of a treatment programme which informs the participants about the dangers of drink driving and alcohol (ab)use.<br>There were 4 groups: 242 participants in the 7 hour lecture group, 228 participants in the 4 hour lecture group, 257 people in the 2 hour lecture group and 940 people in the control group. | Follow-up of the treatment groups and control group during 10 years in order to calculate (DUI) recidivism within this time frame.<br>Also, hazard ratios were computed using Cox regression | Completers versus people never referred for treatment | DUI recidivism | After adjusting for age, gender, and BAC at the time of the first offence, there was a non-significant 47% increase in the risk of DUI recidivism within two years of the first offence for those having attended the seven-hour series of lectures when compared to those that refused to participate in the study. | – | Absolute difference = 47.0% |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Beadnell et al., 2015 | Observational evaluation of a new trainings method within the ***Driver Education and Evaluation Program***: ('***motivation enhancing***' (ME was compared to the earlier used '***standard care'*** (SC).<br>There were several subgroups in the DEEP group: non-completers (n=2083), participants with a stand-alone programme (n=1415) and the participants who received addiction treatment after programme (n=2683). For each of these groups, ME was compared to SC. (Non-completers (n=2226), Completers (n=1856), Completers+treatment, n=2004) | The DUI re-arrest rates of the DEEP group and the control group are compared using a logistic regression.<br>Absolute and relative risk reduction estimates were calculated as well as number needed to treat (NNT). | Noncompleters: ME vs. SC<br><br>Completers: ME vs. SC<br><br>Completers + Treatment: ME vs. SC | DUI recidivism | While for non-completers, there was no difference between SC) and ME, for completers there were fewer recidivists for ME as compared to SC.<br><br>These differences occurred for the 'prevention programme completers' group as well as the 'prevention programme and treatment completers' group. | ↗ | DEEP ME vs SC: odds ratio = 0.73<br><br>DEEP program + treatment, ME vs. SC: odds ratio = 0.80 |
| Mills et al., 2008 | Quasi-experimental study on the effect of the '***Sober Drive program' (SDP)***, This programme aims to reduce recidivism rates among repeat drink drive offenders by *promoting participants' understanding of the effects of drunk driving* on the self and the community at large, and by assisting participants to develop skills, strategies and knowledge to apply in future situations to prevent re-offending.<br>The evaluation design included a comparison of recidivism rates for programme participants (n=2491) and a control group (n=11407) of convicted drink drivers who received legal sanctions alone. | Recidivism rates were examined using Kaplan – Meier survival analysis, as follow-up times varied between participants.<br>Cox regression analysis was conducted to determine the impact of SDP on recidivism after controlling for confounding variables. | Participants versus people never referred for treatment | DUI recidivism | Re-offending among those who participated in SDP was lower than the comparison group. At the 2-year cut-off, 6.1% of all SDP participants had re-offended compared with 10.1% of the comparison group. When this analysis was repeated comparing those who completed SDP with the comparison group, the effect of SDP on recidivism was somewhat greater. | ↗ | Odds ratio = 0.47 |
| Bouffard & Richardson, 2007 | Quasi-experimental study on the effect of '***drug court participation'***. The drug court included in this study is a post conviction court. It is a hybrid DWI/drug court that accepts both drug offenders and | Cox regression to calculate DUI recidivism. | Completers versus people never referred for treatment | Re-arrest during the time period between when drug court offenders completed the | Methamphetamine-involved offenders who completed the drug court programme - did not differ significantly in their probability of post- | – | Methamphetamine, drug court vs prison sentence: relative hazard ratio = 1.064<br><br>Non- |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | DWI offenders.<br>Data was collected from 87 participants in a hybrid DWI/drug court. The control group consisted of 124 people convicted to a prison sentence for a DUI offense. | | | programme and the date at which recidivism data was gathered from official records. | programme re-arrest from methamphetamineinvolved offenders completing traditional sentences of prison followed by parole.<br><br>DUI offenders sentenced to participate in this hybrid drug court were not significantly less likely to be re-arrested after completing the programme than are DUI offenders in the comparison sample. | | methamphetamine, drug court vs prison sentence: relative hazard ratio = 0.751<br><br>DUI, drug court vs prison sentence: relative hazard ratio = 0.527<br><br>Non-DUI, drug court vs prison sentence: relative hazard ratio = 1.587 |
| Robertson et al., 2009 | The purpose of this quasi-experimental study is to evaluate the effectiveness of the '***Mississippi Alcohol Safety Education Program'*** (MASEP), in reducing DUI recidivism. MASEP is a court-mandated intervention for all first-time DUI offenders in Mississippi.<br>The recidivism rates for three groups are compared: people who did not enrol (control group, n=17937)), people who completed the programme within 3 months ('completers', n=24102) and people who enrolled but never attended as prescribed ('non-completers', n=8843). | Cox proportional hazards egression was used. The first model tested the effect of programme completion on DUI recidivism, the second model tested the effect of the programme version. | Non-completers versus people never referred for treatment<br><br>Completers versus people never referred for treatment | DUI recidivism, defined as having occurred when someone mandated to MASEP gets a subsequent DUI citation. The time interval until DUI recidivism is 3 years, measured in months. | Offenders who completed MASEP have significantly lower DUI recidivism over a 3 year period than people who did not enroll. Non-completers recidivated at the highest rate. | ↗ | Non-completers vs control group: relative hazard ratio = 1.30<br><br>Completers vs control group: relative hazard ratio = 0.71 |
| Robertson et al., 2013 | The purpose of this quasi-experimental study is to evaluate the effectiveness of the **'Mississippi Alcohol Safety Education Program'** (MASEP) in reducing DUI recidivism. The purpose of this study is to measure | The Cox proportion hazards model was used to estimate the effects of covariates on DUI | Non-completers versus people never referred for treatment<br><br>Completers versus people | DUI recidivism was defined differently depending on whether the participant enrolled in | Compared to those who did not complete or did not enrol in MASEP, offenders who completed the programme had significantly lower DUI | ↗ | Non-completers vs control group: relative hazard ratio = 0.123<br><br>Completers vs control group: relative hazard ratio = 0.099 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | the effectiveness of the programme as a whole and to examine whether the most recent programme revisions have led to improvements in reducing DUI recidivism.<br>Individuals were grouped into one of three categories: timely completers (n=12975), noncompleters (n=955) and nonenrollers (n=8797) | recidivism data. Model 1 estimated the effects of the programme completion status on the hazard of DUI recidivism for the entire sample, while Model 2 assessed the effectiveness of the MASEP programmes on the hazard of DUI recidivism for the subsample of participants who completed the MASEP curriculum. | never referred for treatment | MASEP. Participants who enrolled in the course were counted as having recidivated if they had another DUI arrest after the date in which they enrolled in the course. Participants who never enrolled in the course were considered to have recidivated if they had a DUI arrest anytime after their first guilty DUI conviction. | recidivism at 12 months and at 36 months. | | |

## 3.4 OBSERVED EFFECTS

Studies reporting the percentages of recidivism in treatment vs. control

| Author(s), Year | Groups defined | Outcome measure | Percentage treatment group | Percentage control group | Other important variables |
|---|---|---|---|---|---|
| Ma et al., 2015 | No BOT – EduBOT on time – EduBOT late – FullBOT on time – FullBOT late | Recidivism | NoBOT = 8.5%<br>NoBOT = 8.5%<br>EduBOT on time = 5.4%<br>EduBOT late = 7.2% | EduBOT on time = 5.4%<br>EduBOT late = 7.2%<br>FullBOT on time = 3.9%<br>FullBOT late = 5.8% | age |
| Ekeh et al., 2008 | Participants of the Drive alive programme – control group (a random selection of individuals in the same age range who committed similar offenses, received standard court sentencing and who did not attend the programme) | Recidivism 6m<br>Recidivism 12m<br>Recidivism 18m<br>Recidivism 24m<br>Recidivism 30m | 28%<br>54.7%<br>68.1%<br>76.1%<br>79.1% | 42%<br>53.8%<br>72.7%<br>76.8%<br>82.7% | Moving violations, alcohol violations |
| Crew & Johnson, 2011 | Participants of the Victim Impact Panel – control group | New DUI conviction<br>Any new conviction | 12.3%<br>22.2% | 8.4%<br>18.2% | Prior convictions |
| Vaucher et al., 2016 | 7hourlecture – 4hourlecture – 2hourlecture – control group (no lecture) | DUI recidivism 0-2 years | Difference between 7hourlecture and control group = 47.0% (no separate percentages mentioned). | | |

Studies calculating odds ratio

| Author(s), Year | Groups defined | Outcome measure | | Result | Other important variables |
|---|---|---|---|---|---|
| Beadnell et al., 2015 | DEEP: non completers, standalone programme, programme and treatment<br><br>Standard Care: non completers, standalone programme, programme and treatment | Rearrest during the 3 years after the intervention or after DUI-arrest | | Non completers: DEEP vs Standard care = OR 1.05' (n.s.)<br><br>Standalone: DEEP vs Standard care = OR 0.73*<br><br>Programme and treatment: DEEP vs Standard care = OR 0.80** | age |
| Mills et al., 2008 | Participants of the Sober Drive Program and control group | Recidivism over a period of 2 years | | All participants: OR=0.57<br>Completers: OR = 0.47 | |
| Crew & Johnson, 2011 | Participants of the Victim Impact Panel – control group | New DUI conviction<br>Any new conviction | | DUI conviction OR=1.16 (n.s.)<br>Any conviction: OR = 0.992 (n.s.) | Earlier DUI conviction, supervision type (parole or not) |

Studies using Cox Regression

| Author(s), Year | Groups defined | Outcome measure | Result | Other important variables |
|---|---|---|---|---|
| Vaucher et al., 2016 | 7hourlecture – 4hourlecture – 2hourlecture – control group (no lecture) | DUI recidivism 0-2 years<br><br>DUI recidivism 2-5 years<br><br>DUI recidivism 5-10 years | 4hourlecture vs 7hourlecture: hazard ratio = 0.53<br>2hourlecture vs 7hourlecture: hazard ratio = 0.75<br><br>4hourlecture vs 7hourlecture: hazard ratio = 1.06<br>2hourlecture vs 7hourlecture: hazard ratio = 1.03<br><br>4hourlecture vs 7hourlecture: hazard ratio = 1.78<br>2hourlecture vs 7hourlecture: hazard ratio = 1.11 | |
| Bouffard & Richardson, 2007 | Drug court: meth-amphetamine – non methamphetamine – DUI – non DUI<br><br>Prison sentence: meth-amphetamine – non methamphetamine – DUI – non DUI | Re-arrest | Methamphetamine, drug court vs prison sentence: hazard ratio = 0.345 (n.s.)<br><br>Non methamphetamine, drug court vs prison sentence: hazard ratio = 0.472*<br><br>DUI, drug court vs prison sentence: hazard ratio = 0.590(n.s.)<br><br>Non DUI, drug court vs prison sentence: hazard ratio = 0.205* | |
| Robertson et al., 2009 | Alcohol Safety Education Program: completers and non-completers<br><br>Control group (not enrolled) | A subsequent DUI citation within a 3-year time period | Non completers vs non enrollers: hazard ratio = 1.30<br><br>Completers vs non enrollers: hazard ratio = 0.71 | |
| Robertson et al., 2013 | Alcohol Safety Education Program: completers and non-completers<br><br>Control group (not enrolled) | DUI arrest up until 36 months after arrest/program | Non completers vs non enrollers: hazard ratio = 0.123<br><br>Completers vs non enrollers: hazard ratio = 0.099 | Version of the program |

## 3.5 REFERENCES

### List of coded studies

Beadnell, B.; Crisafulli, M.A.; Stafford, P.A.; Rosengren, D.B. & DiClemente, C.C. (2015). Operating under the influence: Three year recidivism rates for motivation-enhancing versus standard care programs. *Accident Analysis and Prevention, 80*, 48-56

Bouffard, J.A. & Richardson, K.A. (2007). The Effectiveness of Drug Court Programming for Specific Kinds of Offenders. Methamphetamine and DWI Offenders Versus Other Drug-Involved Offenders. *Criminal Justice Policy Review, 18:3*, 274-293

Crew, B.J. & Johnson, S.E. (2011). Do victim impact programs reduce recidivism for operating a motor vehicle while intoxicated? Findings from an outcomes evaluation. *Criminal Justice Studies: A Critical Journal of Crime, Law and Society, 24:2*, 153-163

Ekeh, A.P.; Hamilton, S.B.; Demko, D. & McCarthy, M.C. (2008). The Effect of a Trauma Center-Based Intervention Program on Recidivism Among Adolescent Driving Offenders. *The Journal of Trauma Injury, Infection, and Critical Care, 65*, 1117-1121

Ma, T.; Byrne, P.A.; Haya, M. & Elzohairy, Y. (2015). Working in tandem: The contribution of remedial programs and roadside licence suspensions to drinking and driving deterrence in Ontario. *Accident Analysis and Prevention, 85*, 248-256

Mills, K.L.; Hodge, W.; Johansson, K. & Conigrave, K.M. (2008). An outcome evaluation of the New South Wales Sober Driver Programme: a remedial programme for recidivist drink drivers. *Drug and Alcohol Review, 27*, 65-74

Robertson, A.A.; Gardner, S.; Xu, X. & Costello, H. (2009). The impact of remedial intervention on 3-year recidivism among first-time DUI offenders in Mississippi. *Accident Analysis and Prevention, 41*, 1080-1086

Robertson, A.A.; Gardner, S.; Xu, X.; Chi, G. & McCluskey, D.L. (2013. Mississippi's DUI Offender Intervention: 40 Years of Programming and Research. *Journal of Offender Rehabilitation, 52:2*, 138-155

Sloan, F.A.; Gifford, E.J.; Eldred, L.M. & McCutchan, S.A. (2016). Does the probability of DWI arrest fall following participation in DWIand hybrid drug treatment court programs? *Accident Analysis and Prevention, 97*, 197-205

Vaucher, P.; Michiels, W.; Lambert, S.J.; Navre, N. ; Perez, B. ; Baertschi, A. ; Favrat, B. & Gache, P. (2016). Benefits of short educational programmes in preventing drink-driving recidivism: A ten-year follow-up randomised controlled trial. *International Journal of Drug Policy, 32*, 70-76

### References on further background information (sorted by authors)

Bartl, G.; Assailly, J-P.; Chatenet, F.; Hatakka, M.; Keskinen, E. & Willmes-Lenz, G.(2002). *EU-projet ANDREA: Analysis of Driver Rehabilitation Programmes.* KfV Wenen.

Blom, M.; Bregman, I. M. & Wartna, B.S.J. (2011). *Geregistreerde verkeerscriminaliteit in kaart: een kwantitatief beeld van achtergrondkenmerken en de recidive van geregistreerde verkeersdelinquenten in Nederland*. Den Haag, Nederland: WODC

Bukasa, B.; Braun, E.; Wenninger, U.: Panosch, E.; Klipp, S.; Boets, S.; Meesmann, U.; Roesner, S.; Kraus, L.; Gaitanidou, L.; Assailly, JP & Billard, A. (2009). *Validation of Existing Driver Rehabilitation Measures. DRUID report*.

Elvik, R. & Christensen, P. (2007). The deterrent effect of increasing fixed penalties for traffic offences: The Norwegian experience. *Journal of Safety Research, 38*, 689–695

Holden, R. T. (1983). Rehabilitative sanctions for drunk driving: an experimental evaluation. *Journal of Research in Crime and Delinquency, 20*, 55-72

Mann, R. E.; Leigh, G.; Vingilis, E. R. & De Genove, K. (1983). A critical review on the effectiveness of drinking-driving rehabilitation programmes. *Accident Analysis and Prevention, 15:6*, 441-461.

Nochajski, T. H.; Miller, B. A.; Wieczorek, W. F. & Whitney, R. (1993). The effects of a drinker-driver treatment program. Does criminal history make a difference? *Criminal Justice and behaviour, 20:2*, 174-189

Shützenhöfer, A. & Krainz, D (1999). Auswirkungen von Driver Improvementmassnamen auf die Legalbewährung. *Zeitschrift für Verkehrsrecht, 4*, 138-143

Vanlaar, W.; Kluppels, L.; Wisseur, A. & Goossens, F. (2003). *Leiden sensibiliseringscursussen voor bestuurders onder invloed van alcohol tot een lager recidivegehalte dan klassieke straffen*. Brussel, België: Belgisch Instituut voor de Verkeersveiligheid

Wells-Parker, E.; Bangert-Drowns, R. & Williams, M. (1995b). The past is prologue: determining directions for research on DUI remediations from meta-analysis. *Addiction, 90*, 1587-1601

Wells-Parker, E.; Bangert-Drowns, R.; McMillen, R.; Williams, M. (1995a). Final results from a meta-analysis of remedial interventions with drink/drive offenders. *Addiction, 90*, 907-926.