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## Some years of communities that care

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# Part III: IMPACT

‘I don’t know, I may go down or up or anywhere, but I feel like this scribbling might stay’

Woody Guthrie

Interest in community interventions is strong. Scientists and politicians, as well as practitioners, see environmental and policy change as a promising way of improving health and well-being and decreasing sickness, disease, and problems. They see community intervention as a promising alternative to individual behaviour change. But community interventions are often difficult to research for various reasons: the outcomes are often difficult to define, changes take place over a long timeframe, they have multiple components, the intervention is often difficult to replicate in different situations, and the costs are high.

Experimental studies are a rarity in the field of social science in the Netherlands. But abroad they have become a more common method to test the effects of policies, programs, and interventions, and are used on a broader scale in social, economic, and prevention science. We find experimental studies in different fields like early childhood development and education, social welfare and unemployment, crime and youth delinquency, and health services. These studies provide answers to questions like what works best for whom. But the interests of these studies are not only on effects, but also on why these programs work. These studies consider the influence of different elements of a program on the outcomes, and ask questions on implementation, participation, and intermediate outcomes which are related to the (longterm) outcomes.

The third and last part of this study focuses on the impact of Communities That Care. Chapter 8 studies the impact and the effect of Communities That Care on preventing adolescent behavioural health problems. Chapter 9 is a discussion paper on the importance of this kind of research.

# 8. PREVENTION OF PROBLEM BEHAVIOURS AMONG YOUNGSTERS: THE IMPACT OF THE COMMUNITIES THAT CARE-STRATEGY IN THE NETHERLANDS (2008-2011).

Harrie Jonkman, Claire Aussems, Majone Steketee, Hans Boutellier and Pim Cuijpers

(Submitted)

# ABSTRACT

**Purpose:** *This study examines whether the Communities that Care (CtC) prevention system has effects on the development of problem behaviours and on targeted risk and protective factors among youngsters (from 12 to 18 years) in the Netherlands. In this quasi-experimental study of five experimental and five control communities the impact of the CtC-program on outcomes are examined in a four wave longitudinal design among youngsters (12-18 years).* **Methods:** *Propensity score methodology is used as well as three level mixed models to test the effects of intervention by time interaction on problem behaviours, risk factors and protective factors.* **Results:** *No influence of the Communities that Care intervention could be detected on the development of a broader range of problem behaviours, risk factors or protective factors nor on the initiation of drinking and smoking of youngsters in this Dutch study.* **Conclusions:** *Disappointing results, different from earlier experimental studies, are placed in the context of the threats to internal validity (among them lack of tested and effective programs, delayed and partial implementation, contamination) and design limitations ( non-randomization, small acceptance rate, small sample size) of this community study. It is important to identify, monitor, address and report threats to internal validity in conducting effectiveness trials where researchers have little control of intervention implementation. Well conducted and reported, this kind of study can contribute to answering persistent social questions.*

# INTRODUCTION

Dutch youth belong to the higher drinking groups in Europe, which is by itself worlds highest drinking continent. Lower initiation ages for alcohol use and increasing amounts of alcohol and hospitalisations for alcohol poisoning are concerning trends (Ministerie van Volksgezondheid, Welzijn en Sport, 2007) (Jonkman, Steketee, Toumbourou, Williams, & Cini, 2012, accepted)<sup>2</sup>. Nearly one fifth of the Dutch youngsters in secondary schools have smoked last month, girls as much as boys. Smoking in the Netherlands is still one of the main causes of early death (Trimbos Institute, 2010). The use of soft drugs (hash and marijuana) of youngsters stabilizes the last years. When adolescents are 16 years old nearly one third has used soft drugs: More than 55% once or twice a month and 14% more than 10 times. A small number of youngsters use one or more hard drugs (like cocaine, amphetamine, ecstasy) (van Laar & Ooyen-Houben, 2009). Violence, delinquency and anti-social behaviour of youngsters are important societal problems. It is estimated that 5-7% of the Dutch children show serious problems and are in need of professional help (Loeber, Slot, Laan, & Hoeve, 2008). In the group of adolescents we see similar percentages (Junger-Tas et al., 2011). Boys show more anti-social problems than girls. Migrants are overrepresented in the juvenile system and the institutions for delinquents.

There is evidence that development of a specific problem behaviour is often intertwined with one or more other problem behaviours. Severe alcohol use, for example, is associated with other substance use. Significant correlation between crime and alcohol has been recognized over a longer time in scientific studies (Steketee, 2011). The intertwining of different problem behaviours brought up the idea to intervene on underlying factors which are strongly associated with problem behaviours at the same time (Catalano et al., 2012). Longitudinal and experimental studies demonstrated over the years the variety of risk and protective factors as the underlying factors for the problem behaviours (IOM, 2009). These factors could be identified in the daily contexts in which children and youngsters grow up: family, school, peers and communities, and became the principles of prevention activities for children and youngsters nowadays.

Problem behaviours among youngsters are worrisome phenomena and also possible starting points of a developmental trajectory of long term problems and disorders. Preventing problem behaviours are therefore important societal and political targets within the Dutch society (Jonkman et al., 2008). Against this social

background, interesting approaches are those pointing out problems and dealing with them in as early a stage as possible, thus preventing young people from going downhill. Research and evaluation has shown that a number of programs are beneficial in helping children and youngsters to avoid numerous problem behaviours (Elliott, 1997; Weissberg & Kumpfer, 2003).

In search of identification and dissemination of effective prevention strategies to combat high prevalence of drug abuse, delinquency, youth violence and other problem behaviour Nation et al. found in their 'review of reviews' nine general principles for effective prevention programs for children and youngsters (Nation et al., 2003). Programs should be comprehensive, include various teaching methods, provide sufficient dosage, are theory driven, provide opportunities for positive relationships, are appropriately timed, socio-culturally relevant, include outcome evaluation and involve well trained staff. These principles inform the practice of prevention, provide a rationale for prevention programs and further research in the future. Communities that Care (CtC) is such a prevention program (operating system) developed and ongoing researched in the US in response to increased problematic behaviour and social dropping out among the youngsters (Brown, Hawkins, Arthur, Briney, & Fagan, 2011; Feinberg, Jones, Greenberg, Osgood, & Bontempo, 2010; Hawkins et al., 2009; Hawkins et al., 2011). The strategy is also set out over the years in several other countries. Since 2000 it is set out in the Netherlands.

The Communities that Care operating system is a community-based strategy aimed to prevent adolescent behavioural health problems. It addresses risk factors found in longitudinal studies to increase the likelihood of different problem behaviours (Coie et al., 1993; IOM, 2009; Oesterlee et al., 2012, accepted). It also addresses protective factors that reduce the likelihood of these outcomes or of risk factors (Catalano, Berglund, Ryan, Lonczak, & Hawkins, 2004; Loeber et al., 2008). Based on this knowledge, the CtC-approach involves assessing the prevalence of problem behaviours, but also of the risk and protective factors in a community (neighbourhood) related to the problem behaviours. With the local profile based on epidemiological research on problem behaviours, risk factors and protective factors, communities can identify and choose tested and effective, preventive interventions to address these underlying factors (Arthur et al., 2007). A strategic, community-specific process has been designed and tailored to increase communication, collaboration and ownership among professionals, service providers and community members (Brown et al., 2011; Steketee et al., 2012). During this process, communities get technical assistance and specific training courses by trained and licensed CtC-experts. Although it is a community intervention in which different parties bear responsibility, one person (the local project leader) has specific responsibilities during the three year implementation period. After the implementation period, the community will be strong enough to work on its own, using the CtC-prevention framework (Jonkman et al., 2008).

Findings from quasi-experimental studies in Pennsylvania (Feinberg et al., 2010) and the CYDS-randomized trial studies (Hawkins et al., 2009; Hawkins et al., 2011) showed that the use of CtC can contribute to improvements in youth outcomes. It showed that adopting the CtC-system in communities reduces the incidence of alcohol, smoking, smokeless tobacco and delinquent behaviours within four years. The prevalence rates were higher in control communities than in experimental communities for substance use last month: alcohol, smokeless tobacco and binge last two week as well as for delinquency last year (Hawkins et al., 2009). These incidence and prevalence results sustained within six years and the CtC-intervention communities lower the level of risk factors significantly (Hawkins et al., 2011).

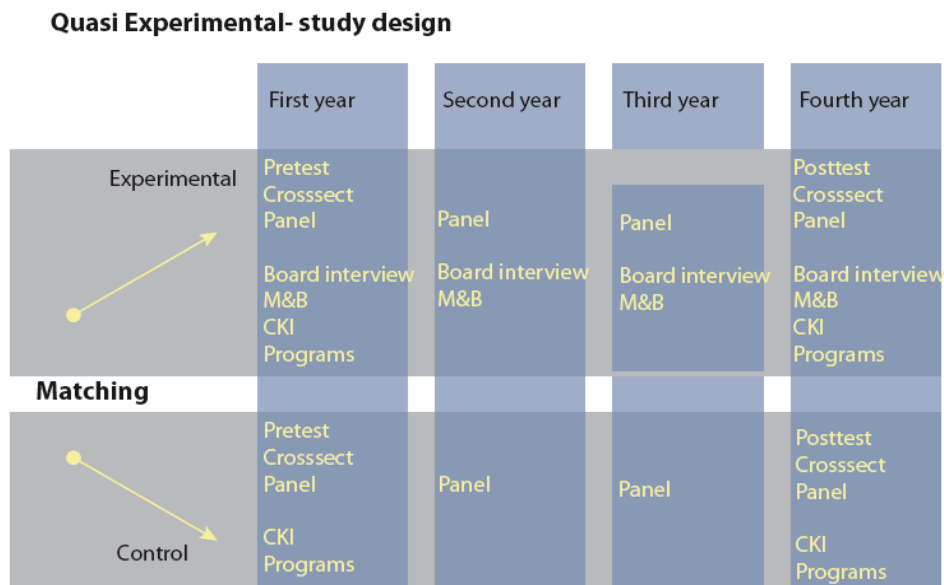
The present study, although designed as a randomized controlled trial, became a quasi-experimental study to evaluate the effectiveness of CtC on various outcomes for youngsters in the Netherlands. In this study the long-term effects of Communities that Care on the behaviour of young adolescents (12-18 years) are assessed using longitudinal data. The objective of this study is to examine the effects and results of the prevention strategy of CtC in the Netherlands with regard to driving back problematic behaviours of youngsters. In our study we compare experimental and control community trends in prevalence of health outcomes of young people over a four year period (2008-2011). Outcomes of interest in this study are initiation and frequency of alcohol use, smoking, drug use and anti-social behaviour of youngster from 12-18 years. Beside these primary outcomes we are also interested in secondary outcomes (precursors). Precursors are factors that affect the likelihood of problem behaviours. They include structural, intermediate (family, school, peer) and individual risk factors which increase problem behaviours. But, they also include protective factors which mediate or moderate risk factors or directly decrease the likelihood of problem behaviours (Catalano et al., 2012). Experimental and control community trends of targeted risk and protective factors in the family, school, peer groups and community of these youngsters are compared over a four year period.



# METHODS

## Design

Figure 1. Study design.



The panel study discussed in this article is part of a broader study design (Figure 1) in which the intervention-condition (CtC-communities) is compared to the control-condition (Care as Usual-communities) over a four year time period. Five experimental neighbourhoods are paired to five control neighbourhoods. The effects of the intervention are measured on different ways: on youth outcomes by a Pre-test Youth Survey in the first year (2008) and a Post-test youth survey four years later (2011) on representative cross-sectional samples of youngsters in the experimental and control neighbourhoods. Also different kind of process outcomes (Milestones and Benchmarks (M&B) and Board interview to measure the level of implementation, Community Key-leader Interview (CKI to measure differences in collaboration and adoption of Prevention thinking) and Prevention Programs (to measure the use of effective programs) are researched. These results will be reported elsewhere (Steketee et al., 2012). In this article we present the results of the longitudinal part of this study.

The panel follows the development of a group of youngsters who live in experimental and control communities over a four year period. Measurements took place every year (autumn) and the first measurement (2008) is the baseline measurement. Youngsters were at that time 12, 13 or 14 years. During the last wave they were 15, 16 or 17 years (2011). We received student- and parental consent for each adolescent to participate in the four-year study.

## Measurements

### Setting

In 2008 five Dutch cities intended to start with the CtC-intervention and they were found prepared to participate in our research project. The five cities are located in the provinces of Zuid-Holland and Zeeland (South-west of the Netherlands). The cities are all middle sized and have an average population of 61,633 (ranging between 44,511 and 77,096, Table 1a). Within each of these cities pairs of neighbourhoods were selected to participate in this study.

The ten Dutch neighbourhoods (total youngsters E=55,2% and C=44,8%) with an average youth population of 768 (biggest 1,183, smallest 390) were matched in pairs within cities on population size, racial and ethnic diversity, economic indicators, and rates of crime and other problem behaviours of youngsters. Assignment accorded on city level in 2008 by City Council (Mayor and Alderman) to participate in the study over a four year period (2008-2011), to work with the CtC-intervention on fidelity base and not to work with the intervention in the control community.

**Table 1a.** *Number of Inhabitants in Participating Cities and Communities*

City	Inhabitants Total	Inhabitants 12 to 18 years	ExperimentalCommunity	Control Community
A	66,159	4,727	1,143	505
B	77,096	5,124	1,183	764
C	48,076	3,502	637	674
D	72,321	4,972	603	716
E	44,511	2,486	390	545
Total	308,163	20,881	3956	3204

Three of the cities agreed on random assignment. One city wanted to participate in the study but decided already at the end of 2007 with different stakeholders in the city for a specific experimental neighbourhood. The other city which didn't agree on random assignment was confronted with huge youth problems in one of their neighbourhoods and became part of national discussion during the assignment period. The city council decided to participate in the study as the protocol was set up. But, because of national interest and local concern, they wanted to choose the CtC-area themselves.

## Participants

Names and addresses were provided by the five city councils of all youngsters who lived in one of the ten communities and were aged 12, 13 or 14 years in 2008. These youths and their parents received an invitation letter at their home address to participate in the panel for four years). Youths were asked to fill in a questionnaire annually on the internet with a personal code. In 2011 (fourth wave) the oldest participants were 17 years of age. Youngsters and parents had to confirm participation consent. In total we contacted 3.368 youngsters in the age group of 12-14 years and their parents. From 148 we got only the parent consent back, from 133 we received a signed letter from only youngsters, 177 parents made clear they did not agree to participation of their children. From 785 we got a signed letter of agreement from parent as well as participant. 24,3% of the youngsters of the experimental communities participated in the panel and 16,3% of the control communities.

In total 785 youngsters participated in this study, more from experimental (511, 70%) than control communities (274, 30%). Over three quarter (75,5%) of the adolescents participated four times (E=76,3%; C=74,1%), 11,6% three times (E=11,0%; C=12,8%), 7,7% two times (E=7,4; C=8,0) and 5,2% once (E=5,3; C=5,1). The participation rates in the experimental and control communities over the waves were similar. Differences on background variables of E- and C-youngsters over the years show similar patterns on age, gender, ethnicity and work of parents (Table 1b).

**Table 1b.** Background Variables of Participants over the Waves

	Total Con- trole	Total Experi- mental	2008 Con- trole	2008 Experi- mental	2009 Con- trole	2009 Experi- mental	2010 Con- trole	2010 Experi- mental	2011 Con- trole	2011 Experi- mental
Age(12 year is 0)	2.26 (0.04)	2.32 (0.03)	1.0 (0.05)	1.05 (0.04)	1.9 (0.05)	2.00 (0.04)	2.8 (0.05)	2.82 (0.04)	3.7 (0.06)	3.72 (0.04)
Fema-le in %	55,9%	54,7%	55,5%	54,8%	57,6%	55,6%	54,6%	54,5%	55,9%	53,8%
EtnicityDutch in %	69,1%	75,1%	77,5%	82,3%	68,6%	74,8 %	67,5%	73,0%	62,7%	70,2
Both work in %	79,2%	84,0%	77,6%	82,3%	78,6%	83,0%	81,0%	85,9%	79,5%	85,2%

•

## Measures

**Primary outcomes.** Alcohol use and other behaviour outcomes are considered as primary outcomes. Regular alcohol use is researched in this study by alcohol use ever, alcohol use last month and binge drinking (use of 5 or more glasses on one occasion last two weeks). Smoking of cigarettes and soft drugs (hash, marijuana) is also been researched on ever use and last month use and hard drugs ever (cocaine, heroin, xtc, speed, amphetamines) is measured. Delinquency (measured on last year occasion) is separated in violence questions (carrying weapons, fighting, attacking someone and threatening) and other delinquency actions (like damaging property, caught by police, shoplifting, stealing on school, selling stolen things). We made one binary antisocial variable of it with a one if yes on two or more on violence or other delinquency items and a no if not. For measuring incidence we used drinking ever, smoking ever, soft drugs ever, and antisocial ever. For measuring the prevalence over the four year period we used all the primary outcomes.

**Secondary outcomes.** In this study risk and protective factors are seen as secondary outcomes. The risk and protective factor constructs included in this study are created following Arthur et al. (Arthur et al., 2007). Because not all the scales of the precursors demonstrated similar internal consistencies only the scales with Cronbach alpha coefficients of .70 and higher are used in this study. CtC works with selected risk and protective factors as part of the community profiles. Only the community selected factors are used. Following these two restrictions a total of nine risk factors (mean alpha=.81.) and four protective factors (mean alpha=.74.) over multiple domains in which youngsters grow up daily in family, school, peers, community are researched.

To measure risks in the *Family* we used Poor Family Management (8 items, .78), Family Conflict (3 items, .74) and Parental Attitudes towards Antisocial Behaviour (3 items, .80). To measure *School* we used: Low Commitment to School (6 items, .73). To measure *Peers* we used: Interaction with antisocial peers (5 items, .76). To measure *Community* we used five scales: Low Neighbourhood Attachment (3 items, .85), Community Disorganization (6 items, .84), Transition and Mobility (1 item) and Perceived Availability of Drugs and Weapons (2 items, .93). To measure protection we used Attachment (6 items, .73) and Opportunities for Pro social Involvement (3 items, .73) for *Family*. For *Peers* we used Belief in the Moral Order (.71). Based on criteria of reliability and selection we couldn't use any protective factors for *School*. For the domain *Community* we used: Opportunities for Pro social Involvement (2 items, .76).

## Data-analysis

The data are analyzed using the Propensity Score Methodology (Guo & Fraser, 2010; Rosenbaum & Rubin, 1983; Rosenbaum & Rubin, 1984). This approach aims at reducing the problem of non-random assignment of subjects to experimental conditions in observational studies by comparing subjects on a function of observed characteristics expected to be related to intervention assignment. By matching experimental subjects to control subjects on their propensity scores, the experimental and control groups are made more comparable on the variables that are included in the propensity score model, leading to less selection bias in the estimated intervention effect. Using an optimally distance-minimizing matching procedure, such as the full matching approach (Rosenbaum, 1991), similarity of subjects in the matched sample can be increased over traditional matching techniques such as nearest neighbour matching. An additional advantage of using comparable subjects in both conditions only is that intervention effects will not be based on extrapolation beyond the overlapping range of observations in the experimental and control groups. Full matching a sample results in matched sets instead of matched pairs. This means that each matched set can contain more than two subjects; one CtC-youngster can be matched to more than one control youngster or vice versa. In our study there are more youngsters in the CtC than control condition and in general matched sets will contain one control-participant matched to more than one CtC-participant. The advantage of matched sets over matched pairs is that more youngsters can be retained for analysis. Weights to optimize balance between the CtC and control condition are determined by the matchings software and can be used in further analysis of the matched data set. The matching procedure is done with the use of statistical software package R (2.15.0). Within R specialized matchings programs are available. We used Matchit (Ho, Imai, King, & Stuart, 2007).

After pre-processing the data using Propensity Score Matching, mixed models were used that combine a between (experimental- or control condition) and within factor (time of measurement). In these models we controlled for dependency of observations on the city-level by including dummy variables representing the city a subject is living in. By examining a intervention-by-time interaction in these models, the intervention effect could be assessed.

The development of problem behaviours, risk and protective factors of the matched dataset is analyzed with the use of multilevel analysis techniques (Gellman & Hill, 2007; Rabe-Hesketh & Skrondal, 2012). Also this is done within R. Three levels of clustering are modelled in this study: measurements, youngsters and matched sets of communities. Within the analyses we used all the information of the youngsters who participated in the first wave.

We compared four different models. We start with an empty model (Model 0) to research the variance on level 2 (individual) and level 3 (matched set). In Model 1 we add control variables: gender (female is reference), age (twelve years is reference), ethnicity (from abroad is reference), propensity score and dummy variables for city (city A is reference). In Model 2 we add the condition (control is reference) and dummy for time (main effect of time). In Model 3 (final model) we add interaction between condition and dummy variable measurement 4 (last measurement). The regression coefficient of this interaction is the interest of this study. This shows if the development of youngsters in the experimental condition (who live in one of the neighbourhood where they use Communities that Care) differs significant when this is compared to the development of youngsters who grow up in the control group.

Two kind of multilevel analyses are presented in succession. First, we analyze the development of problem behaviours, risk and protective factors. Random slope models with interaction between condition and last measurement are presented for all the cities and the specific cities to analyze the specific targeted risk and protective factors. Because we analyse binary outcomes (problem behaviours) as well as continuous outcomes (risk and protective factors) logistic and linear multilevel analyses are used. We used Bonferroni corrections to control for the number of significant tests (Miller, 1981).

Second, we also look at the impact of CtC on the incidence of problem behaviour (survival analysis). The central question here is: does CtC effect the initiation of drinking and smoking. We also wanted to analyze the use of marijuana and the development of anti-social behaviour but for these outcomes our dataset was too small. New variables are made for drinking and smoking: 0 when it didn't happen yet during the measurement, 1 when it happened and a missing value for left truncation. Because of the small number of observations that showed initiation we did this analysis only for all the cities.

## Power analysis

Power analyses were carried out to determine minimum sample sizes for the multilevel longitudinal part of the study and is done with Optimal Design (Raudenbush, S.W., Spybrook, J., Congdon, R., Liu, X., Martinez, A., 2011; Spybrook, J., Raudenbush, S.W., Congdon, R., & Martinez, A., 2011). The necessary sample size for the longitudinal part of the study was determined for a significance level of 5%, a power of 0.80, and an intra-class correlation coefficient of 0.02 (Leventhal & Brooks-Gunn, 2000). Furthermore, the number of repeated measures and clusters were set to four and ten, respectively. Power analyses were carried out in which small (0.20), medium (0.50), and large (0.80) sizes of Cohen's D were varied to determine required sample sizes (Cohen, 1988). It was found that medium and large intervention effects can be detected by sample sizes of 270 and 90, respectively. Small effects ( $d < 0.30$ ) can not be found using these sizes.

# RESULTS

## Descriptives

Table 1c. summarizes the social demographic background variables before and after matching. Before matching we see only significant differences on foreign language background (higher in Control communities) and on fathers, mothers and parents work and youngsters in higher education (higher in E-communities,  $p < 0.05$ ). After matching differences on background variables further shrank and we see only differences between communities on working status of mother and both parents. After matching the total sample became smaller (from 274 Control and 511 Experimental subjects to 230 Controls and 400 Experimental subjects). Only youngsters who are comparable on the propensity score stayed in the sample.

**Table 1c.** *Composition of control and experimental group before and after matching.*

	After matching		T-test	P-value
	Control Mean(SE)	Experimental Mean(SE)		
GENDER	0.54 (0.03)	0.54 (0.02)	0.084	0.93
AGE	0.99 (0.05)	1.03 (0.04)	-0.497	0.62
COUNTRYBORN	0.02 (0.01)	0.01 (0.01)	0.893	0.37
COUNTRYBORNFATHER	0.13 (0.02)	0.08 (0.01)	1.934	0.05
COUNTRYBORNMOTHER	0.12 (0.04)	0.08 (0.01)	1.436	0.15
SURINAM	0.04(0.01)	0.02(0.01)	1.206	0.23
ANTILLES	0.02 (0.01)	0.02 (0.01)	0.231	0.82
TURKEY	0	0	-	-
MARROC	0.01(0.01)	0.01 (0.01)	0.562	0.58
INDONESIA	0.01 (0.01)	0.01 (0.00)	0.689	0.49
OTHER	0.09(0.02)	0.08 (0.01)	0.418	0.68
BROTHERSISTERS	0.93(0.02)	0.96 (0.01)	-1.468	0.14
TWOPARENTSFAMILY	0.94 (0.02)	0.94 (0.01)	0.051	0.96
ONEPARENTFAMILY	0.03 (0.01)	0.03 (0.09)	-0.031	0.98
FLANGUAGEBACKGROUND	0.03 (0.01)	0.02 (0.01)	1.623	0.11
FATHERSWORK	0.96 (0.01)	0.97 (0.08)	-0.801	0.42
MOTHERSWORK	0.76 (0.03)	0.83 (0.02)	-2.31	0.02*
BOTHPARENTSWORK	0.73 (0.03)	0.81 (0.02)	-2.373	0.02*
PRIMARYEDUCATION	0.1 (0.02)	0.1 (0.01)	0.204	0.84
HIGHSCHOOL	0.32 (0.03)	0.28 (0.02)	1.11	0.27
VOCATIONAL	0.26 (0.03)	0.23 (0.02)	1.02	0.31
HIGHEREDUCATION	0.07 (0.01)	0.08 (0.01)	-0.364	0.72
HIGHERHIGHEREDUCATION	0.21 (0.03)	0.29 (0.03)	-1.989	0.05
MIDDLEVOCATIONAL	0	0	-	-
SPECIALEDUCATION	0.00 (0.00)	0.00 (0.00)	0.364	0.72
HIGHERVOCATIONAL	0	0	-	-
OTHEREDUCATION	0.03 (0.01)	0.04 (0.01)	-0.31	0.76
AMOUNT	230	400		



## Problem behaviours, risk factors and protective factors

We researched first the influence of the CtC-intervention on the development of a broader range of problem behaviours, risk factors and protective factors.

Figure 2. Problem Behaviours C(0)-E(1) Communities over 4 Waves

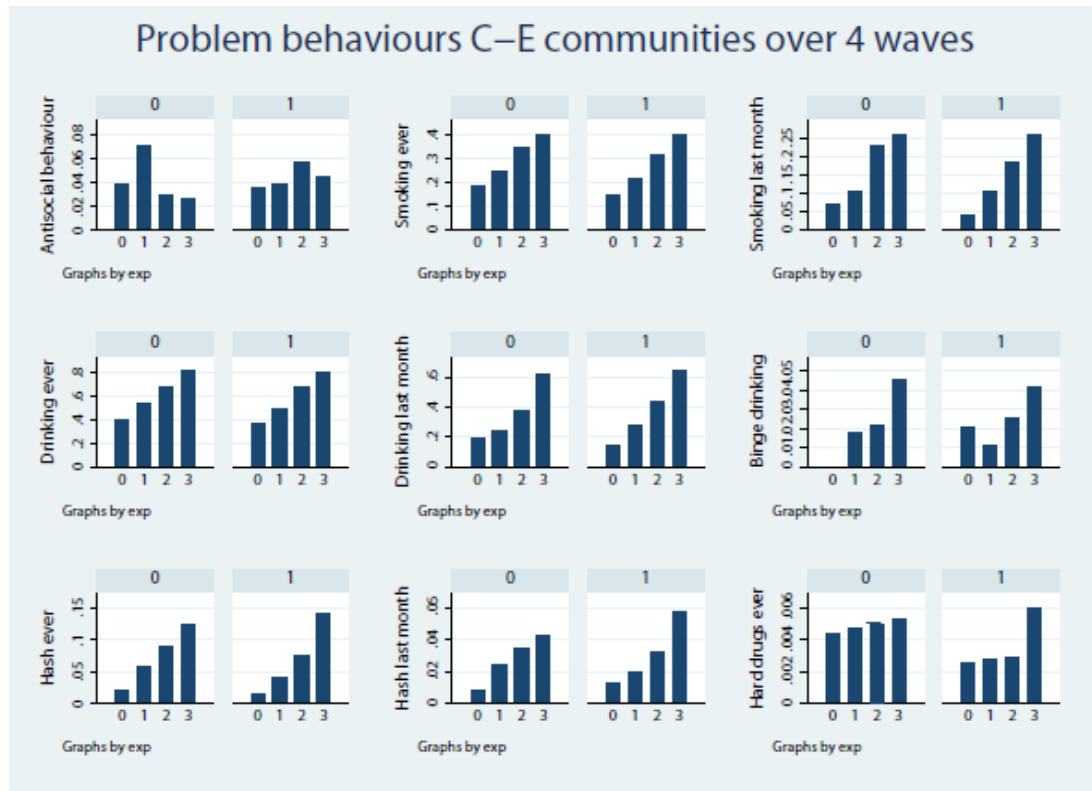


Figure 2. shows similar patterns in the outcomes of different problem behaviours of youngsters in percentages in control and experimental communities researched over a four year period: smoking ever (from 0.19 during first wave to 0.40 for last wave for control communities and from 0.15 to 0.40 for experimental communities), smoking last month (C:0.07– 0.26; E:0.04-0.26), drinking ever (C: 0.40-0.81; E: 0.36-0.79), drinking last month (C: 0.19-0.62; E: 0.15-0.64), binge drinking (C: 0-0.05; E: 0.02-0.04), hash use ever (C:0.02- 0.12; E: 0.02-0.14) , hash use last month (C: 0.01 -0.04 : E: 0.01-0.06) and hard drugs ever( C: 0.00-0.01; E:0.00 -0.01). Only on anti-social behaviour we see difference with, roughly, decreasing percentages on anti-social behaviour for control communities and increasing percentages for experimental communities (C: 0.04- 0.03; E: 0.04-0.05).

Table 2. shows the effects on problem behaviours with the interaction effect between condition and Wave 4 on the whole dataset (samples of individual cities were too small to find effects and not shown). For Hash and Hard drugs the number respondents were also too small (also not reported here). We see no impact of the intervention on any these five behaviour outcomes.

**Tabel 2.** *Effects of CTC on Problem Behaviours*

Hele steekproef	
	Coeff (SE)
Drink ever	0.077 (.391)
Drnk last month	-0.444 (60.86)
Binge drinking	-0.287 (5.830)
Smoke last month	-0.817 (19.382)
Antisocial	0.816 (4.157)

In Table 3. we present the impact on the development of risk and protective factors. We cannot detect influence on any of the factors, not on one of the risk factors, not on one of the protective factors, not on the whole sample nor in the paired communities.

**Tabel 3.** *Effects on Targeted Risk Factors and Protective Factors*

	Whole Sample	A	B	C	D	E
	Coeff (SE.)	Coeff (SE)	Coeff (SE)	Coeff (SE)	Coeff (SE)	Coeff (SE)
<b>RISK FACTORS</b>						
Poor Family Management	<b>0.051</b> (.031)	<b>0.116</b> (.075)	<b>-0.047</b> (.053)		-0.006 (.082)	
Family Conflict	<b>0.009</b> (.045)	<b>-0.004</b> (.094)				<b>0.194 (.139)</b>
Parental Attitudes towards Antisocial Behaviour	<b>0.029</b> (.035)			-0.165 (.066)	0.038 (.101)	
Low commitment to school	<b>0.049</b> (.037)					<b>0.032 (.157)</b>
Interaction with antisocial peers	<b>0.012</b> (.033)		0.067 (.048)	0.073 (.083)	0.060 (.115)	
Low neighbourhood attachments	<b>-0.035</b> (.051)	<b>-0.026</b> (.102)			-0.134 (.166)	
Community disorganization	<b>-0.050</b> (.041)	<b>-0.018</b> (.091)			0.111 (.087)	
Transition and mobility	<b>0.025</b> (.033)	<b>-0.063</b> (.067)				
Perceived availability of Drugs and Weapons	<b>0.059</b> (.109)	<b>0.185</b> (.212)				<b>-0.492</b> (.342)

PROTECTIVE FACTORS						
Attachment	<b>0.005</b> (.040)		0.109 (.066)		0.082 (.117)	
Opportunities for prosocial involvement family	<b>-0.073</b> (.040)					<b>0.177 (.116)</b>
Belief in moral order	<b>-0.049</b> (.034)			-0.020 (.063)		
Opportunities for prosocial involvement communities	<b>-0.039</b> (.058)	<b>-0.093</b> (.119)	<b>-0.074</b> (.105)		-0.161 (.160)	0.186 (.212)

Note. \* =  $p < a/13$

## Survival analysis

Table 4. shows the initiation of drinking (1360 observations. 629 individuals and 178 matched sets) and Table 5. on smoking (1884 observations. 630 individuals and 178 matched sets). We see no significant influence of the intervention on drinking nor on smoking. Developmental predictors as age and wave are important.

**Tabel 4.** *Multilevel Survival Analysis on Drinking*

	Model 0: Only intercept	Model 1: Covariates	Model 2: Timing and condition	Model 3: Interactie between timing and condition
	Coef (SE)	Coef(SE)	Coef (SE)	Coef (SE)
Constant	-0.511 (.061)***	-0.704 (.331)*	-0.742 (.315)*	-0.730 (.316)*
City B		-0.190 (.180)	-0.131 (.168)	-0.131 (.168)
City C		-0.109 (.188)	-0.097 (.177)	-0.094 (.177)
City D		0.004 (.222)	-0.009 (.210)	-0.010 (.211)
City E		-0.147 (.279)	-0.334 (.268)	-0.332 (.268)
Gender		0.272 (.051)	-0.080 (.120)	-0.082 (.120)
Age		0.272 (.051)***	0.589 (.077)***	0.591 (.077)***
Etnicity		-0.050 (.037)	-0.061 (.036)	-0.061 (.036)
Propensity score		-0.224 (.444)	-0.280 (.436)	-0.278 (.436)
Wave 2			-0.354 (.197)*	-0.354 (.169)*
Wave 3			-1.285 (.197)***	-1.288 (.197)***
Wave 4			-1.132 (.261)***	-1.264 (.360)***
Condition			-0.068 (.129)	-0.092 (.136)
Condition*Wave 4				0.204 (.377)
Variance				
Individu	.000	.135	.000	.000
Matched set	.068	.065	.026	.027
Deviance	1837	1754	1709	1708

**Table 5.** *Multilevel Survival Analysis*

	Model 0: Only intercept	Model 1: Covariates	Model 2: Timing and condition	Model 3: Interaction between timing and condition
	Coef (SE)	Coef(SE)	Coef (SE)	Coef (SE)
Constant	-1.877 (.078)***	-2.106 (.436)***	-2.168 (.451)***	-2.140 (.452)***
City B		-0.052 (.250)	-0.024 (.256)	-0.023 (.256)
City C		0.412 (.253)	0.425 (.259)	0.429 (.259)
City D		0.452 (.293)	0.418 (.301)	0.419 (.301)
City E		0.394 (.362)	0.279 (.373)	0.285 (.373)
Gender		-0.070 (.172)	-0.075 (.178)	-0.076 (.176)
Age		0.142 (.061)*	0.386 (.108)***	0.383 (.108)***
Ethnicity		-0.001 (.051)	-0.007 (.052)	-0.007 (.052)
Propensity score		-0.524 (.577)	-0.721 (.608)	-0.713 (.609)
Wave 2			-0.085 (.217)	-0.083 (.217)
Wave 3			-0.969 (.281)***	-0.964 (.281)***
Wave 4			-0.675 (.352)	-0.849 (.437)
Condition			0.025 (.190)	-0.028 (.205)
Condition*Wave 4				0.277 (.404)
Variance				
Individu	.056	1.081	1.203	1.205
Matched set	.029	.000	.000	.000
Deviance	1553	1471	1454	1454

# DISCUSSION

The aim of this social experimental study was to measure the impact of the community prevention system (Communities that Care) on the development and initiation of problem behaviours of youngsters in the Netherlands. We measured primary outcomes as the effect on prevalence of alcohol use, smoking, drug use and delinquent and violent behaviour among adolescents. We measured secondary outcomes (precursors) as the effects on risk and protective factors in the domains of Family, School, Peers and Community. We hypothesized that the CTC prevention system would decrease problem behaviours and the risk factors of adolescents. We also hypothesized that this strategy would increase protective factors experienced by adolescents.

We did not find effects of CTC on the development of risk factors, protective factors or problem behaviours, or on the initiation of drinking or smoking in this study. What should we make of these results? Why are there such apparent differences in the outcomes from the American CTC panel study (Hawkins et al., 2009; Hawkins et al., 2011) and the Dutch CTC panel study? Recall that the US trial of CTC was an efficacy trial in which the researchers provided and controlled resources allocated to CTC communities. In contrast, this is an effectiveness trial. We had no influence on any part of the implementation of CTC in this study and CtC communities did not receive additional resources. This is an important difference. We report elsewhere the degree to which CTC was implemented in the participating neighbourhoods, and the degree to which CTC affected collaborative work in the CTC neighbourhoods (Steketee et al., 2012). Do the Dutch results indicate a failure of CTC, or do they result from plausible threats to the internal validity of this effectiveness trial? Here we assess threats to implementation fidelity of CtC and the internal validity of this study.

Perhaps the greatest potential threat in the Dutch study is the limited number of tested and effective preventive interventions for those in the 12 to 18 age range available in the Netherlands at the time of this study. CTC was developed to encourage communities to select and use tested and effective preventive interventions to address priority risks. CTC's theory of change is explicit in guiding communities to use preventive interventions shown in well controlled trials to have produced significant effects on youth behavioural outcomes. But in the

Netherlands at the time of this study, only 13 youth focused programs had been tested and found to be effective. Of these, 8 programs were treatment programs for individuals with behavioural problems already, leaving only 5 prevention programs, and only 2 of these programs were for those 12 to 18 years of age. CTC communities in the Netherlands selected programs from a databank created by the Dutch Netherlands Youth Institute. The large preponderance of programs on this databank are programs deemed to be theoretically sound, but have not been tested in adequately controlled trials and found to be effective. While the selection and use of tested and effective preventive interventions is a core element of the CTC system, tested and effective preventive interventions were not used consistently in the CTC neighbourhoods in the Netherlands in this trial (Steketee et al., 2012). Without tested and proven effective preventive interventions in place, CTC neighbourhoods did not achieve better outcomes than controls. This is an important lesson for other countries and sites considering the use or testing of CTC. Where tested and effective preventive interventions are not yet available to communities, CTC may not be a viable community prevention system for achieving better youth outcomes.

A related threat was the developmental mismatch between some programs implemented in CTC neighbourhoods and the measures used to assess CTC outcomes in the Netherlands. The Dutch research team did not have resources, influence or authority to ensure that the preventive interventions selected by CTC neighbourhoods would be focused on adolescents aged 12 to 18 and their social contexts, though the measures used to assess outcomes in this study all come from surveys of children aged 12 to 18 years. In fact, 47% of all the programs implemented in the CTC neighbourhoods were focused on preschool and primary school children and their. These programs would not likely have affected the behaviour of 12 to 18 year olds during the time frame of the evaluation. In contrast, the US trial of CTC which found effects on alcohol use, tobacco use, and delinquency limited the menu of tested and effective programs supported in the test to those which focused on youth aged 10 to 15 and their families (Hawkins et al., 2008).

A third threat in the Dutch study was delayed and partial implementation of CTC. Once the research was funded in 2008, the investigators had to search for cities willing to work with the CTC strategy. Recruitment of cities and selection and assignment of neighbourhoods to conditions took time before CTC training could begin. As a result, several sites began the CTC process late in 2008. Further, in some cities CTC coaching was discontinued at the end of 2010. As a result, while the study was planned for four years, the actual CTC prevention work in any specific neighbourhood did not extend longer than three years by the time of the final assessment. Process analyses found that at that time, all the CtC neighborhoods had only recently started implementation of prevention programs (Steketee et al., 2012). It is possible that the three year implementation period of the Dutch study was too short to detect results. The CTC timeline suggests that CTC's effects on behaviour will be seen only after 4 years, and, in fact, in the Community Youth Development Study in the US, effects of CTC on tobacco and alcohol use were observed only after four years of CTC implementation (Hawkins et al., 2009).

Contamination of control neighbourhood is another plausible threat to internal validity in this study. The study was set out in paired neighbourhoods within the same cities. Community workers and professionals in these middle sized cities of the Netherlands communicated with each other frequently, and some were involved in service delivery in both CTC and control neighbourhoods. It is possible that some providers imported parts of CTC and its approach into their control community. The research team was aware of this danger from the beginning, and tried to prevent it by making clear to cities what was possible in experimental neighbourhoods and what in control neighbourhoods. As independent researchers in an effectiveness study we could not control what service providers did in the neighbourhoods. In one of the communities we found some indication of contamination in the last period of the study when they introduced in 2011 a similar prevention plan for the control community when it was confronted with increased youth problems. This was kept hidden from the researchers.

It is likely to be difficult to avoid contamination in experimental studies comparing neighbourhoods within the same cities due to propinquity of experimental and control neighbourhoods and the likelihood of common service providers, at least in the Netherlands. For experimental community research work it may be better to match neighbourhoods of different cities or to work with cities or towns with less chance of contamination. Researchers and governments should work together to make such designs possible. With regard to study design, non-randomization of neighbourhoods to condition in two of the five participating cities introduced a possible selection effect, in that city leaders in those cities chose the neighbourhoods for intervention. A further possible selection threat was introduced by the relatively low acceptance rate of 23.3% of those recruited for the study and by evidence that rates of panel participation in the study appeared to differ significantly in experimental versus control neighbourhoods (24,3% of the experimental, 16,3% of the control). Although a quasi-experimental design with modern matching techniques is the best alternative available for addressing non-random assignment and sample size differences across experimental and control neighbourhoods, it remains possible that selection effects at neighbourhood and individual levels influenced these results.

Finally, this study was limited to five CTC and five control neighbourhoods in five cities. This small number of experimental and control units was too small to detect small effect sizes as significant.

It is still possible that Communities that Care prevention system demonstrates significant effects in preventing delinquency and violence, underage drinking and tobacco use by teens when it is installed with fidelity in the United States and that it doesn't show these effects in the Netherlands with similar conditions. At the end there are important differences between the two countries which may influence the effects, for example cultural differences in service provision and quality of service staff between the US and the Netherlands/Europe (Axford,

2012). There are examples of effect studies on prevention programs (e.g. Multisystemic Therapy) which show significant results in US but disappointing results in the UK (Butler et al., 2011). Of course our effect results of CtC are disappointing and we cannot conclude its effectiveness. But, given the threats of implementation fidelity and internal validity in this effectiveness trial of Communities that Care in the Netherlands, we also cannot conclude that the prevention system is ineffective.

What then, are the contributions of this study? First, community interventions to attack problem behaviours of youngsters or to improve their well-being and healthy and social development are often implemented in communities but rarely researched for outcomes on the level they are set out in the Netherlands. This study was designed to address this problem by focusing on outcomes on the shorter (precursors) and longer run (problem behaviours) in a longitudinal panel design.

Second, this study investigated the development of a broad range of behaviours of youngsters and the initiation of drinking and smoking by focusing on the daily contexts of youth development; that is, families, schools, peer groups and communities. Experimental studies like this which use this daily life perspective are rare. The design, conduct and analysis of this kind of effectiveness trials offers lessons for researchers. Clearly, successfully overcoming threats to implementation fidelity and internal validity must be a high priority for those seeking to experimentally study interventions in everyday real world contexts. Although complex and difficult, such studies can contribute significantly to answering persistent social questions. In the Netherlands there is still a lot to do.

### **Authors contributions:**

MS and HJ obtained funding, designed and organize the study and co-wrote the paper. MS is Principal Investigator and HJ is co-PI of the Communities that Care effectiveness study in the Netherlands. CA and HJ analyzed the data and CA co-wrote the paper. HB assisted in the design of the study and chaired the study advisory group. PC assisted also in the design of the study and gave advice on specific research questions. All authors have been involved in revising the manuscript of the paper and have given final approval of the publication of the paper.

### **Competing interests:**

The authors declare that they have no competing interests.



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