

## Long term effects of preventive activities of youth health care in The Netherlands: results of a four-part study

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### Abstract

**Background.** In this article the results are presented of a four part study on the effect of screening for scoliosis and (repeated) well-care visits and freely accessible consultation hours at secondary schools, on the incidence and prevalence of (para)suicide, mental health, adolescent health compromising behaviour and lastly obesity.

**Methods.** An ecologic case-referent study design was used with data from the Netherlands Bureau of Statistics, the Ministry of Defence, the 1992 High-School Student Study, all of the youth health care departments in The Netherlands and relevant censuses.

**Results.** Attention to mental and physical health and health compromising behaviour, either during screening, open consultation hours or during well-care visits seems to be ineffective and in some instances even detrimental to youth health. Of the 18 different outcome measurements, 5 were significantly negative and none were significantly positive.

**Conclusions.** This four part study does not support the hypothesis that on a population level, the preventive activities of youth health care departments such as screening for scoliosis, (more) frequent well-care visits or offering open consultation hours at secondary schools, have a beneficial effect on prevention of (para)suicide, poor mental health, health compromising behaviour or obesity.

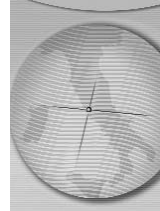
*Key words: long term effects of youth health care, (para)suicide, mental health, lifestyle, scoliosis*

### Introduction

Youth health care (YHC) departments in the Netherlands are part of the Regional Health Services, and often work for more than one municipality. They offer programmes to all primary and secondary schools in the region and the take-up by the schools is almost 100%. Since the first school-based YHC activities were initiated in The Netherlands (almost a century ago) the YHC has grown into a nation-wide, labour-intensive service, employing hundreds of physicians, nurses and medical assistants. By the time they leave school, every child in The Netherlands will have been exposed to a wide variety of preventive health and health promotion activities, administered by many different YHC workers. The services are usually delivered on the school premises and may include health promotion programmes, screening for specific physical abnormalities, well-care visits and (freely accessible) consultation hours. For the most part these activities are carried out by youth health care physicians and less frequently by nurses or

medical assistants. Among youth health care departments, there is a large variety in the total number, content and intensity of programmes, screenings, and well-care visits as well as the availability of consultation hours on schools. This variety is largely due to different views and priorities in the various health care regions with regard to the content of preventive services for children and adolescents. In January 2003, in an effort to harmonise youth health care throughout the country, a standard package of activities was introduced. However, the differences between the various departments are still substantial and the way these activities are carried out varies greatly.

Well-care visits are orientated towards primary or secondary prevention of physical, behavioural and psychological problems and are offered to all children and adolescents at a certain age or in specific grades. Especially in primary schools, parents are encouraged to accompany their children. In primary schools, the up-take by pupils is generally more than 90%, in schools for secondary education it is somewhat lower,



depending on the level of education. The visits last 15–20 minutes per student.

The personal contact during well-care visits provides the possibility of giving individualised advice to parents, children and/or adolescents. Because of this personal approach, advice given during visits is supposed to be more effective than the often unsolicited advice given in, for instance, education programmes or health promotion campaigns.

Consultation hours are accessible to pupils, parents and teachers, in most cases without prior appointment. Most of the time, open consultation hours were implemented, because in the early eighties, regular well-care visits for the older adolescents (age 16–17 years) were discontinued. Consultation hours are intended to provide easy access to health care professionals, generally physicians and sometimes nurses, for questions aimed at preventing physical and mental health problems. Because in freely accessible consultation hours, advice is often actively sought, the impact of individual counselling during these contacts is supposed to be greater than in the more non-specific setting of well-care visits.

Special training is not obligatory for workers that conduct these consultation sessions, as additional education on top of the basic medical and public health training depends greatly on personal interests.

What sets youth health care practice apart from primary and secondary health care, is the fact, that youth health care workers, be it physicians or nurses, are not permitted to treat children under their care. If therapy of any sort is deemed necessary, the child must be referred to a general practitioner or other relevant therapist. However, in some cases a restricted number of short counselling sessions may precede (or even replace) referral to institutes for mental welfare. This strict division between preventive and curative health care seems to be unique when compared to school health services in most other countries.

In the past years, not only has the frequency of contacts changed but also their content. The last two decades have seen profound changes in the way school-based youth health care services are conducted, in many instances necessitated by budgetary cutbacks. Furthermore, a shift of attention from physical to mental health problems required a fundamental change in the content of prevention activities and in the professional attitude of YHC workers.

Examples, however, of changes brought about on scientific grounds or due to outcomes of evaluative health services research, are rare. This is

especially true for the total number of well-care visits, the content of these visits, the institution of freely accessible consultation hours for primary and secondary schools, health promotion activities and the like.

YHC still relies heavily on personal contact, physical examination and individualised advice for the prevention of physical, behavioural and psychological problems in children and adolescents. However, the effectiveness of this approach is not substantiated by any evaluative research.

Part of the rationale for implementing school-based activities is, that by frequent individual contacts, be it during screenings, well-care visits or consultation hours, (the onset of) problems will be detected earlier. Therefore, preventive measures can be taken at a stage early enough to be effective. Since most problems regarding the development of unhealthy lifestyles, poor mental health and the like, start early and tend to persist well into adulthood,[1–7] more individual contacts should increase the likelihood of early detection and thus early prevention. But again, no studies are available to support this assertion.

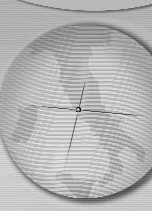
In a setting of long-standing, community-wide and generally accepted prevention activities, evaluative research in the form of experimental studies is hardly ever possible. Furthermore, as most interventions will bear fruit only after several years and the effects are often described in rather vague terms like improved mental or physical well-being, even non-experimental study designs are fraught with possible difficulties. Nevertheless, in the face of an increasing demand for evidence-based medicine,[8,9] an effort was made to substantiate the effectiveness claimed by youth health care workers.

In each of the four studies presented here, the research question is, whether *at the aggregate level*, specific youth health care interventions can lead to measurable effects on the health outcomes targeted, and whether these effects are substantive enough to justify or even necessitate their continuation.

### Population and methods

To address some of the questions regarding the effectiveness of youth health care preventive activities, the following methodological steps were taken:

1. The study was limited to the three principal activities of youth health care: repeated well-care visits, implementation of freely accessible (open) consultation hours and screenings for specific physical abnormalities.



- II. A total of four different health outcomes were chosen. Selection was based on (a) their importance as preventable disease and/or condition, because of the possible impact on later health, (b) their diversity, given the wide range of youth health care activities, and (c) the possibility of clear operationalisation of the outcome.
- III. Comprehensive information was obtained from all youth health care departments in The Netherlands, with respect to the activities mentioned under (I) in the years under study.
- IV. Data on the selected outcomes were obtained from many different registries, so as to minimise the chance of introducing any kind of bias because of the idiosyncrasies of a specific registry. Also, wherever feasible, the referent population comprised the complete relevant census of the Dutch population.
- V. Data were analysed, using an efficient new 'ecological case-referent' design. In this design case-referent methodology is combined with an ecological approach. The distribution of the determinant among cases is inferred from the intervention distribution at an appropriate aggregate level. The distribution among cases is then compared to that in a suitable reference population. The properties of the study design are discussed in the various publications,[10-13] as well as in a separate article.[14]
- VI. In three of the studies the research question was, whether more well-care visits, and/or the availability of freely accessible (open) consultation hours on schools for secondary education could result in an improved lifestyle and/or mental health, expressed in specific outcome measures. A fourth study examined the possible influence of school screening for adolescent idiopathic scoliosis on population rates of scoliosis surgery, another point of contention among Dutch youth health care workers.

As indicated, the outcome measure used in the study of the effectiveness of school scoliosis screening, was surgery for adolescent scoliosis.[11]

In the three remaining studies, the following outcome measures were chosen.

To measure a possible impact on *mental health*, in an ecological case-referent study, population rates for parasuicide and suicide in adolescence were compared between regions with and without open consultation hours. Using data from a study of high-school students (n = 4997),[15] the distribution of cases and referents with regard

to self reported parasuicide, scores on a mental health scale and present mood, was compared between students with different exposures to YHC activities (number of well-care visits and access to open consultation hours).[10,12]

To measure a possible influence on *lifestyle*, and thereby on (later) physical and mental health and general well-being, using data from the study of high-school students, prevalence of substance use (tobacco, alcohol, and cannabis) and eating habits were compared. In the same study, rates for obesity in male conscripts were compared between regions with different YHC working methods.[16]

With the outcome measures as dependent variables, in logistic and linear regression procedures the effect was estimated of screening, having access to open consultation hours, the total number of well-care visits and the time elapsed since the last of these visits conditional on the co-variables. Variables were added and retained in the model only when inclusion resulted in a substantial change (> 5%) in the Odds Ratio of the determinant under consideration. When an interaction term was included, in the final model the constituent variables were also included.

**Results**

*Scoliosis screening.* The study of the effect of school screening for scoliosis on population rates for adolescent scoliosis surgery, showed no difference in the distribution of surgery cases between regions with and without screening (Table 1).

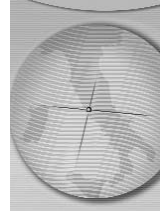
*Suicide and parasuicide.* The institution of freely accessible consultation hours on schools for secondary education could not be shown to

**Table 1. Odds ratios (95% Confidence Intervals) for surgery for adolescent idiopathic scoliosis; comparison of screening (referent) and non-screening YHC departments.**

All cases (n = 182)	1.00 (0.74-1.34)
Cases with surgery > 1 year after possible screening (n = 150)	1.03 (0.74-1.43)

**Table 2. Odds Ratios (95% Confidence Intervals) for (para)suicide; comparison of youth health care departments with and without open consultation hours (OR > 1 signifies an adverse effect).**

Completed suicide (n = 137)	0.98 (0.69-1.38)
Hospital admission for parasuicide and surgery (n = 35)	2.59 (1.30-5.16)
Hospital admission for parasuicide and psychiatric disorder (n = 172)	1.09 (0.78-1.53)
All hospital admissions for parasuicide (n = 207)	1.30 (0.97-1.75)



**Table 3.** Odds Ratios (95% Confidence Intervals) for the influence of having access to open consultation hours, the total number of well-care visits and the number of years since the last well-care visit on mental health and present state of mind (O.R. > 1.00 signifies an adverse effect).

	Poor mental health	Poor state of mind
Open consultation hours	0.90 (0.74-1.09) (n = 1785)	1.15 (0.93-1.42) (n = 3146)
Number of well-care visit	1.02 (0.84-1.24) (n = 2018)	0.92 (0.74-1.14) (n = 3572)
Number of years elapsed	0.96 (0.87-1.05) (n = 2018)	1.00 (0.90-1.11) (n = 3572)

**Table 4.** Odds Ratios (95% Confidence Intervals) for the influence of having access to open consultation hours, the total number of well-care visits and the number of years since the last well-care visit on the four lifestyle variables. OR > 1.00 signifies an adverse effect, n = 4997 (elaborated from <sup>151</sup>)

	Alcohol	Tobacco	Soft drugs	Eating habits
Open consultation hours	1.29 (1.11-1.50)	0.94 (0.82-1.07)	1.20 (0.83-1.74)	0.91 (0.80-1.04)
Number of well-care visits	0.99 (0.84-1.17)	1.15 (1.01-1.33)	1.30 (0.91-1.85)	1.08 (0.95-1.24)
Number of years elapsed	0.91 (0.83-1.00)	0.98 (0.91-1.06)	1.11 (0.92-1.33)	1.01 (0.94-1.08)

**Table 5.** Odds Ratios (95% Confidence Intervals) for obesity (Body Mas Index > 27) per number of well-care visits (1 year as referent) and availability of open consultation hours. OR > 1.00 signifies an adverse effect, n = 12 251. (Ministry of Defence conscript data).

2 well-care visits	1.00 (0.80-1.23)
3 well-care visits	2.46 (1.74-3.46)
Consultation hours	1.97 (1.72-2.25)

contribute to the reduction of suicide mortality, hospital admission rates for parasuicide (Table 2), or incidence of parasuicide among high school students (n = 303; adjusted Odds Ratio = 0.96, 95% CI = 0.72-1.26). A remarkable, and disquieting, finding is the increased risk for hospital admissions for parasuicide cases needing surgery, found in regions with open consultation hours (adjusted Odds Ratio = 2.59, 95% CI = 1.30-5.16).

**Mental health.** The (number of) well-care visits did not contribute to the prevention of mental health problems or improvement of 'present mood' in high school students (Table 3).

Furthermore, only students of schools for lower vocational education seemed to benefit from open consultation hours, at least as far as their mental health was concerned. This effect, however, was not statistically significant. The Odds Ratio (OR) for consultation hours, when including a variable in which mental health of students of lower vocational education schools was compared to that of students of all other types of schools, was 0.81 (95% CI = 0.63-1.04).

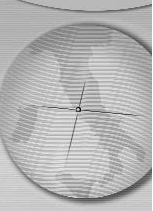
**Lifestyle.** Neither open consultation hours nor (number of) well-care visits had a positive effect on unhealthy behaviour such as unhealthy eating habits, use of alcohol, tobacco and cannabis (Table 4), or on the prevalence of obesity in male adolescents conscripts (Table 5).

## Discussion

In all four part of the study, the question was not so much, whether in individual cases an intervention perhaps could have been of benefit, but whether the effectiveness of the intervention at a population level could be considered substantial enough to merit, or even necessitate continuation.

Integrity of the information concerning youth health care activities and nondifferential misclassification of cases are the main issues in determining the internal and external validity of the results. In the ecologic case-referent study design, the distribution of the determinant (i.e. experience with the intervention) among cases in a (national) case register is inferred from the intervention distribution at an appropriate aggregate level (e.g. regions with homogeneous specific prevention facilities). This distribution among cases is compared to that in a suitable reference population (e.g. the intervention distribution in the total collection of all regions). Where possible, confounding information, obtained at the individual level, was used to adjust the crude estimate of the effect (the OR) by appropriate logistic modelling.

In the ecologic case-referent design the objective is to estimate the group-level effect of participation in an intervention program on the population rate using a case-referent design. Therefore, this design is not subject to ecologic bias. The design will, under the assumption that the regional decision to choose a specific preventive health policy is unrelated to the baseline risk for the specific outcome, enable the evaluation of the hypothesis that these preventive intervention strategies can lead to marked effects on the aggregate level. In The Netherlands, many community-wide interventions are introduced



nationally because of a perceived problem in the population as a whole. Therefore, any relation on a regional scale between the introduction of the intervention and the occurrence of the outcome, be it direct or indirect, and thus introducing selection bias, is unlikely.

The various arguments concerning this validity, and generalisability are discussed in more detail in the respective articles.[11-14] Therefore, hereafter we would like to confine ourselves to a discussion of the possible explanations of these results and the implications for the future of the youth health care as it is practised by many Regional Health Services in The Netherlands.

### *Scoliosis screening*

The results of the study of the effect of school scoliosis screening on population rates of surgery for idiopathic adolescent scoliosis seem unequivocal: if the object of the screening is the prevention of surgery for adolescent scoliosis, continuation of this procedure should be reconsidered.

One frequently heard argument for continuing the screening programme nonetheless, is that it not only serves to prevent surgical intervention in case of progressive scoliosis, but also facilitates early detection of other structural or postural abnormalities of the spinal column. Even when this is considered to be a legitimate ground for screening, although, when applying the well-known rules of Wilson and Jungner,[16] this seems less apparent, it would be an inappropriate use of the screening programme. If the aim of screening is no longer prevention of scoliosis surgery, different screening methods and instruments, employment of other YHC-workers than physicians, and/or the choice of a different age group should be considered. It could even be debated whether in that case involvement of YHC departments would be appropriate. Screening for postural or structural abnormalities of the spinal column could, for instance, well be placed into the capable hands of physical education teachers.

### *Well-care visits*

At a population level no beneficial influence could be demonstrated of (any number of) well-care visits. In at risk populations, however, this might not be the case. As in many Western countries, in The Netherlands there are (urban) regions with characteristics reminiscent of the days when youth health care was first introduced. Here the traditional methods of YHC may prove their worth in promotion of hygiene and healthy eating habits, prevention of infectious diseases,

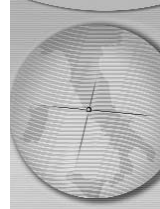
guidance and counselling in raising children, etc. These preventive activities, when administered in the individualised setting of well-care visits, may well be one of the few effective ways to reduce existing inequalities in health. Further studies are necessary to determine whether well-care visits, targeting only particular regions or groups of population at risk, can have the desired effect. For influencing mental or physical well-being, or unhealthy behaviour in the general population, however, the use of this labour-intensive and costly instrument seems unjustified.

### *Open consultation hours*

Institution of freely accessible consultation hours in schools for secondary education does not noticeably contribute to a reduction in the rates of (para)suicide in adolescents.

Suicide attempts are frequently preceded by signs of (severe) depression or one of the other so-called warning signs.[17] Although these signs will perhaps not be recognised as precursors of (para)suicide as such, they will often be noted by teachers, student advisors or even fellow students. One of the professed effects of consultation hours held in secondary schools is referral of youths by teachers or student advisors can be facilitated. Taking the results of the study into consideration, at least in regard to referral of suspected psychosocial problems, this does not seem to be the case. Some youth health care workers even contend that institution of consultation hours in secondary schools induces some sort of 'slackness' in these matters on the part of teachers and student advisors [see also the as yet unexplained finding of a statistically significant negative effect of consultation hours on hospital admission rates for parasuicide cases needing surgery (Table 2)]. An explanation is sought in the fact that, since students seem to have easy access to these facilities, teachers will be less alert to signs of psychosocial distress, thinking their intervention will be unnecessary as the students in question will seek counselling on their own accord. This hypothesis is supported by the fact that enhancement of the professional expertise of teachers and student advisors does have a statistically significant positive effect on the prevention of parasuicide.[12] Therefore, it is advisable, or even mandatory to let the introduction of consultation hours be accompanied by efforts to enhance teachers' expertise in detecting (mental health) problems in their pupils.

The results of the study indicate, that open consultation hours can have a beneficial influence on mental health, but only when certain conditions are satisfied: concurrent enhancement



of professional expertise of teachers and student advisors, targeting specific groups like pupils of schools for lower vocational education, etc. On the whole, these conditions are comparable to those to be met by the implementation of well-care visits: only in particular regions and/or targeting specific populations at risk. Possibly, the overall lack of demonstrable effects on mental health and state of mind is caused by the same factors that give rise to the lack of a positive influence of consultation hours on prevention of (para)suicide.

Open consultation hours seem to have a positive, although not significant effect on eating habits. This can perhaps be explained by the fact that in case of worry about overweight, adolescents actively seeking advice will be more prone to take it, translating into improved eating habits.

**Conclusions**

Attention to mental and physical health and health compromising behaviour, either during open consultation hours or well-care visits seem to be ineffective and in some instances even detrimental to youth health. Table 6 gives an overview of (the significance of) the effect on the various outcome variables.

Possibly, teachers and parents (and even pupils) are less attentive to ‘signals of distress’ or health endangering behaviour of students, because, in their opinion, those problems are adequately dealt with by the (preventive) activities of youth health care workers. Thus, potentially one of the most important factors when it comes to influencing health and health compromising behaviour, the direct environment of child and adolescent, is made ineffective. The sparse moments of contact with youth health care workers cannot hope to make up for this deficiency, rendering them ineffective at best.

In general it can be concluded, that further studies are urgently needed to inquire into the exact reasons behind the lack of demonstrable positive effects of YHC activities. In the mean time, other methods for preventive health care in

children and adolescents, within or outside the context of youth health care, should be developed. Leaving the activities unchanged would represent an unreasonable and disproportionate burden to the already limited resources of preventive health care. In that respect it is regrettable that the Dutch Government decided to authorise a rather meticulously prescribed set of activities, again predominantly consisting of personal contacts by YHC workers with all children of certain age groups, the earlier mentioned standard package of activities. Although it was conceded, that the scientific base for most of these activities is tenuous at best, unfortunately, comparable YHC working methods throughout The Netherlands were considered more important than practising evidence-based public health. Another adverse side-effect of this is, that the ‘natural experiments’ that had arisen in various parts of the country, and that could have functioned perfectly as a starting point for a nation-wide research effort were cut short. This not only entails a waste of valuable baseline information for future research, but is also a rather unfortunate lack of respect for the time, energy and professional expertise the various organisations have put into developing other, possibly more effective approaches.

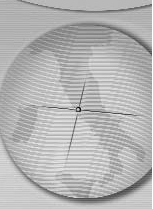
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**Table 6. Summary of results of the four studies of the effect of open consultation hours and well-care visits on the various outcome variables: scoliosis, (para)suicide, mental health, lifestyle and obesity. The figures indicate the number of outcome measures per category.**

	Open consultation hours	Well-care visits
Significantly negative	3	2
Negative	3	3
‘Indifferent’ (OR 0,95-1,05)	2	1
Positive	3	1
Significantly positive	0	0



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