To
The Danish Counseling and Research Centre for Grieving Children, Teens and Young Adults

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COST-BENEFIT ANALYSIS

THE DANISH COUNSELING AND RESEARCH CENTRE FOR GRIEVING CHILDREN, TEENS AND YOUNG ADULTS

RAMBØLL

ANALYSIS

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APPENDICES

1. INTRODUCTION

This report presents the results of a cost-benefit analysis based on register data of children and adolescents who are or have been handling critical illness in their nearest family. In the report, the work of The Danish Counseling and Research Centre for Grieving Children, Teens and Young Adults (hereafter DCRC) is evaluated based on how it affects the life histories of the children and adolescents. DCRC is a consultancy and knowledge center who offers free counseling and support to children and adolescents handling critical illness or bereavement of parents or siblings.

To lose a close family member and the grief connected to this is a natural part of life. Most people handle this grief process without severe physical and psychological difficulties. However, to some – and especially children and adolescents bereaved of a parent or a sibling – the experience may be so immense that it deteriorates the quality of life throughout a long period of time. Similarly, it can be difficult experiencing a close family member being critically ill. To children and adolescents whose parent(s) are diagnosed with a critical illness, the future may suddenly appear unsafe and insecure, and they may find it difficult to find room to live their own lives.

Every year, 100,000 children and adolescents in Denmark experience a parent or sibling being diagnosed with a critical illness or passing away. The majority of these children and adolescents manage to get through this life crisis with the support from family and friends. However, there is a small group of approx. 20-30 pct. who receives limited help to handle the grief. To approx. 10 pct. of the relatives and bereaved children and adolescents, however, the grief is so deteriorating, that they need intensified and professional help because they are at risk of developing depression, anxiety, suicide thoughts and other symptoms of severe dejection (Nielsen, 2012).

DCRC offers, among other things, the kind of specialized help, which may help these 10 pct. and get them back on their feet and on with their lives. Support is also offered to this group (20-30 pct.), who – if not assisted – are at risk of developing complicated grief. The anticipated effects of this initiative are what the present cost-benefit analysis covers.

A clear rationale is present for a socio-economic value of the work of DCRC with children and adolescents who are struck particularly hard in connection with a parent's illness or death. The socio-economic value reaches far beyond the value for the child or adolescent. Partly, several studies conclude that professional help in connection with complicated grief, triggered by a death in the family, has a significant positive impact on the mental health. And partly, depression and anxiety, etc., following an untreated severe grief, can make it difficult to finish an education or hold on to a job, and in addition, there is an increase in the risk of developing a substance abuse or ending up on a criminal path. Thus, the belief that a successful effort is expected to result in reduced public costs of public benefits, health benefits and crime as well as work-related taxes seems well-grounded compared to the scenario when children and adolescents, struck by severe grief, are not offered any help.

1.1 The Process of the Analysis

The presentation of the cost-benefit analysis and the results hereof are built into seven chapters. After a brief summary of the main conclusions reached in the analysis in **chapter 2**, the report is launched in **chapter 3** with a description of the target group for DCRC's work as well as the rating of the offered effort and support.

In chapter 4, the design of the cost-benefit analysis is described, including several relevant definitions and parameters as well as the used basis of data. Due to the fact that some of the estimated effects of DCRC' work show several years after this has taken place, and because these are assumed to extend over several years, we have looked from a life history perspective at the computation of costs and benefits, i.e. not only do we look at net gains of a present day initiative, we also substantiate the net gains over a whole lifetime.

Then, in **chapter 5**, the estimated effects of DCRC's work are presented based on actual information from register data on DCRC's clients and a comparable control group. Finally, **chapter 6**

and **chapter 7** present the actual cost-benefit analysis, divided into a computation of costs and benefits and the total sum of the complete socio-economic calculation.

Our aim has been to write a report using accessible linguistic terms, why the many detailed methodological descriptions, etc., are to be found in the supplements.

In regards to the cost-benefit analysis, a simple calculation tool has been developed in Excel, making it possible to analyze the possible socio-economic consequences of making alterations in certain fundamental preconditions, upon which the analysis is based. A more thorough description of this tool and its use, however, is not included in this report.

2. CONCLUSION

This report includes results of the cost-benefit analysis of DCRC's work with children and adolescents who are at risk of suffering from complicated grief or who have already developed symptoms following the loss of or living with a critically ill parent.

This is a life history analysis due to the fact that a positive estimate of DCRC's work with the relatives and the bereaved children and adolescents' physical and mental well-being is expected to result in a number of secondary and more long-term socio-economic benefits, such as a more stable attachment to the labor market, better education, and a reduction in social issues.

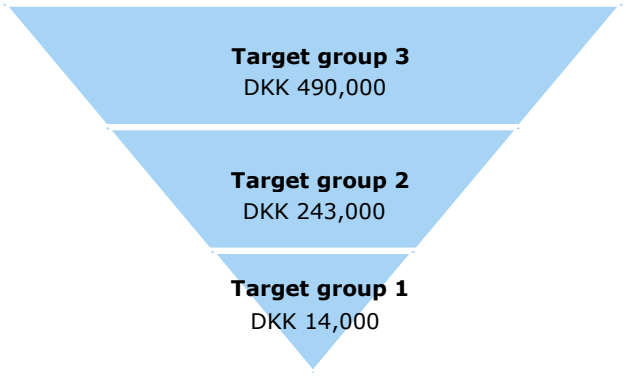
The estimated economic life histories of the people in the target group, an assessment which is based on an age dependent net contribution to society as well as estimates of the expected effects of DCRC's work, are based upon factual register data information on a group of children and adolescents who have received counseling and support from DCRC in connection with the loss of a parent, and a comparative control group.

Below, the main conclusions from the cost-benefit analysis, which distinguish between three different target groups in the work of DCRC, are outlined.

1. Children and adolescents (age 0-19) living at home with critically ill parents, living at home.
2. Children (age 0-17) bereaved of one or both parents.
3. Adolescents (age 18-28) bereaved of one or both parents.

Socio-economic gains for all three target groups
For all three target groups, a socio-economic gain seems to come out of DCRC' work, cf. Figure 2.1.

Figure 2.1: NPV of DCRC' work per client



Counseling and support to children and adolescents bereaved of a relative is of the greatest value to the government
Relatively, however, the greatest value is DCRC' offer to children who have lost a parents. Thus, for Target Group 2 and 3 the value of DCRC' work is estimated to result in savings in the government budgets of approximately DKK 250,000 per child or adolescent, who receives counseling and support from DCRC.

Large private economic benefits for target group 3
Target Group 3, who are considered almost adults when they lose a parent, are also met with considerable private financial returns in connection with the help from DCRC. This is because they, as a result, gain a more stable connection to the labor market and a higher salary income, which raises the total of the socio-economic benefits for this target group up to almost DKK 500,000. For children who receive counseling and support from DCRC, no effects of the initiative related to the labor market can be identified, which is why there are no private financial returns estimated for Target Group 1 and 2.

Only limited economic benefits of counseling and support to relatives
For children and adolescents who are living with a critically ill parent, it is not possible to conclude, based on present data, if the work of DCRC results in a greater progress in the health of the relatives, compared to the progress which the relative would have made if he/she had followed the "normal" path and initiatives offered to this target group. This also means that the argument lacks evidence for including the derived and more long-term benefits of DCRC' work in the socio-economic calculations for Target Group 1. Therefore, an estimate of the socio-economic benefit of DCRC' work with children and adolescents who are handling life with a critically ill parent is set at approx. DKK 14,000. This benefit is the result of reduced costs on preventive measures and the special needs education and mainly accrues to the municipalities.

The benefits for the government is primarily long-term
In general, the benefits of DCRC' work included in the public government budgets are primarily long-term. This means that they appear four years after the initiative has been carried out. However, an exception is found in Target Group 2 where DCRC' work shows an immediate effect on the government expenditures, especially on special needs education and preventive measures, caused by the improved well-being among the people in Target Group 2.

3. THE FIELD FOR CHILDREN AND ADOLESCENTS IN GRIEF

Every year, approximately 7,000 children and adolescents lose a parent. Prior to the loss, the child has had to cope with death close at hand in the daily life with a critically ill parent. Today, approximately 80,000 children and adolescents have to handle dealing with a critically ill parent, and the number is increasing due to, among other things, the medical development which has led to life prolonging treatments for people with fatal diseases.

To lose a parent at a young age can be a traumatic experience and the reactions to this vary. Also the life with a critically ill parent can be difficult for a young person to handle and may be filled with uncertainty about the future as well as a disregard of oneself and one's life. It is crucial for both the bereaved children and adolescents that they talk to someone about their feelings and through this process their grief. In most cases, it is sufficient to talk to other family members or one's network, but in a few cases the grief is so severe that it is necessary to seek professional help.

DCRC is offering counseling to children and adolescents up to the age of 28, whose parents' or siblings are critically ill or have died. The target group is primarily children and adolescents with so-called complicated grief processes.

3.1 The Consequences of Losing or Living with a Critically Ill Parent

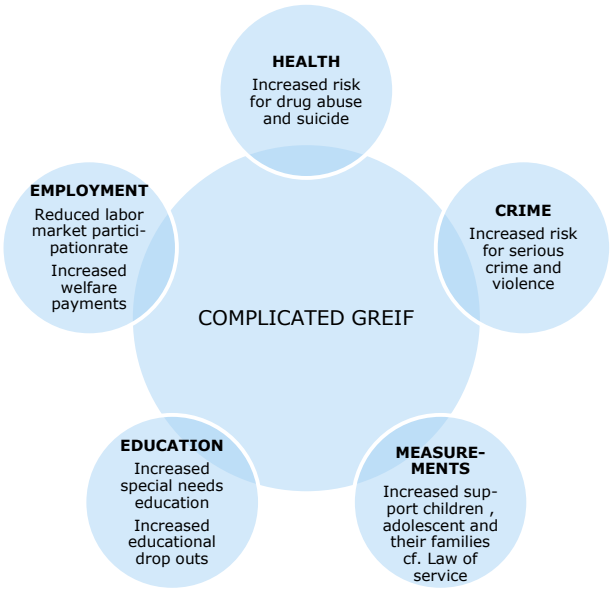
To lose a close family member is a natural part of life. When a close family member dies, most people will go through a grief process, during which one reconciles with the loss and its consequences. The majority of the bereaved experience this grief process without significant mental and psychological issues and with the support only from family, friends and other networks. Nonetheless, a connection has been found and documented between grief and a poor physical and psychological well-being. It is estimated that approximately every tenth person who loses a close relative displays reactions which signify complicated grief (Wittouch, 2010).

Complicated grief is not an officially acknowledged diagnosis, but the condition, as well as its consequences, is well-documented. Complicated grief is an invalidating condition which can be identified as severe grief as well as long-term cognitive, emotional and behavioral symptoms in connection with the loss of a loved one. Thus, complicated grief is connected to more physical and psychological issues such as depression, anxiety, concentration difficulties, hypertension, and heart problems. The symptoms are of such character that they cause a significant impairment of the inflicted person's ability to uphold a commitment to the labor market, to the education system and to other social engagements. This may cause this group to end up living very isolated. Also, some of them may develop a drug abuse and experience such a strongly reduced quality of life that self-inflicted injuries and suicide is an increased risk (Wittouch, 2010). Among adolescents who show symptoms of complicated grief, a significantly increased risk of ending up on a criminal path also seems present (Nielsen, 2010).

From a socio-economic perspective, a strong incentive to prevent and treat complicated grief appears relevant. In addition to the health-related costs of treating the physical and psychological symptoms, the condition also inflict costs on society in the shape of reduced productivity and fewer tax revenues from employment as well as increased costs of social benefits, crime and measurements.

Figure 3.1 illustrates in headlines a number of other possible consequences of complicated grief (and thus, costs for society in addition to treatment itself) due to the inflicted person's reduced ability to function in everyday life as well as reactions to the deteriorated quality of life and the absence of well-being.

Figure 3.1: Consequences of complicated grief from a socio-economic perspective



Due to the fact that only consequences with a direct impact on the social economy are included, Figure 3.1 is not exhaustive, which must be seen in the light of the focus area of the present cost-benefit analysis. A complicated grief process may include that the child or adolescent finds it difficult to uphold labor market participation, which is why the self-support rate drops. Likewise, complicated grief may cause the children and adolescents to make a turn onto a criminal path, which cause an increase in governmental costs of the prevention and fight against crime as well as the justice system. Finally, it is found plausible that children and adolescents who are hit by complicated grief have a greater need of special needs education, just like increased costs connected to the measurements offered to the child, the adolescent and their families are found.

3.2 The Initiatives of the Danish Counseling and Research Centre for Grieving Children, Teens and Young Adults (DCRC)

As mentioned, DCRC is a counseling center offering help to children and adolescents up to the age of 28 whose parent or sibling is critically ill or dead. DCRC's work is specifically targeted those children and adolescents who are at risk of developing – or who are already displaying symptoms of – complicated grief. DCRC is solely focusing on counseling and support to bereaved children and adolescents; it also has a research center ensuring that DCRC's work is based upon the latest knowledge in the field. Therefore, it is assumed that DCRC can offer a more specialized, targeted and thus more efficient initiative, which is based upon the individual client's circumstances and needs. Below is a general description of DCRC.

Box 3.1: About DCRC

The organization The Danish Counseling and Research Centre for Grieving Children, Teens and Young Adults (DCRC) is a national counseling and research center for children and adolescents up to the age of 28 coping with having a parent or sibling being critically ill or dead. The target group is primarily bereaved or children going through a complicated grief process. DCRC is committed to contribute to a good life for children and adolescents despite of critical illness or death in their closest family. This is accomplished through counseling and support as well as collecting and spreading knowledge about the reactions and needs of the affected children and adolescents.

DCRC has existed for more than 10 years with consulting offices in Copenhagen, Odense and Aarhus. Annually, the offices address approximately 2,600 inquiries. The counseling is free of charge and is performed by a counseling department with 15 professional counselors who are primarily psychologists. The counselors offer individual consultations and also manage therapy groups, just like they set up programs targeted relatives, including parents and boy/girlfriends. Additionally, DCRC has a research center working with the documentation of those offers that the counseling center is in charge of. Also, the research center provides new knowledge, which may help the development of the counseling offers. The research center includes one full-time and two part-time employed counselors as well as an associated graduate student. In addition, DCRC has a communication and fundraising department.

DCRC is led by a board of directors and a CEO, who works from the Copenhagen office. Also, there is a professional consultancy manager in the organization who is responsible for the counseling in Aarhus, Odense and Copenhagen. In 2012, an administration manager was brought onboard, who runs the administration and finance.

Source: Children, Adolescents and Greif (DCRC)

The counseling initiatives made by DCRC consist of multiple elements, which is why the organization offers both individual and group counseling sessions. For children and adolescents up to the age of 20, the counseling is always performed by a psychologist. For adolescents, who wish to share experiences with peers, DCRC offers support from young volunteers, in addition to psychological assistance. The volunteers are young, who have lost a parent themselves, and who have taken courses in management of group counseling, phone and chat counseling, social events and letter correspondence.

Table 3.1 presents a schematic overview of DCRC's offers to children and adolescents, divided into age group and parental situation. The list illustrates how DCRC has formed the offers to very specific target groups. In the cost-benefit analysis, it is the complete works of DCRC which is evaluated. This means that no distinction is made between i.e. open and closed therapy groups, because it is assumed that DCRC offers the most optimal course for the individual client, based upon his/her circumstances. However, the client's age and the parent's situation are taken into account.

Table 3.1: List of DCRC' offers

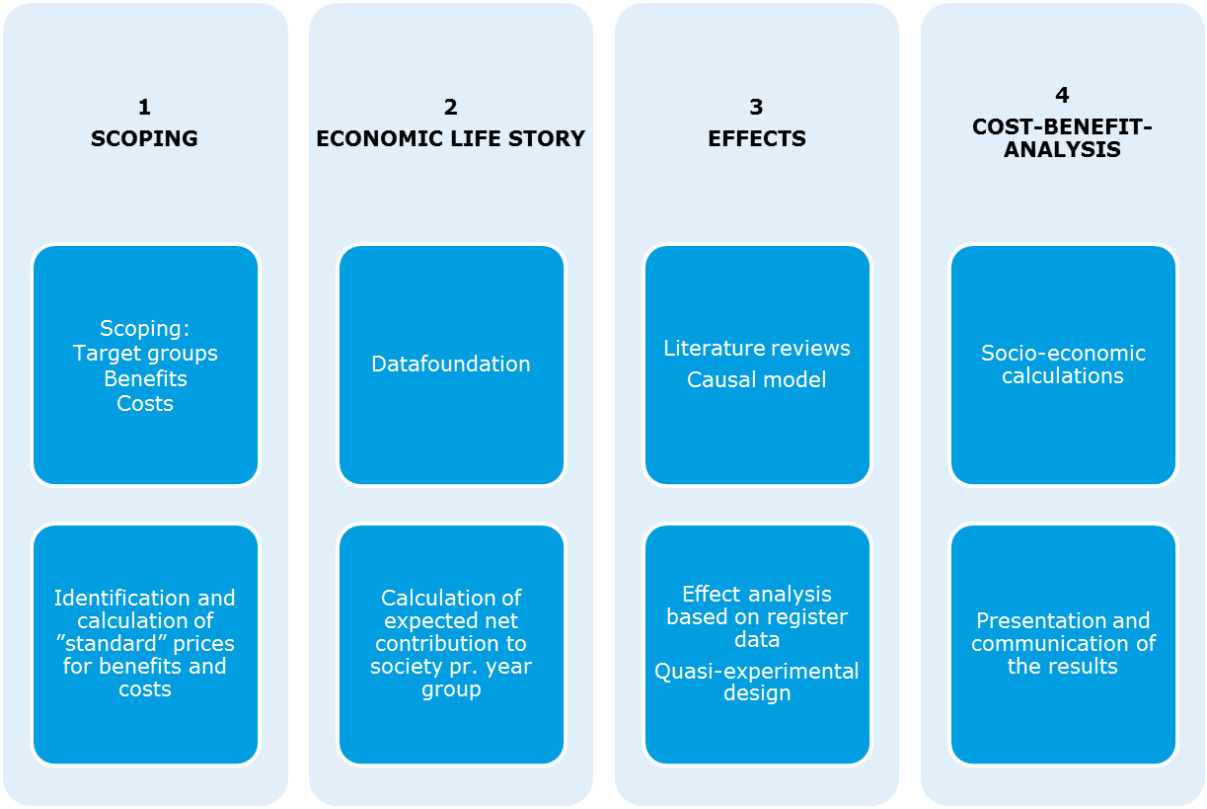
Target group	Offer
Children	Group (age 6-9)
Children	Group (age 10-12)
Children	Group (age 13-15)
Children	Individual consultations (age 0-5)
Children	Individual consultations (age 6-9)
Children	Individual consultations (age 10-12)
Children	Individual consultations (age 13-15)
All	The individual consultations
Teenagers (bereaved)	Teenage groups for the bereaved (age 16-19)
Teenagers	Open teenage group (age 16-19)
Teenagers (family)	Group for teenagers with critically ill parents
Adolescents	Open therapy group (age 20-28)
Adolescents	Closed therapy group (age 20-28)
Adolescents (bereaved)	Groups led by volunteers (age 20-24/age 25-28)
Adolescents (bereaved)	The "A-group": Group of adolescents who have lost a parent who had an alcohol abuse during the adolescent's upbringing
Adolescents (family)	Group of adolescents with critically ill parents (age 20-28)

Note: The list is not exhaustive of the counseling and support which DCRC offers.
Source: DCRC (The Danish Counseling and Research Centre for Grieving Children, Teens and Young Adults).

4. THE SURVEY DESIGN

In order to substantiate the socio-economic benefits of DCRC's work with children and adolescents suffering from complicated grief, the expected socio-economic gains (and costs) of the initiatives must be compared with the expenditures of DCRC's function. Prior to this calculation, however, a significant process must be launched, which is why the completed cost-benefit analysis consists of four general levels.

Figure 4.1: Analysis design



4.1 Definitions and scoping

In this report, the delineation of benefits and costs is led by the wish to make the estimated savings on the municipal and governmental budgets as well as on the private economic return for the child or adolescent plausible. Thus, the cost-benefit analysis uses a conservative approach, because those gains, which cannot be found in the municipal or governmental budgets or on the child's or adolescent's bank account, are not included. An example could be gains of philanthropic character, such as the value of knowing that the bereaved children are being helped; or the value of a more safe society.

Costs

The costs related to the initiatives of DCRC are fundamentally the administrative budget of DCRC.

Estimated gains
The starting point of the delineation of the estimated gains of DCRC initiatives is the documented consequences of complicated grief, which are expected to lead to an increase in the costs for society – and oppositely, a reduction in costs if those consequences are prevented. In the identification and estimate of the effects of the initiative, focus is upon the financial gains related to the derived consequences of complicated grief, i.e.:

- ⇒ **Health**: Reduced health costs (in addition to the treatment of complicated grief itself)
- ⇒ **Crime**: Reduced expenditures related to crime
- ⇒ **Measurements**: Reduced expenditures on measures
- ⇒ **Employment**: Increase in tax income from work income – thus a reduction in expenditures related to social benefits
- ⇒ **Education**: Reduced expenditures related to special needs education and an increase in tax income from work income caused by a higher education level.

However, a criterion for the benefits of this type to be included in the analysis is that it must be found documented that the initiatives of DCRC are having a positive effect on the child's or the adolescent's health and life quality, i.e. a health-related benefit is required for the other (derived) benefits to occur.

This precondition is one of the main reasons why a distinction between three different target groups is made in the cost-benefit analysis. The parent's health condition and the child's age at the time of the initiative may influence the effects and resulting consequences of the initiative.

Target groups
The initiatives of DCRC are focusing on children and adolescents up to the age of 28, whose parent or sibling is critically ill or deceased. Therefore, the work is pointing at a wide age spectrum. Literature on the effects of initiatives focusing on complicated grief makes a fundamental distinction between three groups: 1) children, 2) adolescents, and 3) adults. The literature is primarily about complicated grief which is caused by a death in the close family, but a few studies, including the evaluations of DCRC itself (Children, Adolescents & Greif, 2011), have also clarified the effects of working with children and adolescents in risk of developing complicated grief, or who already shows symptoms of suffering from having a critically ill parent. Even though the number of studies focusing on the effects of an initiative concerning complicated grief is relatively low, it is implied that the effects of an initiative depend on the complexity of the grief as well as on the age at the time of the loss. Based on all these conditions, separate cost-benefit analyses are performed on each of the three target groups:

4. Children and adolescents (age 0-19) living at home with a critically ill parent
5. Children (age 0-17) bereaved of one or both parents.
6. Young adults (age 18-28) bereaved of one or both parents.

In addition to this, the analysis is allocated to only dealing with complicated grief caused by the loss of a parent or by living with a critically ill (biological) parent. Critical illness is not an officially defined term. In the present analysis, the term is defined as illnesses which the Board of Health, in cooperation with the insurance and pension industry, has listed in an IT-system focusing on policyholders who might be entitled to compensation[1].

All three target groups belong to this group of children and adolescents (bereaved or living with a critically ill parent), who are at risk of, or who has already shown symptoms of complicated grief. This group will typically include children and adolescents, who prior to the loss of a parent have had to cope with this life-threatening illness for years in their daily life. To some in this group, the death has also happened abruptly and dramatically, i.e. due to suicide, murder, accident or the loss of both of the parents. Finally, the group also includes children and adolescents, whose remaining parent is so seriously hit by grief that it may be difficult to find the power to adequately take care of the child.

[1] http://www.sst.dk/Indberetning%20og%20statistik/Landspatientregisteret/KritiskSygdom.aspx.

4.2 Life Story

A part of the estimated effects of the DCRC initiatives regarding the bereaved children and adolescents are of such a character that they are presumed to affect both their financial situation and the socio-economics several years after the clients have received counseling and support. This includes estimated effects in terms of higher education level, which is expected to result in an increase in probability of a stable attachment to the labor market and an increase in lifetime income. Thus, the cost-benefit analysis is based upon a life story perspective for the target groups. By following the behaviors in the target groups over time, including in regards to education and employment, it is possible to compute the target groups' average, expected net contribution to society in the initial situation, i.e. in case they have not been offered counseling or support from DCRC. Depending on the estimated effects of the DCRC initiatives, this net contribution will be changed and hereby the expected gains of the initiative can be estimated.

The life stories are basically quantified by actual register data information about the target groups. That fact that the life stories are estimates based on actual wage income, medical expenses and health and social benefits is one of the great strengths of this approach. On the other hand, the approach results in a conservative estimate of the benefits, because the value of philanthropically benefits (e.g. the utility value for the citizens through supporting children and adolescents who are in grief) are not included. Through this delineation of gains, however, we have ensured that all estimated gains can be allocated to actors, e.g. the target groups themselves, municipality and state.

In regards to the analysis, we have been given access to data from a Ph.D.-project within the framework of The Danish Cancer Society (Kræftens Bekæmpelse), Children's Welfare (Børns Vilkår) and DCRC. The sets of data include civil registrations of the clients at DCRC who during 2007-2009 have lost a parent, and of a control group of children and adolescents who have lost or lived with a critically ill parent but who have not received support. The information on a comparative control group makes it possible to establish life stories of the target groups at the starting point, i.e. if they have not received counseling or support from DCRC, just like the control group is also of great value to the evaluation of the estimated effects of the initiative, which is described further in Chapter 5.

Information about the control group makes it possible to estimate the actual life stories of the target group members (net contribution in society) at the age range of 17-38. Outside this age range, the life stories are assumed to follow the life stories of the general population. This assumption is supported by a preliminary analysis of the cost-benefit analysis, which concludes that the DCRC target groups – after checking for a number of relevant demographic and socio-economic characteristics – make a net contribution to society which is at the same level as the contribution made by the general population. Naturally, when looking at this result, one must take into account that death and critical illness – and thus the risk of developing complicated grief – may hit us all, regardless of financial and personal resources. Even though there are studies claiming that there in general is an overrepresentation of bereaved and related adolescents whose parents have low education or an abuse (Nielsen, 2012), and who, one may expect, will have to face a relatively financial and social disadvantage, other studies claim that the children and adolescents who are actively seeking help in connection with death or illness in the family appear to be relatively resourceful and come from well-functioning homes. In relation to this, it needs to be emphasized that the DCRC target groups do not include children and adolescents with parents or siblings suffering from mental illnesses, just like DCRC does not offer support to children and adolescents with a diagnosis of serious mental illness or to children suffering from an abuse.

4.3 Datafoundation

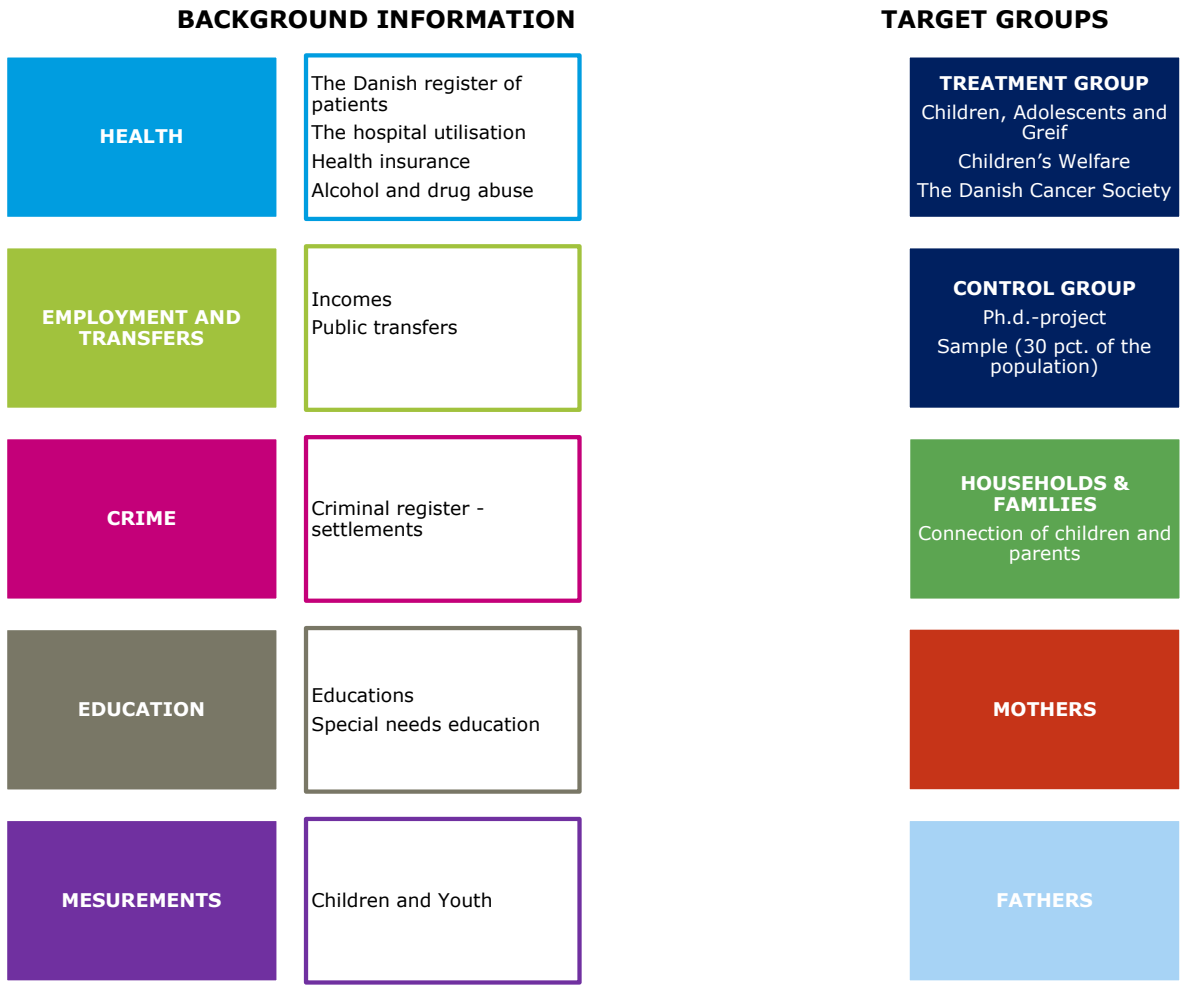
The socio-economic computations, both in regards to the estimates of life stories and effects, are based upon a comprehensive database created for this purpose. The database consists of information which is collected from a long line of registers. With civil registration as key, information from these registers are connected to different (target) groups and populations. In connection with the cost-benefit analysis, background information on four populations is attached:

1. Clients of DCRC
2. Control group of children and adolescents who have lost or have lived with a critically ill parent but who have not received offers of counseling and support from DCRC.
3. Mothers of children and adolescents in ”group 1 and 2”.
4. Fathers of children and adolescents in ”group 1 and 2”.

In addition, comparable background information is connected to a sample consisting of 30 percent of the entire population. Information about this sample is primarily used in connection with analyses regarding the entire population.

Figure 4.2 shows in headlines the contents of the created database. The time of status for the compilations is 2010. Since the people in the different populations belong to different age groups, those in 2010 will belong to different age groups, which makes it possible to set up the life stories. In regards to crime, however, the information is based upon the complete criminal history which, in practice, covers 1980-2010.

Figure 4.2: Database



Also, we have had information about people in substance and drug abuse treatment. However, the number of youngsters among the DCRC clients and in the control group who are represented in these registers is so low which makes it impossible for us to compute estimates of the effect based on this. Thus, the health effects of the DCRC initiatives must be assumed to be underestimated in the socio-economic calculations.

5. EFFECTS OF INITIATIVES AIMING AT CHILDREN AND ADOLESCENTS IN GRIEF

The consequences for children and adolescents who have lost or are living with a critically ill parent are well documented. On the other hand, knowledge regarding the expected effects of a targeted initiative for the group of related or bereaved who are in risk of or already suffering from a complicated grief is more limited.

In the cost-benefit analysis, the estimated effects of the DCRC initiatives aiming at children and adolescents in grief (and thus, the estimated gains) are defined by and delineated the expected results of an initiative, which addresses the consequences for the target group described in section 3.1. Therefore, only the consequences that directly affect the national economy are included.

This means that the following estimated effects of an initiative are included in the analysis:

- ⇒ Better health (besides from the complicated grief treatment)
- ⇒ Reduction in crime
- ⇒ Reduction in the need of measurements
- ⇒ Improved labor market attachment – and thereby an increased degree of self-support
- ⇒ Better education.

Through a preliminary literature study, we have found that no surveys that focus on the effects deriving from initiatives dealing with complicated grief have been performed. Most surveys – which only amount to a few – which are documenting the effects of support given to people who have lost or are living with a critically ill family member, primarily relate to health effects. These effects are most often expressed through changes appearing in an index of depression or mental health. Of course, this should be viewed in light of the fact that a poor psychological well-being is the first sign of complicated grief, while other consequences to a greater extent are characterized as implications caused by a worse health condition. Therefore, a prerequisite in the cost-benefit analysis is that an estimated health effect of the initiative must be detected, before any other effects can be assumed to follow.

From a socio-economic perspective, not only the estimated health effects (benefits) of an initiative for children and adolescents in grief are significant. The most obvious expected benefits of a better health are relevant to be included as well. Thus, with a combination of data sources and methods (literature study and register data), we have tried to clarify 1) whether it is possible to identify estimated effects which do not relate to health (for those target groups where a health benefit of an initiative is documented), and if so, 2) how great these effects are estimated to be.

As described earlier, we have gained access to a data set of DCRC clients and a comparative control group of children and adolescents who have also lost or are living with a critically ill parent, but who are not DCRC clients. Thus, it has been possible to make an analysis and an estimate of the majority of expected effects based on actual register data information. However, it must be emphasized that the control group may have received grief counseling elsewhere, which is why the situation of the control group signifies the results of a *treatment as usual* (TAU) scenario.

It is important to point out that uncertainty connected with the estimated effects is always present. In socio-economic analyses focusing on health, estimated effects are exactly the element, which is connected to a rather great amount of uncertainty because it is difficult to isolate the effect of the initiative itself from aspects in the target group's surrounding.

To reduce the significance of the personal characteristics to the estimated effect of DCRC's work, a statistic matching is used in the effect analysis based on register data to monitor for a possible influence from gender, age, age at the time of parent's death, home address, and parents' education (for more information, see Appendix 1).

For children and adolescents who receive counseling and support from DCRC because they have lost a parent and for children and adolescents who receive counseling and support because they have a parent who is critically ill, the effects are assumed identical. This assumption is made because the relevant literature in relation to the estimated effects of initiatives primarily focuses on complicated grief in connection with the loss of a close family member. Also, the register data set from the Ph.D. project only consists of information about children and adolescents who have lost a parent. However, not all of the estimated effects can be expected to arise for all three of the target groups. As mentioned earlier, evidence of health benefits of the DCRC initiatives must be presented before the derived effects can be expected to appear (and before a difference between the target group and the control group can be attributed to the initiative itself). In addition, the age of the child or adolescent also plays a role in the significance of the derived effects which is described further in section 5.2.

5.1 Results from Literature Review

In regards to the cost-benefit analysis, a literature study has been performed focusing upon the consequences and estimated effects of an initiative regarding complicated grief. While the consequences of complicated grief are fairly well described, knowledge about the expected effects of an initiative, however, is scarce and primarily covers the health effects. A few exceptions are found, however, including an evaluation report from DCRC, which – besides from reduced symptoms of depression after the initiative – points at estimated effects among the participants in terms of a higher self-esteem and an improved ability to concentrate, cf. Box 5.1.

Box 5.1: Fewer symptoms of depression, higher self-esteem and perhaps less absence

The counseling and knowledge center DCRC har performed an evaluation of the following three types of group initiatives for adolescents who have lost a parent:

1. Group meetings for young adults (age 20-28), managed by young volunteers who have lost a parent themselves.
2. Therapy groups for young adults (age 20-28), managed by professional counselors.
3. Groups for teenagers (age 16-19), managed by professional counselors.

The results from the evaluation show that the participants from the beginning of the treatment and to six months after its end had developed in the following areas:

Symptoms of depression and self-esteem:
Six months after the treatment, 84 percent of the participants expressed a reduction in the number of symptoms of depression compared to when they had started. For the participants in the therapy groups, the symptoms had decreased by 42 percent. Across the groups, 61 percent of the participants had gained an improved self-esteem, and in the therapy groups, the participants' self-esteem had improved by 9 percent in average.

The Outside World:
The evaluation states that the participants in general had gained more trust to the outside world and a greater belief in the future, both immediately and six months after the end of therapy, and that they to a larger extent felt acknowledged by their surroundings.

Absence and ability to concentrate:
At the beginning and at the end of the initiatives as well as six months after, the participants were asked to make an assessment of their absence from their study or work on a scale from 1 to 7. However, when comparing the answers from the different time periods, no significant developments in the participants' absence appear. On the other hand, the participants were asked six months after the therapy had ended to make a statement in regards to their experience of how their absence had developed, and here, 46 percent of the participants stated that they believed that they were less absent, while 42 percent believed that their absence was the same as before. Furthermore, the majority of the participants believed that their ability to concentrate have improved.

Source: *Adolescents & Grief (Unge & Sorg),Counseling and Knowledge Center(Rådgivnings- og Videncenter) (2010). "Evaluation report – An evaluation of adolescents who have lost a parent."*

As described above, most of the literature focuses on the work with children and adolescents in grief, primarily bereaved children and adolescents who have lost a parent. However, an analysis of the results from the work with this group states almost unambiguously that a targeted effort for this group seems to result in a progress in the psychological well-being of this group. This is explicit in e.g. a reduction in symptoms of depression (Adolescents & Grief, 2010) and anxiety (Pfeffer, 2002) or the level of complicated grief (Sandler, 2010). However, the size of the expected effects varies across studies, which must be seen in relation to the differences in the characteristics of the target groups, the type of initiative (e.g. group therapy or individual counseling), the time of the initiative and not least the method of estimating the effect.

One of the most recent and comprehensive studies of the results regarding initiatives aiming at children and adolescents who have lost a parent is a meta-analysis by Rosner et al. (2010), cf. Box 5.2. Especially the initiatives, focusing on the exact grief-related symptoms such as depression treatment, appear to have a moderate effect.

Box 5.2: In general, initiatives, targeted at children and adolescents who have experienced grief connected to the loss of a friend or a family member, show small or medium effects

Rosner et al. have performed a meta-analysis of the expected effects of initiatives for children and adolescents who have lost a friend or a family member. The meta-analysis covers 27 studies and 1,073 children and adolescents.

The meta-analysis stated that in average the meta-analysis had an effect size of between 0.35 (13 randomized tests) and 0.49 (12 tests without control group). Based on this, Rosner et al. concluded that the initiatives have small to moderate expected effects.

Grief and loss of a family member or a friend is very complex, and initiatives can help children and adolescents on many different levels and areas. Thus, there are many ways to measure the expected effects of the initiatives. With respect to this complexity, Rosner et al. claim that the most important area of the initiatives must be the directly grief-related symptoms. Here, the analysis showed moderate to large effect sizes of between 0.59 (randomized test) and 0.89 (test without control group).

Source: *Rosner, R.; Krusea, J.; and Hagla, M. (2010). "Meta-Analysis of Interventions for Bereaved Children and Adolescents." Death Studies, 34: 2, 99-136.*

In regards to initiatives for children and adolescents who live with a critically ill parent, no significant effects seem present – however, knowledge about support offered to this group is extremely limited. Therefore, the evaluation of Egmont Fonden's test and development project for children who have lost a parent, made by Karpatschof, – or who are handling living with a critically ill parent – "Will:Can" (Vil:Kan") – is one of only a few analyses, and this reveals no positive effects (Karpatschof, 2003). One of the reasons for this lack of effects of an initiative is that the children, despite counseling, may find it difficult to recover from the grief and the related symptoms because they are still handling a daily life living with the critically ill parent.

Another reason could be that a majority of the children and adolescents are still at risk of developing – though not yet suffering from – complicated grief. Thus, the initiative is of a more preventive character. Experiences from an analysis of studies targeted initiatives for adults suffering from complicated grief concludes that while treatment seems to be an effective means to reduce symptoms of complicated grief, preventive initiatives appear to have no effect (Wittouck, 2011).

Although the literature study demonstrates no significant expected health-related effects of the initiatives for children and adolescents at risk of or suffering from complicated grief, a number of surveys have identified significant effect of "talking to someone about one's grief", e.g. in connection to the related adolescents and their subjective well-being and subjectively perceived health (Nielsen, 2012). By extension, it must be emphasized that the DCRC initiatives are estimated to have a positive effect in regards to helping the children and adolescents through their grief. Only, the effect is not big enough – or of such a character – to be measureable in an index form, e.g. depression or PTSD. Similarly, the conclusion also bears the imprint of very limited knowledge about the expected effects of initiatives targeted at bereaved children and adolescents.

In connection to the cost-benefit analysis, the results of the complete literature study are used to evaluate which effects should be considered benefits for each of the three defined target groups. Then, the factual register data information about DCRC clients and a comparative control group are used to make an estimate of the scale of the expected effects.

5.2 Results of Effect Analysis based on Register Data

The data set used in the effect analysis based upon register data consists of 1,466 former DCRC clients. The control group consists of a total of 3,656 children and adolescents, of which 1,803 have lost a parent, and 1,853 have lived with a critically ill parent. The latter group is not used in the actual estimate of effects because the target group (DCRC clients) counts bereaved children and adolescents only. However, the group is used in establishing the (financial) life story of target group 1.

Because the effects are estimates based on register data information for the year 2010, children and adolescents who have lost a parent after 2009 are also left out of the estimate. This is done to ensure that it is an actual effect of the initiative which we estimate. The information from the Ph.D.-dissertation is also cross-checked with information from the death registration, and children whose parent is not registered here are left out as well. Thus, the final data set of the analysis covers a target group of 1,379 observations (former DCRC clients) and a control group of 1,790.

Table 5.1 presents descriptive statistics of the target group and control group in connection with a number of variables. All of these variables influence the socio-economic expenditures on health, employment, education, crime, etc. In all cases, it is the average for the groups which is presented. Overall, the table portrays how DCRC clients in general get a higher education, commit less crime and need fewer help measures than the comparative control group. However, DCRC clients seem to have relatively lower salary income which is counterbalanced and partly explained by a relatively higher number of people studying and receiving educational support.

Nevertheless, a surprising aspect is that DCRC clients seem to make more use of health insurance benefits, i.e. they appear more often at the doctor’s office as well as seek help from a psychologist. One reason for this could be that DCRC teaches its clients how important it is to talk to someone about their grief and to listen to body signals. If the parent’s death is caused by a hereditary disease, the children and adolescents also become aware of the importance of preventive measurements which include i.e. more frequent doctor visits. On the other hand, a preventive effort and the relatively frequent contact with GP may result in a decrease in the number DCRC clients needing acute and more coercive treatment, which may explain the somewhat less contact with hospital services among this group compared to the control group.

Table 5.1: Descriptive statistics of DCRC clients and control group (2010)

Field	Characteristics	DCRC	Control Group
Health	No. of contacts to health insurance services	9.2	7.6
	Fees for medical benefits	3,063	2,388
	Fees for psychologist	358	155
	Fees for GPs	1,387	1,214
	Days of treatment in hospital and outpatient treatment	2.8	2.7
	Hospital costs calculated by DAGS and DRG rates	3,561	3,667
Crime	% with conviction (all rulings)	16%	23%
	% with conviction of violence	4%	6%
	No. of convictions	0.31	0.56
	No. of convictions of violence	0.06	0.11
	No. of convictions of property damage	0.08	0.17
	No. of traffic offences	0.17	0.28
Measurements	No. of measurements (housing and preventive)	1.09	1.24
Employment	Salary income	164,586	166,832
	% of year on social benefits	2%	4%
Education	% with higher education	41%	29%
	% on educational support	22%	16%
	% receiving special needs education	6,9%	7,5%
Background Information (matching variable)	Age on 1 January 2010	Age 26	Age 26
	Gender (% of women)	75%	75%
	Age when parent died	Age 20	Age 20
	Home address in Copenhagen Region	71%	71%
	% with a mother with higher education	24%	24%
Total no. (n)		**1,379**	**1,790**

Note: The results are based upon a matching data set, which is why the background information from the two groups is identical. Education covers lower, medium, higher education as well as research training.
Source: Database and Ramboll calculations.

In connection with the estimated effects, a distinction is made between the bereaved people, who have lost their parent during childhood, and the bereaved, who have lost their parent at a young age, i.e. a distinction is made between target group 2 and target group 3.

Table 5.2 presents descriptive statistics of the two target groups at the starting position as well as after a verification of a number of demographic and personal characteristics and their possible impact on the estimated effects is performed.

Table 5.2: Characteristics of the bereaved children and adolescents included in the data set of the analysis, before and after matching

Characteristics	Group	Age 0-17 DCRC	Age 0-17 Control group	Age 18-28 DCRC	Age 18-28 Control group
Age, 1 January 2010	Before matching	Age 21.4	Age 21.3	Age 28	Age 27.8
	After matching	Age 21.4	Age 21.7	Age 28	Age 27.7
Gender	Before matching	69%	68%	78%	78%
	After matching	69%	69%	78%	79%
Age when parent died[a]	Before matching	Age 13.6	Age 13.5	Age 23.3	Age 23.5
	After matching	Age 13.6	Age 13.7	Age 23.3	Age 23.3
Home address in Copenhagen Region	Before matching	73%	29%	70%	32%
	After matching	73%	73%	69%	69%
Mother with higher education	Before matching	28%	21%	22%	15%
	After matching	28%	28%	22%	22%
No. (n)	Before matching	477	750	902	1,037

a. In cases when both parents are dead, it is the mother's date of death which is the key.
Source: Database and Ramboll calculations.

In regards to age in 2010, gender, and age when the parent died, the target group and the control group are very much alike. Oppositely, when it comes to home address and the mother's education level, the two groups differ; DCRC clients are to a larger extent residing in the Copenhagen region, and relatively more have a mother with a higher education.

The table also shows that the differences between the target group and the control group on these parameters after matching are almost balanced – and thereby, the estimated effects are cleared of influence from these factors.

The fairly large share of DCRC clients, who are residing in the Copenhagen region and having a relatively well-educated mother, may explain why the target groups - despite the risk or symptoms of complicated grief – in general are in line with – and in some cases above – the general population in regards to the estimated net contribution to society.

Target group 1: Children (age 0-19) handling critically ill parents
The estimate of the effects of DCRC initiatives can only be made with children and adolescents who have lost a parent, due to the fact that the target group (former DCRC clients) only consists of children and adolescents who have lost a parent.

Therefore, the estimated effects of the initiative for children in target group 1, who are living with a critically ill parent, are assumed to be the same as the estimated effects for children in target group 2 (who have lost a parent), provided that a targeted effort for the affected children is proven efficient.

However, the result of the literature study displays that no documented positive effects are found of an initiative for children and adolescents who are living with critically ill parents in regards to their physical and psychological well-being. Due to this, we have no evidence to conclude that DCRC initiatives are connected to significant socio-economic benefits compared to "the standard offers" (*treatment as usual*), which children who are living with a critically ill parent would typically be offered. This is based upon the fact that the majority of the socio-economic benefits of an initiative are connected to the estimated effects which are related to more education (and eventually a stronger attachment to the labor market) as well as fewer social issues and reduced crime. These are the effects of the initiative, which everyone expects will improve the physical and/or psychological well-being of the target group.

Nevertheless, we have found evidence to conclude that DCRC initiatives can replace some of the initiatives which are otherwise offered to the target group, which is why DCRC initiatives result in expenditure decrease in preventive measurements. In addition, the support offered by DCRC to children going through complicated grief processes appears to help them maintain their normal schooling, based on i.e. an improved ability to concentrate. Thereby, also a benefit in the shape of fewer costs on special need education is incorporated in the cost-benefit analysis for Target group 1.

Target group 2 and 3: Children and adolescents who have lost a parent
For children and adolescents who have lost a parent, the result from the literature study shows that children and adolescents suffering from complicated grief appear to improve their psychological well-being through a targeted initiative. Thus, it is presumed that DCRC initiatives would be the cause of derivative positive effects in regards to the bereaved and their attachment to the labor market and educational system, and thus resulting in a better social life.

So, for both Target group 2 and Target group 3, DCRC initiatives appear to be the cause of a reduction in the probability of the bereaved children and adolescents ending up making a career in crime.

For Target group 2, however, the result of the effect study indicates that no significant difference between the target group and the control group in regards to employment appears to be present. This may be due to the fact that the children in this group are exactly children, why symptoms of complicated grief have no effect on the attachment to the labor market. On the other hand, the effect study shows that significant effects is estimated in terms of less special needs education and fewer measurements offered to this target group.

The participants in Target group 3 are almost adults when they lose a parent, which is why effects of neither special needs education nor measurements are incorporated in the analysis.

Table 5.3 is an overview of the estimated effects which are included in the socio-economic calculations, and the size hereof. As an example, the table illustrates that the estimated effects of DCRC initiatives would be the cause of a 43 percent drop in the average number of convictions of violence compared to the average level in the control group, who were at the age of between 0 and 17 when they lost a parent.

Table 5.3: Overview of included effects divided into target groups and direction of effect

Effect	Type of expenditure	Target group 1 Children living at home (age 0-19)	Target group 2 Bereaved children (age 0-17)	Target group 3 Bereaved adolescents (age 18-28)
Health	Psychologist and psychiatrist	…	92% increase	143% increase
	GPs	…	14% increase	15% increase
	Cost of treatment at hospitals and clinics	…	22% reduction	13% increase
Crime	Convictions of violence	…	43% reduction	40% reduction
	Convictions of property damage	…	52% reduction	38% reduction
	Traffic offences	…	61% reduction	27% reduction
Measurements	Measurements	17% reduction	17% reduction	…
Employment	Salary income	…	…	2% increase
	Social benefit	…	…	33% reduction
	Sickness benefit	…	…	19% reduction
	Disability pension	…	…	67% reduction
Education	Higher education	…	9% increase	47% increase
	Educational support	…	44% increase	36% increase
	Special needs education	5% reduction	5% reduction	…

"…"= The effect is not included/is not significant.
Note: The results are based upon a matching set of data.
Source: Database and Ramboll calculations.

In the cost-benefit analysis, the estimated effects of initiatives offered by DCRC will be similar across age groups. However, because the costs are age-dependent, the estimates will be different in absolute terms. In the socio-economic calculations, the estimated effects are thus assumed to continue throughout an entire life.

The estimated effects are converted into monetary terms and included on a more detailed level in the socio-economic calculations, which are described further in the following Chapter 6 as well as in Appendix 3. For example, an increase in the share who are receiving educational support would, at first, result in an increase in the governmental expenditure. However, eventually this effect would convey a socio-economic benefit caused by more tax revenues coming from labor income. The estimated effect, in the shape of i.e. less convictions of violence, would also be converted into and incorporated as a public gain.

6. DELINEATION AND PRICE SETTING

In the previous chapter, the estimated effects were presented. These effects are used in the evaluation of the economic potential of DCRC's work. Before the economic potential can be compiled, it is necessary to present the life stories of the three target group.

The first step in the setting of life stories is a delineation of the costs and benefits which are included in the analysis. In order for costs and benefits to be incorporated in the life stories, it is essential that a price is set on these. Finally, in order to make an estimation of the economic potential connected to this, it is necessary to take into account the costs of DCRC's work.

The different costs and benefits which are included in the analysis are delineated in section 6.1. The section includes a description of our access to the actual delineation as well as a description of the contents in each of the costs and benefits. In section 6.2, the price catalogue, which Rambøll has created to set the price of each of the costs and benefits, is presented. And finally, section 6.3 includes a compilation of costs per client, who receives support and counseling from DCRC.

6.1 Delineation of costs and benefits

A good and reasonable delineation of the elements, which are to be included in the price setting of the different costs and benefits, is a crucial requirement for the results of the analysis to become as valid as possible.

Ramboll's focus upon delineation is threefold: 1) Economic relevance, 2) Reliability of data, and 3) Realisability. This delineation means that a number of elements, such as housing benefits, heat funding, etc., are not taken into account in the analysis because of the criteria regarding economic relevance and reliability of data. Also, gains, which are difficult to realize – such as the value of a safe society as well as the personal and social relationships in connection to special needs education – are not included in the analysis. Often, these conditions are difficult to price set due to the lack of reliable data and also because they can be realized by neither the government nor the participants.

In Table 6.1 the types of costs and benefits settled in each group are presented.

Table 6.1: Description of costs and benefits

Benefits, presented as reduced, public expenditures	
Crime	In the analysis, a distinction is made between three different types of crime: 1) violence and sexual crimes, 2) burglary, theft and vandalism, and 3) traffic violations and other special laws. The direct costs in connection with investigation, criminal charge, conviction and prison time are included in the analysis. The consequential costs, such as compensation payments to victims of violence, etc., as well as insurance payments in connection with burglary, theft and property damage, are also included. Any additional consequential costs for the convicted as well as his/her family are not included in the analysis.
Health (GP and hospital expenditures)	Costs connected to the use of own GP as well as costs connected to hospital treatment are estimated for each of the three target groups.
Psychological diseases	Costs for psychological treatment performed by psychologists and psychiatrists are estimated for each of the three target groups. Due to data-related issues, only the costs for public offers are estimated.
Other measurements, cf. Act on Social Services	Costs for preventive measures and housing. Five different types of measures are included: Foster care, Family and network care, lodgings for children and adolescents, preventive measures, and residential institutions. In the analysis, an average price is estimated across the five

	types for each of the three target groups. The average price varies according to which type of measures the target group is expected to be offered.
Benefits	In a traditional socio-economic analysis, the benefits would not be included based on the fact that benefits only mean moving value between two parts of society (the governmental and the private). From a public-economic perspective, an alteration in the benefits is nonetheless a significant potential benefit, which is why benefits are included in the present analysis. In the analysis, the labor market-related governmental benefits (disability benefit, social benefit, sickness benefit) and educational support (SU) are included. Based on economic relevance, other governmental benefits, e.g. housing benefit and free tuition scheme, are not included in the analysis. It is important to take into account that it is the governmental net costs – i.e. benefits – tax revenues – which are included in the analysis.
Salary income and education	The benefits of employment are calculated as salary income (after tax) for the individual participant and as the tax payments to the state. Salary income and education are closely linked and because we cannot follow the participants in the registers through their entire life, the income listed in the register is added a lump sum benefit for those in the target group who are expected the completion of a higher education.
Special needs education	The costs connected to special needs education are calculated as the direct economic costs of teaching for the school. Indirect costs, such as the child's social and psychological well-being, are not included in the analysis.

In order to place the costs and benefits correctly among the participants, the municipality and the state, it is important to take into account the current economic terms. For instance, is it necessary to take into account whether or not the municipalities or the state is responsible for the financing in connection with health costs? Also, when looking at the benefits and salary incomes, is it necessary to take into account the current tax regulations, including the division of the tax payments between municipality and state? For a more detailed description of the tax matters used in the analysis, look in Appendix 2.

When calculating the net contributions made by the target groups to the public system, a number of other public costs are included in addition to the ones described above. In this analysis, these costs are referred to as "public costs (not dividable)".

The following public costs are included:

- ⇒ Leisure time, culture, etc.
- ⇒ Education, etc. (special needs education analyzed separately)
- ⇒ Other healthcare services
- ⇒ Social protection.

These costs are calculated as standard costs and are assumed to be the same for all. Also, it is assumed that these costs are not affected by the work of DCRC. By including these costs, it is assured that the calculated net contributions to a larger extent reflect the actual level, making it possible to estimate how large a part of the total net contribution is expected to be altered due to the work of DCRC.

One of the key elements of the analysis is to monetarize the socio-economic costs and benefits connected with the work of DCRC. In order to do so, Ramboll has created a catalogue with standard prices for each benefit and cost, as described in Table 6.1. In the following sections, the overall approach to the price-setting as well as the set prices is presented.

6.2 Price-setting of costs and benefits

Two approaches are used to set the value of costs and benefits. The first approach is based upon a unit price (e.g. the cost per conviction of violence or the cost of one year on social benefits), which is then multiplied by the average number (e.g. the average number of convictions of violence per person or the average share of a year in which a person receives social benefits).

The other approach is to look at those costs and benefits which can be found directly from the registers. These costs and benefits are set according to 2012-prices and are used directly in the analysis. Thus, the costs and benefits will be target group and age specific. The costs and benefits which are drawn from the registers include GP expenses, hospital costs, etc.

Table 6.2 provides an overview of the standard prices used in the analysis.

Table 6.2: Calculated standard prices (2012-prices)

Type	Price
Crime	
Violence and sexual crimes, Weapons Act and Law on Narcotics	40,600 DKK per conviction
Burglary, theft and vandalism	25,749 DKK per conviction
Traffic violation and other special laws	13,359 DKK per conviction
Detention	1,397 DKK per conviction
Health	
GP and hospital expenditures	Target group and age specific
Treatment of psychological disorders	Target group and age specific
Other measures cf. The Service Act	
Adolescents (age 0-19) living at home with critically ill parent	764 DKK per day
Children (age 0-17) bereaved of one or both parents	1,662 DKK per day
Adolescents (age 18-28) bereaved of one or both parents	1,662 DKK per day
Benefits	
Disability benefits	189,534 DKK per year
Social benefits (under age 25)	79,920 DKK per year
Social benefits (over age 25)	144,402 DKK per year
Sick benefits	204,880 DKK per year
Educational support	67,944 DKK per year
Salary income and education	
Income	Target group and age specific
Special needs education	
Special needs education	622 DKK per lesson

Source: Ministry of Finance, the Danish Prison Services, borger.dk, "Voldens pris – samfundsmæssige omkostninger ved vold mod kvinder", Statistics Denmark, FLD-net, and Ramboll calculations.

Those costs and benefits which through the registers can be computed as target group and age specific are used directly in the analyses. It is necessary to "convert" the additional costs and benefits to target group and age specific costs before using them in the analyses. This is done by means of the registers of Statistics Denmark, which makes it possible to find the number of incidences for each target group any given year. For instance, it is possible to document the average portion of the year in which an adolescent, belonging to a certain age group, who has lost one or both parents, has received social benefits. This is multiplied by the calculated unit cost in the table above, which makes it possible to construct a target group and age specific cost on social services.

A detailed description of the used methods and sources of the calculation of standard costs are found in Appendix 3.

6.3 Costs per child/adolescent

The costs per client are estimated based on the annual statement of 2011 as well as the number of clients. The costs per client includes both the direct economic costs in connection with the help and counseling, which the client receives, and the administrative costs, including expenses, IT, fundraising, communication, etc.

The costs per client are presented below in Table 6.3.

Table 6.3: Costs per client

Initiative	Costs per client
Children/adolescents (age 0-19) living at home with critically ill parent	11,000 DKK
Children (age 0-17) bereaved of one or both parents	11,000 DKK
Adolescents (age 18-28) bereaved of one of both parents	11,000 DKK

In the above table, the costs per client amount to approx. 11,000 DKK in all three target groups. Thus, it is assumed that the costs per client are identical across the three target groups.

7. THE TOTAL ECONOMIC CONSEQUENCES OF THE WORK OF DCRC

In this chapter, the total economic consequences of the work of DCRC are presented. Thus, it is examined how the average net contribution is expected to change if a person in one of the three target groups has received help or counseling from DCRC.

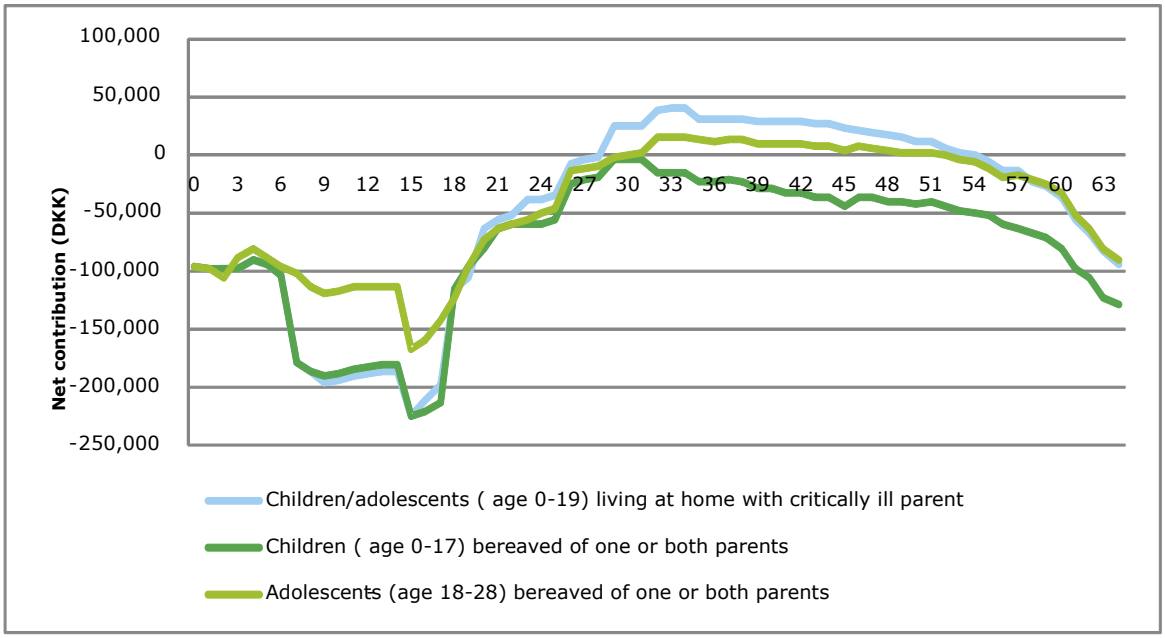
In section 7.1, the "normal" economic life history of the three target groups – meaning the economic life history for people in the target groups who have not received help or counseling from DCRC – are presented. This is followed by section 7.2-7.4 in which a calculation of the total economic consequences of the work of DCRC offered to the three target groups are presented. These sections focus upon the economic potential for the government, as well as how the potential is distributed in different areas, such as crime and health. The more long-term the gains are, the more uncertain they are. This means that the more short-term the gains are, the greater the probability of them becoming real. Therefore, an analysis is presented at the end of each section of when the estimated gains of the actors become real, which makes it possible to estimate whether the effects are short-term or long-term.

7.1 Normal life history for the three target groups

As described in section 4.2, the starting point for the estimate of the economic consequences is the economic life history of the average person in each of the three target groups.

An illustration of the normal life history of an average person in each other the three target groups is found in Figure 7.1.

Figure 7.1: Normal life history of the three target groups



The figure above present the annual, estimated net contribution for the three target groups per year. A negative net contribution means that the costs of governmental services offered to the target group is higher than what the target group participants pay in tax. On the other hand, a positive net contribution means that the target group participants' tax payments exceed the governmental costs of the target group.

It is also illustrated in the figure above, how the children and adolescents (age 0-19) who are living at home with a critically ill parent make a negative net contribution until the age of 29 after which the net contribution remains positive until they reach the age of approx. 55.

Children (age 0-17) bereaved of one or both parents make a negative net contribution throughout their entire life. This is illustrated in the figure by the dark green curve which at no time is above 0.

The third target group – the adolescents (age 18-28) bereaved of one or both parents, are estimated to make a positive net contribution by the time they are at the age of approx. 30 and until they reach the age of approx. 50 after which the net contribution turns negative again.

The above-mentioned life stories may be summarized by calculating the value of the net contribution of an average person throughout his/her life (age 0-64). This value is calculated based upon the Net Present Value (NPV) of the net contribution made each year. The NPV is the discounted value of all the future costs and gains.

For a further description of the term *Net Present Value* and the reason for selecting a discount rate, see Box 7.1.

Box 7.1: NPV and selecting discount rate

What is Net Present value (NPV)?

From a life history perspective, we study a person throughout an entire life (or at least until age 64). In other words, a lot of expenditures on e.g. health and benefits as well as the contribution to the public services through tax payments do not become due for payment until far in the future. The future gains are worth less than the costs and gains we may be facing now. Also, the future costs are less important than the costs we may be facing now. In other words, if we have to choose between receiving 1,000 DKK today and 1,000 DKK in two years, the 1,000 DKK now seems preferable. In order to compare the different scenario with future costs and gains, these are discounted at the selected rate and thus calculated in Net Present Value.

Selecting discount rate

When dealing with investments in the public sector, it is the "discount rate of the society" which is used. No general consensus is found regarding the size of this. In the analysis, a discount rate of 3 percent is used. This, and not the rate of 5 percent recommended by the Ministry of Finance, is used because many economists consider the 5 percent rate to be too high. Thus, the Danish Economic Councils often use the 3 percent rate, which is also the rate used in both the report from the Danish Welfare Commission and the report from the Danish Labour Market Commission. Also, discount rates of 3-4 percent are used in countries with which we compare ourselves.

In continuation of this, Table 7.1 presents the NPV of an average person in each of the three target groups.

Table 7.1: NPV of net contribution of target groups (age 0-64), 2012-costs

Target group	NPV (DKK)
Children and adolescents (age 0-19) living at home with critically ill parent	-2,278,366
Children (age 0-17) bereaved of one or both parents	-2,813,649
Adolescents (age 18-28) bereaved of one or both parents	-1,895,053

As shown in the table above, the NPV of the net contributions from all three target groups is negative throughout their entire life.

The NPV amounts to the most for the adolescents (age 18-28) bereaved of one or both parents and it is estimated to approx. -1.9M DKK throughout a life time. For the children and adolescents (age 0-19) who are living at home with critically ill parents, the NPV reaches an estimate of

approx. -2.3M DKK, while it for the remaining target group, children (age 0-17) bereaved of one or both parents) is estimated to amount to approx. -2,8M DKK.

In the sections below, the economic consequences of the work performed by DCRC for the three target groups are presented.

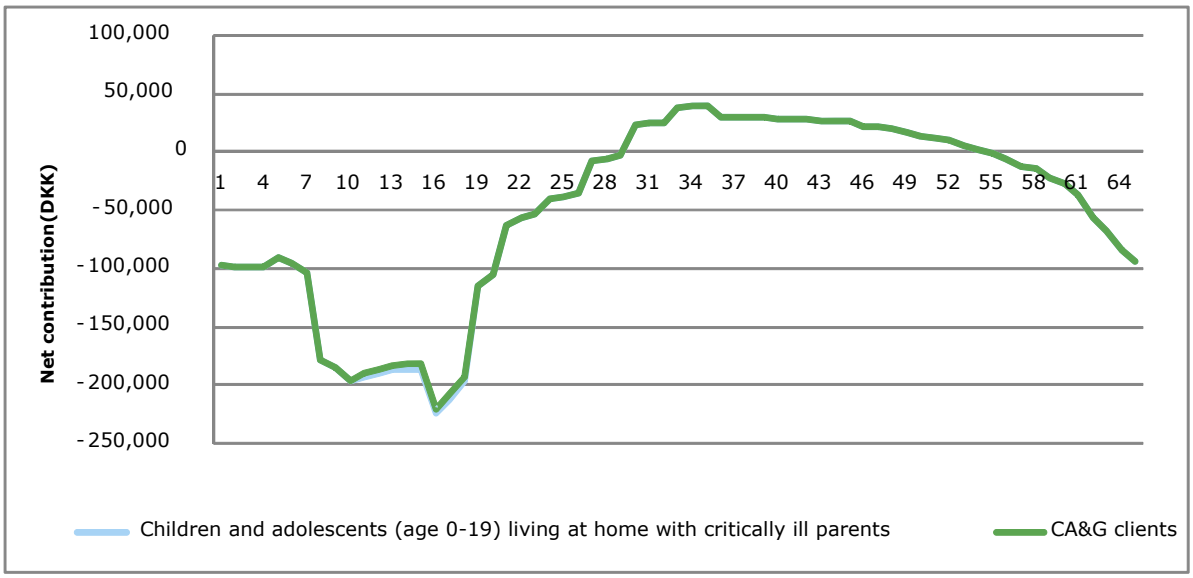
7.2 Children and adolescents (age 0-19) living at home with critically ill parents

The socio-economic potential of the work performed by DCRC is evaluated by means of the estimated effects, cf. Section 5.2, and the normal life histories presented of children and adolescents (age 0-19) living at home with critically ill parents.

The economic potential is illustrated as the difference in the net contribution to the public sector between the children and adolescents (age 0-19) living at home with critically ill parents and the people who have received help from DCRC.

The normal life histories as well as life histories of people receiving help from DCRC are illustrated in the figure below.

Figure 7.2: Normal life histories and life histories of DCRC clients



In the illustration of the life histories of the DCRC clients, it is assumed that they are nine years old by average when they receive help from DCRC. Therefore, the effects are not included in the calculation of the life history until from the client has reached the age of 10.

The blue curve illustrates the normal economic life history of the children and adolescents (age 0-19) living at home with a critically ill parent, while the green curve shows the economic life histories of people who have received help from DCRC.

As illustrated in the figure above, the two groups are estimated to go through the same economic life history, except during the school and teenage years. This is due to the fact that children and adolescents who have received help from DCRC appear to get by with less special needs education and fewer measurements.

The total NPV of the net contribution throughout a life time, broken down to each actor, is illustrated in Table 7.2 below.

Table 7.2: Distribution of financial gains (NPV)

Actor	Children and adolescents (age 0-19) living at home with critically ill parents (DKK)	DCRC (DKK)	Difference (DKK)
State	-8,146	-8,146	-
Municipality	-69,962	-47,474	22,488
Public costs (not divisible)	-2,200,259	-2,200,259	-
Public costs, total	**-2,278,366**	**-2,255,879**	**22,488**
Participant	2,729,695	2,729,695	-
DCRC	-	-8,431	-8,431
In total	**451,329**	465,385	14,057

According to the table above, a normal life history for children and adolescents (age 0-19) living at home with critically ill parents will in average be connected with a governmental cost of approx. 2.28M DKK. Also, the net contribution for children and adolescents who receive help from DCRC is estimated to amount to approx. 2.26M DKK.

Thus, a minor savings on the governmental costs of the amount of approx. 22,500 DKK is estimated. The public savings are to be found only on municipal level, while no savings will be found on state level. It must be pointed out that the participant (i.e. DCRC client) will not experience any of the economic gains of receiving help from DCRC.

By breaking down the governmental gains, it is illustrated where the municipality may expect the gains to appear. This distribution is found in Table 7.3 below.

Table 7.3: Distribution of public financial gains on the field (NPV)

Field	Children and adolescents (age 0-19) living at home with critically ill parents	DCRC	Difference
Crime	-134,789	-134,789	-
Tax of salary income	1,119,976	1.119,976	-
Benefits (minus tax payments)	-346,306	-346,306	-
GP and hospital expenditures	-157,210	-157,210	-
Psychological disorders	-4,065	-4,065	-
Measurements	-35,172	-29,894	5,278
Special needs education	-520,542	-503,332	17,210
Free time, culture, etc.	-68,001	-68,001	-
Courses, etc.	-950,783	-950,783	-
Health services, other	-559,171	-559,171	-
Social protection	-622,304	-622,304	-
Total	**-2,278,366**	**-2,255,879**	**22,488**

The total public gain of approx. 22,500 DKK is distributed between the field of measurements (approx. 5,300 DKK) and the field of special needs education (approx. 17,200 DKK). Thus, the estimate regarding the financial gains of having received help from DCRC in other fields amounts to 0 DKK.

However, it is estimated that parts of the financial gains will not be factual until later in life, why the risk connected to these is relatively high. A calculation of the chronological timing of the financial gains may document this.

Table 7.4 present the chronological timing of the financial gains for each of the individual actors.

Table 7.4: Distribution of financial gains on actors (2012-prices) (DKK)

Actor	Year 0	Year 1	Year 2	Year 3	Year 4 and onward in total	In total
State	-	-	-	-	-	-
Municipality	-	4,180	4,180	4,180	20,899	33,439
DCRC	-11,000	-	-	-	-	-11,000
Total	**-11,000**	**4,180**	**4,180**	**4,180**	**20,889**	**22,439**

Year 0 in the table above refers to the year when the child receives help from DCRC, which for this target group is at the age of 9. Table 7.4 shows how the municipality will experience a positive financial gain of approx. 4,000 DKK per year at year 1-3, after help has been given. This financial gain must be regarded in relation to the total municipal gain, which amounts to approx. 33,500 DKK.

As shown in Table 7.2, the financial gain of DCRC initiatives for the state will amount to 0 DKK. And finally, the table shows that DCRC bears the costs of the help (11,000 DKK), which is stated at Year 0.

For the Target group 1, the estimated financial gains of DCRC initiatives are relatively long-term for the municipality – 63 percent of the municipal gains are estimated to become factual no earlier than after Year 3.

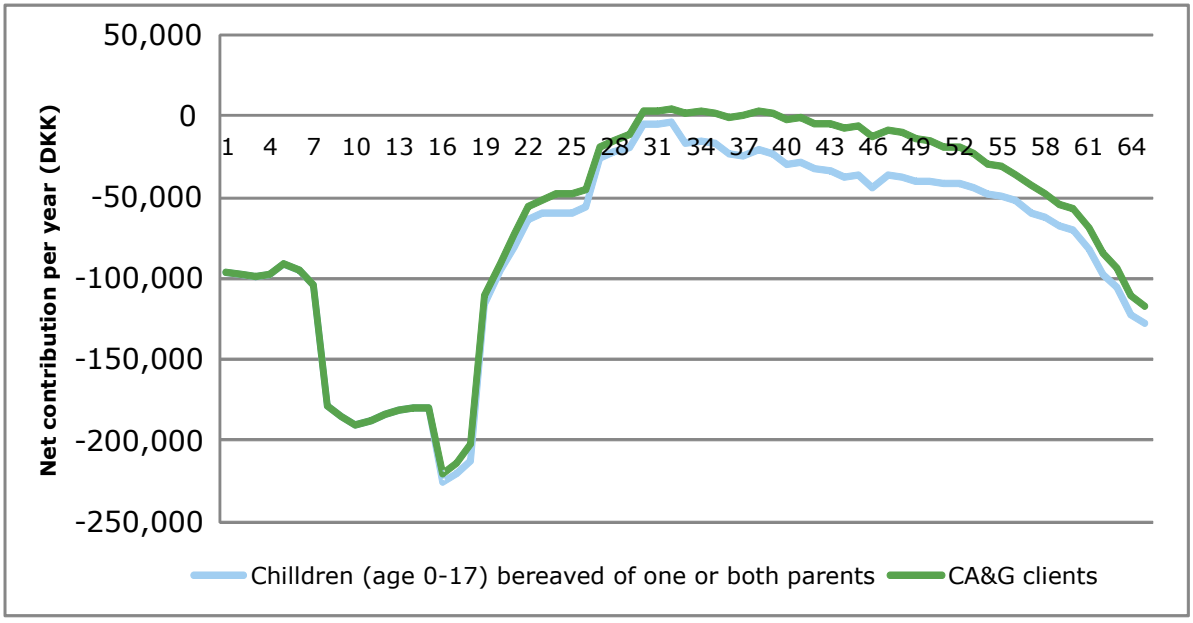
It is important to emphasize that the results in Table 7.3 and Table 7.4 are not identical due to the fact that the amounts in Table 7.3 are calculated NPV, whereas they in Table 7.4 are 2012 prices.

7.3 Children (age 0-17) bereaved of one or both parents

The estimate of the socio-economic potential for children, (age 0-17) bereaved of one or both parents, is based upon the same means as for the above-mentioned Target group 1.

In the figure below, the normal life history for children (age 0-17) bereaved of one or both parents, as well as the life history for people who have received help from DCRC, are illustrated.

Figure 7.3: Normal life history and life history for DCRC clients



It is provided that DCRC clients in average are at the age of 14 when they lose one of their parents, after which they receive counseling from DCRC. The effect of the work performed by DCRC is estimated to appear when the child reaches the age of 15.

As illustrated in the figure above, the two groups have almost identical life histories until they reach the age of approx. 20. From the age of 20, the net contribution of the adolescents who have received help from DCRC will be bigger than the normal process for the target group.

Unlike the target group, the net contributions of people who have received help from DCRC are estimated to be modest but positive from the age of 29 and until the age of 38.

The total NPV of the net contribution over a lifetime is set for the different actors in Table 7.5 below.

Table 7.5: Distribution of benefits (NPV)

Actor	Children (age 0-17) bereaved of one or both parents	DCRC	Difference
State	-408,101	-169,847	238,254
Municipality	-205,289	-193,399	11,809
Public costs (not divisible)	-2,200,259	-2,200,259	-
Public costs, in total	**-2,813,649**	**-2,563,505**	**250,144**
Participant	2,514,235	2,514,235	-
DCRC	-	-8,431	-8,431
Total	**-299,415**	**-56,543**	**242,872**

As illustrated above in Table 7.5, the estimate of the total financial gains across actors is approx. 250,000 DKK. The financial gain of the governmental services is estimated to amount to approx. 250,000 DKK whereas a negative financial gain of approx. 8,400 DKK is estimated for DCRC. The negative gain for DCRC is due to the fact that DCRC bears the costs in connection with the help offered to the children who are bereaved of one or both parents, although none of the financial gains can be attributed to them.

The municipality as well as the state will be awarded a percentage of the governmental gains. Thus, it is estimated that the positive financial gain for the municipality will amount to approx. 12,000 DKK, while the state will get the amount of approx. 238,000 DKK.

The total governmental gain worth approx. 250,000 DKK may also be distributed between the different fields. Such a distribution is illustrated below in Tale 7.6.

Table 7.6: Distribution of public financial gains in different fields (NPV)

Field	Children (age 0-17) bereaved of one or both parents	DCRC	Difference
Crime	-438,703	-206,207	232,496
Tax of salary income	942,524	942,524	-
Benefits (minus tax payments)	-434,120	-434,120	-
GP and hospital expenditures	-136,569	-127,125	9,444
Psychological disorders	-2,714	-4,480	-1,766
Measurements	-23,266	-19,278	3,989
Special needs education	-520,542	-514,560	5,982
Leisure time, culture, etc.	-68,001	-68,001	-
Education, etc.	-950,783	-950,783	-
Health services, other	-559,171	-559,171	-
Social protection	-622,304	-622,304	-
Total	**-2,813,649**	**-2,563,505**	**250,144**

As shown in Table 7.6 above, the governmental gain is distributed between five different fields. The biggest financial gain is found in the field of crime, which is responsible for approx. 90 pct. of the financial gain, approx. 232,000 DKK. Other fields, in which the governmental services are estimated to experience a positive financial gain are GP and hospital expenditures, measurements and in connection with special needs education.

Also, the table shows how the governmental services are estimated a small negative financial gain in connection with psychological disorders, which is caused by the fact that people to a larger extent use public services at psychologists and psychiatrists.

In Table 7.7 below, the timing of the financial gains for each of the actors are shown.

Table 7.7: Distribution of financial gains for actors (2012-priser)

Actor	Year 0	Year 1	Year 2	Year 3	Year 4 and onward, total	In total
State	0	198	1,698	4,745	799,047	805,688
Municipality	0	5,390	5,393	5,411	6,158	22,352
DCRC	-11,000	-	-	-	-	-11,000
Total	**-11,000**	**5,588**	**7,092**	**10,155**	**805,204**	**817,039**

The year (Year 0), when the person receives help from DCRC, the total cost will be approx. 11,000 DKK, whereas the years to come (Year 1-4) are estimated to present a positive financial gain of approx. 6,000-11,000 DKK.

In addition, the table shows that while the biggest financial gain for the municipality drops in Year 1-3 (approx. 72 pct.), only a 1 pct. drop of the state financial gains are estimated in Year 1-3.

For Target group 2, the estimated financial gains from DCRC's work are thus relatively short-term for the municipality, but long-term for the state.

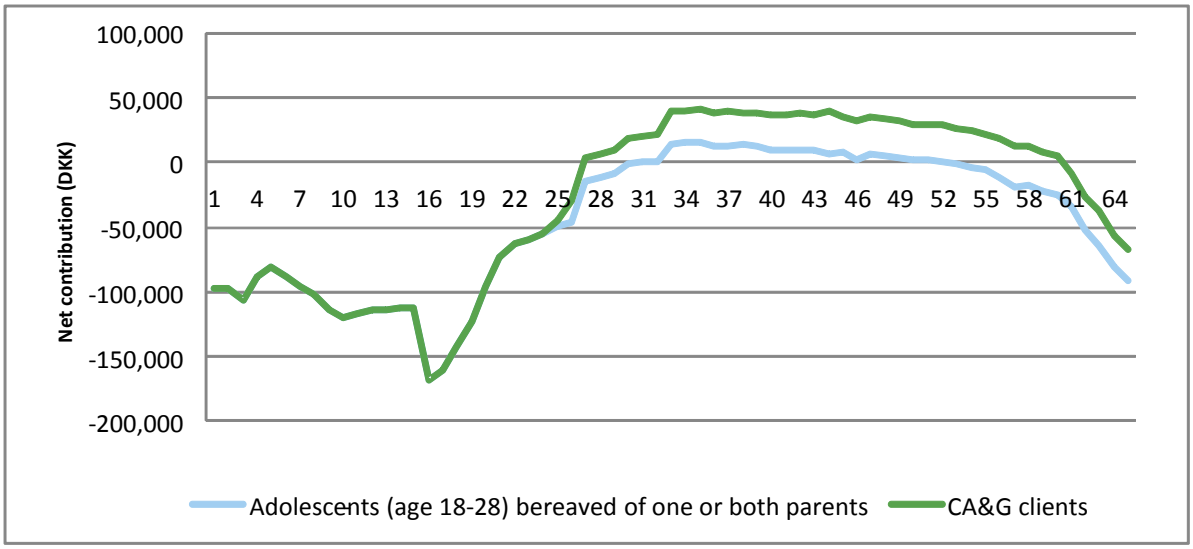
However, it is important to emphasize, that the results in Table 7.5 (and Table 7.6) as well as in Table 7.7 are not identical due to the fact that the amounts in Table 7.5 (and Table 7.6) are presented in NPV while the amounts in Table 7.7 are 2012 prices.

7.4 Adolescents (age 18-28) bereaved of one or both parents

The last of the three target groups are adolescents, who at the age of 18-28 have lost one or both parents. This section will present an estimate of the socio-economic potential of DCRC's work offered to this target group.

Firstly, the financial life histories of the target group members are set along with life histories of people who have received help from DCRC, cf. Figure 7.4.

Figure 7.4: Normal life history and life history of DCRC clients



It is provided that the DCRC clients in average are at the age of 23, when they lose a parent. Furthermore, the effects of DCRC's work are assumed to break through the following year after the clients have received help, i.e. from year 24.

As in the presentation of the results for the first two target groups, the blue curve (see Figure 7.4) shows the normal financial life history of the adolescents (age 18-28) bereaved of one or both parents, whereas the green curve shows the financial life history of people who have received help from DCRC.

As illustrated in Figure 7.4, the two groups have identical life histories up until they lose one or both of their parents. Hereafter and throughout the rest of their life, the adolescents who have received help DCRC have a greater net contribution to society compared to the target group.

Also in Figure 7.4, it is stated that the target group as well as people who have received help from DCRC have a positive net contribution during a big part of their adult life (age 30-51 for target group and age 26-59 for people who have received help from DCRC).

In below Table 7.8, the total value of the net contribution difference between respectively adolescents (age 18-28) bereaved of one or both parents and adolescents (age 18-28) bereaved of one or both parents and who have received help from DCRC is presented.

Table 7.8: Distribution of the financial gains (NPV)

Actor	Adolescents (age 18-28) bereaved of one or both parents	DCRC	Difference
State	-213,431	-53,199	160,232
Municipality	475,595	601,475	125,880
Public costs (not divisible)	-2,157,217	-2,157,217	-
Public costs, in total	**-1,895,053**	**-1,608,941**	**286,112**
Participant	2,576,293	2,785,452	209,159
DCRC	-	-5,574	-5,574
Total	**681,240**	**1,170,937**	**489,697**

The total gain amounts to approx. 490,000 DKK which is distributed to the public services (approx. 286,000 DKK) and to the adolescent (approx. 209,000 DKK). Also, DCRC is estimated to have a negative financial gain of approx. 5,600 DKK. The negative financial gain for DCRC is caused by the fact that the organization bears the costs in connection with helping the adolescents.

Approx. 160,000 DKK of the public gain is distributed to the state, while the remaining approx. 126,000 DKK goes to the municipality. The adolescent is expected to experience a positive financial gain since it is estimated that he/she will achieve an increased income through a higher education level as well as a greater attachment to the labor market.

The increase in salary income is also found in the distribution of financial gains to the public services in the shape of an increase tax income, cf. Table 7.9. The tax increase on salary income amounts to the main part of the gain for the public services. In addition, a public financial gain is estimated in connection with a reduction in criminal offences and benefits worth approx. 87,000 DKK and 55,000 DKK, respectively.

Table 7.9: Distribution of public financial gains in the different fields (NPV)

Field	Adolescents (age 18-28) bereaved of one or both parents	DCRC	Difference
Crime	-283,933	-197,324	86,610
Tax of salary income	1,040,125	1,199,463	159,338
Benefits (minus tax payments)	-323,682	-268,438	55,244
GP and hospital expenditures	-167,201	-179,576	-12,375
Psychological disorders	-3,145	-5,849	-2,704
Measurements	-	-	-
Special needs education	-	-	-
Leisure time, culture, etc.	-68,001	-68,001	-
Education, etc.	-950,783	-950,783	-
Health services, others	-559,171	-559,171	-
Social protection	-579,262	-579,262	-
Total	**-1,895,053**	**-1,608,941**	**286,112**

As shown in the table above, a negative gain on GP and hospital expenditures as well as in connection with treatment of psychological disorders are estimated. This estimate is based on the fact that the adolescents who have received help from DCRC to a larger extent make use of the public medical insurance compared to the target group.

A statement of the perspective of the different gains on a time scale may be used to identify, whether the actors are to expect financial gains during the first years after the initiative has been performed, or if the financial gains are more long-term.

In Table 7.10, the timing of the financial gains for each of the actors are shown.

Table 7.10: Distribution of financial gains on actors (2012 prices)

Actor	Year 0	Year 1	Year 2	Year 3	Year 4 onward, in total	Total
State	-	2,072	7,716	8,446	565,496	583,731
Municipality	-	2,282	9,651	9,527	435,791	457,251
DCRC	-11,000	-	-	-	-	-11,000
Total	**-11,000**	**4,355**	**17,367**	**17,973**	**1,001,286**	**1,029,982**

The total gain amounts to approx. 1.03M DKK, cf. Table 7.10. The majority of this financial gain breaks through in Year 4 and onward, an amount of approx. 1M DKK. This tendency is also found for the municipality as well as for the state, for which only approx. 3 pct. and 5 pct., respectively, are estimated to break through in Year 1-3.

For Target group 3, the estimated financial gains of the DCRC work are thus relatively long-term, both for the municipality and for the state.

BILAG 1
MATCHING

In pure experimental research design the selection into the treatment and the control group is random. The randomization ensures the differences between the two groups can be assigned to the effect from the intervention in the treatment group. In other words, the impact in the control group would be the same, as if the treatment group has not received treatment.

In cases, where the selection is not random the difference in the two groups cannot purely be assign to the intervention, because it can also be explained by underlying characteristics in the two groups. In other words, some individuals are more likely to go into treatment than others. As a result, the difference between the treatment group and the control group will be the effect from the intervention and some underlying characteristics. Consequently, the effect from the control group is not expected to the same as if individuals in the treatment group have not received treatment. Thus, the control group does not represent the counterfactual outcome.

Thus, before comparing the effects in treatment and control group, you should account for differences in the characteristics in the two groups. This is done by ensuring observable characteristics in the two groups are the same before receiving treatment and therefore making the two groups comparable. It is thereby possible to isolate the effect from the intervention and to achieve a more efficient estimate from the counterfactual situation - meaning the effect in the treatment group, if they have not received treatment.

Matching is a method to implement this.

Matching rely on the assumption that the effect from treatment can be independent of the groups, when conditioned on observable characteristics. The basic idea in matching analysis is to reduce the bias caused be self-selection into treatment. The way to make treatment random is to compare nonparticipants to participants who are similar in terms of observable characteristics before going into treatment.

Propensity score matching
In this case, the matching is done by matching the propensity score – the probability of receiving counseling from DCRC for each individual in the treatment and control group (treatment group individuals who received treatment from DCRC). The propensity score is calculated on a range of observable characteristics. In the current case, the follow variables are available:

- ⇨ Age the first of January 2010
- ⇨ Gender
- ⇨ Age at the time of parent(s) death
- ⇨ Dummy for residence in the Capital city
- ⇨ Dummy for the mothers higher education

Not all variables are significant when estimating the propensity score for the two groups of age (children age 0-17 and adolescents age 18-28). In general, it only makes sense to include variables which significantly differ in the treatment and the control group before going into treatment.

The effect from an individual who has received counseling is compared with the effect from an individual from the control group with very similar propensity scores. In other words, you find indivials who are similar in term of receiving treatment – the counseling from DCRC. In that way differences in the effects can be assigned to the intervention (ideal case). This is the way propensity score matching makes treatment random, both individual was equally likely to received counseling from DCRC.

Different methods can be used to perform the exact matching procedure – how to match the " socio-economic twins". In the actual case, nearest neighbor with replacement is used, meaning that individuals from the treatment group are matched with the individual in the control group with the closes propensity score to the individual in the treatment group. By allowing for replacement means, control individuals are allowed to be used more than once, if it is the nearest neighbor to another treated individual as well. Furthermore, the matching is only done over

common support to make sure there is overlap between the characteristics in the two groups. In other words, it is possible to find an individual with the same propensity score in the treatment group and in the control group.

The estimation of the propensity score is in this case done by logistic regression, where the dependent variable is a binary variable for counseling from DCRC or no counseling. The variables included in the propensity score estimation is observable characteristics mentioned above.

Results of matching

An indication of whether matching serve it purpose is to look at the underlying variables mean values before and after matching. Before matching the two groups are expected that they differ in term of observable variables, but after matching this difference should be reduced. As shown in the table 1, it is succeed to get similar mean values in the two groups after matching.

Table 1: Characteristics of the bereaved children and adolescents in the sample, before and after matching

Charateristics	Group	age 0-17 CA&G	age 0-17 control group	age 18-28 CA&G	age 18-28 control group
Age the 1. January 2010	Before matching	21,4	21,3	28	27,8
	After matching	21,4	21,7	28	27,7
Gender	Before matching	69%	68%	78%	78%
	After matching	69%	69%	78%	79%
Age at the time of parent(s) death	Before matching	13,6	13,5	23,3	23,5
	After matching	13,6	13,7	23,3	23,3
Residence in the capital city	Before matching	73%	29%	70%	32%
	After matching	73%	73%	69%	69%
Higher education of the mother	Before matching	28%	21%	22%	15%
	After matching	28%	28%	22%	22%
Number of obs.	Before matching	477	750	902	1037

Further it appears that both children and adolescents who have received counseling from DCRC are comparable to the control groups in terms of age, gender and age at the time of parent death. On the other hand, the difference in treatment and control group is relatively large regarding to residence and the mother's education. After matching this difference in distribution is adjusted and the treatment and control group is very similar in effect calculations.

Though, it is not possible to correct for differences in characteristics, that is either unobservable or no data availability.

BILAG 2
TAX RATES

The individual citizen's tax relations are significant in regards to the distribution of the financial gains, i.e. in connection with salary income between the public services and the individual citizen. However, because such knowledge is practically unattainable, the average tax rates for different income scales are used instead.

Labor market contributions are not paid of public service benefits but only of salary income, which means that it is necessary to make two different tax calculations in the analysis. For the public service benefits, the income and property value tax are included in the calculations while the tax on salary income is made up of income and property value tax as well as labor market contributions.

The average tax rates, including and excluding labor market contributions for different income scales are presented in Table 1.

Table 1: Average tax rate, distributed according to income scale, 2011

Personal income before deduction of labor market contribution (DKK)	Income tax and property value tax, percentage of income	Income tax, property value tax and labor market contribution, percentage of income
Negative	-	-
0-25,000	9 %	17 %
25,001-50,000	4 %	11 %
50,001-75,000	12 %	16 %
75,001-100,000	19 %	21 %
100,001-125,000	23 %	24 %
125,001-150,000	26 %	27 %
150,001-200,000	26 %	29 %
200,001-250,000	26 %	31 %
250,001-300,000	26 %	32 %
300,001-350,000	26 %	34 %
350,001-400,000	27 %	35 %
400,001-500,000	29 %	37%
500,001-750,000	33 %	41 %
750,001-1,000,000	37 %	45 %
More than 1,000,000	39 %	47 %
All taxpayers	**28 %**	**35 %**

Source: www.skat.dk (Table 1: Tax-paying citizens distributed according to income) and Ramboll calculations.

The table illustrates how citizens, who in 2011 received public taxable benefits on the scale of the amount of DKK 200,001-250,001, in average paid a tax rate of approx. 26 percent, while employees with a salary income on the same scale in average paid a tax rate of approx. 31 percent[2].

Due to it being average tax rates, the tax calculations do not take into account possible differences in the taxable income between each individual person.

[2] The difference in these tax rates can only be attributed to the fact that labor market contributions are not paid on public service benefits.

The total tax incomes are distributed between municipality and state. The estimate of the distribution between municipality and state is based upon the average municipality tax rate, health contribution, bottom-bracket tax and labor market contribution. Thus, it is implicitly assumed that the target group has an annual income worth a maximum of DKK 389,899 and thereby stays below the top-bracket tax limit[3].

If this assumption turns out to be invalid and the annual income of the target group exceeds DKK 389,900, the distribution between municipality and state will turn out differently than stated in this report. However, the conclusive results of the analysis will remain intact – and only the distribution between municipality and state will need to be altered.

As mentioned above, labor market contributions are not paid of public service benefits but only of salary income, and due to this, it is required to use two different allocation keys for the tax revenues between municipality and state.

In Table 2, the distribution of tax income between municipality and state in connection with disbursement of taxable benefits are presented.

Table 2: Tax rates and the distribution between different types of tax (public benefits)

Type	Tax rates	Distribution rates
Municipality (municipality tax, incl. church tax)[a]	25.7%	69%
State (health contribution)	8%	21%
State (bottom-bracket tax)	3.64%	10%
State (labor market contribution)[b]	0%	0%

Source: www.skat.dk and Ramboll calculations.
Note: "a" calculated as the average municipality tax, including church tax.
"b" The labor market contributions are spent on the financing of governmental measures on the labor market.

Approx. 69 percent of the collective tax payments are accrued to the municipalities, while the remaining 31 percent goes to the state. The governmental tax revenues are distributed between bottom-bracket tax and health contributions.

As for the public benefits, the distribution of the tax revenues between municipality and state are presented in Table 3 in connection with salary income.

Table 3: Tax rates and the distribution between different types of tax (salary income)

Type	Tax rate	Distribution
Municipality (municipality tax, incl. church tax)[a]	25,7%	57%
State (health contribution)	8%	18%
State (bottom-bracket tax)	3,64%	8%
State (labor market contribution)[b]	8%	18%

Source: www.skat.dk and Ramboll calculations.
Note: "a" calculated as the average municipality tax, including church tax.
"b" The labor market contributions are spent on the financing of governmental measures on the labor market.

In regards to tax revenues of salary income, approx. 57 percent are distributed to the municipalities, and the remaining approx. 43 percent goes to the state, cf. Table 3. The governmental tax revenues are distributed between health contributions, bottom-bracket tax and labor market contributions.

[3] The top-bracket tax limit is set according to the 2011 legislation.

BILAG 3
ESTIMATE OF BENEFITS/COSTS

In this Appendix each of the six groups of benefits and costs are described.

- ⇒ Crime
- ⇒ Health
- ⇒ Measurements
- ⇒ Benefits
- ⇒ Special needs education
- ⇒ Employment and education
- ⇒ Other general costs.

The appendix is divided into sections presenting each of the six groups of benefits and costs. In each section an introduction of the delineation of the elements used in the analysis is presented, before the estimate of each element is introduced.

Basically, two methods are used to estimate the costs and benefits. The one method is based upon a unit cost (e.g. the cost per conviction of violence or the yearly cost of living on social benefits), multiplied by the average amount (e.g. the average number of convictions of violence per person or the average part of a year on social benefits).

The other method makes use of the fact that some costs and benefits can be pulled directly from the registries, e.g. expenditures on GP, hospital, etc. These costs and benefits are projected in 2012 prices and used directly in the analysis.

At the end of each section, a description of the distribution of the different costs and benefits between municipality and state are presented.

Crime

Three types of crime are used in the analysis. The types of crime are defined on the basis of the severity of the crime and are following the categories found in the publication of Statistics Denmark, "Udsatte børn og unge 2010".

The three types of crime and a brief description of each are presented in Table 4.

Table 4: Description of the three types of crime

Type of crime	Description
Violence or sexual offences, Weapons Act and Law on Narcotics	This category includes the most severe kinds of crime. It covers e.g. all types of convictions of violence, homicide attempts, and rape. Also, it covers other sexual offences, violations of the Weapons Act and the Law on Narcotics.
Burglary, theft, and property damage	This category includes all kinds of burglary, theft and property damage.
Traffic Act and other Special Laws	This category includes the mildest crimes such as violations of the Traffic Act and other Special Laws, including the Fire Legislation, Fireworks Legislation and false charges.

Source: Statistics Denmark: "Udsatte børn og unge 2007", and Ramboll Management Consulting: "Analyse af de økonomiske konsekvenser på området for socialt udsatte børn og unge"

The costs are estimated on the basis of the type of crime. In the following, the thoughts and ideas in connection with the delineation of which elements to include in the analysis are described.

The costs of crime

The costs of crime can roughly be divided into three main elements:

- ⇒ Direct costs, which can be attributed to police investigation, charge, verdict and detention.
- ⇒ Personal costs for the criminal and his/family (economic and non-economic)
- ⇒ Socio-economic costs (e.g. compensation, insurance payment, and uncertainty increase).

A number of the costs mentioned above are very difficult to estimate and the uncertainty connected with these is substantial, e.g. the personal costs for the criminal and his/her family, which may be both economic and non-economic. Also, parts of the socio-economic costs, such as the value of a safe society, are covered with great uncertainty.

Thus, the costs of crime are in the analysis limited to:

Direct costs

- ⇒ Police
- ⇒ The Danish Prosecution Service
- ⇒ Defense attorney and Legal representative
- ⇒ Court
- ⇒ The Danish Prison Services (detention).

Socio-economic costs

- ⇒ Insurance payments
- ⇒ Compensation payments.

As listed above, the costs of police services (related to investigation), Danish Prosecution Services, defense attorney and legal representative as well as the courts are included. In cases in which the crime is connected with an unconditional imprisonment, the costs of the Prison Services are included.

Also included in the analysis are parts of the socio-economic costs, including insurance payments of damaged/missing belongings as well as compensation payments related to loss of earnings.

The estimate of the costs of crime is based upon a unit cost per conviction as well as the number of convictions. The number of convictions and the length of the sentence are drawn from the criminal registry of Statistics Denmark of verdicts, which include information about all verdicts divided in type from 1980 and onward. Below, the value-setting of those elements, which are included in the costs of the three types of crime described.

Direct costs of crime
The estimate of the direct costs of crime is based upon prior studies, Statistics Denmark and the annual report from the Danish Prison Services.

Through the publication of "Voldens pris - samfundsmæssige omkostninger ved vold mod kvinder" as well as information from the Danish Prosecution Services, an estimate of the direct costs for the police, the Danish Prosecution Services, the defense attorney and legal representative as well as the courts is made.

In Table 5 the average costs per conviction is presented, divided between the police, the Danish Prosecution Services, defense attorney, legal representative, and courts.

Table 5: Average costs per conviction, distributed between fields (2012 estimates)

Type of crime	Police	Prosecution Services	Defense attorney and legal representative	Court[d]	In total
Violence or sexual offences, Weapons Act and Law on Narcotics[a]	8,142 DKK	8,770 DKK	14,439 DKK	3,294 DKK	36,646 DKK
Burglary, theft, and property damage[b]	3,691 DKK	3,976 DKK	6,546 DKK	3,292 DKK	17,508 DKK
Traffic Act and other Special Laws[c]	2,614 DKK	2,816 DKK	4,635 DKK	3,294 DKK	13,359 DKK

Source: "Voldens pris", Statistics Denmark, annual report from Danish Prison Services, and Ramboll calculations.
Note: "a" Calculation based on a weighting of 1.3.
"b" Calculation based on a weighting of 0.6.
"c" Calculation based on a weighting of 0.4.
"d" An average estimate across all types of proceedings.

As shown in the table, the direct costs are highest related to violence or sexual offences, breach of the Weapons Act and Law on Narcotics and estimated to amount to approx. 37,000 DKK per conviction. Also, the table shows that the costs are lowest related to a breach of the Traffic Act and other Special Laws in which the direct costs are estimated to amount to approx. 14,000 DKK per conviction. And finally, the table shows, that the estimate of the direct costs in connection with burglary, theft and property damage amounts to approx. 18,000 DKK.

As described above, the costs related to detention are also included in the analysis.
The costs for the Danish Prison Services are calculated based upon information from the annual report of the Danish Prison Services in regards to costs per day in prison. This information is presented in Table 6.

Table 6: Price per detainees per day (2012 estimates)

Price per day in prison	DKK
Average price per day	1,397

Source: Annual report of 2009, Danish Prison Services.
Note: Average price per day in prison across all types of detentions.

The price per detainee per day is calculated across the different types of detentions and is estimated to amount to approx. 1,400 DKK per day, cf. Table 6. Thus, it is implicitly assumed that the costs related to detention are the same across the three types of crime.

Socio-economic costs
As described, the socio-economic costs are delineated to include only the insurance payments from the insurance companies and the rulings of the Compensation Board.

The insurance payments related to breaches of the Traffic Law and other Special Laws are not included. Only insurance payments connected with burglary, theft and property damage are included in the analysis. Additionally, it is assumed that compensation payments from the Compensation Board are only allocated to cases regarding homicide, etc., violence and sexual crimes.

Table 7 presents an overview of insurance and compensation payments in 2011, the number of reported cases as well as payments per case.

Table 7: Insurance and compensation payments in 2011 (2012 estimates)

Type of crime	Compensation /insurance	Number of reported cases	Per case
Violence or sexual offences, Weapons Act and Law on Narcotics[a]	2,442,145,337 DKK	296,328[c] DKK	8,241 DKK
Burglary, theft, and property damage[b]	107,434,733 DKK	18,043[d] DKK	5,954 DKK
Traffic Act and other Special Laws	-	-	-

Source: The annual report 2009 of the Compensation Board, and the annual statistics of Forsikring og Pension.
Note: All prices are valued in 2012 estimates.
"a" It is assumed, that none of the compensation payments are collected by the offender, why the public services bear all the expenses incurred. It is assumed that the compensation payments disbursed by the Compensation Boards can be attributed to violence or sexual crimes.
"b" Covers all payments related to theft damages.
"c" Covers reports of homicide, etc., violence and sexual crimes.
"d" Covers reports of robbery, burglary and theft.

As shown in the table above, the level of compensation paid amounted to approx. 2.4 million DKK in 2011, which is equivalent to an average of approx. 8,250 DKK per violence and sexual crime. Also, a total amount of approx. 107 million DKK has been disbursed in insurance payments, which is equivalent to an average of approx. 5,950 DKK per reported burglary or theft.

The insurance and compensation costs are compared to the direct costs, through which the total costs of crime are estimated.

Total costs of crime
In this section, the total costs of crime are presented, which include the direct costs as well as the insurance and compensation payments. In Table 8, an overview of the average collective costs per conviction, distributed between types of crime, are shown.

Table 8: Average collective costs per conviction (2012 estimates)

Type of crime	Costs per conviction
Violence or sexual offences, Weapons Act and Law on Narcotics	40,600 DKK
Burglary, theft, and property damage	25,749 DKK
Traffic Act and other Special Laws	13,359 DKK

Source: "Voldens pris", the annual report 2009 – the Danish Prison Services, the annual report 2009 – Compensation Board, annual statistics – Forsikring og Pension, the Danish Prosecution Services and Rambøll calculations.
Note: The prices are calculated in 2012 estimates.

As shown in Table 8, the highest costs per conviction are found in connection with violence and sexual offences, Weapons Act and Law on Narcotics with the amount of 41,000 DKK per conviction. The estimate of costs of burglary, theft and property damage is set at approx. 26,000 DKK per conviction, while traffic offences and other Special Law offences in public costs are estimated to amount to approx. 13,000 DKK per conviction.

The costs mentioned above do not include costs connected with detentions, why these must be added to the costs in those cases when conviction leads to imprisonment. The costs of detentions cannot be calculated per conviction because it depends on the length of the imprisonment. As described above, these costs can be included by adding an average cost per day of 1,397 DKK.

In order to calculate the total cost for one person in the particular target group, the unit cost is multiplied by the number of convictions or the length of the imprisonment per person within the particular target group.

Financing
To analyze the economic consequences for municipality and State, the total costs of crime are distributed between these parties.

In the table below, the distribution between municipality and State of the direct and social costs of crime are presented.

Table 9: The distribution of costs of crime between municipalities and state/region

Type	Municipality	State
Direct and social costs	0 %	100 %

As shown in the table, all costs of crime are attributed to the State.

In order to reduce the complexity, it is disregarded in the analysis that the insurance payments are actually paid and incurred by the insurance companies, which ultimately means the policyholder. However, this assumption does not affect the results of the analysis due to the fact that the amount per case is modest, while the number of cases is relatively low.

Health

The social costs in the health sector are typically distributed between two sub-elements: Direct costs and indirect costs. Only parts of the direct costs are included in this analysis while all the indirect costs are omitted.

The direct costs are those costs which derive from the citizen's contact with the health sector (e.g. hospitalization, psychologist and psychiatrist). The direct costs also include personal costs such as the change in life quality due to the change in health condition. Thus, illness may result in various social and personal conditions which may lead to social consequences. However, because these personal costs are extremely difficult to valuate, they are not included in this analysis.

The indirect costs are the socioeconomic production losses, which are caused by e.g. premature death, permanent or temporary loss of ability to work or temporary absence from work due to the illness/the changed health condition – i.e. the value, which the person could have contributed with if he/she had been completely fit for work. Often, the indirect costs are a lot bigger than the direct costs, but as mentioned before they are not included in the analysis because they are difficult to assess.

The work of DCRC is expected to have an effect on three different healthcare fields: The use of GPs, contact to the hospital services, and the use of psychologists and psychiatrists. Thus, it is expected that the costs to other healthcare areas (e.g. the use of dentists) will not be affected by the work of DCRC. Nevertheless, these costs are included in the analysis and a part of the group of other healthcare costs.

People suffering from mental illnesses are defined as people who have been in contact with a psychologist or psychiatrist in the primary health sector[4]. Contacts with the psychiatric field of the secondary health sector are not included in the analysis because there are only very few people with this type of contact (e.g. hospitalization with a psychiatric diagnosis), when a grouping by target group and age is performed. Thus, an average assessment would be very sensitive to a few individuals' usage. On the other hand, the psychiatric part of the secondary health sector is included in the group of other healthcare costs.

Healthcare costs

The healthcare costs are estimated by means of the registries of the Danish Health and Medicines Authority and the registries of Statistics Denmark of healthcare benefits and hospital use. In these registries, all Danish citizens' use of public healthcare systems, including GPs, hospitals and psychologists and psychiatrist are listed.

Thus, the healthcare costs are pulled straight out of the registries and used in the analysis. Before the costs are used in the analysis, a factorial estimate of 2012 costs is performed by using an annual factorial of 2 percent.

The financing of healthcare costs

The responsibility for the tasks within the healthcare system is divided between the municipalities and the regions. The table below includes a brief description of the division of responsibilities within the healthcare field between the State and the municipalities.

[4] Delineated to specialties: Psychiatry, child psychiatry, district psychiatry and psychological counseling.

Table 10: Division of responsibilities for tasks within the healthcare field

Municipality	Region
Prevention, care and rehabilitation, which is not performed during hospitalization, treatment of alcohol and drug abuse, home nursing care, dental care and social psychiatry	Hospital sector, including the hospitals, the psychiatric unit as well as the health insurance, including GPs and medical specialists

Source: The Danish Ministry of Finance

The healthcare costs of the regional tasks are primarily financed by the State in the shape of block grants and a smaller activity-based contribution to the regions. In addition, the municipalities contribute with a fixed basic contribution which depends on the demographics of the municipality and an activity-based contribution which depends on the extent of the strain which the citizens of the municipality cause the healthcare system.

In Table 11 below, the distribution of healthcare costs in 2012 between the State/region and municipality are presented.

Table 11: Distribution of healthcare costs between municipalities and the State/region

Type	Municipality	Region/State
Somatic hospital (admission, emergency room, ambulatory) Psychiatric hospital (admission, emergency room, ambulatory) GPs, medical specialists	25 %	75 %

Source:
http://www.fm.dk/Arbejdsomraader/Kommuner%20og%20regioner/Aftalesystemet/Regionernes%20finansiering.aspx

The table illustrates that in 2012, the State financed approx. 75 percent of healthcare costs, while the municipalities financed the remaining approx. 25 percent. In the analysis, this division is used to distribute the costs of both GPs and the hospital system as well as psychologists and psychiatrists.

Measurements

The work of DCRC is expected to provide gains by means of a deduction in the use of preventive measures as well as fewer/shorter housings in the future. Thus, the costs of the preventive measures are included in the analysis. The economic costs of measurements are calculated as all costs with a direct link to the measures.

Roughly, five different types of measures are offered to children and adolescents who have lost or are living with a critically ill parent:

- ⇒ Foster families
- ⇒ Family and network care
- ⇒ Housings for children and adolescents
- ⇒ Preventive measures
- ⇒ Residential institutions.

According to whether they have lost or are living with a critically ill parent, a variance must be expected regarding which type of measurements the child or adolescent receives. Thus, the costs of the measurements are expected to vary according to which target group is being analyzed. This comes to sight in how the average costs of the measurements differ between the target groups.

The costs of the measures are estimated by using cost per day and the number of days during which the child or adolescent receives the measures offered. The number of days in which the individual has received measures is listed in the Children and Adolescent Registry of Statistics Denmark. The costs per day during which the child or the adolescent receives measures are listed below.

Unit costs

The five different types of measurements are different in regards to which type of help the child or adolescent receives. Thus, the costs of the different measurements differ as well.

An average cost per day across the five different types of measurements is used in the analysis. However, it is taken into account that the different target groups are estimated to receive different types of measurements.

The table below includes the cost per day for three different target groups.

Table 12: Cost per day for the different target groups (2012 estimates)

Target group	Cost per day
Children and adolescents (age 0-19) living at home with critically ill parent	764
Children (age 0-17) bereaved of one or both parents	1,662
Adolescents (age 18-28) bereaved of one or both parents	1,662

Source: Estimate based on the Children and Adolescent Registry of Statistics Denmark.

As shown in the table above, the cost per day for children and adolescents who are living at home with a critically ill parent amounts to an estimate of approx. 760 DKK, while the cost per day for the two other target groups amounts to an estimate of approx. 1,660 DKK.

The reason for the difference in the cost per day is to be found in the assumption that the adolescents who are living at home with a critically ill parent to a lesser extent than the other target groups are placed outside their home.

Financing

The municipalities have the overall responsibility for the social field, while the responsibility for the management of a number of institutions for vulnerable groups and groups with special needs in the field of social and special needs education are placed at the regional government. However, in expensive particular cases, the State offers partial reimbursements.[5]

[5] Cf. §§ 176 and 177 in Social Services Act

These special cases are disregarded in the analysis, and it is assumed that the municipalities finance 100 percent of the costs of measurements.

Table 13: The distribution of costs of measurements between municipalities and the State/region

Target group	Municipality	Region/State
All	100	0

Benefits

The number of benefits is limited to include the benefits related to the labor market as well as educational support. The following benefits are included in the analysis:

- ⇒ Disability benefit
- ⇒ Social benefit
- ⇒ Sickness benefit
- ⇒ Educational support

This delineation is recommended partly to reduce the complexity in the analysis as much as possible and partly based on an assessment of economic relevance, e.g. some of the other benefits are so small (e.g. heating allowance, reimbursements for medicine). Also, unemployment benefits are excluded from the analysis because the marginal savings for the individual municipality caused by one person going from living off unemployment benefits to being employed is very small. This is caused by the fact that the unemployment benefits are not disbursed by the municipalities; they only have the administrative costs related to the system[6].

Besides from the costs related to the labor market, the educational support is included. This is based upon the assumption that the work of DCRC may lead to more adolescents getting a higher education.

The costs connected to benefits are estimated on the basis of a unit cost per type of benefit. The information about people's use of the benefits related to the labor market is found in the registry of Statistics Denmark listing the financially supported citizens receiving benefits. This registry includes a detailed calculation of how big a part of the year each individual person has received a given benefit. In the following, the valuations of the different types of benefits which are included in the analysis are described.

Unit costs of benefits

Significant differences are found in the size of the individual benefit types, which are included in the analysis. In Table 14 the annual rates in 2012 of the benefits included in the analysis are listed.

Table 14: The size of the public benefits, 2012 (2012 estimates)

Benefits	Annual rate
Disability benefit[a]	DKK 189,534
Social benefit (below age 25)[b]	DKK 79,920
Social benefit (above age 25)[c]	DKK 144,402
Sickness benefit[d]	DKK 204,880
Educational support[e]	DKK 67,944

Source: www.borger.dk, www.nogletal.dk
Note: All sums are 2012 rates and measured in 2012 estimates.
"a" The rates for the disability benefit is calculated on the basis of the new system. The specified rate is calculated as a simple average of the disability benefit for singles, DKK 204,900, as well as married and cohabitants, DKK 174,168.
"b" The rate is calculated as adolescents, age below 25, living away from home.
"c" The rate is calculated as a simple average of social benefit recipient, above age 25, with family responsibilities (164,784) and without family responsibilities (124,020).
"d" The employer pays the sickness benefits for the first 21 days, after which the municipality takes over the financing of the system. The citizen can receive sickness benefits up to 12 months. The highest rate is set.
"e": Standard rate for educational support during a higher education.

[6] On the contrary, sickness benefits are financed by the employer during the first 21 days, after which the municipalities take over the financing.

The rates of social benefits and disability benefits are base rates, to which some deductions and additions may be added under special circumstances[7]. However, the rates stated in the table may be considered average rates and are used directly in the analysis.

In the analysis, the benefits are calculated as the average payment per person in each of the target groups on a given year. For instance, the target group members may at the age of 30 be paid social benefits for 6 months, equal to approx. 72,000 DKK. Nevertheless, this sum may include target group members who are paid social benefits for 12 months (144,000 DKK), while another part of the target group is not paid any social benefits at all during this particular time.

The financing of public benefits
Each individual type of public benefits is financed differently, which is essential when the costs are distributed between municipality and State.

Table 15 includes an list of the different public benefits as well as a description of how these are distributed between municipality and State.

Table 15: The financing of the public benefits

Public benefits	Financing
Disability benefit[a]	The municipality is responsible for the financing of disability benefits but receives a 35 percent state reimbursement.
Social benefit[b]	The state reimbursement of the municipal costs equals 30 percent if the citizen is not in an activation program. If the citizen is participating in an activation program, cf. The Act on Active Employment, § 32, paragraph 1, no. 1 or chapter 11, the municipality receives a 50 percent state reimbursement.
Sickness benefit[c]	The state reimbursement of the municipal costs regarding sickness benefits equals 30 percent. However, if the sick participates in programs, cf. The Act on Active Employment, § 32, paragraph 1, no. 1, or programs according to chapter 11 and 12, or if the sick gradually returns to work, cf. paragraph 2-4, the state reimbursement equals 50 percent of the sickness benefits.
Educational support[d]	The State alone finances the educational support.

Source: Retsinformation
Note: "a" Regulation in Danish Act on Social Pension. LBK no. 1005 of 19/08/2010 § 52
"b" Regulation in the municipalities entitlement to reimbursement of the costs of social benefits, start allowance, rehabilitation benefits, sickness benefits, unemployment benefits and special benefits to citizens participating in programs, cf. Act on Active Employment, or sickness benefit recipients who gradually return to work, cf. § 1-4. LBK no. 1006 0f 19/08/2010 § 50. For disability benefits granted before 1999, the state reimbursement equals 50 per cent.
"c" Sickness Benefit Act. LBK no. 85 of 07/02/2011 § 61 and § 62
"d" Specific source reference is absent

This means that the municipalities are responsible for the financing of social benefits and sickness benefits but receives state reimbursement – the amount depends on whether the citizen is participating in an activation program or not. Similarly, the municipality receives a state reimbursement of 35 per cent of its costs regarding disability benefits. The table also shows how the State is responsible for the entire financing of educational support, which means that the municipalities have no costs in regards to this.

When public benefits, such as social benefits, are being disbursed, it leaves expenses to the public services in regards to the disbursement itself. However, it is also important to take into account that the public services also get revenues in connection with the tax payments of the benefits.

Thus, it is not sufficient just to estimate the size of the benefits when analyzing the impact on the public purse. It is required to take into account the increased tax revenues, which means that it

[7] After six months receiving social benefits, the citizen becomes subject to "the limit". This means that housing benefits and other special benefits are reduced..

is the government net expenditures connected to the benefits which must be included in the analysis. The estimates of the governmental tax revenues resulting from benefits are calculated based on the tax rates cf. Bilag 2.

Salary income and education

The economic effect of employment can be attributed to the citizen's income, including the distribution between the individual citizen and the public services. The education level for the target group is one of the key factors, which is estimated to affect the average salary income[8].

Due to an obvious connection between education level and salary income, education directly affects the average salary income. Also, education will also have an indirect impact on the salary income through the employment frequency, which increases in height when the education level increases.

However, an estimate of education also presents a temporary negative effect on the salary income. The cause of this is that the student during his/her education has a limited salary income. Nevertheless, this is counterbalanced by the future income increase resulting from the completed education.

Using the income registry of Statistics Denmark, it is possible to present an estimate of the average annual income of each of the target groups. These sums are projected to 2012 estimates and are used directly in the analysis. Thus, the average annual income will be target group- and age-specific.

However, in the registries it is not possible to document the complete impact of the improved education on the income level. The reason for this is that in the registries, it is not possible to follow all the people until they have completed their education and have found a job on the labor market.

This is modified in the analysis by adding to those who have completed an education an additional salary income. The sum of this additional salary income is stated in the table below.

Table 16: The modification in the annual salary income as a result of completed education

	DKK per year
Average	66,412

Source: An estimate based on income registry of Statistics Denmark.

As shown in the table above, the salary income from the registry of those people who have completed an education is supplemented with approx. 66,000 DKK. The share of people who have completed an education will be target group-specific.

In regards to salary incomes, a gain is estimated to be found for the public services in connection with the tax revenue increase. The tax revenues as well as the distribution between municipality and State, tax is calculated using the tax rates, cf. Bilag 2.

[8]The employment frequency and work experience are also key factors.

Special needs education

Special needs education is included in the analysis because it is estimated that the work of DCRC will affect the quantity of special needs education which the child receives. In the analysis, only special needs education in primary school (grades 0-10) is included.

Only the direct financial costs of special needs education are included in the analysis. Indirect costs, such as the child's social and mental condition, are not included because a financial estimate of these is extremely difficult to make.

The costs of special needs education are calculated using three key numbers: 1) percentage of children and adolescents who receives special needs education, 2) average number of special needs education lessons per child/adolescent, and 3) average cost per special needs education lesson.

Percentage of children and adolescents who receive special needs education
As something new, Statistics Denmark published in the summer of 2012 data about the extent of special needs education in the Danish primary schools. The registry includes information about the recipients of special education as well as the extent of this. However, because the registry is so new, Ramboll has decided only to use it to find the target group percentage of those who receiving special needs education.

Average number of special needs education lessons per child/adolescent
The other key number, which is used in the estimate of the costs of special needs education, is the average number of special needs education lessons per child/adolescent. As described above, no reliable registry information based on data about the extent of special needs education per child/adolescent is currently available. Numerous analyses have examined the extent of special needs education (Hornbek, 2009) and identify that a child who receives special needs education in average receives 2.7 special needs education lessons per week. This number of lessons is used in the analysis to estimate the costs of special needs education.

Average cost per special needs education lesson
The third and last key number, which is used, is the average cost per special needs education lesson. The estimate of this key number is found using many different sources, including FLD, Ministry of Finance as well as desk research.

The preconditions used are disclosed in the table below.

Table 17: Preconditions connected with the estimate of the costs per special needs education lesson

Dimension	Value
Average annual salary (DKK)[a]	456,108
Average number of lessons per week (lessons)[b]	22
Number of education weeks per year (weeks)	40
Overhead rate (per cent)	20 %

Source: FLD-net, FM and desk research.
Note: "a": Calculated as the average teacher's basic salary, including pension, based on FLD-data.
"b": Depends on the local agreement between the particular municipality and the Teachers' Association. An estimate of 22 hours is calculated as the average number of lesson hours per year.

Based on the preconditions in the table above, the estimate of the cost per special needs education lesson equals approx. 622 DKK per lesson.

Public costs (not divisible)

When calculating the net contribution of the target groups to the public services, a number of other public costs, besides from the ones described above, will be included. These costs are named *"Public costs (not divisible)"* in the analysis.

Thus, the following costs are included in the analysis:

- ⇒ Leisure time, culture, etc.
- ⇒ Education, etc. (special needs education is analyzed separately)
- ⇒ Other healthcare services
- ⇒ Social protection.

These costs are compiled as standard costs and are presumed identical for all. It is also assumed that these costs are not affected by the work of DCRC. by including these costs, it is ensured that the calculated net contribution to a larger extent reflects the actual level, which makes it possible to estimate how big a part of the total net contribution is expected to be altered due to the work of DCRC.

The standard costs are collected from the technical background check performed before the publication of "Mod nye mål – Danmark 2015" by the Danish Ministry of Finance. The costs are projected in 2012 estimates before being used in the analysis.[9].

[9] In the costs of "Other healthcare services", adjustments have been made in case some of these costs are already included in the analysis.

BILAG 4
LIST OF LITERATURE

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