The Danish Register of Sickness absence compensation and Social transfer payments

Version 1.0

Jacob Pedersen, Ebbe Villadsen, Hermann Burr, Marie Martin, Maj Britt Dahl Nielsen and Louise Meinertz
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The Danish Register of Sickness absence compensation benefits and Social transfer payments – RSS

Linkage of DREAM and the KMD register of sickness absence compensation and maternity pay

Version 1.0

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Version 1.0

Original data set

Data processing
Preface

The Danish Register of Sickness absence compensation and Social transfer payments (RSS) is developed as a tool for use in work environmental research by researchers at the National Research Centre for the Working Environment, Denmark (NRCWE). The register is only for research related use and it is especially adapted to analyses of sickness and maternity periods.

This documentation report describes, among other things, how the RSS 1.0 was developed and the statutory problems related to such data. The documentation was made by The National Labour Market Authority (Danish abbrev: AMS), Kommunedata (Danish abbrev: KMD) and the NRCWE.

The RSS 1.0 includes a linkage of KMD’s sickness absence compensation and maternity pay register in Denmark (KMD register) and AMS’s DREAM register containing information about social benefits in Denmark (DREAM).

The National Labour Market Authority regularly publishes statistics on sickness absence and maternity leave based on their own processing of sickness absence compensation and maternity pay data (Standard interface NX32100Q sickness absence compensation and maternity pay (worked out by KMD)). Similar statistics are not permitted to be reproduced in the RSS 1.0 which is exclusively confined to research related purposes. Information about DREAM is taken from “Beskrivelse af DREAM koder – version 19” (“Description of DREAM codes – version 19”) written by the AMS.

The present documentation was prepared based on meetings and e-mail correspondence with special consultant Tine Mercebach and chief consultant Jørn Hedegaard Rasmussen, both employed at the AMS, and systems analyst John Henrik Møller from the KMD. The NRCWE sincerely appreciates the cooperation with the AMS and KMD, and not least that this cooperation has made it possible to utilize the huge amount of data in work environment research.

The information about how the casework process takes place in practice was obtained by the NRCWE through interviews and e-mail correspondence with case officers in Copenhagen, Greve and Solroed Municipalities.

References to sections of the sickness absence compensation act can be found in the latest edition of the act unless otherwise noted (see www.retsinformation.dk). References in the text to variable names refer to variables in the RSS 1.0.

Any flaws and deficiencies in the processing of the data are the sole responsibility of the NFA. Any professional comments to this documentation report should be addressed to statistician Jacob Pedersen, NRCWE, jpe@nrcwe.dk.

Elsa Bach
Director of Research Coordination, NRCWE
June 2011
Introduction

The present documentation is made as a work of reference, to attend users of the RSS 1.0 register. The documentation gives a detailed insight to how the RSS 1.0 is made and a walk through the source data on which the RSS 1.0 is based upon.

The primary difference between the RSS 1.0 and the DREAM register (made by the National Labour Market Authority) is the more detailed registrations of sickness absence benefits. The present documentation focuses on sickness absence benefit as well, a focus which implies that a detailed insight is given on: how periods of sickness absence benefit and maternity pay are differentiated, how it is possible for the user of the RSS 1.0 to differentiate between different types of sickness absence. Additionally, a short introduction to the act and other regulations concerning sickness absence benefit is provided.

The documentation uses several technical terms concerning the processing of the data. An explanation of the most important technical terms is here given to provide the reader with the full benefit of reading the documentation:

- Processing data: A process in which data are looked through and corrected for: errors, divergence and inconsistencies.

- Preparing data: Data are moved and arranged to be shown in a required manner.

- Linkage of data: Two files of data are put together into one file. This is done by using a key variable which is identical in both data files, e.g. a serial number. The linkage can be visualised by two pieces of clothing (read: files) attach by a zipper (read: key variable).

Documentation structure

The RSS 1.0 documentation describes:

1. How data from the KMD register, concerning cases of sickness absence compensation and maternity payment, are processed.

2. How legislation and other regulations affect the processed data concerning sickness absence compensation and maternity pay registrations.

3. A detailed introduction to the linkage process of the DREAM register and the KMD register.

The procedure of making the RSS 1.0 register is illustrated in figure 1. The figure shows the two datasets: the KMD register and the DREAM register. Then it shows the data processing of the KMD register and the preparing of the DREAM data before the linkage process of the two datasets and the formation of the RSS 1.0 register.
The data processing of the KMD register is of particular importance because the RSS 1.0, in contrary to the KMD register operates with single periods of sickness absence or maternity payment at a time.

Prior to the data processing of the KMD register, a person may have simultaneous multiple cases of sickness absence compensation or maternity pay which are both active and non active:

- A case is made for each employment the person has, e.g. separate cases are made if the person is both self-employed and a wage earner.

- Several simultaneous cases are registered if a person moves from one municipality to another.

- Prior cases concerning a person have not been closed even though they are not active anymore.

- A case is made by mistake.

The decision of having single periods of sickness absence or maternity payment at a time is made due to analysis considerations\(^1\).

After the data processing steps presented in figure 1, all cases of sickness absence or maternity payment have been processed to periods. In contrast to cases, periods cannot overlap each other in time but a person can still have multiple consecutive time periods:

- The term “cases” refers to register data of sickness absence and maternity payment from the original KMD register prior to processing of data.

- The term “periods” refers to register data from the RSS 1.0 register after the processing of the KMD register.

Data processing of the DREAM register is not necessary, as these data already are processed. The step in figure 1: “preparing data” includes counting and rearranging of data.

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\(^1\) The RSS 1.0 is adapted to a statistical survival analysis.
Data

The RSS 1.0 consists of register-based information concerning dates of sickness absence compensation and maternity payment supplemented with weekly based registrations concerning other types of social benefits. The founding principles of the RSS 1.0 are:

1. To show periods of sickness absence in such details that one can distinguish between various types of sickness absence.

2. To hold information about other types of social benefits.

The KMD register of sickness absence compensation and maternity pay

All information about cases of sickness absence compensation and maternity pay comes from the KMD sickness absence compensation and maternity pay register (KMD register). The KMD register has been delivered by KMD to the Ministry of Employment (AMS) since 2003. Each line in the data from the KMD register represents a case. For each case, a number of variables are registered, e.g. the causes for the absenteeism etc.

The KMD register is updated monthly. However, this does not mean that the register is complete at the end of the month. A delay is incorporated into the registrations of the KMD register as it is possible to reopen an ended case of sickness absence compensation benefit up to six months after the application date. Likewise cases of sickness absence lasting less than two weeks (employer period) can be reported up to three months after the first day of the sickness period. To find the earliest date to which the KMD register is complete, one must subtract at least nine months from the month of the update.

Example: A register received in January is considered to be complete approx. nine months prior to the end of January, which means April of the year before.

DREAM

Information concerning other social benefits payments than sickness absence compensation and maternity pay comes from the DREAM register (DREAM). DREAM is updated twice a year by the AMS. DREAM is made by gathering information from several different sources.

DREAM contains information about all citizens in Denmark who have received some kind of social welfare benefit since 1993. Only citizens who have received some kind of social welfare benefit are registered in DREAM.

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2 Illness, occupational injury, occupational disease
3 Retirement pension, early retirement pension and transfer payments, light duties or flexijob, flexi payments, incapacity benefits, re-training, unemployment benefits (unemployment fund), social securities and starting allowances, introduction and unemployment benefits, leave, SVU and VUS, adult trainee/apprentice, and service jobs, state education grants. Furthermore registration of emigration and death.
4 Information from before 2003 is not available as the KMD does not have this information.
5 See: “Standard interface NX32100Q sickness absence compensation and maternity pay” (KMD) for further information.
6 Cf. the sickness absence compensation act, section 38, subsections 5 and 7 and section 46, subsections 5 and 7.
7 For further information about sources, please see: Description of DREAM codes – version 19, which is made by the AMS.
Both DREAM and RSS 1.0 contain information about sickness absence compensation and maternity pay from the same KMD register. But the original registrations of sickness absence compensation and maternity pay in DREAM are not used in RSS 1.0, as they are replaced by more precise and informative registrations in RSS 1.0.

DREAM contains a complex data structure. Each row in the DREAM data set represents a citizen, and each column variable represents a week. If a citizen receives a social benefit, the payment period is converted into weeks, which then are registered in the relevant columns. The type of social benefit is represented by a unique three-digit compensation code. DREAM is updated by adding new columns/weeks and new rows/citizen.

The week-variables are only allowed to contain one type of compensation code at a time. This implies that the types of social benefits are ranked. The ranking implies that if a citizen changes the type of social benefit in the middle of a week, only the highest ranked type is registered that week. If a citizen in a period does not receive social benefits, the period is represented by empty week-variables.

A citizen/row continues to exist in DREAM even though the citizen has emigrated or has passed away (emigration and death are registered with special codes in DREAM, similar to the compensation codes).

Except for sickness absence and maternity leave all social welfare benefits periods registered in DREAM are included in the RSS 1.0, including the original DREAM compensation codes. The RSS 1.0 register uses DREAM data from week 1, 2004, and forth, until the date of completion for the KMD register.

The compensation code ‘000’ in RSS 1.0 represents weeks from DREAM with no payments of social benefits. The compensation code ‘000’ may indicate that the citizen is self-supporting.

DREAM contains additional information about the citizen, i.e. what unemployment fund the citizen is a member of. The additional information is typically not updated as often as the registration of social benefits. The additional information is not included in the RSS 1.0 due to optimization of the RSS 1.0 file size.

**Variables used in RSS 1.0**

The following variables are generated from DREAM and incorporated into RSS 1.0. The variables do not include periods of sickness absence compensation or maternity pay:

- Start date of the compensation period
- End date of the compensation period
- Compensation code

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8 The author is aware that there can be several other reasons for why a person does not receive social welfare benefits than he/she is self-supporting. The interpretation is therefore subjected to uncertainty.

9 Besides the start date, end date and benefit code, supplementary information has not been included in the RSS 1.0.

10 Please see the documentation of DREAM (contact the AMS).
The following variables from the KMD’s sickness absence compensation and maternity pay register are incorporated into the RSS 1.0 (not all variables are available for each period of sickness benefit or maternity pay - marked “If available”):

- Start date of the compensation period
- End date of the compensation period
- Compensation code
- Processed: the length of the compensation period (days)
- Municipality number attached to the period
- If available: company reg. no.(in Danish: SE-number)
- Determination of a period as either wage earner or self-employed period
- The cause of absence in the given period
- The case type of the given period (two variables concerning case type)
- If available: the reason behind the compensation in the given period / extension code
- If available: variables that indicate if the period is with reduced compensation and the size of the reduction (hours and if possible percentage)
- If available: the reason for ending the period
- If available: the visitation code of the period
- Processed: case type of the period (case types 1 and 2)
- An indication if ‘no end date’ is feasible.

The social security number of the citizen is used as a linkage key, when merging the variables from DREAM and the KMD register into the RSS 1.0 register.

**Content of RSS 1.0**

An item overview of RSS 1.0 with focus on the linkage between the DREAM and the KMD register:

- The RSS 1.0 covers from Monday, December the 29, 2003, to the most recent date in the data set (inclusive). The most recent date is updated each time the RSS 1.0 is updated.
• All DREAM week registrations are converted to dates by letting a week start on Monday and end on a Sunday.

• All original week-based DREAM registrations of sickness absence compensation and maternity pay are removed.

• The KMD register contains information regarding cases of sickness absence compensation, as well as maternity pay. Both information concerning sickness absence compensation and maternity pay are included in the RSS 1.0 register, but the present documentation focuses on cases concerning sickness absence compensation.

• In RSS 1.0, periods concerning sickness absence compensation and maternity pay have higher priority than periods of other social welfare benefits which implies that periods of either sickness absence or maternity leave are always shown (contrary to the ranking in DREAM). Among other things, the high priority of sickness absence compensation and maternity pay periods implies that sickness absence for retired citizens is shown in the RSS 1.0 (section 25, subsection 3 in the act).

• Data from the week-based DREAM registration is adjusted according to the sickness absence compensation and maternity pay periods and not the reverse (except from registrations of death in DREAM, where periods of sickness absence or maternity leave are reduced or removed if necessary).

• The periods of sickness absence and maternity pay are registered from the first absence date to the last date of absence (which in practice means the last “calculation date” given according to the municipality). The first absence date is the day the person calls in sick to e.g. the employer (in practice, the first whole day of sickness).

• The compensation code for sickness absence compensation is 891 and the compensation code for maternity pay is 881, accordingly to the code distribution from the DREAM register. Likewise, the other benefit codes from the DREAM register are included unchanged in the RSS 1.0.

• Each period of either sickness absence compensation or maternity pay includes additional information, if available. The additional information makes it is possible to determine e.g. the causes of the absenteeism.

• It is not possible to see if a person becomes unemployed during a period of sickness absence or maternity leave. The work affiliation is given when the case is created by the municipality. The linkage with the DREAM register makes it possible to determine unemployment if a person receives e.g. unemployment benefit immediately after a period of sickness absence.

• Periods of sickness absence and maternity pay going further back than December 29, 2003 (day 1 – week 1 – 2004), exist in the data set if they were still active on December 29, 2003. These periods are registered with their respective first date of absence.

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11 In DREAM, the week-based registration of benefits implies that if there are two or more benefits in the same week it is only the highest prioritised benefit which is shown (see "Beskrivelse af DREAM kode – version 19", figur side 2).

• Periods of sickness absence and maternity pay that are still active after the latest update of the KMD register are registered in the RSS 1.0 with a dummy date as the last date of absence. The dummy dates are periods that are still active. The dummy dates are indicated by the variable FINDSFRAV.

• The dummy dates are based on the latest received update of the KMD register where it can be seen if a case is closed or still active.13

• Periods of maternity pay have higher priority than sickness absence periods as it is impossible to receive sickness absence compensation during maternity leave (cf. guidelines for sickness absence compensation and maternity pay no. 185, September 18, 1998, section 102). This implies that periods of sickness absence are reduced or removed if a period of maternity pay is in conflict with a period of sickness absence.

• There are no social security numbers in the RSS 1.0. Each person is instead represented by a unique id number which has nothing in common with the social security number.

• Periods of sickness absence caused by a parent taking care of a sick child are deselected in the RSS 1.0. These periods are deleted because the cause of sickness absence is not related to the health of the parent but to the child.

Introduction to cases of sickness absence compensation and maternity pay in the KMD register

How a case is defined
A case is defined by the municipality receiving an application for sickness absence compensation or maternity pay. The application comes from an employer, a self-employed businessman, an unemployment fund or the citizen himself.

A case is linked to a person by the social security number (SSN - in Danish: CPR number)14, a municipality number and a case number. A municipality may have several numbers at its disposal if the municipality is divided into several districts/geographical areas.15

Each case has a case number which is determined by the municipality. The case number cannot be reused within the same municipality/district. For each case number, a “cause of absence” and minimum one “case type” is given (illustrated in figure 2).16

One case number may consist of up to four sub-cases. A case is divided into sub-cases if a person has more than one employment (one sub-case for each employment), e.g. a person is both an employee and self-employed at the same time. It is the municipality that determines if sub-cases should be created.

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13 February 1, 2009, has been chosen for the January data. February 1st is a day more than the last possible registration.
14 Social security numbers are not included in the RSS 1.0.
15 Not included in the RSS 1.0.
16 Cause of absence and case type are described in details in “Dividing cause of absenteeism into sickness absence and maternity leave” and “Division of periods into wage earner or self-employed”.
Each case/sub-case may have up to two case types (case type 1 and 2). Each case type indicates according to which rules the case/sub-case should be handled. If a case or sub-case changes handling over time, then case type 2 will describe the further development of the case/sub-case.

**Description of the case officer’s filing procedures**

Data in the RSS 1.0 concerning periods of sickness absence compensation and maternity pay originates from the KMD register. The KMD register originates from the case officer’s filing procedure.

A case concerning sickness absence compensation or maternity pay is initially created by case officers at the municipality’s Office of Sickness Benefit Administration. The municipality receives a notification form from the workplace, the citizen or the unemployment fund (cf. section 35, 36, 38, 40, 43 and 59 of the act)\(^\text{17}\). The form contains information about the citizen’s terms of employment and absenteeism, salary terms and salary during sick leave.

To receive the notification form in time the Office of Sickness Benefit Administration must receive the notification form no later than one week after the employer period has ended (cf. section 37, 40 and 43 of the act). If the cases are received too late, the municipality is delayed concerning the necessary action to be taken in relation to long-term sick leave.

When the Office of Sickness Benefit Administration receives the notification form, a case officer sends an information form to the citizen. On the information form the citizen can give information about absenteeism, when he/she expects to return to work again, information about the workplace and job functions, treatment and education. The information form should be returned to the case officer within eight days after the citizen has received it (cf. section 7 of the act). The case officer forwards the information form to the job centre, which uses the form in their casework.

The job centre reports data changes concerning cases such as the employee has resumed work, extensions or closure of cases. In practice, the job centre informs the Office of Sickness Benefit Administration and the case officer then feeds the KMD system.

The case officer’s filing procedure affects the interpretation of each sickness absence and maternity case in this documentation as follows:

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\(^\text{17}\) Some employers have access to virk.dk which is an on-line notification system they can use to report directly to the employee’s municipality (cf. section 59, subsection 7 of the act). The aim is that all information should be offered on-line from 2010 and forth (Nem Refusion, in English: Easy Repayment)
• Categorisation of the sickness absence as an occupational injury is solely based on how the employer has filled out the notification form. It is not the same as the injury is, or later will be, recognised as an official occupational injury\textsuperscript{18}.

• The categorisation as occupational sickness absence is solely the interpretation of the case officer.

• Termination of a case is decided by the case officer at the job centre and then reported to the Office of Sickness Benefit Administration which closes the case.

• The case type is added by the case officer at the Office of Sickness Benefit Administration. Some case type categories are more used than others, an example of a case type seldom used is: “Transferred to the unemployment fund/the job centre”. Instead, the case officer more often uses “Reported fit for duty by the citizen” or “Reported fit for duty by the administration”. The most used case types are “Reported fit for duty by the citizen” and “Reported fit for duty by the administration”\textsuperscript{19}.

\textbf{Data processing: Cases of sickness absence compensation and maternity pay}

The data from the KMD register has been processed regarding:

• Cases with overlapping time periods.

• Annulled or infinite cases.

• Periods with identical case type and with less than four days between their time periods.

• Categorisation of periods as either sickness absence or maternity leave.

• Each period is, as far as possible, categorised as wage earner or self-employed.

\begin{center}
\begin{tabular}{|l|}
\hline
The data was processed always within identical person id, never across different person id \\
\hline
\end{tabular}
\end{center}

Figure 3 shows how periods of maternity leave and periods of sickness absence are prioritised. By looking at figure 3, it is seen that periods of maternity leave have higher priority than periods of sickness absence. An additional observation from figure 3 is that periods of wage earner are prioritised higher than periods of self-employed persons.

\textsuperscript{18} The National Board of Industrial Injuries recognises occupational injuries. Please see www.ask.dk for further information.

\textsuperscript{19} Please see paragraph: “Division of periods into wage earner or self-employed”
### Figure 3 – Main prioritisation

<table>
<thead>
<tr>
<th>Cause of absence</th>
<th>Case type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternity leave</td>
<td>Wage earner</td>
</tr>
<tr>
<td></td>
<td>Self-employed</td>
</tr>
<tr>
<td>Sickness absence</td>
<td>Wage earner</td>
</tr>
<tr>
<td></td>
<td>Self-employed</td>
</tr>
</tbody>
</table>

For a technically and detailed description of the data processing of the KMD register, please see appendix A (Documentation regarding the processing of the RSB register...).

### Definition and prioritisation of periods

In case of a conflict between two time periods of different prioritisation in the data processing of the KMD register, the prioritisation shown in figure 3 implies:

- If the time conflict is a partly overlap, the period with the highest prioritisation maintains its first and last date of calculation, while the period with a lower prioritisation has its first and last date changed. The change of the first and last date happens according to the period with highest prioritisation.

- If a period with a higher prioritisation completely overlaps the time period of a period with a lower prioritisation, then the period with the lowest prioritisation is deleted.

### Determination of the absence period

The absence period is identified as the period from the start date of the sick-listing or the maternity leave (i.e. the first day of absenteeism) to the last date of absence (end date). When processing the data this implies:

First date of absence → last date of calculation

The first date of absence is the day the person calls in sick to the employer, and the date is listed in the notification form to the municipality (cf. section 33 and 34 of the act). However, if a person goes home sick from work, the first day of absence is the following day²⁰.

The last date of absence is “the last date of calculation”, a term used by the municipality: the last day of calculation of sickness absence compensation and maternity payment. At the time the present documentation is made, the best indication of when a person is no longer on sick leave is “the last date of calculation”. If a case type is changed at a particular date, then this date is “the last date of calculation”.

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Dates of disbursements for sickness absence compensations or maternity payments are not to be used for determination of the end dates of absence, because such dates are likely to take place later than the actual absenteeism.

**Overlapping time periods in connection with e.g. change of address**

Temporal overlaps of periods of sickness absence or maternity leave can occur due to more or less incidental causes, but they typically occur in connection with change of address (by moving to another municipality or to another district within a municipality with several districts).

If a person with an active case of sickness absence compensation or maternity pay changes his or her address by moving, then a new case will be created in the new municipality or district. But even though several new cases are made, both the old cases and the new ones are all registered with the same first date of absence, and this causes the time periods of the cases to overlap.

The data processing of the KMD register adjusts for overlapping time periods by comparing cases according to social security number, cause of absence and the first and last date of absence. There are two types of temporal time overlap: partial overlap and full overlap.

Definition:

- **Partial overlap:** When a period is not closed before another is started and the new period is longer than the first.

- **Full overlap:** When a period includes one or more shorter periods.

Data with time periods with overlaps are typically processed by merging the periods into a single time period. Before the periods can be merged, they must be characterised as identical. The minimum criteria for periods to be identical: they must have identical social security numbers and at least one identical case type.

**Partial or full time overlap**

The two rules concerning identical periods with time overlap:

Partial overlap:

- If two or more overlapping time periods are identical, then they are merged into one time period. The first day of absence is the earliest date of absence (start date). The last day of absence is the earliest date of calculation which is listed in the last time period (end date).
Full overlap:

- The shortest time period(s) is/are deleted. However, if there is more than one short period which has end dates and the long overlapping period does not have an end date, then the long period is deleted.

If partial or full overlap occurs between non-identical periods, a supplementary set of rules are used. The supplementary rules decide if periods should be merged and what periods to give the highest priority (the rules are described in paragraph: “Prioritisation of non-identical periods according to overlap in time periods”)

**Prioritisation of non-identical periods according to overlap in time periods**

With the RSS 1.0, it is intended as accurately as possible to indicate when a sickness absence or maternity period takes place. But if a person in the same time period is registered with several cases of sick absence and / or maternity leave, a prioritisation is made. The prioritisation implies that only one time period of sickness absence or maternity leave is registered in the same time interval. The prioritisation is based on the following rules:

1. Periods for wage earner have higher priority than periods for self-employed (defined by case type).

2. If time periods have the same labour market affiliation, then the case types are compared and prioritised (e.g. two periods of wage earner). The time period with the lowest priority of case type is changed or possibly deleted:

   a. Within periods of wage earner, the case types are prioritised in this order: codes 11, 42 and 43.

   b. If there are different case types, and they are not marked with codes 11, 42 or 43 (see rule 2a), then the time period with the lowest number of code for the case type gets the highest prioritisation.

3. Specific prioritizations of causes of absenteeism:

   a. Cause of absence no. 4 “Four weeks or less to expected birth” is lower prioritised than no. 5 “Maternity leave”.

   b. Cause of absence no. 5 “Maternity leave” is lower prioritised than no. 6 “Adoption”.

   c. Cause of absence no. 9 “Pregnancy, more than four weeks to expected birth” is higher prioritized than no. 1 “Sickness”.

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21 The code number of the case type is used as prioritisation variable.
Merging identical time periods separated by less than four days
When there are less than four week days between periods of sickness absence compensation or maternity pay, they are merged into one period. Before the periods are merged, they must pass the criteria of being considered identical\(^22\).

The reason for merging the periods is that they may derive from time lags in case handling instead of showing real periods of out of sick-listing.
Regarding persons with long-term and chronic disease (section 56), an exception from the above is made as periods regarding such persons cannot be merged, even though there is less than four days in between them. The reason is that such periods are very likely to occur if such persons attend e.g. regular medical examinations (please see paragraph “Long term and chronic diseases”).

Still active cases
The KMD register contains cases which are still active, and these cases are characterized by having no last date of calculation. The comparable “still active” periods in RSS 1.0 are registered with a dummy end date, e.g. “February 1, 2009”.

Periods that are started and not closed on December 29, 2003, are included in the RSS 1.0 as well. These periods are registered with the real start and end date of absence. Periods of sickness absence or maternity pay closed before the December 29, 2003, are not included in the RSS 1.0.

Infinite and annulled cases
The KMD register contains several types of incorrect cases which for several reasons ought to be removed in the RSS 1.0 register. These types of cases are characterised as either infinite or annulled cases:

Annulled cases: Occurs when a case worker sets up a new case of e.g. sickness absence benefit instead of using an already active case. The old case is usually closed but not deleted. Annulled cases stand out from infinite cases as they often have a last date of calculation registered.

Infinite cases: Occurs when a case worker does not close a case, even though the person is no longer sick or on maternity leave. Infinite cases also occur when a case worker, by mistake, creates a new case and forgets to remove or cancel it. Infinite cases look like “still active cases” as they have no registered last date of calculation.

Identification of annulled and infinite cases
Annulled cases may be localised by finding cases with the code 23 “Computer technical termination” in the variable “Reason for termination” (COPHØRSG). The code 23 specifically appears in the KMD register if the case has been created before 2009\(^23\). Cases with code 23 in the variable “Reason for termination” are removed from the data when processing it. It is likely that several annulled cases are missing the code 23, and are left in the data as

\(^{22}\) Definition: At least one of the case types 1 or 2 is identical and the reduced compensation rate is identical (i.e. max. difference +/- two hours (applies only for cases with the case types 11 and 21)), with the exception of periods of chronic disease, code 14.

\(^{23}\) If there is no last date of absenteeism, the dummy date February 1, 2009, is used. This may also indicate that the case is infinite.
there is no other way to distinguish them from other cases. Presumably many of the non-deleted annulled cases do not make it through the data processing to RSS 1.0, as they are fully overlapped by other comparable periods in the RSS 1.0. This is presumably because the annulled cases tend to cover relatively short time intervals.

Annulled cases with end date of absence occurring after January 1, 2009 are identified by the variable “area code” marked "AN" in the KMD register. From January 1, 2009, and forth, the KMD and the municipalities are addressing the problem by identifying annulled cases. All cases marked "AN" in the variable “area code” in the KMD register are deleted in the data processing step.

Identifying infinite cases is a different and more complex problem than identifying annulled cases. In order to find infinite cases, it is a possibility to look at the legislation concerning the maximum length of special cases of sickness absence compensation. According to the act (cf. section 24), a case of sickness absence compensation can run for up to 52 weeks. However, the act includes several options for extension and the legislation is, therefore, not a satisfying way of identifying infinite cases (see: “Extension of periods of sickness absence compensation periods for duration limited persons”). It is possible for the case worker to mark a case with an extension code when extending it, but unfortunately, as this is not done automatically, it is far from always being done to all extended cases.

As described, it is extremely difficult to assess whether a case in the KMD register might be infinite or annulled, unless it is marked by the KMD. This fact makes both the KMD register and the RSS 1.0 uncertain in relation to showing the exact number of days concerning specifically sickness absence compensation. The data processing does remove infinite and annulled cases if they are temporally overlapping a non-infinite or cancelled case, but it cannot be ruled out that some infinite and annulled cases still occur in the RSS 1.0.

**Delimitation of absence with minimum length of e.g. minimum three weeks**

It is possible to delimit the RSS 1.0 to only include time periods of sickness absence with the minimum length of three weeks. This can be done by selecting the codes 11, 42 and 43 from the case type variables (CSAGSAR1 and CSAGSAR2).

The case type code 11 has been used since June 2, 200824, and it always identifies more than three weeks of absenteeism. If the start date of a period starts before the June 2, 2008, the case type code 11 cannot be used for this purpose. For the codes 42 and 43, it is necessary to check the actual length of the period in order to be sure that it covers more than the minimum of three weeks of absenteeism (start date of absence to end date – both included).

**Dividing causes of absenteeism into sickness absence and maternity leave**

The variable “cause of absence” (CFRAVARA) states the cause of absenteeism. The variable is determined on the basis of which type of notification form that has been received by the municipality and the information given on the form. The cause of absence variable is categorised according to nine possible categories. In the RSS 1.0, nine categories are used to

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24 This information cannot be used in the version 1.0 of the RSS register because it only includes data until April 27, 2008.
distinguish between periods of maternity leave or periods of sickness absence, and two of the categories are removed from the RSS 1.0. Additionally, the nine categories are used to specify periods of sickness absence caused by an occupational injury:

The nine categories of causes for absenteeism:

<table>
<thead>
<tr>
<th>Code</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Illness</td>
</tr>
<tr>
<td>2</td>
<td>Occupational injury</td>
</tr>
<tr>
<td>3</td>
<td>Occupational disease</td>
</tr>
<tr>
<td>4</td>
<td>Four weeks or less to expected birth</td>
</tr>
<tr>
<td>5</td>
<td>Maternity leave</td>
</tr>
<tr>
<td>6</td>
<td>Adoption</td>
</tr>
<tr>
<td>7</td>
<td>Taking care of sick child</td>
</tr>
<tr>
<td>8</td>
<td>Holiday compensation</td>
</tr>
<tr>
<td>9</td>
<td>Pregnancy, more than four weeks to expected birth</td>
</tr>
</tbody>
</table>

**Sickness absence** (definition: the person is completely or partially incapacitated due to personal sickness):

- Illness.
- Occupational injury.
- Occupational disease.
- Pregnancy, more than four weeks to expected birth.

**Maternity leave** (definition: the person is absent due to maternity leave or adoption):25

- Maternity leave.
- Adoption.
- Four weeks or less to expected birth (cf. section 12, subsection 1 of the act).

**Deselected categories:**

- Taking care of sick child.
- Holiday compensation.

Periods categorized with code 7 are removed from the RSS 1.0, as sickness does not concern the person’s own health.

Sickness periods categorized as holiday compensation periods (case type code 9) are removed from the RSS 1.0 due to the legislation concerning sickness absence compensation: A sickness absence compensation beneficiary has to report fit for duty to go on holiday. This

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25 (cf. section 24, subsection 2 of the act)
implies that the person does not receive any sickness absence compensation during the holiday period unless a special exemption is given (cf. guidelines concerning sickness absence compensation and maternity leave pay no. 185 of September 18, 1998, paragraph 27).

**Division of periods into wage earner or self-employed**

The codes of the variables for case types CSAGSAR1 and CSAGSAR2 indicate according to which rules the case is to be treated. The municipality evaluates which rules are to be used. In the RSS 1.0, the codes are used to divide periods of sickness absence or maternity pay into the sub categories: wage earner or self-employed. The wage earner category includes “unemployed, wage earners” (code 17). A remaining set of codes are left outside the categories.

Notes to codes:

- The case type codes are not categorized into sickness absence or maternity leave as they are sub-categories of the variable “cause of absence”.

- The original codes for both the variable “cause of absence” and “case type” are included in the RSS 1.0.

The categorization of codes for wage earners (Code and category):

<table>
<thead>
<tr>
<th>Code</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>07</td>
<td>Before adoption, wage earners</td>
</tr>
<tr>
<td>10</td>
<td>Birth, wage earners</td>
</tr>
<tr>
<td>11</td>
<td>After the employer period, wage earners</td>
</tr>
<tr>
<td>12</td>
<td>Insured employers, wage earners section 27 (cannot be reported by public employers)</td>
</tr>
<tr>
<td>13</td>
<td>No employer period, wage earners</td>
</tr>
<tr>
<td>14</td>
<td>Chronic disease, wage earners, section 28</td>
</tr>
<tr>
<td>16</td>
<td>Sickness absence compensation paid in advance, wage earners</td>
</tr>
<tr>
<td>17</td>
<td>Unemployed, wage earners</td>
</tr>
<tr>
<td>18</td>
<td>Taking care of sick child, wage earners</td>
</tr>
<tr>
<td>24</td>
<td>Birth. Wage earners, 32 weeks (46 weeks) – joint leave</td>
</tr>
<tr>
<td>26</td>
<td>Adoption. Wage earners, 32 weeks (46 weeks) – joint leave</td>
</tr>
<tr>
<td>35</td>
<td>Postponed leave (8-13 weeks) before the child is nine years old, wage earners</td>
</tr>
<tr>
<td>37</td>
<td>Postponed leave until 32 weeks before the child is nine years old, wage earners</td>
</tr>
<tr>
<td>42</td>
<td>Occupational injury, wage earners</td>
</tr>
<tr>
<td>43</td>
<td>Flexijob, wage earner</td>
</tr>
<tr>
<td>44</td>
<td>Flexijob with public employer (cases where the first day of absenteeism is before January 1, 2000)</td>
</tr>
<tr>
<td>45</td>
<td>Child given up for adoption/stillborn etc., wage earners</td>
</tr>
<tr>
<td>47</td>
<td>Pregnancy-related disease after childbirth, wage earners</td>
</tr>
<tr>
<td>50</td>
<td>Adoption, wage earners</td>
</tr>
<tr>
<td>55</td>
<td>Extension resumed working hours, wage earners</td>
</tr>
<tr>
<td>65</td>
<td>Pregnancy, wage earners</td>
</tr>
<tr>
<td>75</td>
<td>Two weeks after birth/adoption, wage earners, new legislation after March 26,</td>
</tr>
<tr>
<td>76</td>
<td>Paternity leave, weeks 25-26, wage earners, old legislation before March 26,</td>
</tr>
<tr>
<td>77</td>
<td>Two weeks after adoption, wage earners, old legislation before March 26, 2002</td>
</tr>
</tbody>
</table>
The categorization of codes for self-employed (code and category):

<table>
<thead>
<tr>
<th>Code</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>08</td>
<td>Before adoption, self-employed</td>
</tr>
<tr>
<td>20</td>
<td>Birth, self-employed</td>
</tr>
<tr>
<td>21</td>
<td>After 2 weeks, self-employed</td>
</tr>
<tr>
<td>22</td>
<td>Voluntarily insured, self-employed</td>
</tr>
<tr>
<td>23</td>
<td>Taking care of sick child, self-employed</td>
</tr>
<tr>
<td>25</td>
<td>Birth. Self-employed, 32 weeks (46 weeks) – joint leave</td>
</tr>
<tr>
<td>27</td>
<td>Adoption. Self-employed, 32 weeks (46 weeks) – joint leave</td>
</tr>
<tr>
<td>28</td>
<td>Birth. Self-employed, 32 weeks (46 weeks) – joint leave</td>
</tr>
<tr>
<td>36</td>
<td>Postponed leave (8-13 weeks) before the child is nine years old, self-employed</td>
</tr>
<tr>
<td>38</td>
<td>Postponed leave up till 32 weeks before the child is nine years old, self-</td>
</tr>
<tr>
<td>41</td>
<td>Occupational injury, self-employed</td>
</tr>
<tr>
<td>46</td>
<td>Child given up for adoption/stillborn etc., self-employed</td>
</tr>
<tr>
<td>48</td>
<td>Pregnancy related disease after childbirth, self-employed</td>
</tr>
<tr>
<td>56</td>
<td>Extension resumed working hours, self-employed</td>
</tr>
<tr>
<td>60</td>
<td>Adoption, self-employed</td>
</tr>
<tr>
<td>70</td>
<td>Pregnancy, self-employed</td>
</tr>
<tr>
<td>80</td>
<td>Two weeks after birth/adoption, self-employed, new legislation after March 26, 2002</td>
</tr>
<tr>
<td>81</td>
<td>Paternity leave, weeks 25-26, self-employed, old legislation before March 26, 2002</td>
</tr>
<tr>
<td>82</td>
<td>Two weeks after adoption, self-employed, old legislation before March 26, 2002</td>
</tr>
</tbody>
</table>

Remaining group of codes (code and category):

<table>
<thead>
<tr>
<th>Code</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>09</td>
<td>Holiday compensation</td>
</tr>
<tr>
<td>49</td>
<td>Late notification (duration)</td>
</tr>
</tbody>
</table>

The remaining group of codes contains persons who receive holiday compensation (09) or have given notice about their sickness absence or maternity leave too late (49). In case of late notification, the municipality is authorized to use an exception and still grant sickness absence compensation or maternity pay (cf. section 37, 40 and 43 of the act). It is not possible to make a categorization into wage earners or self-employed on the basis of the codes 49 or 9.

**Supplementary variables, rules and legislation attached to periods concerning sickness absence**

For periods of sickness absence, as well as for periods of maternity leave, a number of additional variables from the KMD register are processed into the RSS 1.0. The additional variables allow the user to make a sub-selection of periods.

Sickness absence compensation and the associated additional variables for each period are governed by regulation in concern of law and other rules. This chapter describes the regulation by using references to the relevant legislation (the act is modified regularly and a reference is, therefore, conditional on existing legislation (January 2010)).
The chapter solely describes the rules and legislation associated with periods of sickness absence. For further information about legislation concerning maternity leave, the reader should look for other sources, e.g. the Maternity Act\textsuperscript{26}.

**Labour market affiliation**

For an employer to receive compensation when an employee is sick-listed, the employment of the employee has to meet certain demands. The demands are split into two groups/points (section 32(1)):

- **Demand regarding municipality**: the employee has a minimum of 13 weeks of unbroken labour market affiliation, and 120 hours of work during the 13 weeks, counting backwards from the first day of sick-listing.

- **Demand regarding employer**: the length of the employment period at the employer has lasted at least 8 weeks, counting backwards from the first day of sick-listing. And the sum of the working time in the minimum of 8 weeks of employment must count a minimum of 74 hours.

The use of the two demands:

- If the employee fulfils the demand for the municipality and the demand for the employer, the employer is entitled to receive sickness absence compensation, when the length of the sickness absence period has passed the “employer period” (please see paragraph: Rules concerning the employer period). Until the employer period is ended, the employer is bound by law to pay the sick-listed employee sickness absence compensation or full salary depending on the terms of the contract of the employment.

- If the employee only fulfils the demand concerning the municipality, then the employer is entitled to receive sickness absence compensation from the first day of sick-listing. The employer is then only bound to pay the employee an amount corresponding to the sickness absence compensation.

- If the employee does not fulfil any of the two demands, then the employee cannot receive sickness absence compensation, and the employer is not bound to pay the employee any compensation either.

- If a sick-listed person is unemployed but fulfils the demand concerning the municipality, then the person is entitled to receive sickness absence compensation from the municipality for the first day of sickness.

Note regarding unemployment when sick-listed: If a period of sickness absence in the RSS 1.0 is attached to an employer, a company id may be registered (in Denmark the company reg. no. SE-number, indicated in the variable EARBJGIV). If a period of sickness absence compensation is paid to the employer and then switches from the employers to the citizen, it does not necessarily imply that the employment has ended, but only that the employer has

\textsuperscript{26} https://www.retsinformation.dk/Forms/R0710.aspx?id=31753
stopped paying salary during sickness absence. It cannot be concluded that a person is unemployed just because there is no company id attached to a period of sickness absence. Sickness absence compensation is paid partly by the municipality and the state (please see the act for further information).

**Rules concerning the employer period**
The employer period is from the first day of sickness absence until the employer is entitled to receive compensation from the municipality, i.e. the period in which the employer bears all costs in connection with the sickness absence (cf. section 6 of the act).

From April 2, 2007, the employer period has changed from 14 to 15 days. On June 2, 2008, it was further expanded to 21 days (Act no. 389 of May 27, 2008)

**Partially fit for duty when sick-listed**
Persons partially fit for duty when receiving sickness absence benefit can be identified by looking at the variables GNEDSDPG and GNEDSTIM. The variables show the percentage and the number of hours to which work has been resumed (cf. section 53 of the act). There exists no information in the RSS 1.0 or the KMD register about how much time a person worked before he/she was absent due to sickness or maternity leave.

**Exception which overrules or compensate the employer period**
It is possible to have special types of sickness absence periods with exceptions concerning the employer period. The special types of sickness absence periods are regulated through special terms in the law, e.g. it is also possible for an employer to arrange special insurance policies to compensate the employer period.

A common feature for many of the exceptions is that they also concern periods of sickness absence which are shorter than the employer period. Periods of sickness absence which are shorter than the employer period have special regulations with respect to reporting to the municipality in time. The reporting of such short sickness absence can be made up to 3 months after the first day of the sickness period occurred, but only if the duration of a period of sickness absence is shorter than the employer period and the type of sickness absence is entitled to compensation.

**Insurance for small and private businesses and self-employed**
Small and private businesses have the opportunity to take out insurance covering sickness absence compensation in the employer period. If such a contract is made, then the small and private businesses are entitled to sickness absence compensation from the second day of the sickness absence period (cf. section 55). The insurance covers all the employees in the small and private businesses and the cost of the insurance is a specific percentage of the total sum of payment for the wages (0,56% - 2 June, 2008).

A small and private business is defined (2007):

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27 As data only runs until April 27, 2008, in the RSS 1.0, this information cannot be used in the RSS version 1.0.
• The maximum sum of payment for the wages must not exceed DKK 5,976,250 and the business must have a SE/CVR number registered.

• Furthermore, the employer cannot be a public authority or private institutions whose expenses are paid with a minimum of 50% of public funding, or parents who have chosen to receive a financial subsidy for private care, see section 26 of the Law on Social Services.

A self-employed person has the opportunity to take out a comparable insurance to the small and private business (cf. section 45). The comparable insurance gives the self-employed person sickness absence compensation from the first or the third day of sickness absence, depending on the insurance taken.

In the RSS 1.0, insurance for small businesses or self-employed concerning sickness absence compensation is registered in the first variable “case type” with code 12 (CSAGSAR1). The case type changes to code 11 when the period of sickness absence exceeds the length of the employer period. The new code 11 is registered in the second variable of case type (CSAGSAR2).

**Long-term and chronic diseases**

Section 56 of the act concerns employees with a long-term or a chronic disease. With a pre-approval from the municipality, an employer and a diseased employee can make an agreement about sickness absence caused by long term or chronic disease. The agreement qualifies the employer to receive compensation from the municipality from the first day of sickness absence concerning the diseased employee. The terms of the act require that the municipality prior to the approval of the agreement has obtained a medical certificate. The certificate acts as proof that the long-term or chronic disease significantly increases the normal risk of absence (section 58), and will cause a minimum of 10 days of sickness absence per year.

If a period of sickness absence has the mentioned agreement, the variable “case type” will be marked with code 14 (code 14: Chronic disease, wage earners).

Apart from periods of sickness absence where the employee suffers from long-term or a chronic disease, agreements can be concluded in situations where:

• The employee is to be hospitalised or treated as out-patient at a hospital or the like. The treatment or the hospitalisation must be given by the employment date.

• The employer (for two weeks within the last 12 months in an existing employment relationship) already has paid sickness absence compensation or wages, concerning the particular disease prior to the beginning of hospitalisation or treatment.

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28 www.rm.dk Dokument: Daggpengerefusion ved sygdom.
Pregnancy-related disease

An employer may obtain compensation from the employee’s first day of sickness absence if the employee is absent due to a pregnancy-related disease. Common pregnancy examinations are not defined as a disease. Examples of pregnancy-related disease: threat of miscarriage, severe mental problems, twin pregnancies, etc29.

Persons in flexijobs

An employer who has an employee with the employment term “flexible jobs” with wage subsidies is entitled to sickness absence compensation from the first day of sickness, if the sickness absence concerns the employee. This implies that the employer is exempted from paying sickness absence compensation during the employer period (section 32 subsection 1(5)).

Student and other persons just finishing an education

Students are entitled to sickness absence compensation from the first day of sickness absence if:

- The student receives wage concerning a traineeship which are regulated according to the law (section 32, subsection 1(4)).

Persons who have just finished an education are entitled to sickness absence compensation from the first day of sickness absence if:

- The person has finished a commercial education within a month counting from the first day of sickness absence. And the duration of the education is a least 18 months (section 32, subsection 1(3)).

Industrial/occupational injuries

Persons with sickness absence caused by an occupational injury may receive sickness absence compensation from the first day of sickness. Only the National Board of Industrial Injuries determines if an injury is an occupational injury (section 34).

Industrial/occupational injuries

The identification of periods of sickness absence as occupational injury cannot be determined uniquely on neither the variables “cause of absence” nor “case type”. However, there are ways of tracking periods related to occupational injuries:

- The variable for cause of absence is marked with code 2 “occupational injury” if a period of sickness absence compensation is related to an occupational injury. Occupational injuries can be reported on the application form to the municipality. The municipality will later report if the sickness absence is due to an occupational disease (absence code 3). It is not certain that the code 2 “occupational injury” is

tantamount to a case of occupational injury have been approved at the National Board of Industrial Injuries.

- Both an injury sustained during a leisure activity, as well as an occupational injury, can be created with the case type code 42 (i.e. "Occupational injury, wage earner").

**Duration limits for sickness absence compensation**

According to section 24 of the act, the payment of sickness absence compensation stops after a maximum of 52 weeks of payment summed over the preceding 18 calendar months. The payment includes both reduced sickness absence compensation and salary during the sickness period. Because of the employer period of two weeks, registrations of sickness absence covering up to 54 weeks can occur in the RSS 1.0 (378 days) (cf. section 24, subsection 2 of the act).

If a person is identified as "retired" other rules apply as the payment stops after 13 weeks of sickness absence compensation (if paid within the last 12 months cf. section 25). The identification “Retired” is defined as follows:

- Person on national supplementary disability pension (except from disability benefits (Danish: invalideydelse)).
- Persons who meet the medical conditions for receiving national supplementary disability pension (except from disability benefits (Danish: invalideydelse)).
- Persons aged 65+

If the right to sickness absence compensation has been used during a consecutive period of more than 52 weeks (cf. section 24, subsection 1), then sickness absence compensation can be paid again when the person in question fulfils the demand concerning the municipality (please see paragraph: Labour market affiliation).

If the minimum demands of the municipality are not meet, a person on sick-leave can receive sickness absence compensation again when the employment requirements mentioned in section 32 and section 42 of the act are met. It is an additional requirement that one of the conditions of section 27 of the act is satisfied in order to extend the sickness absence compensation period. This includes persons registered as "retired" (cf. section 26 of the act).

**Extension of periods of sickness absence compensation for persons with limited duration**

According to section 27 of the act, it is the municipality that takes decisions concerning extension of the period of sickness absence compensation for persons who are affected by the duration limit cf. section 24 of the act. This can happen in cases where:

- It is considered likely that the person on sick leave can return to the ordinary labour market, if a rehabilitation including a company internship programme is initiated.
It is considered necessary to implement a company internship programme or other clarifying measures in order to identify the sick person’s workability. This implies that the period of sickness absence compensation is extended up to 26 weeks.

The sick person is undergoing or awaits medical treatment, and the person on the basis of a medical assessment is likely to resume gainful employment within 52 weeks from the duration limit has occurred.

The sick person has a life threatening disease and no further medical treatment can help the person.

If there are legal proceedings concerning the right to compensation (under the Act on workers’ safety or law on protection against the consequences of work injury).

If a proceeding has been opened concerning national supplementary disability pension.

The municipality can extend the sickness absence compensation period for persons who are covered by section 25 of the act (see paragraph: Duration limits for sickness absence compensation).

The municipality is capable of extending the sickness absence compensation period if a medical assessment confirms that the sick person within a maximum of 26 weeks will be available for the labour market or will be able to resume work (cf. section 29 of the act).

**Linkage of DREAM and sickness absence compensation and maternity pay data in the RSS 1.0**

**Introduction to the linkage**

The RSS 1.0 is established to show history of social benefits together with more detailed information on sickness absence benefit than found in the week-based DREAM. The establishment is done by supplementing the date-based sickness absence compensation and maternity pay registrations register (KMD register: Standard interface NX32100Q sickness absence compensation and maternity pay) with the week-based DREAM register.

Periods of sickness absence compensation and maternity pay do always have the highest priority in RSS 1.0 as they are registered with exact start and end dates. The priority implies that other week-based benefits are adjusted to periods of sickness absence compensation or maternity pay, and not the opposite. The only exception from this is when periods of sickness absence or maternity pay collide with registrations of death from the week-based DREAM.

The reader should be aware that the conversion of the week-based registration from DREAM into date-based registrations in the RSS 1.0 results in several date inaccuracies. The date inaccuracies only concern benefits other than sickness absence compensation and maternity pay and will, in most analysis, turn out relatively small (conversion inaccuracies: 1 to 6 days pr. start and end date).
The alternative of using the less accurate week to date-based conversion from DREAM is having access to the huge amount of more precise source registers which DREAM is based on. Such an access would require much competence and a huge work in relation to data processing each source register, a workload which does not correspond to the purpose of the RSS 1.0 and with the huge amount of information already processed and listed in DREAM.

**Organising data**

Data is organised such that for each benefit period a person has, a line/row in the data set is created (see figure 4). Each line contains information about: the person id number\(^{30}\), start and end dates for the benefit period, the type of benefit which is registered with a three digits benefit code (Y_KODE). Each data line containing periods of sickness absence compensation or maternity pay has additional information (for further information, please see paragraph: Data and variable description). Data is arranged chronologically for each person’s id, i.e. the period with the earliest benefit first/on top.

![Figure 4 – Organisation of data](image)

Data in the week-based DREAM are organised differently than data in the RSS 1.0, such that there is one variable per week per year and, thereby, only one data line/row per person. When a person receives a social benefit, the week of receiving is marked with a three digits benefit code.

When preparing DREAM in concern to the linkage, periods are defined as succeeding weeks with the same benefit code. Periods also include succeeding weeks when a person does not receive any social benefits, such weeks are given the code 000. The start and end week of every period are converted into start and end dates. Converted periods always start on a Monday and end on a Sunday. Periods with the codes concerning sickness absence benefit or maternity pay are deleted from the prepared DREAM data in order to link with new periods coming from the processed KMD register\(^{31}\).

**Linkage of data**

Figure 5 illustrates how the prepared DREAM data and periods of sickness absence compensation and maternity pay from the processed KMD register are linked.

Each period is described by a start and an end date (both dates are inclusive). In figure 5, the start and end dates are represented by the letters A and B.

\(^{30}\) A unique serial number is attached to each person. The serial number has nothing to do with the person’s social security number.

\(^{31}\) These periods are registered weekly and ranked according to the other social benefits. To obtain as high a degree of detail as possible, these periods are replaced by more precise dates for each period of sickness absences, or maternity pay and supplementary information.
The benefit periods are shown via boxes and the letters X and Y represent benefit codes which both are different from the periods of sickness absence compensation and maternity pay. Figure 5, only shows examples with sickness absence compensation (code 891) but could also show periods of maternity pay (code 881).

![Figure 5](image)

Figure 5 illustrates how a period of sickness absence compensation from the KMD register is linked with two date-based periods from DREAM. The linkage is made by stretching start and end dates for the surrounding DREAM periods X and Y, so that they border on to the period of sickness absence.

The start and end dates are only changed if the interval between the preceding/following date is less than seven days, but they are never changed if they are start and end dates for periods concerning sickness absence or maternity pay. An exception is made if a period of sickness absence or maternity pay overlaps the date where a person is registered as deceased. A date of deceased is never changed but the end date of a period of sickness absence or maternity period is allowed to change so that it borders directly the time where the person died.

By changing the start or end dates when the gap between preceding/following period intervals are less than seven days, a reduction of small and unregistered time gaps are made. Likewise, a period of 891/881 is allowed to push the end date of an X-period or the start date of a Y-period if they overlap.

A new period of sickness absence or maternity pay may occur in a time period where no such period existed in DREAM. If such a situation occurs, then the registered period (X) is divided into two periods to make room for the new period (illustrated in figure 6). A situation illustrated in figure 6 occurs if a pensioner is working a paid job and is entitled to receive compensation in case of sickness absence. The described situation with a pensioner is not visible in DREAM due to the lower ranking of sickness absence compensation in relation to retirement benefits.

![Figure 6](image)
Unregistered time

Unregistered time in the RSS 1.0 happens when deleted periods of sickness absence or maternity pay from DREAM are not replaced by date-based periods from the KMD register. If such deleted periods are not replaced, there will be a time gap in the data in the RSS 1.0. Time gaps are only closed if there are less than seven days between the end date and start date of the surrounding time periods. If there are seven or more days between the time gaps, they remain in the RSS 1.0, because time gaps cannot be closed without knowing what social benefit the person is or is not receiving during the time gap/unregistered time, and such information does not exist in neither DREAM nor the KMD register.

Unregistered time appears in the RSS 1.0 as time gaps between an end date and the succeeding start date of the next time period within person id.

Figures 7-10 illustrate what happens if there are less than seven days (<7) between periods:

- If the two surrounding periods are identical (X and X), then the two periods are merged into one period:

  ![Figure 7]

- If the two surrounding periods are not identical then the periods are extended until they adjoin each other. A specific number of days are equally divided between the periods. If the number of days between the periods is unequal, then period X is allocated one day more than Y.

  ![Figure 8]

- If period X is registered with the benefit code “no benefit” (000), then its end date is extended until it adjoins period Y.

  ![Figure 9]
• If the period Y is registered with the benefit code “no benefit” (000), then its start date is extended until it adjoins period X.

![Diagram of X and Y periods](image)

**Figure 10**

In situations where no period of X or Y exists, the original start and end dates are maintained. Such situations primarily occur at the first or the last period registered for a person.

**Ranking types of benefits**

All types of social benefits registered in the RSS 1.0 are ranked. The ranking is based on the ranking of benefit in DREAM, with the exception of sickness absence and maternity pay. In the RSS 1.0, periods of sickness absence compensation and maternity pay are ranked over all other benefit types but beneath registrations of death. The prioritisation is illustrated in figure 11\(^{32}\).

---

\(^{32}\) The figure is an edited and extended version of a figure from the document “Description of DREAM codes – version 19” which can be obtained from the AMS.
Figure 11 – Ranking and prioritisation of benefits: variable and source of variable.

The ranking shown in figure 11 has high influence on the length of periods of social benefits below sickness absence and maternity pay. If a week is divided between days of two benefits, then only the higher ranked benefit will show for that particular week. In the RSS 1.0, periods of sickness absence and maternity pay are always shown with their actual length, given in days.
Data and variable description

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Label – description</th>
</tr>
</thead>
<tbody>
<tr>
<td>id</td>
<td>Personal serial number.</td>
</tr>
<tr>
<td>start_dato</td>
<td>Start date of the period (first day of absence).</td>
</tr>
<tr>
<td>slut_dato</td>
<td>End date of the period (last date of calculation).</td>
</tr>
<tr>
<td>y_kode</td>
<td>The benefit type is given by a three-digit code:</td>
</tr>
<tr>
<td></td>
<td>- 000 = no benefit received.</td>
</tr>
<tr>
<td></td>
<td>- 891 = sickness absence.</td>
</tr>
<tr>
<td></td>
<td>- 881 = maternity leave.</td>
</tr>
<tr>
<td>varighed</td>
<td>Duration of absence, number of days.</td>
</tr>
<tr>
<td>ekommune</td>
<td>Municipality number.</td>
</tr>
<tr>
<td>earbjgiv</td>
<td>Company id (in Denmark: SE-number).</td>
</tr>
<tr>
<td>stat2</td>
<td>Wage earner/self-employed</td>
</tr>
<tr>
<td>cfravara</td>
<td>Cause of absence:</td>
</tr>
<tr>
<td></td>
<td>Description: Indicates the cause for being absent.</td>
</tr>
<tr>
<td></td>
<td>Set of values:</td>
</tr>
<tr>
<td></td>
<td>1 = Sickness.</td>
</tr>
<tr>
<td></td>
<td>2 = Occupational injury.</td>
</tr>
<tr>
<td></td>
<td>3 = Occupational disease.</td>
</tr>
<tr>
<td></td>
<td>4 = Four weeks or less to expected birth.</td>
</tr>
<tr>
<td></td>
<td>5 = Maternity leave.</td>
</tr>
<tr>
<td></td>
<td>6 = Adoption.</td>
</tr>
<tr>
<td></td>
<td>9 = Pregnancy, more than four weeks to expected birth.</td>
</tr>
<tr>
<td>csagsar1</td>
<td>Case type 1:</td>
</tr>
<tr>
<td></td>
<td>Description: Indicates according to which rules the employment/the sub-case should be dealt with.</td>
</tr>
<tr>
<td></td>
<td>Set of values:</td>
</tr>
<tr>
<td></td>
<td>07 = Before adoption, wage earner.</td>
</tr>
<tr>
<td></td>
<td>08 = Before adoption, self-employed.</td>
</tr>
<tr>
<td></td>
<td>09 = Holiday compensation.</td>
</tr>
<tr>
<td></td>
<td>10 = Birth, wage earner.</td>
</tr>
<tr>
<td></td>
<td>11 = After the employer period, wage earner.</td>
</tr>
<tr>
<td></td>
<td>12 = Insured employers, wage earners section 27 (cannot be reported for public employers).</td>
</tr>
</tbody>
</table>

33 In this chapter, any reference to the legislation is a direct reference to the act of earlier sickness absence compensation. The text on sets of value is taken from the documentation for the KMD register: “Standard interface NX32100Q sickness absence compensation and maternity pay”. 
<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>No employer period, wage earners.</td>
</tr>
<tr>
<td>14</td>
<td>Chronic ill persons, wage earners, section 28.</td>
</tr>
<tr>
<td>16</td>
<td>Compensation in advance, wage earner</td>
</tr>
<tr>
<td>17</td>
<td>Unemployed, wage earners.</td>
</tr>
<tr>
<td>18</td>
<td>Taking care of sick child, wage earner.</td>
</tr>
<tr>
<td>20</td>
<td>Birth, self-employed.</td>
</tr>
<tr>
<td>21</td>
<td>After the second week, self-employed.</td>
</tr>
<tr>
<td>22</td>
<td>Voluntarily insured, self-employed.</td>
</tr>
<tr>
<td>23</td>
<td>Taking care of sick child, self-employed.</td>
</tr>
<tr>
<td>24</td>
<td>Birth, wage earner, 32 weeks (46 weeks) – joint leave.</td>
</tr>
<tr>
<td>25</td>
<td>Birth, self-employed, 32 weeks (46 weeks) – joint leave.</td>
</tr>
<tr>
<td>26</td>
<td>Adoption, wage earner, 32 weeks (46 weeks) – joint leave.</td>
</tr>
<tr>
<td>27</td>
<td>Adoption, self-employed, 32 weeks (46 weeks) – joint leave.</td>
</tr>
<tr>
<td>35</td>
<td>Postponed leave (8-13 weeks) before the child reaches the age of nine, wage earners.</td>
</tr>
<tr>
<td>36</td>
<td>Postponed leave (8-13 weeks) before the child reaches the age of nine, self-employed.</td>
</tr>
<tr>
<td>37</td>
<td>Postponed leave up to 32 weeks before the child reaches the age of nine, wage earners.</td>
</tr>
<tr>
<td>38</td>
<td>Postponed leave up to 32 weeks before the child reaches the age of nine, self-employed.</td>
</tr>
<tr>
<td>41</td>
<td>Occupational injury, self-employed.</td>
</tr>
<tr>
<td>42</td>
<td>Occupational injury, wage earner.</td>
</tr>
<tr>
<td>43</td>
<td>Flexjob – wage earner1.</td>
</tr>
<tr>
<td>44</td>
<td>Flexjob with public employer (cases with first day of absenteeism before January 1, 2000).</td>
</tr>
<tr>
<td>45</td>
<td>Child given up for adoption/stillborn etc., wage earners.</td>
</tr>
<tr>
<td>46</td>
<td>Child given up for adoption/stillborn etc., self-employed.</td>
</tr>
<tr>
<td>47</td>
<td>Pregnancy-related sickness after the birth, wage earners.</td>
</tr>
<tr>
<td>48</td>
<td>Pregnancy-related sickness after the birth, self-employed.</td>
</tr>
<tr>
<td>49</td>
<td>Too late notification (counting days of duration).</td>
</tr>
<tr>
<td>50</td>
<td>Adoption, wage earners.</td>
</tr>
<tr>
<td>55</td>
<td>Extension resumed working hours, wage earners.</td>
</tr>
<tr>
<td>56</td>
<td>Extension resumed working hours, self-employed.</td>
</tr>
<tr>
<td>60</td>
<td>Adoption, self-employed.</td>
</tr>
<tr>
<td>65</td>
<td>Pregnancy, wage earners.</td>
</tr>
<tr>
<td>70</td>
<td>Pregnancy, self-employed.</td>
</tr>
<tr>
<td>75</td>
<td>Two weeks after birth/adoPTION, wage earner, new legislation after March 26, 2002.</td>
</tr>
<tr>
<td>76</td>
<td>Paternity leave weeks 25-26, wage earners, legislation until March 26, 2002.</td>
</tr>
<tr>
<td>77</td>
<td>Two weeks after adoption, wage earners, legislation until March 26, 2002.</td>
</tr>
<tr>
<td>80</td>
<td>Two weeks after birth/adoPTION, self-employed, new legislation after March 26, 2002.</td>
</tr>
<tr>
<td>81</td>
<td>Paternity leave weeks 25-26, self-employed, legislation until March 26, 2002.</td>
</tr>
<tr>
<td>82</td>
<td>Two weeks after adoption, self-employed, legislation until March 26, 2002.</td>
</tr>
<tr>
<td>csagsar2</td>
<td>Case type 2: (Se csagsar1)</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>cydarsag</td>
<td>Cause of benefit:</td>
</tr>
</tbody>
</table>

Description: Benefit cause/extension code for the foundation on which the compensation case rests (only regarding sickness).

Please note: The cause of benefit codes (code values higher than 49) describe the background for compensation (regarding sickness absence benefit). It is not compulsory to report the cause of benefit codes to the municipality. Extension codes (code values less than 42) describe the background for compensation (regarding sickness absence benefit). Extension codes must be reported to the municipality due to dispensation from the duration limits.

Set of values:

- Blank = Not filled in.
- 01 = Extension code. Rehabilitation most likely, but not planned.
- 02 = Extension code. Rehabilitation most likely, awaits pre-rehabilitation.
- 03 = Extension code. Rehabilitation most likely, pre-rehabilitation started.
- 04 = Extension code. Rehabilitation most likely, awaits rehabilitation.
- 06 = Extension code. Occupational injury reported.
- 07 = Extension code. Case about incapacity benefit initiated.
- 08 = Extension code. Recommended for incapacity benefit (Not used after January 1, 2001)).
- 10 = Extension code. Under medical treatment, expected to be fit for work within 26 weeks. The code allows an extension of max. 26 weeks.
- 11 = Extension code. Awaits medical treatment, expected to be fit for work within 26 weeks. The code allows an extension of max. 26 weeks.
- 12 = Extension code. Sustained medical treatment, expected to be fit for work within 26 weeks. The code allows an extension of max. 26 weeks.
- 13 = Under sustained medical treatment, expected to be fit for work within 2x26 weeks. The code allows an extension of max. 26 weeks.
- 14 = Awaits medical treatment at a public hospital.
- 15 = Waiting time more than 52 weeks: Treatment started, expected to be fit for work within 26 weeks.
- 16 = Under medical treatment, expected to be fit for work within 26 weeks.
- 20 = The person suffers from a severe disease where it is assessed that there is no possible treatment.
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>SDPL, section 27, subsection 1(4). Right to max. 104 weeks extension from the date where the general duration commenced. Replaces the use of extension codes 10, 11, 12, 13.</td>
</tr>
<tr>
<td>24</td>
<td>Under medical treatment after waiting time, SDPL section 27, subsection 1(3). Right to max. 104 weeks extension from the date of commencement. Replaces the use of extension codes 15, 16.</td>
</tr>
<tr>
<td>30</td>
<td>New sickness absence, general duration. Used when the citizen has exhausted the maximum duration of 52 weeks of sickness absence. The citizen must have resumed working and again fulfil the employment requirements. If the citizen then again becomes absent due to sickness, a case is created with code = 30 which gives the right to sickness absence compensation for 26 weeks.</td>
</tr>
<tr>
<td>31</td>
<td>New sickness absence, extension. See above. Used when the citizen is still on sick leave after 26 weeks. Code = 31 enables an extension of further 26 weeks.</td>
</tr>
<tr>
<td>32</td>
<td>New sickness absence, SDPL section 26, subsection 1. Right to max. 104 weeks extension from the first day of absenteeism.</td>
</tr>
<tr>
<td>40</td>
<td>Clarification, extension for 13 weeks.</td>
</tr>
<tr>
<td>41</td>
<td>Clarification, extension for further 13 weeks.</td>
</tr>
<tr>
<td>42</td>
<td>Clarification, SDPL section 27, subsection 1(2) up to 26 weeks.</td>
</tr>
<tr>
<td>50</td>
<td>Awaits pre-rehabilitation/work ability testing. Only used in connection with the 52-week period.</td>
</tr>
<tr>
<td>51</td>
<td>Pre-rehabilitation/work ability testing initiated. Only used in connection with the 52-week period.</td>
</tr>
<tr>
<td>52</td>
<td>Awaits initiation of rehabilitation. Only used in connection with the 52-week period.</td>
</tr>
<tr>
<td>53</td>
<td>Occupational injury reported. Only used in connection with the 52-week period.</td>
</tr>
<tr>
<td>54</td>
<td>Retirement case opened. Only used in connection with the 52-week period.</td>
</tr>
<tr>
<td>56</td>
<td>Awaits to be reported fit for duty, no arrangement necessary. Only used in connection with the 52-week period.</td>
</tr>
<tr>
<td>57</td>
<td>Under medical treatment, no arrangement necessary. Only used in connection with the 52-week period.</td>
</tr>
<tr>
<td>60</td>
<td>Awaits hospitalization. Only used in connection with the 52-week period.</td>
</tr>
<tr>
<td>61</td>
<td>Awaits examination by medical specialist. Only used in connection with the 52-week period.</td>
</tr>
<tr>
<td>63</td>
<td>Awaits out-patient treatment. Only used in connection with the 52-week period.</td>
</tr>
<tr>
<td>Column</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>gnedsdpge</td>
<td>Reduced sickness absence compensation:</td>
</tr>
<tr>
<td></td>
<td>Description: Indicates the percentage of resumed working hours</td>
</tr>
<tr>
<td>gnedstim</td>
<td>Hours:</td>
</tr>
<tr>
<td></td>
<td>Description: Indicates with how many hours work has been resumed (part of gnedsmin).</td>
</tr>
<tr>
<td>cophorsg</td>
<td>Reason for termination:</td>
</tr>
<tr>
<td></td>
<td>Description: Indicates the reason for why the sub-case (the employment) has ended.</td>
</tr>
<tr>
<td></td>
<td>Set of values:</td>
</tr>
<tr>
<td></td>
<td>01 = The citizen reports fit for duty.</td>
</tr>
<tr>
<td></td>
<td>02 = Reported fit for duty by the authorities (section 5).</td>
</tr>
<tr>
<td></td>
<td>04 = Dead.</td>
</tr>
<tr>
<td></td>
<td>06 = Old age pension.</td>
</tr>
<tr>
<td></td>
<td>09 = Other rehabilitation initiatives.</td>
</tr>
<tr>
<td></td>
<td>10 = Relocated.</td>
</tr>
<tr>
<td></td>
<td>12 = Awarded pension.</td>
</tr>
<tr>
<td></td>
<td>14 = General duration limit.</td>
</tr>
<tr>
<td></td>
<td>15 = Maternity leave/adoption before the duration limit.</td>
</tr>
<tr>
<td></td>
<td>16 = Duration, maternity leave/adoption.</td>
</tr>
<tr>
<td></td>
<td>17 = Duration, pensioners.</td>
</tr>
<tr>
<td></td>
<td>18 = Medical certificate not presented.</td>
</tr>
<tr>
<td></td>
<td>19 = Case type 49/91, transferred to sickness absence compensation.</td>
</tr>
<tr>
<td></td>
<td>20 = Refuses treatment etc. (section 8).</td>
</tr>
<tr>
<td></td>
<td>21 = Case type 14 publicly employed.</td>
</tr>
<tr>
<td></td>
<td>22 = Turned 70 years of age/duration.</td>
</tr>
<tr>
<td></td>
<td>23 = Computer technical termination (means that the municipality has annulled the case due to wrong entry of data and has probably created a new case).</td>
</tr>
<tr>
<td></td>
<td>24 = Temporary termination (holiday).</td>
</tr>
<tr>
<td></td>
<td>25 = Termination after extension.</td>
</tr>
<tr>
<td></td>
<td>26 = Maternity leave/adoption – shared leave</td>
</tr>
<tr>
<td></td>
<td>27 = Gross rehabilitation benefit.</td>
</tr>
<tr>
<td></td>
<td>28 = The Active Act section 60.</td>
</tr>
<tr>
<td></td>
<td>29 = Termination after eight weeks, flexijob with public employer.</td>
</tr>
<tr>
<td></td>
<td>30 = Termination, taking care of sick child.</td>
</tr>
<tr>
<td></td>
<td>31 = Transferred to flexijob.</td>
</tr>
<tr>
<td></td>
<td>32 = Transferred to unemployment fund/job centre.</td>
</tr>
<tr>
<td></td>
<td>33 = Deceased child/given up for adoption</td>
</tr>
<tr>
<td></td>
<td>34 = End of holiday.</td>
</tr>
<tr>
<td></td>
<td>35 = Lacking participation in follow-up.</td>
</tr>
<tr>
<td><strong>cviskode</strong></td>
<td>Visitation code section 24:</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Description: section 24-follow-up gives reason to assign a visitation code to ongoing case of sickness absence compensation (includes pregnancy related sickness) (the case types 11,12,13,14,16,17,21,22,41,42,43, (47,48,65,70 pregnancy related sickness)).</td>
<td></td>
</tr>
<tr>
<td>Set of values:</td>
<td></td>
</tr>
<tr>
<td>Blank = Not filled out.</td>
<td></td>
</tr>
<tr>
<td>01 = Cases where return to the labour market is imminent (category 1).</td>
<td></td>
</tr>
<tr>
<td>02 = Cases with the risk of a lengthy sickness absence period and/or risk in relation to workability (category 2).</td>
<td></td>
</tr>
<tr>
<td>03 = Cases where the disorder or the disease leads to a lengthy sickness absence period (category 3).</td>
<td></td>
</tr>
</tbody>
</table>

| **sagsart** | Processed case type: If case type 2 exists, otherwise case type 1. |
| **findsfrav** | Last day of absenteeism exists: 0 = no 1 = yes. If no, then the date February 1, 2009, has been used. |
| **kon** | Gender: |
| Set of values: |
| 0 = Female. |
| 1 = Male. |
| **fodtdato** | Date of birth. |

**Links:**

Appendix A – Documentation regarding the processing of the RSB register (Register of sickness absence compensation and maternity pay) (RSB: Danish abbreviation) Version 1.0

The purpose of this register of sickness absence compensation and maternity pay (RSB) is to establish a research register based on the sickness absence compensation and maternity pay register from the National Labour Market Authority (Standard interface NX32100Q sickness absence compensation and maternity pay). The RSB is used in a linkage with DREAM in order to form the RSS 1.0 (please see the documentation).

A key purpose of the processing is to go from a case which is the unit that defines the Standard Surface NX32100Q sickness absence compensation and maternity pay to an event, i.e. a sickness absence or maternity leave period. An event for a person is the unit that defines the RSB. An event can turn into several cases, e.g. sickness absenteeism can bring about several cases, if the sick person relocates from one municipality to another. An event can also turn into several cases if a person is employed more than one place at a time or if a person who is both self-employed and employed has multiple cases.

Another principle is that events may overlap each other temporally. During processing, maternity leave has a higher priority than sickness absence, and events including wage earners are prioritized higher than events including self-employed.

Several different events are included in the RSB, not only long-term sickness absence among wage earners (absence for more than 14, 15 or 21 days depending on when), but also short-term sickness absence among persons with chronic diseases, short-term sickness absence among wage earners employed in small companies that have a special insurance arrangement, long-term sickness absence among insured self-employed and maternity leave. Knowledge of all these different events is a prerequisite for correct use of the register.

Original data set
The original data sets on sickness absence or maternity leave stem from the KMD’s sickness absence compensation and maternity pay register.

The data sets are named as listed below, and the size of the files are shown in the brackets. The file names of the raw data:

december2004.sas7bdat (668 MB)
december2005.sas7bdat (670 MB)
december2006.sas7bdat (694 MB)
december2007.sas7bdat (723 MB)
december2008.sas7bdat (721 MB)
The data files were drawn on February 8, 2009, and in total, they comprised 5,312,748 observations. The size of the data sets in total was approx. 3.6 GB.

The following describes how data concerning sickness absence or maternity leave were drawn and processed. In connection with the processing of the data, the most important principle was to make sure that a person did not have absence periods which overlapped in time.

See item 14 for a further description of data sets created.

Data processing
1) Description of data drawn and processed:
All programs and tables referred to in the chapter are saved.

Program: Udtraek.sas

The data set contains the following absence codes and case types so an observation is selected if either the absence code or one or two case types (or both criteria) are relevant.

a) Relevant absence codes:

1 = Disease
2 = Occupational injury
3 = Occupational disease
4 = Four weeks or less to expected birth
5 = Maternity leave
6 = Adoption
7 = Pregnancy, more than four weeks to expected birth

b) Relevant case types:

11 = After the employer period, wage earners
13 = No employer period, wage earners
17 = Unemployed, wage earners
21 = After the second week, self-employed
22 = Voluntarily insured, self-employed
41 = Occupational injury, self-employed
42 = Occupational injury, wage earners
43 = Flexijob, wage earners
49 = Too late notification (counting days of duration)
56 = Extension, resumed working hours, self-employed

The original draw contains: 5,306,069 observations
2) Then annulled observations (EOMRADEK = ‘AN’) and observations with termination due to computer technical reasons (COPHORSG 0 23) are deleted.

In total: 211,592 observations
Remaining observations: 5,094,477 observations

3) Then it is checked if there are duplicates on the first date of absence of each person. If duplicates occur, the observation with the longest duration is selected. However, observations with a wage earner code have higher priority than observations with a self-employed code. The case types with the codes 11, 13, 17, 42 and 43 cover Danish wage earners, whereas the codes 21, 22, 41 and 56 cover self-employed persons. Code 49 cannot be placed anywhere.

A new variable is created, STAT2. It indicates if the observation in question has a wage earner or a self-employed code (the variables has the values 1 = ‘wage earner’ or 2 = ‘self-employed’).

a) No duplicates on the first date of absence: 3,862,638 observations
b) Duplicates on the first date of absence: 1,231,839 observations
c) - Deleted: - 682,151 observations
d) - Remaining observations: -549,688 observations

New data set (3.a + 3.d), total: 4,412,326 observations

4) Then it is checked if there are duplicates on the last date of absence of each person. If duplicates occur, the observation with the longest duration is selected. However, observations with a wage earner code have higher priority than observations with a self-employed code.

a) No duplicates on the last date of absence: 4,396,221 observations
b) Duplicates on the last date of absence: 16,105 observations
c) - Deleted: - 8,139 observations
d) - Remaining observations: -7,966 observations

New data set (4.a + 4.d), total: 4,404,187 observations

5) Then the observations are checked for negative duration, and such observations are deleted: 2 observations

New data set: 4,404,185 observations
This data set represents a total of 1,454,946 persons.

6) The data set is then divided according to whether the last date of absence is known or not.
    a) Unknown last date of absence
       (marked: FINDSFRAV = 0):
       76,335 observations
       (These are coded with the date February 1, 2009 as the last date of absence as the most recent observations in the data set from January 2009)
       (data set EJSIDFRV.SAS7BDAT)
    b) Known last date of absence:
       4,327,850 observations
       (marked: FINDSFRAV = 1)

7) The data set from item 6.b is then divided according to whether the person is connected to several observations in the data set or only appears once.
    a) No duplicates on SSN:
       633,647 observations
       (Data set EJDUBS.SAS7BDAT)
    b) Duplicates on SSN:
       3,694,203 observations
       (Data set DUBS.SAS7BDAT)

8) Then, an all-against-all merge is made (via Proc SQL) for the data set under item 7.b. so that each observation is merged with all other observations for the person. Next, each pair of observations is checked against each other and is divided into the following types (see the file OVERLAP1.RFT)

   1 = no overlap between the periods
   2 = one period is entirely within the other period
   3 = partial overlap between the periods

Program file: merge.sas

9) Editing Type = 3:
Program file: Type3a.sas

If there is partial overlap between the periods, then the observations are edited as below:

   a) Maternity leave has a higher priority than sickness absence, and periods of sickness absence are therefore reduced.

   b) Wage earner absence has a higher priority than absence among self-employed and the absence period with a self-employed code is reduced.

   c) If the overlapping records have the same case type (Case type 1 in the _A observation = case type 1 in the _B observation, or case type 2 in the _A observation = case type 2 in the _B observation)

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in the \textastersharp{B} observation (and case type 2 non-missing)), then the observations are combined by selecting the end points. The original observations are then deleted.

d) Observations where case type 1 in an observation is different from case type 1 in the comparable observation, and likewise the case type 2 in the observation, is different from case type 2 in the same comparable observation:

- If that is the case, the case types are prioritized interdependently. The prioritizing implies that the observation with the lowest code of case type has the highest priority. The period with the lowest prioritized case type is then reduced.

It has been necessary to run this program twice in order to eliminate all partial overlaps, as there may be situations in which e.g. three observations overlap in time. After the first run, the following changes have been made:

- 12,387 old observations are deleted
- 7,717 new observations are added

These changes are made in the data set from item 7.b so that a new data set with 3,689,533 observations is created. This data set is divided into duplicates and non-duplicates on the SSN, as there may be situations where two original observations for one person are added to one observation.

e) Non-duplicates on the SSN: 1,148 observations
(Data set EJDBS3.SAS7BDAT)

f) Duplicates on the SSN: 3,688,385 observations
(Data set DUBS3.SAS7BDAT)

Then a new all-against-all merge is made on the data set from item 9.f (see the file OVERLAP3A.RTF)

After the second run, the following changes have been made:

Program file: type3b.sas

166 old observations are deleted
100 new observations are added

These changes are made in the data set from item 9.b so that a new data set with 3,688,319 observations is created. This data set is divided into duplicates and non-duplicates on the SSN as there may be situations where two original observations for one person are added to one observation.

g) Non-duplicates on the SSN: 8 observations
(Data set EJDBS3B.SAS7BDAT)

h) Duplicates on the SSN: 3,688,311 observations
Then a new all against all merge is made on the data set from item 9.h (see the file OVERLAP3B.RTF).

10) Editing Type = 2

Program file: Type2.sas

If one period lies completely within another period, then the observations are edited as follows:

a) The observation with the shortest duration is deleted. However, a period marked with a wage earner code has higher priority than a period marked with a self-employed code (no matter the duration of the period). 

- 7,035 observations are deleted

These changes are made in the data set from item 9.h so a new data set with 3,681,276 observations is created.

This data set is divided into duplicates and non-duplicates on the SSN.

b) Non-duplicates on the SSN: 891 observations
   (Data set EJDUBS2.SAS7BDAT)

c) Duplicates on the SSN: 3,680,385 observations
   (Data set DUBS2.SAS7BDAT)

Then a new all against all merge is made on the data set from item 10.c (see the file OVERLAP2.RTF).

11) Editing Type = 1:

Program file: Type1.sas

If there is no overlap between the two periods, then the observations are edited as follows:

a) Periods where the following conditions are fulfilled:

- Case type no. 1 or case type no. 2 = 11, 21.

- Case type 1 in the _A observation must be identical with the case type in the _B observation, or case type 2 in the _A observation must be identical with case type 2 in the _B observation.

- The interval between the two observations (calculated from the last date of
absence from the earliest observation to the first date of absence in the latest observation) is ≥ 3 days.

- The percentage rate of the reduced compensation for the sickness absence benefit must be identical between the two observations.

- If there exists any registered hour concerning reduced compensation rate of sickness absence benefit, then the registered hour must only differ by a maximum of two hours between the two observations.

The periods are added so a new period is constructed based on the earliest first date of absence and the latest last date of absence. The two original observations are then deleted.

- 3,178 new observations are added

- 6,258 old observations are deleted

These changes are made in the data set from item 10.c so a new data set with 3,677,305 observations is created.

This data set is divided into duplicates and non-duplicates on the SSN

b) Non-duplicates on the SSN: 561 observations
   (Data set EJDBS1.SAS7BDAT)

c) Duplicates on the SSN: 3,676,744 observations
   (Data set DUBS1.SAS7BDAT)

Then a new all against all merge is made on the data set from item 11 to check if there are any remaining problems with overlapping periods (see the file OVERLAP4.RTF).

12) A new run over, concerning Type = 3:

Program file: type3c.sas

The few remaining overlaps which are not corrected by this program are handled by the program Redig_Type3.sas which edits the observations and creates a supplementary to be included in the Type 3c.sas. Furthermore, some few corrections are added directly in the Type3c.sas on basis of the serial number and the first date of absence.

- 124 new observations are added

- 202 old observations are deleted

A check is then made for duplicates on the first and the last date of absence, and the following observations are deleted:
a) Duplicates, the first date of absence: 15 observations
b) Duplicates, the last date of absence: 13 observations

These changes are made in the data set from item 11.c so a new data set with 3,676,638 observations is created.

This data set is checked for duplicates and non-duplicates on the SSN

a) Non-duplicates on the SSN: 7 observations
   (Data set EJDUBS3c.SAS7BDAT)

b) Duplicates on the SSN: 3,676,631 observations
   (Data set DUB3cS.SAS7BDAT)

Then a new all against all merge is made on the data set from item 12.c to check if there are any remaining problems with overlapping periods (see the file OVERLAP3c.RTF).

13) Combining the data sets:

Program file: Saml.sas

The data sets generated during the process:

- Ejsidfrv.SAS7BDAT
- Ejdubs.SAS7BDAT
- Ejdubs3.SAS7BDAT
- Ejdubs3b.SAS7BDAT
- Ejdubs2.SAS7BDAT
- Ejdubs1.SAS7BDAT
- Ejdubs3c.SAS7BDAT
- Dubs3c.SAS7BDAT

In total: 4,389,228 observations

- 28 observations with a duration = 0 are identified. They emerged when e.g. a period of sickness absence overlapped two maternity leave periods which started before and ended after. As maternity leave is prioritized over sickness absence, both the start date and the end date of the sickness absence period will be reduced, and therefore it is possible to see periods were the duration = 0. Such observations have been deleted
from the data set.

- The number of different persons in the total data set is compared with the data set representing 1,454,940 persons. There are 6 persons lacking in the new data set. These persons are identified, and all the observations (12 observations) concerning these persons are listed and edited by the program so that they are also included in the new data set. These six persons contribute with 8 observations.

- Total data set: 4,389,208 observations

(4,389,228 obs. + 8 obs. (for the 6 persons) - 28 obs. (duration = 0))

The total data set represents: 1,454,946 persons

- Absence periods ended before 2004 or started after 2008 are deleted as the data set is only complete in the period 2004-2008. The following cut-off dates used are: December 29, 2003 (day 1, week 1, 2004) and December 29, 2008 (day 7, week 52, 2008).

In total 87,283 observations have been deleted and the final data set contains 4,301,925 observations.

- A period variable is defined in the new data set for selection of long-term absence among wage earners (respectively 14, 15 or 21 days). The definition is made on the basis of the first date of absence, and the variable is named PERIODE. This variable takes the following values:

1 = Employer period the first 14 days: Until April 1, 2007.

2 = Employer period the first 15 days: April 2, 2007 to June 1, 2008

3 = Employer period the first 21 days: From June 2, 2008.

- We have made files with a rank-size distribution of the new data set (see the files: Freq_Saml.rtf, Varighed_Saml.rtf og Varighed_Perioede.rtf).

- Minimum, maximum, average and standard deviation have been calculated for the duration in the data sets. These are also used in a comparison to the number of different persons (see the file: Varighed_Gns.rtf).

14) Permanent dataset with information about sickness absence and maternity leave:

- The data set RSB_ALLE.SAS7BDATA contains information about all types of absence (i.e. sickness absence and maternity leave among wage earners, as well as self-employed). It contains 4,301,925 observations (representing 4,442,189 different persons). The size of the data set is 6.4 GB.
- The data set RSL_ALLE.SAS7BDAT contains information about long-term sickness absence (i.e. sickness absence lasting at least 14/15/21 days, depending on the period) for wage earners with 1,233,024 observations and 819,103 persons. The size of the data set is 1.8 GB.

(Absence periods ≥ 14/15/21 days have not yet been purified).

- The data set RSA_ALLE.SAS7BDAT includes all types of sickness absences among wage earners (i.e. both long-term and short-term sickness absence) with 3,267,368 observations and 1,136,538 persons. The size of the data set is approx. 4.8 GB.

- The data set RSS_1_0_2004_APR2008.SAS7BDAT is a linkage of DREAM and KMD’s sickness absence compensation and maternity pay register. It contains 25,813,272 observations and 3,876,889 persons. The size of the data set is 2.2 GB.