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**Supplementary file 1: Details on recruiting and selecting matched-pair controls using Propensity Score Matching**

Propensity Score Matching

The matched-pair control group will be recruited and selected using the propensity score method (PSM). The propensity score is the probability of treatment assignment conditional on observed baseline characteristics [1]. We generate the matched-pairs with nearest neighbor matching. The nearest neighbor matching selects an untreated subject whose propensity score is closest to that of the treated subject. “Good matched-pair samples contain both closely matched individual pairs and balanced intervention and control groups. A pair is closely matched if the distance between the case and the control is small” [2]. Several economic as well as clinical covariates are used for PSM in this study. They are represented in the matching procedure as a single propensity score. “The distance between the matched pairs can therefore more simply be viewed as the absolute difference in the propensity score of the case and the control. Matching on propensity score can create good matched-pairs. Matching on the propensity score can also balance case and control groups, (...). It has been shown that a sample matched on propensity score will be similar for all the covariates that went into computing the propensity score” [2].

Recruiting and selection of statistical twins for the control group:

(1) In a first step the insurance ID of study participants will be forwarded to a specific department of the health insurance company. This department is responsible for the selection of ten matched controls from the insurance data base for each study participant of the intervention group. The factor ten has already been proven successful in a previous study of the insurance company and was therefore adopted for the present study as well [3]. The matching criteria for this step are displayed in table a of this document. If it is not possible to select ten statistical twins for a subject of the intervention group according to

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the matching criteria and tolerances displayed in table a, the tolerance will be extended in an iterative manner (steps of 100 Euro or one day respectively) until ten twins can be extracted from the data base.

- (2) The address and insurance number of the potential statistical twins according to step (1) will be forwarded to another department of the company. This department will then forward study details (study information sheet for participants, informed consent form, questionnaires) by mail in order to ask for the willingness to participate in the control group of the study.
- (3) In a third step all returned and duly completed questionnaires at t0 will be checked for exclusion criteria which are part of the initial self-administered questionnaire (see main document: table 1, table 6).
- (4) Eligible participants for the control group will then be rewritten to ask for follow-up data at t3, t6 and t12. These follow-up data have to be recorded from all potential twins as the extraction of economic data at t0 from the insurance data base is temporally delayed for twelve month for organizational reasons. However these data are crucial for the PSM used in this trial.
- (5) The final matched sample with each participant of the intervention group having one statistical twin (1:1 matching for the propensity score) will be selected according to the following matching criteria: As a primary criterion, twins must be identical with regard to site(s) of OA (hip, knee or both). The following independent variables of the self-administered questionnaires and insurance data base will then be used as input variables for the logistic regression of the PSM:
  - Socio-demographic data at t0: age and gender (SAQ)
  - Co-morbidity: Quantity of hierarchical ordered morbidity groups in the previous year (IDB)
  - Osteoarthritis of the hip or knee in the previous year (IDB)

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- WOMAC Index subscale pain at t0 (SAQ).
  - WOMAC Index subscale physical functioning at t0 (SAQ).
  - Quality Adjusted Life Years at t0 via VR-6D (SAQ).
  - Body mass index at t0 (SAQ).
  - Joint replacement hip and/or knee joint(s) at t0 (SAQ).
  - General Self-Efficacy scale GSE at t0 (SAQ)
  - Habitual physical and sports activity status at t0
  - Participation in health activity programs (i. e. walking courses) at t0

If there are any cost/disability day categories, in which the standard mean differences after matching are above 0.05, a new matching will be conducted with these cost/disability day categories as matching variables in addition.

The matching process for the identification of statistical twins (CO) for each subject of the intervention group will be permuted in blocks: The matching procedure will be conducted quarterly until the number of needed subjects is reached.

No follow-up data will be analyzed prior to the final definition of the statistical twin of the CO for a given IG patient.

**Table a: Matching Criteria for the selection of ten statistical twins for each participant of the intervention group using Propensity Score Matching. Legend: a tolerance of “0” is equal to complete agreement, i.e. for age in years. Matching criteria are derived from the insurance data base.**

<b>Criteria</b>	<b>Tolerance</b>
Co-morbidity: Quantity of hierarchical ordered morbidity groups in the previous year	0
Osteoarthritis of the hip or knee joint in the previous year: yes/no	0
Participation in a special general practitioner care program (“Hausarztzentrierte Versorgung”): yes/no	0
Routine data: Age (years), gender, type of insurance (compulsorily insured, family insured, pensioner, unemployed), complexity of work (from 1= low to 4= high), level of education (1 = no graduation to 4 = High School), highest level of educational attainment (from 1=no qualification to 6= doctoral degree), contractual form (permanent/fixed term contract, full time/part time)	0
Joint replacement in the last 24 month prior t0 at the hip and/or knee joint(s): yes/no	0
Sum of unspecific health care costs (overall costs) in the last 24 month prior t0: Sick-pay, hospital costs, out-patient costs, costs related to periods of disability and costs related to drugs, physical modalities and adjuvants.	+/- 100 EUR
Sum of unspecific health care costs (overall costs) in the last 6 month prior t0 (tm6): Sick-pay, hospital costs, out-patient costs, costs related to periods of disability and costs related to drugs, physical modalities and adjuvants.	+/- 100 EUR
Sum of specific diagnosis (hip/knee OA) related health care costs in the last 24 month prior t0: Sick-pay, hospital costs, out-patient costs, costs related to periods of disability and costs related to disease related drugs, physical modalities and adjuvants such as walkers, cranks or orthotics.	+/- 100 EUR
Sum of specific diagnosis (hip/knee OA) related health care costs in the last 6 month prior t0 (tm6): Sick-pay, hospital costs, out-patient costs, costs related to periods of disability and costs related to disease related drugs, physical modalities and adjuvants such as walkers, cranks or orthotics.	+/- 100 EUR
Disability days in the last 24 month prior t0 (tm24)	+/- 1 Day
Disability days in the last 6 month prior t0 (tm6)	+/- 1 Day
Specific disability days (hip/knee OA) days in the last 24 month prior t0 (tm24)	+/- 1 Day
Specific disability days (hip/knee OA) in the last 6 month prior t0 (tm6)	+/- 1 Day

#### Reference List

1. Austin PC: An Introduction to Propensity Score Methods for Reducing the Effects of Confounding in Observational Studies. *Multivariate Behavioral Research* 2011, 46: 399-424.
2. Parsons LS: Reducing bias in a propensity score matched-pair sample using greedy matching techniques. Proceedings of the 26th Annual SAS Users Group International Conference. 2001.
3. Müller G. Bericht zur Evaluationsstudie AOK-Rückenkonzept. 2015. Personal Communication.