RUG-III Plus

Resource Utilization Groups version III Plus (RUG-III Plus) Grouping Methodology Using iCodes

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Institut canadien d'information sur la santé

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Introduction

Welcome to the *Resource Utilization Groups version III Plus (RUG-III Plus) Grouping Methodology Using iCodes* prepared by the Canadian Institute for Health Information (CIHI).

The RUG-III Plus methodology using iCodes is used to determine how assessments submitted to CIHI's Integrated interRAI Reporting System (IRRS) are assigned to discrete groups.

Overview of the RUG-III Plus grouping methodology using iCodes

LTCF data source

The foundation data for the RUG-III Plus grouping methodology using iCodes is collected using the Long-Term Care Facilities © (LTCF) assessment tool developed by the International Resident Assessment Instrument Corporation (interRAI) (interrai.org).

The objective of a grouping methodology is to categorize individuals into statistically and clinically similar groups. Grouping is based on different levels of acuity and supports evidence-based system- and facility-level planning, quality improvement and case mix–adjusted resource allocation.

Case Mix Index for RUG-III Plus groups

The Case Mix Index (CMI) is a value reflecting the daily relative weight of resources used by an individual within each RUG-III Plus group compared with a base resource level (the average resource use of the client population). It should be emphasized that the CMI value is not a dollar amount; rather, it is a relative value.

The RUG-III Plus methodology includes new CMI values based on Canada's residential care population.

RUG-III Plus methodology: IRRS version

RUG-III Plus and IRRS

This RUG-III Plus grouping methodology using iCodes material corresponds to the IRRS version of the RUG-III Plus grouping methodology.

Assumptions made for this logic

This algorithm assumes that data conforms to CIHI's IRRS data submission standards. CIHI assumes no responsibility for unexpected results arising from the use of data that does not meet CIHI's defined formats and edit specifications for IRRS data.

As with all grouping methodology, it should be acknowledged that the RUG-III Plus algorithm for use with iCodes is not an edit routine. If inconsistent or illogical data is processed using this algorithm, inappropriate RUG-III Plus group assignment may occur.

RUG-III Plus assignment for an LTCF assessment

Clinical characteristics from the LTCF assessment instrument form the basis for assigning RUG-III Plus groups using iCodes (more than 100 data items from the instrument are used in the assignment).

For RUG-III Plus assignment using iCodes, usually there are 2 approaches for assigning qualifying codes to an assessment. Each of the 44 groups is reviewed to first identify all groups that qualify for an assessment. The RUG-III Plus group code is then determined based on 1 of 2 ways of ranking:

RUG-III Plus hierarchical group is based on a clinical ranking of all 44 groups. These codes are examined following a clinical hierarchy: special rehabilitation, extensive care, special care, clinically complex care, impaired cognition, behaviour problems and reduced physical function. Of the groups that qualify, the first one is assigned.

RUG-III Plus index maximizing group is based on the order of CMI values. Of all the groups that qualify for an assessment, the RUG-III Plus index-maximizing group has the highest CMI value.

In the SAS code for iCode presented in this document, the RUG-III Plus group code is assigned using the hierarchical approach.

Items included in this product (SAS code, test data, flowcharts)

a. **RUG-III Plus for iCodes SAS code (PDF file)**

   This document is the PDF version of the introduction, SAS program code and methodology flowcharts.

b. **RUG-III Plus for iCodes SAS code (text file)**

   The text file contains the SAS program code in machine-readable format.

   The text file corresponds exactly to the information contained in the SAS code produced below.

c. **IRRS RUG-III Plus CMI values (CSV file)**

   This file contains the CMI values used within the RUG-III Plus grouping methodology for use with the LTCF.

d. **IRRS RUG-III Plus test data (CSV file)**

   Test cases have been created for use in validating the grouping methodology. The test data contains IRRS variables used within the grouping methodology.

Questions about CIHI's version of RUG-III Plus for the LTCF

If you have a question about the IRRS version of the RUG-III Plus grouping methodology, please submit a query through CIHI's online eQuery tool or email your question to casemix@cihi.ca.

SAS code for the RUG-III Plus grouping methodology

The SAS code presented on the following pages is also available as a machine-readable text file.

```
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/*    use of the Work.                                                         */
/*  - These terms are governed by, and to be construed in accordance with the laws */
/*    of the Province of Ontario and the applicable laws of Canada, without regard */
/*    to principles of conflicts of laws.                                      */
/*                                                                             */
/*=============================================================================*/
```

```
/*=============================================================================*/
/*  RUG-III Plus grouping methodology using iCodes for IRRS LTCF               */
/*  IRRS LTCF Version 2022-2023                                                */
/*=============================================================================*/
/*  Program:      RUG-III Plus grouping methodology using iCodes for LTCF.sas  */
/*                                                                             */
/*  Purpose:      SAS codes for grouping the LTCF data using interRAI iCodes   */
/*                                                                             */
/*  Created:        April 28, 2017 revised June 29th 2017 to include sCPS and  */
/*                  sDRS code and ICD-10-CA sepsis codes                       */
/*                                                                             */
/*  Updated:        March 15, 2021                                             */
/*                  - sDRS excluded from valid iCodes checklist                */
/*                  - Values range is corrected in description on iE3a to iE3f */
/*                  - Outcome variable names are kept without 'CIHI_' prefix   */
/*                    i.e. aR3, aR3a, aNR3, aNR3a                              */
/*                                                                             */
/*  Notes:          Grouper Codes provided by interRAI                         */
/*                                                                             */
/*  APPLIES TO:     interRAI LTCF only                                         */
/*                                                                             */
/*  DESCRIPTION:    RUG-III Plus is a resource-intensity (case-mix) measurement*/
/*                  system designed for use in nursing homes.                  */
/*                                                                             */
/*                                                                             */
/*  REFERENCES:     Fries BE, Schneider D, Foley WJ, Gavazzi M, Burke R, Cornelius */
/*                  E. "Refining a Case-Mix Measure for Nursing Homes: Resource */
/*                  Utilization Groups (RUG-III)" Medical Care 32(7):668-685 (July) */
/*                  1994.                                                      */
/*                                                                             */
/*  INTERPRETATION: See article above for basic description.  This code is based */
/*                  on RUG-III originally developed for use with the MDS Version 2.0*/
/*                  assessment form.  This version is a modification of a newer */
/*                  model called the RUG-III 1997 Update.  RUG-III 1997 Update is */
/*                  based on a nursing home staff time measurement study conducted */
/*                  in nursing homes in a number of US states during 1995.  The code*/
/*                  here crosswalks this version to the interRAI Suite interRAI LTCF*/
/*                  (Long-Term Care Facility).                                 */
/*                  Note that there are two versions for RUG-III for the       */
/*                  interRAI LTCF.  The "base" version does not utilize the item */
/*                  describing nursing rehabilitation for final splits in the  */
/*                  impaired cognition, behavior problems, and reduced physical */
/*                  function categories.  As a result, 9 pairs of groups are merged */
/*                  resulting in a total of 35 interRAI RUG-III groups (rather than */
/*                  44 in the original system). The "A" version more closely matches*/
/*                  the original, 44-group system with these final splits.     */
/*                                                                             */
/*  INPUT VARIABLES: The interRAI LTCF Version 2.0 variables required by the SAS */
/*                  code for interRAI RUG-III classification are given below.  For */
/*                  each variable, the interRAI 'iCODE' item and label are given. */
/*                  Specification of these 'iCODES' and links to specific items in */
/*                  the interRAI LTCF are available in the iCODE MATRIX,       */
/*                  available from interRAI.                                   */
/*                                                                             */
/*  Before execution of RUG-III PLUS classification using the SAS code,        */
/*  all iCODE items (that are used for grouper) must be scanned                */
/*  for valid values. Note that ONLY ICD-10 codes will  be used                */
/*                                                                             */
/*=============================================================================*/
```

```
/*=====================================================================*/
/* MACRO create_sCPS_scale                                             */
/*=====================================================================*/
%MACRO create_sCPS_scale;

/*note: if iC1 = 5 then iC2a and iD1 are missing */
/* if iC1 ne 5 then no items should be missing   */

**  CREATE IMPAIRMENT COUNTS  **;
xcps1 = 0;                                          **  IMPAIRMENT COUNT  **;
   if iC1 in (1,2,3)                              then xcps1 = xcps1 + 1;
   if iD1 in (1,2,3,4)                            then xcps1 = xcps1 + 1;
   if iC2a = 1                                    then xcps1 = xcps1 + 1;

xcps2 = 0;        **  SEVERE IMP COUNT  **;
   if  iC1 = 3                                    then xcps2 = xcps2 + 1;
   if  iD1 in (3,4)                               then xcps2 = xcps2 + 1;

**  COMPUTE CPS SCALE  **;
if iC1 = 5                                        then sCPS = 6;
   else if iC1 = 4 then do;
       if iG2j in (6,8)                           then sCPS = 6;
          else if iG2j in (0,1,2,3,4,5)           then sCPS = 5;
   end;
   else if (iC1 > = 0 and iC1 < 4) then do;
       if xcps1 in (2,3) then do;
          if xcps2 = 2                            then sCPS = 4;
             else if xcps2 = 1                    then sCPS = 3;
             else if xcps2 = 0                    then sCPS = 2;
        end;
        else if xcps1 = 1                         then sCPS = 1;
        else if xcps1 = 0                         then sCPS = 0;
   end;

 %MEND create_sCPS_scale;
```

```
/*=====================================================================*/
/* MACRO create_sDRS_scale                                             */
/*=====================================================================*/
%MACRO create_sDRS_scale;

**  CALCULATE SCALE ONLY WHEN NO VARIABLE HAS AN INVALID VALUE  **;
if iE1a in(0,1,2,3) and iE1b in(0,1,2,3) and iE1c in(0,1,2,3)
   and iE1d in(0,1,2,3) and iE1e in(0,1,2,3) and iE1f in(0,1,2,3)
   and iE1g in(0,1,2,3) then do;

**  COMPUTE DRS SCALE  **;
sDRS = 0;
     if iE1a in (1,2)    then sDRS = sDRS + 1;
else if iE1a in (3)      then sDRS = sDRS + 2;
     if iE1b in (1,2)    then sDRS = sDRS + 1;
else if iE1b in (3)      then sDRS = sDRS + 2;
     if iE1c in (1,2)    then sDRS = sDRS + 1;
else if iE1c in (3)      then sDRS = sDRS + 2;
     if iE1d in (1,2)    then sDRS = sDRS + 1;
else if iE1d in (3)      then sDRS = sDRS + 2;
     if iE1e in (1,2)    then sDRS = sDRS + 1;
else if iE1e in (3)      then sDRS = sDRS + 2;
     if iE1f in (1,2)    then sDRS = sDRS + 1;
else if iE1f in (3)      then sDRS = sDRS + 2;
     if iE1g in (1,2)    then sDRS = sDRS + 1;
else if iE1g in (3)      then sDRS = sDRS + 2;

end;

%MEND create_sDRS_scale;
```

```
/*=====================================================================*/
/* Macro to run the RUG-III-PLUS LTCF grouping methodology using iCodes  */
/*=====================================================================*/
%MACRO RUG_IIIp_LTCF_grouper;

/* include the macro to create sDRS scale */
%create_sDRS_scale;
/* include the macro to create sCPS scale */
%create_sCPS_scale;


/*  Valid iCode value check                                            */
if (iC1 = 5 or (iE3a in (0,1,2,3) and iE3b in (0,1,2,3)   and iE3c in (0,1,2,3)
 and iE3d in  (0,1,2,3)         and iE3e in (0,1,2,3)   and iE3f in (0,1,2,3)))
 and iG2g in  (0,1,2,3,4,5,6,8) and iG2h in (0,1,2,3,4,5,6,8)
 and iG2i in  (0,1,2,3,4,5,6,8) and iG2j in (0,1,2,3,4,5,6,8)
 and iI1e in  (0,1,2,3)         and iI1f in (0,1,2,3)   and iI1i in (0,1,2,3)
 and iI1q in  (0,1,2,3)         and iI1t in (0,1,2,3)
 and iJ2h in  (0,1,2,3,4)       and iJ2i in (0,1,2,3,4) and iJ2j in (0,1,2,3,4)
 and iJ2n in  (0,1,2,3,4)       and iJ2q in (0,1,2,3,4) and iJ2r in (0,1,2,3,4)
 and iJ6c in  (0,1)             and iK2a in (0,1)       and iK2c in (0,1)
 and iK3  in  (0,1,2,3,4,5,6,7,8,9)                     and iK5 in (0,1,2,3)
 and iL1  in  (0,1,2,3,4,5)     and iL4  in (0,1)
 and iL5  in  (0,1)             and iL7  in (0,1,2,3,4)
 and iN2a in  (0,1,2,3)         and iN2b in (0,1,2,3)   and iN2c in (0,1,2,3)
 and iN2e in  (0,1,2,3)         and iN2f in (0,1,2,3)
 and iN2h in  (0,1,2,3)         and iN2i in (0,1,2,3)   and iN2j in (0,1,2,3)
 and iN2k in  (0,1,2,3)         and iN2n in (0,1,2,3)
 and iN3ea in (0,1,2,3,4,5,6,7) and (0 <=iN3eb <=999)
 and iN3fa in (0,1,2,3,4,5,6,7) and (0 <=iN3fb <=999)
 and iN3ga in (0,1,2,3,4,5,6,7) and (0 <=iN3gb <=999)
 and iN3ja in (0,1,2,3,4,5,6,7)
 and (0 <= iN7 <= 14)           and (0 <= iN8  <= 14)   and iS3  in (0,1,2,3)
then do;


/*---------------------------------------------------------------------------*/
/* Step I.  Initialize needed variables.                                     */
/*---------------------------------------------------------------------------*/

** Initialize clinical category indicators                                  **;
xreh_u   = 0;
xreh_v   = 0;
xreh_h   = 0;
xreh_m   = 0;
xreh_l   = 0;
x_ext    = 0;
x_spec   = 0;
x_clin   = 0;
x_behav  = 0;
x_impair = 0;
```

```
/*-------------------------------------------------------------------------*/
/* Step II. Calculate RUG-III ADL Index.                                   */
/*  The ADL index is required for use in splitting the Special Rehabilitation,*/
/*     Special Care, Clinically Complex, Impaired Cognition, Behavior      */
/*     Problems, and Reduced Physical Function RUG-III clinical            */
/*     categories.  The ADL index requires scoring conversion for          */
/*     4 different ADLs and then summation.                                */
/*-------------------------------------------------------------------------*/
x_adlsum = .;

** ADL scoring conversion for Bed mobility                                  ;
IF      ( iG2i = 0  OR  iG2i = 1  OR iG2i = 2 )              THEN x_bedmb = 1;
ELSE IF ( iG2i = 3 )                                         THEN x_bedmb = 3;
ELSE IF ( iG2i = 4 )                                         THEN x_bedmb = 4;
ELSE IF ( iG2i = 5  OR  iG2i = 6  OR iG2i = 8 )              THEN x_bedmb = 5;

** ------------------------------                                          ;
** ADL scoring conversion for Transfer                                     ;
IF      ( iG2g = 0  OR  iG2g = 1  OR iG2g = 2 )              THEN x_trans = 1;
ELSE IF ( iG2g = 3 )                                         THEN x_trans = 3;
ELSE IF ( iG2g = 4 )                                         THEN x_trans = 4;
ELSE IF ( iG2g = 5  OR  iG2g = 6  OR iG2g = 8 )              THEN x_trans = 5;

** ------------------------------                                          ;
** ADL scoring conversion for Toilet Use                                   ;
IF      ( iG2h = 0  OR  iG2h = 1  OR iG2h = 2 )              THEN x_toilt = 1;
ELSE IF ( iG2h = 3 )                                         THEN x_toilt = 3;
ELSE IF ( iG2h = 4 )                                         THEN x_toilt = 4;
ELSE IF ( iG2h = 5  OR  iG2h = 6  OR iG2h = 8 )              THEN x_toilt = 5;

** ------------------------------                                          ;
** Code parenteral\enteral intake level--used for Eating scoring conversion and;
** later for Special Care and Clinically Complex qualification.           ;
**    x_intake = 1 if (1) 51% or more of total calories are received     ;
**                 through parenteral/enteral intake (iK5) or (2) 26% to 50%  ;
**                 of total calories received through parenteral/enteral      ;
**                 intake (iK5) and fluid intake is 501 or more cc per day    ;
**                 (iK2b).                                                    ;
**                 NOTE: Cannot replicate in interRAI LTCF- only use parenteral;
**                 or enteral intake only, or joint if >=26% of calories      ;
**    x_intake = 0 if parenteral/enteral intake is at a lower level (including ;
**                 none).                                                     ;

IF      iK5 = 3   THEN x_intake = 1;
ELSE                   x_intake = 0;

** ADL scoring conversion for Eating                                        ;
IF      ( iK3  = 6  OR  iK3  = 7 OR  iK3 = 8 ) OR (iK3 = 5  AND  x_intake = 1 )
                                                          THEN x_eatng = 3;
ELSE IF ( iG2j = 4  OR  iG2j = 5  OR iG2j = 6 OR  iG2j = 8 )   THEN x_eatng = 3;
ELSE IF ( iG2j = 3 )                                      THEN x_eatng = 2;
ELSE                                                           x_eatng = 1;


** ------------------------------                                          ;
** Sum the converted ADL scores to x_adlsum;                               ;
x_adlsum = x_bedmb + x_trans + x_toilt + x_eatng;
```

```
/*-------------------------------------------------------------------------*/
/* Step III. Determine Rehab and Rehab nursing variables needed for        */
/*             Special Rehabilitation category.                            */
/*           Variables needed to determine Special Rehabilitation clinical */
/*             hierarchy qualification for Standard rehab classification   */
/*              - Total minutes of rehab therapy received (x_th_min)       */
/*              - Total number of days of rehab received (x_th_day)        */
/*              - Number of types of rehab therapy (x_th_ty3) received     */
/*                   at 3+ days each                                       */
/*              - Number of types of rehab therapy (x_th_ty5) received     */
/*                   at 5+ days each                                       */
/*-------------------------------------------------------------------------*/

** ------------------------------                                          ;
** Determine x_th_min -- the number of minutes of rehab therapy received.  ;

x_th_min = 0;

** Add speech therapy minutes                                             ;
IF (  iN3gb > 0 )                 THEN x_th_min = x_th_min + iN3gb;

** Add occupational therapy minutes                                       ;
IF (  iN3fb > 0 )                 THEN x_th_min = x_th_min + iN3fb;

** Add physical therapy minutes                                           ;
IF (  iN3eb > 0 )                 THEN x_th_min = x_th_min + iN3eb;


** ------------------------------                                          ;
** Determine x_th_day -- the number of days of rehab therapy received.    ;

x_th_day = 0;

** Add speech therapy days if in valid numeric range                      ;
IF (1 <=  iN3ga  AND  iN3ga <= 7)  THEN x_th_day = x_th_day + iN3ga;

** Add occupational therapy days if in valid numeric range                ;
IF (1 <=  iN3fa  AND  iN3fa <= 7)  THEN x_th_day = x_th_day + iN3fa;

** Add physical therapy days if in valid numeric range                    ;
IF (1 <=  iN3ea  AND  iN3ea <= 7)  THEN x_th_day = x_th_day + iN3ea;


** ------------------------------                                          ;
** Determine x_th_ty3.                                                    ;
**    x_th_ty3 represents the number of different rehab therapies that    ;
**    were provided on 3 or more days during that period. It is used      ;
**    to determine qualification for Ultra High intensity rehab.          ;

x_th_ty3 = 0;
IF (3 <=  iN3ga  AND  iN3ga <= 7)  THEN x_th_ty3 = x_th_ty3 + 1;
IF (3 <=  iN3fa  AND  iN3fa <= 7)  THEN x_th_ty3 = x_th_ty3 + 1;
IF (3 <=  iN3ea  AND  iN3ea <= 7)  THEN x_th_ty3 = x_th_ty3 + 1;
```

```
** ------------------------------                                              ;
** Determine x_th_ty5.                                                        ;
**    x_th_ty5 represents the number of different rehab therapies that       ;
**    were provided on 5 or more days during that period. It is used          ;
**    to determine qualification for Ultra High, Very High and High          ;
**    intensity rehab.                                                        ;

x_th_ty5 = 0;
IF (5 <=  iN3ga  AND  iN3ga <= 7)  THEN x_th_ty5 = x_th_ty5 + 1;
IF (5 <=  iN3fa  AND  iN3fa <= 7)  THEN x_th_ty5 = x_th_ty5 + 1;
IF (5 <=  iN3ea  AND  iN3ea <= 7)  THEN x_th_ty5 = x_th_ty5 + 1;

** ------------------------------                                              ;
** Determine threshold for nursing rehabilitation therapies                 **;

x_nrehab=0;
if (5 <= iN3ja   AND  iN3ja <= 7)  THEN x_nrehab=1;

** ------------------------------                                              ;
```

```
/*-------------------------------------------------------------------------------*/
/* Step IV. Test Special Rehabilitation category qualification.                  */
/*           Rehab categories are separated by several factors Total minutes     */
/*           of rehab therapy, number of types of therapy, and number of types*/
/*           of nursing rehab activities.                                        */
/*                                                                               */
/*-------------------------------------------------------------------------------*/

** ------------------------------                                                ;
** Determine qualification for Ultra High Rehab                                  ;
        ** ------------------------------                                        ;
        ** Resident qualifies for Ultra High Intensity Rehab.                    ;
        **    Qualifications                                                     ;
        **       (1) 720+ minutes received across all types (x_th_min)         ;
        **                   AND                                               ;
        **       (2) 5+ days received for 1 type of therapy (x_th_ty5)         ;
        **                   AND                                               ;
        **       (3) 3+ days received for a second type of                     ;
        **           therapy (x_th_ty3)                                        ;

IF (       x_th_min >= 720
       AND x_th_ty5 >= 1
       AND x_th_ty3 >= 2   )
  THEN                     xreh_u = 1;


** ------------------------------                                                ;
** Determine qualification for Very High Rehab                                   ;
        ** ------------------------------                                        ;
        ** Resident qualifies for Very High Intensity Rehab.                     ;
        **    Qualifications                                                     ;
        **       (1) 500+ minutes received across all types (x_th_min)         ;
        **                   AND                                               ;
        **       (2) 5+ days received for 1 type of therapy (x_th_ty5)         ;

IF (       x_th_min >= 500
       AND x_th_ty5 >= 1  )
  THEN                     xreh_v = 1;


** ------------------------------                                                ;
** Determine qualification for High Rehab                                        ;
         ** ------------------------------                                       ;
         ** Resident qualifies for High Intensity Rehab.                         ;
         **       Qualifications                                                ;
         **          (1) 325+ minutes received across all types (x_th_min)     ;
         **                    AND                                             ;
         **          (2) 5+ days received for 1 type of therapy (x_th_ty5)     ;

IF (       x_th_min >= 325
       AND x_th_ty5 >= 1   )
  THEN                     xreh_h = 1;
```

```
** ------------------------------                                              ;
** Determine qualification for Medium Rehab                                   ;
         ** ------------------------------                                     ;
         ** Resident qualifies for Medium Rehab.                              ;
         **       Qualifications                                             ;
         **          (1) 150+ minutes received across all types (x_th_min)   ;
         **                 AND                                             ;
         **          (2) 5+ days received across all types of                ;
         **              therapy (x_th_day)                                  ;
         **                                                                  ;
IF (x_th_min >= 150 AND x_th_day >= 5)
  THEN                     xreh_m = 1;


** ------------------------------                                              ;
** Determine qualification for Low Rehab                                      ;
         ** ------------------------------                                     ;
         ** Resident qualifies for Low Intensity Rehab.                       ;
         **       Qualifications                                             ;
         **          (1) 45+ minutes received across all types (x_th_min)    ;
         **                 AND                                             ;
         **          (2) 3+ days received across all types of                ;
         **              therapy (x_th_day)                                  ;
         **                 AND                                             ;
         **          (3) We cannot use the fullowing criterion:              ;
         **              2+ nursing rehab activities at 6+ days each         ;
         **                                                                  ;

IF (x_th_min >= 45 AND x_th_day >= 3)
  THEN                     xreh_l = 1;
```

```
/*-------------------------------------------------------------------------------*/
/* Step V.  Test Extensive Services qualification.                               */
/*-------------------------------------------------------------------------------*/
**                                                                               ;
** -------------------------------                                               ;
** Determine qualification for Extensive Services.                               ;
**                                                                               ;
** Check for required Extensive Services clinical indicators.                    ;
   ** -------------------------------                                            ;
   ** Resident qualifies for Extensive Services category on the basis of        ;
   ** clinical indicators.                                                       ;
   **    Qualifications                                                         ;
   **       Infection control segregation (iN2c) OR                             ;
   **       Tracheostomy care (iN2h)                                            ;
   **       ventilator or respirator (iN2j).                                    ;
   ** -------------------------------                                            ;

IF (  iN2c = 2 OR iN2c = 3  OR
      iN2h = 2 OR iN2h = 3  OR
      iN2j = 2 OR iN2j = 3)
  THEN   x_ext = 1;
```

```
/*-------------------------------------------------------------------------------*/
/* Step VI.  Test Special Care qualification.                                    */
/*-------------------------------------------------------------------------------*/
** NOTE: DO NOT USE DISEASE CODE (iI2aa-iI2af) as assumed non-zero              ;
**       if ICD-10 CA is coded                                                  ;
** ICD-10 CA: assumes left justified character format CCC.CC.  In SAS, this is  ;
** handled by the SUBSTR function. The function SUBSTR(var,1,x) extracts the   ;
** leftmost 'x' characters from the string 'var'.                               ;

** Code Cerebral Palsy from ICD-10 CA Code;
x_cpal=0;

** Code Cerebral Palsy from ICD-10 CA Code                                      ;
** ICD-10 CA CODES for cerebral palsy: G80.x                                    ;
IF SUBSTR(iI2abb,1,3)= 'G80' THEN x_cpal=1;
IF SUBSTR(iI2bbb,1,3)= 'G80' THEN x_cpal=1;
IF SUBSTR(iI2cbb,1,3)= 'G80' THEN x_cpal=1;
IF SUBSTR(iI2dbb,1,3)= 'G80' THEN x_cpal=1;
IF SUBSTR(iI2ebb,1,3)= 'G80' THEN x_cpal=1;
IF SUBSTR(iI2fbb,1,3)= 'G80' THEN x_cpal=1;

** Code Septicemia from ICD-10 CA Code                                         ;
** CIHI is providing guidance to use A40. or A41. for coding sepsis using     ;
** ICD-10 CA however the RUG-III PLUS LTCF sas code and flow charts documents  ;
** include a broader list of ICD-10 CA sepsis codes.  ;
** ICD-10 CA CODES for septicemia: A40 A41 R65 B00.7 A02.1 A22.7 A24.1 A26.7 A32.7
A42.7 B37.7;

x_sept=0;

IF SUBSTR(iI2abb,1,3) in ('A40', 'A41', 'R65') THEN x_sept=1;
IF SUBSTR(iI2bbb,1,3) in ('A40', 'A41', 'R65') THEN x_sept=1;
IF SUBSTR(iI2cbb,1,3) in ('A40', 'A41', 'R65') THEN x_sept=1;
IF SUBSTR(iI2dbb,1,3) in ('A40', 'A41', 'R65') THEN x_sept=1;
IF SUBSTR(iI2ebb,1,3) in ('A40', 'A41', 'R65') THEN x_sept=1;
IF SUBSTR(iI2fbb,1,3) in ('A40', 'A41', 'R65') THEN x_sept=1;


IF SUBSTR(iI2abb,1,5) in ('B00.7', 'A02.1', 'A22.7', 'A24.1', 'A26.7',
                          'A32.7', 'A42.7', 'B37.7')
THEN x_sept=1;
IF SUBSTR(iI2bbb,1,5) in ('B00.7', 'A02.1', 'A22.7', 'A24.1', 'A26.7',
                          'A32.7', 'A42.7', 'B37.7')
THEN x_sept=1;
IF SUBSTR(iI2cbb,1,5) in ('B00.7', 'A02.1', 'A22.7', 'A24.1', 'A26.7',
                          'A32.7', 'A42.7', 'B37.7')
THEN x_sept=1;
IF SUBSTR(iI2dbb,1,5) in ('B00.7', 'A02.1', 'A22.7', 'A24.1', 'A26.7',
                          'A32.7', 'A42.7', 'B37.7')
THEN x_sept=1;
IF SUBSTR(iI2ebb,1,5) in ('B00.7', 'A02.1', 'A22.7', 'A24.1', 'A26.7',
                          'A32.7', 'A42.7', 'B37.7')
THEN x_sept=1;
IF SUBSTR(iI2fbb,1,5) in ('B00.7', 'A02.1', 'A22.7', 'A24.1', 'A26.7',
                          'A32.7', 'A42.7', 'B37.7')
THEN x_sept=1;
```

```
** ------------------------------                                              ;
** Check for required Special Care clinical indicators                         ;
         ** ----------------------------                                       ;
         ** Resident qualifies for Special Care category on the basis of       ;
         ** clinical indicators.                                              ;
         **    Qualifications (any one sufficient)                            ;
         **       1. Stage 3  or 4 pressure ulcer (iL1) (Note: Do not have    ;
         **          count of ulcers),                                        ;
         **             AND                                                   ;
         **          turning and positioning (iN2n).                          ;
         **       2. Feeding tube (iK3) WITH parenteral/enteral intake       ;
         **          (x_intake) AND aphasia (iJ2j).                           ;
         **       3. Major skin problems (iL4) or Skin tears or cuts (iL5),  ;
         **            with wound care (iN2k)                                 ;
         **       4. Respiratory therapy for 7 days (iN3ia).                 ;
         **       5. Cerebral palsy (x_cpal) AND ADL score of 10 or more     ;
         **          (x_adlsum).                                              ;
         **       6. Fever (iJ2q)                                            ;
         **             AND                                                   ;
         **          vomiting (iJ2n) OR weight loss (iK2a) OR tube feeding    ;
         **          (iK3) WITH high parenteral/enteral intake (x_intake)     ;
         **          OR pneumonia (iI1q) OR dehydrated (iK2c).                ;
         **       7. Multiple sclerosis (iI1f) AND ADL score of 10 or more   ;
         **          (x_adlsum).                                              ;
         **       8. Quadriplegia (iI1i) AND ADL score of 10 or more         ;
         **          (x_adlsum).                                              ;
         **       9. Radiation therapy (iN2f).                               ;

IF (      ( (iL1 = 3 OR iL1 = 4) AND (iN2n = 2 OR iN2n = 3) )
      OR  ( (iK3 = 6 OR (iK3=5 AND x_intake = 1)) AND
            (iJ2j = 2 OR iJ2j = 3 OR iJ2j = 4) )
      OR  ( (iL4 = 1 OR iL5 = 1) AND (iN2k = 2 OR iN2k = 3) )
      OR   iN3ia = 7
      OR  (x_cpal=1 AND x_adlsum >= 10)
      OR  ( (iJ2q =2 OR iJ2q = 3 OR iJ2q = 4)
              AND
            ( (iJ2n =2 OR iJ2n = 3 OR iJ2n = 4)
               OR    iK2a = 1
               OR  (iK3 = 6 OR (iK3=5 AND x_intake = 1))
               OR   (iI1q = 1 OR iI1q = 2 OR iI1q = 3 OR iK2c=1) )  )
      OR  (  (iI1f = 1 OR iI1f = 2 OR iI1f = 3)  AND  x_adlsum >= 10)
      OR  (  (iI1i = 1 OR iI1i = 2 OR iI1i = 3)  AND  x_adlsum >= 10)
      OR  (  iN2f = 2 OR iN2f =3)  )
  THEN
         x_spec = 1;
```

```
/*-------------------------------------------------------------------------------*/
/* Step VII. Test Clinically Complex qualification.                              */
/*-------------------------------------------------------------------------------*/

** -------------------------------                                               ;
** Calculate x_coma indicating whether the resident is comatose with qualifiers ;
**       x_coma = 1 if resident is comatose (iC1 = 5) and not awake most of the;
**                  time (iS3=1,2, or 3) and ADL dependent (iG2i, iG2g, iG2j,  ;
**                  and iG2h all have values of 6 or 8).                       ;
**              = 0 otherwise.                                                 ;

x_coma = 0;

IF (  iC1 = 5
        AND  ( iS3=1 OR iS3=2 OR iS3=3)
        AND  ( iG2i = 6  OR  iG2i = 8)
        AND  ( iG2g = 6  OR  iG2g = 8)
        AND  ( iG2j = 6  OR  iG2j = 8)
        AND  ( iG2h = 6  OR  iG2h = 8) )
  THEN
          x_coma = 1;
```

```
** ------------------------------                                              ;
** Check for Clinically Complex qualification.                                 ;
         ** Resident qualifies for Clinically Complex category on the basis of  ;
         ** clinical indicators.                                               ;
         ** ----------------------------                                       ;
         **    Qualifications (any one sufficient)                            ;
         **       1. Feeding tube (iK3) WITH high parenteral/enteral          ;
         **          intake (x_intake).                                       ;
         **       2. Comatose (iC1=5) AND not awake (iS3) AND                 ;
         **          ADL dependent (iG2i, iG2g, iG2j, iG2h).                  ;
         **       3. Septicemia (x_sept).                                     ;
         **       4. Burns--second or third degree (not available separately) ;
         **       5. Dehydration (iK2c).                                      ;
         **       6. Hemiplegia/hemiparesis (iI1e) and ADL score of           ;
         **          10 or more (x_adlsum).                                   ;
         **       7. Internal bleeding (iJ2r).                                ;
         **       8. Pneumonia (iI1q).                                        ;
         **       9. End stage disease (iJ6c).                                ;
         **      10. Chemotherapy (iN2a).                                     ;
         **      11. Dialysis (iN2b).                                         ;
         **      12. Physician order changes (iN8) on 4 or more days          ;
         **          AND physician visits (iN7) on 1 or more days.            ;
         **      13. Physician order changes (iN8) on 2 or more days          ;
         **          AND physician visits (iN7) on 2 or more days.            ;
         **      14. Diabetes (iI1t) AND injections (not available) on 7 days ;
         **          AND physician order changes (iN8) on 2 or more           ;
         **          days.   (Eventually, get insulin injections from drug list;
         **      15. Transfusions (iN2i).                                     ;
         **      16. Oxygen therapy (iN2e).                                   ;
         **      17. Infection on foot (m6b) OR open lesion on foot (m6c)     ;
         **             AND                                                   ;
         **          application of dressings to foot (m6f)                   ;
         **        Replaced by Foot problems that limit/prevent walking (iL7) ;
         **                                                                   ;


IF (     (iK3=6)  OR  (iK3 = 5  AND  x_intake = 1)
      OR    x_coma = 1
      OR    x_sept = 1
      OR    iK2c = 1
      OR  ( ( iI1e = 1 OR iI1e = 2 OR iI1e = 3)  AND  x_adlsum >= 10)
      OR  (  iJ2r = 2 OR iJ2r = 3 OR iJ2r = 4)
      OR  (  iI1q = 1 OR iI1q = 2 OR iI1q = 3)
      OR    iJ6c = 1
      OR  ( iN2a = 2 OR iN2a = 3)
      OR  ( iN2b = 2 OR iN2b = 3)
      OR  ((4 <= iN8  AND  iN8 <= 14)  AND
           (1 <= iN7  AND  iN7 <= 14))
      OR  ((2 <= iN8  AND  iN8 <= 14)  AND
           (2 <= iN7  AND  iN7 <= 14))
      OR  ((iI1t = 1 OR iI1t = 2 OR iI1t = 3)
           AND  (2 <= iN8  AND  iN8 <= 14))
      OR  ( iN2i = 2 OR iN2i = 3)
      OR  ( iN2e = 2 OR iN2e = 3)
      OR  ( iL7 = 2 OR iL7 = 3) )
  THEN
        x_clin = 1;
```

```
/*-------------------------------------------------------------------------------*/
/* Step VIII.  Determine depression variable (x_depres) needed                   */
/*                for splitting the Clinically Complex Category.                 */
/*             x_depres is a depression flag indicating presence of              */
/*                depression (value 1) or absence of depression (value 0).       */
/*-------------------------------------------------------------------------------*/


** Replaced by interRAI Depression Scale                                         ;
** Be sure to run sDRS prior to running this code                                ;
** ------------------------------                                               ;
** Set depression flag (x_depres).                                              ;
IF sDRS >= 3   THEN  x_depres = 1;
ELSE                 x_depres = 0;



/*-------------------------------------------------------------------------------*/
/* Step IX. Test Cognitive Impairment qualification.                             */
/*-------------------------------------------------------------------------------*/
**                                                                              ;
** Note  Use interRAI Cognitive Performance Scale (sCPS)                        ;

** Be sure to run sCPS code before running this program                         ;

** ------------------------------                                               ;
** Determine Cognitive Impairment qualification.                                ;
**    Qualification if Cognitive Performance Scale is 3 or more.                ;

IF      sCPS >= 3  THEN   x_impair = 1;
ELSE                      x_impair = 0;
```

```
/*-------------------------------------------------------------------------------*/
/* Step X. Test Behavior Problems qualification.                                 */
/*-------------------------------------------------------------------------------*/

** ------------------------------                                               ;
** Check for Behavior Problems qualification.                                   ;
         ** ------------------------------                                      ;
         ** Behavior Problems Qualifications (any one sufficient)               ;
         **       1. Wandering occurred on 4 or more days (iE3a).              ;
         **       2. Verbally abusive behavior occurred on 4 or more           ;
         **          days (iE3b).                                              ;
         **       3. Physically abusive behavior occurred on 4 or              ;
         **          more days (iE3c).                                         ;
         **       4. Socially inappropriate/disruptive behavior                ;
         **          occurred on 4 or more days (iE3d).                        ;
         **       5. Resident resisted care on 4 or more days (iE3e).          ;
         **       6. Sexually inapprop. Behav 4 or more days (iE3f)            ;
         **       7. Hallucinations (iJ2i).                                    ;
         **       8. Delusions (iJ2h).                                         ;

IF (     (iE3a = 2  OR  iE3a = 3)
     OR  (iE3b = 2  OR  iE3b = 3)
     OR  (iE3c = 2  OR  iE3c = 3)
     OR  (iE3d = 2  OR  iE3d = 3)
     OR  (iE3e = 2  OR  iE3e = 3)
     OR  (iE3f = 2  OR  iE3f = 3)
     OR  (iJ2i = 2 OR iJ2i = 3 OR iJ2i = 4)
     OR  (iJ2h = 2 OR iJ2h = 3 OR iJ2h = 4) )
   THEN
         x_behav = 1;
```

```
/*-------------------------------------------------------------------------------*/
/* Step XI. Classify into RUG-III Plus Groups                                    */
/*-------------------------------------------------------------------------------*/

** ------------------------------                                                ;
** Classify into Special Rehabilitation Groups **                               ;
**  All final splits based on ADL sum (x_adlsum).                               ;

** ------------------------------                                                ;
** Classify into Ultra High Intensity Rehab groups **                           ;
**                                                                              ;
**    Classify if Ultra High rehab indicators present.                          ;
**                                                                              ;
**    Determine final splits for Ultra High Intensity Rehab residents           ;
**    on the basis of ADL sum.                                                  ;

IF xreh_u = 1  THEN DO;

   IF      (16 <= x_adlsum  AND  x_adlsum <= 18)   THEN aR3 = 'RUC';
   ELSE IF ( 9 <= x_adlsum  AND  x_adlsum <= 15)   THEN aR3 = 'RUB';
   ELSE IF ( 4 <= x_adlsum  AND  x_adlsum <=  8)   THEN aR3 = 'RUA';
END;



** ------------------------------                                                ;
** Classify into Very High Intensity Rehab groups **                            ;
**                                                                              ;
**    Classify if Very High rehab indicators present                            ;
**                                                                              ;
**    Determine final splits for Very High Intensity Rehab residents            ;
**    on the basis of ADL sum.                                                  ;

ELSE IF (xreh_v = 1)  THEN DO;

   IF      (16 <= x_adlsum  AND  x_adlsum <= 18)   THEN aR3 = 'RVC';
   ELSE IF ( 9 <= x_adlsum  AND  x_adlsum <= 15)   THEN aR3 = 'RVB';
   ELSE IF ( 4 <= x_adlsum  AND  x_adlsum <=  8)   THEN aR3 = 'RVA';
END;



** ------------------------------                                                ;
** Classify into High Intensity Rehab groups **                                 ;
**                                                                              ;
**    Classify if High Rehab indicators present                                 ;
**                                                                              ;
**    Determine final splits for High Intensity Rehab residents                 ;
**    on the basis of ADL sum.                                                  ;

ELSE IF (xreh_h = 1)  THEN DO;

   IF      (13 <= x_adlsum  AND  x_adlsum <= 18)   THEN aR3 = 'RHC';
   ELSE IF ( 8 <= x_adlsum  AND  x_adlsum <= 12)   THEN aR3 = 'RHB';
   ELSE IF ( 4 <= x_adlsum  AND  x_adlsum <=  7)   THEN aR3 = 'RHA';
END;
```

```
** ------------------------------                                              ;
** Classify into Medium Intensity Rehab groups **                              ;
**                                                                             ;
**    Classify if Medium Rehab indicators present                              ;
**                                                                             ;
**    Determine final splits for Medium Intensity Rehab residents              ;
**    on the basis of ADL sum.                                                 ;

ELSE IF (xreh_m = 1)  THEN DO;

   IF      (15 <= x_adlsum  AND  x_adlsum <= 18)  THEN aR3 = 'RMC';
   ELSE IF ( 8 <= x_adlsum  AND  x_adlsum <= 14)  THEN aR3 = 'RMB';
   ELSE IF ( 4 <= x_adlsum  AND  x_adlsum <=  7)  THEN aR3 = 'RMA';
END;


** ------------------------------                                              ;
** Classify into Low Intensity Rehab groups **                                 ;
**                                                                             ;
**    Classify if Low Rehab indicators present                                 ;
**                                                                             ;
**    Determine final splits for Low Intensity Rehab residents                 ;
**    on the basis of ADL sum.                                                 ;

ELSE IF (xreh_l = 1)  THEN DO;

   IF      (14 <= x_adlsum  AND  x_adlsum <= 18)   THEN aR3 = 'RLB';
   ELSE IF ( 4 <= x_adlsum  AND  x_adlsum <= 13)   THEN aR3 = 'RLA';
END;
```

```
** ------------------------------                                                ;
** Classify into Extensive Services Groups **                                   ;
**                                                                              ;
** To be classified as Extensive Services a resident must qualify on the       ;
**     basis of having Extensive Services clinical indicators (x_ext = 1)  and ;
**     an ADL sum of 7 or more                                                  ;
**                                                                              ;
**     Note that residents who have Extensive Services clinical indicators     ;
**     but have too low an ADL score (6 or less) are classified as Special Care ;
**     rather than Extensive Services.                                          ;

ELSE IF  (x_ext = 1  AND  x_adlsum >=7)  THEN DO;
       IF           iN2h IN (2,3) AND iN2j IN (2,3) THEN aR3 = 'SE3';
       ELSE IF      iN2h IN (2,3) OR  iN2j IN (2,3) THEN aR3 = 'SE2';
       ELSE                                              aR3 = 'SE1';
END;
```

```
** ------------------------------                                              ;
** Classify into Special Care Groups **                                        ;
**                                                                             ;
** To be classified as Special Care a resident must satisfy one of the        ;
**    two following conditions                                                 ;
**    1. The resident has both Special Care clinical indicators (x_spec = 1)   ;
**       and an ADL sum of 7 or more.                                          ;
**    2. The resident has both Extensive Services indicators (x_ext = 1) and   ;
**       was not already classified as Extensive (i.e., an ADL sum of 6        ;
**       or less).                                                             ;
**                                                                             ;
**    Note that residents who have Special Care clinical indicators but        ;
**    have too low an ADL score (6 or less) are classified as Clinically       ;
**    Complex rather than Special Care.                                        ;
**                                                                             ;
** Split into Special Care groups is based on ADL sum.                         ;

ELSE IF  ((x_spec = 1  AND  x_adlsum >= 7)  OR  x_ext = 1)  THEN DO;

   IF      (17 <= x_adlsum  AND  x_adlsum <= 18)   THEN aR3 = 'SSC';
   ELSE IF (15 <= x_adlsum  AND  x_adlsum <= 16)   THEN aR3 = 'SSB';
   ELSE IF ( 4 <= x_adlsum  AND  x_adlsum <= 14)   THEN aR3 = 'SSA';
END;



** ------------------------------                                              ;
** Classify into Clinically Complex Groups **                                  ;
** To be classified as Clinically Complex a resident must satisfy one of the  ;
**    two following conditions                                                 ;
**    1. The resident has Clinically Complex clinical indicators (x_clin = 1), ;
**    2. The resident has both Special Care indicators (x_spec = 1) and        ;
**       was not already classified as Special Care (i.e., an ADL sum of 6     ;
**       or less).                                                             ;
**                                                                             ;
** Split into Clinically Complex groups is based on ADL sum and depression.    ;

ELSE IF  (x_clin = 1  OR  x_spec = 1)  THEN DO;

   IF      (17 <= x_adlsum  AND  x_adlsum <= 18)  THEN DO;
             IF x_depres = 1                      THEN aR3 = 'CC2';
             ELSE                                      aR3 = 'CC1';
   END;
   ELSE IF (12 <= x_adlsum  AND  x_adlsum <= 16)  THEN DO;
             IF x_depres = 1                      THEN aR3 = 'CB2';
             ELSE                                      aR3 = 'CB1';
   END;
   ELSE IF ( 4 <= x_adlsum  AND  x_adlsum <= 11)  THEN DO;
             IF x_depres = 1                      THEN aR3 = 'CA2';
             ELSE                                      aR3 = 'CA1';
   END;
END;
```

```
** ------------------------------                                                ;
** Classify into Behavior Problems Groups **                                    ;
**                                                                              ;
** To be classified as Behavior Problems the resident has Behavior              ;
**    Problems indicators (x_behav = 1)  and an ADL sum of 10 or less           ;
**                                                                              ;
** Split into Behavior Problems groups is based on ADL sum and nursing          ;
**    rehab                                                                     ;
**    (Note: splits of nursing rehabilitation performed in "A" version only)    ;

ELSE IF  (x_behav = 1  AND  4 <= x_adlsum  AND  x_adlsum <= 10)  THEN DO;

   IF      ( 6 <= x_adlsum  AND  x_adlsum <= 10)  THEN DO;
        aR3 = 'BB0';
        IF x_nrehab=1 THEN aR3a = 'BB2';
        ELSE               aR3a = 'BB1';
   END;

   ELSE IF ( 4 <= x_adlsum  AND  x_adlsum <=  5)  THEN DO;
        aR3 = 'BA0';
        IF x_nrehab=1 THEN aR3a = 'BA2';
        ELSE               aR3a = 'BA1';
   END;

END;


** ------------------------------                                                ;
** Classify into Impaired Cognition Groups **                                   ;
**                                                                              ;
** To be classified as Impaired Cognition the resident has Cognitive            ;
**    Impairment indicators (x_impair = 1)  and an ADL sum of 10 or less        ;
**                                                                              ;
** Split into Impaired Cognition groups is based on ADL sum                     ;
**    (Note: splits of nursing rehabilitation performed in "A" version only)    ;

ELSE IF  (x_impair = 1  AND  4 <= x_adlsum  AND  x_adlsum <= 10)  THEN DO;

   IF      ( 6 <= x_adlsum  AND  x_adlsum <= 10)  THEN DO;
        aR3 = 'IB0';
        IF x_nrehab = 1 THEN aR3a = 'IB2';
        ELSE                 aR3a = 'IB1';
   END;
   ELSE IF ( 4 <= x_adlsum  AND  x_adlsum <=  5)  THEN DO;
        aR3 = 'IA0';
        IF x_nrehab = 1 THEN aR3a = 'IA2';
        ELSE                 aR3a = 'IA1';
   END;
END;
```

```
** ------------------------------                                                ;
** Classify into Reduced Physical Functions Groups **                           ;
**    A resident is classified as Reduced Physical Functions if a previous      ;
**      hierarchical classification has not been made.                          ;
**                                                                              ;
** Split into Reduced Physical Functions groups is based on ADL sum            ;
**    (Note: splits of nursing rehabilitation performed in "A" version only)    ;

ELSE  IF     (16 <= x_adlsum  AND  x_adlsum <= 18)  THEN DO;
       aR3 = 'PE0';
       IF x_nrehab = 1 THEN aR3a = 'PE2';
       ELSE                 aR3a = 'PE1';
END;

ELSE  IF     (11 <= x_adlsum  AND  x_adlsum <= 15)  THEN DO;
       aR3 = 'PD0';
       IF x_nrehab = 1 THEN aR3a = 'PD2';
       ELSE                 aR3a = 'PD1';
END;

ELSE  IF     ( 9 <= x_adlsum  AND  x_adlsum <= 10)  THEN DO;
       aR3 = 'PC0';
       IF x_nrehab = 1 THEN aR3a = 'PC2';
       ELSE                 aR3a = 'PC1';
END;

ELSE  IF     ( 6 <= x_adlsum  AND  x_adlsum <=  8)  THEN DO;
       aR3 = 'PB0';
       IF x_nrehab = 1 THEN aR3a = 'PB2';
       ELSE                 aR3a = 'PB1';
END;

ELSE
DO;   **  NOTE: FOR 4<=x_adlsum<=5;
       aR3 = 'PA0';
       IF x_nrehab = 1 THEN aR3a='PA2';
       ELSE                 aR3a='PA1';
END;
                                                        **;

** RUG-III PLUS Grouping Methodology complete                                  ;

** ADD NUMERICAL GROUP IDENTIFIERS **;

length aNR3 aNR3a 3.;
 IF      aR3 = 'RUC' THEN aNR3 = 111;
 ELSE IF aR3 = 'RUB' THEN aNR3 = 112;
 ELSE IF aR3 = 'RUA' THEN aNR3 = 113;
 ELSE IF aR3 = 'RVC' THEN aNR3 = 121;
 ELSE IF aR3 = 'RVB' THEN aNR3 = 122;
 ELSE IF aR3 = 'RVA' THEN aNR3 = 123;
 ELSE IF aR3 = 'RHC' THEN aNR3 = 131;
 ELSE IF aR3 = 'RHB' THEN aNR3 = 132;
 ELSE IF aR3 = 'RHA' THEN aNR3 = 133;
 ELSE IF aR3 = 'RMC' THEN aNR3 = 141;
 ELSE IF aR3 = 'RMB' THEN aNR3 = 142;
 ELSE IF aR3 = 'RMA' THEN aNR3 = 143;
 ELSE IF aR3 = 'RLB' THEN aNR3 = 151;
 ELSE IF aR3 = 'RLA' THEN aNR3 = 152;
 ELSE IF aR3 = 'SE3' THEN aNR3 = 210;
```

```
 ELSE IF aR3 = 'SE2' THEN aNR3 = 220;
 ELSE IF aR3 = 'SE1' THEN aNR3 = 230;
 ELSE IF aR3 = 'SSC' THEN aNR3 = 310;
 ELSE IF aR3 = 'SSB' THEN aNR3 = 320;
 ELSE IF aR3 = 'SSA' THEN aNR3 = 330;
 ELSE IF aR3 = 'CC2' THEN aNR3 = 411;
 ELSE IF aR3 = 'CC1' THEN aNR3 = 412;
 ELSE IF aR3 = 'CB2' THEN aNR3 = 421;
 ELSE IF aR3 = 'CB1' THEN aNR3 = 422;
 ELSE IF aR3 = 'CA2' THEN aNR3 = 431;
 ELSE IF aR3 = 'CA1' THEN aNR3 = 432;
 ELSE IF aR3 = 'BB0' THEN aNR3 = 510;
 ELSE IF aR3 = 'BA0' THEN aNR3 = 520;
 ELSE IF aR3 = 'IB0' THEN aNR3 = 610;
 ELSE IF aR3 = 'IA0' THEN aNR3 = 620;
 ELSE IF aR3 = 'PE0' THEN aNR3 = 710;
 ELSE IF aR3 = 'PD0' THEN aNR3 = 720;
 ELSE IF aR3 = 'PC0' THEN aNR3 = 730;
 ELSE IF aR3 = 'PB0' THEN aNR3 = 740;
 ELSE IF aR3 = 'PA0' THEN aNR3 = 750;
 ELSE                     aNR3 = .  ;


IF aNR3 < 500 THEN DO;
     aR3a  = aR3;
     aNR3a = aNR3;
END;

 ELSE IF aR3a = 'BB2' THEN aNR3a = 511;
 ELSE IF aR3a = 'BB1' THEN aNR3a = 512;
 ELSE IF aR3a = 'BA2' THEN aNR3a = 521;
 ELSE IF aR3a = 'BA1' THEN aNR3a = 522;
 ELSE IF aR3a = 'IB2' THEN aNR3a = 611;
 ELSE IF aR3a = 'IB1' THEN aNR3a = 612;
 ELSE IF aR3a = 'IA2' THEN aNR3a = 621;
 ELSE IF aR3a = 'IA1' THEN aNR3a = 622;
 ELSE IF aR3a = 'PE2' THEN aNR3a = 711;
 ELSE IF aR3a = 'PE1' THEN aNR3a = 712;
 ELSE IF aR3a = 'PD2' THEN aNR3a = 721;
 ELSE IF aR3a = 'PD1' THEN aNR3a = 722;
 ELSE IF aR3a = 'PC2' THEN aNR3a = 731;
 ELSE IF aR3a = 'PC1' THEN aNR3a = 732;
 ELSE IF aR3a = 'PB2' THEN aNR3a = 741;
 ELSE IF aR3a = 'PB1' THEN aNR3a = 742;
 ELSE IF aR3a = 'PA2' THEN aNR3a = 751;
 ELSE IF aR3a = 'PA1' THEN aNR3a = 752;
 ELSE                      aNR3a = .  ;

end;

**  END OF RUG-III PLUS SAS CODE  **;

%MEND RUG_IIIp_LTCF_grouper;
```

```
/*=============================================================================*/
/* Main macro for RUG-III Plus grouping                                        */
/*=============================================================================*/
/* Before running the macro, users need to update following            */
/* input and output datasets:                                          */
/*    %LET datain  =.;                                                 */
/*    %LET dataout =.;                                                 */
/*                                                                     */
/*=====================================================================*/

%MACRO RUN_RUG_IIIp_LTCF_grouper (datain, dataout);

data &dataout.;
set &datain.;

%RUG_IIIp_LTCF_grouper;

run;

title “Volume by RUG_III_PLUS_LTCF groups”;
proc freq data= &dataout.;
table aR3 *  aNR3 / missing list out= FREG_RUG_IIIp_LTCF_grouper;
table aR3a * aNR3a/ list missing out= FREG_RUG_IIIp_LTCF_grouper_a;
run;

%MEND RUN_RUG_IIIp_LTCF_grouper;



/*=============================================================================*/
/* END OF PROGRAM                                                              */
/*=============================================================================*/
```

Flowcharts

RUG-III Plus overview

RUG-III Plus is an update to the RUG-III case-mix system that is made up of a grouping methodology and associated CMI values. Canadian organizations that provide residential care to seniors can apply the RUG-III Plus grouping methodology and CMI values to their assessment data. RUG-III Plus CMI values can be derived over a specified time period for a particular resident or organization and function as a relative resource use indicator. Comparative and time series trending reports can be generated using RUG-III Plus to identify peers, inform resource allocation and assist with planning.

This document outlines the approach used to identify qualifying RUG-III Plus 44 groups for interRAI LTCF assessments submitted to IRRS.

Calculate RUG-III Plus temporary variables

Several temporary variables are required to derive RUG-III Plus groups. The first part of this section provides a listing of the data elements used and their valid values. The second part of this section provides further details and outlines the specific criteria to derive the RUG-III Plus temporary variables.

The temporary variables are listed below.

RUG-III Plus temporary variables

x_bedmb	x_nrehab*	x_coma
x_trans	xreh_u	x_clin
x_toilt	xreh_v	x_impair
x_intake	xreh_h	x_depres
x_eatng	xreh_m	xcps1
x_adlsum	xreh_l	xcps2
x_th_min	x_ext	x_behav
x_th_day	x_cpal	sCPS
x_th_ty3	x_sept	sDRS
x_th_ty5	x_spec	

Note

* The nursing rehabilitation variable derived for use with the LTCF is different than the nursing rehabilitation variable derived for use with the RAI-MDS 2.0. Further details are provided in the VARIABLE: x_nrehab flowchart.

Calculate RUG-III Plus category triggers

There are 7 RUG-III Plus categories. Each has specific criteria that trigger whether an assessment qualifies for that category, except for the last category (Reduced Physical Functions), where all assessments qualify. The third part of this section outlines the specific criteria for the RUG-III Plus category triggers.

Assign qualifying RUG-III Plus groups

Specific criteria are used to assign a qualifying RUG-III Plus group to a given IRRS LTCF assessment. The fourth part of this section outlines the specific criteria for the 44 RUG-III Plus groups.

The assignment of the final RUG-III Plus group to a given assessment can be done using the group with the highest CMI value (index-maximizing approach).

IRRS RUG-III Plus (44-Group) Section 1

LTCF variables used in RUG-III Plus

Variable name (valid codes) description

Section C — Cognition

Memory or recall ability

iC2a (0, 1) Short term memory OK — seems or appears to recall after 5 minutes

Cognitive skills for daily decision making

iC1 (0, 1, 2, 3, 4, 5) Made decisions regarding tasks of daily life

Section D — Communication and Vision

iD1 (0, 1, 2, 3, 4) Making self understood

Section E — Mood and Behaviour

Indicators of possible depressed, anxious, or sad mood (observed within LAST 3 DAYS)

iE1a	(0, 1, 2, 3)	Made negative statements
iE1b	(0, 1, 2, 3)	Persistent angers
iE1c	(0, 1, 2, 3)	Unrealistic fears
iE1d	(0, 1, 2, 3)	Repetitive health complaints
iE1e	(0, 1, 2, 3)	Repetitive anxious complaints
iE1f	(0, 1, 2, 3)	Sad, pained, or worried facial expressions
iE1g	(0, 1, 2, 3)	Crying, tearfulness

Behavioural Symptoms (frequency within LAST 3 DAYS)

iE3a	(0, 1, 2, 3)	Wandering
iE3b	(0, 1, 2, 3)	Verbally abusive
iE3c	(0, 1, 2, 3)	Physically abusive
iE3d	(0, 1, 2, 3)	Socially inappropriate or disruptive behaviour
iE3e	(0, 1, 2, 3)	Resists care
iE3f	(0, 1, 2, 3)	Inappropriate public sexual behaviour or public disrobing

Section G — Functional Status

ADL Self-Performance

iG2g	(0, 1, 2, 3, 4, 5, 6, 8)	Toilet Transfer — ADL Self-Performance
iG2h	(0, 1, 2, 3, 4, 5, 6, 8)	Toilet Use — ADL Self-Performance
iG2i	(0, 1, 2, 3, 4, 5, 6, 8)	Bed Mobility — ADL Self-Performance
iG2j	(0, 1, 2, 3, 4, 5, 6, 8)	Eating — ADL Self-Performance

Section I — Disease Diagnoses

Disease Diagnoses

Neurological

iI1e	(0, 1, 2, 3)	Hemiplegia/Hemiparesis
iI1f	(0, 1, 2, 3)	Multiple sclerosis
iI1i	(0, 1, 2, 3)	Quadriplegia

Infections

iI1q	(0, 1, 2, 3)	Pneumonia

Other

iI1t	(0, 1, 2, 3)	Diabetes mellitus

Other Disease Diagnoses

iI2abb	CCC.CC	ICD-10-CA Code for Cerebral Palsy/Septicemia
iI2bbb	CCC.CC	ICD-10-CA Code for Cerebral Palsy/Septicemia
iI2cbb	CCC.CC	ICD-10-CA Code for Cerebral Palsy/Septicemia
iI2dbb	CCC.CC	ICD-10-CA Code for Cerebral Palsy/Septicemia
iI2ebb	CCC.CC	ICD-10-CA Code for Cerebral Palsy/Septicemia
iI2fbb	CCC.CC	ICD-10-CA Code for Cerebral Palsy/Septicemia

Section J — Health Conditions

Problem Frequency (in LAST 3 DAYS)

iJ2h	(0, 1, 2, 3, 4)	Delusions
iJ2i	(0, 1, 2, 3, 4)	Hallucinations
iJ2j	(0, 1, 2, 3, 4)	Aphasia
iJ2n	(0, 1, 2, 3, 4)	Vomiting
iJ2q	(0, 1, 2, 3, 4)	Fever
iJ2r	(0, 1, 2, 3, 4)	GI or GU bleeding

Instability of Conditions

iJ6c	(0, 1)	End-stage disease (6 months or less to live)

Section K — Oral and Nutritional Status

Nutritional issues

iK2a	(0, 1)	Weight loss (5% or more in LAST 30 DAYS or 10% or more in LAST 180 DAYS)
iK2c	(0, 1)	Dehydrated

Mode of Nutritional Intake

iK3	(0, 1, 2, 3, 4, 5, 6, 7, 8, 9)	Mode of nutritional intake

Parenteral or Enteral Intake

iK5	(0, 1, 2, 3)	Proportion of total calories received through parenteral or tube feedings in the LAST 3 DAYS

Section L — Skin Condition

Most severe pressure ulcer

iL1	(0, 1, 2, 3, 4, 5)	Most severe pressure ulcer

Major skin problems

iL4	(0, 1)	e.g., lesions, 2nd- or 3rd- degree burns, healing surgical wounds

Skin tears or cuts

iL5	(0, 1)	Skin tears or cuts other than surgery

Foot problem

iL7	(0, 1, 2, 3, 4)	e.g., bunions, hammertoes, overlapping toes, structural problems, infection, ulcers

Section M — Activity Pursuit

Time asleep

iS3	(0, 1, 2, 3)	Time asleep during the day

Section O — Treatments and procedures

Treatments and programs *(within LAST 3 DAYS)*

Treatments

iN2a	(0, 1, 2, 3)	Chemotherapy
iN2b	(0, 1, 2, 3)	Dialysis
iN2d	(0, 1, 2, 3)	IV medication
iN2e	(0, 1, 2, 3)	Oxygen therapy
iN2f	(0, 1, 2, 3)	Radiation
iN2g	(0, 1, 2, 3)	Suctioning
iN2h	(0, 1, 2, 3)	Tracheostomy care
iN2i	(0, 1, 2, 3)	Transfusions
iN2j	(0, 1, 2, 3)	Ventilator or respirator
iN2k	(0, 1, 2, 3)	Wound care

Programs

iN2n	(0, 1, 2, 3)	Turning/repositioning program

Therapy/Nursing services *(within LAST 7 DAYS)*

iN3ga	(0, 1, 2, 3, 3, 4, 5, 6, 7)	Speech–language pathology and audiology services — number of days administered for 15 minutes or more in last 7 days
iN3gb	(0000–9999)	Speech–language pathology and audiology services — total number of minutes provided in last 7 days
iN3fa	(0, 1, 2, 3, 3, 4, 5, 6, 7)	Occupational therapy — number of days administered for 15 minutes or more in last 7 days
iN3fb	(0000–9999)	Occupational therapy — total number of minutes provided in last 7 days
iN3ea	(0, 1, 2, 3, 3, 4, 5, 6, 7)	Physical therapy — number of days administered for 15 minutes or more in last 7 days
iN3eb	(0000–9999)	Physical therapy — total number of minutes provided in last 7 days

iN3ia	(0, 1, 2, 3, 3, 4, 5, 6, 7)	Respiratory therapy — number of days administered for 15 minutes or more in last 7 days
iN3ja	(0, 1, 2, 3, 3, 4, 5, 6, 7)	Functional rehabilitation or walking program by licensed nurse — Number of days administered for 15 minutes or more in last 7 days

Physician visits *(within LAST 14 DAYS)*

iN7	(00–14)	Number of days in LAST 14 DAYS (or since admission if less than 14 days in facility) physician (or authorized assistant or practitioner) examined person

Physician orders *(within LAST 14 DAYS)*

iN8	(00–14)	Number of days in LAST 14 DAYS (or since admission if less than 14 days in facility) physician (or authorized assistant or practitioner) changed person's orders. Renewals without changes are excluded.

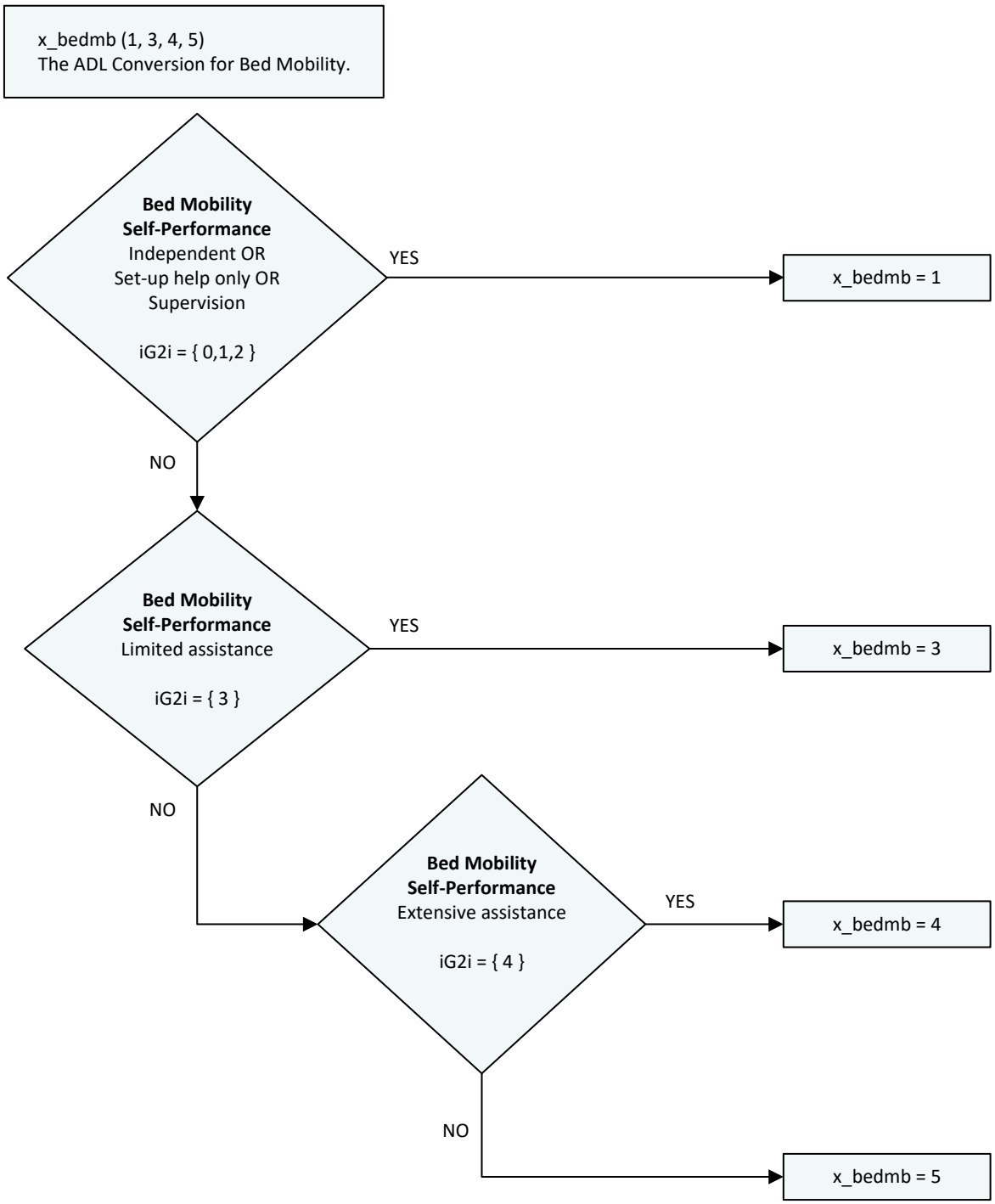
RUG-III Plus group listing

RUG-III Plus category and name	RUG-III Plus rank	RUG-III Plus group
1. Special Rehabilitation		
Ultra high sub-category	1	RUC
	2	RUB
	3	RUA
Very high sub-category	4	RVC
	5	RVB
	6	RVA
High sub-category	7	RHC
	8	RHB
	9	RHA
Medium sub-category	10	RMC
	11	RMB
	12	RMA
Low sub-category	13	RLB
	14	RLA
2. Extensive Services	15	SE3
	16	SE2
	17	SE1
3. Special Care	18	SSC
	19	SSB
	20	SSA
4. Clinically Complex	21	CC2
	22	CC1
	23	CB2
	24	CB1
	25	CA2
	26	CA1
5. Behaviour Problems	27	BB2
	28	BB1
	29	BA2
	30	BA1

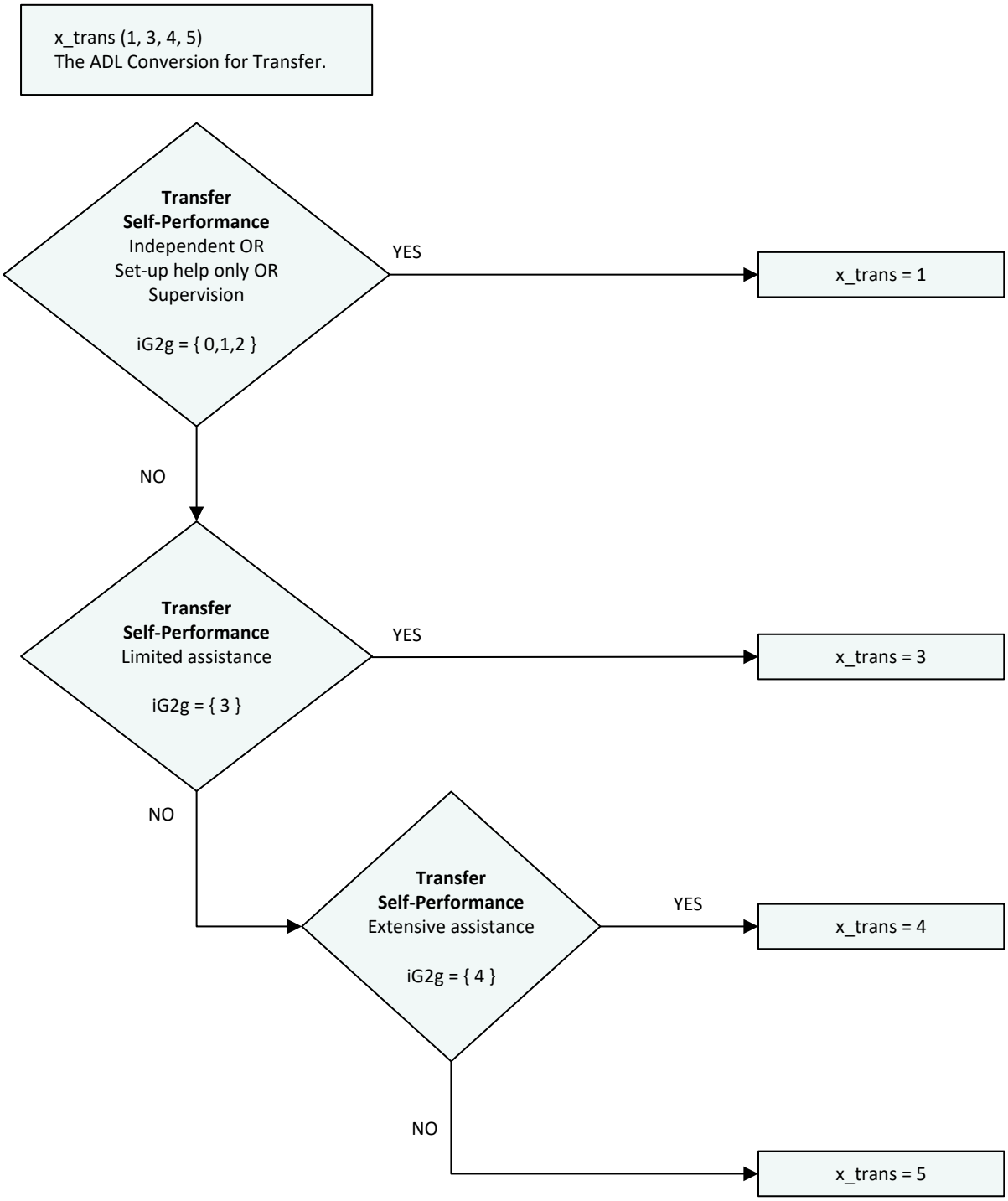
RUG-III Plus category and name	RUG-III Plus rank	RUG-III Plus group
6. Impaired Cognition	31	IB2
	32	IB1
	33	IA2
	34	IA1
7. Reduced Physical Functions	35	PE2
	36	PE1
	37	PD2
	38	PD1
	39	PC2
	40	PC1
	41	PB2
	42	PB1
	43	PA2
	44	PA1

IRRS RUG-III (44-Group) Section 2: Calculate RUG-III Plus temporary variables

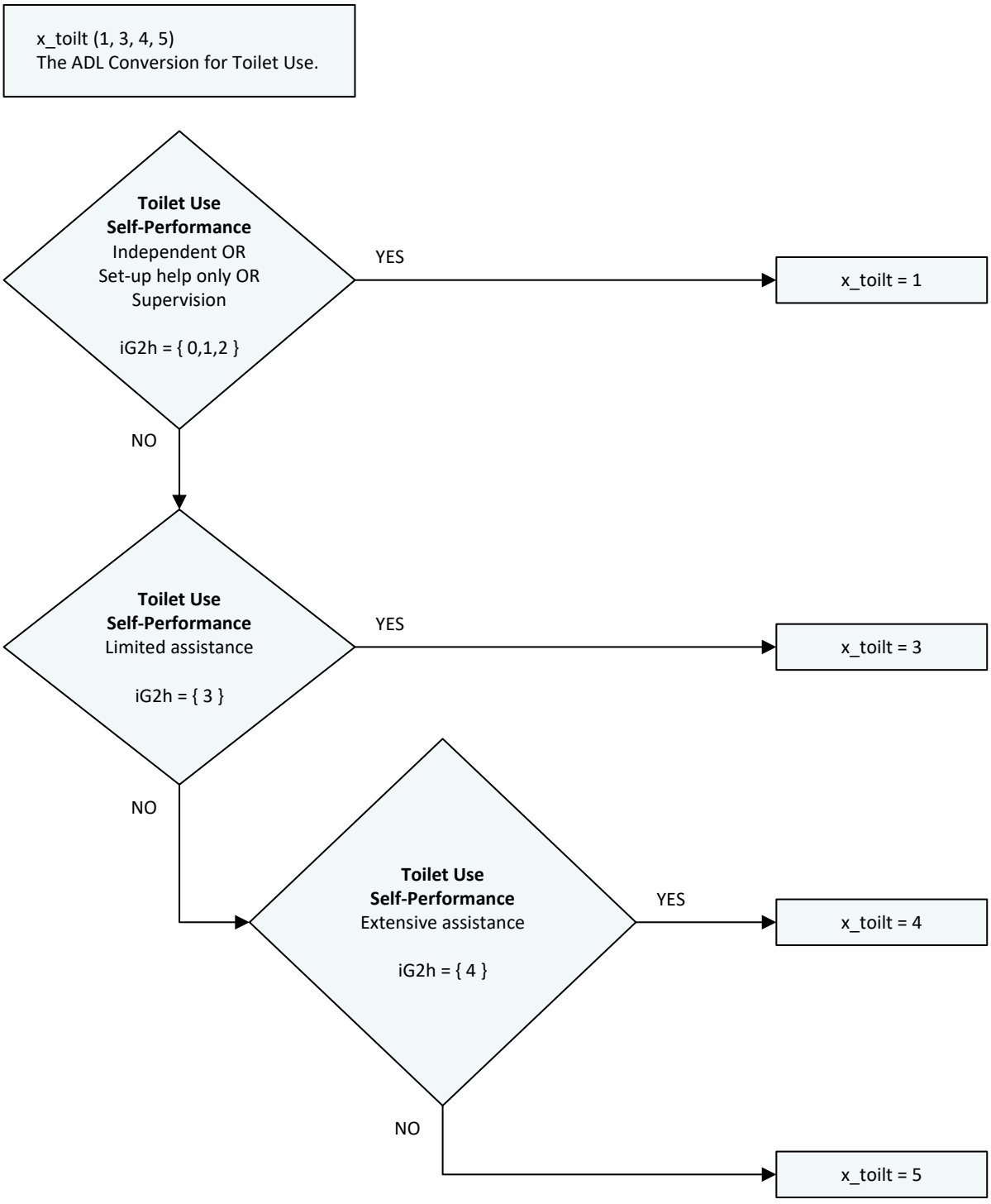
VARIABLE: X_ADLSUM (1 OF 6)



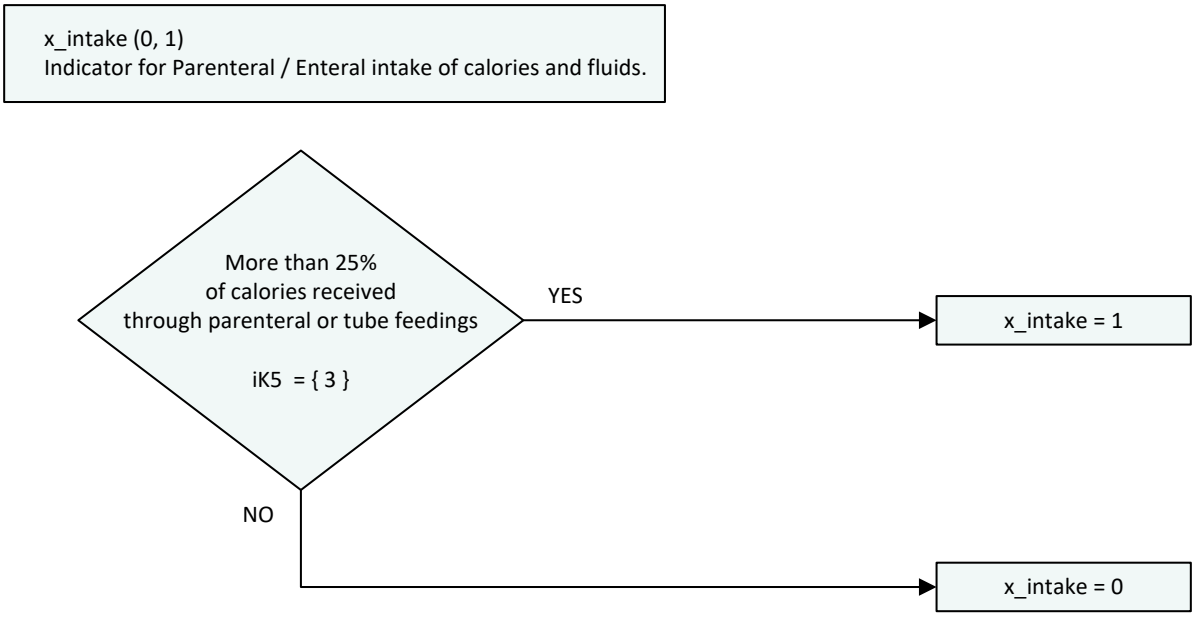
VARIABLE: X_ADLSUM (2 OF 6)



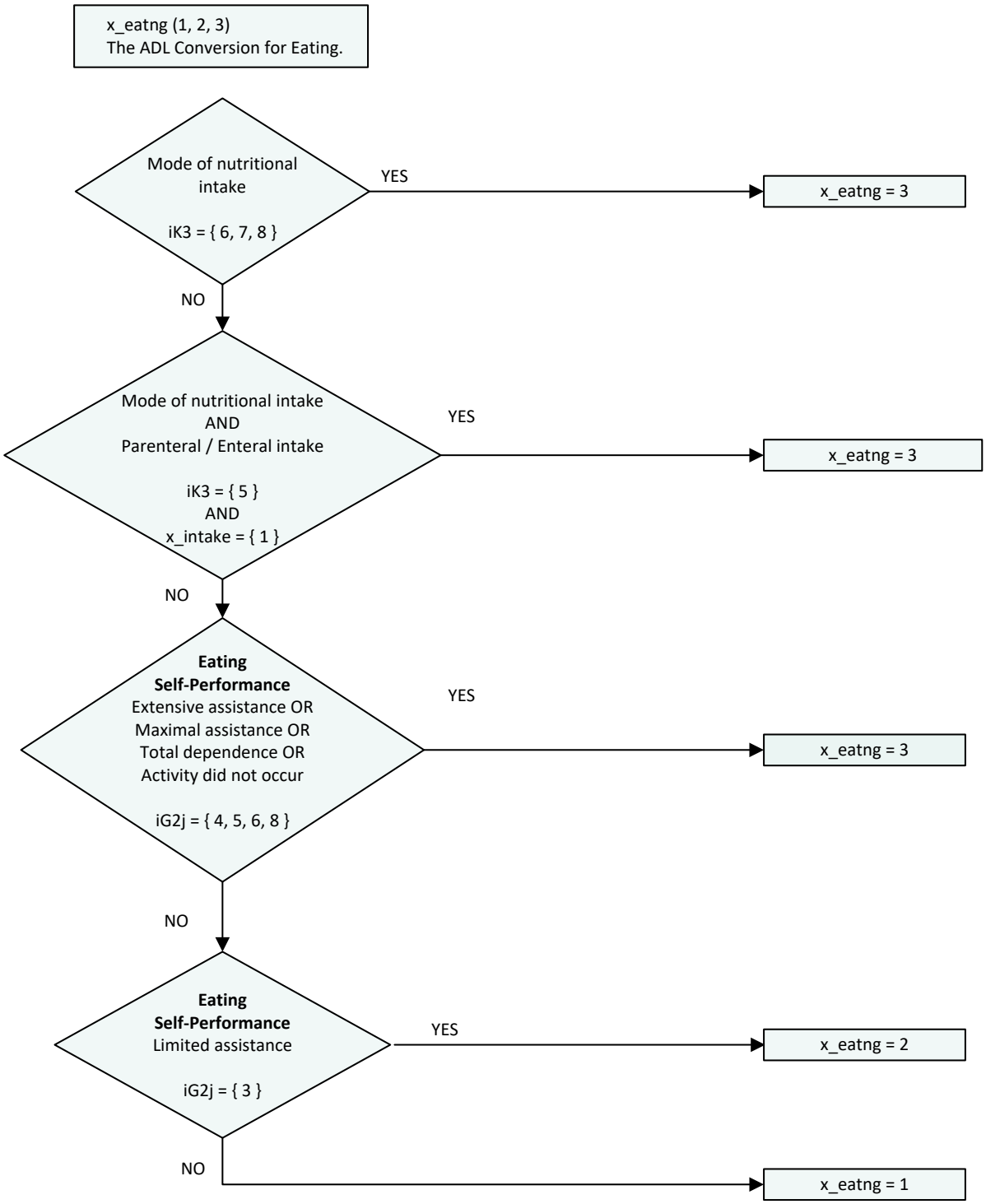
VARIABLE: X_ADLSUM (3 OF 6)



VARIABLE: X_ADLSUM (4 OF 6)



VARIABLE: X_ADLSUM (5 OF 6)



VARIABLE: X_ADLSUM (6 OF 6)

x_adlsum (4 to 18)
The Activities Of Daily Living (ADL) score used within RUG-III.

x_adlsum = x_bedmb + x_trans + x_toilt + x_eatng

VARIABLE: THERAPIES (1 OF 3)

x_th_min (0 or more)
The total number of minutes of physical, occupational and speech therapy in the 7 day look back period from the resident's last assessment.

Total minutes of rehab therapy =
Total minutes of speech therapy +
Total minutes of occupational therapy +
Total minutes of physical therapy

x_th_min = iN3gb + iN3fb + iN3eb

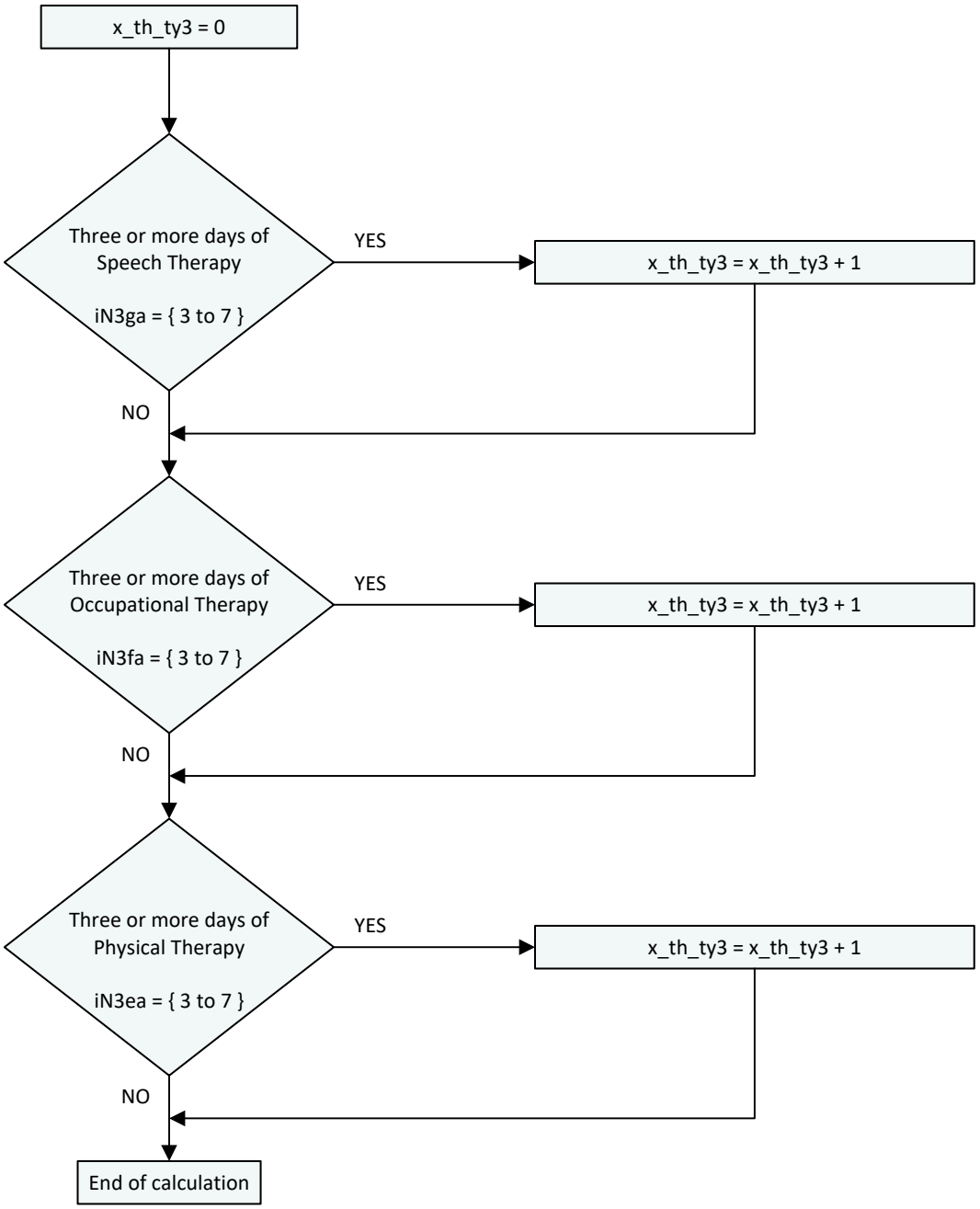
x_th_day (0 to 21)
The number of "days" of physical, occupational and speech therapies in the 7 day look back period from the resident's last assessment, ***totaled across therapies.***

Number of therapy days =
Number of days of speech therapy +
Number of days of occupational therapy +
Number of days of physical therapy

x_th_day = iN3ga + iN3fa + iN3ea

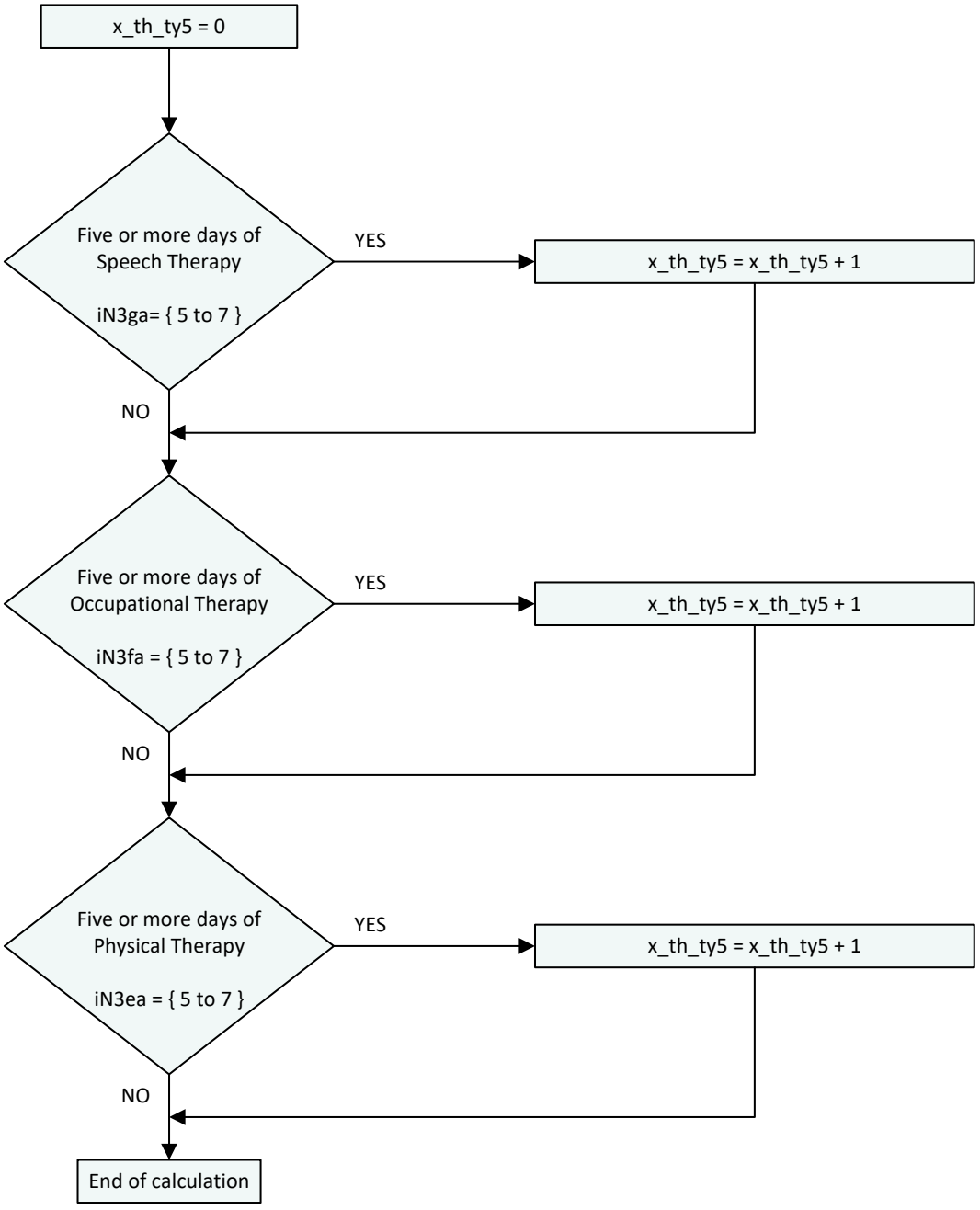
VARIABLE: THERAPIES (2 OF 3)

x_th_ty3 (0 to 3)
The number of physiotherapy, occupational and speech language therapies provided on **three or more** days.



VARIABLE: THERAPIES (3 OF 3)

x_th_ty5 (0 to 3)
The number of physiotherapy, occupational and speech language therapies provided on **five or more** days.



VARIABLE: x_nrehab

x_nrehab (0, 1)

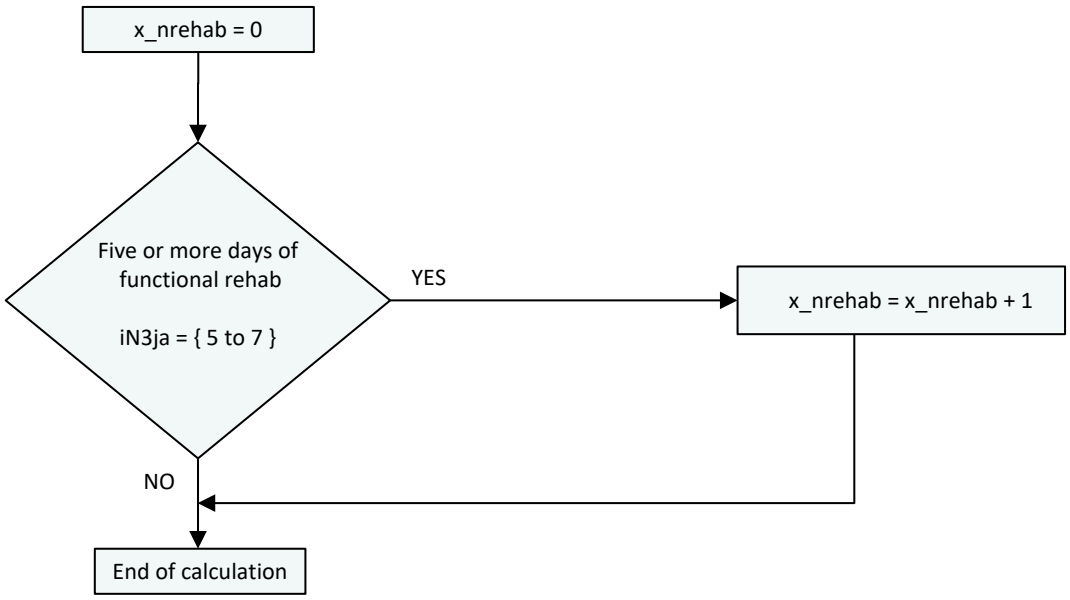
RUG-III Plus indicator for functional rehabilitation by nurse. Please note that the criterial for nursing rehabilitation is different for the LTCF as compared to the RAI MDS 2.0. The differences are as follows:

These items are captured in the nursing rehabilitation temporary variable for RUG-III Plus and RUG-III in both data standards:

- Range of motion—passive
- Range of motion—active
- Bed mobility
- Transfer
- Walking
- Splint or brace assistance
- Dressing or grooming
- Eating or swallowing
- Amputation or prosthesis care
- Communication
- Other

These items are only captured in the nursing rehabilitation temporary variable for RUG-III Plus and RUG-III for the RAI MDS 2.0:

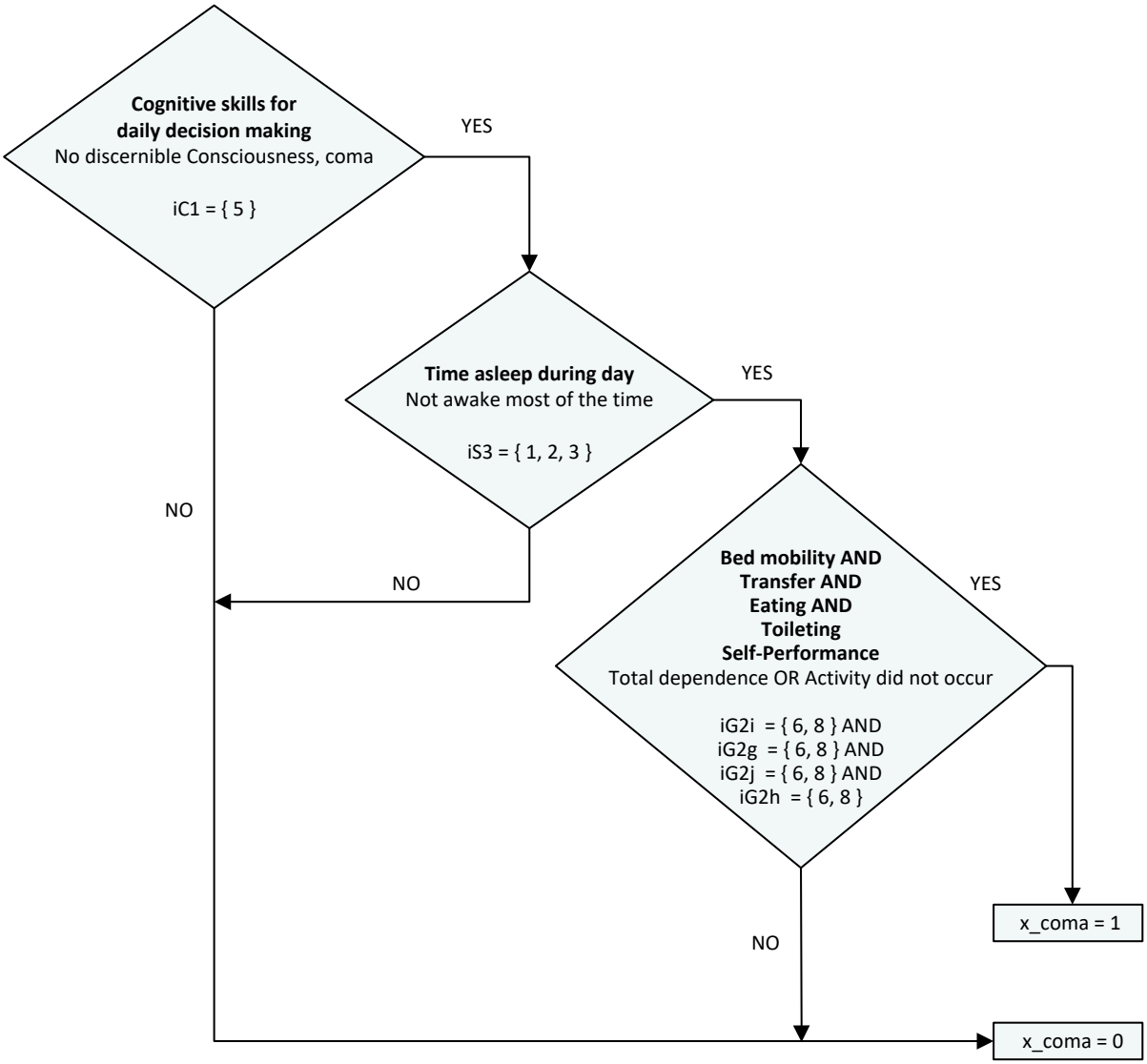
- Scheduled Toileting Plan
- Bladder Retraining Program



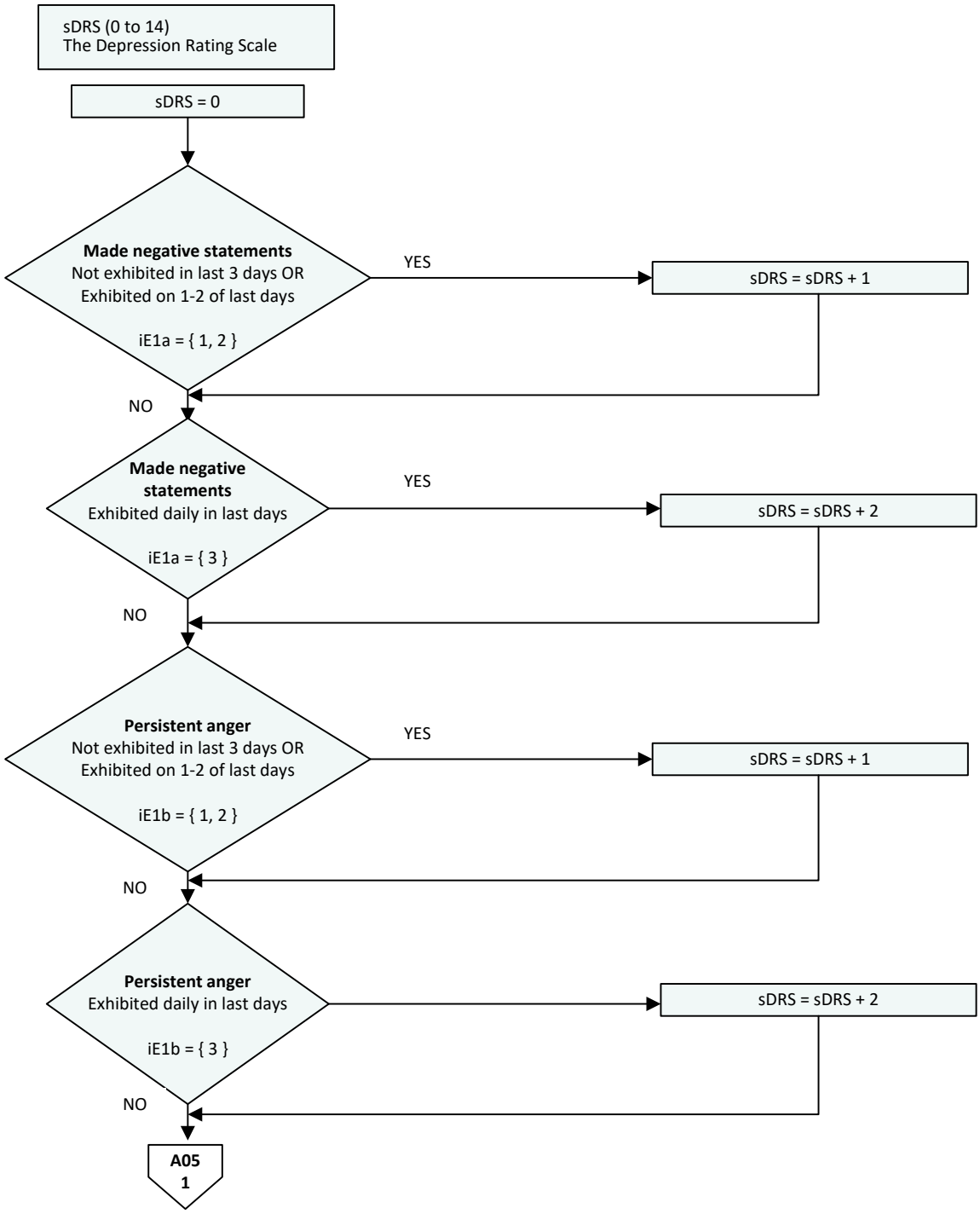
VARIABLE: X_COMA

x_coma (0, 1)
Indicator for the patient being comatose.

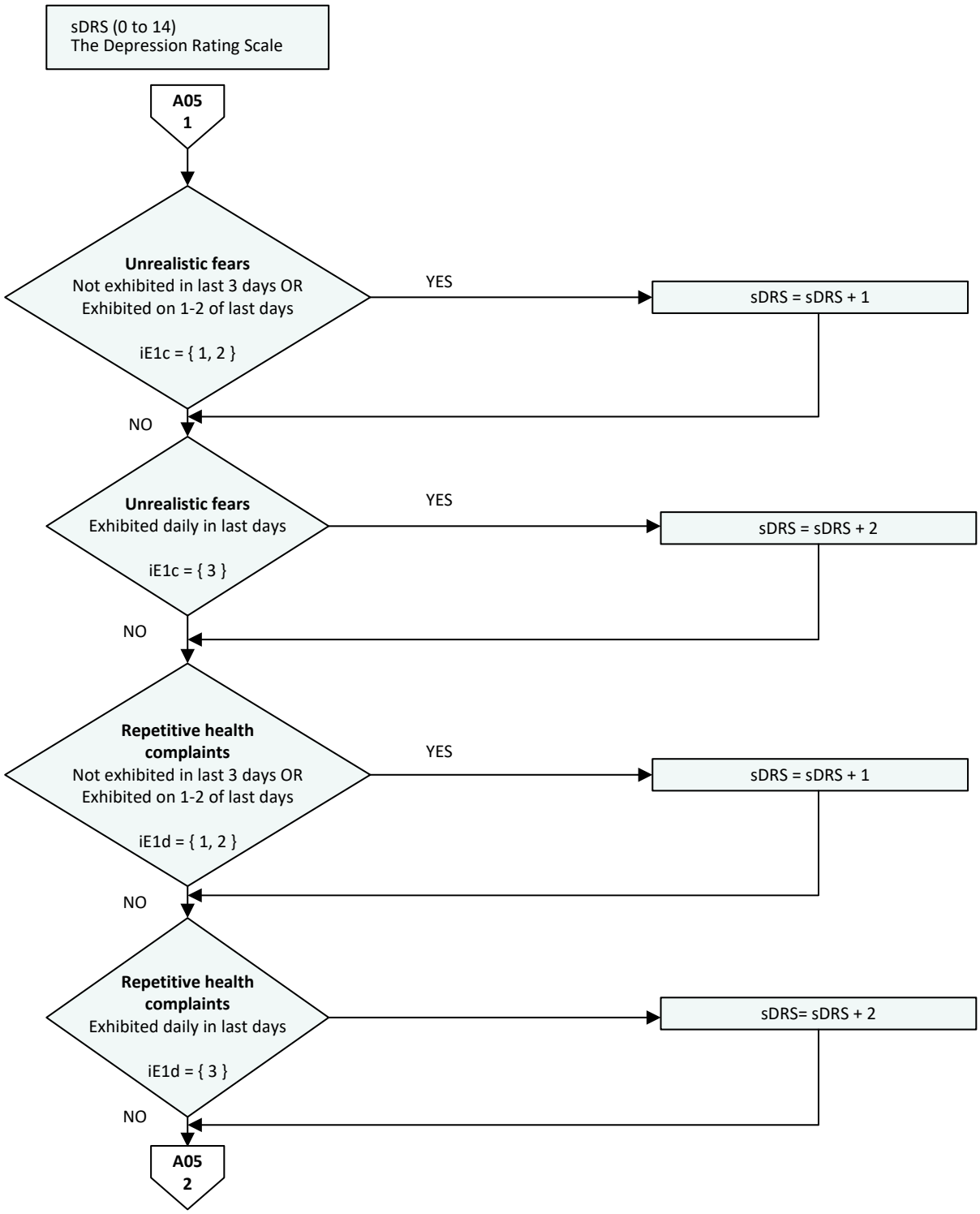
Please note: For comatose assessments, some outputs will be coded others will be null- for example, CPS is automatically coded as 6 (the highest CPS level), DRS is missing because all the items are missing, others are calculated with either the item not contributing or the item being set to 0.



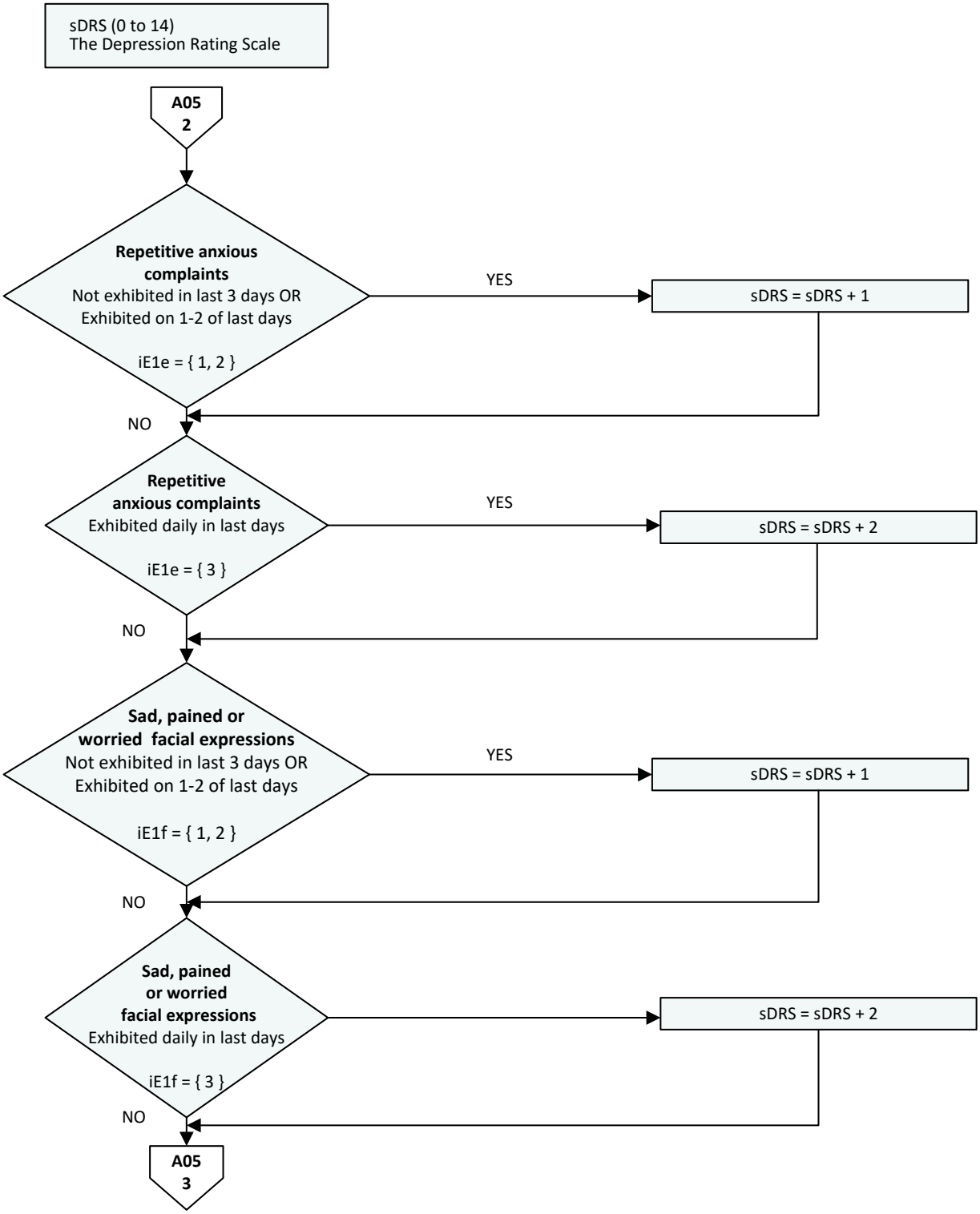
VARIABLE: SDRS (1 OF 4)



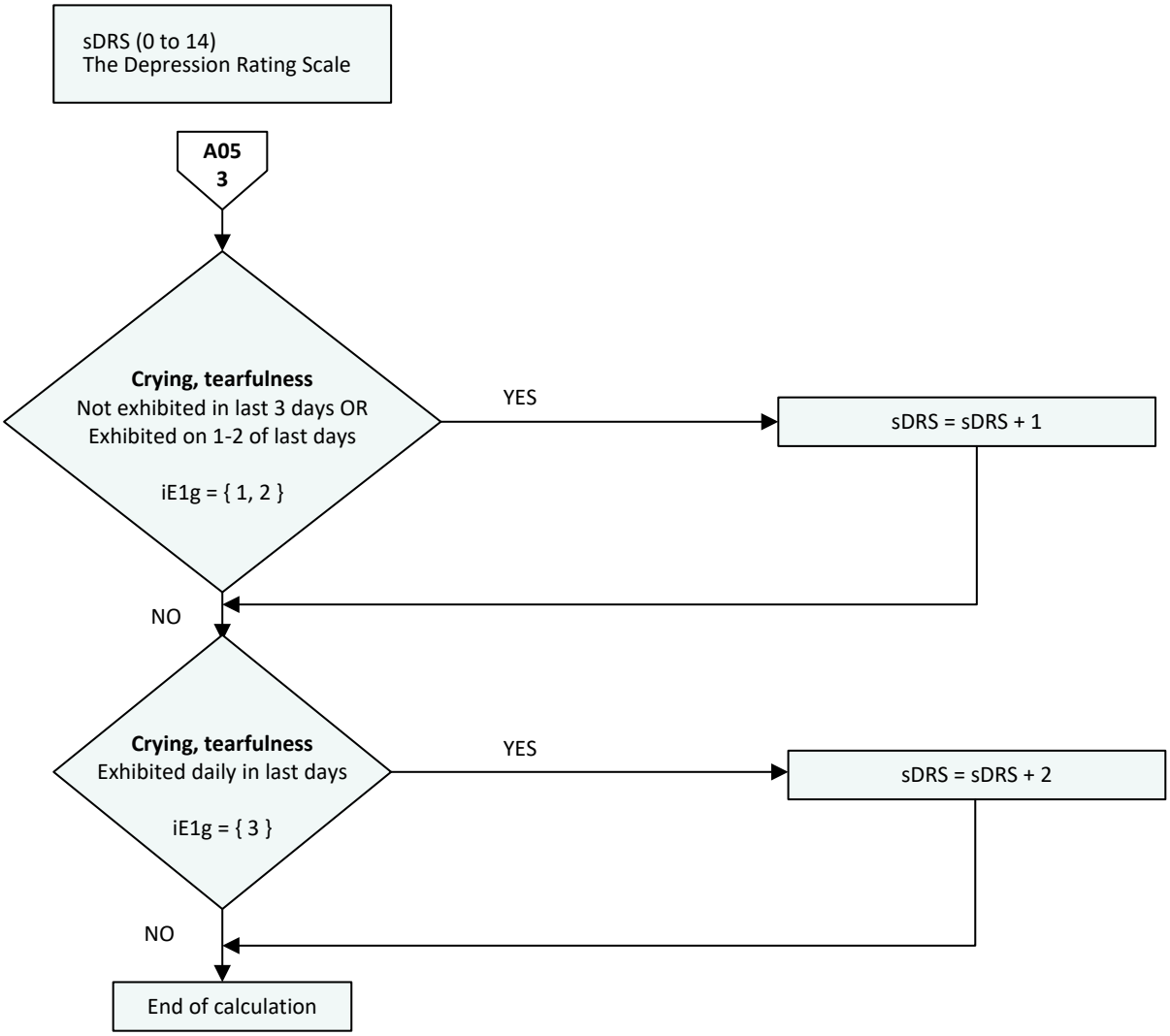
VARIABLE: SDRS (2 OF 4)



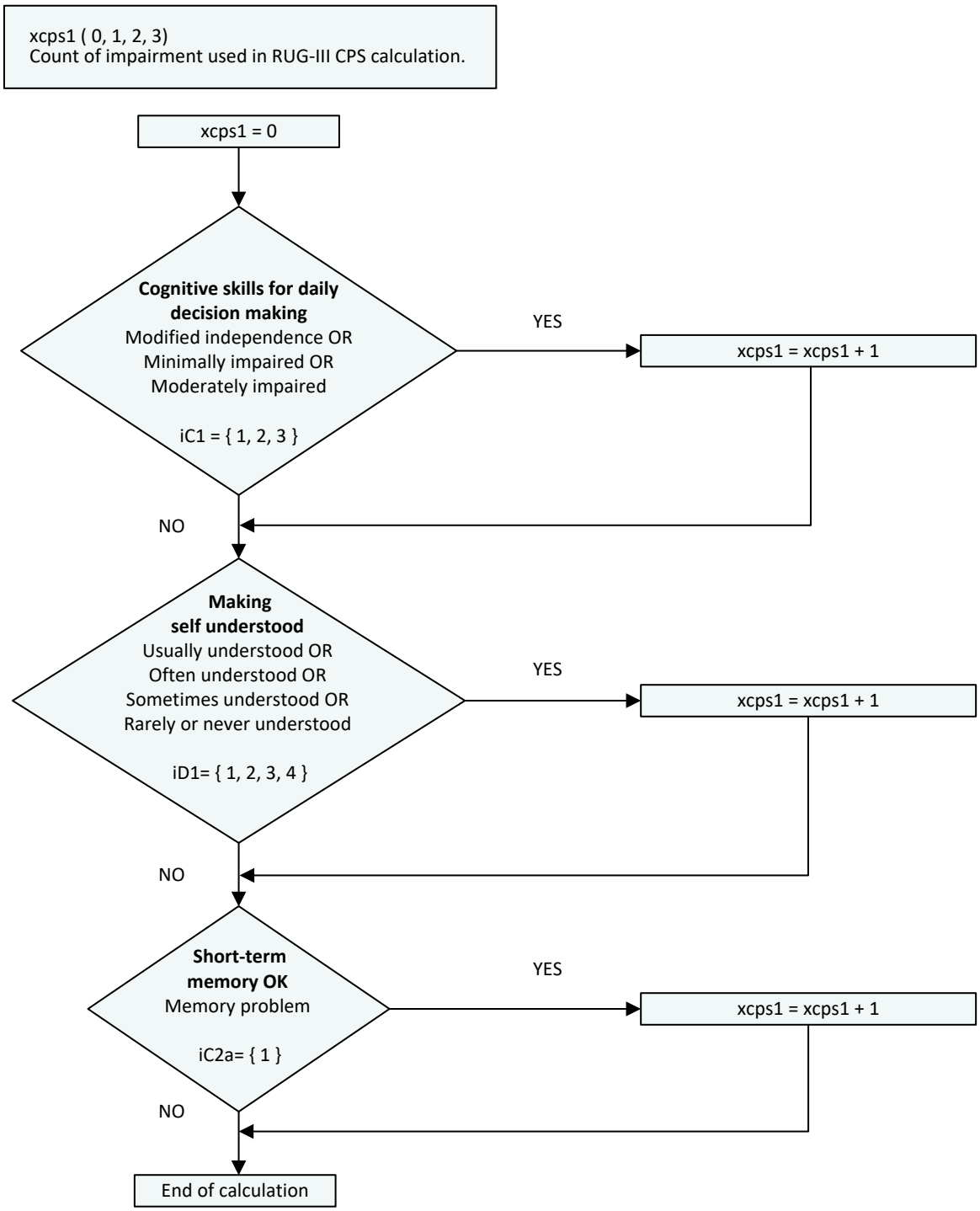
VARIABLE: SDRS (3 OF 4)



VARIABLE: SDRS (4 OF 4)

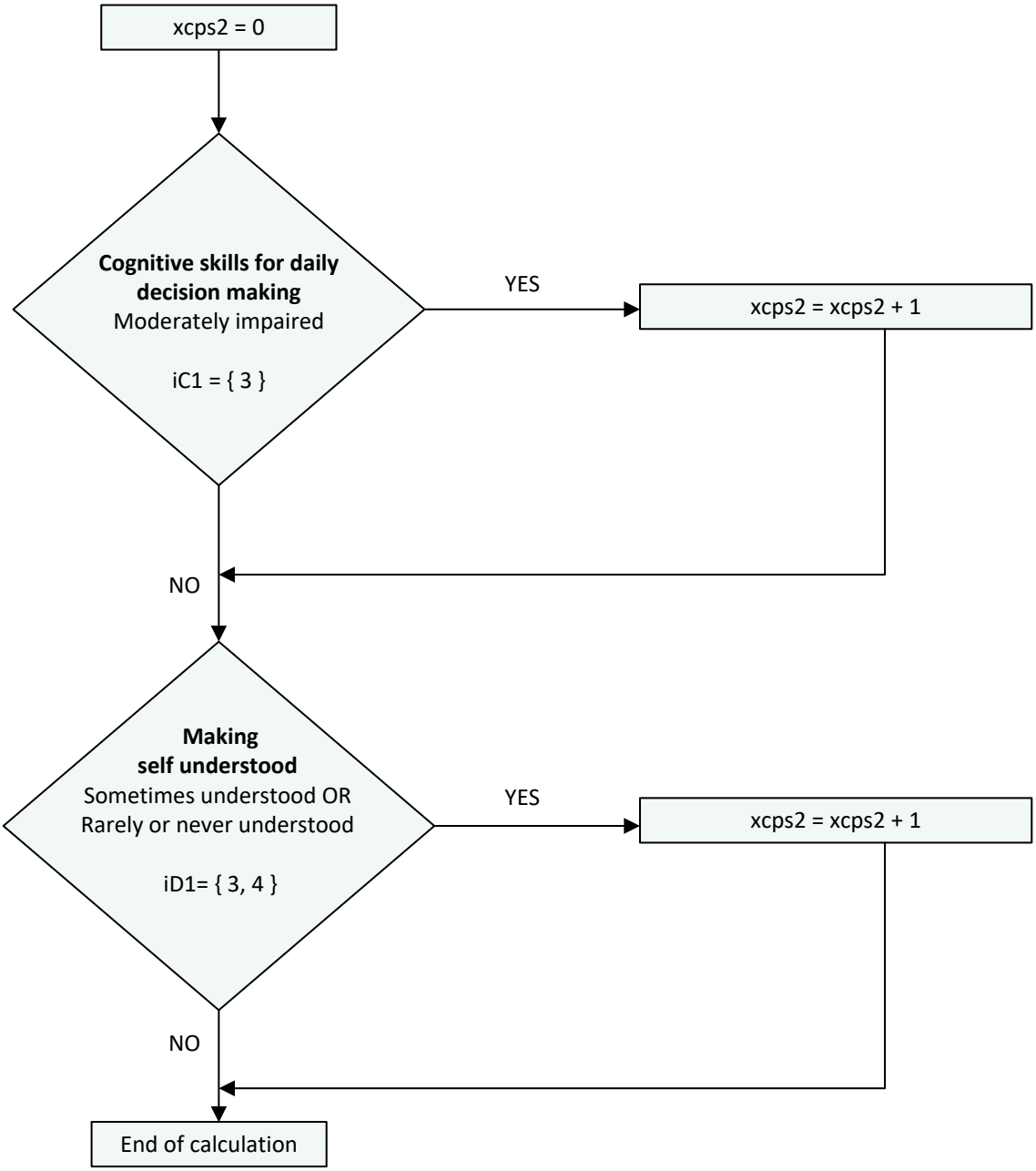


VARIABLE: SCPS (1 OF 3)

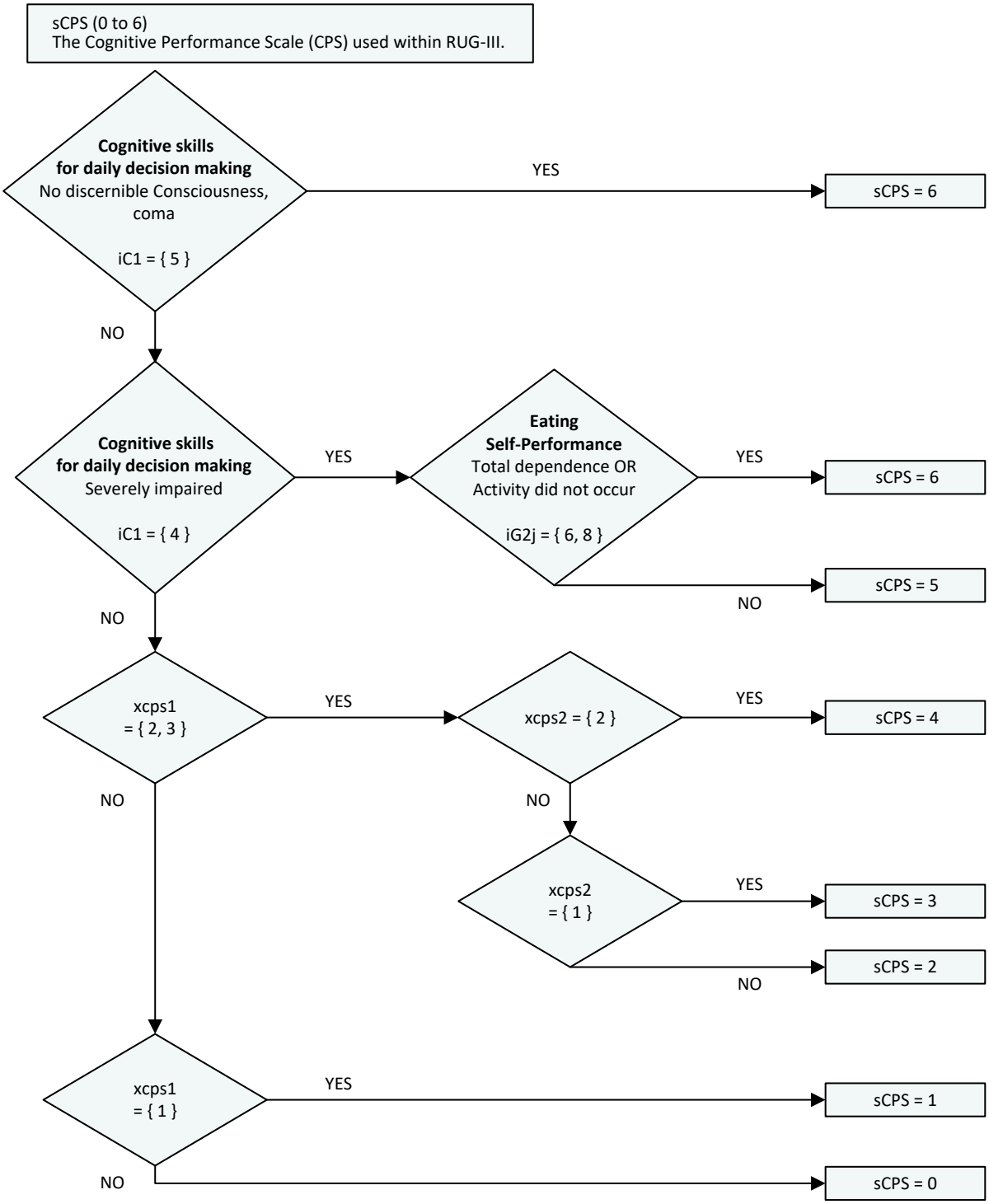


VARIABLE: SCPS (2 OF 3)

xcps2 (0, 1, 2)
Count of Severe impairment used in RUG-III CPS calculation.



VARIABLE: SCPS (3 OF 3)



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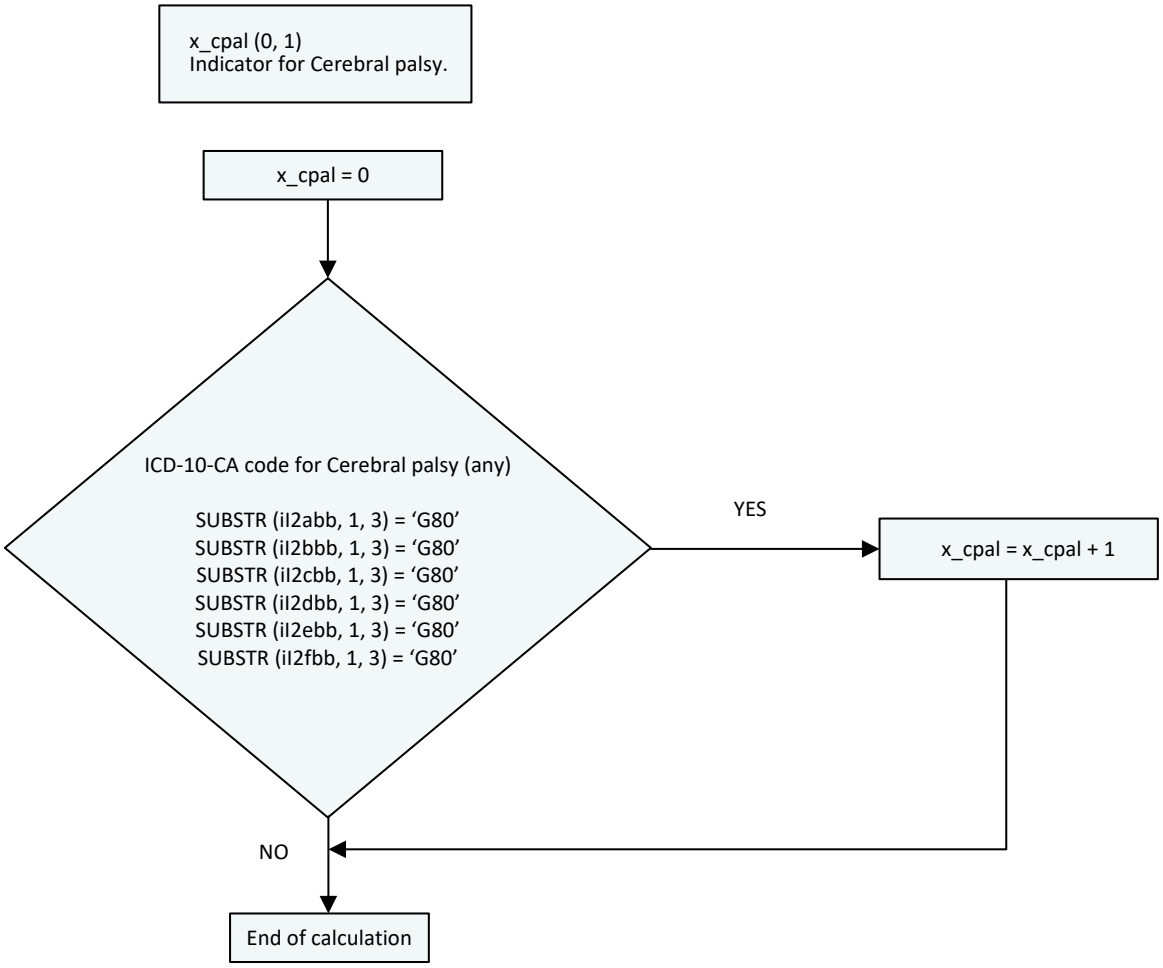
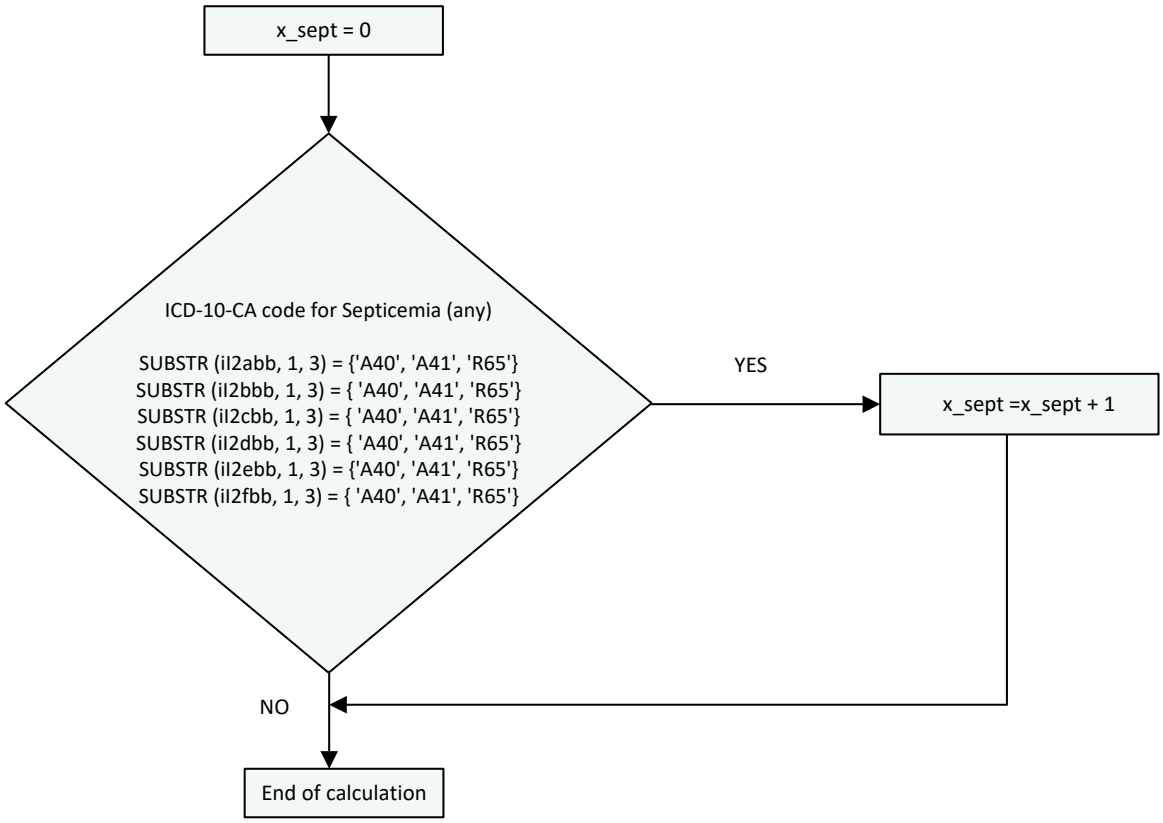


VARIABLE: X_SEPT (1 OF 2)

x_sept (0, 1)
Indicator for Septicemia

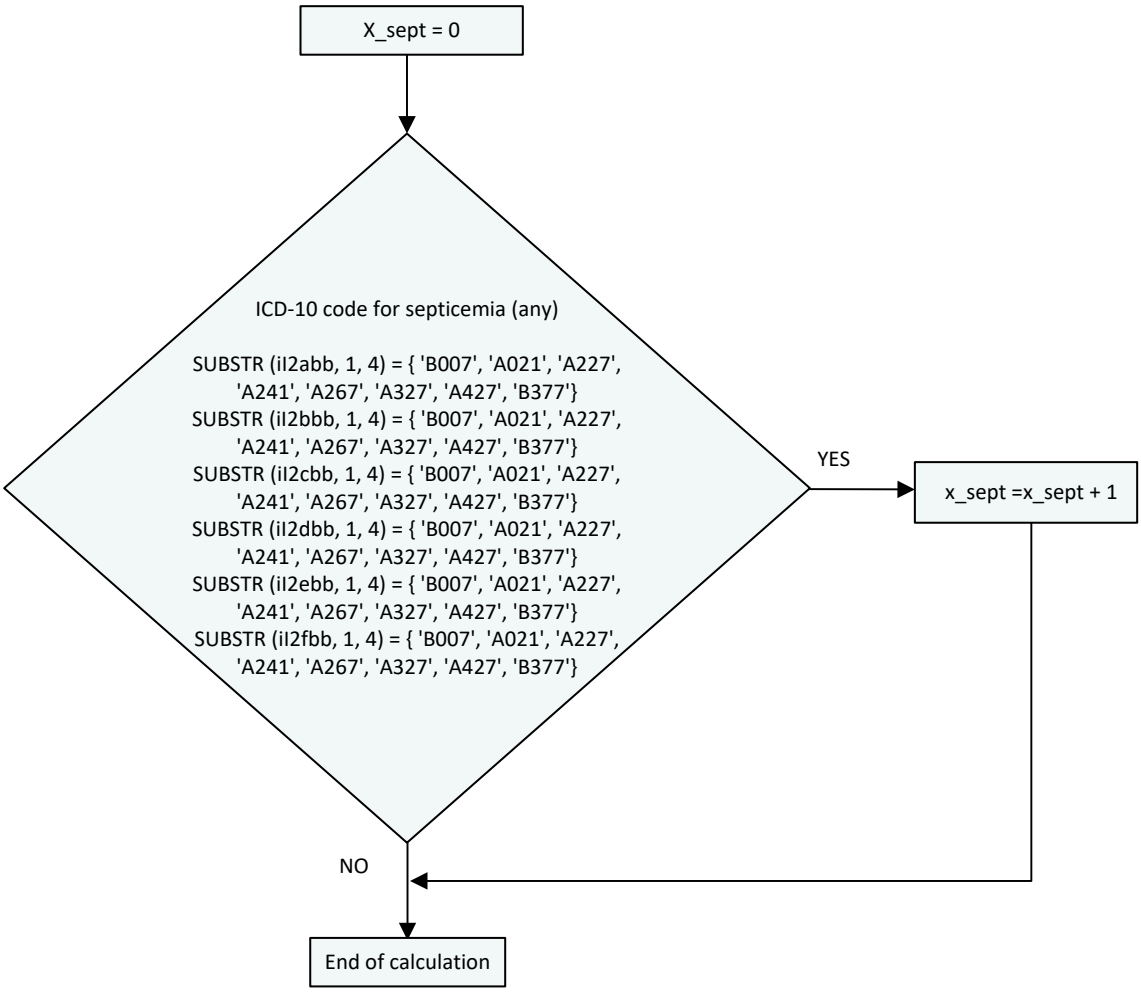
Please note CIHI is providing guidance to use A40. or A41. for coding sepsis using ICD-10 CA however the RUG-III LTCF sas code and flow charts documents include a broader list of ICD-10 CA sepsis codes.



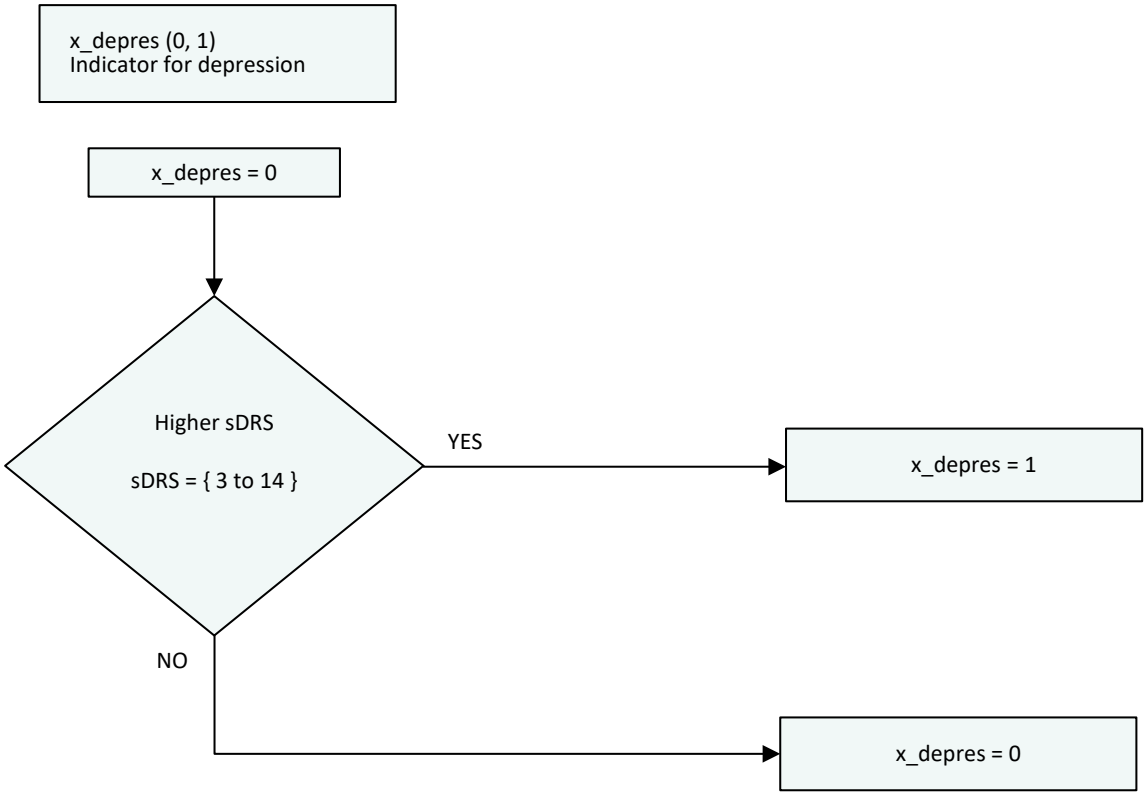
VARIABLE: X_SEPT (2 OF 2)

x_sept (0, 1)
Indicator for Septicemia

Please note CIHI is providing guidance to use A40. or A41. for coding sepsis using ICD-10 CA however the RUG-III LTCF sas code and flow charts documents include a broader list of ICD-10 CA sepsis codes.



VARIABLE: X_DEPRES



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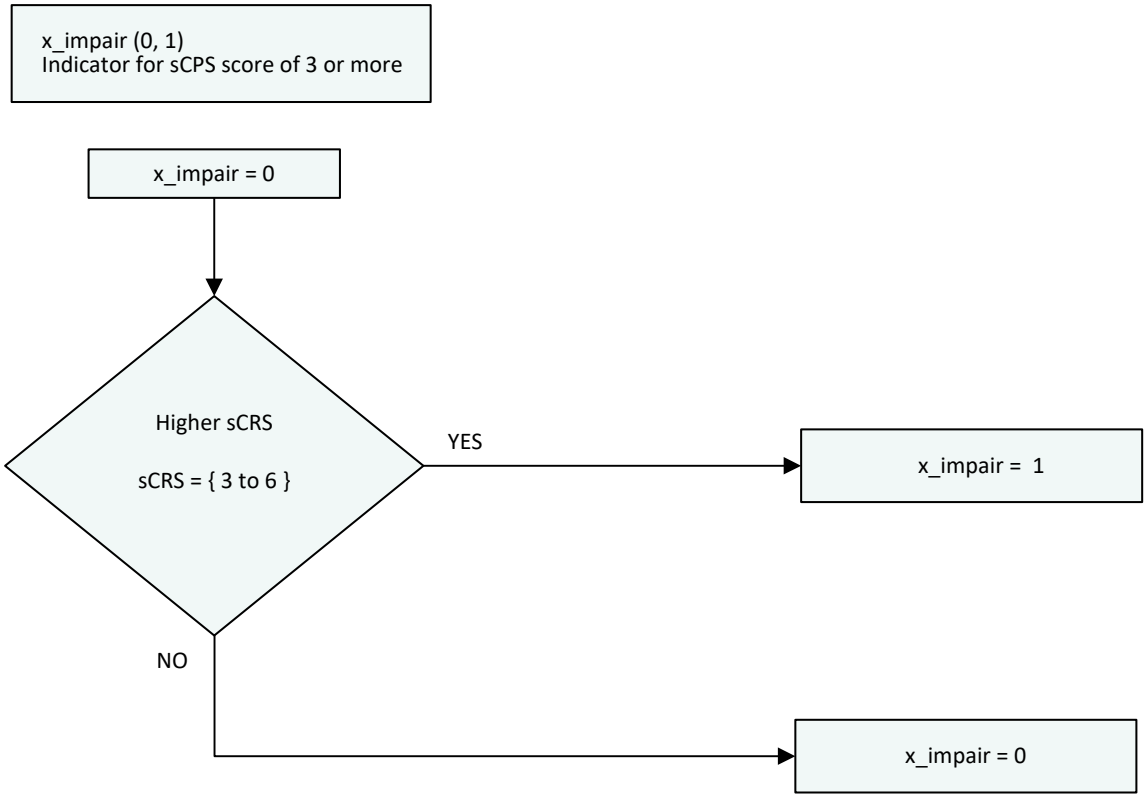
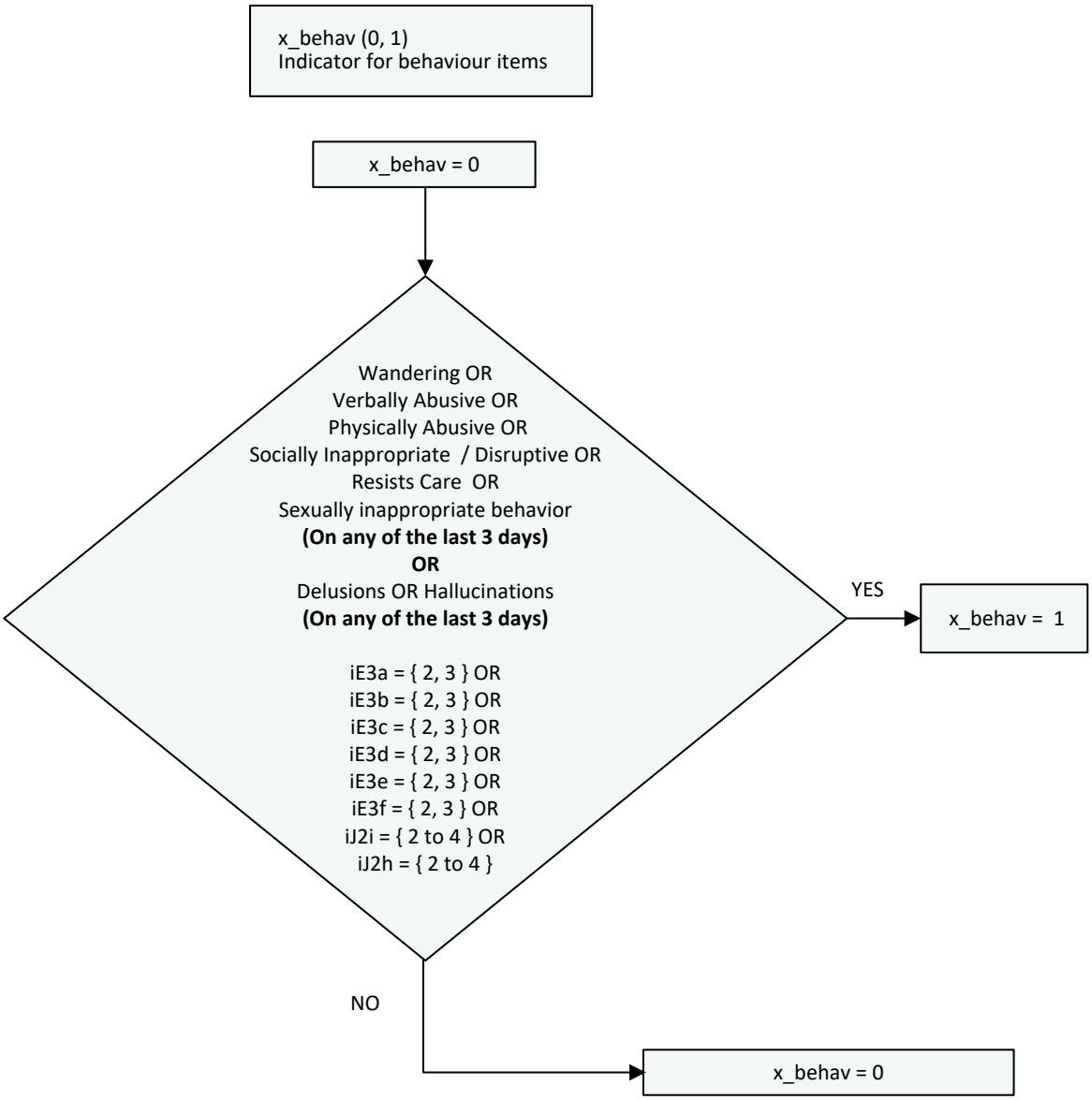
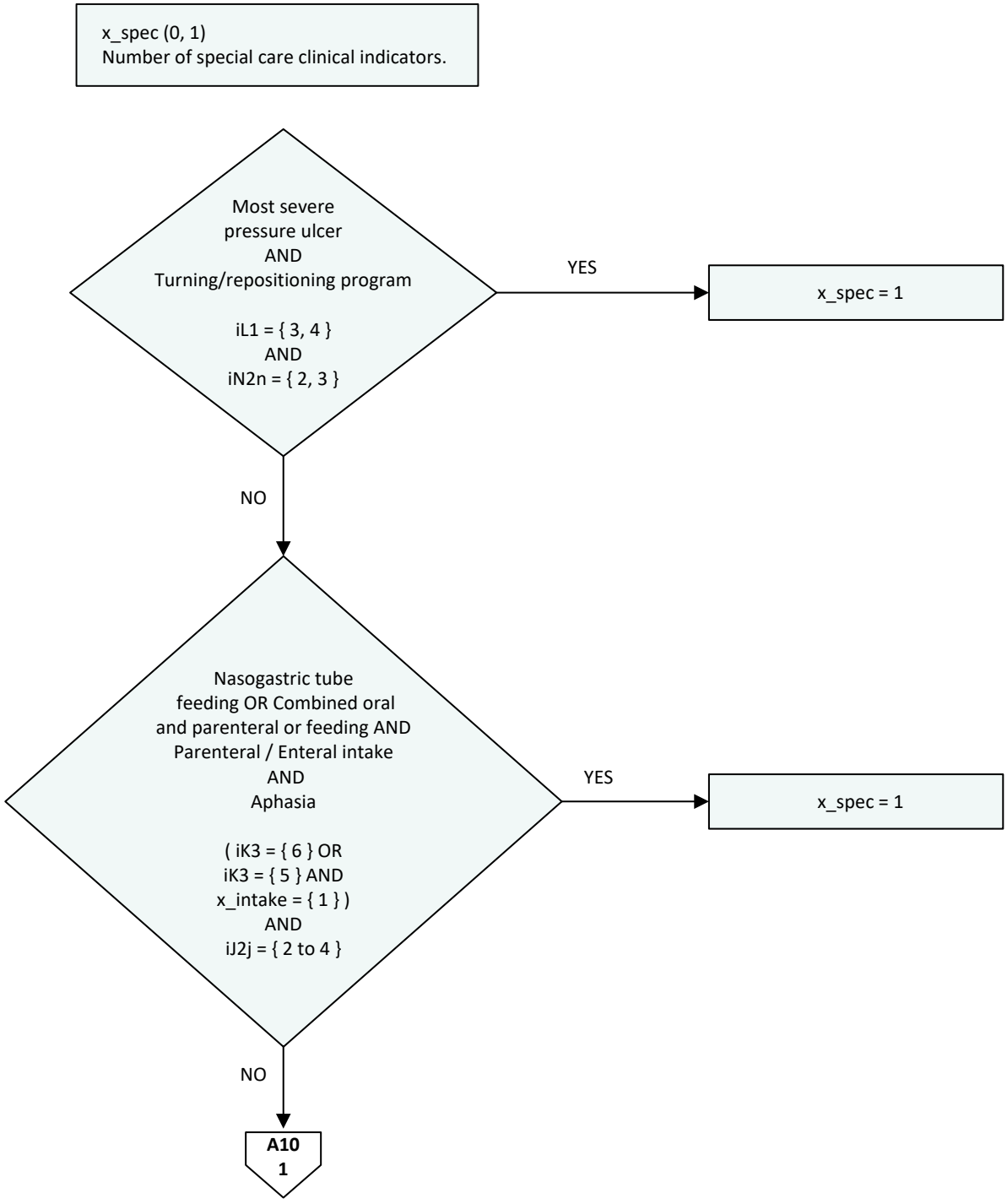


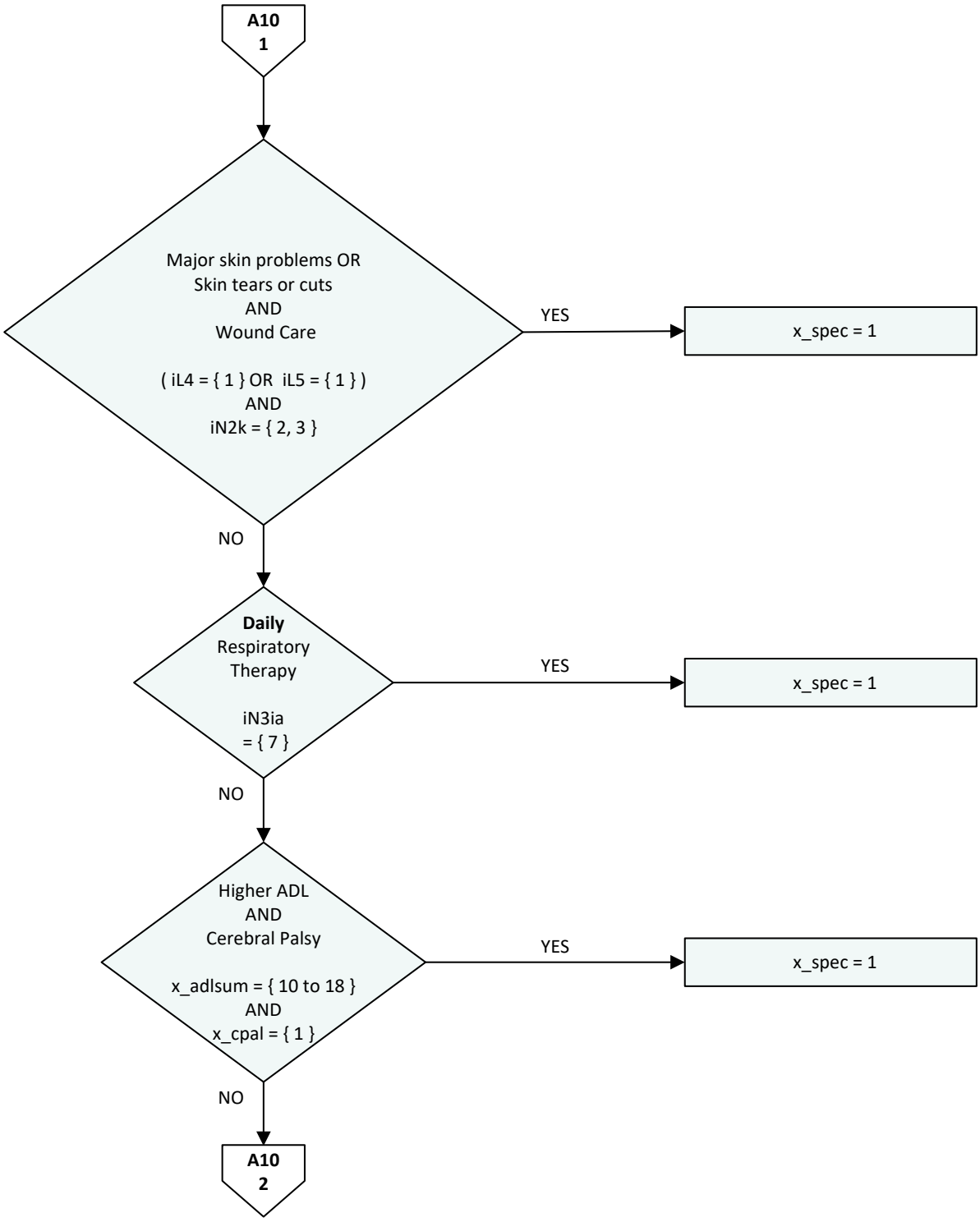
VARIABLE: X_BEHAV



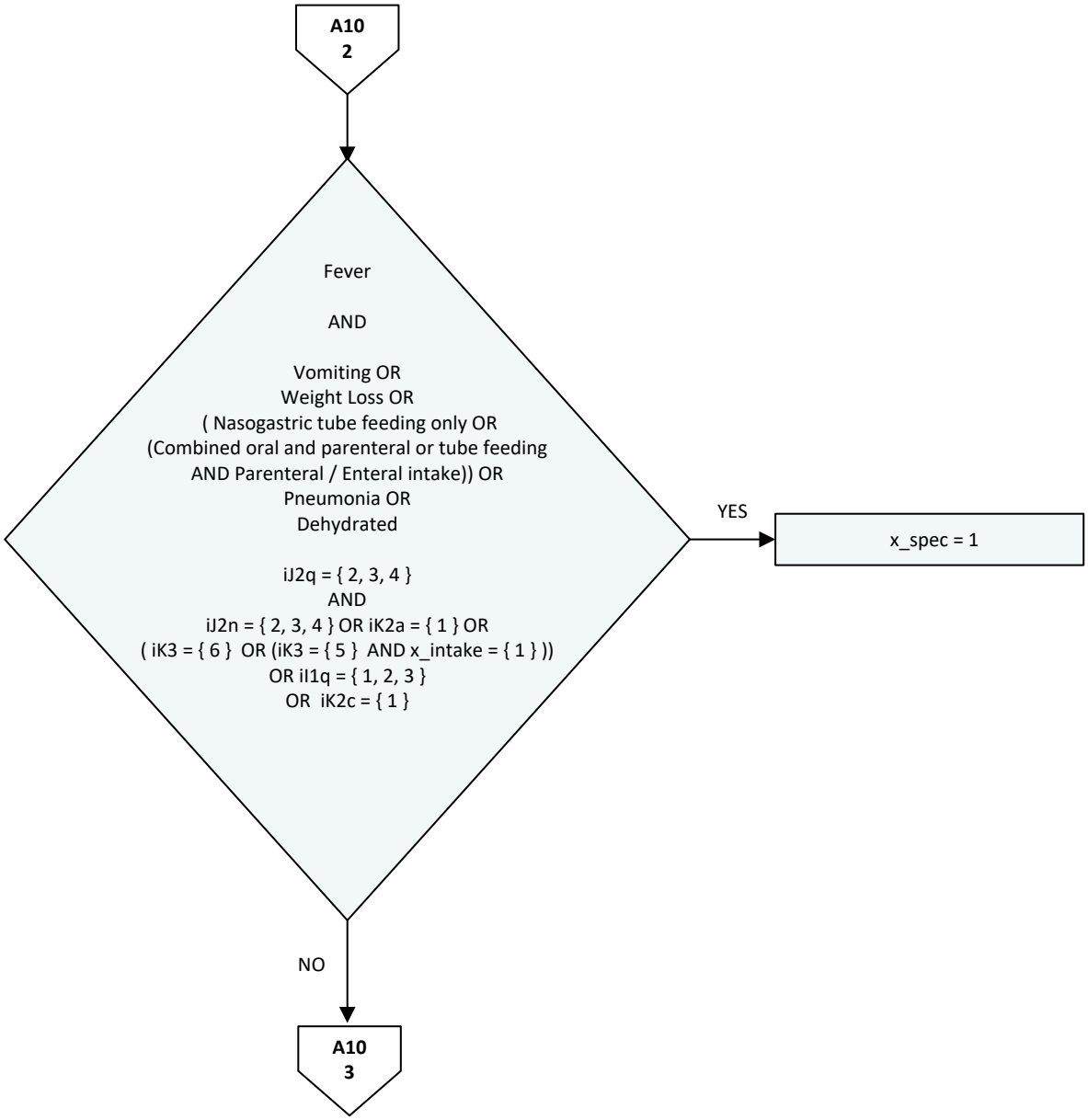
VARIABLE: X_SPEC (1 OF 4)



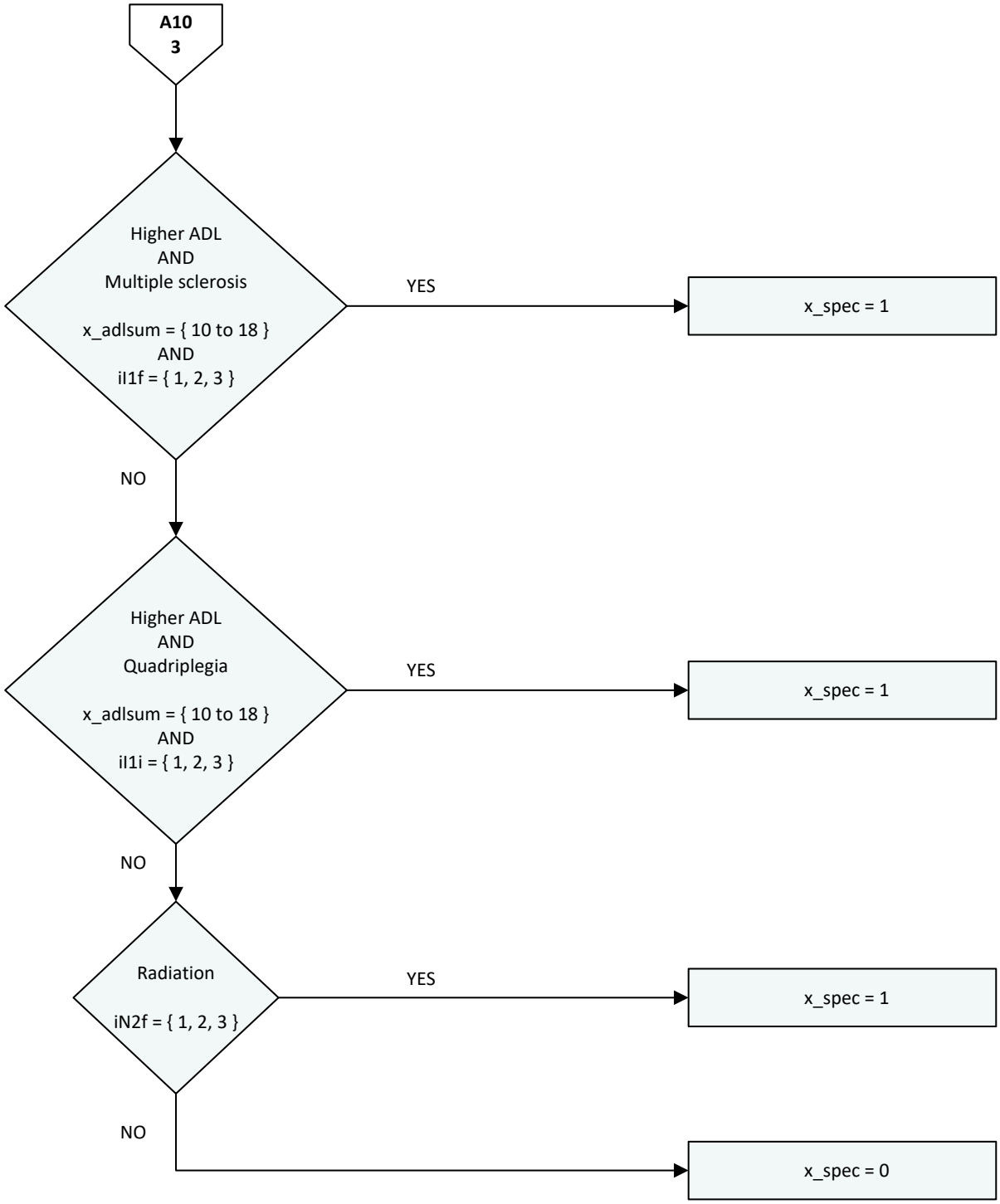
VARIABLE: X_SPEC (2 OF 4)



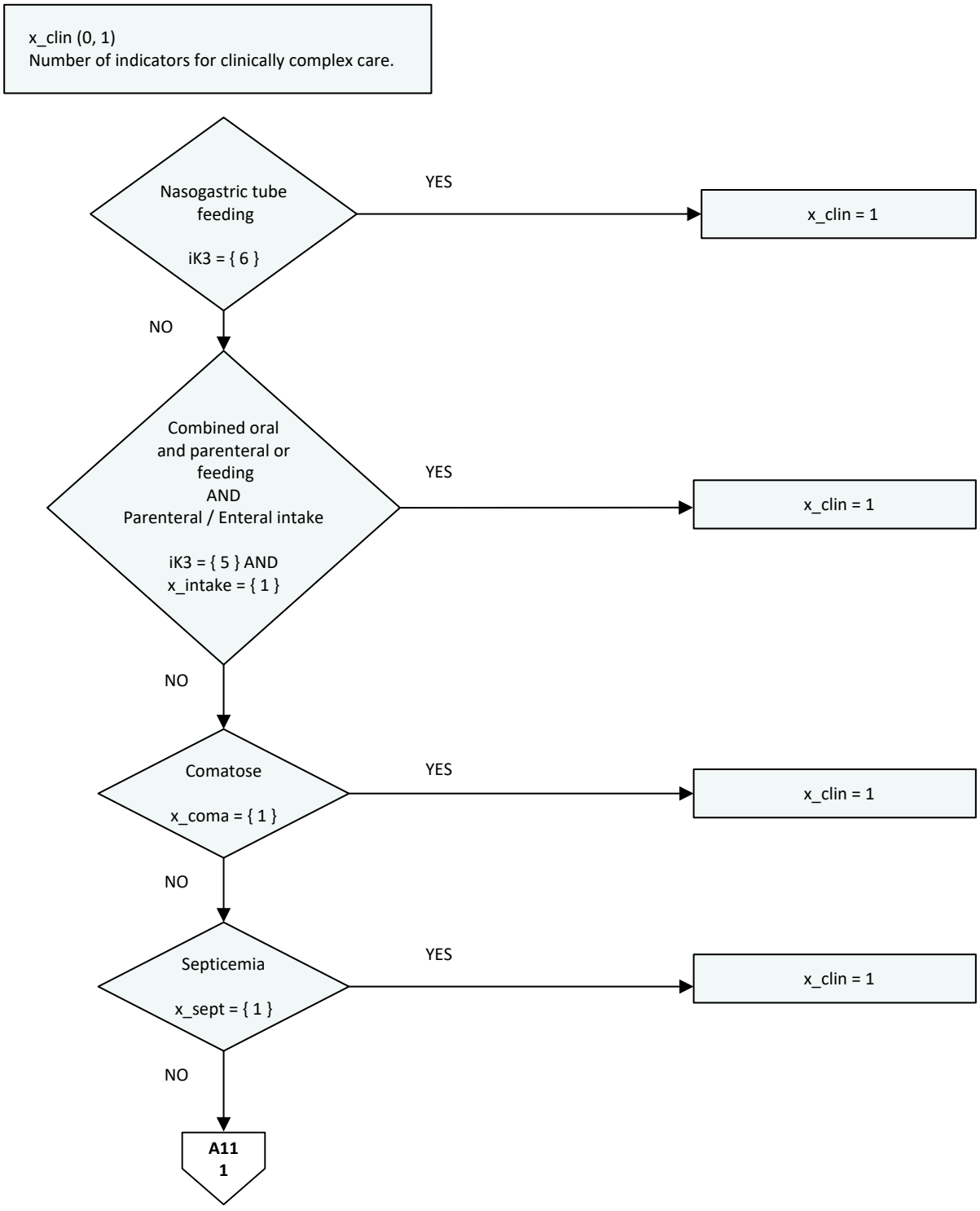
VARIABLE: X_SPEC (3 OF 4)



VARIABLE: X_SPEC (4 OF 4)



VARIABLE: X_CLIN (1 OF 4)



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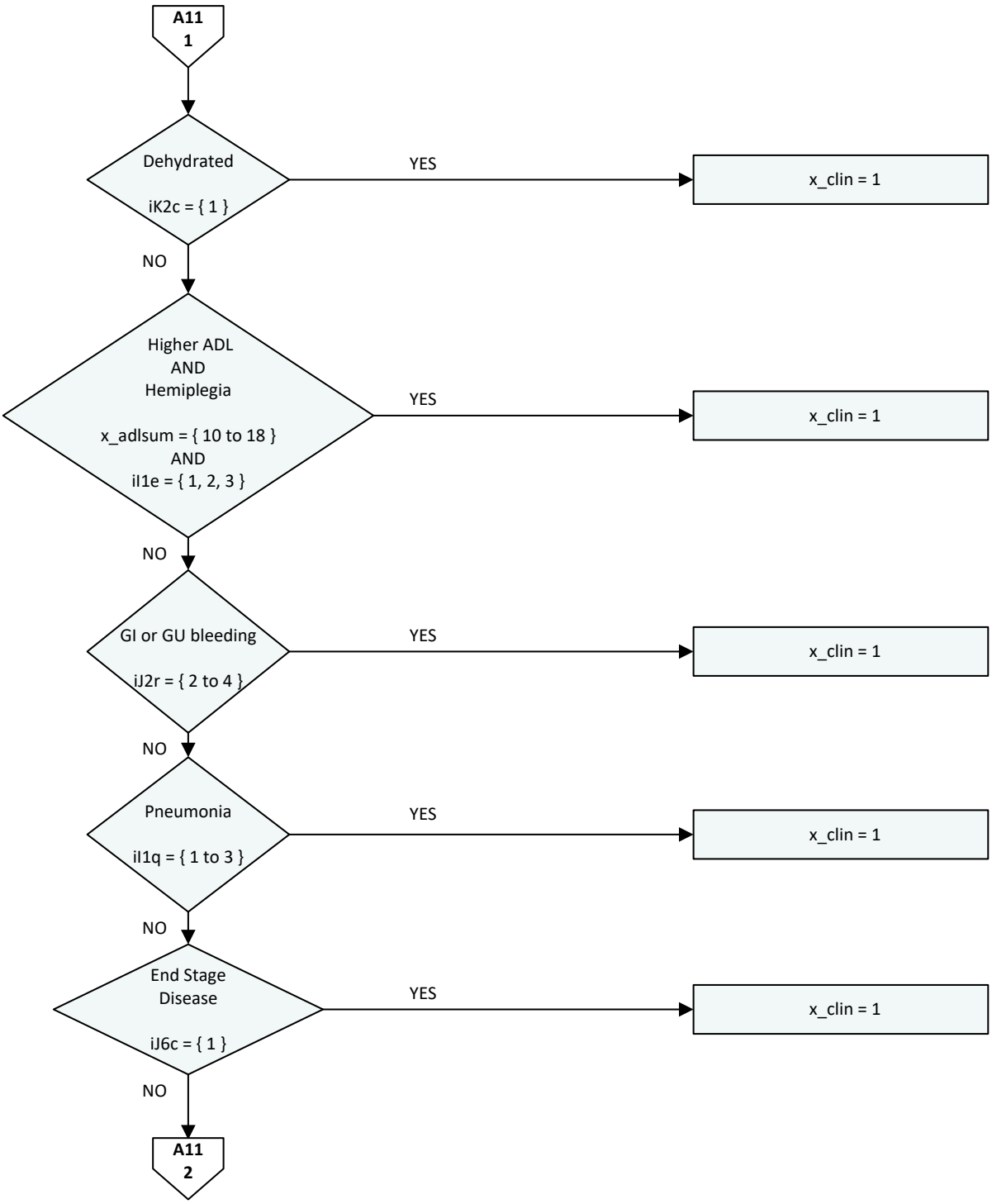
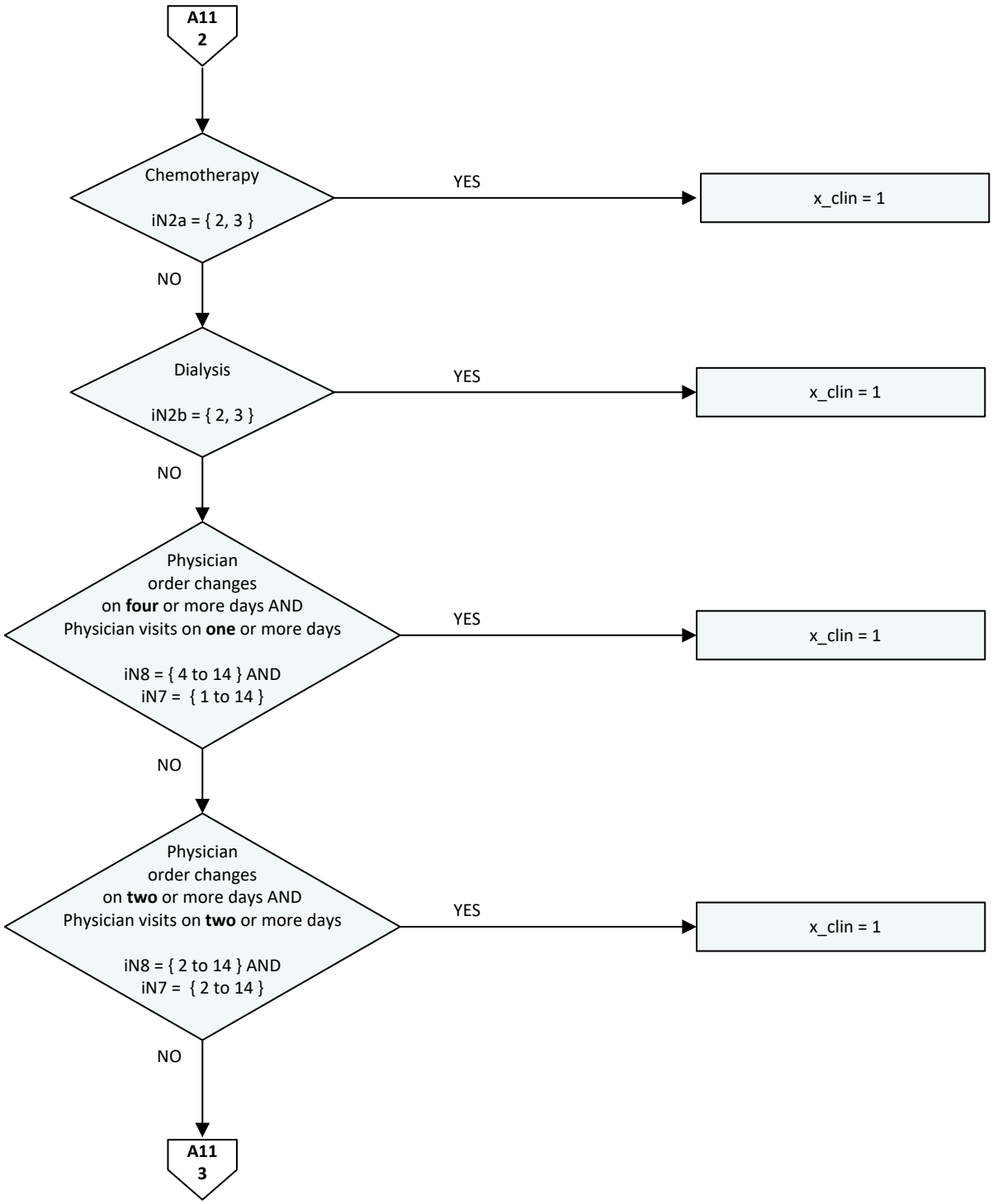
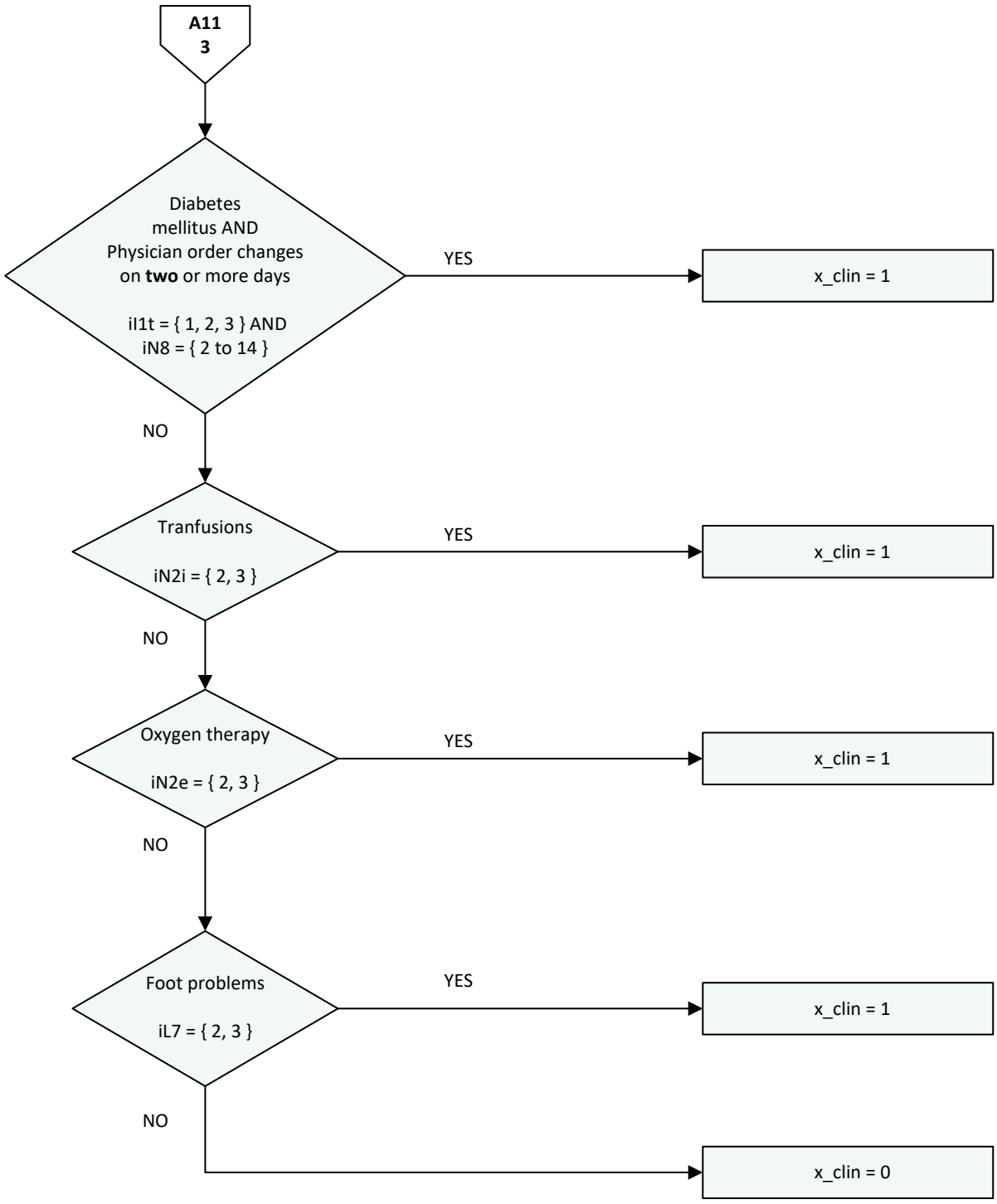


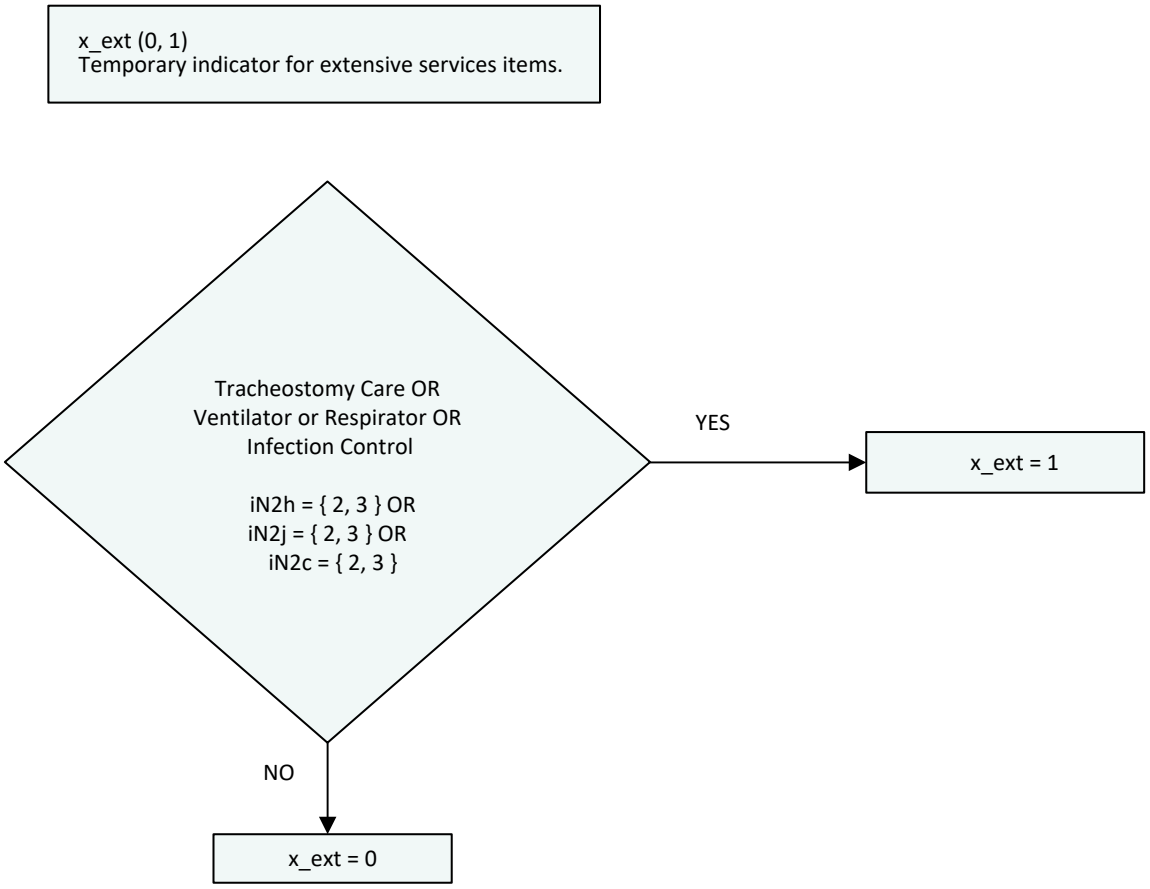
VARIABLE: X_CLIN (3 OF 4)



VARIABLE: X_CLIN (4 OF 4)



VARIABLE: X_EXT

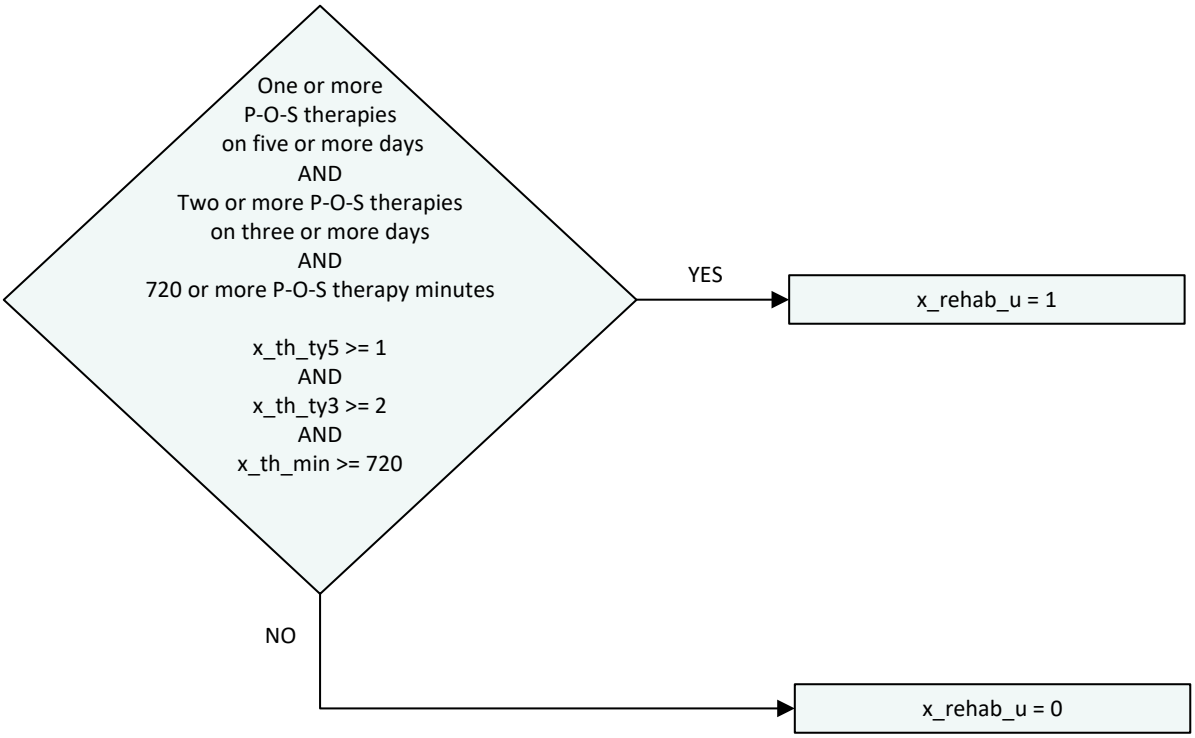


IRRS RUG-III Plus (44-Group) Section 3: Calculate RUG-III Plus category triggers

RUG-III PLUS TRIGGERS (1 OF 7)

x_rehab_u (0, 1)

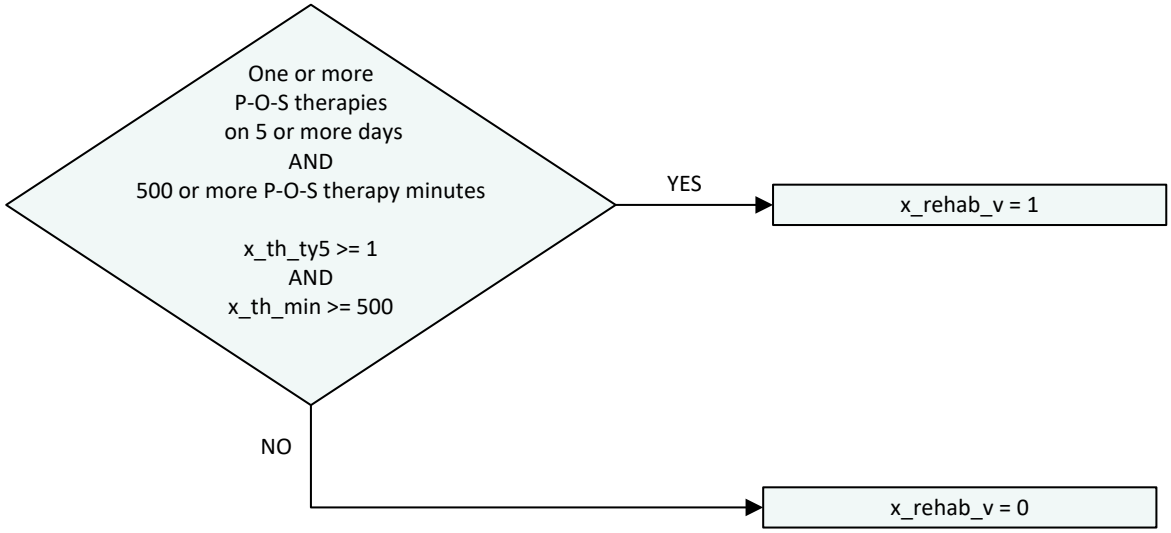
The Ultra High Special Rehabilitation trigger is set
a) if there are one or more P-O-S therapies on five or more days
AND
b) if there are two or more P-O-S therapies on three or more days
AND
c) if there are 720 or more P-O-S therapy minutes



RUG-III PLUS TRIGGERS (2 OF 7)

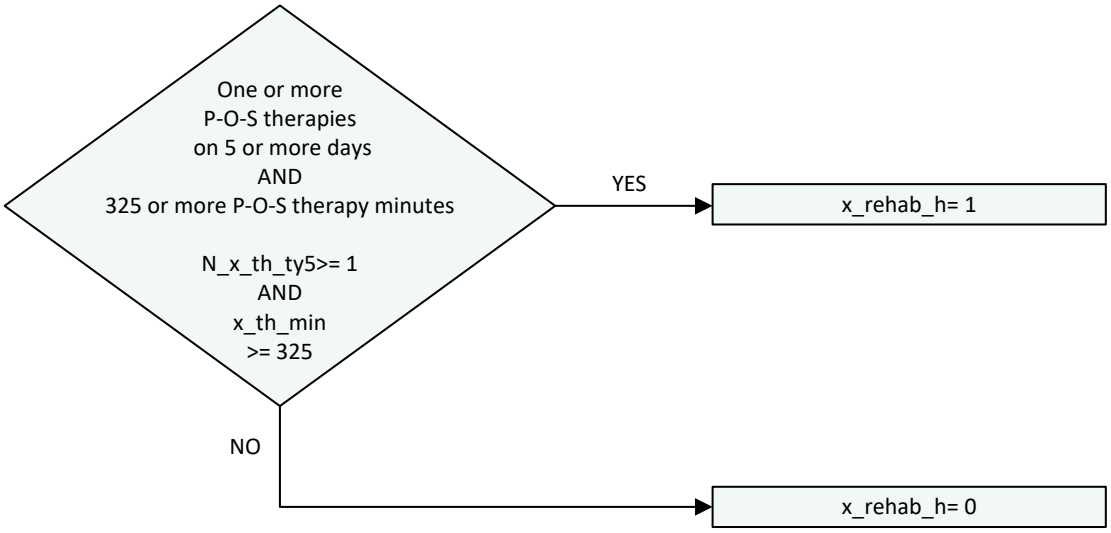
x_rehab_v (0, 1)

The Very High Special Rehabilitation trigger is set if there are one or more P-O-S therapies on five or more days AND if there are 500 or more P-O-S therapy minutes



x_rehab_h (0, 1)

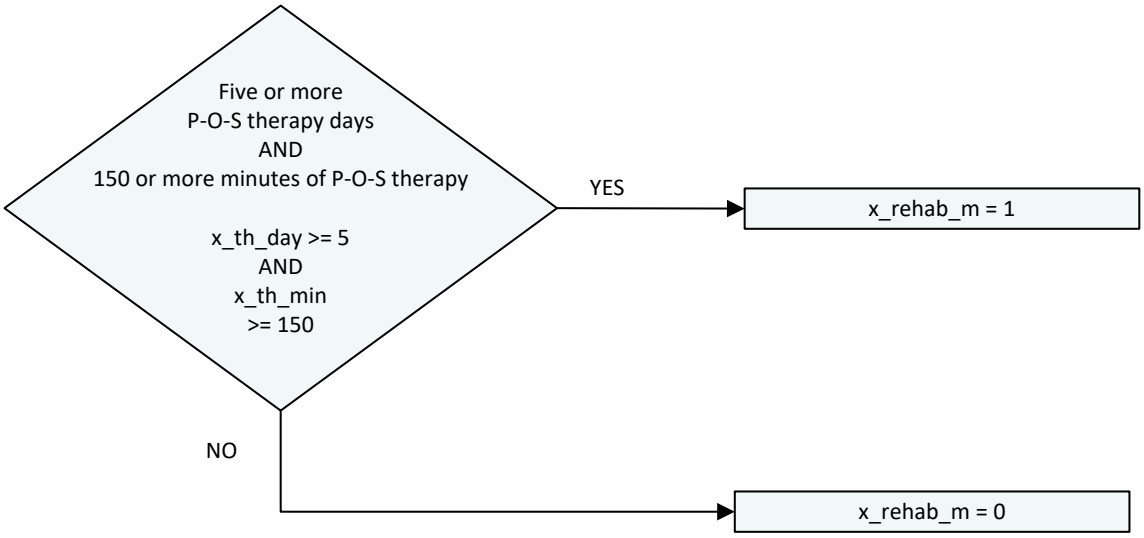
The High Special Rehabilitation trigger is set if there are one or more P-O-S therapies on five or more days AND if there are 325 or more P-O-S therapy minutes



RUG-III PLUS TRIGGERS (3 OF 7)

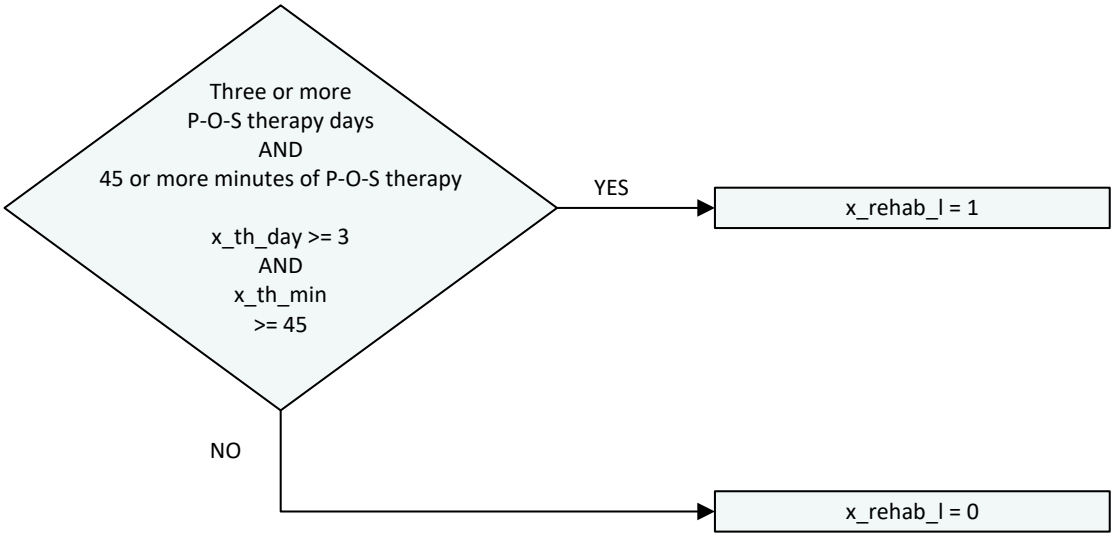
x_rehab_m (0, 1)

The Medium Special Rehabilitation trigger is set if there are five or more P-O-S therapy days AND if there are 150 or more P-O-S therapy minutes



x_rehab_l (0, 1)

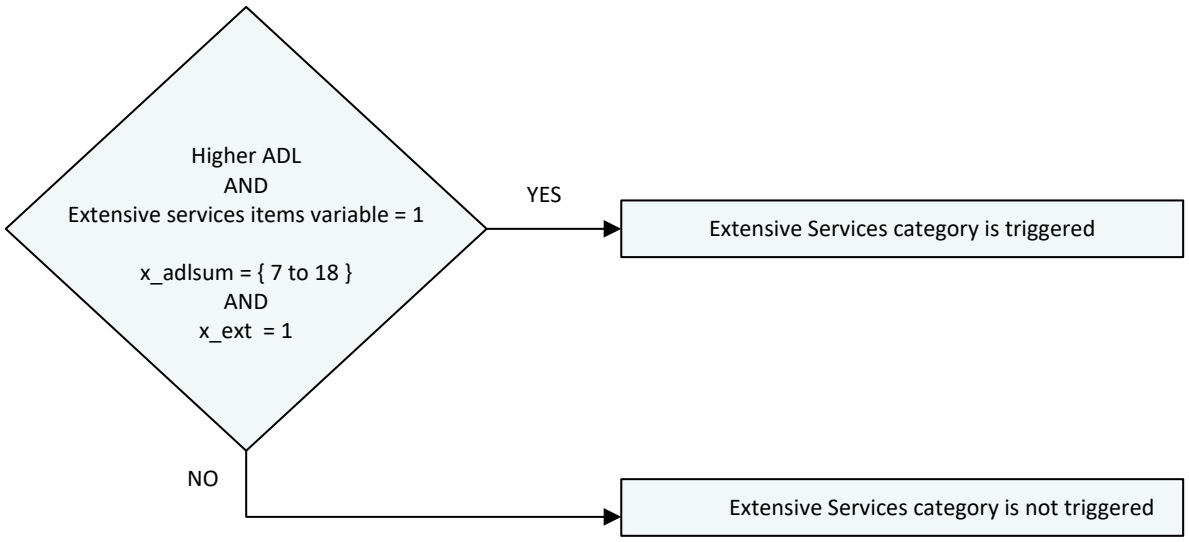
The Low Special Rehabilitation trigger is set if there are three or more P-O-S therapy days AND if there are 45 or more P-O-S therapy minutes



RUG-III PLUS TRIGGERS (4 OF 7)

The assignment of qualifying extensive services RUG-III Plus groups to assessments includes the identification of the trigger for the extensive services category. This document does not provide a specific temporary variable for assessments that trigger the extensive services category.

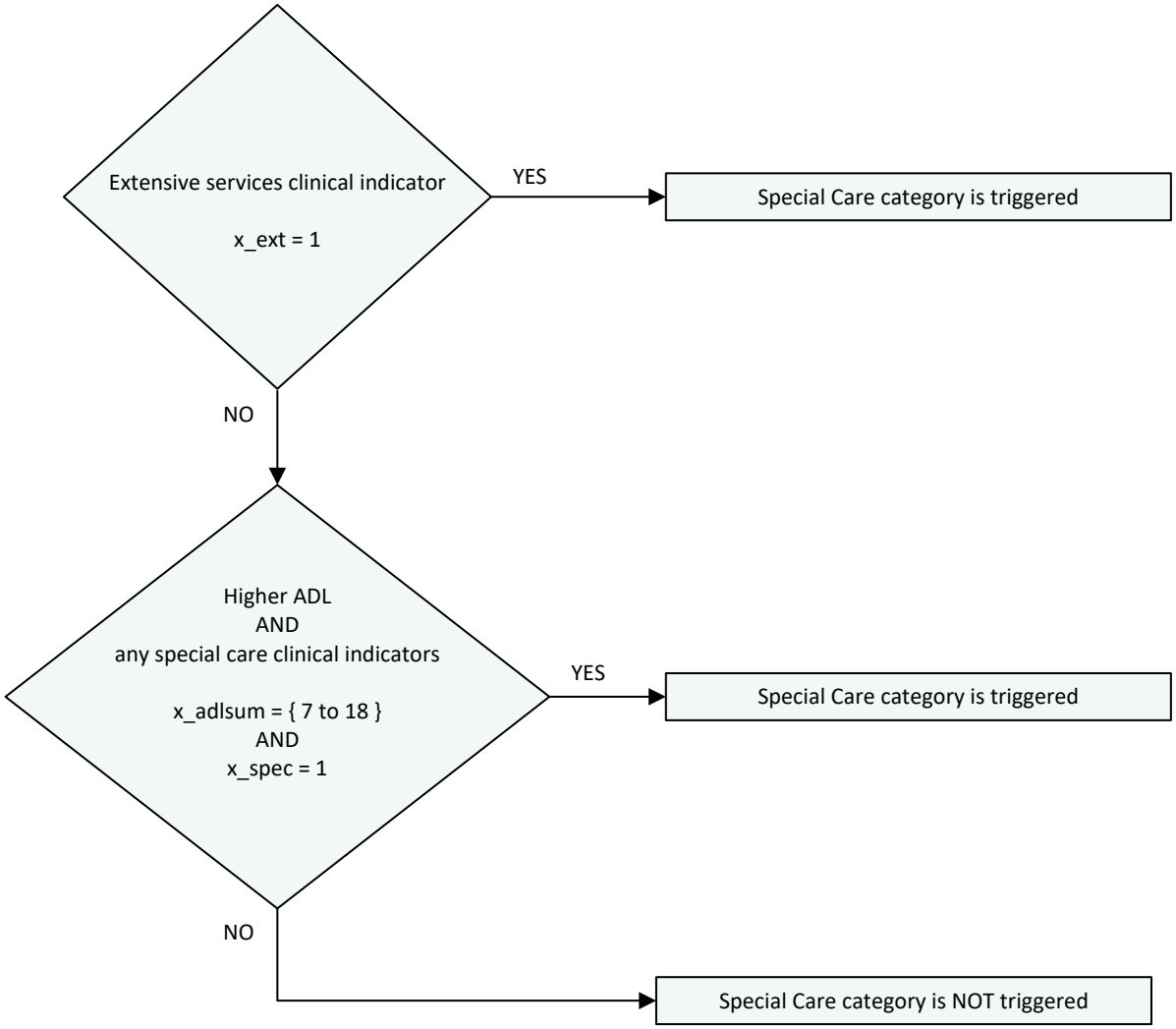
The RUG-III Plus Extensive Services trigger is set if there are any RUG-III Plus Extensive Care clinical items AND a higher ADL score. Note this is different than the criteria for RUG-III Extensive Care clinical items.



RUG-III PLUS TRIGGERS (5 OF 7)

The assignment of qualifying special care RUG-III Plus groups to assessments includes the identification of the trigger for the special care category. This document does not provide a specific temporary variable for assessments that trigger the special care category.

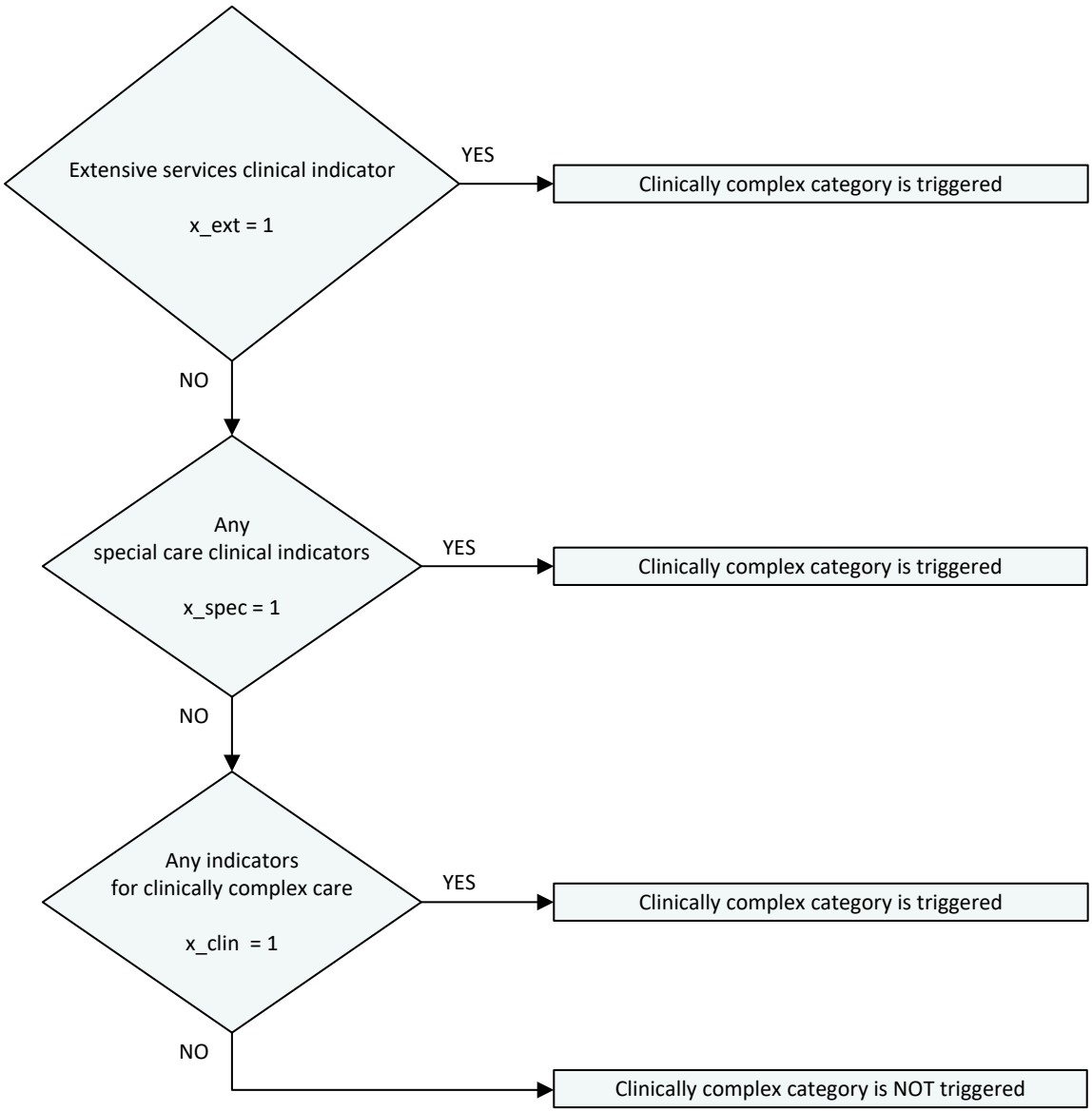
The RUG-III Plus Special Care trigger is set
a) if there are any Extensive Care clinical indicators
OR
b) if there are any Special Care clinical indicators AND there is also a higher ADL score for the assessment



RUG-III PLUS TRIGGERS (6 OF 7)

The assignment of qualifying clinically complex RUG-III Plus groups to assessments includes the identification of the trigger for the clinically complex category. This document does not provide a specific temporary variable for assessments that trigger the clinically complex category.

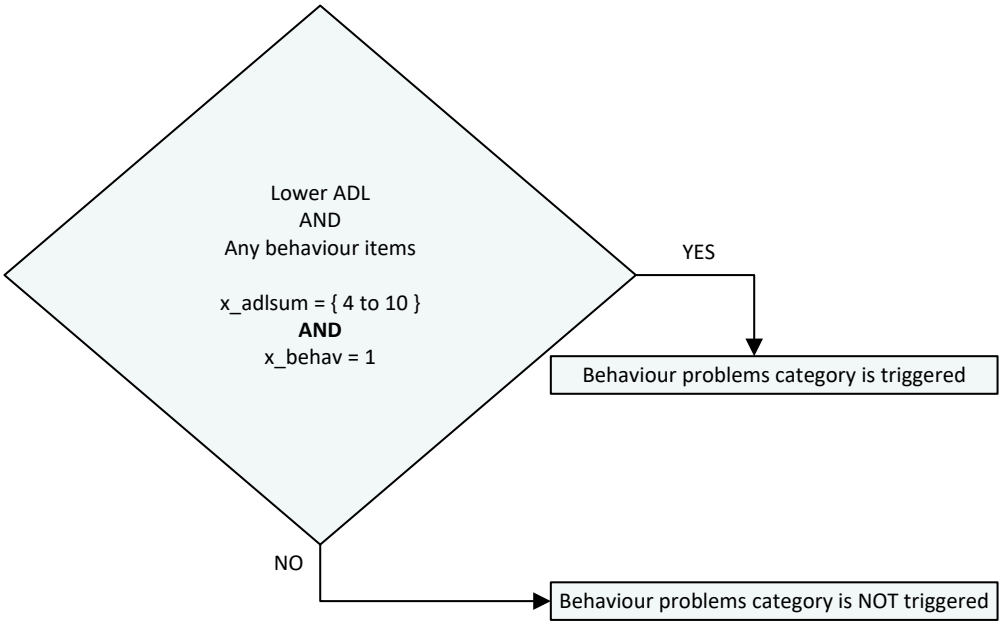
The Clinically Complex trigger is set
a) if there are any Extensive Care clinical indicators
OR
b) if there are any Special Care clinical indicators
OR
c) if there are any indicators for Clinically Complex care



RUG-III PLUS TRIGGERS (7 OF 7)

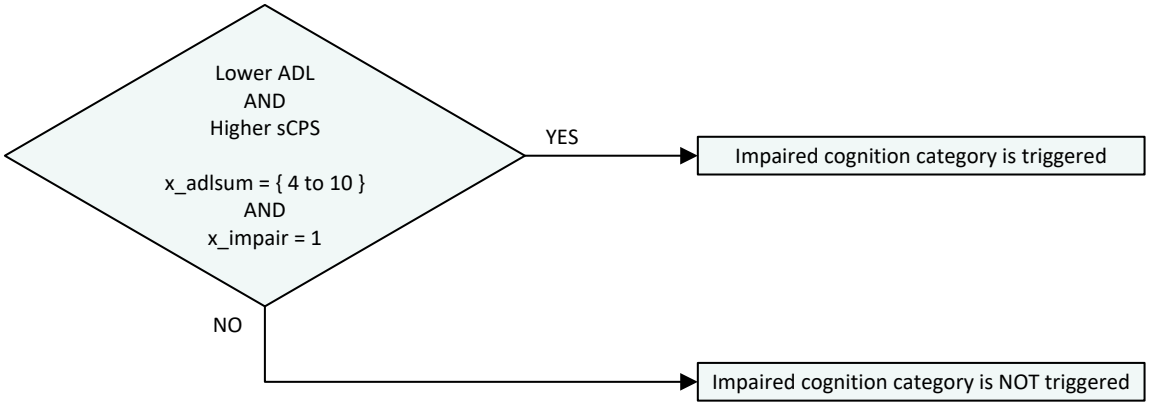
The assignment of qualifying behaviour problems RUG-III Plus groups to assessments includes the identification of the trigger for the behaviour problems category. This document does not provide a specific temporary variable for assessments that trigger the behaviour problems category.

The Behaviour Problem trigger is set when there is a lower ADL score and any Behaviour Problem item



The assignment of qualifying impaired cognition RUG-III Plus groups to assessments includes the identification of the trigger for the impaired cognition category. This document does not provide a specific temporary variable for assessments that trigger the impaired cognition category.

The Impaired Cognition TRIGGER is set when there is a Lower ADL score and a Higher CPS score



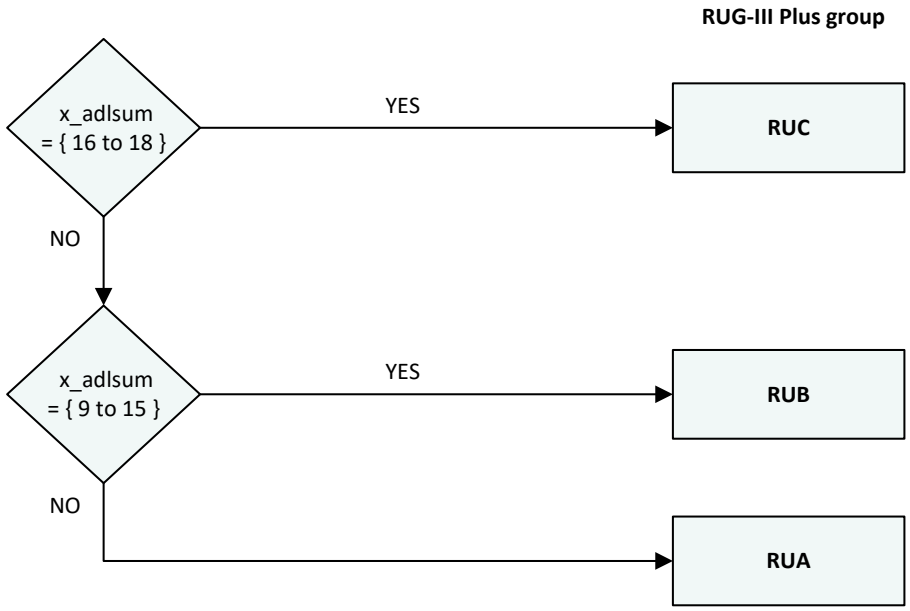
IRRS RUG-III (44-Group) Section 4: Assign qualifying RUG-III Plus groups

CATEGORY: SPECIAL REHABILITATION (1 OF 3)

There are five sub-categories within the Special Rehabilitation category. Assessments that qualified for this category will qualify for **at least one** of the sub-categories.

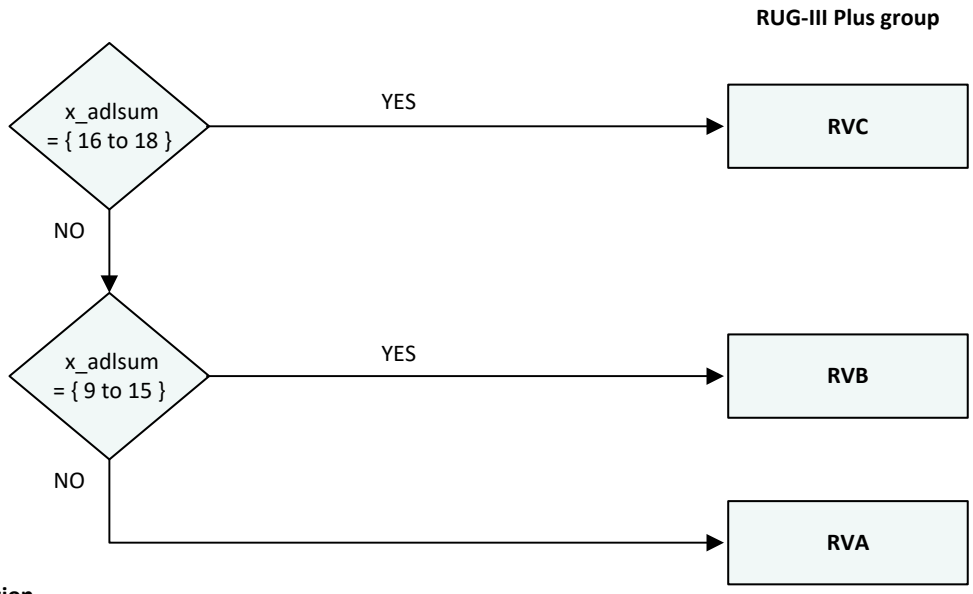
One RUG group flag will be set within each sub-category that the assessment qualifies for.

Special Rehabilitation
Ultra High Sub-Category

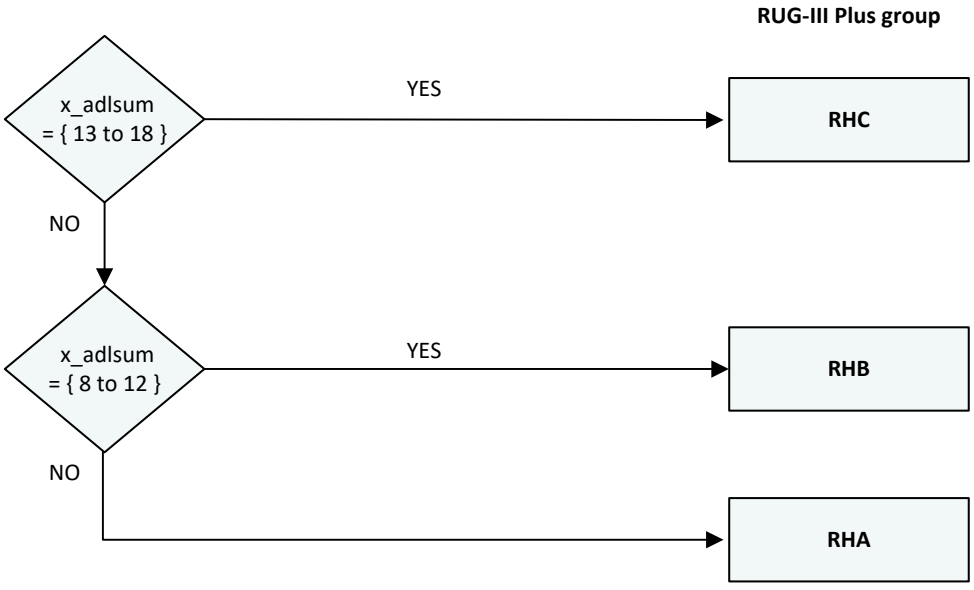


CATEGORY: SPECIAL REHABILITATION (2 OF 3)

Special Rehabilitation
Very High Sub-Category

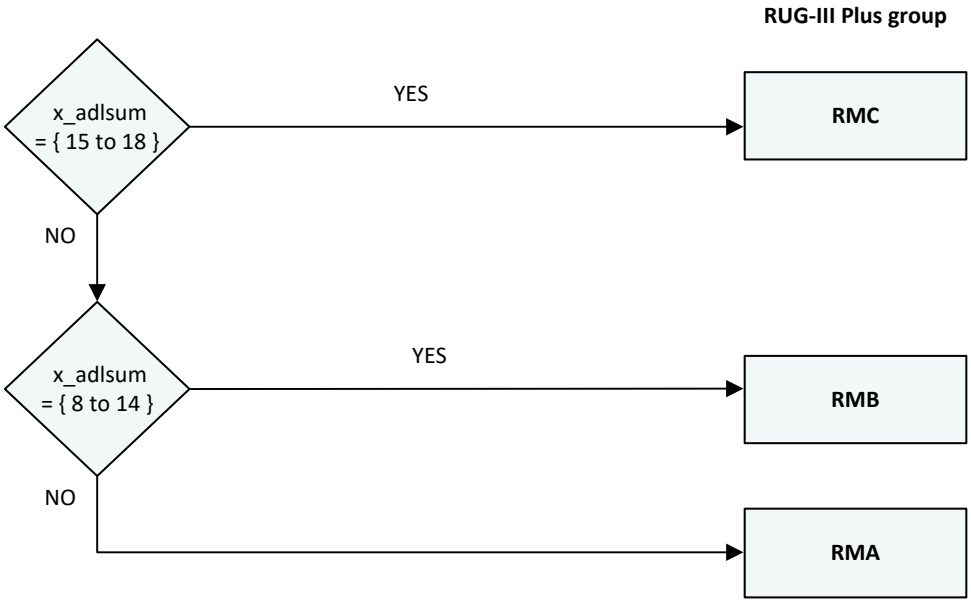


Special Rehabilitation
High Sub-Category

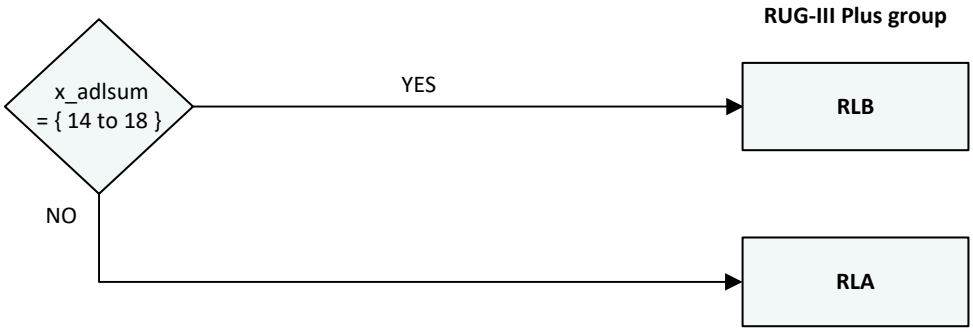


CATEGORY: SPECIAL REHABILITATION (3 OF 3)

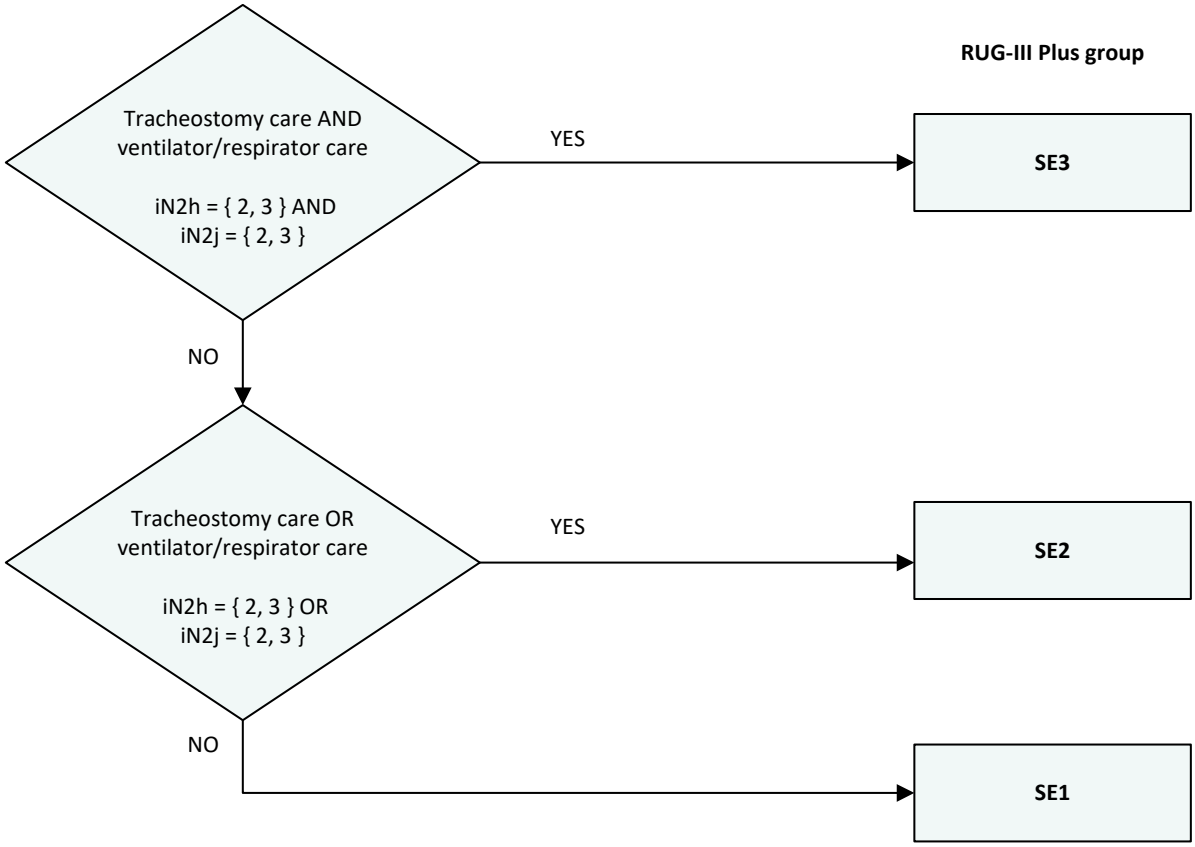
Special Rehabilitation
Medium Sub-Category



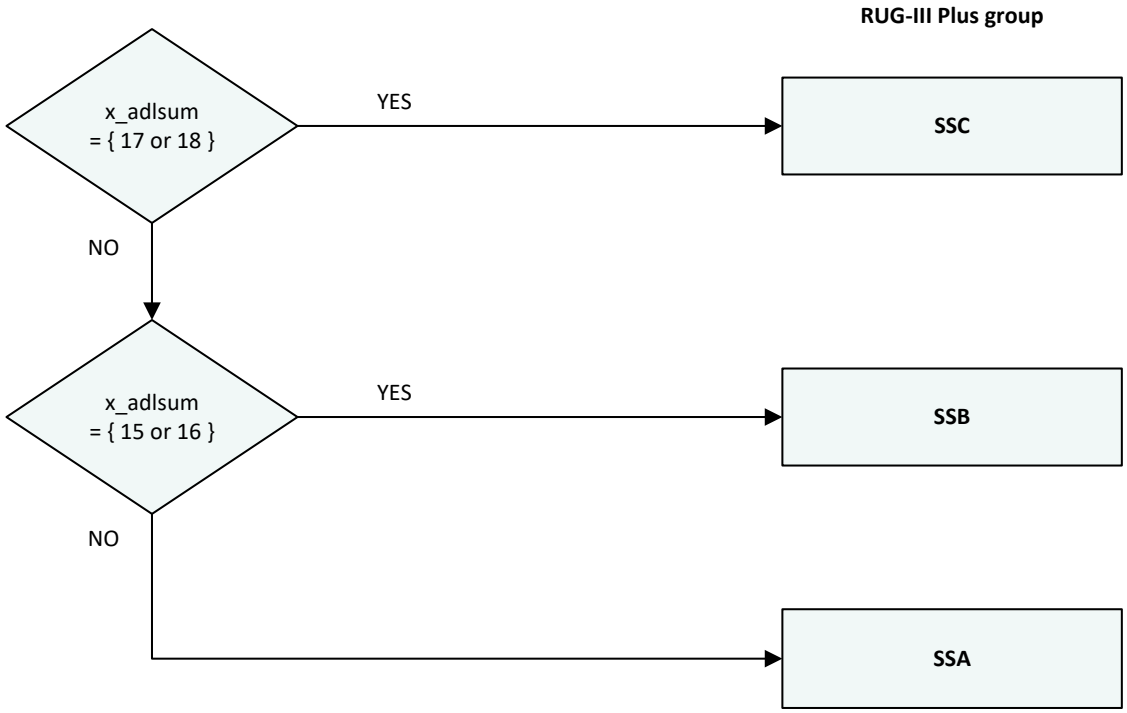
Special Rehabilitation
Low Sub-Category



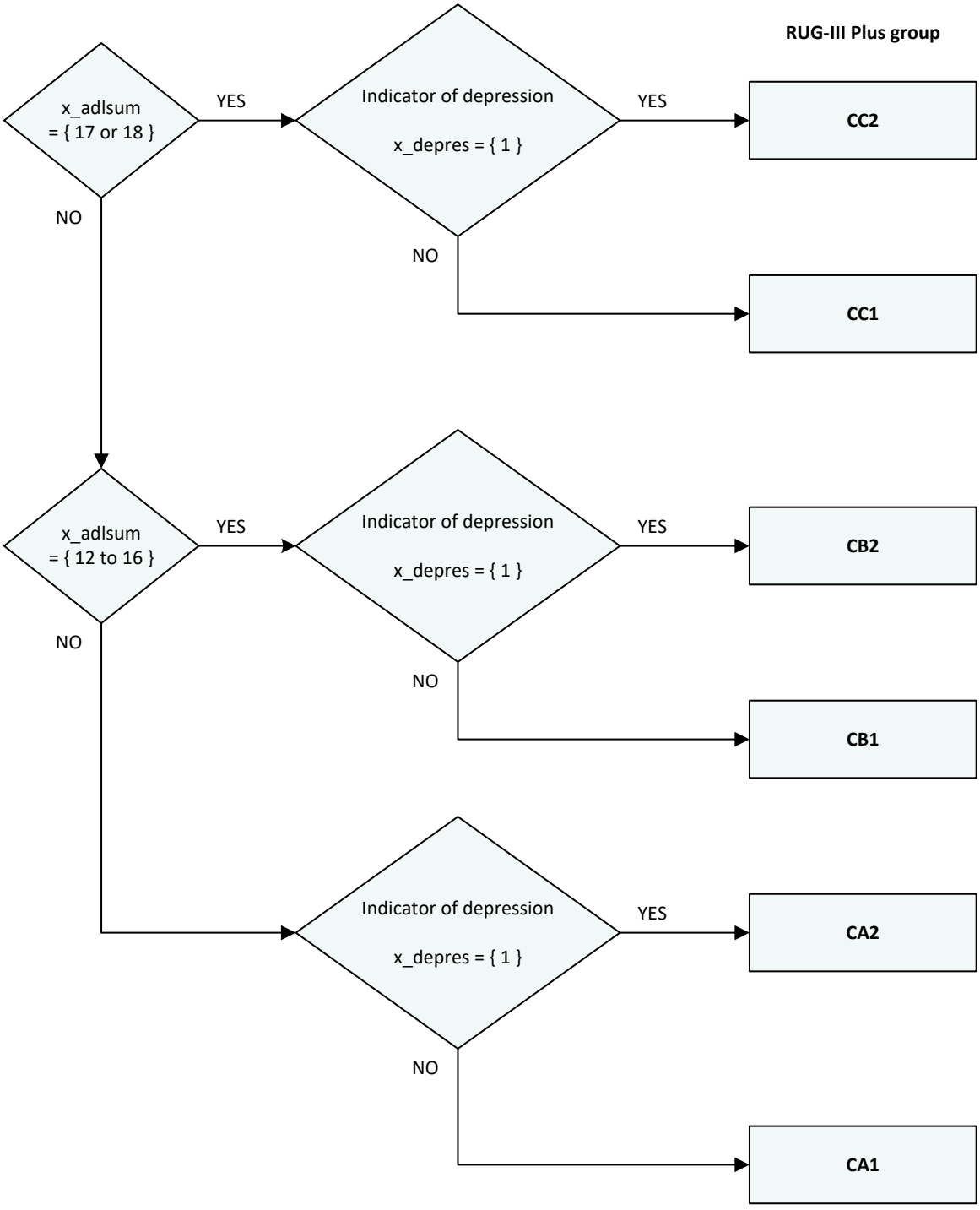
CATEGORY: EXTENSIVE SERVICES



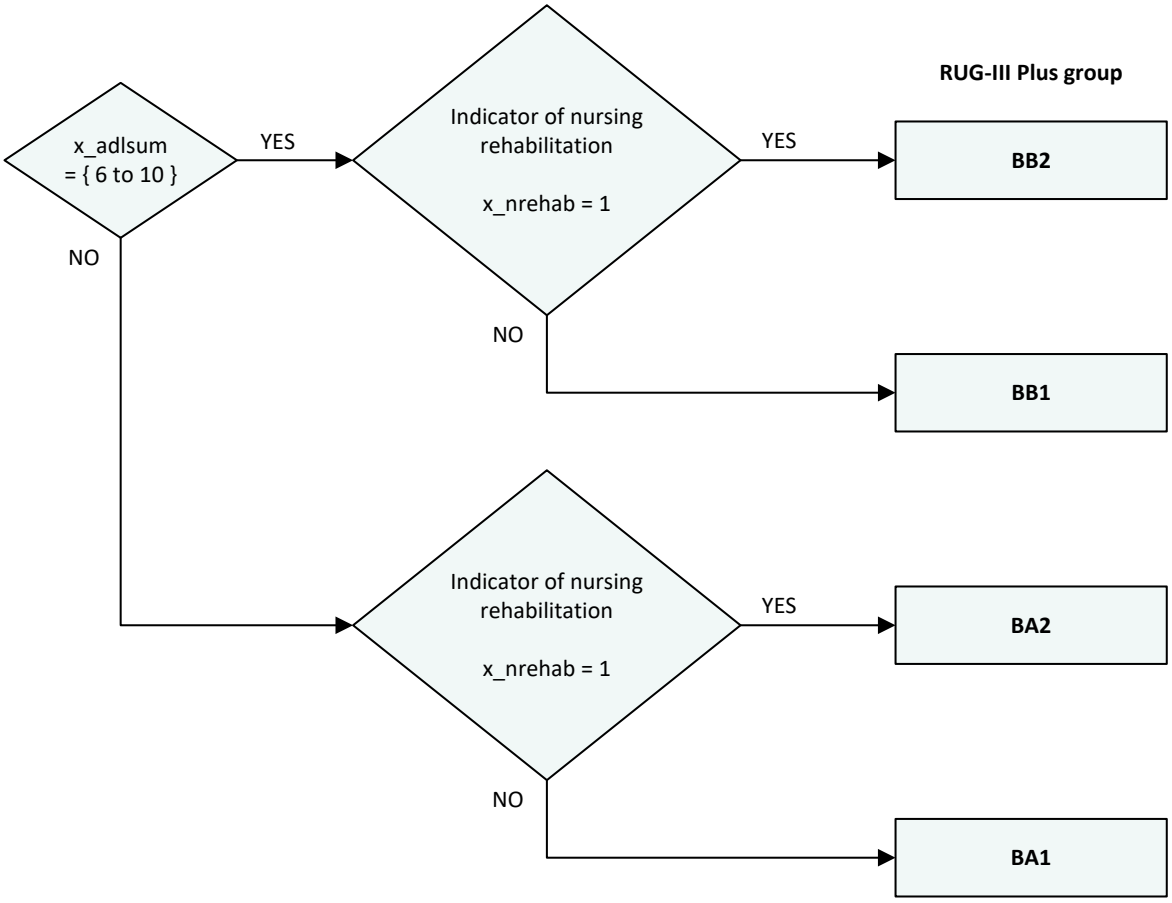
CATEGORY: SPECIAL CARE



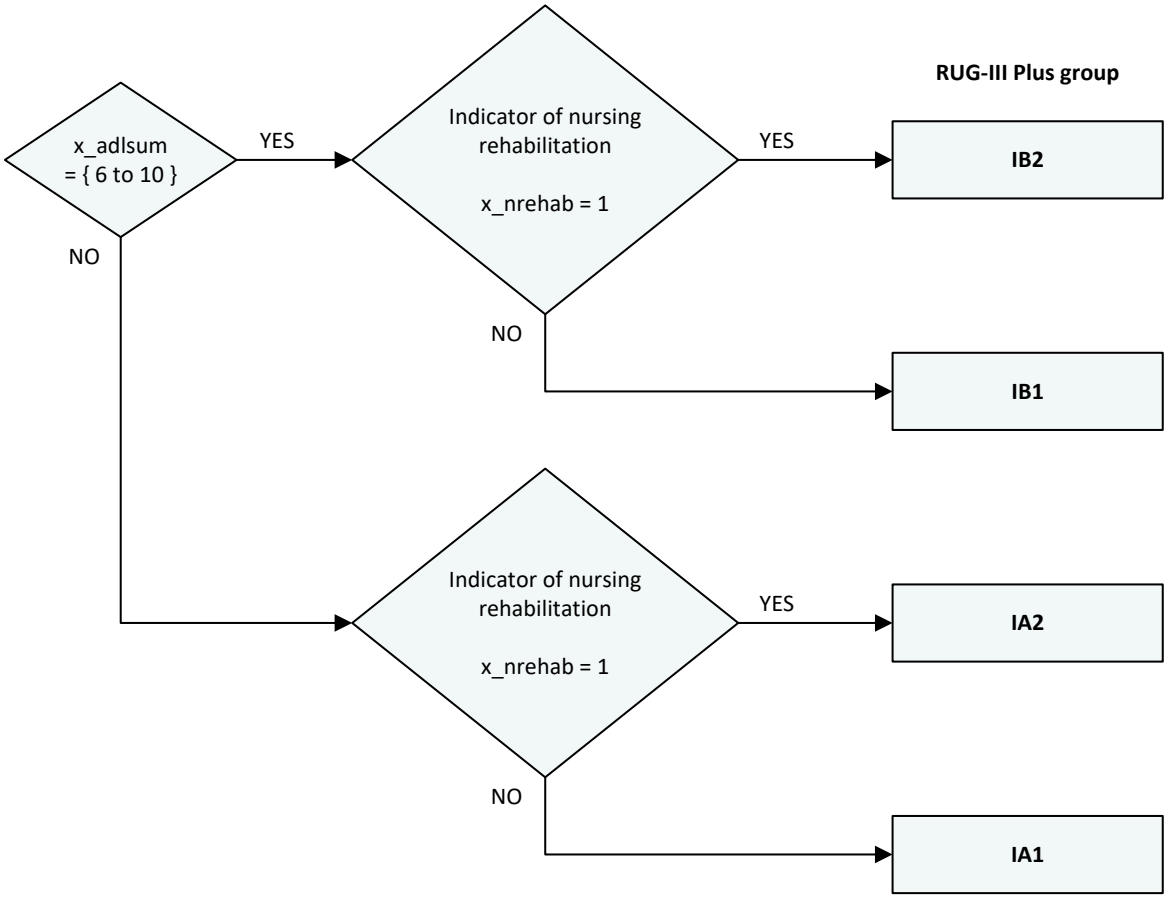
CATEGORY: CLINICALLY COMPLEX



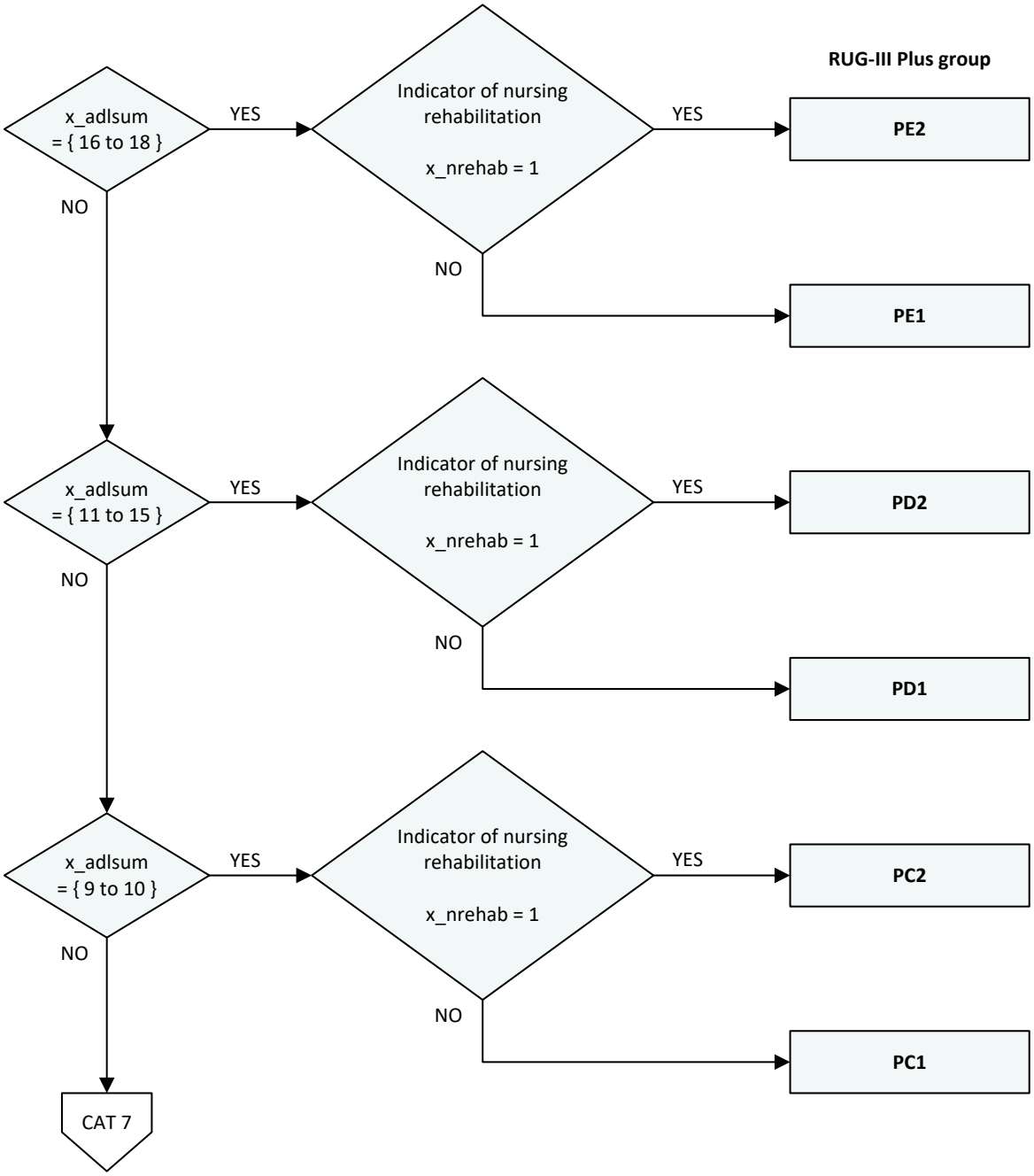
CATEGORY: BEHAVIOUR PROBLEMS



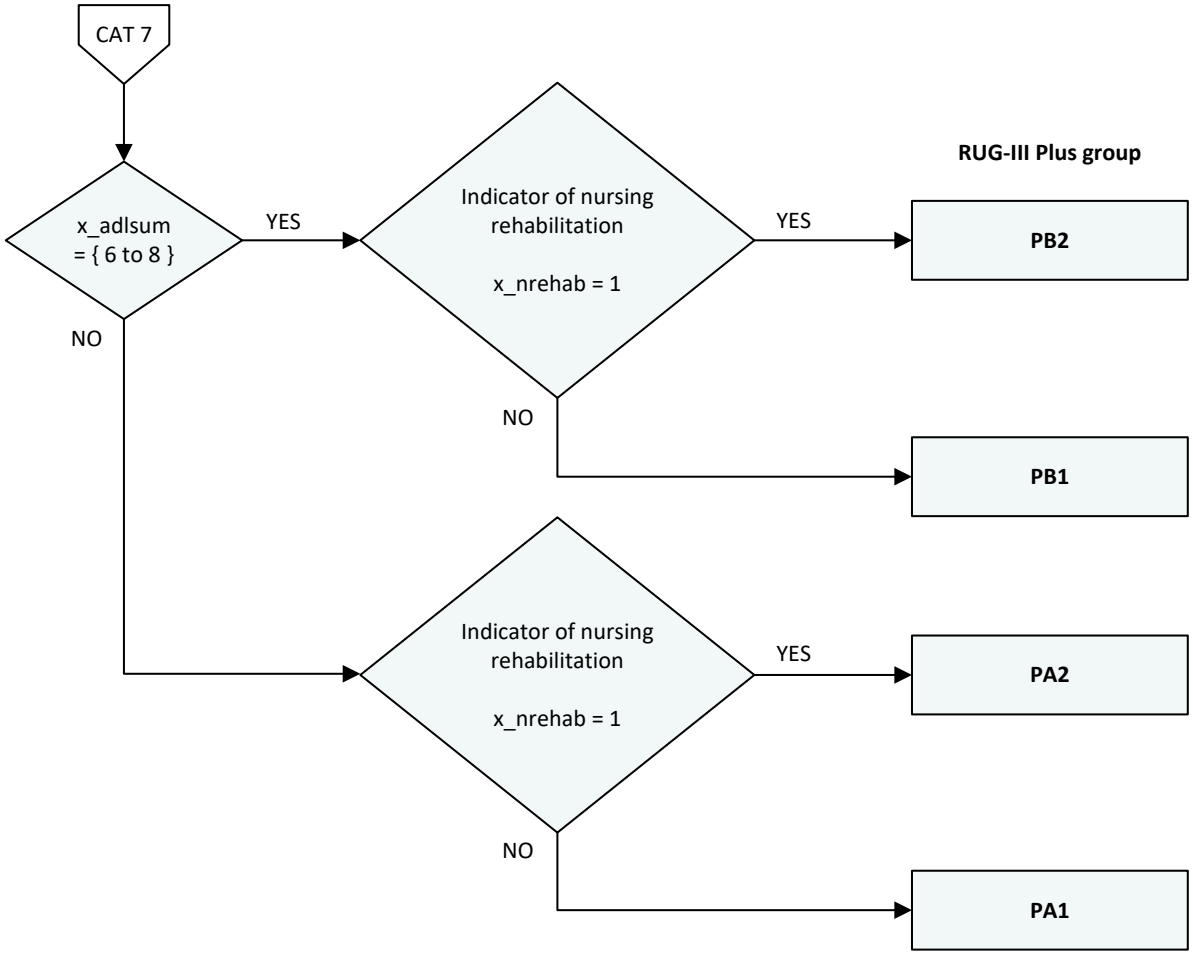
CATEGORY: IMPAIRED COGNITION



CATEGORY: REDUCED PHYSICAL FUNCTIONS (1 OF 2)



CATEGORY: REDUCED PHYSICAL FUNCTIONS (2 OF 2)



Appendix: Summary of changes to RUG-III Plus methodology using iCodes

Fiscal year	Grouping methodology
2022–2023	• sDRS is excluded from valid value checking step. • iE3a to iE3f value range in description is corrected. • Outcome variables prefix are removed, i.e. aR3, aR3a, aNR3, aNR3a.
2018–2019	• Initial release

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