

Appendix C: Algorithm (Corrected)

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Note:

This document is a corrected version of the original Appendix C. The algorithm originally published in our final report, and in Appendix C, contained an error that meant a case with a specific rare combination of Current View Ratings would not be allocated to a grouping. The corrected version of the algorithm published here avoids this error. The change made is to add an exclusion condition to the definition of the “OCD” grouping, which requires that the rating for “Self harm” must be smaller (less severe) than the rating for “Compelled to do or think things”. This change has been made in Table C.1 below, as well as in the R code contained in section 2 of this document. In addition, we have made small changes to the code, such that objects, variables and functions used in the algorithm are removed when they are no longer needed.

This appendix provides the algorithm for allocation of service users to a grouping, based on clinician ratings of a Current View form. The algorithm is first briefly described and presented in tabular form (section 1), and then in the form of code for the computing language R (section 2)¹.

1. Algorithm description and tabular presentation

1.1 The algorithm in brief

The algorithm is based on 31 ratings from the Current View Form, namely the thirty presenting problems and the complexity factor “Pervasive Developmental Disorders”. For some groupings, the age of the child or young person (CYP) is also taken into account. All groupings are mutually exclusive, with the exception of grouping NEU (Neurodevelopmental Assessment), which may be combined with any of the other groupings. The algorithm never suggests PBP (Presentation Suggestive of Potential BPD), because we think that this grouping may not be identifiable from presenting information captured on the Current View. The following presents a common-sense explanation of the algorithm. Some details are left out in order to facilitate a conceptual understanding. For a full specification please consult Tables C1a and C1b and/or the R code provided (section 2).

The “NICE groupings” (ADH, AUT, BEH, BIP, DEP, GAP, OCD, PTS, SHA, SOC, EAT, PSY):

For the algorithm to suggest one of these groupings, the CYP must have the associated “index problem” rated at least moderate. The index problem is the main symptom associated with a particular NICE² clinical guideline [e.g. “Low Mood” for DEP

¹ R Core Team (2014) A: a language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL: <http://www.R-project.org/>.

² ‘NICE’ is the acronym for the National Institute for Health and Care Excellence, which provides guidance and advice to improve health and social care (www.nice.org.uk).

(“Depression”), “Eating Issues” for EAT (“Eating Disorders”)]. In addition, the child must NOT have high ratings on a selection of other presenting problems. These “exclusion criteria” are different for each grouping and are based on clinical judgement regarding which kinds of symptoms may mean that the group indicated by the “index problem” may not be appropriate.

NEU (Neurodevelopmental Assessment): If “Unexplained Developmental Difficulties” is rated moderate or severe, the algorithm suggests NEU. Note that a child can be in NEU at the same time as being in any of the other groupings.

If the CYP does not have any of the index problems identifying the “NICE groupings”, or if the presence of exclusion criteria means that no “NICE grouping” could be suggested, then there are five further possibilities:

ADV (Getting Advice: Signposting and Self-management Advice): If the CYP presents with mild symptoms only – or has at most one moderate problem, but this ‘moderate problem’ is none of the “index” problems associated with the “NICE Groupings” that we have referred to above – then the algorithm suggests ADV.

EMO (Co-occurring Emotional Difficulties): If the CYP has two or more “emotional problems” (anxieties and/or depression) rated at least moderate, the algorithm will suggest EMO. There are some additional exclusion criteria; for details see Table C1b or the R-code below.

BEM (Co-occurring Behavioural and Emotional Difficulties): If the CYP has “Behavioural Difficulties” and one or more emotional problems (anxiety/anxieties or depression) rated at least moderate, the algorithm will suggest BEM. There are some additional exclusion criteria; for details see Table C1b or the R-code below.

DNC (Difficulties Not Covered by Other Groupings): If the CYP has either two or more problems rated as moderate, or a single problem rated as severe, but doesn’t fit into any of the groupings described above (except NEU), then the algorithm will suggest DNC. Some additional criteria apply; for details see Table C1b or the R-code below.

DSI (Difficulties of Severe Impact): The algorithm will suggest DSI if the CYP has either

- two or more problems rated as severe, or
- has either Delusional Beliefs or Eating Issues rated as moderate or severe, or Extremes of Mood rated as severe, but doesn’t fit the criteria for either grouping EAT or PSY.³

Some additional criteria apply; for details see Table C1b or the R-code below.

³ Note that in cases where DSI is suggested by the algorithm and Delusional Beliefs, Eating Issues or Extremes of Mood are rated as moderate or severe, a co-occurring problem has meant that a “NICE grouping” has not been suggested

Table C1: Algorithm for Cluster Allocation based on Current View Ratings

C1a: Groups defined by a single “index” presenting problem

Current View Presenting Problem	Self-Harm: SHA	PTSD	DEP: Depression	OCD/BDD	BIP: Bipolar Disorder	ADHD	Generalised Anxiety/Panic Disorder	BEH: Conduct Disorder	SOC: Social Anxiety	AUT: Autism management	EAT: Eating Disorders	PSY: Psychosis	NEU: Neurodev. Assessment
ANXIOUS AWAY CAREGIVERS	≤Self-harm	<Trauma	≤mild	<Comp do think	Any	≤mild	≤Anx Gen	<Panic	≤mild	<Anx Soc	≤mild	≤mild	Any
ANXIOUS SOCIAL	≤Self-harm	<Trauma	≤mild	<Comp do think	Any	≤mild	≤Anx Gen	<Panic	≤mild	≥moderate	≤mild	≤mild	Any
ANXIOUS GENERALLY	≤Self-harm	<Trauma	≤mild	<Comp do think	Any	≤mild	≥moderate	Any	≤mild	<Anx Soc	≤mild	≤mild	Any
COMPELLED DO THINK	≤Self-harm	<Trauma	≤mild	≥moderate	Any	≤mild	<Anx Gen	<Panic	≤mild	<Anx Soc	≤mild	<Eat	Any
PANICS	≤Self-harm	≤ Trauma	≤mild	<Comp do think	Any	≤mild	Any	≥moderate	≤mild	<Anx Soc	≤mild	≤mild	Any
AVOIDS GOING OUT	≤Self-harm	≤ Trauma	≤mild	<Comp do think	Any	≤mild	≤Anx Gen	<Panic	≤mild	<Anx Soc	≤mild	≤mild	Any
AVOIDS SPECIFIC THINGS	≤Self-harm	<Trauma	≤mild	≤Comp do think	Any	≤mild	≤Anx Gen	<Panic	≤mild	<Anx Soc	≤mild	<Eat	Any
REPETITIVE PROBLEM BEHARS	≤Self-harm	<Trauma	≤mild	<Comp do think	Any	≤mild	≤Anx Gen	<Panic	≤mild	<Anx Soc	≤mild	≤mild	Any
LOW MOOD	≤Self-harm	<Trauma	≥moderate	≤mild	Any	≤mild	≤mild	≤mild	≤mild	≤mild	≤mild	≤Eat	Any
SELF HARM	≥moderate	≤mild	<Low Mood	<Comp do think	<Extremes Mood	≤mild	<Anx. Gen.	<Panic	≤mild	≤mild	≤mild	Any	Any
EXTREMES OF MOOD	<Self-harm	≤mild	≤mild	≤mild	moderate	≤mild	≤mild	≤mild	≤mild	≤mild	≤mild	≤mild	severe OR
DELUSIONAL BELIEF HALLUCINATIONS	≤mild	≤mild	≤mild	≤mild	<Extremes Mood	≤mild	≤mild	≤mild	≤mild	≤mild	≤mild	≤mild	≥moderate
DRUG ALCOHOL DIFFICULTIES	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	≤mild	Any	Any
DIFFICULTIES SITTING STILL CONCENTRATE	≤mild	<Trauma	<Low Mood	<Comp do think	Any	≥moderate	≤mild	≤mild	≤mild	≤mild	≤mild	≤mild	Any
BEHAVIOURAL DIFFICULTIES	≤mild	<Trauma	<Low Mood	<Comp do think	Any	Any	≤mild	≤mild	≥moderate	≤mild	Any	≤mild	Any
POSES RISK OTHERS	≤mild	≤mild	≤mild	<Comp do think	Any	Any	≤mild	≤mild	Any	≤mild	Any	≤mild	Any
CARER MANAGENT	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any
TOILET PROBLEMS	≤mild	≤mild	≤mild	<Comp do think	Any	≤mild	≤mild	≤mild	≤mild	≤mild	≤mild	≤mild	Any
TRAUMATIC EVENT	≤mild	≥moderate	≤mild	<Comp do think	Any	≤mild	≤mild	≤mild	≤mild	≤mild	≤mild	≤mild	Any
EATING ISSUES	≤mild	≤mild	<Low Mood	<Comp do think	Any	≤mild	≤mild	≤mild	≤mild	≤mild	≤mild	≥moderate	Any
FAMILY REL'SHIP DIFFICULTIES	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any
ATTACHMENT CARER PROBLEMS	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any	Any
PEER RELATIONSHIP DIFFICULTIES	Any	Any	≤Low Mood	≤mild	Any	Any	≤mild	<Panic	Any	Any	Any	Any	Any
PERSIST. REL'SHIP DIFFICULT.	≤Self Harm	Any	<Low Mood	≤mild	Any	Any	≤mild	<Panic	Any	Any	Any	Any	Any
DOES NOT SPEAK	≤mild	Any	<Low Mood	<Comp do think	Any	≤mild	≤Anx Gen	<Panic	≤mild	Any	Any	Any	Any
GENDER DISCOMFORT	<Self Harm	Any	Any	<Comp do think	Any	Any	<Anx Gen	Any	<Behav diffs	Any	Any	Any	Any
UNEXPLAINED PHYSICAL SYMPTOMS	≤mild	Any	≤Low Mood	<Comp do think	Any	≤mild	≤Anx Gen	<Panic	≤mild	Any	Any	≤mild	Any
UNEXPLAINED DEVELOPM. DIF.	≤mild	≤mild	≤mild	≤mild	Any	Any	≤mild	≤mild	≤mild	≤mild	≤mild	Any	Any
SELF CARE ISSUES	<Self Harm	Any	≤Low Mood	<comp do think	Any	Any	<Anx Gen	<Panic	≤mild	Any	Any	Any	Any
ADJUSTMENT HEALTH ISSUES	≤mild	Any	Any	Any	≤mild	Any	Any	Any	≤mild	Any	Any	Any	≤mild
Complexity: Pervasive Develop. Disorder	Any	Any	Any	Any	Any	Any	Any	Any	NO	Any	YES	Any	Any
Age	Any	Any	Any	Any	≥ 10 years	Any	Any	Any	Any	Any	Any	≥ 10 years	≥ 10 years

Colour key:

Colour	Meaning
Green	“Index problem”, or required condition.
Yellow	Exclusion criterion compared to the index problem.
Red	Absolute Exclusion Criterion. Problem must be absent or mild (where appropriate).
Blue	No restrictions on ratings apply.
Light Green	Additional required condition (age restriction for BIP, EAT and PSY).

Symbols:

≤ **Less severe or equal severity.** Example: “≤mild” means “Must be rated ‘none’ or ‘mild’”.

< **Less severe than.** Example: “<Self-Harm” means “must be rated as being less severe than self-harm”

≥ **More severe or equal severity.** Example: “≥moderate” means “must be rated ‘moderate’ or ‘severe’”

NO *Must be absent.*

YES *Must be present.*

Any *No conditions on ratings apply.*

Table C1b: Remaining Groups

	ADV: Getting Advice: Signposting and Self-management Advice	DNC: Getting Help: Difficulties Not Covered by Other Groupings	DSI: Getting More Help: Difficulties of Severe Impact	EMO: Getting Help: Co-occurring Emotional Difficulties	BEM: Getting Help: Co-occurring Behavioural and Emotional Difficulties
Does not fit the criteria of any of the groups in Table C1a (except Neurodevelopmental Assessment)	YES	YES	YES	YES	YES
Number of presenting problems rated moderate or higher ≤1	YES	Any	NO	NO	NO
Number of presenting problems rated moderate or higher ≥2 OR Number of presenting problems rated severe =1 AND number of presenting problems rated moderate = 0	NO	YES	Any	Any	Any
Number of presenting problems rated severe ≥2 OR [Number of presenting problems rated moderate or higher ≥ 2 if one of these is from list A AND the child is aged ≥10]	NO	NO	YES	Any	Any
Number of “emotional” problems rated moderate or higher ≥2	NO	Any	Any	YES	Any
Any “emotional” problem rated moderate or higher AND Behavioural Difficulties rated moderate or higher	NO	Any	Any	NO	YES
Number of problems from list B rated moderate or higher = 0	YES	Any	Any	YES	YES

Notes: For the purpose of this table, the complexity factor “Pervasive Developmental Disorder” is counted as a “moderate presenting problem” if present.

List A: Delusional Beliefs/Hallucinations; Eating Issues; Extremes of Mood (severe rating only)

List B: Extremes of mood (Bipolar disorder); Pervasive Developmental Disorders (Autism/Asperger’s); Delusional beliefs and hallucinations (Psychosis); Eating issues (Anorexia/Bulimia); Disturbed by traumatic event (PTSD); Self-Harm (Self injury or self-harm); Difficulties sitting still or concentrating (ADHD/Hyperactivity)

“Emotional” presenting problems: Depression/low mood (Depression); Panics (Panic Disorder); Anxious generally (Generalized anxiety); Compelled to do or think things (OCD); Anxious in social situations (Social anxiety/phobia); Anxious away from caregivers (Separation anxiety); Avoids going out (Agoraphobia); Avoids specific things (Specific phobia).

2. Code for implementing the algorithm for assigning cluster membership on the basis of Current View ratings

Programming Language: R⁴

The following code assumes that a data set called “DF” has been prepared whose columns include all thirty ratings of presenting problems, and a rating of the complexity factor “Pervasive Developmental Difficulties”, with the column names defined as in the CYP IAPT data specification. Important Note: Missing values (where item has been rated as “Not Known” or where a rating has not been given) must be coded as 0 (“zero”).

Coding:

Problem Descriptions

0 None, Not Known, Missing

1 Mild

2 Moderate

3 Severe

Complexity Factor (Pervasive Developmental Disorder)

0 No, Not Known, Missing

1 Yes

Age

Should be coded as “age at last birthday” in years.

```
#Code Start
```

```
## Algorithm for Defining 18 Groupings
```

```
#Note: there is no algorithm for grouping PBP
```

```
# Step 1: NICE-related clusters: NEU, ADH, AUT, BIP, BEH, DEP, GAP, OCD, PTS, SHA, SOC, EAT, PSY
```

```
DF<-within(DF, {
```

```
#Depression
```

```
DEP = ifelse(CURR_VIEW_LOW_MOOD >= 2 &
```

```
  #yellow conditions
```

```
  CURR_VIEW_DIFFICULTIES_SITTING_STILL_CONCENTRATING < CURR_VIEW_LOW_MOOD &
```

```
  CURR_VIEW_BEHAVIOURAL_DIFFICULTIES < CURR_VIEW_LOW_MOOD &
```

```
  CURR_VIEW_EATING_ISSUES < CURR_VIEW_LOW_MOOD &
```

```
  CURR_VIEW_PEER_RELATIONSHIP_DIFFICULTIES <= CURR_VIEW_LOW_MOOD &
```

```
  CURR_VIEW_PERSISTENT_RELATIONSHIP_DIFFICULTIES < CURR_VIEW_LOW_MOOD &
```

```
  CURR_VIEW_DOES_NOT_SPEAK < CURR_VIEW_LOW_MOOD &
```

```
  CURR_VIEW_UNEXPLAINED_PHYSICAL_SYMPTOMS <= CURR_VIEW_LOW_MOOD &
```

```
  CURR_VIEW_SELF_CARE_ISSUES <= CURR_VIEW_LOW_MOOD &
```

```
  CURR_VIEW_SELF_HARM < CURR_VIEW_LOW_MOOD &
```

```
  #red conditions
```

```
  CURR_VIEW_ANXIOUS_AWAY_CAREGIVERS <= 1 &
```

```
  CURR_VIEW_ANXIOUS_SOCIAL <= 1 &
```

```
  CURR_VIEW_ANXIOUS_GENERALLY <= 1 &
```

```
  CURR_VIEW_COMPELLED_DO_THINK <= 1 &
```

```
  CURR_VIEW_PANICS <= 1 &
```

```
  CURR_VIEW_AVOIDS_GOING_OUT <= 1 &
```

```
  CURR_VIEW_AVOIDS_SPECIFIC_THINGS <= 1 &
```

```
  CURR_VIEW_REPETITIVE_PROBLEM_BEHAVIOURS <= 1 &
```

```
  CURR_VIEW_EXTREMES_OF_MOOD <= 1 &
```

```
  CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS <= 1 &
```

```
  CURR_VIEW_POSES_RISK_OTHERS <= 1 &
```

```
  CURR_VIEW_TOILET_PROBLEMS <= 1 &
```

```
  CURR_VIEW_TRAUMATIC_EVENT <= 1 &
```

```
  CURR_VIEW_UNEXPLAINED_DEVELOPMENT_DIFFICULTIES <= 1, 1, 0)
```

```
#GAD and/or Panic
```

```
GAP = ifelse((CURR_VIEW_ANXIOUS_GENERALLY >= 2 &
```

⁴ R Core Team (2014) A: a language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL: <http://www.R-project.org/>.

```
#yellow
CURR_VIEW_ANXIOUS_AWAY_CAREGIVERS <= CURR_VIEW_ANXIOUS_GENERALLY &
CURR_VIEW_ANXIOUS_SOCIAL <= CURR_VIEW_ANXIOUS_GENERALLY &
CURR_VIEW_COMPELLED_DO_THINK < CURR_VIEW_ANXIOUS_GENERALLY &
CURR_VIEW_AVOIDS_GOING_OUT <= CURR_VIEW_ANXIOUS_GENERALLY &
CURR_VIEW_AVOIDS_SPECIFIC_THINGS <= CURR_VIEW_ANXIOUS_GENERALLY &
CURR_VIEW_REPETITIVE_PROBLEM_BEHAVIOURS <= CURR_VIEW_ANXIOUS_GENERALLY &
CURR_VIEW_GENDER_DISCOMFORT < CURR_VIEW_ANXIOUS_GENERALLY &
CURR_VIEW_SELF_HARM < CURR_VIEW_ANXIOUS_GENERALLY &
CURR_VIEW_DOES_NOT_SPEAK < CURR_VIEW_ANXIOUS_GENERALLY &
CURR_VIEW_UNEXPLAINED_PHYSICAL_SYMPTOMS < CURR_VIEW_ANXIOUS_GENERALLY &
CURR_VIEW_SELF_CARE_ISSUES < CURR_VIEW_ANXIOUS_GENERALLY &
```

```
#red
CURR_VIEW_LOW_MOOD <= 1 &
CURR_VIEW_EXTREMES_OF_MOOD <= 1 &
CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS <= 1 &
CURR_VIEW_DIFFICULTIES_SITTING_STILL_CONCENTRATING <= 1 &
CURR_VIEW_BEHAVIOURAL_DIFFICULTIES <= 1 &
CURR_VIEW_POSES_RISK_OTHERS <= 1 &
CURR_VIEW_TOILET_PROBLEMS <= 1 &
CURR_VIEW_TRAUMATIC_EVENT <= 1 &
CURR_VIEW_EATING_ISSUES <= 1 &
CURR_VIEW_PEER_RELATIONSHIP_DIFFICULTIES <= 1 &
CURR_VIEW_PERSISTENT_RELATIONSHIP_DIFFICULTIES <= 1 &
CURR_VIEW_UNEXPLAINED_DEVELOPMENT_DIFFICULTIES <= 1) |
```

```
#Panic
```

```
(CURR_VIEW_PANICS >= 2 &
```

```
#yellow
```

```
CURR_VIEW_ANXIOUS_AWAY_CAREGIVERS < CURR_VIEW_PANICS &
CURR_VIEW_ANXIOUS_SOCIAL < CURR_VIEW_PANICS &
CURR_VIEW_SELF_HARM < CURR_VIEW_PANICS &
CURR_VIEW_COMPELLED_DO_THINK < CURR_VIEW_PANICS &
CURR_VIEW_AVOIDS_GOING_OUT < CURR_VIEW_PANICS &
CURR_VIEW_AVOIDS_SPECIFIC_THINGS < CURR_VIEW_PANICS &
CURR_VIEW_REPETITIVE_PROBLEM_BEHAVIOURS < CURR_VIEW_PANICS &
CURR_VIEW_PEER_RELATIONSHIP_DIFFICULTIES < CURR_VIEW_PANICS &
CURR_VIEW_PERSISTENT_RELATIONSHIP_DIFFICULTIES < CURR_VIEW_PANICS &
CURR_VIEW_DOES_NOT_SPEAK < CURR_VIEW_PANICS &
CURR_VIEW_UNEXPLAINED_PHYSICAL_SYMPTOMS < CURR_VIEW_PANICS &
CURR_VIEW_SELF_CARE_ISSUES < CURR_VIEW_PANICS &
```

```
#red
```

```
CURR_VIEW_LOW_MOOD <= 1 &
CURR_VIEW_EXTREMES_OF_MOOD <= 1 &
CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS <= 1 &
CURR_VIEW_DIFFICULTIES_SITTING_STILL_CONCENTRATING <= 1 &
CURR_VIEW_BEHAVIOURAL_DIFFICULTIES <= 1 &
CURR_VIEW_POSES_RISK_OTHERS <= 1 &
CURR_VIEW_TOILET_PROBLEMS <= 1 &
CURR_VIEW_TRAUMATIC_EVENT <= 1 &
CURR_VIEW_EATING_ISSUES <= 1 &
CURR_VIEW_UNEXPLAINED_DEVELOPMENT_DIFFICULTIES <= 1), 1, 0)
```

```
#OCD
```

```
OCD = ifelse(CURR_VIEW_COMPELLED_DO_THINK >= 2 &
```

```
#yellow
```

```
CURR_VIEW_SELF_HARM < CURR_VIEW_COMPELLED_DO_THINK & #this is the correction
CURR_VIEW_ANXIOUS_AWAY_CAREGIVERS < CURR_VIEW_COMPELLED_DO_THINK &
CURR_VIEW_ANXIOUS_SOCIAL < CURR_VIEW_COMPELLED_DO_THINK &
CURR_VIEW_ANXIOUS_GENERALLY < CURR_VIEW_COMPELLED_DO_THINK &
CURR_VIEW_PANICS < CURR_VIEW_COMPELLED_DO_THINK &
CURR_VIEW_AVOIDS_GOING_OUT < CURR_VIEW_COMPELLED_DO_THINK &
CURR_VIEW_AVOIDS_SPECIFIC_THINGS <= CURR_VIEW_COMPELLED_DO_THINK &
CURR_VIEW_REPETITIVE_PROBLEM_BEHAVIOURS < CURR_VIEW_COMPELLED_DO_THINK &
CURR_VIEW_DIFFICULTIES_SITTING_STILL_CONCENTRATING < CURR_VIEW_COMPELLED_DO_THINK &
CURR_VIEW_BEHAVIOURAL_DIFFICULTIES < CURR_VIEW_COMPELLED_DO_THINK &
CURR_VIEW_POSES_RISK_OTHERS < CURR_VIEW_COMPELLED_DO_THINK &
CURR_VIEW_TOILET_PROBLEMS < CURR_VIEW_COMPELLED_DO_THINK &
CURR_VIEW_TRAUMATIC_EVENT < CURR_VIEW_COMPELLED_DO_THINK &
CURR_VIEW_EATING_ISSUES < CURR_VIEW_COMPELLED_DO_THINK &
CURR_VIEW_DOES_NOT_SPEAK < CURR_VIEW_COMPELLED_DO_THINK &
CURR_VIEW_GENDER_DISCOMFORT < CURR_VIEW_COMPELLED_DO_THINK &
CURR_VIEW_UNEXPLAINED_PHYSICAL_SYMPTOMS < CURR_VIEW_COMPELLED_DO_THINK &
CURR_VIEW_SELF_CARE_ISSUES < CURR_VIEW_COMPELLED_DO_THINK &
```

```
#red
```

```
CURR_VIEW_LOW_MOOD <= 1 &
CURR_VIEW_EXTREMES_OF_MOOD <= 1 &
CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS <= 1 &
CURR_VIEW_PEER_RELATIONSHIP_DIFFICULTIES <= 1 &
CURR_VIEW_PERSISTENT_RELATIONSHIP_DIFFICULTIES <= 1 &
CURR_VIEW_UNEXPLAINED_DEVELOPMENT_DIFFICULTIES <= 1, 1, 0)
```

```
#Social Anxiety
```

```
SOC = ifelse(CURR_VIEW_ANXIOUS_SOCIAL >= 2 &
```

```
#yellow
CURR_VIEW_ANXIOUS_AWAY_CAREGIVERS < CURR_VIEW_ANXIOUS_SOCIAL &
CURR_VIEW_ANXIOUS_GENERALLY < CURR_VIEW_ANXIOUS_SOCIAL &
CURR_VIEW_COMPELLED_DO_THINK < CURR_VIEW_ANXIOUS_SOCIAL &
CURR_VIEW_PANICS < CURR_VIEW_ANXIOUS_SOCIAL &
CURR_VIEW_AVOIDS_GOING_OUT < CURR_VIEW_ANXIOUS_SOCIAL &
CURR_VIEW_AVOIDS_SPECIFIC_THINGS < CURR_VIEW_ANXIOUS_SOCIAL &
CURR_VIEW_REPETITIVE_PROBLEM_BEHAVIOURS < CURR_VIEW_ANXIOUS_SOCIAL &
```

```
#red
CURR_VIEW_LOW_MOOD <= 1 &
CURR_VIEW_SELF_HARM <= 1 &
CURR_VIEW_EXTREMES_OF_MOOD <= 1 &
CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS <= 1 &
CURR_VIEW_DIFFICULTIES_SITTING_STILL_CONCENTRATING <= 1 &
CURR_VIEW_BEHAVIOURAL_DIFFICULTIES <= 1 &
CURR_VIEW_POSES_RISK_OTHERS <= 1 &
CURR_VIEW_TOILET_PROBLEMS <= 1 &
CURR_VIEW_TRAUMATIC_EVENT <= 1 &
CURR_VIEW_EATING_ISSUES <= 1 &
CURR_VIEW_UNEXPLAINED_DEVELOPMENT_DIFFICULTIES <= 1, 1, 0)
```

```
#PTSD
```

```
PTS = ifelse(CURR_VIEW_TRAUMATIC_EVENT >= 2 &
```

```
#yellow
CURR_VIEW_ANXIOUS_AWAY_CAREGIVERS < CURR_VIEW_TRAUMATIC_EVENT &
CURR_VIEW_ANXIOUS_SOCIAL < CURR_VIEW_TRAUMATIC_EVENT &
CURR_VIEW_ANXIOUS_GENERALLY < CURR_VIEW_TRAUMATIC_EVENT &
CURR_VIEW_COMPELLED_DO_THINK < CURR_VIEW_TRAUMATIC_EVENT &
CURR_VIEW_PANICS <= CURR_VIEW_TRAUMATIC_EVENT &
CURR_VIEW_AVOIDS_GOING_OUT <= CURR_VIEW_TRAUMATIC_EVENT &
CURR_VIEW_AVOIDS_SPECIFIC_THINGS < CURR_VIEW_TRAUMATIC_EVENT &
CURR_VIEW_REPETITIVE_PROBLEM_BEHAVIOURS < CURR_VIEW_TRAUMATIC_EVENT &
CURR_VIEW_LOW_MOOD < CURR_VIEW_TRAUMATIC_EVENT &
CURR_VIEW_DIFFICULTIES_SITTING_STILL_CONCENTRATING < CURR_VIEW_TRAUMATIC_EVENT &
CURR_VIEW_BEHAVIOURAL_DIFFICULTIES < CURR_VIEW_TRAUMATIC_EVENT &
```

```
#red
CURR_VIEW_SELF_HARM <= 1 &
CURR_VIEW_EXTREMES_OF_MOOD <= 1 &
CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS <= 1 &
CURR_VIEW_POSES_RISK_OTHERS <= 1 &
CURR_VIEW_TOILET_PROBLEMS <= 1 &
CURR_VIEW_EATING_ISSUES <= 1 &
CURR_VIEW_UNEXPLAINED_DEVELOPMENT_DIFFICULTIES <= 1, 1, 0)
```

```
#Self Harm
```

```
SHA = ifelse(CURR_VIEW_SELF_HARM >= 2 &
```

```
#yellow
CURR_VIEW_ANXIOUS_AWAY_CAREGIVERS <= CURR_VIEW_SELF_HARM &
CURR_VIEW_ANXIOUS_SOCIAL <= CURR_VIEW_SELF_HARM &
CURR_VIEW_ANXIOUS_GENERALLY <= CURR_VIEW_SELF_HARM &
CURR_VIEW_COMPELLED_DO_THINK <= CURR_VIEW_SELF_HARM &
CURR_VIEW_PANICS <= CURR_VIEW_SELF_HARM &
CURR_VIEW_AVOIDS_GOING_OUT <= CURR_VIEW_SELF_HARM &
CURR_VIEW_AVOIDS_SPECIFIC_THINGS <= CURR_VIEW_SELF_HARM &
CURR_VIEW_REPETITIVE_PROBLEM_BEHAVIOURS <= CURR_VIEW_SELF_HARM &
CURR_VIEW_LOW_MOOD <= CURR_VIEW_SELF_HARM &
CURR_VIEW_EXTREMES_OF_MOOD < CURR_VIEW_SELF_HARM &
CURR_VIEW_PERSISTENT_RELATIONSHIP_DIFFICULTIES <= CURR_VIEW_SELF_HARM &
CURR_VIEW_GENDER_DISCOMFORT < CURR_VIEW_SELF_HARM &
CURR_VIEW_SELF_CARE_ISSUES < CURR_VIEW_SELF_HARM &
```

```
#red
CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS <=1 &
CURR_VIEW_DIFFICULTIES_SITTING_STILL_CONCENTRATING <= 1 &
CURR_VIEW_BEHAVIOURAL_DIFFICULTIES <= 1 &
CURR_VIEW_POSES_RISK_OTHERS <= 1 &
CURR_VIEW_TOILET_PROBLEMS <= 1 &
CURR_VIEW_TRAUMATIC_EVENT <= 1 &
CURR_VIEW_EATING_ISSUES <= 1 &
CURR_VIEW_DOES_NOT_SPEAK <= 1 &
CURR_VIEW_UNEXPLAINED_PHYSICAL_SYMPTOMS <= 1 &
CURR_VIEW_UNEXPLAINED_DEVELOPMENT_DIFFICULTIES <= 1 &
CURR_VIEW_ADJUSTMENT_HEALTH_ISSUES <=1, 1, 0)
```

```
#Antisocial Behaviour, Conduct Disorder
```

```
BEH = ifelse(CURR_VIEW_BEHAVIOURAL_DIFFICULTIES >= 2 &
```

```
#yellows
CURR_VIEW_GENDER_DISCOMFORT < CURR_VIEW_BEHAVIOURAL_DIFFICULTIES &
#reds
CURR_VIEW_ANXIOUS_AWAY_CAREGIVERS <= 1 &
CURR_VIEW_ANXIOUS_SOCIAL <= 1 &
CURR_VIEW_ANXIOUS_GENERALLY <= 1 &
CURR_VIEW_COMPELLED_DO_THINK <= 1 &
```

```
CURR_VIEW_PANICS <= 1 &
CURR_VIEW_AVOIDS_GOING_OUT <= 1 &
CURR_VIEW_AVOIDS_SPECIFIC_THINGS <= 1 &
CURR_VIEW_REPETITIVE_PROBLEM_BEHAVIOURS <= 1 &
CURR_VIEW_LOW_MOOD <= 1 &
CURR_VIEW_SELF_HARM <= 1 &
CURR_VIEW_EXTREMES_OF_MOOD <= 1 &
CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS <= 1 &
CURR_VIEW_DIFFICULTIES_SITTING_STILL_CONCENTRATING <= 1 &
CURR_VIEW_TOILET_PROBLEMS <= 1 &
CURR_VIEW_TRAUMATIC_EVENT <= 1 &
CURR_VIEW_EATING_ISSUES <= 1 &
CURR_VIEW_DOES_NOT_SPEAK <= 1 &
CURR_VIEW_UNEXPLAINED_PHYSICAL_SYMPTOMS <= 1 &
CURR_VIEW_UNEXPLAINED_DEVELOPMENT_DIFFICULTIES <= 1 &
CURR_VIEW_SELF_CARE_ISSUES <= 1 &
CURR_VIEW_ADJUSTMENT_HEALTH_ISSUES <= 1 &
#excluding those with autism
CURR_VIEW_PDD == 0, 1, 0)
```

#Bipolar Disorder (moderate)

```
BIP = ifelse(CURR_VIEW_EXTREMES_OF_MOOD == 2 & AGE_AT_POC_START_DATE >= 10 & !is.na(AGE_AT_POC_START_DATE) &
#yellow
CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS < CURR_VIEW_EXTREMES_OF_MOOD &
CURR_VIEW_SELF_HARM < CURR_VIEW_EXTREMES_OF_MOOD &
#red
CURR_VIEW_ADJUSTMENT_HEALTH_ISSUES <=1, 1, 0)
```

#Psychosis

```
PSY = ifelse((CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS >= 2 | CURR_VIEW_EXTREMES_OF_MOOD==3) &
AGE_AT_POC_START_DATE >= 10 & !is.na(AGE_AT_POC_START_DATE) &
#red
CURR_VIEW_ADJUSTMENT_HEALTH_ISSUES <=1, 1, 0)
```

#Eating Disorder

```
EAT = ifelse(CURR_VIEW_EATING_ISSUES >= 2 &
AGE_AT_POC_START_DATE >= 10 & !is.na(AGE_AT_POC_START_DATE) &
#yellow
CURR_VIEW_COMPELLED_DO_THINK < CURR_VIEW_EATING_ISSUES &
CURR_VIEW_AVOIDS_SPECIFIC_THINGS < CURR_VIEW_EATING_ISSUES &
CURR_VIEW_LOW_MOOD <= CURR_VIEW_EATING_ISSUES &
#red
CURR_VIEW_ANXIOUS_AWAY_CAREGIVERS <= 1 &
CURR_VIEW_ANXIOUS_SOCIAL <= 1 &
CURR_VIEW_ANXIOUS_GENERALLY <= 1 &
CURR_VIEW_PANICS <= 1 &
CURR_VIEW_AVOIDS_GOING_OUT <= 1 &
CURR_VIEW_REPETITIVE_PROBLEM_BEHAVIOURS <= 1 &
CURR_VIEW_EXTREMES_OF_MOOD <= 1 &
CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS <= 1 &
CURR_VIEW_DIFFICULTIES_SITTING_STILL_CONCENTRATING <= 1 &
CURR_VIEW_BEHAVIOURAL_DIFFICULTIES <= 1 &
CURR_VIEW_POSES_RISK_OTHERS <= 1 &
CURR_VIEW_TOILET_PROBLEMS <= 1 &
CURR_VIEW_TRAUMATIC_EVENT <= 1 &
CURR_VIEW_UNEXPLAINED_PHYSICAL_SYMPTOMS <= 1, 1, 0)
```

#Autism Management

```
AUT = ifelse(CURR_VIEW_PDD == 1 &
#red
CURR_VIEW_ANXIOUS_AWAY_CAREGIVERS <=1 &
CURR_VIEW_ANXIOUS_SOCIAL <=1 &
CURR_VIEW_ANXIOUS_GENERALLY <=1 &
CURR_VIEW_COMPELLED_DO_THINK <=1 &
CURR_VIEW_PANICS <=1 &
CURR_VIEW_AVOIDS_GOING_OUT <=1 &
CURR_VIEW_AVOIDS_SPECIFIC_THINGS <=1 &
CURR_VIEW_REPETITIVE_PROBLEM_BEHAVIOURS <=1 &
CURR_VIEW_LOW_MOOD <=1 &
CURR_VIEW_SELF_HARM <=1 &
CURR_VIEW_EXTREMES_OF_MOOD <=1 &
CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS <=1 &
CURR_VIEW_DRUG_ALCOHOL_DIFFICULTIES <=1 &
CURR_VIEW_TOILET_PROBLEMS <=1 &
CURR_VIEW_TRAUMATIC_EVENT <=1 &
CURR_VIEW_EATING_ISSUES <=1 &
CURR_VIEW_UNEXPLAINED_DEVELOPMENT_DIFFICULTIES <=1 &
CURR_VIEW_DIFFICULTIES_SITTING_STILL_CONCENTRATING <=1 &
#excluding those with Antisocial Behaviour / Conduct Disorder
BEH==0, 1, 0)
```

#ADHD

```
ADH = ifelse(CURR_VIEW_DIFFICULTIES_SITTING_STILL_CONCENTRATING >= 2 &
```

```

#red
CURR_VIEW_ANXIOUS_AWAY_CAREGIVERS <= 1 &
CURR_VIEW_ANXIOUS_SOCIAL <= 1 &
CURR_VIEW_ANXIOUS_GENERALLY<=1 &
CURR_VIEW_COMPELLED_DO_THINK <= 1 &
CURR_VIEW_PANICS <= 1 &
CURR_VIEW_AVOIDS_GOING_OUT <= 1 &
CURR_VIEW_AVOIDS_SPECIFIC_THINGS <= 1 &
CURR_VIEW_REPETITIVE_PROBLEM_BEHAVIOURS <= 1 &
CURR_VIEW_LOW_MOOD <= 1 &
CURR_VIEW_SELF_HARM <= 1 &
CURR_VIEW_EXTREMES_OF_MOOD <= 1 &
CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS <= 1 &
CURR_VIEW_TOILET_PROBLEMS <=1 &
CURR_VIEW_TRAUMATIC_EVENT <=1 &
CURR_VIEW_EATING_ISSUES <=1 &
CURR_VIEW_DOES_NOT_SPEAK <=1 &
CURR_VIEW_UNEXPLAINED_PHYSICAL_SYMPTOMS <=1, 1, 0)

#Neurodevelopmental Assessment
NEU = ifelse(CURR_VIEW_UNEXPLAINED_DEVELOPMENT_DIFFICULTIES>=2, 1, 0 )
))

categories<-c("ADH","AUT","BEH","BIP", "DEP", "GAP","OCD","PTS","SHA","SOC","EAT","PSY")

DF$NICE.PAT<-""
for (cat in categories) {
  DF$NICE.PAT<-paste(DF$NICE.PAT, ifelse(DF[,cat]==1, ifelse(nzchar(DF$NICE.PAT),sprintf("&%s", cat),cat),""),sep="")
}
DF$NICE.PAT[DF$NICE.PAT==""]<-"No category"

## Step 2: Functions to count number of problems

Anx.mod <- function(x) { 2 %in% x | 3 %in% x}
modProb <- function (x) {sum(x %in% 2:3)}
sevProb <- function (x) {sum(x %in% 3)}

DF$No_mod_prob<-apply(DF[,c("CURR_VIEW_ANXIOUS_AWAY_CAREGIVERS",
"CURR_VIEW_ANXIOUS_SOCIAL","CURR_VIEW_ANXIOUS_GENERALLY","CURR_VIEW_COMPELLED_DO_THINK","CURR_VIEW_PANICS",
"CURR_VIEW_AVOIDS_GOING_OUT","CURR_VIEW_AVOIDS_SPECIFIC_THINGS","CURR_VIEW_REPETITIVE_PROBLEM_BEHAVIOURS",
CURR_VIEW_LOW_MOOD",
"CURR_VIEW_SELF_HARM","CURR_VIEW_EXTREMES_OF_MOOD","CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS","CURR_VIE
W_DRUG_ALCOHOL_DIFFICULTIES","CURR_VIEW_DIFFICULTIES_SITTING_STILL_CONCENTRATING","CURR_VIEW_BEHAVIOURAL_DIF
FICULTIES","CURR_VIEW_POSES_RISK_OTHERS","CURR_VIEW_CARER_MANAGEMENT_PROBLEMS",
"CURR_VIEW_TOILET_PROBLEMS", "CURR_VIEW_TRAUMATIC_EVENT", "CURR_VIEW_EATING_ISSUES",
"CURR_VIEW_FAMILY_RELATIONSHIP_DIFFICULTIES","CURR_VIEW_ATTACHMENT_CARER_PROBLEMS",
"CURR_VIEW_PEER_RELATIONSHIP_DIFFICULTIES",
"CURR_VIEW_PERSISTENT_RELATIONSHIP_DIFFICULTIES","CURR_VIEW_DOES_NOT_SPEAK", "CURR_VIEW_GENDER_DISCOMFORT",
"CURR_VIEW_UNEXPLAINED_PHYSICAL_SYMPTOMS","CURR_VIEW_UNEXPLAINED_DEVELOPMENT_DIFFICULTIES",
"CURR_VIEW_SELF_CARE_ISSUES", "CURR_VIEW_ADJUSTMENT_HEALTH_ISSUES"]),1,modProb)

DF$No_mod_prob<-DF$No_mod_prob + DF$CURR_VIEW_PDD

DF$No_sev_prob<-apply(DF[,c("CURR_VIEW_ANXIOUS_AWAY_CAREGIVERS",
"CURR_VIEW_ANXIOUS_SOCIAL","CURR_VIEW_ANXIOUS_GENERALLY","CURR_VIEW_COMPELLED_DO_THINK","CURR_VIEW_PANICS",
"CURR_VIEW_AVOIDS_GOING_OUT","CURR_VIEW_AVOIDS_SPECIFIC_THINGS","CURR_VIEW_REPETITIVE_PROBLEM_BEHAVIOURS",
CURR_VIEW_LOW_MOOD",
"CURR_VIEW_SELF_HARM","CURR_VIEW_EXTREMES_OF_MOOD","CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS","CURR_VIE
W_DRUG_ALCOHOL_DIFFICULTIES","CURR_VIEW_DIFFICULTIES_SITTING_STILL_CONCENTRATING","CURR_VIEW_BEHAVIOURAL_DIF
FICULTIES","CURR_VIEW_POSES_RISK_OTHERS","CURR_VIEW_CARER_MANAGEMENT_PROBLEMS",
"CURR_VIEW_TOILET_PROBLEMS", "CURR_VIEW_TRAUMATIC_EVENT", "CURR_VIEW_EATING_ISSUES",
"CURR_VIEW_FAMILY_RELATIONSHIP_DIFFICULTIES","CURR_VIEW_ATTACHMENT_CARER_PROBLEMS",
"CURR_VIEW_PEER_RELATIONSHIP_DIFFICULTIES",
"CURR_VIEW_PERSISTENT_RELATIONSHIP_DIFFICULTIES","CURR_VIEW_DOES_NOT_SPEAK", "CURR_VIEW_GENDER_DISCOMFORT",
"CURR_VIEW_UNEXPLAINED_PHYSICAL_SYMPTOMS","CURR_VIEW_UNEXPLAINED_DEVELOPMENT_DIFFICULTIES",
"CURR_VIEW_SELF_CARE_ISSUES", "CURR_VIEW_ADJUSTMENT_HEALTH_ISSUES"]),1,sevProb)

DF$num.anx7<-apply(DF[,c("CURR_VIEW_ANXIOUS_AWAY_CAREGIVERS",
"CURR_VIEW_ANXIOUS_SOCIAL","CURR_VIEW_ANXIOUS_GENERALLY","CURR_VIEW_COMPELLED_DO_THINK","CURR_VIEW_PANICS",
"CURR_VIEW_AVOIDS_GOING_OUT","CURR_VIEW_AVOIDS_SPECIFIC_THINGS"]), 1, modProb)

## Step 3: Remaining clusters: ADV, BEM, EMO, DNC, DSI

DF<-within(DF,{
  BEM<-ifelse(NICE.PAT=="No category" & (CURR_VIEW_LOW_MOOD>=2 | CURR_VIEW_PANICS>=2 |
CURR_VIEW_ANXIOUS_GENERALLY>=2 | CURR_VIEW_COMPELLED_DO_THINK>=2 | CURR_VIEW_ANXIOUS_SOCIAL>=2 |
CURR_VIEW_ANXIOUS_AWAY_CAREGIVERS>=2 | CURR_VIEW_AVOIDS_GOING_OUT>=2 |
CURR_VIEW_AVOIDS_SPECIFIC_THINGS>=2) & CURR_VIEW_BEHAVIOURAL_DIFFICULTIES>=2 &

```

```
CURR_VIEW_EXTREMES_OF_MOOD<=1 & CURR_VIEW_PDD==0 & CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS<=1
& CURR_VIEW_EATING_ISSUES<=1 & CURR_VIEW_TRAUMATIC_EVENT<=1 & CURR_VIEW_SELF_HARM<=1 &
CURR_VIEW_DIFFICULTIES_SITTING_STILL_CONCENTRATING<=1, 1, 0)
```

```
EMO<-ifelse(NICE.PAT=="No category" & (num.anx7>1 | (num.anx7>0 & CURR_VIEW_LOW_MOOD>=2)) &
CURR_VIEW_BEHAVIOURAL_DIFFICULTIES<=1 &
```

```
CURR_VIEW_EXTREMES_OF_MOOD<=1 & CURR_VIEW_PDD==0 & CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS<=1
& CURR_VIEW_EATING_ISSUES<=1 & CURR_VIEW_TRAUMATIC_EVENT<=1 & CURR_VIEW_SELF_HARM<=1 &
CURR_VIEW_DIFFICULTIES_SITTING_STILL_CONCENTRATING<=1,1,0)
```

```
DSI<-ifelse(NICE.PAT=="No category" & BEM==0 & EMO==0 & ((CURR_VIEW_DELUSIONAL_BELIEF_HALLUCINATIONS>=2 &
AGE_AT_POC_START_DATE >= 10 & !is.na(AGE_AT_POC_START_DATE)) | (CURR_VIEW_EATING_ISSUES>=2 &
AGE_AT_POC_START_DATE >= 10 & !is.na(AGE_AT_POC_START_DATE)) | (CURR_VIEW_EXTREMES_OF_MOOD==3 &
AGE_AT_POC_START_DATE >= 10 & !is.na(AGE_AT_POC_START_DATE)) | No_sev_prob>1),1,0)
```

```
DNC<-ifelse(NICE.PAT=="No category" & BEM==0 & EMO==0 & DSI==0 & ((No_mod_prob>1 & No_sev_prob<=1) | No_sev_prob==1),1,0)
```

```
ADV<-ifelse(NICE.PAT=="No category" & No_mod_prob<=1 & No_sev_prob==0,1,0)
```

```
))
```

```
cat17<-c("ADV","ADH","AUT", "BEH", "BIP", "DEP", "GAP","OCD","PTS","SHA","SOC","BEM","EMO","DNC","EAT","PSY","DSI")
```

```
DF$NICE.PAT7<-""
```

```
for (cat in cat17) {
```

```
DF$NICE.PAT7<-paste(DF$NICE.PAT7, ifelse(DF[,cat]==1, ifelse(nzchar(DF$NICE.PAT7),sprintf("%s", cat),cat),""),sep="")
}
```

```
DF$NICE.PAT7[DF$NICE.PAT7==""]<-"No category"
```

```
## Make Clust17
```

```
DF$clust17<-factor(as.character(DF$NICE.PAT7), levels=c("ADV","ADH","AUT", "BEH", "BIP", "DEP",
"GAP","OCD","PTS","SHA","SOC","BEM","EMO","DNC","EAT","PSY","DSI"))
```

```
#Clear up: removing variables, objects and functions that are no longer needed
```

```
DF<-DF[, !(names(DF) %in% cat17)]
```

```
DF<-DF[, !(names(DF) %in% c("NICE.PAT","No_mod_prob","No_sev_prob","num.anx7","NICE.PAT7"))]
```

```
rm(cat, cat17, categories, Anx.mod, modProb, sevProb)
```

```
#Tables of results
```

```
table(DF$clust17)
```

```
table(DF$NEU)
```