Care Pathways and Packages Project

*Developing currencies for mental health*

# Care Transition Analysis Plan

# Summary of Results

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# Executive Summary

## 1. Background

Care transition protocols were developed to avoid staff changing a patient's allocated cluster inappropriately at a care review. Whilst the clusters were empirically derived, the first protocols were developed primarily from a clinical perspective. This was because at that time, no longitudinal data were available to undertake analysis in order to understand how and why patients moved between clusters.

As data about patients moving through clusters at a review has accumulated, it became possible to analyse, validate and/or propose refinements to the care transition protocols. As a result of the decision to bring the work of the CPPP to an end in April 2015, this legacy document is intended to provide NHS England and Monitor with recommendations for refinement of the cluster booklet based on the best available CPPP data, and to provide a template for replication using national data.

## 2. Findings

The project set out to use the available data to report on a number of questions and compare these to the suggestions set out in the MHCT based on clinical opinion.

***How do the suggested likelihoods of each cluster transition in the cluster booklet compare to actual practice?***

- The majority of cluster transitions (84%) were in line with the suggested likelihoods in the cluster booklets.
- The transitions not matching the expected likelihoods (16%) were reviewed based on the percentages gained from the data as well as clinical input.

***What threshold should be set in order to distinguish between 'rare' and 'possible' transitions in the Clustering Booklet?***

- Following a review of the data the following thresholds were proposed:
    - Green = Most likely transition (highest percentage in the data set for each cluster)
    - Red = Rare transition (transitions with 0-1% likelihood)
    - Orange = Possible transition (anything in the data set that is not coded as red or green)

***Once these are derived from the data do they continue to make clinical sense?***

- Clustering accuracy is improving however, as the extract included transitions from over 2 years ago, some transitions were a consequence of correcting inaccurate initial allocations. As a result all transitions were considered clinically as well as statistically.
- All transitions where the actual data suggested that their colour coding should be changed were reviewed in consultation with a wider clinical audience.
- The colour coding was then either adjusted or remained the same according to clinical feedback.

***How do the maximum review intervals suggested in the clustering booklet compare to actual practice?***

- The majority of cluster reviews (76%) were within the maximum cluster review periods.
- The only clusters where the mean interval exceeded the maximum review period were clusters 0, 1, 2, 14 and 15. These have shorter maximum review periods compared to other clusters and it is unclear whether the high levels that exceed the review period are indicative of a need to review the current limits or whether it is a construct of some other issue, such as under-clustering or confusion about when patients discharged from inpatient care should be reviewed. Given this uncertainty it is believed that the evidence for resource utilisation is the more important indicator to guide any recommendation for changing these parameters.

***At the point where clusters are being reviewed is there a corresponding change in the level of input as measured by: average total contact time per week; average hourly rate for contact each week; average cost of weekly contact (hourly rate x contact duration at that grade)?***

- Some clusters showed a clear corresponding change in the level of input as measured by contact time and cost (e.g. Cluster 1, 2, 3, 5) at the point when their maximum review period was reached.
  Other clusters either did not show a clear corresponding change or patients were already at the point where hardly any input was recorded when the cluster review took place (e.g. Cluster 7, 8, 11, 12, 13). After a clinical review of the data no changes were proposed but that the review periods are reconsidered in two years-time.

***At cluster review, does the resulting score change meet the expectations set out in the cluster booklet?***

- Out of 142 possible transitions 102 met the expectations set out in the cluster booklet at cluster review (72% of transitions).
- 40 possible transitions met less than 70% of the expectations set out in the cluster booklet (28% of all transitions analysed).
- Following clinical workshop discussions, of the transitions not meeting the 70% threshold, changes were proposed to 13 of the transition criteria which are set out in the main report.

## 3. Recommendations

Based on the findings of these analyses the following proposals are recommended for action to ensure that the MHCT and clustering continues to be respected by the clinical community as a valid and reliable tool for assessing and summarising needs.

3.1: It is recommended that the proposed changes developed through the comparison of the actual frequency of cluster transitions compared to the current MHCT be used to further adapt and update the Clustering Booklet.

3.2: It is recommended that the current maximum review periods for the 21 clusters remain unchanged at the current time but are subject to further review in 2 years' time.

3.3: It is recommended that the proposed changes to transition criteria are considered for further testing on a wider data set as a step to their being considered for inclusion in an updated version of the Clustering Booklet.

## 4. Conclusion

This report outlines proposals for continued refinement of the cluster booklet based on CPPP data. It also provides a template for analyses that should be undertaken using national data from the MHLDDS.

## 1. Introduction

Care transition protocols were derived in order to avoid staff changing a patient's allocated cluster inappropriately at a care review. Allocation to cluster for initial referral is based primarily on MHCT ratings but at review the scores can be misleading and clinicians need to decide whether the current ratings (given for the two weeks prior to review) reflect the patients true and sustained levels of risk, need and functioning. At this point the care transition protocols should be considered. The current guidance states:

1. Select the page containing care transition protocols that correspond to the individual's current cluster.

2. After completing an appropriate re-assessment of risks and needs complete a new MHCT.

3. Consider the **step-up criteria**. If any one of these is met, this suggests the current cluster allocation needs to change and, with reference to the clustering booklet; the latest MHCT ratings should be used to decide on the new cluster. If the step-up criteria are not met…

4. Consider the **discharge criteria**. If all of these are met, this indicates the need to explore discharge from in-scope Mental Health Services back to GP-led (Primary) Care. If the discharge criteria are not met…

5. Consider the **step-down criteria**. If all of these are met, this suggests the current cluster allocation needs to change and, with reference to the clustering booklet, the MHCT ratings should be used to decide on the new cluster. If the step-down criteria are not met …

6. This indicates that the existing cluster allocation remains valid, as any differences in the user's needs that have occurred do not warrant the changes in service response that allocation to a different cluster would trigger.

Whilst the clusters were empirically derived, the first draft of the care transition protocols were developed primarily from a clinical perspective. This was because at that time, no longitudinal data were available to undertake analysis in order to understand how and why patients moved between clusters. As a result, whilst the protocols were included in the national booklet to indicate the direction of travel, they were not mandated.

As the use of the clusters has now been mandated for some time, many patients have moved through clusters at a review. Data was therefore available to analyse, validate and/or refine the care transition protocols. As a result of the decision to bring the work of the CPPP to an end in April 2015, this legacy document is intended to provide NHS England and Monitor with recommendations for refinement of the cluster booklet based on the best available CPPP data, and to provide a template for replication using national data. This report summarises the results of the analysis that has been undertaken. The original care transition analysis plan that provided the structure for this analysis can be found in Appendix 1.

## 2.0 Analysis

### 2.1 Frequency of each transition

The project set out to use the available data to report the actual frequency of cluster transitions and compare these to the suggestions set out in the MHCT based on clinical opinion. It was hoped that the empirical evidence provided would provide a threshold to distinguish between rare and possible transitions. The main questions to be answered were:

1. How do the suggested likelihoods of each cluster transition in the cluster booklet compare to actual practice
2. What threshold should be set in order to distinguish between 'rare' and 'possible' transitions in the Clustering Booklet?
3. Once these are derived from the data do they continue to make clinical sense?

A data extract was produced from the CPPP data warehouse which included all cluster transitions from 1st April 2013 to 31st March 2014. MHCT scale scores, clusters and dates of assessments were included for the initial cluster, and the subsequent allocation. If a patient was discharged from care this was treated as a specific transition and the MHCT/HoNOS ratings at discharge were included.

113,231 transitions remained after the data was cleansed (see Appendix 2 for exclusion criteria). The remaining data set consisted of records from 6 trusts: Trust 1 (23,164 transitions), Trust 2 (41,882 transitions), Trust 3 (10,066 transitions), Trust 4 (7,123 transitions), Trust 5 (12,962 transitions) and Trust 5 (18,034 transitions).

Matrixes which show the number and percentages of patients making transitions between clusters were produced. They were colour coded according to the original likelihoods in the cluster booklet. Based on previous analyses, a target of approximately 50 cases per cell was agreed for the analysis of that transition to be considered meaningful.

The clinical review allowed experienced clinical staff from a variety of professional backgrounds and different NHS Trusts to consider the results generated by the data and undertake the following actions:

- Overrule results because the transition is impossible (thus introducing a new category into the grid. NB This had been proposed originally but it was felt important to allow a wider group of clinical staff to become familiar with the clusters before gaining a consensus).

Either agree a change to the colour coding of a transition based on the data or overrule results with the proviso that a clear rationale for this could be provided.

A detailed overview of the matrixes can be found in Appendix 3. The two matrixes below show the original colour coding (matrix 2.1) and the final version after clinical review of the proposed changes (matrix 2.3). The colour coding for matrix 2.3 was adjusted based on careful examination of the matrixes and the following thresholds agreed:

- Red = Rare transition (transitions with 0-1% likelihood)
- Orange = Possible transition (anything in the data set that is not coded as red or green)
- Green = Most likely transition (highest % in the data set for each cluster)

The thresholds were based on the larger data set making it possible to identify a single, most likely transition. In addition, after assessing the distributions a 1% threshold seemed appropriate to divide the remainder of the data into rare and possible transitions.

- **Matrix 2.1: Overview of transitions using the original colour coding but with new data from the current analysis.**

Percentage transitions

| Previous Cluster \ New Cluster | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | Discharge |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 24% | 1% | 1% | 4% | 5% | 3% | 2% | 5% | 3% | 4% | 3% | 3% | 2% | 2% | 1% | 1% | 0% | 4% | 7% | 2% | 1% | 23% |
| 1 | 0% | 10% | 3% | 5% | 7% | 3% | 1% | 2% | 1% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 3% | 1% | 0% | 0% | 60% |
| 2 | 0% | 2% | 17% | 10% | 8% | 4% | 1% | 2% | 1% | 1% | 2% | 1% | 0% | 0% | 0% | 0% | 0% | 2% | 1% | 0% | 0% | 48% |
| 3 | 0% | 1% | 2% | 24% | 9% | 2% | 1% | 2% | 1% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 0% | 0% | 54% |
| 4 | 0% | 1% | 1% | 5% | 35% | 6% | 3% | 4% | 2% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 0% | 0% | 41% |
| 5 | 0% | 1% | 1% | 3% | 8% | 41% | 3% | 7% | 3% | 1% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 29% |
| 6 | 0% | 0% | 0% | 1% | 3% | 3% | 49% | 8% | 3% | 1% | 1% | 1% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 28% |
| 7 | 0% | 0% | 1% | 2% | 3% | 3% | 2% | 54% | 4% | 0% | 1% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 27% |
| 8 | 0% | 0% | 0% | 1% | 2% | 2% | 1% | 5% | 61% | 0% | 1% | 1% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 22% |
| 10 | 1% | 0% | 0% | 1% | 1% | 1% | 0% | 1% | 1% | 54% | 4% | 4% | 2% | 5% | 1% | 0% | 1% | 1% | 1% | 0% | 0% | 21% |
| 11 | 0% | 0% | 0% | 1% | 1% | 0% | 0% | 1% | 0% | 1% | 59% | 11% | 3% | 2% | 0% | 0% | 1% | 0% | 0% | 0% | 0% | 18% |
| 12 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 1% | 9% | 63% | 7% | 3% | 0% | 1% | 1% | 0% | 1% | 0% | 0% | 10% |
| 13 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 1% | 6% | 15% | 56% | 6% | 1% | 1% | 3% | 0% | 1% | 0% | 0% | 9% |
| 14 | 0% | 0% | 0% | 1% | 1% | 1% | 0% | 0% | 1% | 7% | 5% | 15% | 12% | 35% | 1% | 3% | 5% | 0% | 1% | 0% | 0% | 10% |
| 15 | 0% | 1% | 0% | 2% | 3% | 3% | 2% | 2% | 2% | 3% | 8% | 12% | 8% | 2% | 40% | 1% | 2% | 0% | 0% | 1% | 0% | 10% |
| 16 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 2% | 2% | 3% | 5% | 2% | 5% | 0% | 62% | 5% | 0% | 0% | 0% | 0% | 12% |
| 17 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 3% | 4% | 4% | 5% | 0% | 3% | 74% | 0% | 0% | 0% | 0% | 5% |
| 18 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 45% | 18% | 2% | 0% | 34% |
| 19 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 3% | 61% | 8% | 1% | 26% |
| 20 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 6% | 56% | 5% | 33% |
| 21 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 3% | 8% | 45% | 43% |
| Grand Total | 0% | 0% | 1% | 3% | 5% | 3% | 2% | 4% | 3% | 2% | 5% | 6% | 3% | 2% | 0% | 1% | 2% | 7% | 15% | 6% | 2% | 29% |

Most likely transition
Possible transition
Rare transition

**Matrix 2.3: Overview of transitions with the proposed changes that remained after consultation with a wider clinical audience.**

Percentage transitions

| Previous Cluster \ New Cluster | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | Discharge |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 24% | 1% | 1% | 4% | 5% | 3% | 2% | 5% | 3% | 4% | 3% | 3% | 2% | 2% | 1% | 1% | 0% | 4% | 7% | 2% | 1% | 23% |
| 1 | 0% | 10% | 3% | 5% | 7% | 3% | 1% | 2% | 1% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 3% | 1% | 0% | 0% | 60% |
| 2 | 0% | 2% | 17% | 10% | 8% | 4% | 1% | 2% | 1% | 1% | 2% | 1% | 0% | 0% | 0% | 0% | 0% | 2% | 1% | 0% | 0% | 48% |
| 3 | 0% | 1% | 2% | 24% | 9% | 2% | 1% | 2% | 1% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 0% | 0% | 54% |
| 4 | 0% | 1% | 1% | 5% | 35% | 6% | 3% | 4% | 2% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 0% | 0% | 41% |
| 5 | 0% | 1% | 1% | 3% | 8% | 41% | 3% | 7% | 3% | 1% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 29% |
| 6 | 0% | 0% | 0% | 1% | 3% | 3% | 49% | 8% | 3% | 1% | 1% | 1% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 28% |
| 7 | 0% | 0 | 0 | 0 | 3% | 3% | 2% | 55% | 4% | 0% | 1% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 28% |
| 8 | 0% | 0 | 0 | 0 | 2% | 2% | 1% | 5% | 62% | 0% | 1% | 1% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 23% |
| 10 | 1% | 0% | 0% | 1% | 1% | 1% | 0% | 1% | 1% | 54% | 4% | 4% | 2% | 5% | 1% | 0% | 1% | 1% | 1% | 0% | 0% | 21% |
| 11 | 0% | 0% | 0% | 1% | 1% | 0% | 0% | 1% | 0% | 0 | 60% | 11% | 3% | 2% | 0% | 0% | 1% | 0% | 0% | 0% | 0% | 18% |
| 12 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 0 | 9% | 64% | 7% | 3% | 0% | 1% | 1% | 0% | 1% | 0% | 0% | 10% |
| 13 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0 | 6% | 15% | 56% | 6% | 1% | 1% | 3% | 0% | 1% | 0% | 0% | 9% |
| 14 | 0% | 0% | 0% | 1% | 1% | 1% | 0% | 0% | 1% | 7% | 5% | 15% | 12% | 35% | 1% | 3% | 5% | 0% | 1% | 0% | 0% | 10% |
| 15 | 0% | 1% | 0% | 2% | 3% | 3% | 2% | 2% | 2% | 3% | 8% | 12% | 8% | 2% | 40% | 1% | 2% | 0% | 0% | 1% | 0% | 10% |
| 16 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 2% | 0 | 3% | 5% | 2% | 5% | 0% | 63% | 5% | 0% | 0% | 0% | 0% | 12% |
| 17 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0 | 3% | 4% | 4% | 5% | 0% | 3% | 74% | 0% | 0% | 0% | 0% | 5% |
| 18 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 45% | 18% | 2% | 0% | 34% |
| 19 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 3% | 61% | 8% | 1% | 26% |
| 20 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 6% | 56% | 5% | 33% |
| 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8% | 47% | 45% |
| Grand Total | 0% | 0% | 1% | 3% | 5% | 3% | 2% | 4% | 3% | 2% | 5% | 6% | 3% | 2% | 0% | 1% | 2% | 7% | 15% | 6% | 2% | 29% |

Most likely transition
Possible transition
Rare transition
Impossible transition

## 2.1 Results

1. ***How do the suggested likelihoods of each cluster transition in the cluster booklet compare to actual practice?***
   - The majority of cluster transitions (84%) were in line with the suggested likelihoods in the cluster booklets.
   - The transitions not matching the expected likelihoods (16%) were reviewed based on the percentages gained from the data as well as clinical input.

2. ***What threshold should be set in order to distinguish between 'rare' and 'possible' transitions in the Clustering Booklet?***
   - The thresholds that were defined are the following:
     - Green = Most likely transition (highest percentage in the data set for each cluster)
     - Red = Rare transition (transitions with 0-1% likelihood)
     - Orange = Possible transition (anything in the data set that is not coded as red or green)

3. ***Once these are derived from the data do they continue to make clinical sense?***
    - Clustering accuracy is improving however, as the extract included transitions from over 2 years ago, some transitions were a consequence of correcting inaccurate initial allocations. As a result all transitions were considered clinically as well as statistically.
    - All transitions where the actual data suggested that their colour coding should be changed were reviewed in consultation with a wider clinical audience.
    - The colour coding was then either adjusted or remained the same according to clinical feedback.
    - The transitions where changes were overruled can be found in Appendix 4.
    - The transitions where changes are proposed are shown below.

## Overview of transitions using the proposed changes that remained

| Cluster | Current status | Data suggests | New data % | Clinical judgement |
|---|---|---|---|---|
| Cluster 1 to 6 | orange | red | 1% | agree with data |
| Cluster 1 to 8 | orange | red | 1% | agree with data |
| Cluster 2 to 7 | red | orange | 2% | agree with data |
| Cluster 2 to 11 | red | orange | 2% | agree with data |
| Cluster 3 to 3 | green | orange | 24% | agree with data |
| Cluster 3 to 7 | red | orange | 2% | agree with data |
| Cluster 4 to 10 | orange | red | 0% | agree with data |
| Cluster 5 to 14 | orange | red | 0% | agree with data |
| Cluster 5 to Discharge | green | orange | 29% | agree with data |
| Cluster 6 to 10 | orange | red | 1% | agree with data |
| Cluster 6 to 14 | orange | red | 1% | agree with data |
| Cluster 6 to 15 | orange | red | 0% | agree with data |
| Cluster 7 to 10 | orange | red | 0% | agree with data |
| Cluster 8 to 6 | orange | red | 1% | agree with data |
| Cluster 8 to 12 | orange | red | 1% | agree with data |
| Cluster 8 to 13 | orange | red | 1% | agree with data |
| Cluster 8 to 16 | orange | red | 0% | agree with data |
| Cluster 8 to 17 | orange | red | 0% | agree with data |
| Cluster 10 to 18 | orange | red | 1% | agree with data |
| Cluster 11 to 16 | orange | red | 0% | agree with data |
| Cluster 11 to 17 | orange | red | 1% | agree with data |
| Cluster 11 to 18 | orange | red | 0% | agree with data |
| Cluster 12 to 8 | orange | red | 0% | agree with data |
| Cluster 12 to 19 | orange | red | 1% | agree with data |
| Cluster 13 to 8 | orange | red | 1% | agree with data |
| Cluster 13 to 19 | orange | red | 1% | agree with data |
| Cluster 14 to 3 | orange | red | 1% | agree with data |
| Cluster 14 to 4 | orange | red | 1% | agree with data |
| Cluster 14 to 5 | orange | red | 1% | agree with data |
| Cluster 14 to 6 | orange | red | 0% | agree with data |
| Cluster 14 to 18 | orange | red | 0% | agree with data |
| Cluster 14 to 19 | orange | red | 1% | agree with data |
| Cluster 15 to 18 | orange | red | 0% | agree with data |
| Cluster 15 to 19 | orange | red | 0% | agree with data |
| Cluster 16 to 19 | orange | red | 0% | agree with data |
| Cluster 17 to 19 | orange | red | 0% | agree with data |
| Cluster 18 to 21 | orange | red | 0% | agree with data |
| Cluster 19 to 18 | red | orange | 3% | agree with data |

## 2.2 Cluster review periods

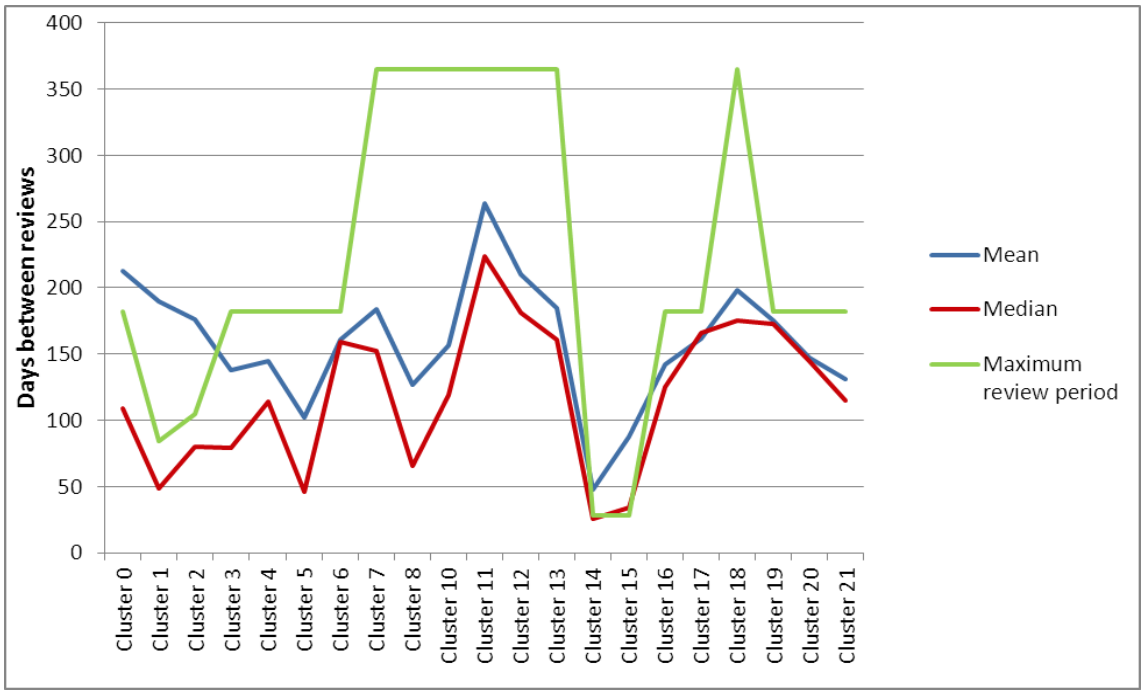
The project also set out to use the available data to report the actual length of time that transpired between initial clustering and first review and compare these to the maximum review periods initially set out in the MHCT. It was hoped that the empirical evidence would either support, or provide updated suggestions for the maximum length of time for each cluster. In addition, there was an evaluation of whether cluster reviews had some correlation with changes to overall resource utilisation in respect of the clients' care package. It was recognised however that there is a case to argue that if people are told to review after 6 months then this is likely to influence the clinical behaviour.

The main questions to be answered were:

1. How do the maximum review intervals suggested in the clustering booklet compare to actual practice?
2. At the point where clusters are being reviewed is there a corresponding change in the level of input as measured by: average total contact time per week; average hourly rate for contact each week; average cost of weekly contact (hourly rate x contact duration at that grade)?

For 2.2 part 1 the same data set as in question 2.1 was used. The mean, median, mode, standard deviation, minimum and maximum per cluster were calculated. A box plot and histograms per cluster were also produced (Appendix 5). The actual review intervals were plotted against the maximum review period below.

**Review intervals per cluster:**

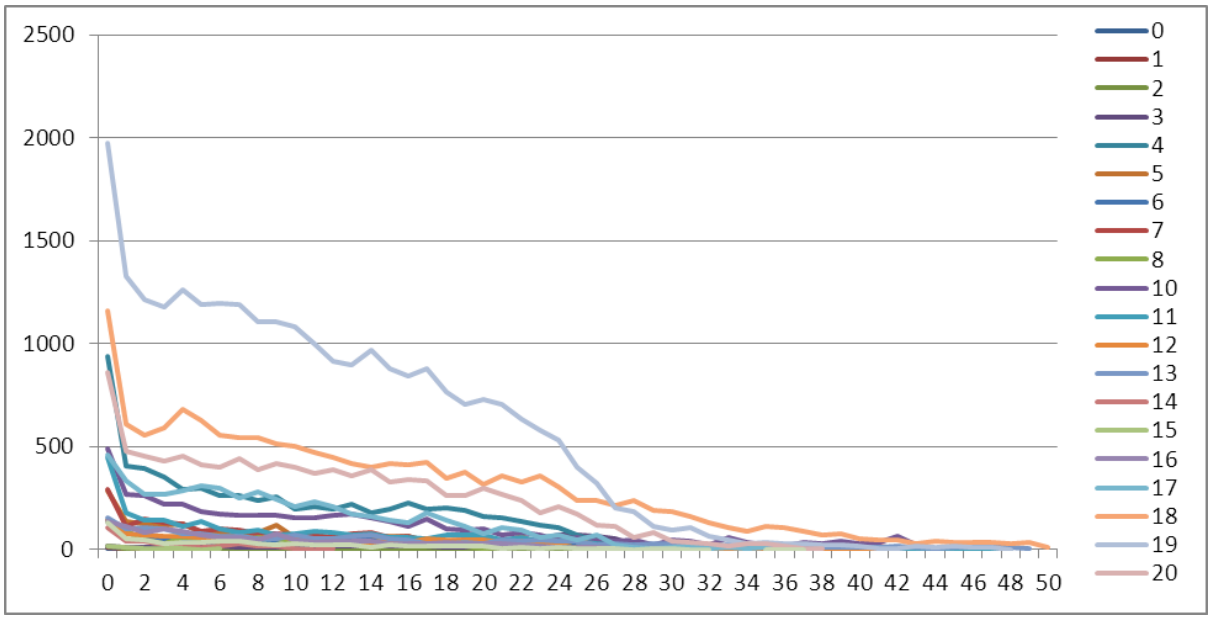


For 2.2 part 2 a new data set was extracted which included the activity time spent per staff band before and after a cluster transition. The time period was limited from 1st April 2013 (to coincide with the latest cluster guidance.) to August 2014 (end of data collection).

The original data extract contained 119,581 transitions from 6 trusts (see Appendix 6 for extraction criteria). Discharge was treated as a review (indicating the end of a cluster period. The remaining data set of 113,026 transactions consisted of the following trusts: Trust 1 (23,115 transitions), Trust 2 (41,797 transitions), Trust 3 (10,052 transitions), Trust 4 (7,121 transitions), Trust 5 (12,948 transitions) and Trust 6 (17,993 transitions). A table containing the hourly rates per band used for the analysis can be found in Appendix 6.

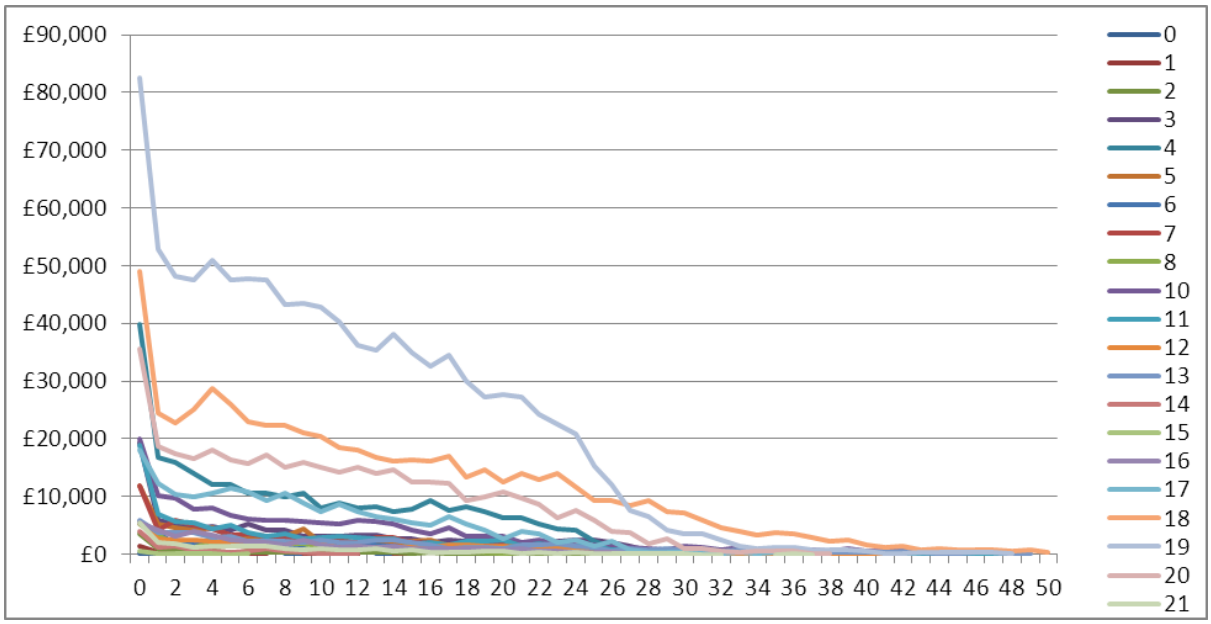
The charts below show the mean contact time and cost per cluster. Contact time refers to the mean total recorded time spent per cluster (e.g. both face to face and non-face to face contact) as well as different types of activity (assessment, monitoring, medical intervention etc.). Individual charts for each cluster can be found in Appendix 7.

**Average contact time per cluster:**




x axis=weeks from initial clustering; y axis=activity time per patient in hours

**Average cost per cluster:**




x axis=weeks from clustering; y axis=average cost per patient

## 2.2 Results

1. ***How do the maximum review intervals suggested in the clustering booklet compare to actual practice?***
    - The majority of cluster reviews (76%) were within the maximum cluster review periods.
    - The only clusters where the mean interval exceeded the maximum review period were clusters 0, 1, 2, 14 and 15. Clusters 1, 2, 14 and 15 all have shorter maximum review periods compared to other clusters and it is unclear whether the high levels that exceed the review period are indicative of a need to review the current limits or whether it is a construct of some other issue, such as people with longer term needs being wrongly allocated to clusters 1 and 2 and issues of confusion about when patients discharged from inpatient care should be reviewed. Given this uncertainty it is believed that the evidence for resource utilisation is the more important indicator to guide any recommendation for changing these parameters.

2. ***At the point where clusters are being reviewed is there a corresponding change in the level of input as measured by: average total contact time per week; average hourly rate for contact each week; average cost of weekly contact (hourly rate x contact duration at that grade)?***
    - Some clusters showed a clear corresponding change in the level of input as measured by contact time and cost (e.g. Cluster 1, 2, 3, 5) at the point when their maximum review period was reached.
    - Other clusters either did not show a clear corresponding change or patients were already at the point where hardly any input was required when the cluster review took place (e.g. Cluster 7, 8, 11, 12, 13). Based on these data we considered recommending a reduction in the review intervals for Cluster 7, 8, 11, 12 and 13. However, we have not made this recommendation for the following reasons:
        - Cluster 7: A case for a 6 month review interval could be made based on average contact time and cost. However, the only possible step down transition from this cluster is discharge and there is no possibility of adjusting the payment. Additionally, this patient group is relatively stable which makes more frequent reviews clinically unnecessary.
        - Cluster 8: A similar argument to cluster 7 can be made for the data. However, nice guidance warns against reviewing this patient group too frequently due to the destabilising effect it has on their mental state.
        - Cluster 11: Same conclusions as cluster 7.
        - Cluster 12 and 13: These clusters require clinical stability for a period of 12 months prior to step down making more frequent reviews unnecessary.

### 2.3 Step up, step down and discharge criteria

The third and final aim of the analyses was to use the available data to analyse whether the scores at cluster reviews met the existing transition criteria. It is recognised this is not a comprehensive review against transition criteria as not all were measurable from the available data. Thus, the main question to be answered here was:

1. At cluster review, does the resulting score change meet the expectations set out in the cluster booklet?

For 2.3 the same data set as in question 2.1 was used. 31,174 transitions ending in discharge did not have any MHCT scores linked to them and were excluded from the analysis (excluded 95% of discharges). 1725 discharges did have MHCT scores and were included in the analysis. In total 82,057 transitions remained for the analysis after exclusions were made.

The expectations set out in the cluster booklet (v4.0 – 2014/15) were incorporated wherever possible into the analysis. However, only criteria linked to MHCT scores could be used for the analysis.

For example, “Service user fits description and scoring profile of any likely/possible ‘step-up’/’step-down’ cluster” was interpreted as the MHCT scores needing to meet the “red rule” for the new cluster. If additional criteria were provided and they could be measured through MHCT scores they were included (e.g. Cluster 16 step-down criteria include MHCT scores for item D and item 3). Any other criteria such as “requires no psychotropic medication or has been on a stable dose for the past year.” were not included.

The charts below show the results of the analysis. They include any step up/step down/discharges which meet less than 70% of the relevant transition criteria (highlighted in orange). The scoring for those was investigated further.

For example, the step up transition from cluster 4 to 5 only met the criteria in 47% of the cases. In a more detailed analysis the scores for item 6, 7 and 8 were analysed and it was concluded that all 47% were linked to the high number of cases rated 3 for item 7/8. Where appropriate proposals were made to adjust the criteria (highlighted in green in the 3 detailed analyses sheets). These proposals were made based on expert clinical opinion developed through workshops where the results of analysis were discussed and clinical guidance sought to formulate the final recommendations. Additional charts explaining the analysis that was done can be found in Appendix 8.

## Analysis of step ups not meeting transition criteria:

| Summary of issues with care transition criteria for step up transitions (%) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type of transition | Cluster before transition | New cluster | Number of transitions | Item number | % meeting condition | Number of 0 scores | Number of 1 scores | Number of 2 scores | Number of 3 scores | Number of 4 scores | Proposal |
| up | 4 | 5 | 623 | 7/8 | 48% | 1% | 2% | 9% | 40% | 48% | no change |
| up | 4 | 8 | 168 | B | 52% | 26% | 6% | 15% | 42% | 10% | no change |
| up | 5 | 6 | 157 | 13 | 55% | 23% | 9% | 13% | 43% | 11% | no change |
| up | 5 | 8 | 143 | B | 62% | 22% | 3% | 13% | 48% | 13% | no change |
| up | 6 | 8 | 80 | B | 43% | 26% | 13% | 19% | 31% | 11% | no change |
| up | 6 | 15 | 3 | 6 | 67% | 0% | 33% | 0% | 67% | 0% | no change |
| up | 6 | 15 | 3 | 7/8 | 67% | 0% | 33% | 0% | 33% | 33% | no change |
| up | 7 | 8 | 218 | B | 50% | 28% | 8% | 15% | 39% | 11% | no change |
| up | 11 | 12 | 746 | 6 | 60% | 33% | 25% | 35% | 6% | 1% | no change |
| up | 11 | 13 | 187 | 6 | 56% | 19% | 7% | 17% | 49% | 7% | no change |
| up | 11 | 15** | 16 | 6 | 75% | 25% | 0% | 50% | 19% | 6% | no change |
| up | 11 | 15** | 16 | 7/8 | 88% | 13% | 0% | 0% | 44% | 44% | no change |
| up | 11 | 16 | 31 | 6 | 61% | 23% | 16% | 35% | 23% | 3% | no change |
| up | 11 | 17 | 66 | 6 | 62% | 38% | 21% | 26% | 12% | 3% | no change |
| up | 12 | 8 | 31 | 7/8 | 65% | 0% | 3% | 32% | 65% | 0% | no change |
| up | 12 | 8 | 31 | B | 52% | 39% | 0% | 10% | 39% | 13% | no change |
| up | 12 | 13 | 461 | 6 | 55% | 13% | 9% | 24% | 46% | 9% | no change |
| ** In combination both conditions together score 69% | | | | | | | | | | | |
| | % meeting care transition criteria <70% | | | | | | | | | | |
| | Criteria that need to be met according to cluster booklet v4.0 | | | | | | | | | | |

## Analysis of step downs not meeting transition criteria:

| Summary of issues with care transition criteria for step down transitions (%) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type of transition | Cluster before transition | New cluster | Number of transitions | Item number | % meeting condition | Number of 0 scores | Number of 1 scores | Number of 2 scores | Number of 3 scores | Number of 4 scores | Proposal |
| down | 3 | 2 | 145 | 7/8 | 27% | 5% | 63% | 27% | 5% | 1% | no change |
| down | 13 | 11 | 216 | 6 | 65% | 39% | 26% | 26% | 9% | 0% | no change |
| down | 13 | 12 | 513 | 6 | 68% | 20% | 21% | 46% | 11% | 1% | no change |
| down | 15 | 3 | 13 | 7/8 | 54% | 0% | 23% | 46% | 31% | 0% | no change |
| down | 15 | 5 | 18 | 6 | 67% | 56% | 11% | 17% | 6% | 11% | no change |
| down | 15 | 5 | 18 | 7/8 | 39% | 6% | 6% | 17% | 33% | 39% | no change |
| down | 15 | 6 | 9 | 13 | 67% | 22% | 0% | 11% | 67% | 0% | no change |
| down | 15 | 8 | 10 | B | 50% | 20% | 10% | 20% | 40% | 10% | no change |
| down | 15 | 13 | 45 | 6 | 56% | 11% | 13% | 20% | 53% | 2% | no change |
| down | 16 | 11** | 37 | 3 | 78% | 38% | 22% | 19% | 22% | 0% | no change |
| down | 16 | 11** | 37 | 6 | 70% | 35% | 35% | 22% | 8% | 0% | no change |
| down | 16 | 11** | 37 | D | 70% | 54% | 16% | 16% | 11% | 3% | no change |
| down | 16 | 12 | 60 | D | 43% | 27% | 17% | 32% | 18% | 7% | Include score of 2 |
| down | 16 | 13 | 24 | 6 | 63% | 4% | 17% | 17% | 54% | 8% | no change |
| down | 16 | 13 | 24 | D | 54% | 38% | 17% | 17% | 17% | 13% | Include score of 2 |
| down | 16 | 17 | 71 | D | 31% | 27% | 4% | 24% | 25% | 20% | Include score of 2 |
| down | 16 | 19 | 1 | D | 0% | 0% | 0% | 0% | 100% | 0% | more data needed |
| down | 17 | 11 | 71 | 6 | 56% | 44% | 30% | 20% | 7% | 0% | no change |
| down | 17 | 11 | 71 | D | 51% | 39% | 11% | 17% | 23% | 10% | no change |
| down | 17 | 12 | 110 | 6 | 67% | 22% | 24% | 44% | 7% | 3% | no change |
| down | 17 | 12 | 110 | D | 46% | 29% | 17% | 32% | 13% | 9% | Include score of 2 |
| down | 17 | 13 | 107 | 6 | 49% | 14% | 12% | 25% | 37% | 11% | no change |
| down | 17 | 13 | 107 | D | 41% | 28% | 13% | 21% | 26% | 11% | Include score of 2 |
| down | 17 | 19 | 1 | 4 | 0% | 100% | 0% | 0% | 0% | 0% | more data needed |
| ** In combination all 3 conditions together score 43% | | | | | | | | | | | |
| | % meeting care transition criteria <70% | | | | | | | | | | |
| | Criteria that need to be met according to cluster booklet v4.0 | | | | | | | | | | |
| | Proposed new criteria to be included | | | | | | | | | | |

## Analysis of discharges not meeting transition criteria:

| Summary of issues with care transition criteria for discharge transitions (%) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type of transition | Cluster before transition | New cluster | Number of transitions | Item number | % meeting condition | Number of 0 scores | Number of 1 scores | Number of 2 scores | Number of 3 scores | Number of 4 scores | Proposal |
| discharge | 3 | discharge | 163 | 7/8 | 59% | 23% | 36% | 37% | 4% | 0% | no change |
| discharge | 4 | discharge | 226 | 7/8 | 46% | 18% | 28% | 24% | 27% | 1% | Include score of 2 |
| discharge | 5 | discharge | 135 | 2 | 64% | 64% | 19% | 10% | 4% | 2% | Include score of 1 |
| discharge | 5 | discharge | 135 | 7/8 | 44% | 21% | 23% | 28% | 19% | 10% | Include score of 2 |
| discharge | 6 | discharge | 53 | 7/8 | 43% | 21% | 23% | 19% | 30% | 8% | no change |
| discharge | 7 | discharge | 121 | 7/8 | 52% | 26% | 26% | 29% | 17% | 2% | no change |
| discharge | 8 | discharge | 53 | 7/8 | 45% | 30% | 15% | 25% | 25% | 4% | Include score of 2 |
| discharge | 8 | discharge | 53 | B | 58% | 51% | 8% | 11% | 21% | 9% | Include score of 2 |
| discharge | 10** | discharge | 53 | 6 | 83% | 60% | 23% | 13% | 2% | 0% | no change |
| discharge | 10** | discharge | 53 | 12 | 74% | 53% | 21% | 19% | 6% | 0% | Include score of 2 |
| discharge | 12 | discharge | 82 | 6 | 30% | 68% | 22% | 9% | 1% | 0% | Include score of 0 |
| discharge | 13 | discharge | 46 | 6 | 59% | 50% | 9% | 11% | 26% | 4% | no change |
| discharge | 16 | discharge | 10 | 12 | 50% | 30% | 20% | 40% | 10% | 0% | Include score of 2 |
| discharge | 16 | discharge | 10 | D | 30% | 30% | 0% | 10% | 40% | 20% | no change |
| discharge | 17 | discharge | 10 | 6 | 60% | 60% | 0% | 20% | 20% | 0% | no change |
| ** In combination both conditions together score 68% | | | | | | | | | | | |
| | % meeting care transition criteria <70% | | | | | | | | | | |
| | Criteria that need to be met according to cluster booklet v4.0 | | | | | | | | | | |
| | Proposed new criteria to be included | | | | | | | | | | |

## 2.3 Results:

***At cluster review, does the resulting score change meet the expectations set out in the cluster booklet?***

- Out of 142 possible transitions 102 met the expectations set out in the cluster booklet at cluster review (72% of transitions).
- 40 transitions met less than 70% of the expectations set out in the cluster booklet (28% of transitions).
- Following clinical workshop discussions, of the transitions not meeting the 70% threshold, the changes below are being proposed. A table showing any proposed changes which have been overruled according to clinical judgement can be found in Appendix 9.

| Proposed changes to cluster booklet criteria | | | | | | |
|---|---|---|---|---|---|---|
| **Type of transition** | **Cluster before transition** | **New cluster** | **Item number** | **% meeting condition** | **Current rule** | **Proposal for new rule** |
| up | no change proposed | | | | | |
| down | 16 | 12 | D | 43% | Needs to score 0 or 1 | Include score of 2 |
| down | 16 | 13 | D | 54% | Needs to score 0 or 1 | Include score of 2 |
| down | 16 | 17 | D | 31% | Needs to score 0 or 1 | Include score of 2 |
| down | 17 | 12 | D | 46% | Needs to score 0 or 1 | Include score of 2 |
| down | 17 | 13 | D | 41% | Needs to score 0 or 1 | Include score of 2 |
| discharge | 4 | discharge | 7/8 | 46% | Needs to score 0 or 1 | Include score of 2 |
| discharge | 5 | discharge | 2 | 64% | Needs to score 0 | Include score of 1 |
| discharge | 5 | discharge | 7/8 | 44% | Needs to score 0 or 1 | Include score of 2 |
| discharge | 8 | discharge | 7/8 | 45% | Needs to score 0 or 1 | Include score of 2 |
| discharge | 8 | discharge | B | 58% | Needs to score 0 or 1 | Include score of 2 |
| discharge | 10** | discharge | 12 | 74% | Needs to score 0 or 1 | Include score of 2 |
| discharge | 12 | discharge | 6 | 30% | Needs to score 1 or 2 | Include score of 0 |
| discharge | 16 | discharge | 12 | 50% | Needs to score 0 or 1 | Include score of 2 |

** In combination both conditions together score 68%

## 2.4 Qualitative Feedback

Due to the CPP Programme's closure, on-line surveys were not held. All findings though have been discussed with key clinical representatives from each organisation and an MDT group of trainers.

## 3.0 Recommendations

Based on the findings of these analyses the following proposals are recommended for action to ensure that the MHCT and clustering continues to be respected by the clinical community as a valid and reliable tool for assessing and summarising needs.

**3.1**: It is recommended that the proposed changes developed through the comparison of the actual frequency of cluster transitions compared to suggestions initially set out in the MHCT (based on clinical opinion) set in matrix 2.3 below, (addition of impossible transitions and revised thresholds to distinguish between 'rare' and 'possible' transitions) be used to further adapt and update the Clustering Booklet.

Percentage transitions

| Previous Cluster \ New Cluster | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | Discharge |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 24% | 1% | 1% | 4% | 5% | 3% | 2% | 5% | 3% | 4% | 3% | 3% | 2% | 2% | 1% | 1% | 0% | 4% | 7% | 2% | 1% | 23% |
| 1 | 0% | 10% | 3% | 5% | 7% | 3% | 1% | 2% | 1% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 3% | 1% | 0% | 0% | 60% |
| 2 | 0% | 2% | 17% | 10% | 8% | 4% | 1% | 2% | 1% | 1% | 2% | 1% | 0% | 0% | 0% | 0% | 0% | 2% | 1% | 0% | 0% | 48% |
| 3 | 0% | 1% | 2% | 24% | 9% | 2% | 1% | 2% | 1% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 0% | 0% | 54% |
| 4 | 0% | 1% | 1% | 5% | 35% | 6% | 3% | 4% | 2% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 0% | 0% | 41% |
| 5 | 0% | 1% | 1% | 3% | 8% | 41% | 3% | 7% | 3% | 1% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 29% |
| 6 | 0% | 0% | 0% | 1% | 3% | 3% | 49% | 8% | 3% | 1% | 1% | 1% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 28% |
| 7 | 0% | 0 | 0 | 0 | 3% | 3% | 2% | 55% | 4% | 0% | 1% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 28% |
| 8 | 0% | 0 | 0 | 0 | 2% | 2% | 1% | 5% | 62% | 0% | 1% | 1% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 23% |
| 10 | 1% | 0% | 0% | 1% | 1% | 1% | 0% | 1% | 1% | 54% | 4% | 4% | 2% | 5% | 1% | 0% | 1% | 1% | 1% | 0% | 0% | 21% |
| 11 | 0% | 0% | 0% | 1% | 1% | 0% | 0% | 1% | 0% | 0 | 60% | 11% | 3% | 2% | 0% | 0% | 1% | 0% | 0% | 0% | 0% | 18% |
| 12 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 0 | 9% | 64% | 7% | 3% | 0% | 1% | 1% | 0% | 1% | 0% | 0% | 10% |
| 13 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0 | 6% | 15% | 56% | 6% | 1% | 1% | 3% | 0% | 1% | 0% | 0% | 9% |
| 14 | 0% | 0% | 0% | 1% | 1% | 1% | 0% | 0% | 1% | 7% | 5% | 15% | 12% | 35% | 1% | 3% | 5% | 0% | 1% | 0% | 0% | 10% |
| 15 | 0% | 1% | 0% | 2% | 3% | 3% | 2% | 2% | 2% | 3% | 8% | 12% | 8% | 2% | 40% | 1% | 2% | 0% | 0% | 1% | 0% | 10% |
| 16 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 2% | 0 | 3% | 5% | 2% | 5% | 0% | 63% | 5% | 0% | 0% | 0% | 0% | 12% |
| 17 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0 | 3% | 4% | 4% | 5% | 0% | 3% | 74% | 0% | 0% | 0% | 0% | 5% |
| 18 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 45% | 18% | 2% | 0% | 34% |
| 19 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 3% | 61% | 8% | 1% | 26% |
| 20 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 6% | 56% | 5% | 33% |
| 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8% | 47% | 45% |
| Grand Total | 0% | 0% | 1% | 3% | 5% | 3% | 2% | 4% | 3% | 2% | 5% | 6% | 3% | 2% | 0% | 1% | 2% | 7% | 15% | 6% | 2% | 29% |

Most likely transition
Possible transition
Rare transition
Impossible transition

**3.2**: It is recommended that the current maximum review periods for the 21 clusters remain unchanged at the current time but are subject to further review in 2 years' time.

**3.3:** It is recommended that the following proposed changes to transition criteria are considered for further testing on a wider data set as a step to them being considered for inclusion in an updated version of the Clustering Booklet.

| Proposed changes to cluster booklet criteria | | | | | | |
|---|---|---|---|---|---|---|
| **Type of transition** | **Cluster before transition** | **New cluster** | **Item number** | **% meeting condition** | **Current rule** | **Proposal for new rule** |
| up | no change proposed | | | | | |
| down | 16 | 12 | D | 43% | Needs to score 0 or 1 | Include score of 2 |
| down | 16 | 13 | D | 54% | Needs to score 0 or 1 | Include score of 2 |
| down | 16 | 17 | D | 31% | Needs to score 0 or 1 | Include score of 2 |
| down | 17 | 12 | D | 46% | Needs to score 0 or 1 | Include score of 2 |
| down | 17 | 13 | D | 41% | Needs to score 0 or 1 | Include score of 2 |
| discharge | 4 | discharge | 7/8 | 46% | Needs to score 0 or 1 | Include score of 2 |
| discharge | 5 | discharge | 2 | 64% | Needs to score 0 | Include score of 1 |
| discharge | 5 | discharge | 7/8 | 44% | Needs to score 0 or 1 | Include score of 2 |
| discharge | 8 | discharge | 7/8 | 45% | Needs to score 0 or 1 | Include score of 2 |
| discharge | 8 | discharge | B | 58% | Needs to score 0 or 1 | Include score of 2 |
| discharge | 10** | discharge | 12 | 74% | Needs to score 0 or 1 | Include score of 2 |
| discharge | 12 | discharge | 6 | 30% | Needs to score 1 or 2 | Include score of 0 |
| discharge | 16 | discharge | 12 | 50% | Needs to score 0 or 1 | Include score of 2 |

** In combination both conditions together score 68%

## Appendices

### Appendix 1 – Care Transition Analysis Plan V0.2

The following is the plan used as basis for the questions answered in this document:

# Care Transition Analysis Plan V0.2


## Jon Painter

## Richard Carthew

## Mick James


### 1.0 Introduction

Care transition protocols were derived in order to avoid staff changing a patient's allocated cluster inappropriately at a care review. Allocation to cluster for initial referral is based primarily on MHCT ratings but at review the scores can be misleading and clinicians need to decide whether the current ratings (given for the two weeks prior to review) reflect the patients true and sustained levels of risk, need and functioning. At this point the care transition protocols should be considered. The current guidance states:

7. Select the page containing care transition protocols that correspond to the individual's current cluster.

8. After completing an appropriate re-assessment of risks and needs complete a new MHCT.

9. Consider the **step-up criteria**. If any one of these is met, this suggests the current cluster allocation needs to change and, with reference to the clustering booklet; the latest MHCT ratings should be used to decide on the new cluster. If the step-up criteria are not met…

10. Consider the **discharge criteria**. If all of these are met, this indicates the need to explore discharge from in-scope Mental Health Services back to GP-led (Primary) Care. If the discharge criteria are not met…

11. Consider the **step-down criteria**. If all of these are met, this suggests the current cluster allocation needs to change and, with reference to the clustering booklet, the MHCT ratings should be used to decide on the new cluster. If the step-down criteria are not met …

12. This indicates that the existing cluster allocation remains valid, as any differences in the user's needs that have occurred do not warrant the changes in service response that allocation to a different cluster would trigger.

Whilst the clusters were empirically derived, the first draft of the care transition protocols were developed primarily from a clinical perspective. This was because

no longitudinal data was available for analysis in order to understand how and why patients moved between clusters. As a result, whilst the protocols were included in the national booklet to indicate the direction of travel, they were not mandated.

As the use of the clusters has been mandated for some time many patients have moved through clusters at a review. Data is therefore available to analyse, validate and/or refine the care transition protocols. The following is a broad description of the analysis that will be undertaken.

## 2.0 Analysis Plan

### 2.1 Frequency of each transition

The main questions to be answered here are:

4. How do the suggested likelihoods of each cluster transition in the cluster booklet compare to actual practice
5. What threshold should be set in order to distinguish between 'rare' and 'possible' transitions in the Clustering Booklet?
6. Once these are derived from the data do they continue to make clinical sense?

A data extract will be produced that includes all cluster transitions that have occurred in the most recent 12 month period of data available. MHCT scale scores, clusters and dates of assessments will be included for the initial cluster, and the subsequent allocation. NB when the patient's review results in discharge from care (not just hospital) this will be treated as another cluster and the MHCT/HoNOS ratings for the outcome measurement at discharge should be included.

The data set will be cleansed by removing all transitions where the initial cluster allocations do not meet the relevant clusters' red rules.

A simple matrix will then be produced that depicts the number of patients making each transition (including discharges). The matrix will also be produced separately with percentages of each initial cluster allocation making each transition.

These matrices can be colour coded according to the likelihoods in the cluster booklet to allow the current likelihood guidance to be assessed. See example below:

| Initial cluster | Subsequent cluster | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | D/C |
| 0 | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0.00 | 12.64 | 2.87 | 5.75 | 5.75 | 1.15 | 1.72 | 0.00 | 0.00 | 1.15 | 2.30 | 0.00 | 0.00 | 0.00 | 0.00 | 0.57 | 0.00 | 1.72 | 0.00 | 0.00 | 0.00 | 64.37 |
| 2 | 0.00 | 1.38 | 23.53 | 9.69 | 5.19 | 0.69 | 1.04 | 2.08 | 0.35 | 0.00 | 1.73 | 1.04 | 0.35 | 0.69 | 0.00 | 0.00 | 0.00 | 0.69 | 0.69 | 0.00 | 0.00 | 50.87 |
| 3 | 0.10 | 1.47 | 3.13 | 39.10 | 9.38 | 1.27 | 1.17 | 2.15 | 0.88 | 0.20 | 1.08 | 0.20 | 0.10 | 0.00 | 0.00 | 0.10 | 0.10 | 0.68 | 0.68 | 0.20 | 0.00 | 37.93 |
| 4 | 0.64 | 0.48 | 1.44 | 7.87 | 29.05 | 6.58 | 3.05 | 4.01 | 2.09 | 0.00 | 1.44 | 0.16 | 0.32 | 0.00 | 0.16 | 0.16 | 0.00 | 0.80 | 0.80 | 0.00 | 0.00 | 40.93 |
| 5 | 0.00 | 0.88 | 0.00 | 4.42 | 6.19 | 24.78 | 4.42 | 5.31 | 3.54 | 0.00 | 0.88 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 49.56 |
| 6 | 0.00 | 0.00 | 1.82 | 6.06 | 3.64 | 2.42 | 41.21 | 8.48 | 1.21 | 1.21 | 1.21 | 0.00 | 0.00 | 1.21 | 1.21 | 1.21 | 0.00 | 0.00 | 0.61 | 0.00 | 0.00 | 28.48 |
| 7 | 0.00 | 0.26 | 0.53 | 1.32 | 1.85 | 1.32 | 1.06 | 63.59 | 3.69 | 0.26 | 1.06 | 1.58 | 0.79 | 0.00 | 0.53 | 0.26 | 0.00 | 0.26 | 0.26 | 0.00 | 0.00 | 21.37 |
| 8 | 0.00 | 0.00 | 0.00 | 0.54 | 1.09 | 0.00 | 0.00 | 5.98 | 55.98 | 0.54 | 0.00 | 0.00 | 0.00 | 0.00 | 0.54 | 0.00 | 0.00 | 0.54 | 0.00 | 0.00 | 0.00 | 34.24 |
| 10 | 0.21 | 0.42 | 0.42 | 1.05 | 1.36 | 0.10 | 0.42 | 0.63 | 0.73 | 54.93 | 5.87 | 3.67 | 3.04 | 2.83 | 0.00 | 0.42 | 0.31 | 1.05 | 1.36 | 0.21 | 0.10 | 20.75 |
| 11 | 0.22 | 0.18 | 0.44 | 0.88 | 0.74 | 0.26 | 0.22 | 0.63 | 0.39 | 0.66 | 58.49 | 15.28 | 2.50 | 1.53 | 0.22 | 0.61 | 1.44 | 0.22 | 0.13 | 0.09 | 0.00 | 14.89 |
| 12 | 0.12 | 0.06 | 0.23 | 0.53 | 0.41 | 0.18 | 0.23 | 0.59 | 0.47 | 0.82 | 8.38 | 64.26 | 7.62 | 2.34 | 0.59 | 0.88 | 1.64 | 0.23 | 0.53 | 0.29 | 0.06 | 9.55 |
| 13 | 0.00 | 0.00 | 0.12 | 0.24 | 0.49 | 0.00 | 0.12 | 0.00 | 0.98 | 0.61 | 6.23 | 8.68 | 63.08 | 4.28 | 0.86 | 0.86 | 4.65 | 0.12 | 0.24 | 0.37 | 0.12 | 7.95 |
| 14 | 0.00 | 0.00 | 0.19 | 0.38 | 0.95 | 0.38 | 0.38 | 0.00 | 1.89 | 4.17 | 9.09 | 14.77 | 14.20 | 38.07 | 0.38 | 2.08 | 7.20 | 0.00 | 0.57 | 0.19 | 0.00 | 4.92 |
| 15 | 0.00 | 0.00 | 0.00 | 2.80 | 1.87 | 2.80 | 1.87 | 1.87 | 2.80 | 2.80 | 7.48 | 10.28 | 5.61 | 2.80 | 44.86 | 0.00 | 1.87 | 0.93 | 0.00 | 0.00 | 0.00 | 9.35 |
| 16 | 0.27 | 0.00 | 0.00 | 0.82 | 0.00 | 0.27 | 0.00 | 0.27 | 1.10 | 0.55 | 1.92 | 3.02 | 3.85 | 2.47 | 0.55 | 68.68 | 4.67 | 0.00 | 0.00 | 0.00 | 0.00 | 11.54 |
| 17 | 0.10 | 0.00 | 0.00 | 0.30 | 0.10 | 0.00 | 0.00 | 0.50 | 0.40 | 0.10 | 3.81 | 3.91 | 3.71 | 5.41 | 0.10 | 2.00 | 76.15 | 0.00 | 0.10 | 0.00 | 0.00 | 3.31 |
| 18 | 0.00 | 0.12 | 0.03 | 0.18 | 0.18 | 0.09 | 0.03 | 0.06 | 0.03 | 0.03 | 0.09 | 0.03 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 55.59 | 22.95 | 1.98 | 0.35 | 18.18 |
| 19 | 0.04 | 0.04 | 0.09 | 0.15 | 0.13 | 0.04 | 0.02 | 0.04 | 0.00 | 0.00 | 0.07 | 0.09 | 0.02 | 0.00 | 0.02 | 0.00 | 0.00 | 3.72 | 59.85 | 10.47 | 1.71 | 23.48 |
| 20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.06 | 0.00 | 0.06 | 0.00 | 0.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.72 | 6.27 | 50.72 | 6.51 | 35.59 |
| 21 | 0.00 | 0.00 | 0.00 | 0.16 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.16 | 0.16 | 0.31 | 0.00 | 0.00 | 0.00 | 0.00 | 0.62 | 3.28 | 7.64 | 41.97 | 45.71 |

NB a minimum of 50 cases per cell are required for analysis of that transition to be meaningful.

## 2.2 Care review periods

The main questions to be answered here are:

3. How do the maximum review intervals suggested in the clustering booklet compare to actual practice?
4. At the point where clusters are being reviewed is there a corresponding change in the level of input as measured by: average total contact time per week; average hourly rate for contact each week; average cost of weekly contact (hourly rate x contact duration at that grade)?

From the likelihood data set (2.1) the interval between reviews will be analysed. Distribution curves will be produced for each cluster as well as the mean, mode, median intervals and standard deviations.

A second data set will be extracted which provides a cohort of newly referred patients for each cluster (adhering to the red rules for that cluster). The data items will include date of clustering, cluster, MHCT scale scores contact activity (in minutes) by band and the cost of direct treatment per week (calculated from contact activity duration, staff banding and hourly rates) until cluster transition / discharge. The number of days from clustering to transition/discharge will also be included. This data will be presented in tabular and graphical format to allow weekly discharges rates and any significant changes in cost that occur prior to the current review intervals to be identified.

These analyses alone should not inform any revisions to the review frequencies as CPA policy and other best practice guidance will also need to be taken into account.

## 2.3 Step up, step down and discharge criteria

The main questions to be answered here are:

2. At cluster review, does the resulting score change meet the expectations set out in the cluster booklet?

From the matrices produced in the likelihood analysis the records for each cell with at least 50 cases will be further analysed. The underpinning records for each cell will be compared to the relevant step up / step down / discharge / little change criteria. Two further matrices will be produced showing numbers and percentages of cases meeting the relevant criteria. Where these criteria are infrequently met further analysis will be necessary to consider the criteria individually.

This further analysis will be presented in tabular format, and as Venn diagrams to allow the proportion of cases fitting each criterion to be understood.

Where there is concern over one or more criteria, a third piece of analysis will be undertaken. Here the change in score for each MHCT rating will be produced in tabular form (this will require a 5x5 matrix for each scale which plots initial score against subsequent score).

Finally extracts from any trusts that can provide data on the criteria not related to the MHCT scales (e.g. “level of social inclusion meets service user’s expectations”) will be analysed. This will follow a similar method to that described in paragraphs 1 &2 of section2.3.

## 2.4 Qualitative Feedback

In line with previous CPPP work, qualitative clinician feedback will also be sought. NB this work will not commence until the analysis outlined in sections 2.1-2.3 has been reviewed as these outputs will shape the focus of the questionnaire / interview schedule.

## Appendix 2 – 2.1 Exclusion Criteria

The original data extract from May 2014 contained 180,289 transitions. 113,231 transitions remained after the data not meeting the following criteria were excluded:

- Cluster transitions occurred since the latest cluster guidance was published in Apr 2013 (excluded 9444 lines for March 2013) and May 2014 (excluded 6 lines with data for June-Aug 2014). The June to Aug 2014 data was excluded as the file was extracted before June and no cluster transitions for the future should be recorded.
- Clusters were accurately coded e.g. did not contain cluster 98 (used incorrectly in same cases as discharge for Trust 1 or 88/blank (used incorrectly same cases as discharge for Trust 2) or 99 (discharge for Trust 4). This approach was based on information from IT and a more in depth investigation into the reasons why Trusts used cluster 88, 98 or 99. The findings of the investigation are explained in more detail below:
    - Cluster 98 or 88 to Discharge transfer (with 0 or a low number of days between old and new cluster): it appeared people had incorrectly entered patients into the clustering tool as patients were only seen for 1 assessment and then discharged.
    - Cluster 98, 88 or 99 to Discharge transfer (with a high number of days between old and new cluster – e.g. up to 624 days in Trust 1): it appeared people had been treated but when they were transferred to another place within the trust it was incorrectly clustered as a discharge. In total 4616 lines for cluster 98, 2790 for cluster 88 and 3 lines for cluster 99 were excluded.
    - Cluster 98, 88 or 99 transfer to another non-discharge cluster. Patients were either discharged and then returned or their transition was incorrectly clustered as discharge. In total 157 lines for cluster 98, 441 lines for cluster 88 and 1 line for cluster 99 were excluded.
- Initial cluster allocations need to meet the relevant clusters' red rules (excluded 49138 lines = 27%).
- Any impossible transitions that had previously been agreed (see chart below) were removed. This excluded the following transitions: cluster 7 to 1 – (13 transitions), 7 to 2 – (35 transitions), 7 to 3 – (81 transitions), 8 to 1 – (5 transitions), 8 to 2 – (24 transitions), 8 to 3 – (48 transitions), 11 to 10 – (45 transitions), 12 to 10 – (48 transitions), 13 to 10 – (28 transitions), 16 to 10 – (22 transitions), 17 to 10 – (12 transitions), cluster 21 to cluster 0/1/2/3/4/5/6/7/8/10/11/12/13/14/15/16/17/18/19 – (100 transitions). In total 454 transitions were removed.

## Impossible Transitions

| Previous Cluster \ New Cluster | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | Discharge |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | | | | | | | | | | | | | | | | |
| 1 | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | |
| 8 | | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | ■ | | | | | | | | | | | | |
| 12 | | | | | | | | | | ■ | | | | | | | | | | | | |
| 13 | | | | | | | | | | ■ | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | ■ | | | | | | | | | | | | |
| 17 | | | | | | | | | | ■ | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | | |
| 21 | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | |

■ Impossible transition

## Appendix 3 – 2.1 Matrixes

The following pivot tables show the different stages of analysis for the transition criteria. The explanations below provide an overview over the different versions.

**Explanation of versions:**
Version 1: Version that was developed based on the original colour coding that was agreed in the past but using new data.
Version 2.1: Uses data from version 1 but impossible transitions have been agreed and excluded.
Version 2.2: Uses data from version 2.2 but field colours have been adjusted based on the revised guidance for transitions below.
version 2.3: Uses data from version 2.2 but a number of colours have been overwritten based on the decisions made in the clinical review

**Revised guidance for transitions:**
Green = Most likely transition (highest % in the data set for each cluster)
Red = Rare transition (0 or 1 % in the data set)
Orange = Possible transition (anything in the data set that is not coded as red or green)

## Pivot Version 1 (%):

**Percentage transitions**

| Previous Cluster \ New Cluster | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | Discharge | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 24% | 1% | 1% | 4% | 5% | 3% | 2% | 5% | 3% | 4% | 3% | 3% | 2% | 2% | 1% | 1% | 0% | 4% | 7% | 2% | 1% | 23% | **100%** |
| **1** | 0% | 10% | 3% | 5% | 7% | 3% | 1% | 2% | 1% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 3% | 1% | 0% | 0% | 60% | **100%** |
| **2** | 0% | 2% | 17% | 10% | 8% | 4% | 1% | 2% | 1% | 1% | 2% | 1% | 0% | 0% | 0% | 0% | 0% | 2% | 1% | 0% | 0% | 48% | **100%** |
| **3** | 0% | 1% | 2% | 24% | 9% | 2% | 1% | 2% | 1% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 0% | 0% | 54% | **100%** |
| **4** | 0% | 1% | 1% | 5% | 35% | 6% | 3% | 4% | 2% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 0% | 0% | 41% | **100%** |
| **5** | 0% | 1% | 1% | 3% | 8% | 41% | 3% | 7% | 3% | 1% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 29% | **100%** |
| **6** | 0% | 0% | 0% | 1% | 3% | 3% | 49% | 8% | 3% | 1% | 1% | 1% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 28% | **100%** |
| **7** | 0% | 0% | 1% | 2% | 3% | 3% | 2% | 54% | 4% | 0% | 1% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 27% | **100%** |
| **8** | 0% | 0% | 0% | 1% | 2% | 2% | 1% | 5% | 61% | 0% | 1% | 1% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 22% | **100%** |
| **10** | 1% | 0% | 0% | 1% | 1% | 1% | 0% | 1% | 1% | 54% | 4% | 4% | 2% | 5% | 1% | 0% | 1% | 1% | 1% | 0% | 0% | 21% | **100%** |
| **11** | 0% | 0% | 0% | 1% | 1% | 0% | 0% | 1% | 0% | 1% | 59% | 11% | 3% | 2% | 0% | 0% | 1% | 0% | 0% | 0% | 0% | 18% | **100%** |
| **12** | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 1% | 9% | 63% | 7% | 3% | 0% | 1% | 1% | 0% | 1% | 0% | 0% | 10% | **100%** |
| **13** | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 1% | 6% | 15% | 56% | 6% | 1% | 1% | 3% | 0% | 1% | 0% | 0% | 9% | **100%** |
| **14** | 0% | 0% | 0% | 1% | 1% | 1% | 0% | 0% | 1% | 7% | 5% | 15% | 12% | 35% | 1% | 3% | 5% | 0% | 1% | 0% | 0% | 10% | **100%** |
| **15** | 0% | 1% | 0% | 2% | 3% | 3% | 2% | 2% | 2% | 3% | 8% | 12% | 8% | 2% | 40% | 1% | 2% | 0% | 0% | 1% | 0% | 10% | **100%** |
| **16** | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 2% | 2% | 3% | 5% | 2% | 5% | 0% | 62% | 5% | 0% | 0% | 0% | 0% | 12% | **100%** |
| **17** | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 3% | 4% | 4% | 5% | 0% | 3% | 74% | 0% | 0% | 0% | 0% | 5% | **100%** |
| **18** | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 45% | 18% | 2% | 0% | 34% | **100%** |
| **19** | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 3% | 61% | 8% | 1% | 26% | **100%** |
| **20** | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 6% | 56% | 5% | 33% | **100%** |
| **21** | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 3% | 8% | 45% | 43% | **100%** |
| **Grand Total** | **0%** | **0%** | **1%** | **3%** | **5%** | **3%** | **2%** | **4%** | **3%** | **2%** | **5%** | **6%** | **3%** | **2%** | **0%** | **1%** | **2%** | **7%** | **15%** | **6%** | **2%** | **29%** | **100%** |

Most likely transition

Possible transition

Rare transition

## Pivot Version 1 (Count):

**Count of transitions**

| Previous Cluster \ New Cluster | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | Discharge | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 75 | 3 | 4 | 14 | 16 | 11 | 6 | 15 | 9 | 12 | 8 | 10 | 5 | 7 | 3 | 2 | 1 | 12 | 22 | 6 | 2 | 73 | **316** |
| **1** | 5 | 115 | 33 | 63 | 83 | 36 | 15 | 26 | 14 | 9 | 16 | 4 | 2 | 4 | 1 | 2 | 1 | 30 | 15 | 4 | 2 | 711 | **1,191** |
| **2** | 3 | 31 | 250 | 143 | 115 | 53 | 15 | 35 | 18 | 13 | 32 | 8 | 7 | 7 | 2 | 1 | | 23 | 17 | 4 | | 726 | **1,503** |
| **3** | 21 | 56 | 145 | 1,997 | 740 | 204 | 78 | 201 | 95 | 41 | 55 | 25 | 19 | 16 | 5 | 6 | 3 | 64 | 34 | 2 | 4 | 4,491 | **8,302** |
| **4** | 30 | 61 | 93 | 550 | 3,757 | 623 | 314 | 482 | 168 | 41 | 62 | 45 | 15 | 21 | 16 | 6 | 9 | 62 | 49 | 12 | 3 | 4,441 | **10,860** |
| **5** | 9 | 25 | 35 | 148 | 408 | 2,018 | 157 | 321 | 143 | 30 | 24 | 30 | 11 | 16 | 20 | 5 | 5 | 5 | 13 | 6 | 1 | 1,434 | **4,864** |
| **6** | 14 | 6 | 14 | 46 | 101 | 80 | 1,511 | 257 | 80 | 23 | 20 | 20 | 11 | 16 | 3 | 1 | 2 | 4 | 6 | 4 | 3 | 884 | **3,106** |
| **7** | 18 | 13 | 35 | 81 | 156 | 137 | 90 | 2,847 | 218 | 17 | 69 | 60 | 29 | 15 | 9 | 9 | 7 | 19 | 23 | 9 | | 1,419 | **5,280** |
| **8** | 7 | 5 | 7 | 48 | 71 | 70 | 41 | 168 | 1,978 | 14 | 17 | 17 | 17 | 24 | 1 | 9 | 14 | 5 | 5 | 4 | 1 | 727 | **3,250** |
| **10** | 20 | 18 | 15 | 41 | 53 | 39 | 15 | 25 | 43 | 2,162 | 162 | 159 | 73 | 193 | 23 | 17 | 21 | 21 | 28 | 9 | 4 | 829 | **3,970** |
| **11** | 9 | 10 | 16 | 48 | 49 | 31 | 13 | 43 | 31 | 45 | 4,017 | 746 | 187 | 133 | 16 | 31 | 66 | 17 | 16 | 10 | 2 | 1,223 | **6,759** |
| **12** | 3 | 2 | 11 | 14 | 26 | 20 | 11 | 46 | 31 | 48 | 581 | 4,081 | 461 | 218 | 26 | 60 | 80 | 14 | 42 | 16 | 1 | 650 | **6,442** |
| **13** | 6 | 1 | 3 | 11 | 7 | 10 | 10 | 17 | 21 | 28 | 216 | 513 | 1,956 | 210 | 24 | 34 | 98 | 13 | 20 | 9 | 2 | 313 | **3,522** |
| **14** | 3 | 3 | 3 | 15 | 21 | 18 | 13 | 12 | 29 | 198 | 148 | 405 | 337 | 950 | 26 | 68 | 138 | 8 | 20 | 9 | 4 | 279 | **2,707** |
| **15** | 2 | 3 | 2 | 13 | 16 | 18 | 9 | 12 | 10 | 19 | 44 | 68 | 45 | 10 | 233 | 5 | 12 | 1 | 2 | 4 | 1 | 57 | **586** |
| **16** | 1 | 2 | 1 | 4 | 6 | 5 | 3 | 8 | 28 | 22 | 37 | 60 | 24 | 67 | 2 | 818 | 71 | | 1 | 1 | | 156 | **1,317** |
| **17** | 1 | | 2 | 7 | 3 | 1 | 7 | 6 | 21 | 12 | 71 | 110 | 107 | 126 | 6 | 77 | 1,989 | 8 | 1 | 3 | | 143 | **2,701** |
| **18** | 7 | 11 | 17 | 43 | 39 | 9 | 4 | 15 | 3 | 15 | 4 | 9 | 4 | 8 | 1 | 2 | 5 | 6,604 | 2,710 | 236 | 59 | 5,027 | **14,832** |
| **19** | 8 | 4 | 11 | 18 | 25 | 12 | 4 | 10 | 8 | 12 | 17 | 17 | 6 | 6 | 4 | | 2 | 616 | 13,263 | 1,812 | 240 | 5,690 | **21,785** |
| **20** | 7 | | 2 | 4 | 3 | 4 | 2 | | 1 | 5 | 6 | 5 | 7 | 1 | 2 | 2 | 4 | 29 | 458 | 4,487 | 398 | 2,620 | **8,047** |
| **21** | 1 | 1 | | 3 | | | 2 | | 1 | 1 | 1 | 2 | 1 | | | | | 13 | 74 | 181 | 1,065 | 1,006 | **2,352** |
| **Grand Total** | **250** | **370** | **699** | **3,311** | **5,695** | **3,399** | **2,320** | **4,546** | **2,950** | **2,767** | **5,607** | **6,394** | **3,324** | **2,048** | **423** | **1,155** | **2,528** | **7,568** | **16,819** | **6,828** | **1,792** | **32,899** | **113,692** |

Most likely transition
Possible transition
Rare transition

## Pivot Version 2.3 (%):

**Percentage transitions**

| Previous Cluster \ New Cluster | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | Discharge | Grand Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 24% | 1% | 1% | 4% | 5% | 3% | 2% | 5% | 3% | 4% | 3% | 3% | 2% | 2% | 1% | 1% | 0% | 4% | 7% | 2% | 1% | 23% | 100% |
| 1 | 0% | 10% | 3% | 5% | 7% | 3% | 1% | 2% | 1% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 3% | 1% | 0% | 0% | 60% | 100% |
| 2 | 0% | 2% | 17% | 10% | 8% | 4% | 1% | 2% | 1% | 1% | 2% | 1% | 0% | 0% | 0% | 0% | 0% | 2% | 1% | 0% | 0% | 48% | 100% |
| 3 | 0% | 1% | 2% | 24% | 9% | 2% | 1% | 2% | 1% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 0% | 0% | 54% | 100% |
| 4 | 0% | 1% | 1% | 5% | 35% | 6% | 3% | 4% | 2% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 0% | 0% | 41% | 100% |
| 5 | 0% | 1% | 1% | 3% | 8% | 41% | 3% | 7% | 3% | 1% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 29% | 100% |
| 6 | 0% | 0% | 0% | 1% | 3% | 3% | 49% | 8% | 3% | 1% | 1% | 1% | 0% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 28% | 100% |
| 7 | 0% | 0 | 0 | 0 | 3% | 3% | 2% | 55% | 4% | 0% | 1% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 28% | 100% |
| 8 | 0% | 0 | 0 | 0 | 2% | 2% | 1% | 5% | 62% | 0% | 1% | 1% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 23% | 100% |
| 10 | 1% | 0% | 0% | 1% | 1% | 1% | 0% | 1% | 1% | 54% | 4% | 4% | 2% | 5% | 1% | 0% | 1% | 1% | 1% | 0% | 0% | 21% | 100% |
| 11 | 0% | 0% | 0% | 1% | 1% | 0% | 0% | 1% | 0% | 0 | 60% | 11% | 3% | 2% | 0% | 0% | 1% | 0% | 0% | 0% | 0% | 18% | 100% |
| 12 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0% | 0 | 9% | 64% | 7% | 3% | 0% | 1% | 1% | 0% | 1% | 0% | 0% | 10% | 100% |
| 13 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0 | 6% | 15% | 56% | 6% | 1% | 1% | 3% | 0% | 1% | 0% | 0% | 9% | 100% |
| 14 | 0% | 0% | 0% | 1% | 1% | 1% | 0% | 0% | 1% | 7% | 5% | 15% | 12% | 35% | 1% | 3% | 5% | 0% | 1% | 0% | 0% | 10% | 100% |
| 15 | 0% | 1% | 0% | 2% | 3% | 3% | 2% | 2% | 2% | 3% | 8% | 12% | 8% | 2% | 40% | 1% | 2% | 0% | 0% | 1% | 0% | 10% | 100% |
| 16 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 2% | 0 | 3% | 5% | 2% | 5% | 0% | 63% | 5% | 0% | 0% | 0% | 0% | 12% | 100% |
| 17 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 1% | 0 | 3% | 4% | 4% | 5% | 0% | 3% | 74% | 0% | 0% | 0% | 0% | 5% | 100% |
| 18 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 45% | 18% | 2% | 0% | 34% | 100% |
| 19 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 3% | 61% | 8% | 1% | 26% | 100% |
| 20 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 6% | 56% | 5% | 33% | 100% |
| 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8% | 47% | 45% | 100% |
| Grand Total | 0% | 0% | 1% | 3% | 5% | 3% | 2% | 4% | 3% | 2% | 5% | 6% | 3% | 2% | 0% | 1% | 2% | 7% | 15% | 6% | 2% | 29% | 100% |

Most likely transition

Possible transition

Rare transition

Impossible transition

## Pivot Version 2.3 (Count):

**Count of transitions**

| Previous Cluster \ New Cluster | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | Discharge |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 75 | 3 | 4 | 14 | 16 | 11 | 6 | 15 | 9 | 12 | 8 | 10 | 5 | 7 | 3 | 2 | 1 | 12 | 22 | 6 | 2 | 73 |
| **1** | 5 | 115 | 33 | 63 | 83 | 36 | 15 | 26 | 14 | 9 | 16 | 4 | 2 | 4 | 1 | 2 | 1 | 30 | 15 | 4 | 2 | 711 |
| **2** | 3 | 31 | 250 | 143 | 115 | 53 | 15 | 35 | 18 | 13 | 32 | 8 | 7 | 7 | 2 | 1 | | 23 | 17 | 4 | | 726 |
| **3** | 21 | 56 | 145 | 1,997 | 740 | 204 | 78 | 201 | 95 | 41 | 55 | 25 | 19 | 16 | 5 | 6 | 3 | 64 | 34 | 2 | 4 | 4,491 |
| **4** | 30 | 61 | 93 | 550 | 3,757 | 623 | 314 | 482 | 168 | 41 | 62 | 45 | 15 | 21 | 16 | 6 | 9 | 62 | 49 | 12 | 3 | 4,441 |
| **5** | 9 | 25 | 35 | 148 | 408 | 2,018 | 157 | 321 | 143 | 30 | 24 | 30 | 11 | 16 | 20 | 5 | 5 | 5 | 13 | 6 | 1 | 1,434 |
| **6** | 14 | 6 | 14 | 46 | 101 | 80 | 1,511 | 257 | 80 | 23 | 20 | 20 | 11 | 16 | 3 | 1 | 2 | 4 | 6 | 4 | 3 | 884 |
| **7** | 18 | | | | 156 | 137 | 90 | 2,847 | 218 | 17 | 69 | 60 | 29 | 15 | 9 | 9 | 7 | 19 | 23 | 9 | | 1,419 |
| **8** | 7 | | | | 71 | 70 | 41 | 168 | 1,978 | 14 | 17 | 17 | 17 | 24 | 1 | 9 | 14 | 5 | 5 | 4 | 1 | 727 |
| **10** | 20 | 18 | 15 | 41 | 53 | 39 | 15 | 25 | 43 | 2,162 | 162 | 159 | 73 | 193 | 23 | 17 | 21 | 21 | 28 | 9 | 4 | 829 |
| **11** | 9 | 10 | 16 | 48 | 49 | 31 | 13 | 43 | 31 | | 4,017 | 746 | 187 | 133 | 16 | 31 | 66 | 17 | 16 | 10 | 2 | 1,223 |
| **12** | 3 | 2 | 11 | 14 | 26 | 20 | 11 | 46 | 31 | | 581 | 4,081 | 461 | 218 | 26 | 60 | 80 | 14 | 42 | 16 | 1 | 650 |
| **13** | 6 | 1 | 3 | 11 | 7 | 10 | 10 | 17 | 21 | | 216 | 513 | 1,956 | 210 | 24 | 34 | 98 | 13 | 20 | 9 | 2 | 313 |
| **14** | 3 | 3 | 3 | 15 | 21 | 18 | 13 | 12 | 29 | 198 | 148 | 405 | 337 | 950 | 26 | 68 | 138 | 8 | 20 | 9 | 4 | 279 |
| **15** | 2 | 3 | 2 | 13 | 16 | 18 | 9 | 12 | 10 | 19 | 44 | 68 | 45 | 10 | 233 | 5 | 12 | 1 | 2 | 4 | 1 | 57 |
| **16** | 1 | 2 | 1 | 4 | 6 | 5 | 3 | 8 | 28 | | 37 | 60 | 24 | 67 | 2 | 818 | 71 | | 1 | 1 | | 156 |
| **17** | 1 | | 2 | 7 | 3 | 1 | 7 | 6 | 21 | | 71 | 110 | 107 | 126 | 6 | 77 | 1,989 | 8 | 1 | 3 | | 143 |
| **18** | 7 | 11 | | 43 | 39 | 9 | 4 | 15 | 3 | 15 | 4 | 9 | 4 | 8 | 1 | 2 | 5 | 6,604 | 2,710 | 236 | 59 | 5,027 |
| **19** | 8 | 4 | 11 | 18 | 25 | 12 | 4 | 10 | 8 | 12 | 17 | 17 | 6 | 6 | 4 | | 2 | 616 | 13,263 | 1,812 | 240 | 5,690 |
| **20** | 7 | | 2 | 4 | 3 | 4 | 2 | | 1 | 5 | 6 | 5 | 7 | 1 | 2 | 2 | 4 | 29 | 458 | 4,487 | 398 | 2,620 |
| **21** | | | | | | | | | | | | | | | | | | | | 181 | 1,065 | 1,006 |
| **Grand Total** | **249** | **351** | **640** | **3,179** | **5,695** | **3,399** | **2,318** | **4,546** | **2,949** | **2,611** | **5,606** | **6,392** | **3,323** | **2,048** | **423** | **1,155** | **2,528** | **7,555** | **16,745** | **6,828** | **1,792** | **32,899** |

| | |
|---|---|
| | Most likely transition |
| | Possible transition |
| | Rare transition |
| | Impossible transition |

## Appendix 4 – 2.1 Overruled data results

The following data-driven conclusions were overruled through clinical judgement and hence these changes not included in the proposal.

| Cluster | Current status | Data suggests | New data % | Clinical judgement | Comments |
|---|---|---|---|---|---|
| Cluster 1 to 1 | red | orange | 10% | red | Asked IAPT for guidance, data overruled |
| Cluster 1 to 7 | red | orange | 2% | red | Data overruled |
| Cluster 1 to 10 | orange | red | 1% | orange | Data overruled |
| Cluster 2 to 1 | red | orange | 2% | red | Asked IAPT for guidance, data overruled |
| Cluster 2 to 6 | orange | red | 1% | orange | Data overruled |
| Cluster 2 to 8 | orange | red | 1% | orange | Data overruled |
| Cluster 2 to 10 | orange | red | 1% | orange | Data overruled |
| Cluster 3 to 6 | orange | red | 1% | orange | Data overruled |
| Cluster 3 to 8 | orange | red | 1% | orange | Data overruled |
| Cluster 3 to 10 | orange | red | 0% | orange | Data overruled |
| Cluster 5 to 3 | red | orange | 3% | red | Data overruled |
| Cluster 5 to 4 | red | orange | 8% | red | Data overruled |
| Cluster 5 to 10 | orange | red | 1% | orange | Data overruled |
| Cluster 5 to 15 | orange | red | 0% | orange | Data overruled |
| Cluster 6 to 4 | red | orange | 3% | red | Data overruled |
| Cluster 6 to 5 | red | orange | 3% | red | Data overruled |
| Cluster 7 to 4 | red | orange | 3% | red | Data overruled |
| Cluster 7 to 5 | red | orange | 3% | red | Data overruled |
| Cluster 7 to 6 | red | orange | 2% | red | Data overruled |
| Cluster 8 to 4 | red | orange | 2% | red | Data overruled |
| Cluster 8 to 5 | red | orange | 2% | red | Data overruled |
| Cluster 8 to 10 | orange | red | 0% | orange | Data overruled |
| Cluster 8 to 14 | orange | red | 1% | orange | Data overruled |
| Cluster 8 to 15 | orange | red | 0% | orange | Data overruled |
| Cluster 10 to 8 | orange | red | 1% | orange | Data overruled |
| Cluster 10 to 15 | orange | red | 1% | orange | Data overruled |
| Cluster 10 to 16 | orange | red | 0% | orange | Data overruled |
| Cluster 10 to 17 | orange | red | 1% | orange | Data overruled |
| Cluster 11 to 15 | orange | red | 0% | orange | Data overruled |
| Cluster 12 to 15 | orange | red | 0% | orange | Data overruled |

| | | | | | |
|---|---|---|---|---|---|
| Cluster 12 to 16 | orange | red | 1% | orange | Data overruled |
| Cluster 12 to 17 | orange | red | 1% | orange | Data overruled |
| Cluster 13 to 15 | orange | red | 1% | orange | Data overruled |
| Cluster 13 to 16 | orange | red | 1% | orange | Data overruled |
| Cluster 14 to 11 | red | orange | 5% | red | Data overruled |
| Cluster 14 to 15 | orange | red | 1% | orange | Data overruled |
| Cluster 15 to 11 | red | orange | 8% | red | 8% due to incorrect practice, data overruled |
| Cluster 15 to 16 | orange | red | 1% | orange | Data overruled |
| Cluster 16 to 15 | orange | red | 0% | orange | Data overruled |
| Cluster 17 to 8 | orange | red | 1% | red | Data overruled |
| Cluster 17 to 15 | orange | red | 0% | orange | Data overruled |
| Cluster 19 to 21 | orange | red | 1% | orange | Data overruled |

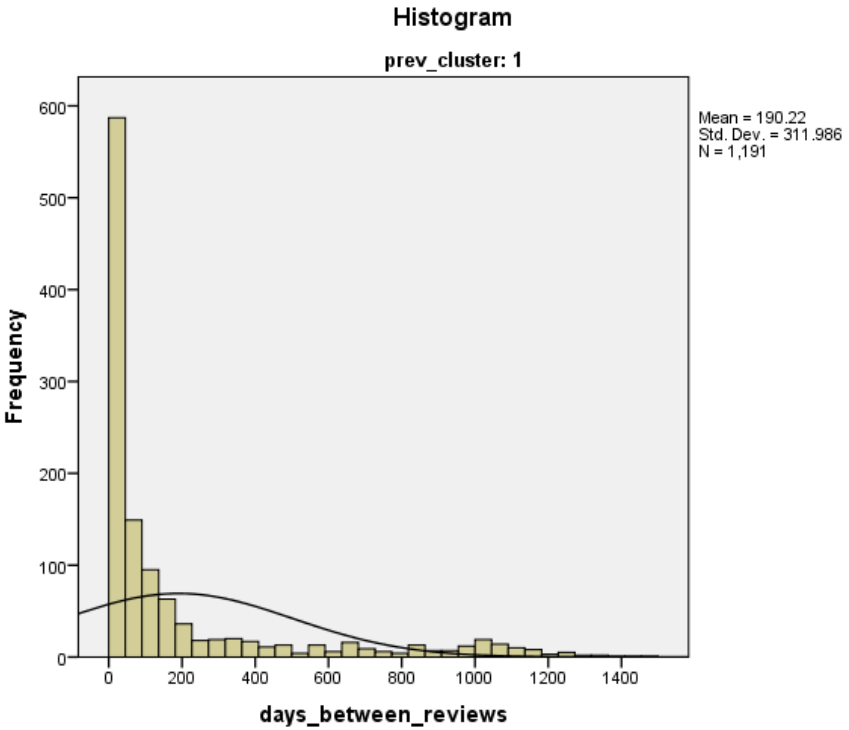
## Appendix 5 – 2.2 Histograms and Boxplot

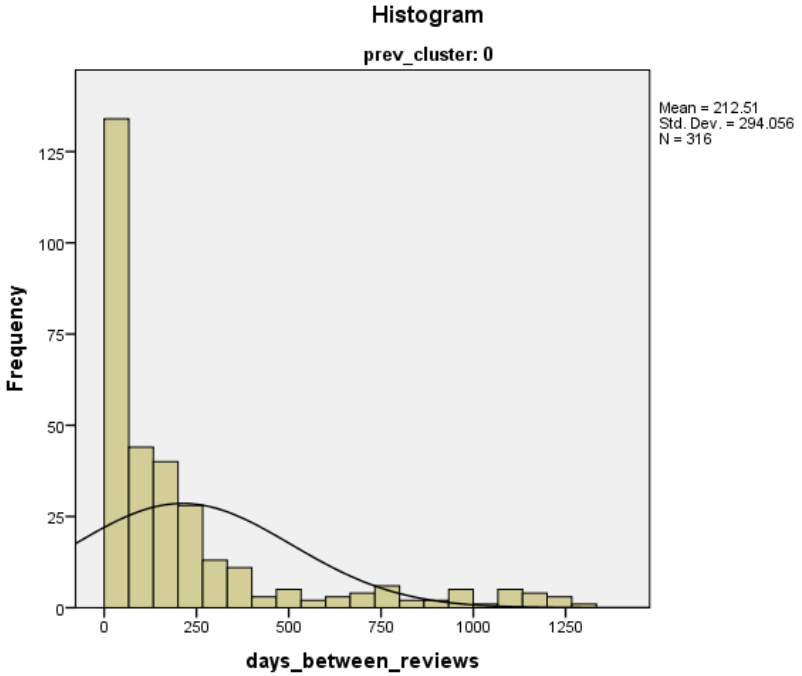
The following table provides statistical data such as the mean, median, mode, maximum review period and standard deviations for the individual clusters. The Histograms highlight the distribution of review intervals per cluster and the boxplot provides an overview over the means.

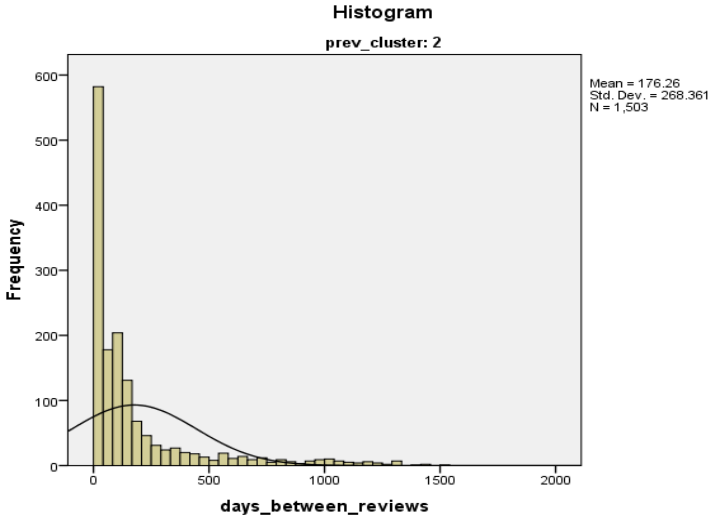
### Review intervals per cluster overview:

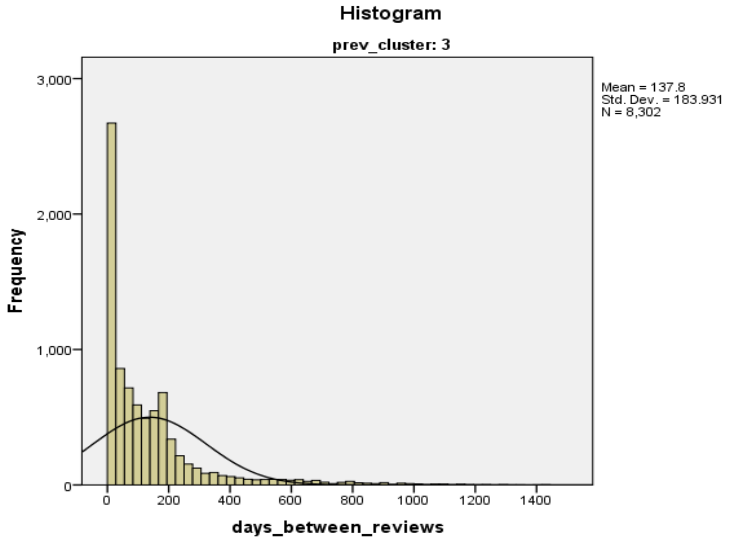
| | Mean | Median | Mode | Maximum review period | Std. Deviation | Minimum | Maximum |
|---|---|---|---|---|---|---|---|
| **Cluster 0** | 213 | 109 | 0 | 183 | 294 | 0 | 1,271 |
| **Cluster 1** | 190 | 49 | 1 | 84 | 312 | 0 | 1,486 |
| **Cluster 2** | 176 | 80 | 0 | 105 | 268 | 0 | 1,505 |
| **Cluster 3** | 138 | 79 | 0 | 183 | 184 | 0 | 1,439 |
| **Cluster 4** | 145 | 114 | 0 | 183 | 154 | 0 | 1,245 |
| **Cluster 5** | 102 | 46 | 1 | 183 | 133 | 0 | 1,422 |
| **Cluster 6** | 161 | 159 | 1 | 183 | 144 | 0 | 1,218 |
| **Cluster 7** | 184 | 152 | 1 | 365 | 177 | 0 | 1,620 |
| **Cluster 8** | 127 | 66 | 1 | 365 | 165 | 0 | 1,253 |
| **Cluster 10** | 157 | 119 | 1 | 365 | 157 | 0 | 1,211 |
| **Cluster 11** | 264 | 224 | 364 | 365 | 218 | 0 | 1,529 |
| **Cluster 12** | 210 | 181 | 182 | 365 | 175 | 0 | 1,343 |
| **Cluster 13** | 185 | 161 | 1 | 365 | 168 | 0 | 1,303 |
| **Cluster 14** | 48 | 26 | 28 | 28 | 99 | 0 | 1,278 |
| **Cluster 15** | 88 | 34 | 28 | 28 | 150 | 0 | 1,327 |
| **Cluster 16** | 142 | 125 | 1 | 183 | 134 | 0 | 1,008 |
| **Cluster 17** | 162 | 166 | 182 | 183 | 120 | 0 | 1,226 |
| **Cluster 18** | 198 | 175 | 182 | 365 | 176 | 0 | 1,376 |
| **Cluster 19** | 175 | 173 | 182 | 183 | 138 | 0 | 1,477 |
| **Cluster 20** | 147 | 145 | 0 | 183 | 126 | 0 | 1,362 |
| **Cluster 21** | 131 | 115 | 1 | 183 | 126 | 0 | 1,160 |

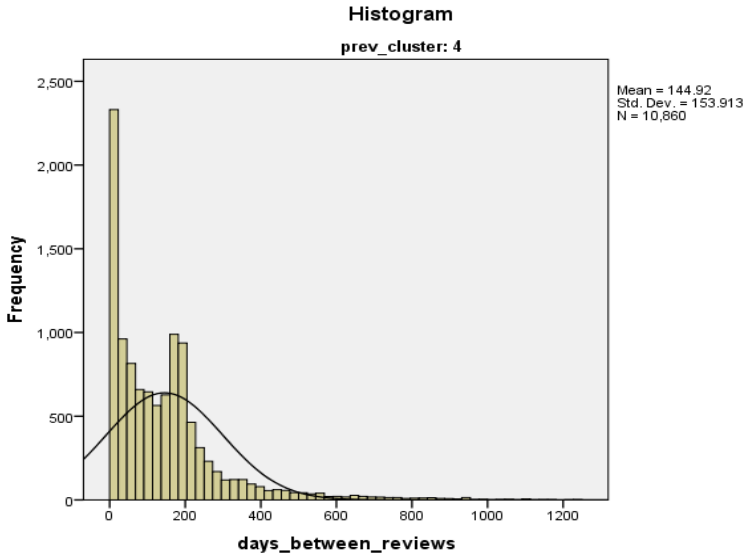
**Histograms:**

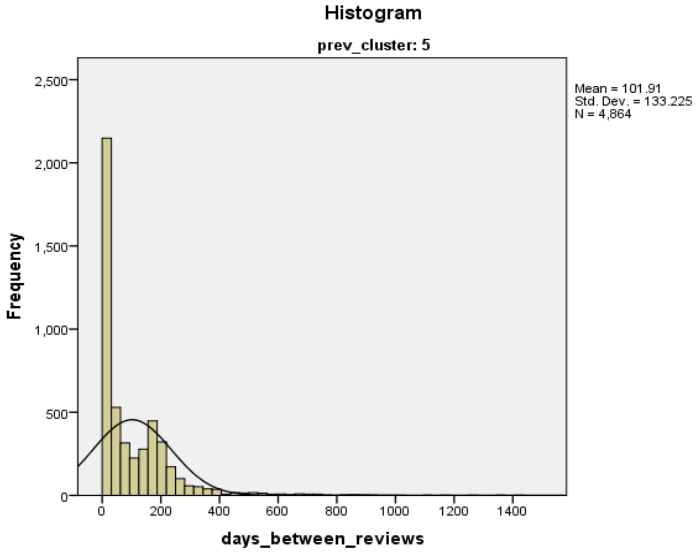

Histogram
prev_cluster: 1
Mean = 190.22
Std. Dev. = 311.986
N = 1,191
Frequency
days_between_reviews

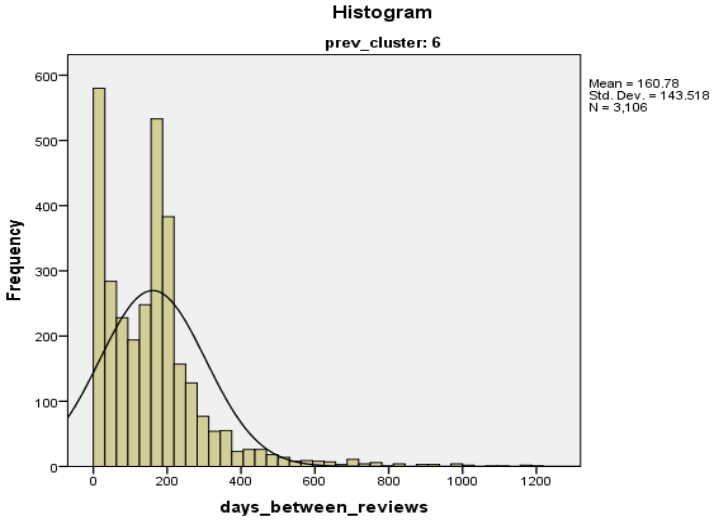

Histogram
prev_cluster: 0
Mean = 212.51
Std. Dev. = 294.056
N = 316
Frequency
days_between_reviews

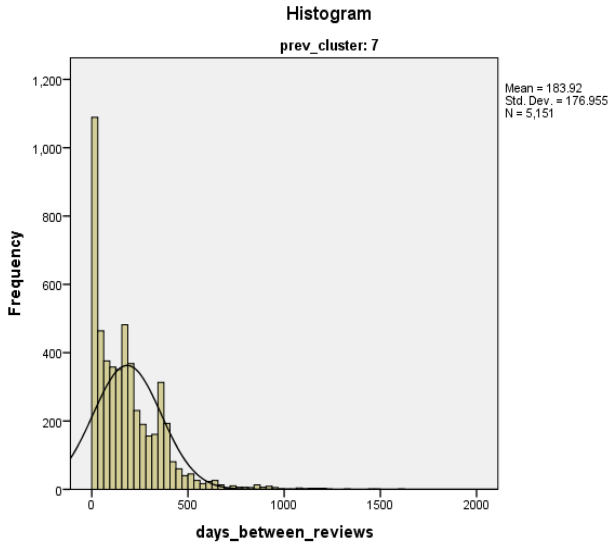

Histogram
prev_cluster: 2
Mean = 176.26
Std. Dev. = 268.361
N = 1,503
Frequency
days_between_reviews

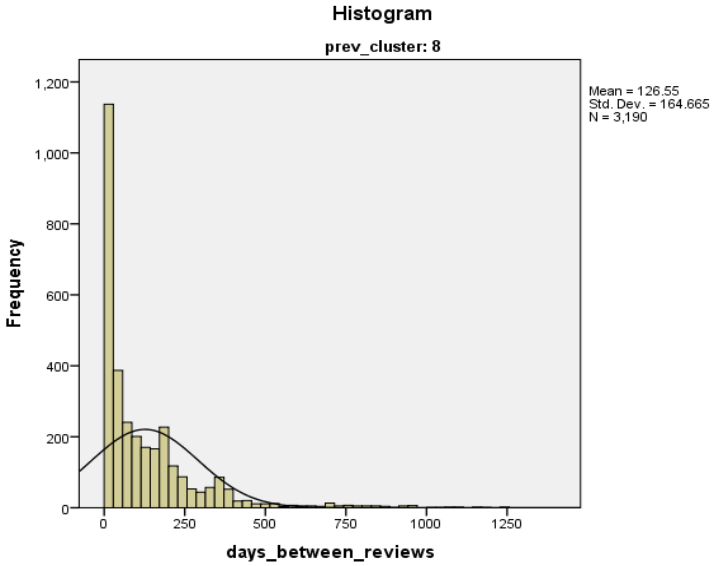

Histogram
prev_cluster: 3
Mean = 137.8
Std. Dev. = 183.931
N = 8,302
Frequency
days_between_reviews

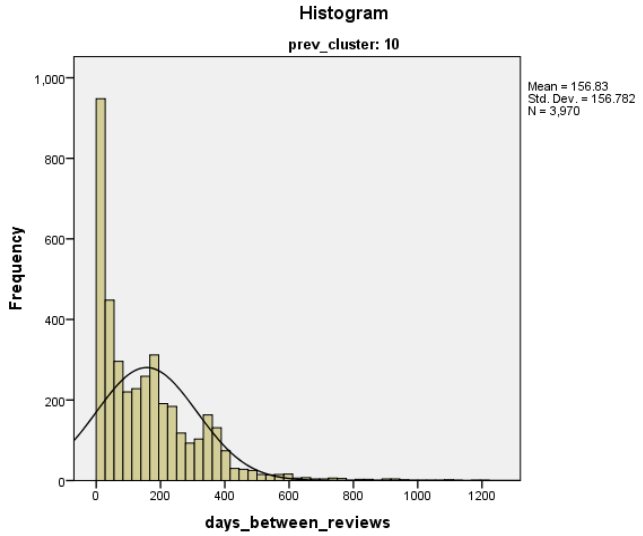

Histogram
prev_cluster: 4
Mean = 144.92
Std. Dev. = 153.913
N = 10,860
Frequency
days_between_reviews

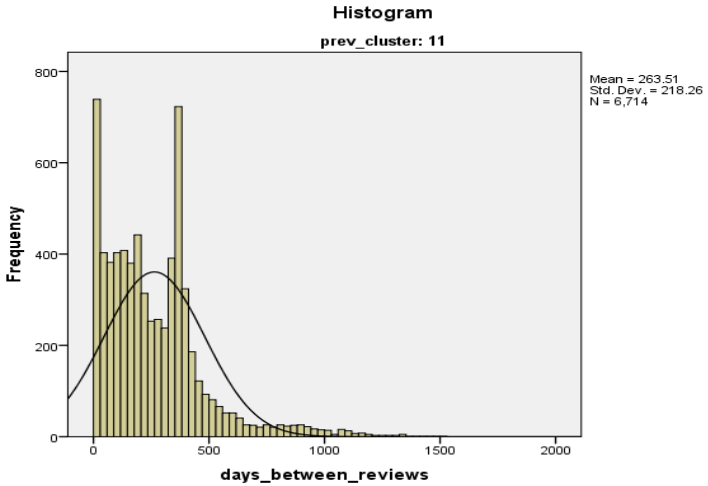

Histogram
prev_cluster: 5
Mean = 101.91
Std. Dev. = 133.225
N = 4,864
Frequency
days_between_reviews

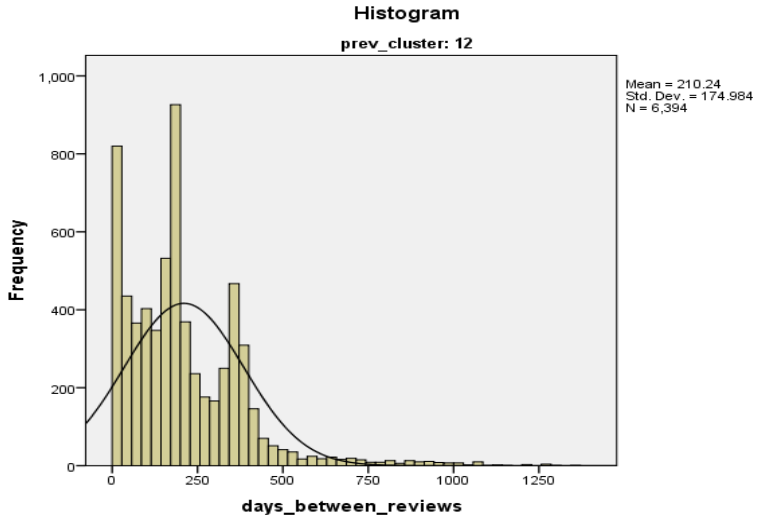

Histogram
prev_cluster: 6
Mean = 160.78
Std. Dev. = 143.518
N = 3,106
Frequency
days_between_reviews

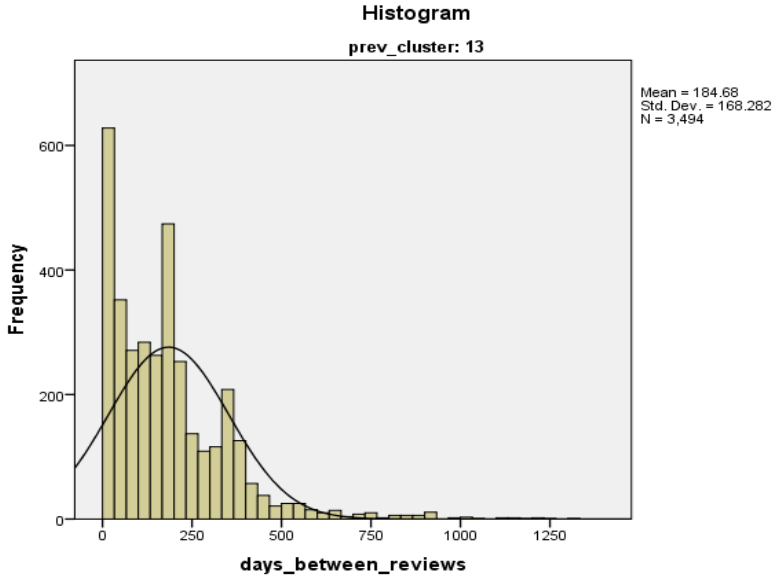

Histogram
prev_cluster: 7
Mean = 183.92
Std. Dev. = 176.955
N = 5,151
Frequency
days_between_reviews

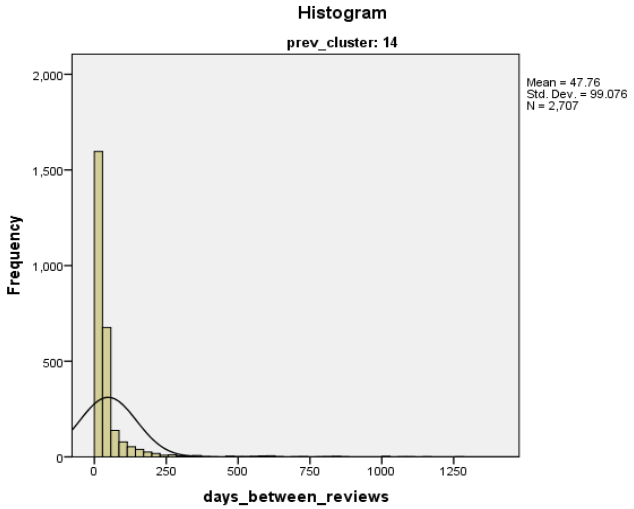

Histogram
prev_cluster: 8
Mean = 126.55
Std. Dev. = 164.665
N = 3,190
Frequency
days_between_reviews

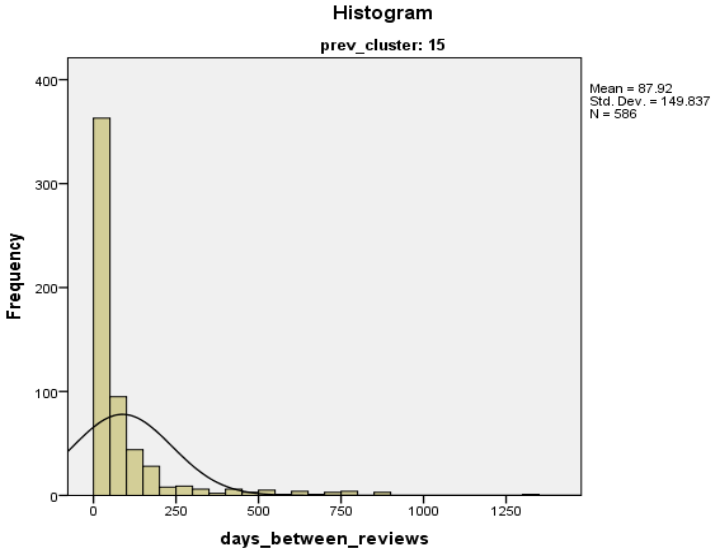

Histogram
prev_cluster: 10
Mean = 156.83
Std. Dev. = 156.782
N = 3,970
Frequency
days_between_reviews

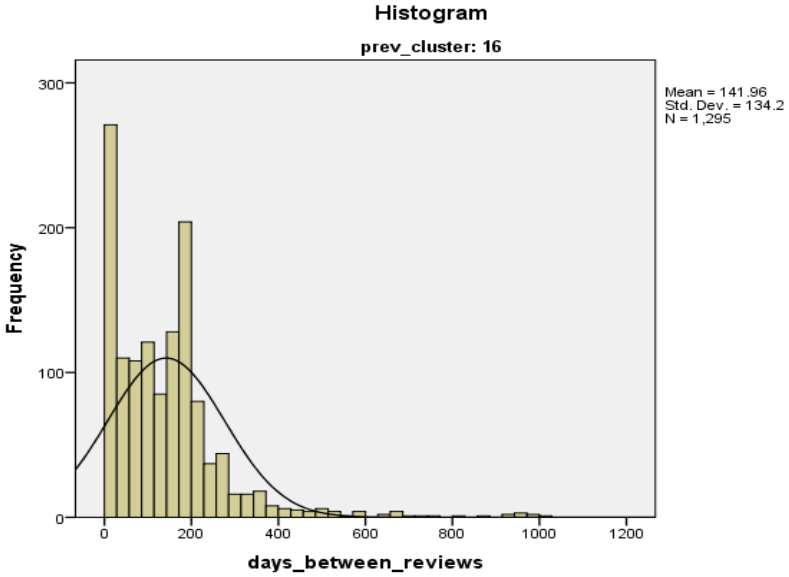

Histogram
prev_cluster: 11
Mean = 263.51
Std. Dev. = 218.26
N = 6,714
Frequency
days_between_reviews

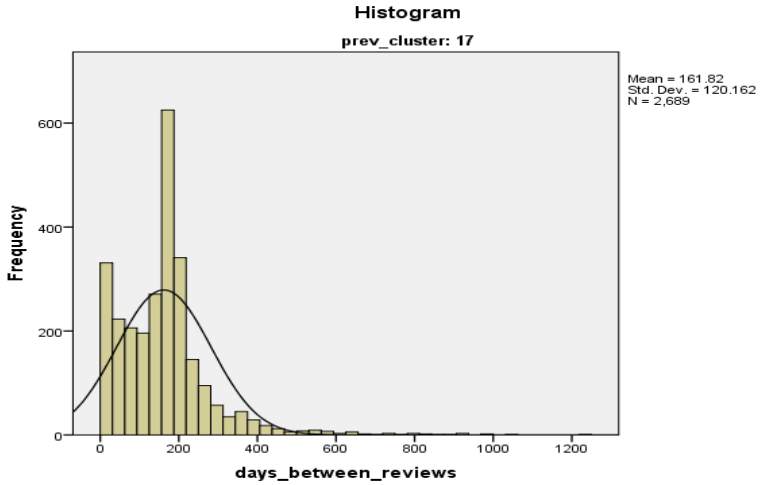

Histogram
prev_cluster: 12
Mean = 210.24
Std. Dev. = 174.984
N = 6,394
Frequency
days_between_reviews

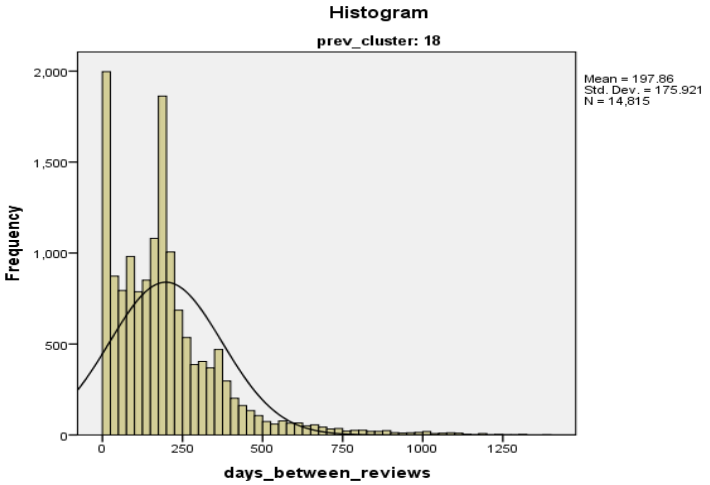

Histogram
prev_cluster: 13
Mean = 184.68
Std. Dev. = 168.282
N = 3,494
Frequency
days_between_reviews

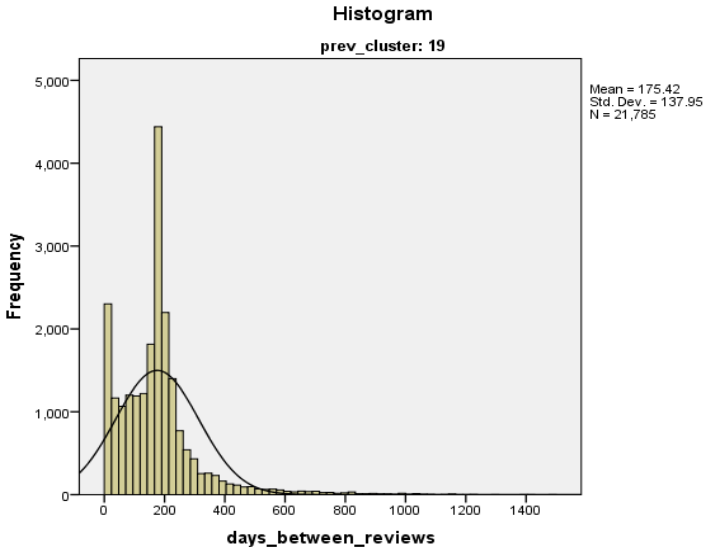

Histogram
prev_cluster: 14
Mean = 47.76
Std. Dev. = 99.076
N = 2,707
Frequency
days_between_reviews

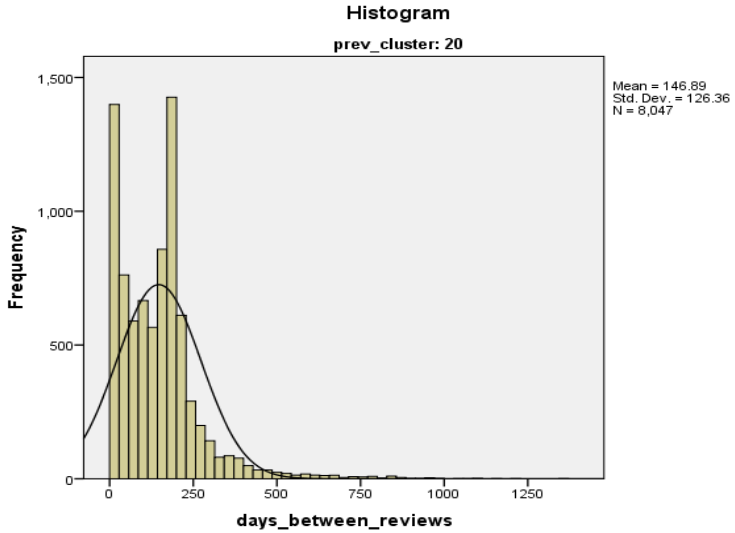

Histogram
prev_cluster: 15
Mean = 87.92
Std. Dev. = 149.837
N = 586
Frequency
days_between_reviews

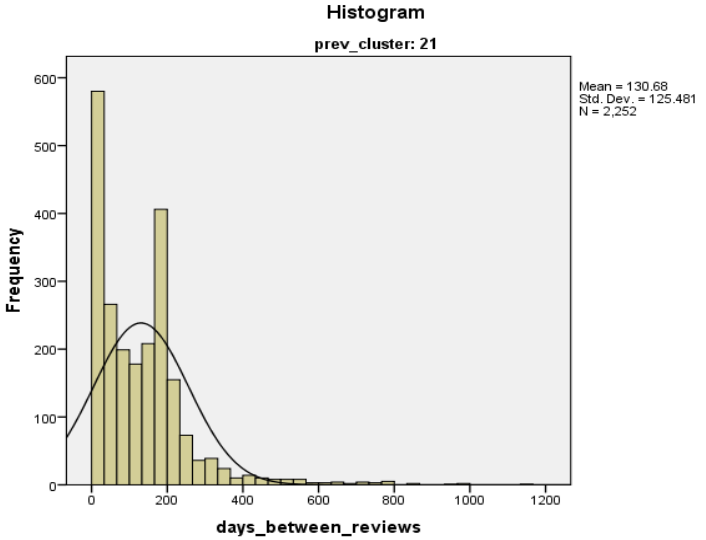

Histogram
prev_cluster: 16
Mean = 141.96
Std. Dev. = 134.2
N = 1,295
Frequency
days_between_reviews


Histogram
prev_cluster: 17
Mean = 161.82
Std. Dev. = 120.162
N = 2,689
Frequency
days_between_reviews

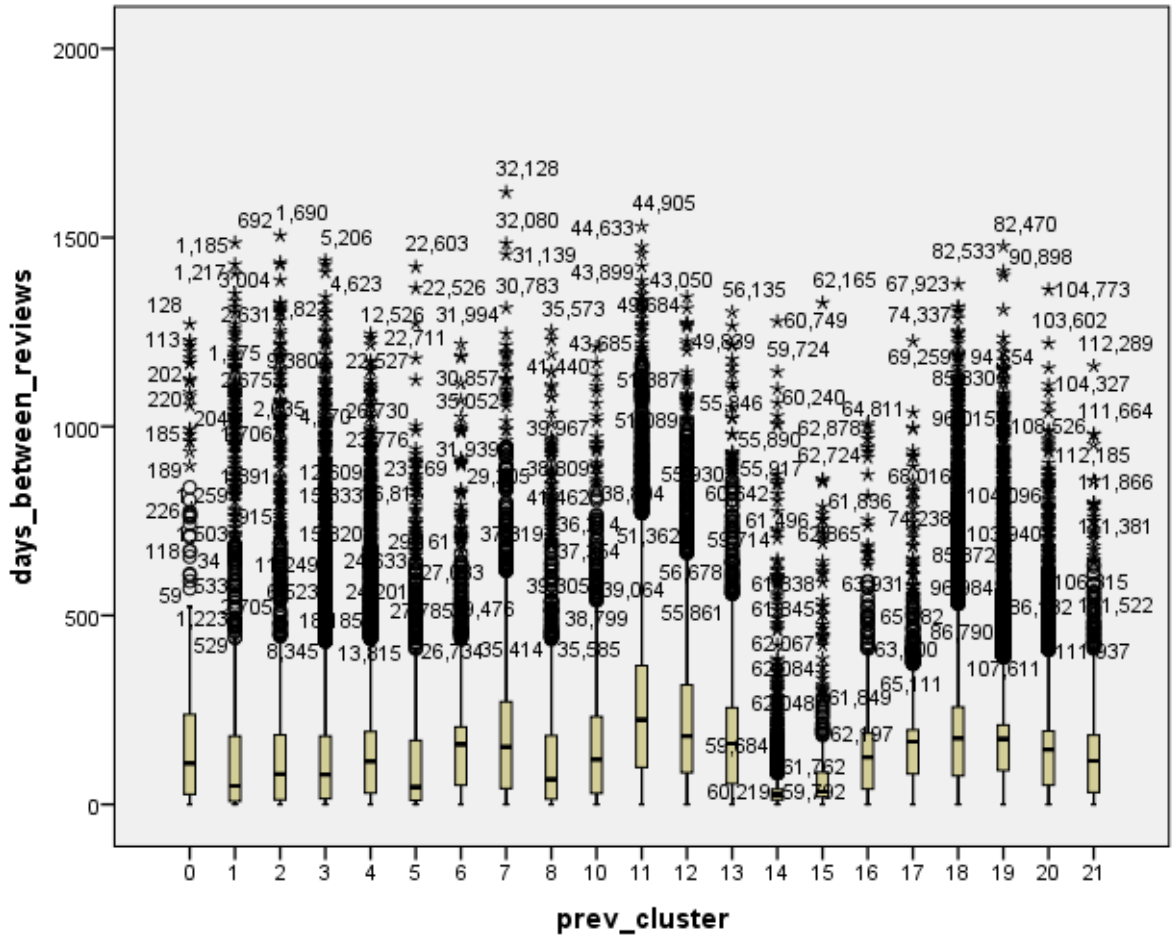

Histogram
prev_cluster: 18
Mean = 197.86
Std. Dev. = 175.921
N = 14,815
Frequency
days_between_reviews


Histogram
prev_cluster: 19
Mean = 175.42
Std. Dev. = 137.95
N = 21,785
Frequency
days_between_reviews


Histogram
prev_cluster: 20
Mean = 146.89
Std. Dev. = 126.36
N = 8,047
Frequency
days_between_reviews


Histogram
prev_cluster: 21
Mean = 130.68
Std. Dev. = 125.481
N = 2,252
Frequency
days_between_reviews

**Boxplot:**


days_between_reviews
2000
1500
1000
500
0
prev_cluster
0
1
2
3
4
5
6
7
8
10
11
12
13
14
15
16
17
18
19
20
21

## Appendix 6 – 2.2 Extraction criteria and hourly rates

The following rules where applied when extracting the data for question 2.2 part 2:

- Cluster transitions occurred since the latest cluster guidance was published in Apr 2013 and August 2014.
- Initial cluster allocations needed to meet the relevant clusters' red rules.
- Any impossible transitions as per the impossible transition file from question 2.1 were excluded.
- Activity time for any DNA appointments i.e. that were not attended was excluded.
- Face to face and non-face to face contact was included as activity time.
- It was not distinguished between different activity code values (e.g. assessment, monitoring, medical intervention) and they were summarised as activity time.
- Clusters did not contain cluster 98, 88/blank or 99 (based on the same logic used in question 2.1).

The charts for each cluster were created using the following additional rules:

- The transitions data were summarised so the showed the weeks from when a patient was initially clustered (regardless of subsequent transitions).
- The review period +25% (rounded to the nearest week if necessary) was displayed. If the review period exceeded the available data all available data was displayed.

Trust 3's data was all reported as Band 99 as their system currently does not link with ESR. Band 99 was therefore included in the analysis using Band 6 costs as these represent the mode.

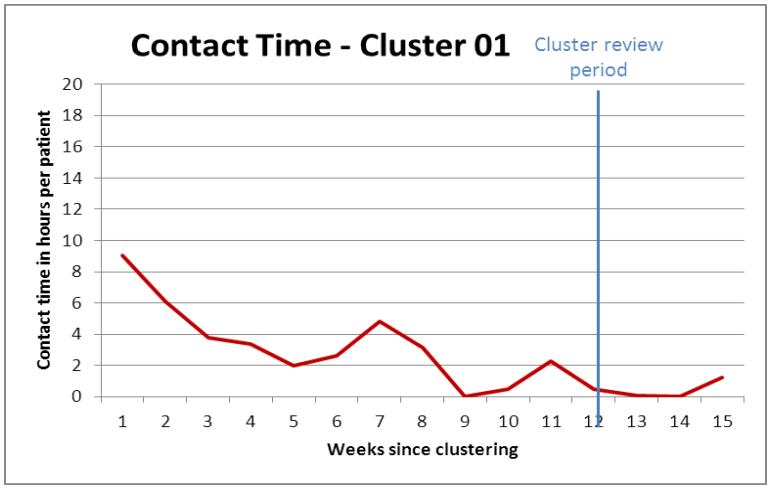
The table below shows the hourly cost per band used for the analysis.

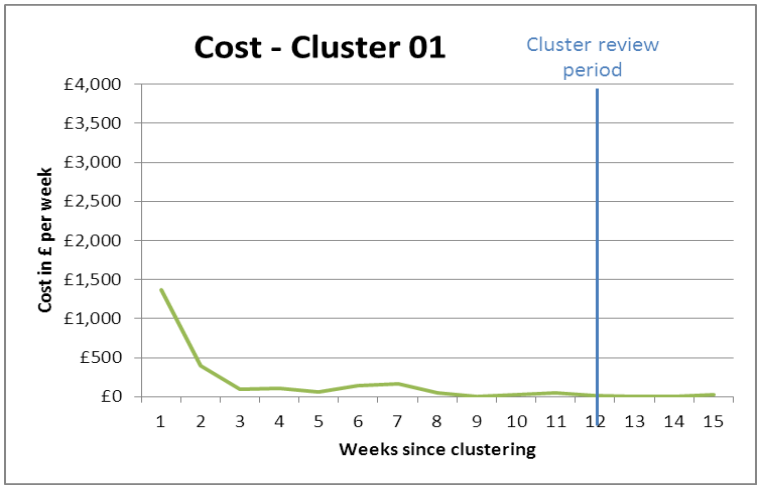
| | Annual Cost | Annual Hours (46 weeks) | Hourly Cost |
|---|---|---|---|
| Band 1 | £17,414 | 1,725 | £10.10 |
| Band 2 | £18,928 | 1,725 | £10.97 |
| Band 3 | £21,314 | 1,725 | £12.36 |
| band 4 | £24,635 | 1,725 | £14.28 |
| band 5 | £29,914 | 1,725 | £17.34 |
| Band 6 | £36,808 | 1,725 | £21.34 |
| Band 7 | £43,689 | 1,725 | £25.33 |
| Band 8a | £53,110 | 1,725 | £30.79 |

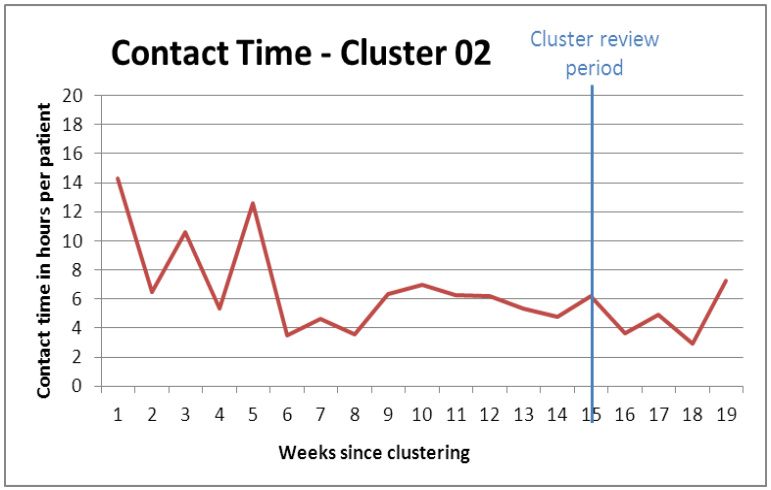
| | | | |
|---|---|---|---|
| Band 8b | £63,314 | 1,725 | £36.70 |
| Band 8c | £76,536 | 1,725 | £44.37 |
| Band 8d | £92,422 | 1,725 | £53.58 |
| Band 9 | £110,897 | 1,725 | £64.29 |
| Band 10 | £111,245 | 1,725 | £64.49 |
| Band 11 | £36,808 | 1,725 | £21.34 |
| Band 12 | £42,500 | 1,725 | £24.64 |
| Band 13 | £36,808 | 1,725 | £21.34 |
| Band 99 | £36,808 | 1,725 | £21.34 |

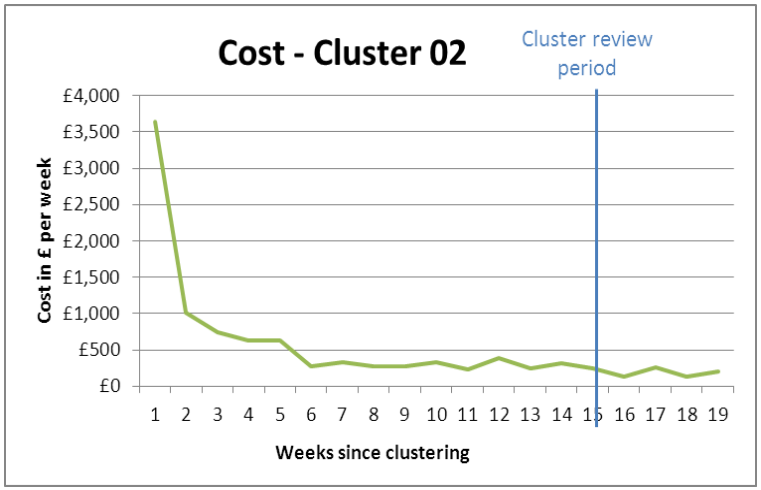
## Appendix 7 – 2.2 Contact time and cost analysis charts

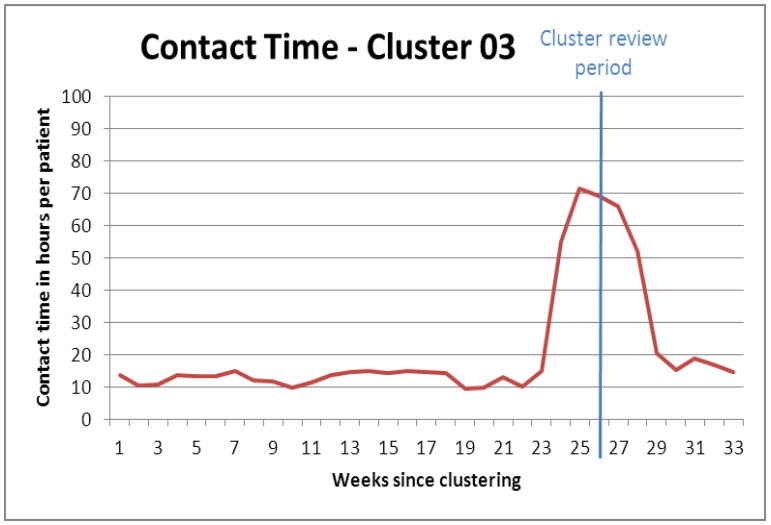
The charts below show the average hourly contact time and cost per patient per cluster.

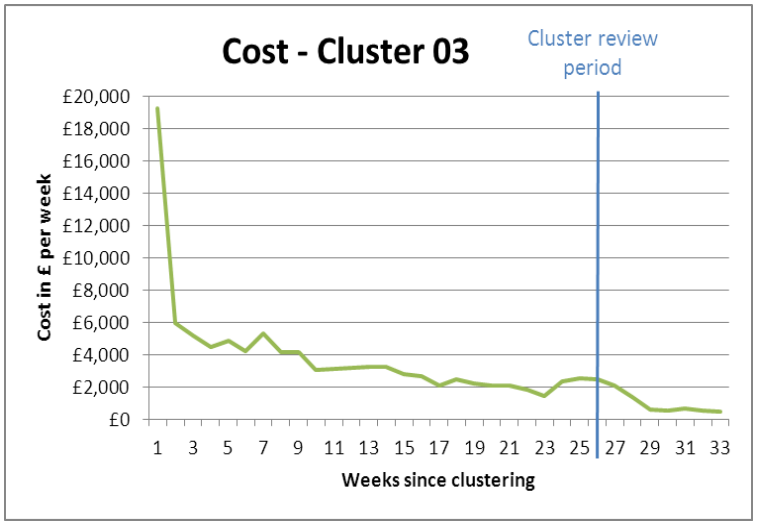


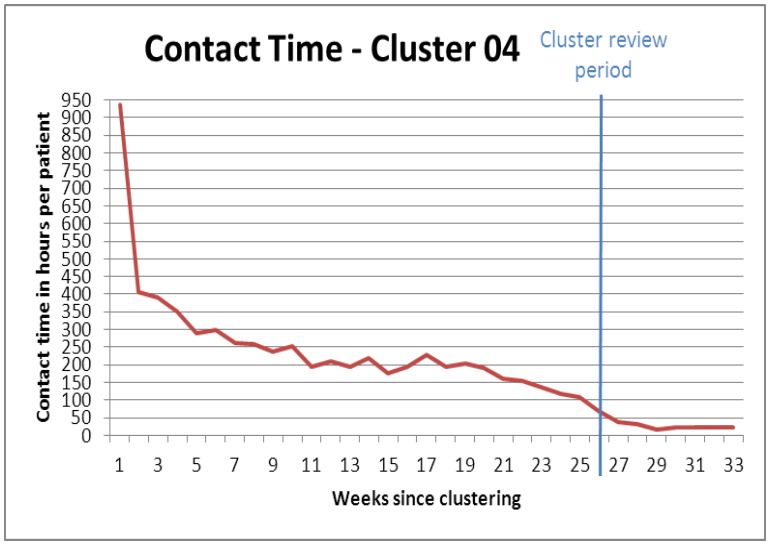



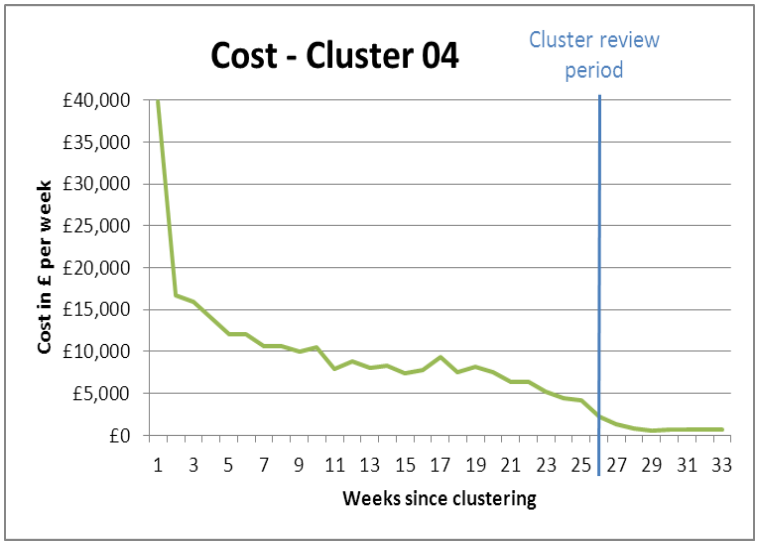



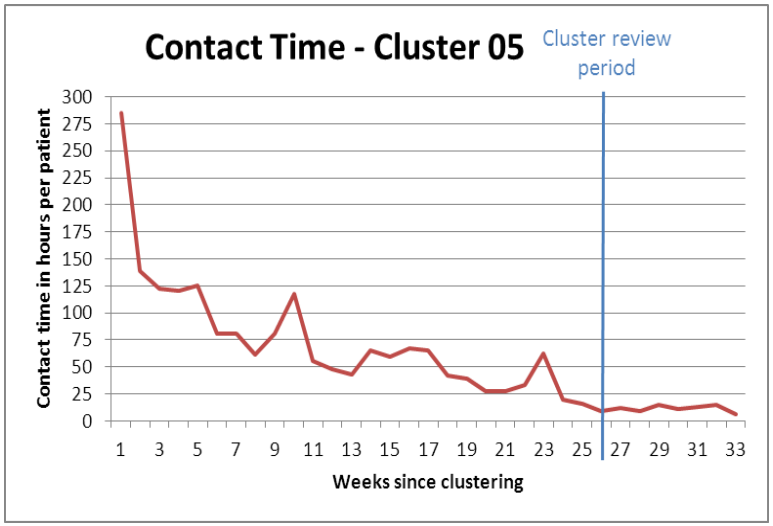



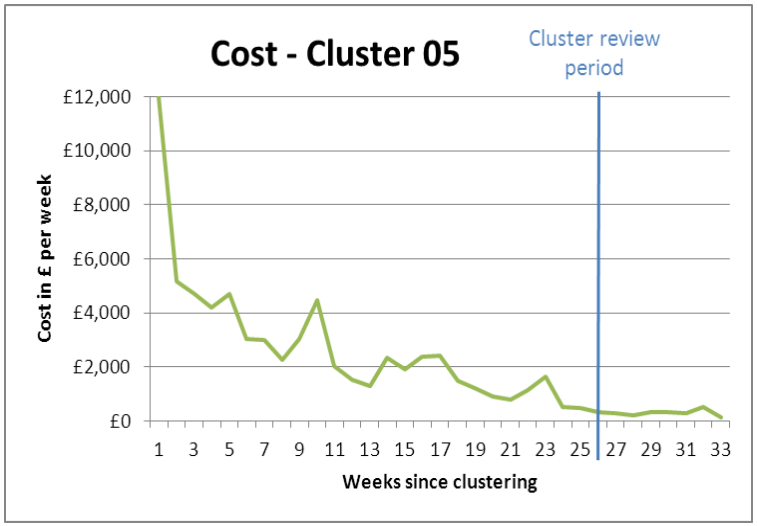

Contact Time - Cluster 03
Cluster review period
Contact time in hours per patient
100
90
80
70
60
50
40
30
20
10
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering

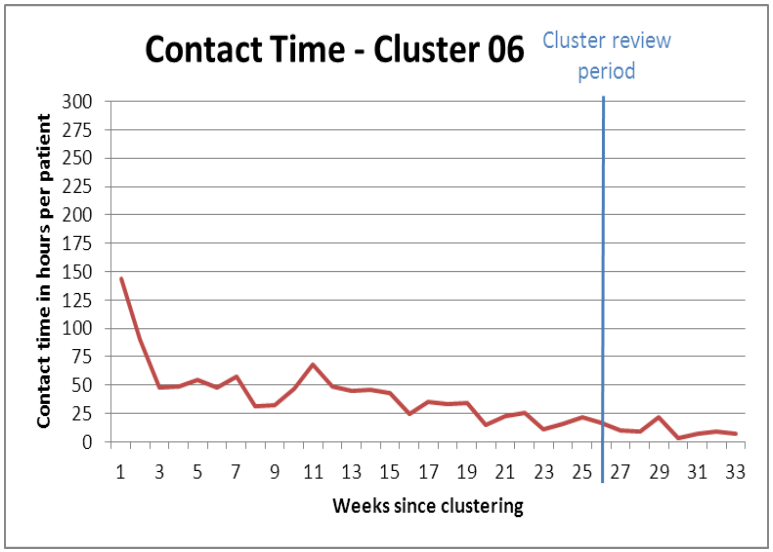

Cost - Cluster 03
Cluster review period
Cost in £ per week
£20,000
£18,000
£16,000
£14,000
£12,000
£10,000
£8,000
£6,000
£4,000
£2,000
£0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering

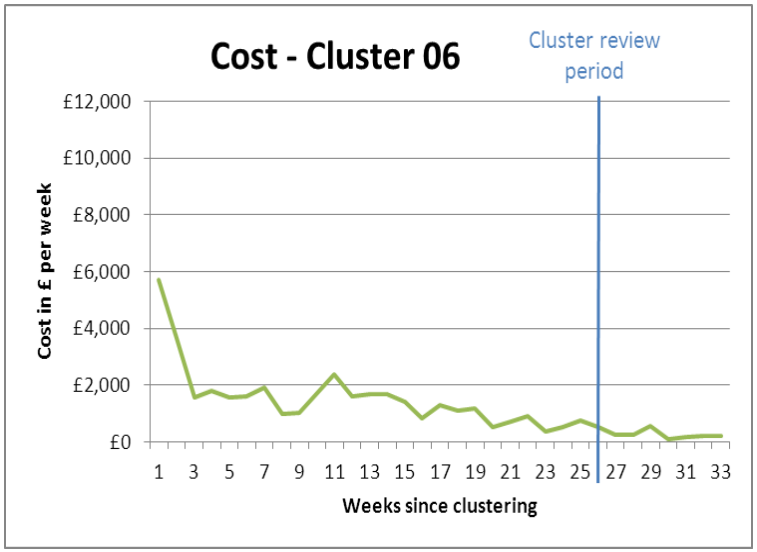

Contact Time - Cluster 04
Cluster review period
Contact time in hours per patient
950
900
850
800
750
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering

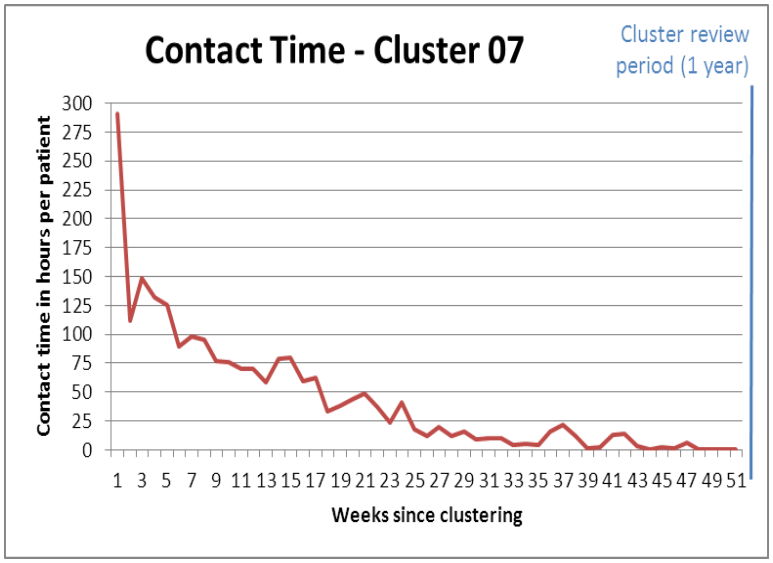

Cost - Cluster 04
Cluster review period
Cost in £ per week
£40,000
£35,000
£30,000
£25,000
£20,000
£15,000
£10,000
£5,000
£0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering

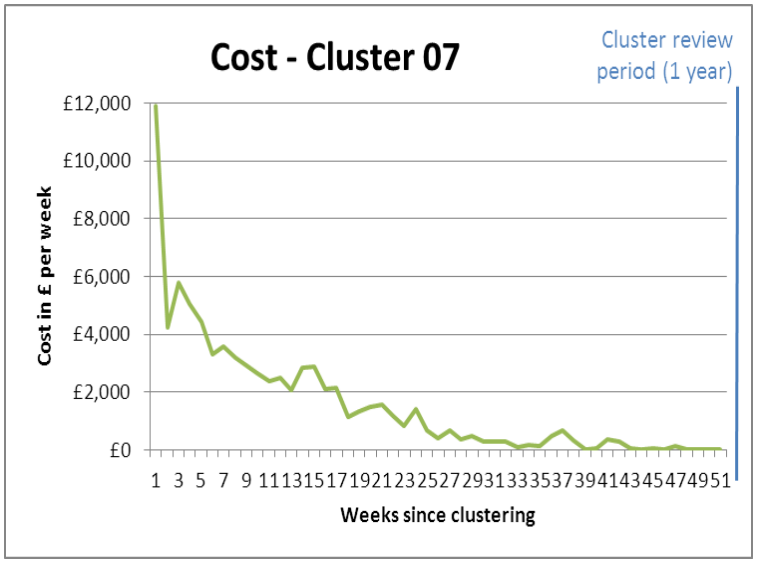

Contact Time - Cluster 05
Cluster review period
Contact time in hours per patient
300
275
250
225
200
175
150
125
100
75
50
25
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering

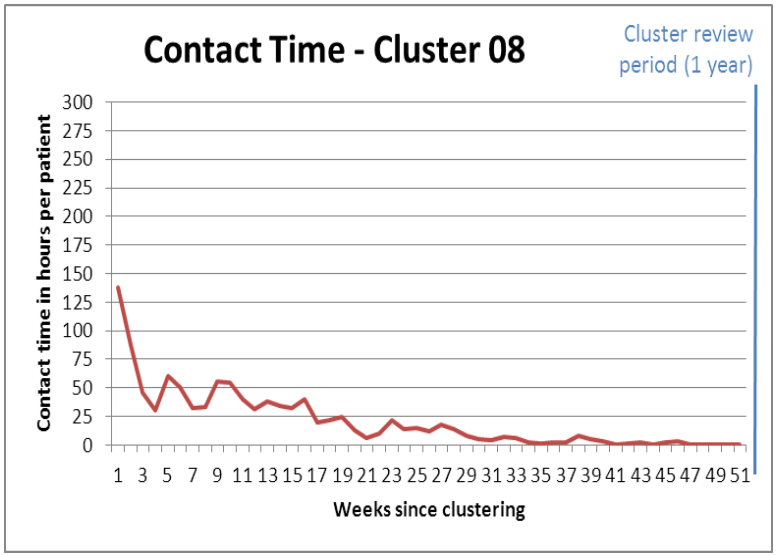

Cost - Cluster 05
Cluster review period
Cost in £ per week
£12,000
£10,000
£8,000
£6,000
£4,000
£2,000
£0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering

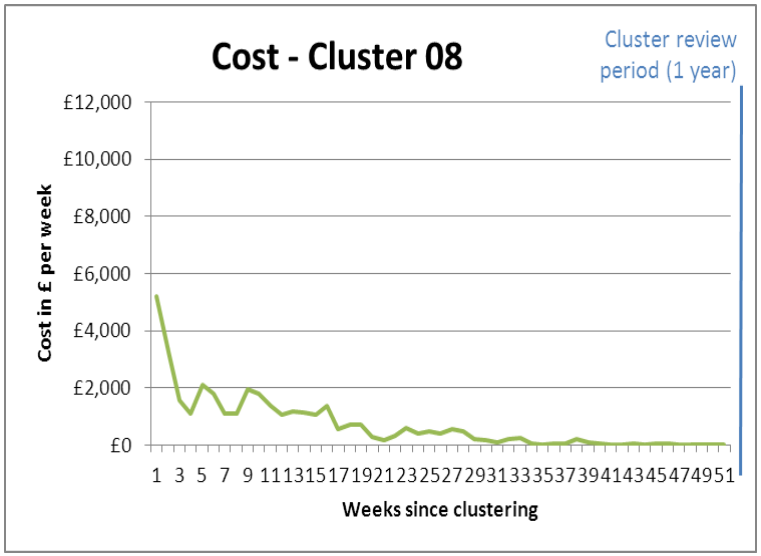

Contact Time - Cluster 06
Cluster review period
Contact time in hours per patient
300
275
250
225
200
175
150
125
100
75
50
25
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering

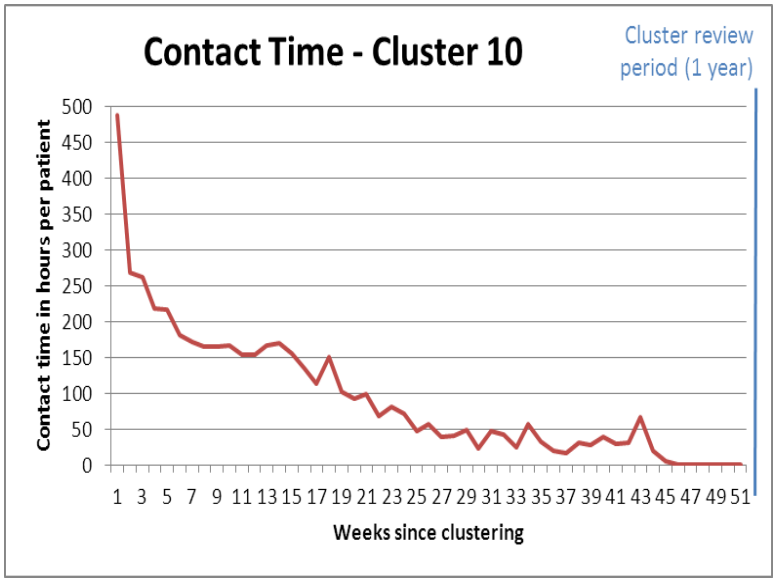

Cost - Cluster 06
Cluster review period
Cost in £ per week
£12,000
£10,000
£8,000
£6,000
£4,000
£2,000
£0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering

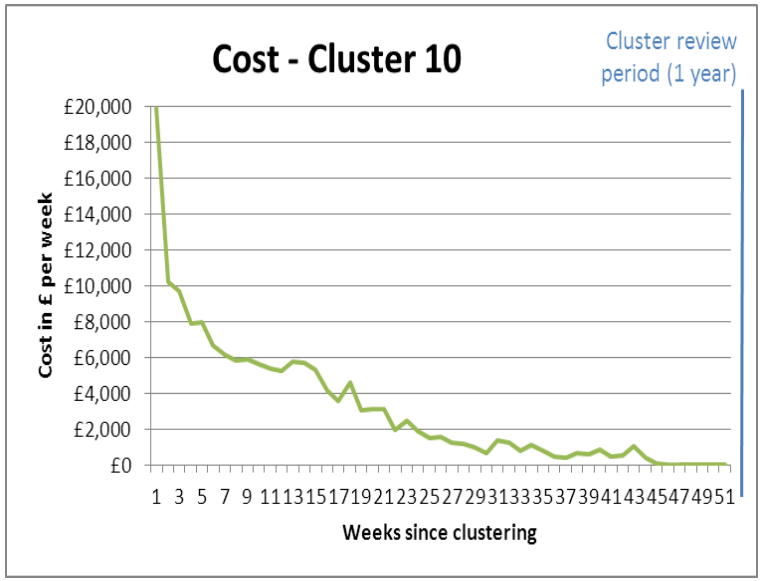

Contact Time - Cluster 07
Cluster review period (1 year)
Contact time in hours per patient
300
275
250
225
200
175
150
125
100
75
50
25
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
Weeks since clustering

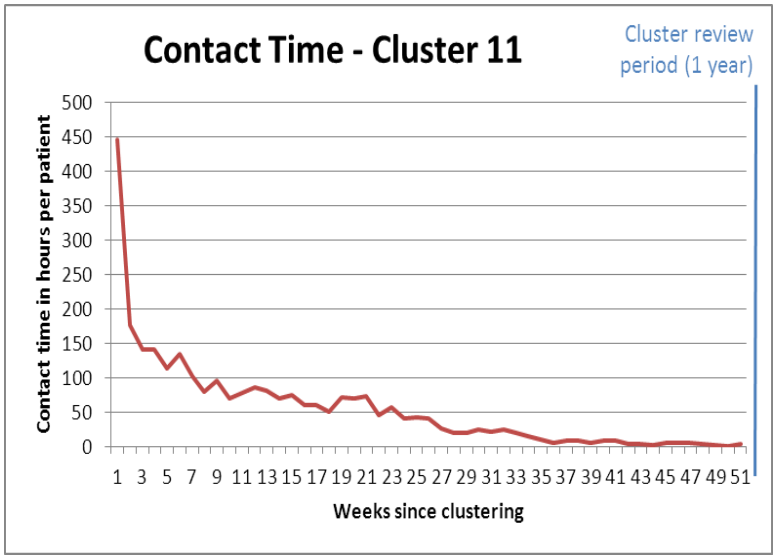

Cost - Cluster 07
Cluster review period (1 year)
Cost in £ per week
£12,000
£10,000
£8,000
£6,000
£4,000
£2,000
£0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
Weeks since clustering

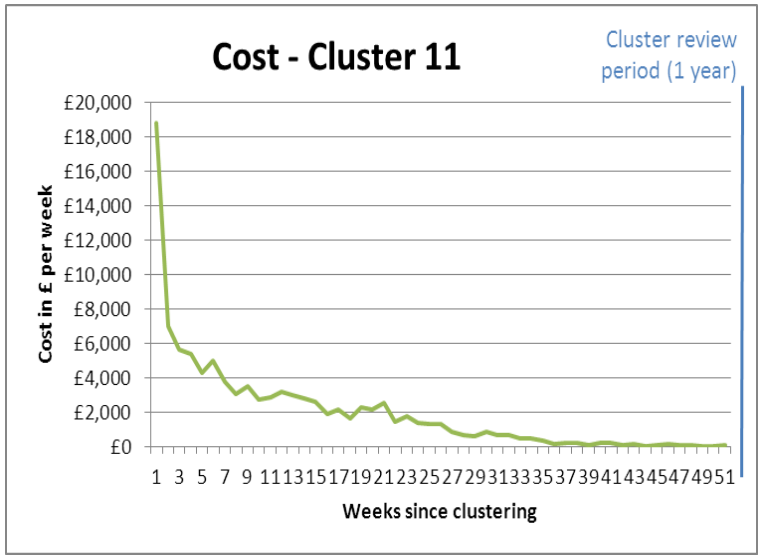

Contact Time - Cluster 08
Cluster review period (1 year)
Contact time in hours per patient
300
275
250
225
200
175
150
125
100
75
50
25
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
Weeks since clustering

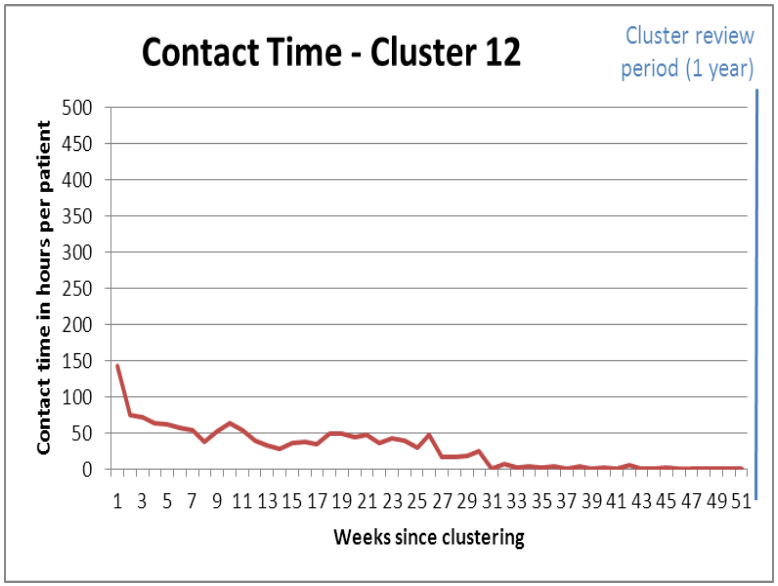

Cost - Cluster 08
Cluster review period (1 year)
Cost in £ per week
£12,000
£10,000
£8,000
£6,000
£4,000
£2,000
£0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
Weeks since clustering

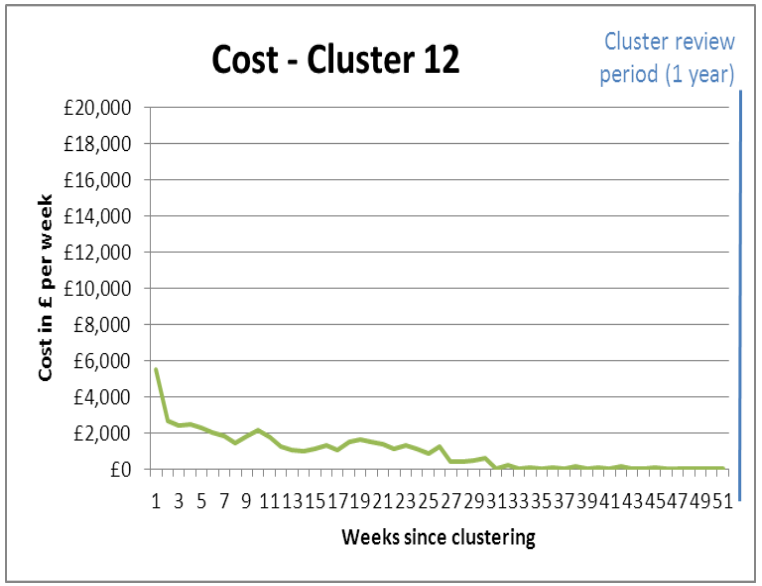

Contact Time - Cluster 10
Cluster review period (1 year)
Contact time in hours per patient
500
450
400
350
300
250
200
150
100
50
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
Weeks since clustering

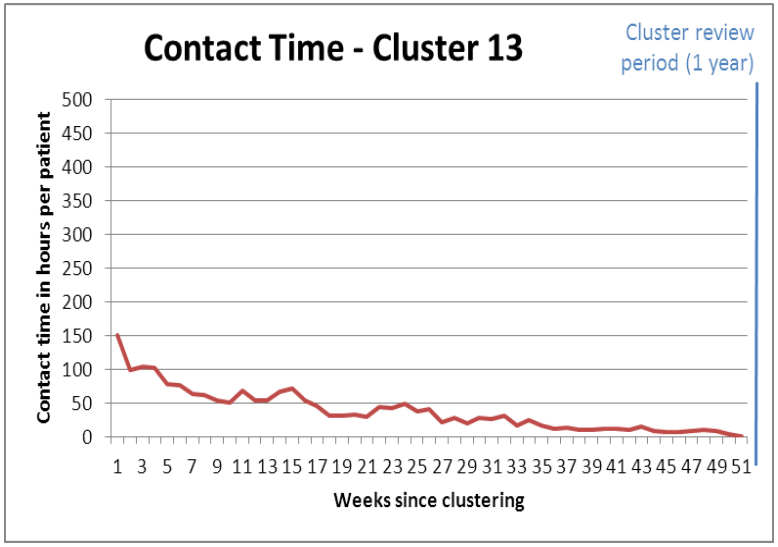

Cost - Cluster 10
Cluster review period (1 year)
Cost in £ per week
£20,000
£18,000
£16,000
£14,000
£12,000
£10,000
£8,000
£6,000
£4,000
£2,000
£0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
Weeks since clustering

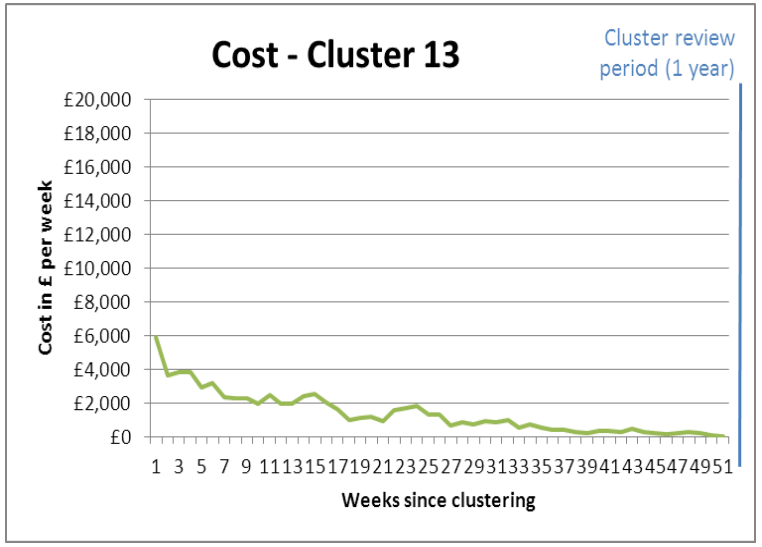

Contact Time - Cluster 11
Cluster review period (1 year)
Contact time in hours per patient
500
450
400
350
300
250
200
150
100
50
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
Weeks since clustering

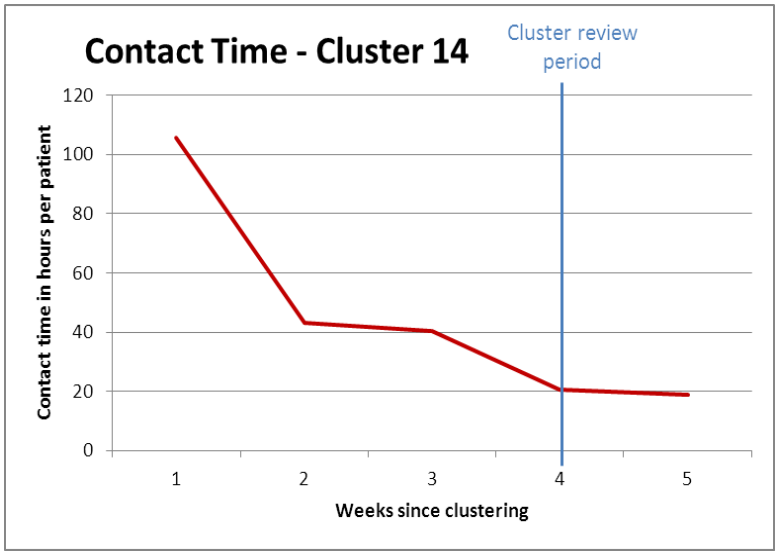

Cost - Cluster 11
Cluster review period (1 year)
Cost in £ per week
£20,000
£18,000
£16,000
£14,000
£12,000
£10,000
£8,000
£6,000
£4,000
£2,000
£0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
Weeks since clustering

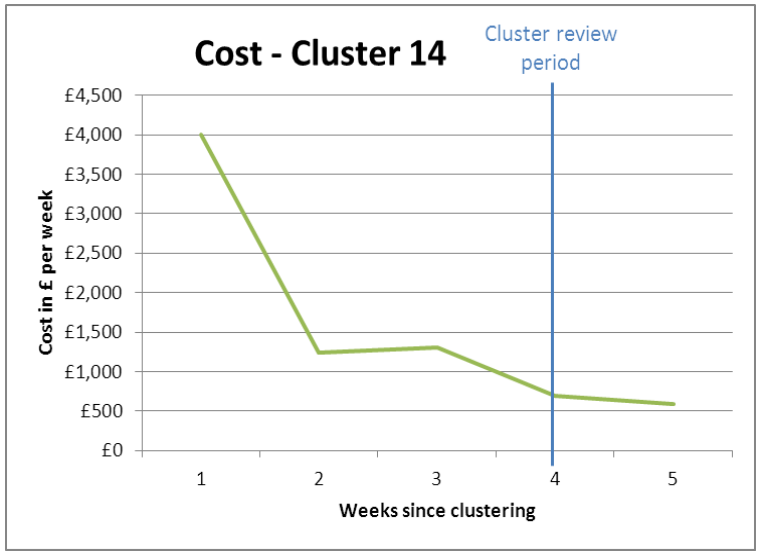

Contact Time - Cluster 12
Cluster review period (1 year)
Contact time in hours per patient
500
450
400
350
300
250
200
150
100
50
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
Weeks since clustering

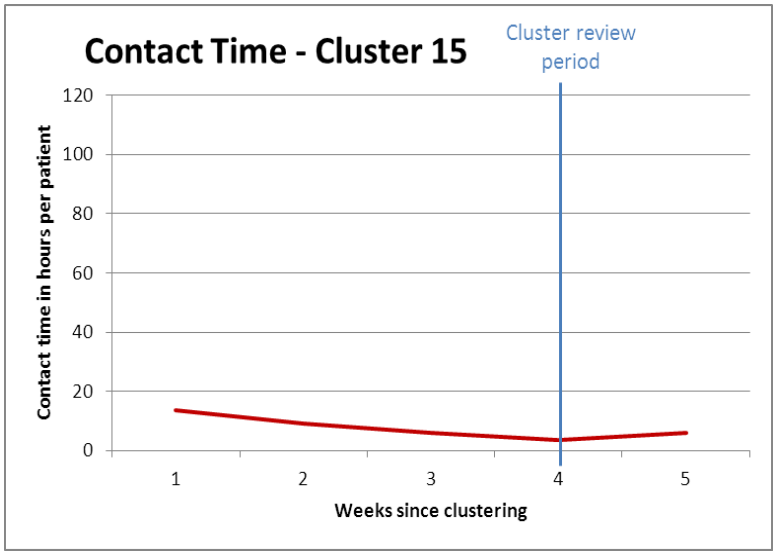

Cost - Cluster 12
Cluster review period (1 year)
Cost in £ per week
£20,000
£18,000
£16,000
£14,000
£12,000
£10,000
£8,000
£6,000
£4,000
£2,000
£0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
Weeks since clustering

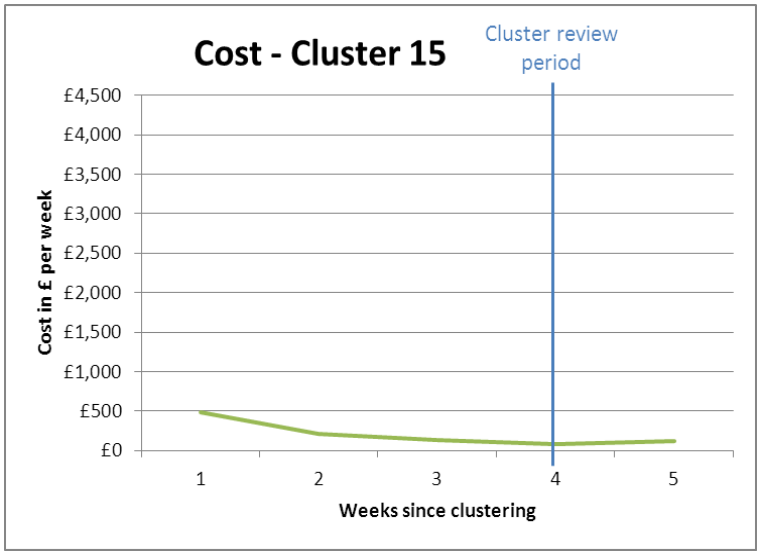

Contact Time - Cluster 13
Cluster review period (1 year)
Contact time in hours per patient
500
450
400
350
300
250
200
150
100
50
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
Weeks since clustering

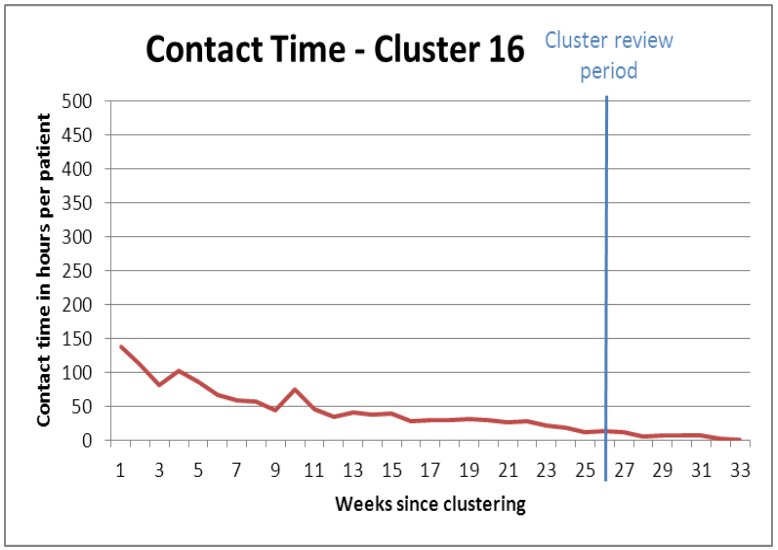

Cost - Cluster 13
Cluster review period (1 year)
Cost in £ per week
£20,000
£18,000
£16,000
£14,000
£12,000
£10,000
£8,000
£6,000
£4,000
£2,000
£0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
Weeks since clustering

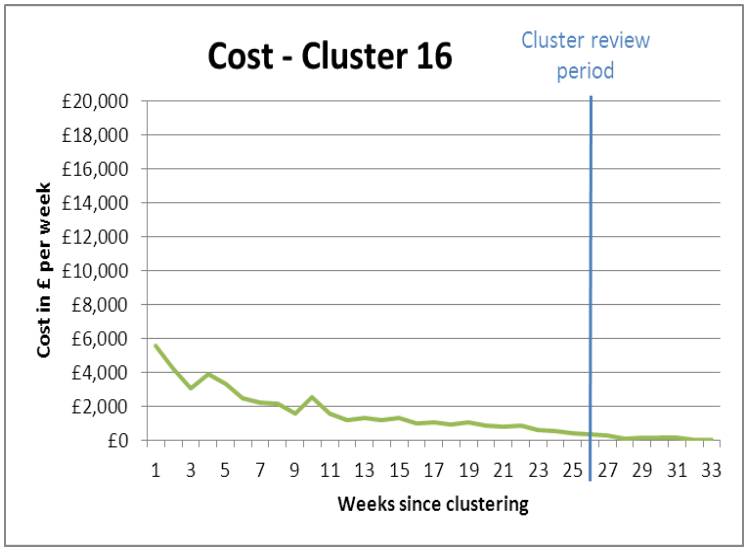

Contact Time - Cluster 14
Cluster review period
Contact time in hours per patient
120
100
80
60
40
20
0
1
2
3
4
5
Weeks since clustering

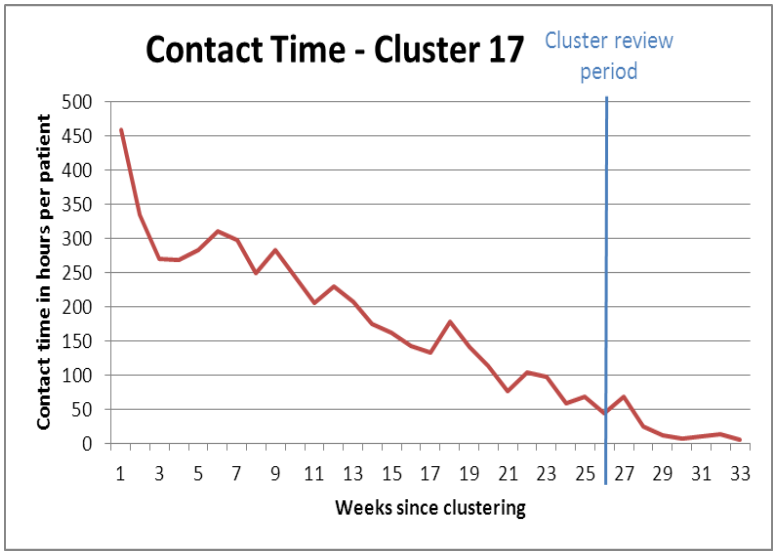

Cost - Cluster 14
Cluster review period
Cost in £ per week
£4,500
£4,000
£3,500
£3,000
£2,500
£2,000
£1,500
£1,000
£500
£0
1
2
3
4
5
Weeks since clustering

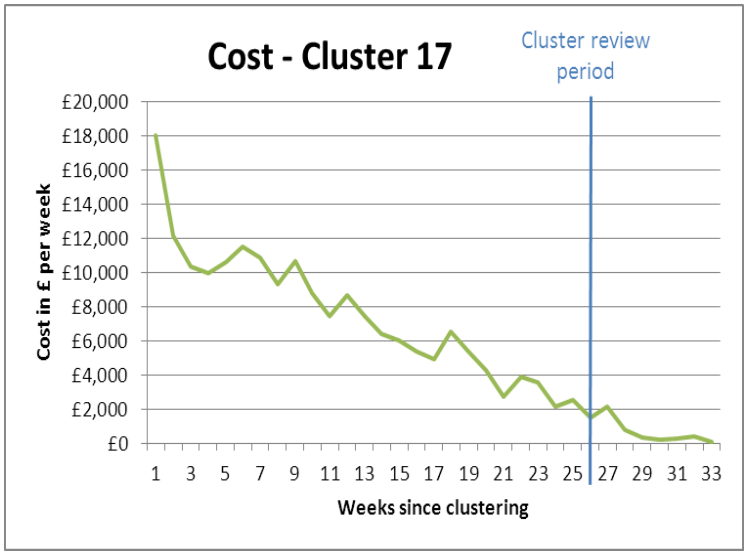

Contact Time - Cluster 15
Cluster review period
Contact time in hours per patient
120
100
80
60
40
20
0
1
2
3
4
5
Weeks since clustering

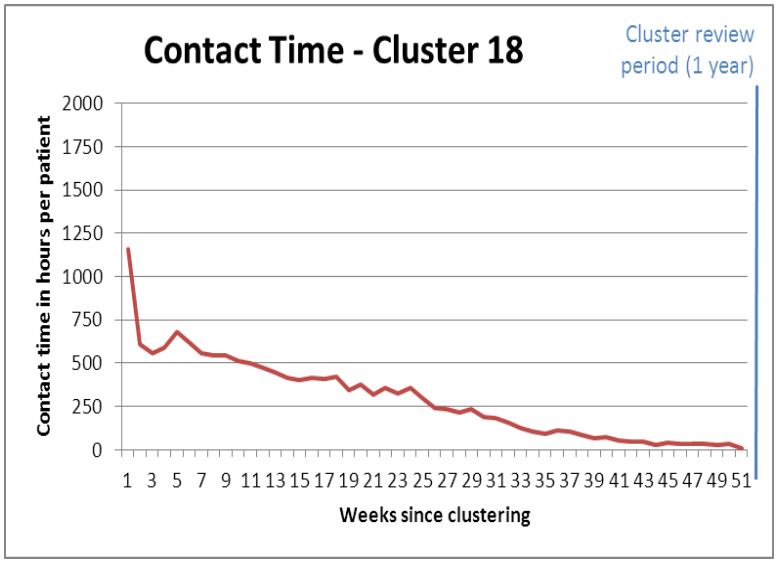

Cost - Cluster 15
Cluster review period
Cost in £ per week
£4,500
£4,000
£3,500
£3,000
£2,500
£2,000
£1,500
£1,000
£500
£0
1
2
3
4
5
Weeks since clustering

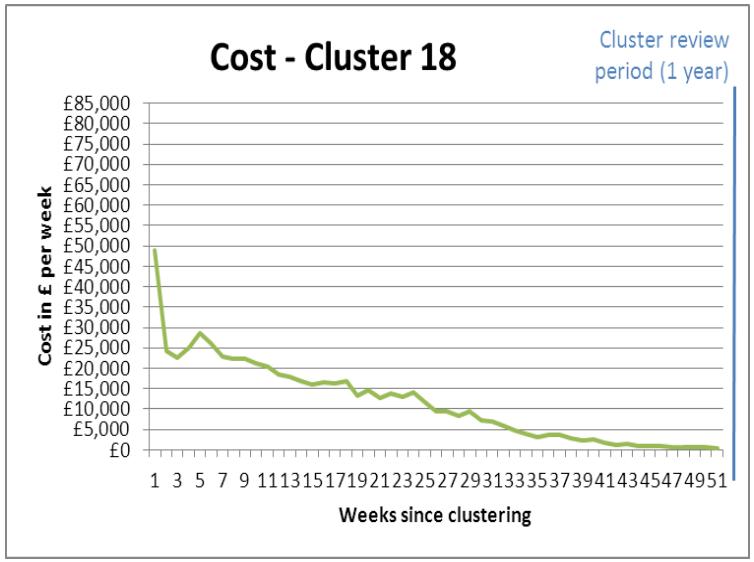

Contact Time - Cluster 16
Cluster review period
Contact time in hours per patient
500
450
400
350
300
250
200
150
100
50
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering

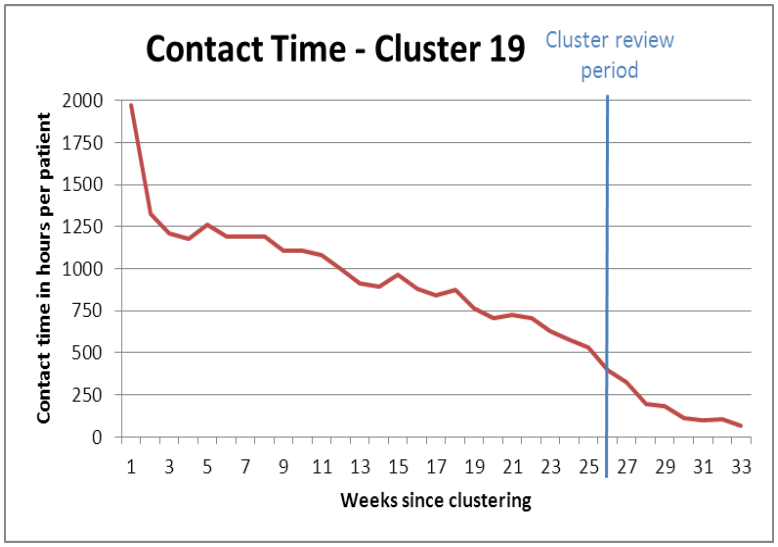

Cost - Cluster 16
Cluster review period
Cost in £ per week
£20,000
£18,000
£16,000
£14,000
£12,000
£10,000
£8,000
£6,000
£4,000
£2,000
£0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering

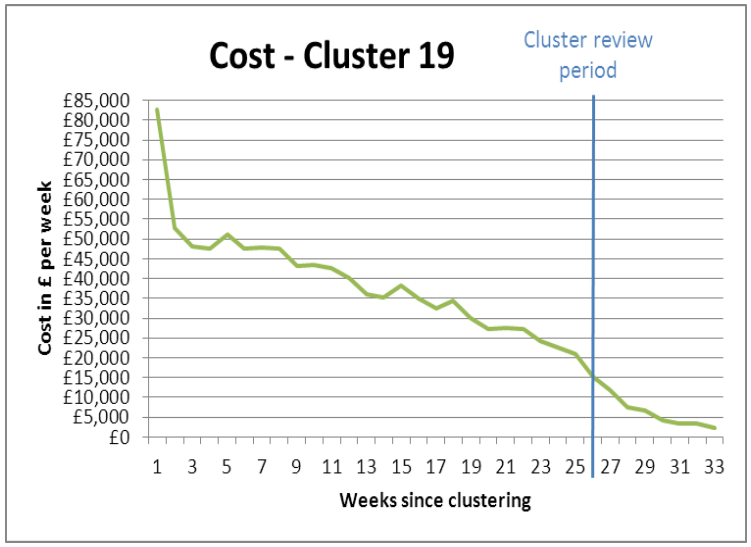

Contact Time - Cluster 17
Cluster review period
Contact time in hours per patient
500
450
400
350
300
250
200
150
100
50
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering

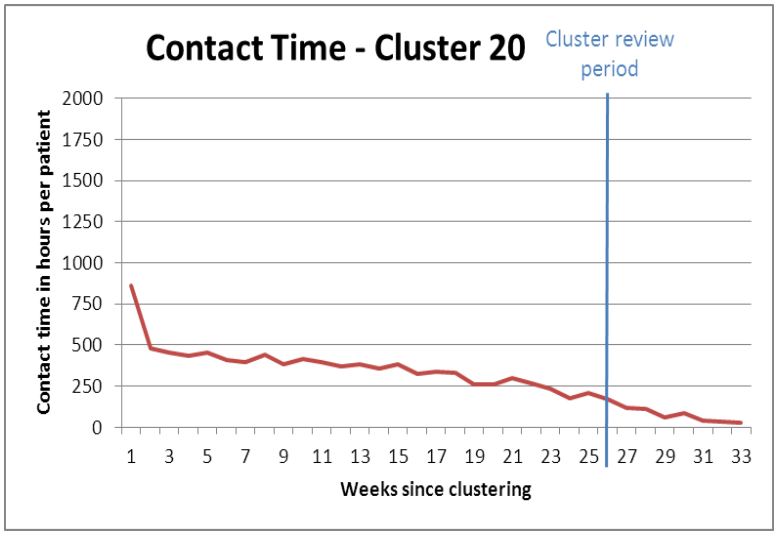

Cost - Cluster 17
Cluster review period
Cost in £ per week
£20,000
£18,000
£16,000
£14,000
£12,000
£10,000
£8,000
£6,000
£4,000
£2,000
£0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering

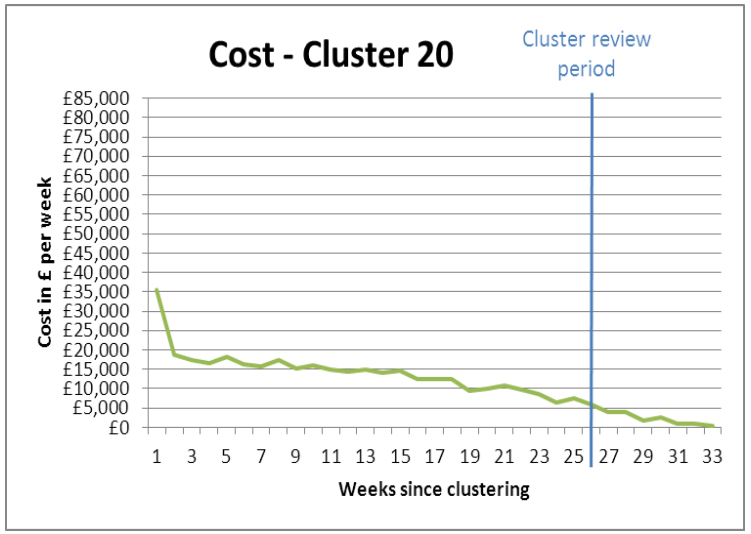

Contact Time - Cluster 18
Cluster review period (1 year)
Contact time in hours per patient
2000
1750
1500
1250
1000
750
500
250
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
Weeks since clustering

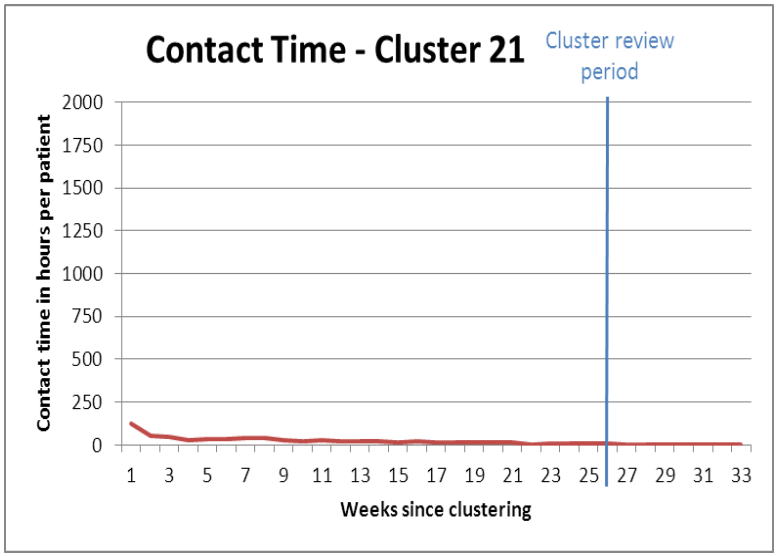

Cost - Cluster 18
Cluster review period (1 year)
Cost in £ per week
£85,000
£80,000
£75,000
£70,000
£65,000
£60,000
£55,000
£50,000
£45,000
£40,000
£35,000
£30,000
£25,000
£20,000
£15,000
£10,000
£5,000
£0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51
Weeks since clustering

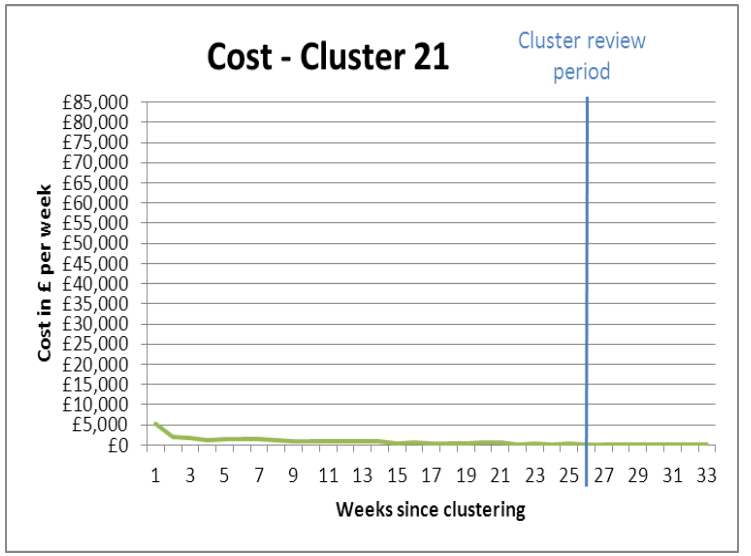

Contact Time - Cluster 19
Cluster review period
Contact time in hours per patient
2000
1750
1500
1250
1000
750
500
250
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering

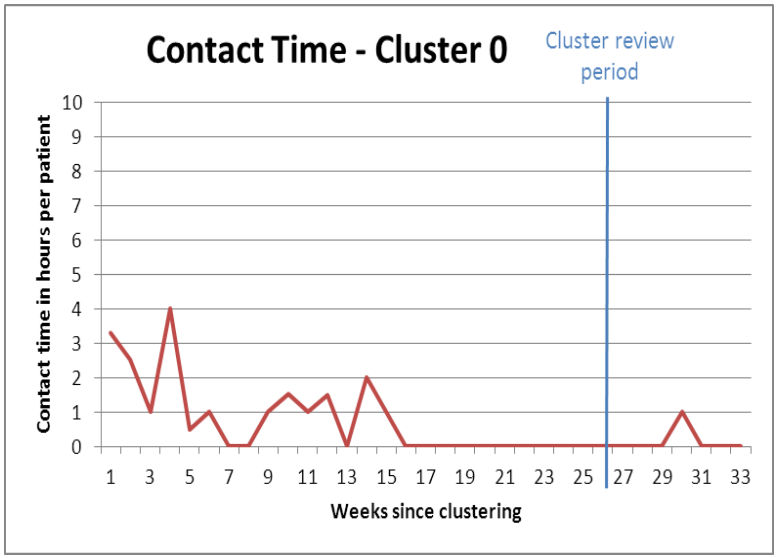

Cost - Cluster 19
Cluster review period
Cost in £ per week
£85,000
£80,000
£75,000
£70,000
£65,000
£60,000
£55,000
£50,000
£45,000
£40,000
£35,000
£30,000
£25,000
£20,000
£15,000
£10,000
£5,000
£0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering

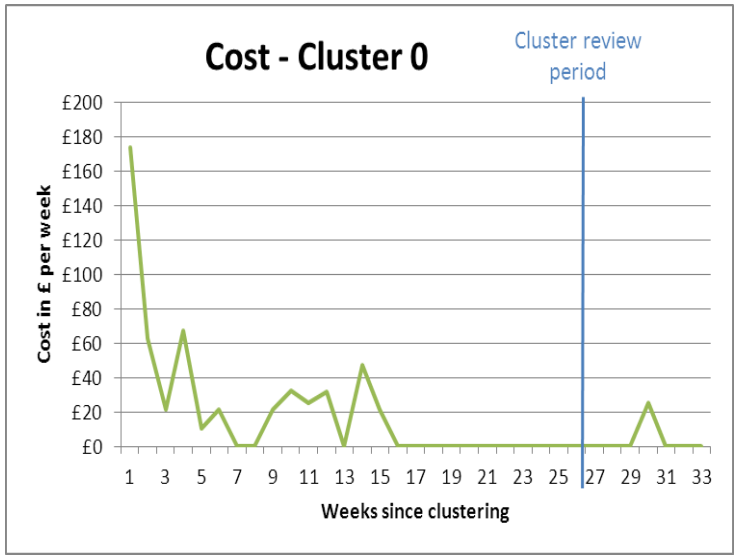

Contact Time - Cluster 20
Cluster review period
Contact time in hours per patient
2000
1750
1500
1250
1000
750
500
250
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering


Cost - Cluster 20
Cluster review period
Cost in £ per week
£85,000
£80,000
£75,000
£70,000
£65,000
£60,000
£55,000
£50,000
£45,000
£40,000
£35,000
£30,000
£25,000
£20,000
£15,000
£10,000
£5,000
£0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering


Contact Time - Cluster 21
Cluster review period
Contact time in hours per patient
2000
1750
1500
1250
1000
750
500
250
0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering


Cost - Cluster 21
Cluster review period
Cost in £ per week
£85,000
£80,000
£75,000
£70,000
£65,000
£60,000
£55,000
£50,000
£45,000
£40,000
£35,000
£30,000
£25,000
£20,000
£15,000
£10,000
£5,000
£0
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering


Contact Time - Cluster 0
Cluster review period
Contact time in hours per patient
0
1
2
3
4
5
6
7
8
9
10
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering


Cost - Cluster 0
Cluster review period
Cost in £ per week
£0
£20
£40
£60
£80
£100
£120
£140
£160
£180
£200
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33
Weeks since clustering

## Appendix 8 – Transition criteria analysis

The following charts show the additional analysis that was undertaken in order to reach the conclusions for question 2.3.

### Overview of clusters meeting care transition criteria:

| Transitions meeting care transition criteria (red rule & any measurable criteria) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Previous cluster | Total number of transitions | Number of step up transitions | Number step ups meeting criteria | % of step ups meeting criteria | Number of step down transitions | Number step downs meeting criteria | % of step downs meeting criteria | Number of discharges | Number of discharges meeting criteria | % of discharges meeting criteria |
| 1 | 480 | 283 | 221 | 78% | n/a | n/a | n/a | 10 | 10 | 100% |
| 2 | 777 | 380 | 312 | 82% | n/a | n/a | n/a | 22 | 16 | 73% |
| 3 | 3,811 | 1,158 | 850 | 73% | 145 | 90 | 62% | 163 | 91 | 56% |
| 4 | 6,419 | 1,146 | 634 | 55% | 1032 | 781 | 76% | 226 | 101 | 45% |
| 5 | 3,430 | 366 | 220 | 60% | 321 | 266 | 83% | 135 | 55 | 41% |
| 6 | 2,222 | 122 | 70 | 57% | 257 | 213 | 83% | 53 | 23 | 43% |
| 7 | 3,732 | 235 | 108 | 46% | n/a | n/a | n/a | 121 | 63 | 52% |
| 8 | 2,463 | 25 | 22 | 88% | 257 | 193 | 75% | 53 | 20 | 38% |
| 10 | 3,141 | 216 | 189 | 88% | 453 | 346 | 76% | 53 | 36 | 68% |
| 11 | 5,491 | 1,222 | 755 | 62% | n/a | n/a | n/a | 57 | 50 | 88% |
| 12 | 5,744 | 876 | 566 | 65% | 581 | 479 | 82% | 82 | 20 | 24% |
| 13 | 3,181 | 387 | 317 | 82% | 749 | 488 | 65% | 46 | 26 | 57% |
| 14 | 2,428 | n/a | n/a | n/a | 1270 | 936 | 74% | 24 | 17 | 71% |
| 15 | 529 | n/a | n/a | n/a | 230 | 153 | 67% | 6 | 5 | 83% |
| 16 | 1,139 | 69 | 56 | 81% | 193 | 50 | 26% | 10 | 2 | 20% |
| 17 | 2,546 | 230 | 187 | 81% | 289 | 69 | 24% | 10 | 6 | 60% |
| 18 | 9,788 | 3,005 | 2,924 | 97% | n/a | n/a | n/a | 224 | 202 | 90% |
| 19 | 16,095 | 2,052 | 1,892 | 92% | n/a | n/a | n/a | 299 | 251 | 84% |
| 20 | 5,427 | 398 | 396 | 99% | 458 | 427 | 93% | 110 | 90 | 82% |
| 21 | 1,246 | n/a | n/a | n/a | 181 | 160 | 88% | 21 | n/a | n/a |
| **Total** | **80,089** | **11,940** | **9,532** | **80%** | **6416** | **4651** | **72%** | **1725** | **1084** | **64%** |

## Cluster matrix - % meeting care transition criteria:

**Percentage possible & likely step up/step down/discharge transitions**

| Previous Cluster | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | Discharge |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | - | 64% | 70% | 83% | 83% | 87% | - | 79% | 56% | - | - | - | - | - | - | - | 93% | - | - | - | 100% |
| 2 | - | - | 80% | 79% | 85% | 87% | - | 78% | 92% | - | - | - | - | - | - | - | 96% | - | - | - | 73% |
| 3 | - | 62% | - | 79% | 60% | 76% | - | 51% | 88% | - | - | - | - | - | - | - | - | - | - | - | 56% |
| 4 | - | - | 64% | - | 47% | 70% | 89% | 52% | 85% | - | - | - | - | - | - | - | - | - | - | - | 45% |
| 5 | - | - | - | - | - | 54% | 83% | 58% | 83% | - | - | - | 75% | 80% | - | - | - | - | - | - | 41% |
| 6 | - | - | - | - | - | - | 83% | 41% | 87% | - | - | - | 94% | 67% | - | - | - | - | - | - | 43% |
| 7 | - | - | - | - | - | - | - | 43% | 88% | - | - | - | - | - | - | - | - | - | - | - | 52% |
| 8 | - | - | - | - | - | 51% | 92% | - | - | - | 35% | 59% | 88% | 100% | - | 14% | - | - | - | - | 38% |
| 10 | - | - | - | - | - | - | - | - | - | 74% | 81% | 85% | 87% | 91% | 88% | 95% | 100% | - | - | - | 68% |
| 11 | - | - | - | - | - | - | 77% | - | - | - | 60% | 56% | 76% | 69% | 61% | 62% | - | - | - | - | 88% |
| 12 | - | - | - | - | - | - | - | 32% | - | 82% | - | 55% | 79% | 77% | 82% | 84% | - | - | - | - | 24% |
| 13 | - | - |  | - | - | - | - | 52% | - | 65% | 68% | - | 83% | 83% | 74% | 89% | - | 100% | - | - | 57% |
| 14 | - | - | 60% | 57% | 44% | 31% | - | 28% | 84% | - | 78% | 62% | - | - | 75% | 92% | 88% | 100% | - | - | 71% |
| 15 | - | - | 46% | 75% | 22% | 56% | 100% | 40% | 89% | - | 76% | 56% | - | - | 80% | 92% | 100% | 100% | - | - | 83% |
| 16 | - | - | - | - | - | - | - | - | - | 43% | 22% | 25% | 81% | 100% | - | 21% | - | 0% | - | - | 20% |
| 17 | - | - | - | - | - | - | - | 38% | - | 38% | 26% | 12% | 90% | 100% | 78% | - | - | 0% | - | - | 60% |
| 18 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 98% | 85% | 98% | 90% |
| 19 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 91% | 99% | 84% |
| 20 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 93% | - | 99% | 82% |
| 21 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | none | 88% | - | 100% |

% of total step up/step down or discharge care transition criteria <70% for the previous cluster

## Analysis Step up transition criteria:

| Step up Care transition criteria <70% | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Type of transition | Cluster before transition | New cluster | Number of transitions | Care transition criteria met | % Care transition criteria met | Relevant items for conditions in order | Condition 1 ok * | % ok | Condition 2 ok * | % ok |
| up | 4 | 5 | 623 | 293 | 47% | 6, 7/8 | 600 | 96% | 301 | 48% |
| up | 4 | 8 | 168 | 87 | 52% | 7/8, B | 146 | 87% | 88 | 52% |
| up | 5 | 6 | 157 | 84 | 54% | 7/8, 13 | 134 | 85% | 86 | 55% |
| up | 5 | 8 | 143 | 83 | 58% | 7/8, B | 128 | 90% | 88 | 62% |
| up | 6 | 8 | 80 | 33 | 41% | 7/8, B | 72 | 90% | 34 | 43% |
| up | 6 | 15 | 3 | 2 | 67% | 6, 7/8 | 2 | 67% | 2 | 67% |
| up | 7 | 8 | 218 | 93 | 43% | 7/8, B | 169 | 78% | 108 | 50% |
| up | 11 | 12 | 746 | 445 | 60% | 6 | 445 | 60% | - | - |
| up | 11 | 13 | 187 | 105 | 56% | 6 | 105 | 56% | - | - |
| up | 11 | 15 | 16 | 11 | 69% | 6, 7/8 | 12 | 75% | 14 | 88% |
| up | 11 | 16 | 31 | 19 | 61% | 6 | 19 | 61% | - | - |
| up | 11 | 17 | 66 | 41 | 62% | 6 | 41 | 62% | - | - |
| up | 12 | 8 | 31 | 10 | 32% | 7/8, B | 20 | 65% | 16 | 52% |
| up | 12 | 13 | 461 | 252 | 55% | 6 | 252 | 55% | - | - |

* Conditions start with the lowest item of item 1-13 followed by A-E

## Analysis of step ups not meeting transition criteria (Count):

| Summary of issues with care transition criteria for step up transitions (number of scores) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type of transition | Cluster before transition | New cluster | Number of transitions | Item number | % meeting condition | Number of 0 scores | Number of 1 scores | Number of 2 scores | Number of 3 scores | Number of 4 scores | Proposal |
| up | 4 | 5 | 623 | 7/8 | 48% | 5 | 10 | 57 | 250 | 301 | no change |
| up | 4 | 8 | 168 | B | 52% | 44 | 10 | 26 | 71 | 17 | no change |
| up | 5 | 6 | 157 | 13 | 55% | 36 | 14 | 21 | 68 | 18 | no change |
| up | 5 | 8 | 143 | B | 62% | 32 | 4 | 19 | 69 | 19 | no change |
| up | 6 | 8 | 80 | B | 43% | 21 | 10 | 15 | 25 | 9 | no change |
| up | 6 | 15 | 3 | 6 | 67% | 0 | 1 | 0 | 2 | 0 | no change |
| up | 6 | 15 | 3 | 7/8 | 67% | 0 | 1 | 0 | 1 | 1 | no change |
| up | 7 | 8 | 218 | B | 50% | 60 | 17 | 33 | 84 | 24 | no change |
| up | 11 | 12 | 746 | 6 | 60% | 248 | 187 | 258 | 44 | 9 | no change |
| up | 11 | 13 | 187 | 6 | 56% | 36 | 14 | 32 | 92 | 13 | no change |
| up | 11 | 15** | 16 | 6 | 75% | 4 | 0 | 8 | 3 | 1 | no change |
| up | 11 | 15** | 16 | 7/8 | 88% | 2 | 0 | 0 | 7 | 7 | no change |
| up | 11 | 16 | 31 | 6 | 61% | 7 | 5 | 11 | 7 | 1 | no change |
| up | 11 | 17 | 66 | 6 | 62% | 25 | 14 | 17 | 8 | 2 | no change |
| up | 12 | 8 | 31 | 7/8 | 65% | 0 | 1 | 10 | 20 | 0 | no change |
| up | 12 | 8 | 31 | B | 52% | 12 | 0 | 3 | 12 | 4 | no change |
| up | 12 | 13 | 461 | 6 | 55% | 59 | 40 | 110 | 211 | 41 | no change |
| ** In combination both conditions together score 69% | | | | | | | | | | | |
| | % meeting care transition criteria <70% | | | | | | | | | | |
| | Criteria that need to be met according to cluster booklet v4.0 | | | | | | | | | | |

## Analysis Step down transition criteria:

| Step down Care transition criteria <70% | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type of transition | Cluster before transition | New cluster | Number of transitions | Care transition criteria met | % Care transition criteria met | Relevant items for conditions in order | Condition 1 ok * | % ok | Condition 2 ok * | % ok | Condition 3 ok * | % ok |
| down | 3 | 2 | 145 | 90 | 62% | 6, 7/8 | 144 | 99% | 39 | 27% | - | - |
| down | 13 | 11 | 216 | 141 | 65% | 6 | 141 | 65% | - | - | - | - |
| down | 13 | 12 | 513 | 347 | 68% | 6 | 347 | 68% | - | - | - | - |
| down | 15 | 3 | 13 | 6 | 46% | 6, 7/8 | 12 | 92% | 7 | 54% | - | - |
| down | 15 | 5 | 18 | 4 | 22% | 6, 7/8 | 12 | 67% | 7 | 39% | - | - |
| down | 15 | 6 | 9 | 5 | 56% | 7/8, 13 | 7 | 78% | 6 | 67% | - | - |
| down | 15 | 8 | 10 | 4 | 40% | 7/8, B | 8 | 80% | 5 | 50% | - | - |
| down | 15 | 13 | 45 | 25 | 56% | 6 | 25 | 56% | - | - | - | - |
| down | 16 | 11 | 37 | 16 | 43% | 3, 6, D | 29 | 78% | 26 | 70% | 26 | 70% |
| down | 16 | 12 | 60 | 13 | 22% | 3, 6, D | 47 | 78% | 43 | 72% | 26 | 43% |
| down | 16 | 13 | 24 | 6 | 25% | 3, 6, D | 17 | 71% | 15 | 63% | 13 | 54% |
| down | 16 | 17 | 71 | 15 | 21% | 3, 6, D | 53 | 75% | 67 | 94% | 22 | 31% |
| down | 16 | 19 | 1 | 0 | 0% | 3, 4, D | 1 | 100% | 1 | 100% | 0 | 0% |
| down | 17 | 11 | 71 | 27 | 38% | 6, D | 40 | 56% | 36 | 51% | - | - |
| down | 17 | 12 | 110 | 29 | 26% | 6, D | 74 | 67% | 51 | 46% | - | - |
| down | 17 | 13 | 107 | 13 | 12% | 6, D | 52 | 49% | 44 | 41% | - | - |
| down | 17 | 19 | 1 | 0 | 0% | 4, D | 0 | 0% | 1 | 100% | - | - |

* Conditions start with the lowest item of item 1-13 followed by A-E

## Analysis of step downs not meeting transition criteria (Count):

| Summary of issues with care transition criteria for step down transitions (number of scores) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Type of transition | Cluster before transition | New cluster | Number of transitions | Item number | % meeting condition | Number of 0 scores | Number of 1 scores | Number of 2 scores | Number of 3 scores | Number of 4 scores | Proposal |
| down | 3 | 2 | 145 | 7/8 | 27% | 7 | 91 | 39 | 7 | 1 | no change |
| down | 13 | 11 | 216 | 6 | 65% | 85 | 56 | 56 | 19 | 0 | no change |
| down | 13 | 12 | 513 | 6 | 68% | 101 | 109 | 238 | 58 | 7 | no change |
| down | 15 | 3 | 13 | 7/8 | 54% | 0 | 3 | 6 | 4 | 0 | no change |
| down | 15 | 5 | 18 | 6 | 67% | 10 | 2 | 3 | 1 | 2 | no change |
| down | 15 | 5 | 18 | 7/8 | 39% | 1 | 1 | 3 | 6 | 7 | no change |
| down | 15 | 6 | 9 | 13 | 67% | 2 | 0 | 1 | 6 | 0 | no change |
| down | 15 | 8 | 10 | B | 50% | 2 | 1 | 2 | 4 | 1 | no change |
| down | 15 | 13 | 45 | 6 | 56% | 5 | 6 | 9 | 24 | 1 | no change |
| down | 16 | 11** | 37 | 3 | 78% | 14 | 8 | 7 | 8 | 0 | no change |
| down | 16 | 11** | 37 | 6 | 70% | 13 | 13 | 8 | 3 | 0 | no change |
| down | 16 | 11** | 37 | D | 70% | 20 | 6 | 6 | 4 | 1 | no change |
| down | 16 | 12 | 60 | D | 43% | 16 | 10 | 19 | 11 | 4 | Include score of 2 |
| down | 16 | 13 | 24 | 6 | 63% | 1 | 4 | 4 | 13 | 2 | no change |
| down | 16 | 13 | 24 | D | 54% | 9 | 4 | 4 | 4 | 3 | Include score of 2 |
| down | 16 | 17 | 71 | D | 31% | 19 | 3 | 17 | 18 | 14 | Include score of 2 |
| down | 16 | 19 | 1 | D | 0% | 0 | 0 | 0 | 1 | 0 | more data needed |
| down | 17 | 11 | 71 | 6 | 56% | 31 | 21 | 14 | 5 | 0 | no change |
| down | 17 | 11 | 71 | D | 51% | 28 | 8 | 12 | 16 | 7 | no change |
| down | 17 | 12 | 110 | 6 | 67% | 24 | 26 | 48 | 8 | 3 | no change |
| down | 17 | 12 | 110 | D | 46% | 32 | 19 | 35 | 14 | 10 | Include score of 2 |
| down | 17 | 13 | 107 | 6 | 49% | 15 | 13 | 27 | 40 | 12 | no change |
| down | 17 | 13 | 107 | D | 41% | 30 | 14 | 23 | 28 | 12 | Include score of 2 |
| down | 17 | 19 | 1 | 4 | 0% | 1 | 0 | 0 | 0 | 0 | more data needed |
| ** In combination all 3 conditions together score 43% | | | | | | | | | | | |
| | % meeting care transition criteria <70% | | | | | | | | | | |
| | Criteria that need to be met according to cluster booklet v4.0 | | | | | | | | | | |
| | Proposed new criteria to be included | | | | | | | | | | |

## Analysis discharge transition criteria:

| Discharges Care transition criteria <70% | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type of transition | Cluster before transition | New cluster | Number of transitions | Care transition criteria met | % Care transition criteria met | Relevant items for conditions in order | Condition 1 ok * | % ok | Condition 2 ok * | % ok | Condition 3 ok * | % ok |
| discharge | 3 | discharge | 163 | 91 | 56% | 2, 7/8 | 149 | 91% | 96 | 59% | - | - |
| discharge | 4 | discharge | 226 | 101 | 45% | 2, 7/8 | 196 | 87% | 104 | 46% | - | - |
| discharge | 5 | discharge | 135 | 55 | 41% | 2, 7/8 | 87 | 64% | 59 | 44% | - | - |
| discharge | 6 | discharge | 53 | 23 | 43% | 2, 7/8, 13 | 49 | 92% | 23 | 43% | 39 | 74% |
| discharge | 7 | discharge | 121 | 63 | 52% | 2, 7/8 | 86 | 71% | 63 | 52% | - | - |
| discharge | 8 | discharge | 53 | 20 | 38% | 2, 7/8, B | 40 | 75% | 24 | 45% | 31 | 58% |
| discharge | 10 | discharge | 53 | 36 | 68% | 6, 12 | 44 | 83% | 39 | 74% | - | - |
| discharge | 12 | discharge | 82 | 20 | 24% | 6, 12 | 25 | 30% | 73 | 89% | - | - |
| discharge | 13 | discharge | 46 | 26 | 57% | 6, 12 | 27 | 59% | 32 | 70% | - | - |
| discharge | 16 | discharge | 10 | 2 | 20% | 6, 12, D | 8 | 80% | 5 | 50% | 3 | 30% |
| discharge | 17 | discharge | 10 | 6 | 60% | 6, 12, D | 6 | 60% | 7 | 70% | 7 | 70% |

* Conditions start with the lowest item of item 1-13 followed by A-E

## Analysis of discharges not meeting transition criteria (Count):

| Summary of issues with care transition criteria for discharge transitions (number of scores) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Type of transition** | **Cluster before transition** | **New cluster** | **Number of transitions** | **Item number** | **% meeting condition** | **Number of 0 scores** | **Number of 1 scores** | **Number of 2 scores** | **Number of 3 scores** | **Number of 4 scores** | **Proposal** |
| discharge | 3 | discharge | 163 | 7/8 | 59% | 37 | 59 | 61 | 6 | 0 | no change |
| discharge | 4 | discharge | 226 | 7/8 | 46% | 40 | 64 | 55 | 62 | 3 | Include score of 2 |
| discharge | 5 | discharge | 135 | 2 | 64% | 87 | 26 | 14 | 5 | 3 | Include score of 1 |
| discharge | 5 | discharge | 135 | 7/8 | 44% | 28 | 31 | 38 | 25 | 13 | Include score of 2 |
| discharge | 6 | discharge | 53 | 7/8 | 43% | 11 | 12 | 10 | 16 | 4 | no change |
| discharge | 7 | discharge | 121 | 7/8 | 52% | 32 | 31 | 35 | 20 | 3 | no change |
| discharge | 8 | discharge | 53 | 7/8 | 45% | 16 | 8 | 13 | 13 | 2 | Include score of 2 |
| discharge | 8 | discharge | 53 | B | 58% | 27 | 4 | 6 | 11 | 5 | Include score of 2 |
| discharge | 10** | discharge | 53 | 6 | 83% | 32 | 12 | 7 | 1 | 0 | no change |
| discharge | 10** | discharge | 53 | 12 | 74% | 28 | 11 | 10 | 3 | 0 | Include score of 2 |
| discharge | 12 | discharge | 82 | 6 | 30% | 56 | 18 | 7 | 1 | 0 | Include score of 0 |
| discharge | 13 | discharge | 46 | 6 | 59% | 23 | 4 | 5 | 12 | 2 | no change |
| discharge | 16 | discharge | 10 | 12 | 50% | 3 | 2 | 4 | 1 | 0 | Include score of 2 |
| discharge | 16 | discharge | 10 | D | 30% | 3 | 0 | 1 | 4 | 2 | no change |
| discharge | 17 | discharge | 10 | 6 | 60% | 6 | 0 | 2 | 2 | 0 | no change |
| ** In combination both conditions together score 68% | | | | | | | | | | | |
| | % meeting care transition criteria <70% | | | | | | | | | | |
| | Criteria that need to be met according to cluster booklet v4.0 | | | | | | | | | | |
| | Proposed new criteria to be included | | | | | | | | | | |

## Appendix 9 – Transition criteria changes

The following data were overruled according to clinical judgement and hence these changes not included in the proposal.

| No changes to cluster booklet criteria proposed | | | | | |
|---|---|---|---|---|---|
| **Type of transition** | **Cluster before transition** | **New cluster** | **Item number** | **% meeting condition** | **Proposal** |
| up | 4 | 5 | 7/8 | 48% | no change |
| up | 4 | 8 | B | 52% | no change |
| up | 5 | 6 | 13 | 55% | no change |
| up | 5 | 8 | B | 62% | no change |
| up | 6 | 8 | B | 43% | no change |
| up | 6 | 15 | 6 | 67% | no change |
| up | 6 | 15 | 7/8 | 67% | no change |
| up | 7 | 8 | B | 50% | no change |
| up | 11 | 12 | 6 | 60% | no change |
| up | 11 | 13 | 6 | 56% | no change |
| up | 11 | 15** | 6 | 75% | no change |
| up | 11 | 15** | 7/8 | 88% | no change |
| up | 11 | 16 | 6 | 61% | no change |
| up | 11 | 17 | 6 | 62% | no change |
| up | 12 | 8 | 7/8 | 65% | no change |
| up | 12 | 8 | B | 52% | no change |
| up | 12 | 13 | 6 | 55% | no change |
| down | 3 | 2 | 7/8 | 27% | no change |
| down | 13 | 11 | 6 | 65% | no change |
| down | 13 | 12 | 6 | 68% | no change |
| down | 15 | 3 | 7/8 | 54% | no change |
| down | 15 | 5 | 6 | 67% | no change |
| down | 15 | 5 | 7/8 | 39% | no change |
| down | 15 | 6 | 13 | 67% | no change |
| down | 15 | 8 | B | 50% | no change |
| down | 15 | 13 | 6 | 56% | no change |
| down | 16 | 11** | 3 | 78% | no change |
| down | 16 | 11** | 6 | 70% | no change |
| down | 16 | 11** | D | 70% | no change |
| down | 16 | 13 | 6 | 63% | no change |
| down | 16 | 19 | D | 0% | more data needed |
| down | 17 | 11 | 6 | 56% | no change |
| down | 17 | 11 | D | 51% | no change |
| down | 17 | 12 | 6 | 67% | no change |
| down | 17 | 13 | 6 | 49% | no change |

| | | | | | |
|---|---|---|---|---|---|
| down | 17 | 19 | 4 | 0% | more data needed |
| discharge | 3 | discharge | 7/8 | 59% | no change |
| discharge | 6 | discharge | 7/8 | 43% | no change |
| discharge | 7 | discharge | 7/8 | 52% | no change |
| discharge | 10** | discharge | 6 | 83% | no change |
| discharge | 13 | discharge | 6 | 59% | no change |
| discharge | 16 | discharge | D | 30% | no change |
| discharge | 17 | discharge | 6 | 60% | no change |

up ** In combination both conditions together score 69%

down ** In combination all 3 conditions together score 43%

discharge ** In combination 2 conditions together score 68%