

Handy guide to calculating new to follow-up ratios

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The Mental Health Access Improvement Support Team (MHAIST) supports NHS Scotland boards to improve the quality and accessibility of Psychological Therapy (PT) and Child and Adolescent Mental Health services (CAMHS).

MHAIST have developed these resources that can be used to identify enablers and barriers in your services, which in turn can help identify improvement opportunities.

We have developed the following handy guides:

1. Handy guide to calculating new to follow-up ratios
2. Handy guide to Measurement for Improvement
3. Handy guide to mental health waste spotters
4. Handy guide to process mapping
5. Handy guide to the Model for Improvement

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This handy guide sets out guidance on two methods that can be used for calculating new to follow-up ratios for individuals receiving psychological therapies, and identifies the strengths and weaknesses of each.

The guide does not cover how to use new to follow-up ratios, or any of the wider issues around effectively managing demand and capacity. Its focus is on providing guidance for calculating new to follow-up ratios.

Background

Average number of follow-ups per person is a key variable in estimating demand for services that offer recurring appointments.

Demand is calculated as the total number of hours needed to respond to the referrals presenting. The average number of follow-ups per service user is a key factor in determining this figure. For example, if one service sees 10 service users for an average of 10 sessions of one hour duration then 100 hours of clinical time are needed to respond to those 10 referrals. However, if another service sees those same 10 service users for an average of 20 sessions of one hour duration then 200 hours of clinical time is needed to respond to those same 10 referrals. Therefore, because of its significance in modelling overall levels of demand for a service, it is important to obtain an average new to follow-up ratio which is as representative of the service as possible.

There are different methods for calculating average number of follow-ups. Two of these methods are described in this guide, which produce different new to follow-up ratios for the same service, which in turn result in different levels of modelled demand. A full appreciation of the assumptions, benefits and drawbacks of each method should be sought before attempting a full service-level scenario model of your demand.

Average number of follow-ups is only one of a range of variables you will need to look at to model demand.

To effectively model your demand, you will also need a range of other data, including for example, number of referrals, number of Did Not Attends (DNAs), length of sessions, percentage of referrals accessing groups.

Further, it is recommended that any work on the average number of follow-ups is undertaken in **conjunction with work around clinical outcomes** as services need to be constantly looking at the quality of outcomes for the level of resources they are investing.

Optimising the new to follow-up ratio is key for more effective and efficient working.

As the average number of follow-ups per service user can have such a large impact on the workload of a team, it is a key area for focusing work and looking for opportunities for more efficient and effective working.

Clearly the number of times someone is seen will be in part associated with the needs of the person. However, there can be significant variation amongst clinicians in terms of the number of therapy sessions, even with similar client groups. Work by Okiishi et al 2006¹ showed that it can't be assumed that more contacts means a better quality service either, as the most effective therapists in this study saw people for considerably less time than the least effective therapists. This doesn't mean less is better either – it just means that **you can't assume there is a correlation between how many sessions someone has and the quality of outcomes achieved.**

Assessment and treatment slots need to be separated for accurate modelling of demand.

This guide uses the term 'average number of follow-ups'. It assumes that in addition to follow-up slots, each person has one new assessment/first appointment slot. Separating out assessment and treatment slots is important if they are different lengths of time – as your demand calculations take the length of the sessions into account.

However, if the slots are the same length then it is less important to distinguish between them for Demand, Capacity, Activity & Queue (DCAQ) work. If this is the case then we recommend you think about the initial appointment and then follow-up slots (regardless of whether assessment is on-going after the first appointment). Where assessment and treatment slots are the same length, the reason for separating out the first appointment is because the DNA rate tends to be higher for first appointments. Therefore, separating it out allows you to apply a more accurate DNA rate and hence end up with a more accurate estimate of demand.

¹ Okiishi, J C, Lambert M J, Eggett D, Nielsen L, Dayton D, Vermeersch, D A (2006) *An Analysis of Therapist Treatment Effects: Toward Providing Feedback to Individual Therapists on Their Clients' Psychotherapy Outcome*, Journal of Clinical Psychology, Vol 62 (9) 1157- 1172

Method One – Tracking back activity for service users discharged over a defined period

Method summary

- Uses activity data for service users discharged over a defined period – recommend a minimum of six months and ideally 12 months.
- For each person discharged in this period, tracks back the whole ‘episode’ of treatment, from assessment to discharge, to establish how many sessions the person received.
- It is recommended that these data are put into a histogram to establish which average is best to use. If data are normally distributed take the mean. If data are heavily skewed then median is recommended. The histogram may also indicate that the demand analysis needs to be segmented. For example, if the data shows a bimodal (two peaks) distribution and hence there is one group of people seen relatively quickly and another who are seen longer term, we would recommend splitting the two groups out and running two sets of demand analysis.
- An individual may be seen by more than one therapist during their course of treatment. This method looks at the total number of contacts from initial assessment to discharge and needs to include transfers between therapists.

Table 1: Benefits and constraints of Method One

Benefits	Constraints
Calculated sessions are highly likely to be representative of actual practice if large enough sample is used. However, this might be actual practice going back for a large number of years. Data can be obtained through manual audit of case-notes or automatic download from electronic patient information system.	Discharge practice over the period analysed needs to be representative. Therefore, if during the 'snapshot' period, a case review system is implemented that results in a higher proportion of longer term service users being discharged than normal, this will make the figure less representative going forward. However, this can be partially controlled for by displaying the new to follow-up ratios for each service user in the date order of discharge on a run chart and indicating when the case review system was implemented. Requires the availability of data from initial assessment through to discharge. The data collection method needs to be consistent from the earliest admission in the snapshot. The number of sessions may be underestimated using this method if there are any data completeness issues. Dependent on regular discharges from service and may not adequately cater for service users seen on a longer-term basis. Current practice will not be represented if discharge practices have changed recently..There needs to be reasonable throughput in the discharge period selected. Assumes length of treatment sessions is relatively similar.

Method detail

Identify all service users discharged over a defined time period

The first step for this method of calculating average number of sessions per service user involves identifying all service users that have been discharged from a given team/service over a defined time period. The longer the chosen time period, the larger the sample, and therefore the more reflective the calculated ratio will be of what is actually happening in the service. A six to 12- month sample of discharges is recommended, and the most recent six to 12-month period should be used to best reflect the current practices of the team.

Remove people who are discharged following DNA at initial assessment

Remove anyone who was discharged following DNA at initial assessment. Service users who did not attend their initial assessments, and who are subsequently discharged from the service should be removed, as these service users are never actually seen².

(However, please note that you will still need to feed data on DNAs for initial assessments into your demand calculations so it is important that you collect this information.)

Identify how many times each person was seen back to initial referral

Once the sample of discharged service users has been identified, it is necessary to 'track' all their activity back to their initial assessment. There are two options for doing this, via the electronic patient information system or via a manual audit of case records. When doing the audit via the electronic patient information system the following needs to be borne in mind.

- It is possible that a service user may be referred for treatment on more than one occasion, and so it is important to ensure that only data for the relevant referrals for each service user are included in the sample. If data from an electronic patient information system are being used, activity for these service users can be identified using unique patient identification numbers and unique referral identification numbers.
- It is essential that the date at which the system was routinely used is established before undertaking any analyses. If data are not available from

² If you have a significant number of people cancelling their first appointment that are subsequently discharged without being seen then these data also need to be excluded (and will also need to be fed into the demand modelling). However experience to date is that this is not a major issue in mental health services and if it only accounts for a very small percentage of overall activity, given the error margins inherent within any demand estimates, it is reasonable to ignore this issue. However, it must not be ignored if it is a significant issue in your service.

the initial assessment for service users in the sample, then the number of sessions received will be underestimated.

Follow-up attendance DNAs should **not be** removed from the calculation, as these still form part of the demand on the service. However, it is useful to split out DNAs from attended appointments as it will be useful for the team to know what percentage of its sessions are lost to DNAs – for example, on average each person is offered 10 sessions and DNAs two of them – hence actually seen eight times.

If the service has different length of appointments for assessment slots and treatment slots, then you will need to check to see on average how many times someone is seen for an assessment. Most services offer one assessment slot – so you can assume all other slots are treatment slots. However, you do need to check with the service if this is a reasonable assumption.

Put data into a histogram to establish how to best analyse

Put the number of contacts per service user into a histogram to establish which average is best to use. If data are normally distributed take the mean. If data are heavily skewed then the median may be more appropriate. The histogram may also indicate that the demand analysis needs to be segmented (for example, if it shows a bimodal distribution and hence there is one group of people seen relatively quickly and another who are seen longer term). In this situation, we would recommend splitting the two groups out and running two sets of demand analysis. In this situation, you need to discuss the data with the clinical team to understand what the appropriate subgroups might be.

Check any assumptions made with the clinical team for validity

Before calculating the figure, any potential errors should be checked for, and rectified if necessary and any assumptions checked back with the clinical team to ensure they are reasonable.

Present data in a run chart (optional step but recommended if doing any work focused on improving flow through team)

Ideally you want to present the data in a statistical control chart, putting it in time order. If doing this, it is vital that you keep the data in the order of the date the person was discharged. This will enable you to identify whether any changes you are testing have led to an improvement. It will also help you to see the level of normal variation in new to follow-up ratios and to identify any unusual (special cause) variation.

Calculate your figure for overall average number of follow-ups per service user

Formula if your data are symmetrically distributed and the mean can be considered as a valid average Assuming each service user has one new assessment slot and the rest are considered follow-up treatment slots then the average number of follow-ups (f/ups) per service user is calculated as:

the total number of follow-up slots offered (including DNAs)

the total number of people discharged.

Table 2 below contains average sessions per service user for a team in NHS Lothian calculated using this method. This is based on discharges over a 6-month period; each service user has one new assessment session.

Table 2: Example calculations using Method One

New attendances (excluding DNAs)	Follow-up attendances (including DNAs)	Total Sessions Offered	Number of service users discharged	Average f/ups per service user (Including f/up DNAs)	Follow- up DNAs	Follow- up % DNA (for info)	Average times service user actually seen excluding f/up DNAs
53	322	375	53	6.1	34	11%	5.4

Hence each service user assessed has an average of 6.1 follow-up appointments and this is the figure you want to feed into your demand calculations.

Formula if your data are skewed and hence median is valid average

In this situation, you will need to place the numbers of follow-ups per service user in value order and find the number for which as many numbers are greater as are smaller - that is the median. This will then be the figure you use for your demand calculations.

In summary, this method allows for average number of sessions to be calculated based on whole episodes of care for service users undergoing therapy, and with a large enough sample size, the ratio should be representative of what is actually happening within the service.

Method Two – Taking a ‘snapshot’ of data

Method summary

- This method for estimating the average number of sessions per service user involves taking a snapshot of the number of new and follow-up sessions undertaken over a given time period. It may be necessary to do this if a team may have only recently started recording their data using an electronic patient administration system (for example, in the past 12 months).
- Uses a ‘snapshot’ of activity data to calculate a new to follow-up ratio. It assumes that the system is currently in balance and hence the ‘snapshot’ ratio is reflective of what normally happens on average.

Table 3: Benefits and constraints of Method Two

Benefits	Constraints
Applicable to teams with limited data available	Assumes regular ‘throughput’ – e.g. number of referrals over given period approximately equal to the number of discharges.
Takes into account those on caseloads for longer term work.	Assumes length of treatment sessions is relatively similar.
Providing assumptions are met – provides a figure that is more representative of current practice.	Assumes no waiting list for treatment – and hence new to follow-up ratios represent system balance. If the service sees new assessments immediately but then places them on a waiting list for treatment, this method cannot be used.
	The ratio may be underestimated using this method if there are any data completeness issues.

Method detail

Check the following assumptions are reasonable

- The number of service users starting therapy before the beginning of the 'snapshot' that are discharged during the snapshot is approximately equal to the number of service users starting therapy during the snapshot, that are discharged after the snapshot.
- There is no waiting list for treatment and hence new to follow-up ratios represent current system balance.
- It is also assumed that the majority of service users will not be receiving therapy over a period that is much longer than the sample period. However, this method does control for the fact that some people will be on caseload longer term.

If these assumptions are **not** reasonable then you should not use this method.

Identify total new assessments and follow-ups in time period

Identify the total number of new assessments and total number of follow-up assessments within a given time period. We recommend a minimum of 6 months of data. Your average number of follow-ups per service user is then calculated as:

$$\frac{\text{Total number of follow-up (treatment) sessions delivered (including DNAs)}}{\text{Total number of new service users seen in 'snap shot' period}}$$

As with Method One, service users that do not attend their initial assessment should be excluded – so you are only counting new service users actually seen. Table 4 below contains data for new to follow up ratios from the same team in NHS Lothian as shown in Table 1.

This is based on a 12-month 'snapshot'.

Table 4: Example calculations using Method Two

Number of new service users seen	Follow-up attendances (including DNAs)	Average f/ups per service user (Including f/up DNAs)	Follow-up DNAs	Follow-up % DNA (for info)	Average times service user actually seen excluding f/up DNAs
150	1057	7.0	118	11%	6.3

Comparing the two methods

A comparison of the results obtained using both methods is shown in Table 5 below as this helps to assess reliability of the data calculated. Ideally, services want to use both methods so that this cross check can be made.

The variation in data can be explained by the fact that two very different selection methods have been used in order to obtain the data samples and the differences could be explained by any or a combination of the following:

- Method One under-calculated the average sessions per service user due to the full data set from assessment not being available.
- There has been a change in discharge practice. Method One represents practice over a longer period of time, Method Two is more in line with current practice.
- One or more of the assumptions in Method Two is not valid, hence impacting on the validity of the results.

Table 5: Method One and Method Two - results comparison

Method One	Method Two
Average follow-ups per service user (including follow-up DNAs)	Average follow-ups per service user (including follow-up DNAs)
6.1	7.0

For both of the methods detailed above, if the teams offer any group therapy, care should be taken to remove any service users who have had an initial assessment and then gone on to only receive group therapy.

Given the different benefits and constraints of the two methods, where possible it is recommended that both approaches are used and a comparison completed to help inform the confidence levels that can be applied to the use of these data.

Further, if you are focusing work on improving the flow of individuals through your team then we recommend that you use Method One and display the new to follow-up ratios for each service user in the date order of discharge on a run chart which also identified when any changes were tested. This will help you to quickly identify whether the changes you are making are leading to an improvement.

Calculating individual practitioner follow-up ratios

It is possible to use the data downloaded to compare follow-up ratios between individual practitioners. These can be useful for identifying any significant variances within a team in terms of the number of times service users are seen, though as always with variances, care needs to be taken to understand the reason for the variance. Furthermore, there are a number of issues that need to be taken into account when doing this:

- If practitioners are working with different service user populations then comparison is not valid as the variation may be accounted for by specialisms in the team – with a practitioner specialising in a certain type of presentation that needs more or less therapy time.
- If they are working with similar service user populations then you will need to control for any transfers between practitioners, otherwise you may be comparing someone who has seen the majority of their service users for the whole course of treatment with someone who has taken over treatment midway for the majority of their caseload.
- Great care needs to be taken when dealing with small numbers as the variance may simply be explained by random variation. Hence, we recommend applying the ANOVA test with post-hoc Tukey (or Scheffe) test to see whether there is an overall difference (and level of significance) between all of the therapists. This test is only valid if data are normally distributed. If the data distribution is skewed then a non-parametric equivalent test would be more appropriate. Please note that this test is only valid where the service user group is homogeneous. If the service user group is not homogeneous then you should not be doing comparisons between practitioners anyway.

If, having controlled for all of the issues above, you find a variation then ideally you need to:

- check to see if the variation is based on client need and, therefore, warranted variation.
- gather information on clinical outcomes and chart this alongside contact data.
- through clinical supervision, establish if there are any issues around holding on to cases longer than necessary. Remember there is evidence that overtreatment can be harmful.
- considering routine review of cases in either individual or peer supervision after a given number of sessions.

In summary, great care needs to be taken when looking at variation between practitioners for new to follow-up ratios as it would be very easy to draw inappropriate conclusions from the data. The method used in calculating average new to follow-up ratios should be made explicit when communicating the results of such analysis.

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