Written evidence submitted by Imosphere (ALG0044)

Executive Summary

Our organisation is Imosphere Ltd and our response to the inquiry covers:

2. The scope of our work with Local Authorities and Clinical Commissioning Groups.
3. Our approach to sharing information about the RAS algorithms.
4. Our understanding of the legal issues surrounding transparency.

The main points we make are that:

- The use of algorithms is the most accurate and equitable method of allocating personal budgets.
- It is important to distinguish between algorithms, such as our own, which are intended to support decision-making and those designed to make decisions.
- The concept of ‘transparency’ is often confused with that of ‘simplicity’, by both the general public and representatives of public bodies.
- The provision of evidence of accuracy should form a key element in criteria for transparency.
1 The FACE Resource Allocation System (RAS)

Following the introduction of personalisation and personal budgets within adult social care, a method was needed with which to estimate the person’s budget prior to co-producing their care and support plan.

Early systems used a ‘pounds-per-points’ basis for estimating budgets. A ‘score’ was given for each ‘domain’ of need. The amount allocated was the sum of the scores on all areas of need multiplied by a fixed value to convert it into £. For this reason such systems came to be referred to as ‘£ per point’ systems.

Our research showed that this approach does not produce an accurate calculation because needs interact with each other. A simple additive approach results either in systematic over-allocation, or systematic under-allocation resulting from attempts to reduce over-allocation.

Our findings led us to develop the FACE RAS for adult social care in 2010, modelled using data from five councils. It has since been developed and extended for use in adult health care and children’s services. Our adult social care RAS is used in over 40 councils. In addition, around 12 CCGs now use our RAS for their Continuing Healthcare eligible cases and 15 areas use the RAS for children with disabilities and/or special educational needs.

Over £1billion of public money has been indicatively ‘allocated’ using our algorithms.

As with other systems, the FACE RAS uses ‘scored’ data items from a needs assessment to estimate an individual’s budget. However, unlike the early algorithms, it does not allocate a monetary value to each point and then add them together. The budget estimated by the FACE RAS is instead equivalent to a single statement along the lines of ‘a person with this needs profile would typically be predicted to require a total weekly sum in the region of £a, taking into account their needs, the national eligibility criteria, local financial and market conditions and the council’s or CCG’s local policies’.

Whilst the FACE RAS does assign weightings to scored data items within an assessment, these weightings can only be considered in the context of the full set of weightings assigned to all items. Thus, weightings are not translatable into an amount of money allocated ‘for’ a specific need. Whilst within the formula a weighting x may be assigned to a specific item, such as need for support with dressing, this does not mean that £x is being allocated ‘for’ dressing or that x times a standard multiplier £ is being allocated ‘for’ support with dressing. Instead, the whole set of weightings is assigned in a manner which best predicts the total cost for service users with the particular pattern of assessed needs. An example that makes the rationale for this clearer is:

- Suppose we have a person who needs:
  - help getting dressed every morning;
  - help getting undressed every evening; and
  - help to manage toileting three times a day.
One method of allocating a budget for someone who needs help with all three tasks is to estimate a cost of support for dressing, another cost for undressing, and another cost for managing toileting and then to add them up. However, this would over-allocate as it assumes that support is provided separately for each of five ‘interventions’ needed during a day.

In reality, support would likely be provided three times each day and would overlap due to the clear ‘crossover’ of providing toileting support with providing support for dressing and undressing, assuming the person can be supported with toileting around the same time as when they get dressed in the morning and when they get undressed in the evening. The marginal cost of help with toileting in this situation is therefore different to the situation where the only support needed is for managing toileting.

So, rather than producing an additive set of costs for support with dressing, undressing and managing toileting on an item-by-item basis, we took an alternative approach using a range of cases with different combinations of needs. We assigned weightings to the three items to produce the best overall fit between predicted and actual costs. This resulted in a higher weighting for support with managing toileting than for dressing and undressing.

Having arrived at this formula it would be misleading to say that the model was ‘really’ allocating more for toileting than for undressing, because the reason undressing has a lower weighting is that part of the need associated with undressing has already been spoken for by the weighting assigned for help with toileting.

The approach described is a very simple form of algorithmic modelling. Unfortunately, however, our experience is that public expectations have been shaped by misleading literature, including some from official sources, that assumes that simple additive models can produce accurate cost predictions. There is no evidence that simple additive models can work and plenty of evidence that they don't, meaning the ‘gold standard’ for assessing transparency has become a standard that has never been met by an accurate working system. This is like establishing in people’s minds that it is possible to predict the weather by adding up the number of clouds in the sky and then evaluating actual meteorological models, not against their accuracy in weather prediction, but against whether they are as simple as adding up clouds.

Relative to such approaches, the FACE RAS may appear complex, even though compared to sophisticated modelling techniques it is very simple.

### 1.1 Local configuration

The FACE RAS allocations are based on the national baseline model which was developed using the methods described above, with adjustments applied to account for local costs and allocation practices. Effectively, the method of arriving at any single indicative budget figure can be described as ‘in line with what it costs to meet the needs of other comparable individuals locally, based upon a nationally-validated overall model’. The national model was developed and tested in conjunction with independent researchers at University College London.
The FACE RAS is based on ‘standardised’ costs rather than actual costs and so does not simply replicate existing costs and practice. It is configured during setup to ensure any undesired existing allocation practices are not perpetuated. What a council or CCG chooses to use as standard costs is a local decision, but it can be, for example:

- Actual costs (not recommended as these vary according to provider, e.g. in-house and external)
- Average actual costs
- External standard costs
- Anticipated or desired standard costs

The above leaves considerable room for flexibility. For example, if a council or CCG wished to use a single cost model for all, actual cost data for adults with learning disabilities could be collected and then re-standardised based on standard costs for older people, with the RAS then being recalibrated accordingly.

The RAS is tested locally in every implementation by comparing indicative budgets produced with the cost of support for sets of cases that were not used to calibrate the RAS initially, providing an independent test of accuracy. These audits consistently find high levels of accuracy (correlations $>0.95$ between predicted and actual costs).

In the most recent ‘Care Act-compliant’ RAS we have increased the transparency of the method of calculation. The overall RAS formula has two components:

1. The council’s or CCG’s individual ‘configuration decisions’, to be considered in two distinct parts:
   - The standard rates agreed locally for applying to ‘units’ determined by the core algorithm. For example, the cost per hour for meeting personal care needs, the cost per ‘session’ for meeting social participation needs, the cost per night for providing ‘sleep-in’ support, the cost of residential and nursing care home placements locally.
   - A number of local decisions regarding how the RAS should operate that are linked to the paid and unpaid services available within the local marketplace, including consideration of any ‘in house’ services run by the local authority. For example: Should different rates be used for people with a learning disability or people with a mental health problem, compared to older people? How should the RAS allocate budgets for people living in ‘Extracare’ housing (where cost models tend to be bespoke and therefore not comparable to the cost of meeting the same needs elsewhere)?

2. The ‘core’ algorithm which calculates the indicative budget in a number of steps, using the council’s or CCG’s local configuration rates.

1.2 The FACE RAS algorithms

To date we have not published our algorithms. One reason is that they are of commercial value as they have consistently been demonstrated to be far more accurate than competitor products.
Secondly, viewing an algorithm is in itself not a very enlightening process, without explanation of how the algorithm was derived. Even then it is not possible for an individual to assess an algorithm’s validity, since validity testing needs to be undertaken across many individuals.

Thirdly, the algorithmic calculations involve a path through a ‘decision tree’. When applied to any one individual, the calculation follows only one of many possible paths through the tree. The steps in the calculation for that person cannot represent the scope of the whole tree. There is thus the paradox that if any individual is exposed to the whole tree, containing millions of possible paths, it will seem overwhelmingly complex. However, if all they see is their path then the broader basis of the approach will be invisible.

Whilst these reasons have prevented us from publishing the algorithms, we have strived to increase understanding of what we do by:

- providing councils and CCGs with documentation that provides different levels of explanation of the FACE RAS;
- producing academic publications on the development of the FACE RAS; and
- assisting our customers with responding to ‘Freedom of Information Requests’ received from local organisations, service users and carers.

2 Legal Aspects of Transparency

‘Authorities/Panels must give adequate reasons for their belief that the personal budget that they wish to sign off on is adequate to meet the needs of the client.’


We believe that much of the anxiety concerning transparency is either misplaced or based upon misunderstanding of the role of a RAS in decision-making. This section explains our views on this matter, with reference to the judgement above.

2.1 What needs to be transparent?

What is signed off is someone’s actual personal budget, not the underlying calculation method of their indicative budget. What therefore needs to be transparent are the organisation’s reasons for believing that the actual budget is adequate to meet the person’s needs. Having said that, it is obviously desirable that the reasons for this belief can be explained to the service user.

However, the subject of any legal challenge is not the transparency or otherwise of any particular step in the decision-making process. Instead, it is the decision as a whole, and the degree to which the actual budget the council or CCG has determined is reasonable. It is therefore the decision as a whole that needs to be transparent, not the inner workings of a particular step in the decision-making process. The basic reasons why a council or CCG thinks that £x is actually adequate to meet ‘a, b, and c needs’ follow the logic set out below:
These are the agreed needs.
These are the agreed outcomes.
This is the agreed support necessary to achieve those outcomes.
This is the sum necessary to procure the support necessary to achieve those outcomes.
Therefore, there is a means of meeting the needs with the allocated budget.

A set of statements following the structure set out above would be a fully transparent explanation, but does not refer to a RAS.

The calculation produced by a RAS may provide additional evidence to support the view that the sum allocated is adequate if the RAS has been demonstrated to be accurate in similar cases. However, this does not mean that the indicative sum generated by the RAS should be the final determinant of the actual allocation. Even with the most accurate RAS, there may be personal circumstances or preferences, or local factors that mean the sum required differs from the norm. The council or CCG must consider these when co-producing the care and support plan.

2.2 Can use of a RAS be illegal?

We believe not. The judgement cited is both common sense and in line with what we believe to be well-established case law in other contexts, for example risk assessment and computerised decision support tools. The general rule of thumb is that as long as a reasonable decision-making process is used to arrive at a judgement, then a decision is defensible. The judgement that use of a resource allocation system is ‘legal’ simply reiterates that position.

A RAS is a decision-support tool not a decision-making tool (this is what the term ‘indicative’ means in this context). So, assuming that a council or CCG is using a RAS to help inform a decision and there is reason to believe that this usually results in a reasonable decision, there would seem no grounds for a RAS to be considered illegal.

It has been claimed that a RAS has a special significance because of its impact on people’s lives. However, it is the budget that has the impact, not the RAS. In this respect also, a RAS is no more critical to a person’s quality of life than many other decisions that may be informed by decision support tools. For example, whether to remove a child from the parental home, whether to allow a secure prisoner to go free, or whether to conduct a life-threatening operation. These cases are structurally very similar, in that the support tool informs the decision – it does not make the decision.

2.3 Is publication of a RAS formula required for transparency?

The judgement does not refer to such a requirement. Consider an example from a different context:

A patient goes to a doctor with a rash and the doctor prescribes a cream. The patient asks why the doctor believes that the cream will work. The doctor says: ‘There has been research that looked at the outcomes of patients with a similar rash to yours who were given the cream and not given the cream. In the group
which used the cream, on average, the rash had improved much more than the group which received no cream.’

Now suppose the patient says, ‘OK, but why should I take your word, show me the research’. The doctor replies: ‘In one study, in group one there were 45 patients with an average skin rash severity score of 4.8 using a skin rash scale before treatment. In group two, there were 44 patients with an average skin rash severity score of 4.7 before treatment. After treatment the scores were respectively 2.1 and 3.2. This difference was statistically significant using a statistical test called a t-test, which calculates the likelihood that this result could have happened by chance. In this case the t-test indicated that the likelihood of this result happening by chance was less than 1 in 20.’

Is this a ‘transparent’ explanation? It is if you understand it, but not if you don’t. And would it be even more transparent if the formula for a t-test was explained and its theoretical basis in the normal distribution set out? It would be more transparent but would require a different level of understanding.

The point is that the everyday concept of transparency has limited purchase in many situations. There is a natural tendency to associate ‘transparency’ with simplicity, whereas in fact transparency is often inversely proportional to simplicity: scientific explanations become more transparent the more underlying complexity is laid bare. The nature of the world is often complex – or at least not transparent to the layperson. For example, if someone points to rain and asks ‘where does that come from?’ the answer ‘clouds’ seems transparent enough. But only if we are prepared to accept as obvious that water vapour can radically change material state, turn itself into liquid and fall as rain – a set of processes which are far from transparent.

Transparency of approach should therefore not be confused with simplicity of formula used. A pounds-per-point formula for allocating money is seemingly ‘transparent’ only because everyone can understand basic arithmetic. However, that is a reflection of the simplicity of the formula rather than its transparency. However, if the question is asked ‘Why use this simple formula as opposed to any other formula?’ no rationale can be given because there is no underpinning evidence base or analysis of the relationship between needs and costs underpinning the formula. The formula that appeared ‘transparent’ thus becomes completely opaque.

It cannot be the case that there is a legal requirement for an arithmetical formula to be simple. It is an empirical matter whether the best formula is simple or complex. The Pearl judgement refers to linear and non-linear methods. Clearly, non-linear methods are going to be less easy to understand for the ordinary person than linear methods. But if non-linear methods provide the most accurate means of generating an indicative budget, that is a fact. The law cannot require the world to be different to how it is.

2.4 Practical implications

The practical implications from the Pearl judgement are as follows:

1. The need to explain the decision-making process and to make the service user aware of the evidence base. This needs to be done at an early stage.
2. For the council to provide a standard letter of explanation.

In support of the above, we have produced a range of documentation explaining our approach to resource allocation, which is available to councils and CCGs using FACE.

The broader point again though is that a legal challenge has to demonstrate that the budget allocated cannot in fact meet the service user’s needs. Use of a RAS is just a single step in the decision-making process leading to the support plan – a plan that the council or CCG has to sign off as adequate regardless of the preceding indicative budget. Excessive emphasis on method of calculation is likely to confuse rather than clarify.

We have used easily understandable measures of need in an assessment to generate a set of scores indicating the level of support the person needs in different aspects of their life. We then looked at a group of service users with similar needs and worked out a formula that, within limits, accurately predicts the cost of meeting those needs. We have tested the formula in many areas of the country and found that it appears to be accurate wherever tested. We have also tested it in each local area and found it to be accurate with new service users presenting to the council or CCG.

These facts, which are in themselves transparent and easy enough to understand, provide the basis for any individual council’s or CCG’s belief that the indicative amount generated by their FACE RAS is unlikely to be very different to the sum actually required.

So in any particular case where the FACE RAS has been used and a support plan subsequently drawn up, the reasons for believing that the budget is adequate are:

1. a similar sum has generally proved adequate for people with similar needs;
2. the range of services provided to meet those needs is still available at a similar price;
3. there is no reason to believe that this particular service user’s situation differs in any major material respect from the service users in the comparison sample; and
4. a review of the service user’s support plan by a trained professional leads them to believe that the plan adequately addresses the needs and outcomes identified in the assessment.

We believe that if a council or CCG is able to say this with confidence based on both national and local evidence, this should be adequate to pass the test of transparency.

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