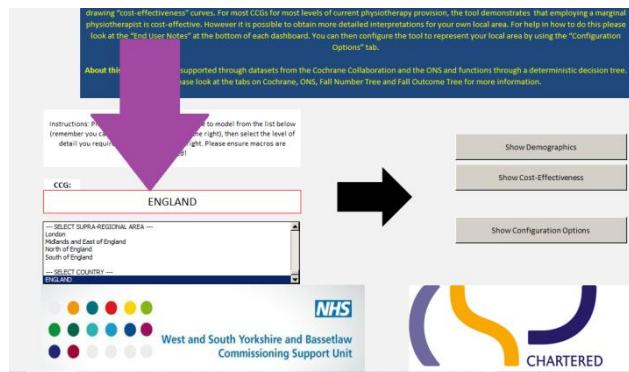


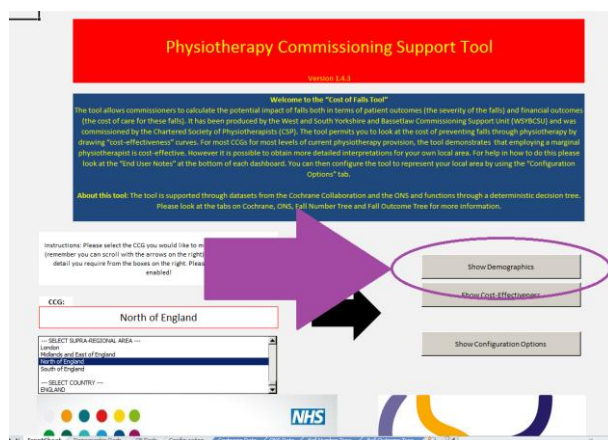
A simple scenario demonstrating the need for physiotherapists in the North of England

In the first scenario, **Chris** – a commissioner - expresses doubt that there is a real need for physiotherapy in the North of England. Chris thinks that with the young urban population in places like Leeds and Manchester, CSP guidance on the importance of physiotherapy doesn't apply. **Pat** – a physiotherapist - has arranged to meet Chris to demonstrate the Commissioning Support Tool.



The first thing Pat should do is select 'North of England' from the drop-down list on the first page. This will ensure that every result Chris sees is tailored to the relevant area.

Pat: Hi Chris, I understand you have some questions about the need for physiotherapy in the North of England. I've got a tool here which I think can address some of your concerns. As you can see, I've currently got it set to generate results for the whole North of England, but we can look at specific CCGs a bit later if you'd like. What I'm going to do now is show you some demographic projections...

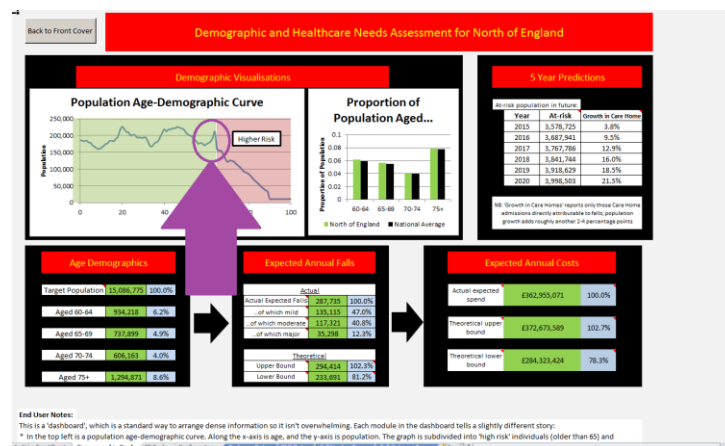


Pat should now click the 'Show Demographics' button. This will bring up the demographic dashboard.

Pat: What you can see here is a selection of demographic projections, drawn from the Office for National Statistics and clinical trial literature on falls in the elderly. The basic assumption of the model is that people aged 65 and above are at the greatest risk of falls (although those aged 60 to 64 are at a statistically significant risk). The first table I want to show you is the 'Population Age-Demographic Curve'. This shows you how many people in the North of England are at risk of falling.

Chris: This proves exactly what I was saying! There are plenty of young people, but the number of older people drops off very quickly. That means guidance produced by the CSP for the whole country doesn't apply here!

Pat: Well this table here (*'Proportion of Population Aged...'*) addresses that concern by comparing the average age of the population in this area to the national average. As you can see, there are more 60-64 year olds, more 65-69 year olds, about the same number of 70-74 year olds and ever so slightly more 75+ (who are at the greatest risk of falling). In fact, I'd also like to draw your attention to the big 'hump' of people on the population age-demographic curve, which indicates that falls are going to become much more of a problem in the future as currently healthy 60-64 age.



Note that this 'hump' seems to exist in a lot of CCGs and areas, so it is worth looking for. We're not quite sure what causes it – maybe a baby boom after the war? – but it means that falls pathways are about to become heavily over-stretched, and commissioners might not be aware of this.

Pat: We can also use an economic model – which I won't show you right now but we can look at later – to estimate how many falls this translates into. The simple summary is here (*'Expected Annual Falls'*). It says we'd expect the North of England to 288,000 falls per year.

Chris: What do these numbers underneath mean – minor, moderate and major?

Pat: It is an attempt to break the falls pathway down a bit further. All falls contributing to the model are fairly 'serious', because they result in a patient turning up to A&E. Minor and moderate falls don't need any additional treatment ('minor' is a discharge with no treatment, 'moderate' is a discharge to a GP) but major falls are extremely expensive – they average out at about £5,000 per fall. As you see, the North expects about 35,000 major falls per year. The rest of the model indicates how effective physiotherapy is at preventing these falls. It's also worth noting, although the point of physiotherapy is to *prevent* falls rather than *reduce the severity* of falls, one important side-effect of physiotherapy not captured in this model is that it will turn some of those major falls into minor falls.

Pat: We could also look at this table (*'Expected Annual Costs'*) to get an idea about how much falls are costing you right now. In the North they seem to be about £350m per annum, which is in line with what we would expect (the whole of England spends about £1.6bn, so an individual CCG would expect to be spending somewhere between £5m and £10m). It isn't all bad news though – it looks like the falls pathway you already have in place is already preventing about £6.5m of spend on falls, which is brilliant!

Chris: Well you've certainly convinced me that falls are an issue in the North of England, but can you give me any guidance as to how much of an issue they might be in the future? Are things going to get better or worse?

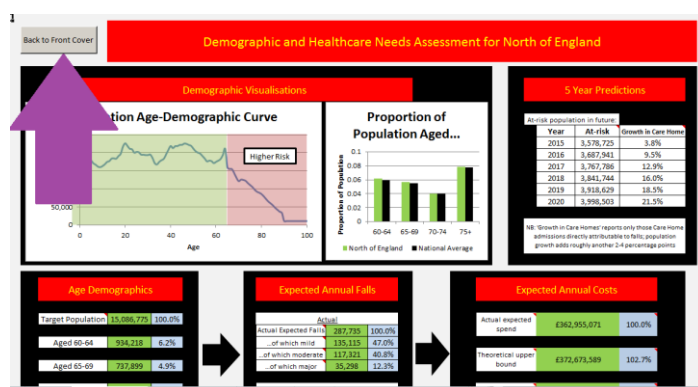
Pat: This table here ('5 Year Predictions') is a good guide to that. It looks at what we have learned in discussion are the two most important issues for commissioners; the number of people falling (the activity) and the resulting increase in care home admissions (the capacity). As you can see, given the population characteristics of the North of England, it looks likely care home places will have to increase by over 20% unless there is a radical change in the falls pathway.

Chris: Does this just assume that activity and admissions grow at a constant rate?

Pat: No, it uses population predictions from the ONS to try and estimate what the actual population will be in 2020, taking into account migration and mortality. However it only estimates the care home admissions from falls alone, and you will probably face additional pressure from e.g. dementia.

Chris: Hmm... that's really worrying. It would be good if we could prevent those falls and admissions. You mentioned earlier that this tool also looks at cost-effectiveness?

Pat: That's right – let me show you the cost-effectiveness slide.



Pat should either click through to the 'CE Dash' slide or (to make things look a little more professional) click on the 'Back to Front Cover' button in the top left and then then the 'Show Cost-Effectiveness' button on the front page. This will bring up the cost-effectiveness calculator.

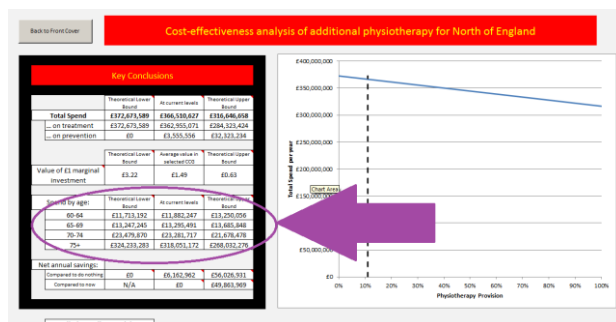
Pat: This slide shows how purchasing more physiotherapy interacts with the complete cost of the fall pathway. In other words, does paying a physiotherapy for an hour of their time to try to prevent a fall free up more or less money than allowing that fall to happen in the first place? You can see the graph slopes downwards, which means that the model calculates that – in the North of England at least – physiotherapy is cost-effective.

Chris: Can you give me some idea about how cost-effective it is?

Pat: Well there are actually a couple of answers to that question. The simplest is answered in the 'Net Annual Saving' boxes, which give an indication of how much money could be potentially saved by giving physiotherapy to everyone identified as being 'at risk' by a conventional test (the model is currently set up with the assumption that commissioners use a timed 'Up and Go' standardised test). You can also see in the 'Value of £1 marginal investment' boxes what the payback of investing another £1 in physiotherapy is given the average makeup of your pathway, and the payback of having that £1 be perfectly targeted (at the high risk group) are perfectly badly targeted (at the lowest risk group).

Pat: One interesting feature I want to draw your attention to is the ‘Spend by Age’ tallies, which are located about halfway down the box. You can see that the 60-64 year old age group costs quite a lot of money to give physiotherapy to, and the 65-69 year old age group is roughly cost-neutral (about a £300,000 net saving, but this requires a £4.5m investment). Without this break-down table you might miss this important point, because the saving in the 70+ categories absolutely dominates the added spend here. It is important to discuss a limitation of the model here; it is very likely that the model is giving the correct cost-effectiveness calculations and that giving physio to 60 year olds does not save money. However, there are three benefits which physio provides which the model does not price in:

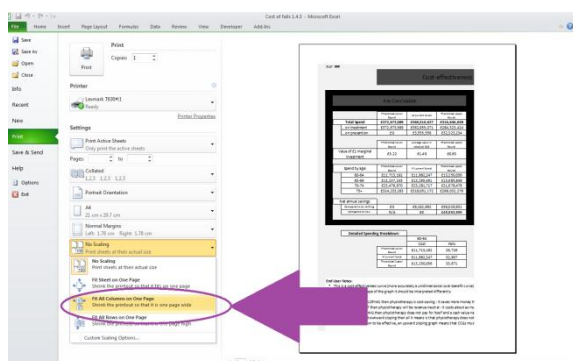
- Not every healthcare intervention can be cost saving (sadly). Eventually you will find a group who will benefit from physiotherapy in terms of the quality of their life, but not in terms of direct NHS spending. There is potentially a moral argument for treating this cohort, but the economic model does not deal in moral arguments.
- Developing good habits in these 60 year olds will prevent many *other* conditions commissioners are keen to target; for example it physiotherapy provides a non-trivial level of improvement in COPD, CVD and Dementia. These benefits are not priced in.
- Giving physiotherapy to this cohort is extremely likely to cause the severity of falls in this cohort to lessen, as well as the number / rate of falling. This means that there are some cash benefits not accounted for by the model (because the CSU cannot find a reliable source for the magnitude of this effect)



*Understanding this table is absolutely critical to making the case that physiotherapy prevents spending on falls. Unfortunately, the 65-69 year old cohort is very finely balanced in most cases between cost-saving and cost-increasing, so it is **extremely** important to check before using the tool what outcome you expect to see so you don't get a surprise!*

Chris: Thank you – that's really helped my understanding of the issue. Can I show these numbers to some other people and get back to you?

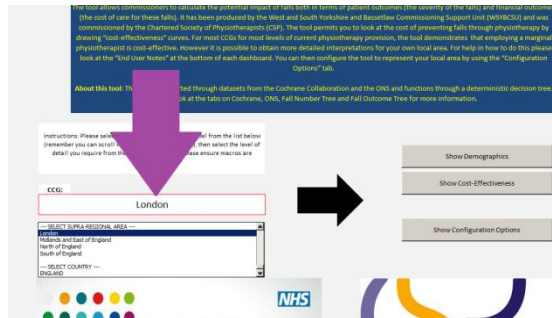
Pat: Of course – let me print these off for you.



Quick word of warning – these slides don't quite fit on a landscape printout, so when you print them off you should remember to select 'fit all columns on one page'. Also, be aware that the file menu is usually hiding off the top of the screen, so press 'Escape' to get it back!

A more complex scenario demonstrating how to alter the assumptions of the tool

In this scenario **Pat** is back, talking to **Sam** – a statistician in London. Sam knows that a lot of primary research is done in London, and has some figures which (Sam thinks) are more applicable to the local area. Since these figures show the probability of an elderly person falling are less than the CSP thinks, Pat has arranged to meet Sam to discuss whether this study changes the case for physiotherapy.



Just like before, the first thing Pat should do is select 'London' from the drop-down list on the first page. This will ensure that every result Sam sees is tailored to the relevant area, even after making some local adjustments.

Pat: Hi Sam, nice to see you again. I've got a tool here I think you'll be very interested in – it is a cost-effectiveness model for physiotherapy which I've just set up to give results for your area.

Sam: Nice to see you too Pat, but I'm afraid if that model is what I think it is then it will be giving you junk data. What is your source for the rate at which elderly people fall?

Pat: Hmm... I can't remember off the top of my head. Let's check...

Change with skill – requires no specialist knowledge

Proportion male 75%

0.4035

0.4045

Change with education – requires specialist knowledge of local commissioning arrangements or literature on facts

Source is the ONS

<http://www.ons.gov.uk/ons/hmcts/westminster-commissioning-group-population-estimates/mid-2011-census-based-facts>

Change with extreme caution – requires specialist knowledge of local commissioning arrangements or literature on facts

Transition Probabilities

Fall (Male):	60-64	65-69	70-74	75+
Fail	0.5720	0.5873	0.5876	0.5943
Refer	0.5730	0.5727	0.5623	0.5047

Fall (Female):

Fall (Female):	60-64	65-69	70-74	75+
Fail	0.5720	0.5873	0.5876	0.5943
Refer	0.5730	0.5727	0.5623	0.5047

All Outcomes:

	60-64	65-69	70-74	75+
No treatment	0.5841	0.5850	0.5720	0.5776
Refer	0.1896	0.2710	0.3220	0.2640
Referred	0.1706	0.1770	0.1640	0.1338
Referred	0.1004	0.0961	0.0470	0.0426
Referred	0.0038	0.0064	0.0253	0.0205
Referred	0.0114	0.0107	0.0720	0.0468
Referred	0.0006	0.0000	0.0125	0.0630

Multiple Fall risk:

	60-64	65-69	70-74	75+
Male	0.2641	0.4363	0.5162	0.4912
Female	0.1618	0.2689	0.3511	0.2973

Transition probabilities are the most complicated table in this configuration sheet, and so while extremely powerful we would expect it to fit the facts times through the model. Commissioners should make alterations to these probabilities. The top left table gives the probability of a fall in a year given a particular age and age band, while the bottom table gives the probability of a particular outcome given where you have a fall based on your age band.

These data come from a recent assessment of falls risk, they are both based on national data and may not be relevant for your CSOs. For example, fully CSOs or northern CSOs might have an increased incidence of falls because of the risk of stairs and ice, while the rates of osteoporosis in the elderly might be different. The rates of osteoporosis in the elderly might be different. The rates of osteoporosis in the elderly might be different.

It is suggested that you consider adding the two academic sources that you only change these figures to reflect what ITT analysis, because the relationship between fall and risk outcome is not risk in itself.

Source for fall risk is: <https://www.ons.gov.uk/ons/hmcts/westminster-commissioning-group-population-estimates/mid-2011-census-based-facts>

Source for fall outcome is: <https://www.ons.gov.uk/ons/hmcts/westminster-commissioning-group-population-estimates/mid-2011-census-based-facts>

Source for fall outcome is: <https://www.ons.gov.uk/ons/hmcts/westminster-commissioning-group-population-estimates/mid-2011-census-based-facts>

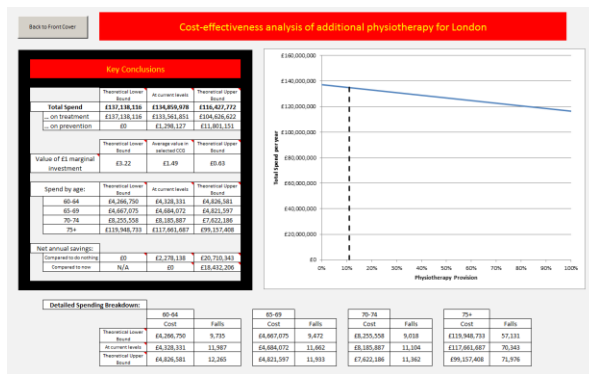
Source for fall outcome is: <https://www.ons.gov.uk/ons/hmcts/westminster-commissioning-group-population-estimates/mid-2011-census-based-facts>

Pat should select 'Show Configuration Options' then find the relevant data source (which is always located next to the tables). In this case, the source is Tromp et al (2001). This is an excellent paper, and Sam is being very unreasonable, but Pat is too polite to say so.

Pat: Ah yes, Tromp et al. Would you like a copy of the paper?

Sam: No thanks! I have a paper here by Prof. Cleverclogs and Dr. Knowitall that suggests the rate of falls in 75+ year old men is not 0.094 like you think, but in fact 0.093. I'm afraid that completely invalidates your results and I will tell my CCG board so at the next meeting.

Pat: Well hold on a moment, it seem like that might not make much of a difference to the results. Why don't I load the new figures into the model and see what happens?



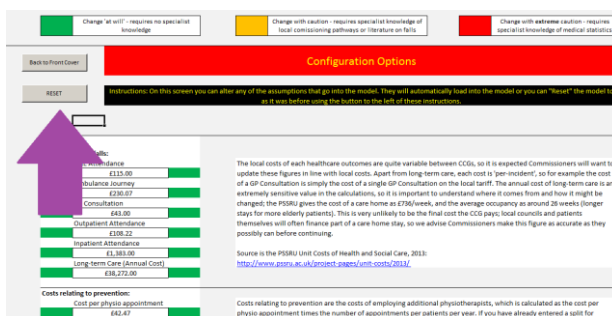
Changes made to the underlying assumptions are automatically propagated through to the demographic and cost-effectiveness dashboards. This means all you have to do is type the new numbers into the correct box and hit 'Enter' when you're done. Be aware that if you want to compare and contrast two figures, you might need to use a pen and paper to write down the salient results from the 'before' setup.

Pat: Look, when we make the change you suggest the total possible saving only dips from £18.4m to £18.1m across the whole of London. So while you're correct that elderly people falling slightly less frequently than before makes physiotherapy slightly less effective, it only makes about 1 percentage point of difference to the overall outcome; it is still really cost-effective to commission more physiotherapy.

Sam: I guess I agree that Prof. Cleverclogs and Dr. Knowitall might have been over-exaggerating the importance of their findings a *tiny* bit, but I still think you've over-estimated the effectiveness of physiotherapy. You assume it is delivered in a mostly multidisciplinary setting, whereas here in London it is delivered in a mostly one-on-one setting.

Pat: Well we can certainly look at that. Before I make the changes, do you want to use the old numbers for fall rates (Tromp et al) or the new numbers (Cleverclogs and Knowitall)?

Sam: The old numbers please



Pat should push the 'RESET' button located at the top to reset all the assumptions to the literature-supported defaults. There will be a warning box giving you a chance to change your mind, but in this case we should just click 'Yes' and the model will automatically update

Pat: Now let's look at the delivery assumptions. If I click on this box here (marked 'Descriptive Risk Ratio') then we can use a pre-set value for the effectiveness of physiotherapy. We see that one is already set up for 'mostly individual physiotherapy', so we could just use that if you want?

Sam: Could you tell me what the numbers mean please?

Pat: Certainly. A risk ratio is – roughly speaking – the probability that the intervention (which in this case is physiotherapy) is as risky as the control (which in this case is doing nothing). In other words, if the risk ratio is 1 then there is no difference at all between physiotherapy and doing nothing, while if the risk ratio is 2 then twice as many falls occur to patients receiving physiotherapy as not. Fortunately, in real life the risk ratio for physiotherapy is somewhere between 0.75 and 0.85

depending on how it is delivered, which means that people who receive physiotherapy have between 0.75 and 0.85 falls for every fall suffered by someone who has not received physiotherapy.

Sam: So the fact the 'Mostly Multidisciplinary' risk ratio is 0.76 and the 'Mostly Individual' risk ratio is 0.83 implies that multidisciplinary teams are more effective at preventing falls?

Pat: That is correct – although the caveat to that is that individual physios are much cheaper than a full multidisciplinary team, and the difference in effectiveness is not all that great.

Sam: Where are these numbers coming from?

Pat: They come from the Cochrane Collaboration, which is an international research team who perform 'Systematic Reviews' – looking through all the literature for randomised control trials on a particular topic and then mathematically combining the results.

Sam: Can I see the data?

Pat: Absolutely, one moment...

Change 'at will' - requires no specialist knowledge

Change with caution - requires specialist knowledge of local commissioning pathways or literature on falls

Change with extreme caution - specialist knowledge of medical

Back to Front Cover

RESET

Instructions: On this screen you can alter any of the assumptions that go into the model. They will automatically load into the model or you can "Reset" the model to the original values as it was before using the button to the left of these instructions.

Local Costs:

Costs relating to falls:	
A&E Attendance	£115.00
Ambulance Journey	£236.07
GP Consultation	£62.00
Outpatient Attendance	£108.22
Inpatient Attendance	£1,383.00
Long-term Care (Annual Cost)	£98,372.00

The local costs of each healthcare outcome are quite variable between CCGs, so it is expected Commissioners will update these figures in line with local costs. Apart from long-term care, each cost is 'per-incident', so for example of a GP Consultation is simply the cost of a single GP Consultation on the local tariff. The annual cost of long-term care is extremely sensitive value in the calculations, so it is important to understand where it comes from and how it might change; the PSSRU gives the cost of a care home as £796/week, and the average occupancy as around 26 weeks (10 days for more elderly patients). This is very unlikely to be the final cost the CCG pays; local councils and patients themselves will often finance part of a care home stay, so we advise Commissioners make this figure as accurate as possible before continuing.

Source is the PSSRU Unit Costs of Health and Social Care, 2013: <https://www.pssru.ac.uk/project-pages/unit-costs/2013/>

Costs relating to prevention:

Cost per physio appointment	£42.47

Costs relating to prevention are the costs of employing additional physiotherapists, which is calculated as the cost per physio appointment times the number of appointments per patient per year. If you have already entered a split for physiotherapy, this will be used to calculate the total cost.

FrontSheet Demographic Data CE Data Configuration

Pat should select 'Cochrane' from the list of tabs at the bottom. These tabs are marked in blue and are inaccessible from the main presentation because they should be regarded as 'out of bounds'; they don't actually do anything other than contribute data which is made more accessible elsewhere and they haven't been made 'pretty' like the rest of the client-facing presentation. Nevertheless, they are important to be able to access if you receive questions about the internal working of the model.

Pat: There's a lot of information here which is only really meaningful to someone with specialist economic/statistical training. I don't think I can be much more help than I already have been if you have any specific questions about the meta-analysis, but the original Cochrane Review is freely available if you google "Cochrane Exercise Falls" or similar wording, and that might answer some more of your questions.

Sam: OK, I'm happy with the methodology for generating the risk ratio, let's go back and put that into the model.

Pat: Brilliant. Looks like London could still save about £10m, despite being a very young area.

Sam: That's very interesting, I'll definitely recommend to the board that they look into why we aren't commissioning more physiotherapy. Thanks for taking the time to answer my questions!

An extremely complex scenario demonstrating how to use the tool to plan out services

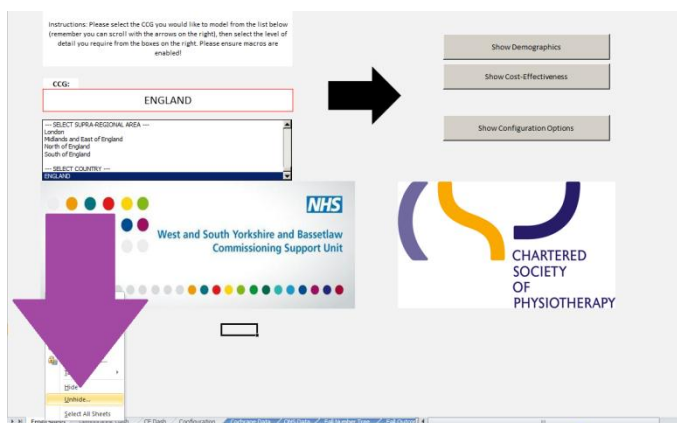
In this final scenario, **Pat** the physio is talking to **Alex**, an academic. Alex wants to know what the probability of a dangerous overspend on the falls pathway is, and how that decreases with the availability of physiotherapy. Pat has agreed to meet with Alex to demonstrate how the PSA attached to the model works.

It is advisable that you steer commissioners away from this module unless they express a specific interest in questions the PSA is uniquely suited to answer; in almost all cases interpretation is better suited to the 'mainstream' economic model. PSA is a very specialised technique which is extremely powerful but somewhat fiddly because if you set the dials incorrectly you have a very good chance of generating complete nonsense.

Pat: Hi Alex, how's your research going?

Alex: Not great, Pat; I want to look at the probability of a catastrophic overspend on the falls pathway in England, but I don't know how the availability of physiotherapists impacts upon it.

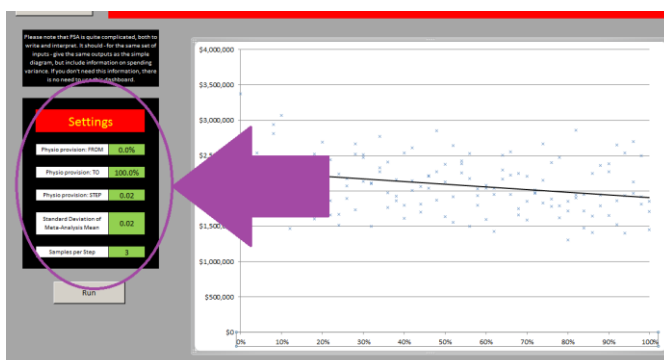
Pat: What a coincidence - I happen to have just such a tool on my laptop here! I'll just load it up...



PSA is hidden from the casual user. In order to access the PSA, Pat must right click the tabs at the bottom of the tool, click 'Unhide', then unhide the tab titled 'PSA Dash' (note that 'PSA' will just look like a confusing jumble of numbers – this is not the one you want)

Pat: PSA is a very time consuming technique, so why don't you tell me the area that you want to focus on?

Alex: Well my research suggests that most CCGs have at least 10% of patients receiving physiotherapy, so let's ensure we document that. Also, I don't care so much about the resolution of the model as long as it identifies low-probability high-spend events, so let's decrease the 'Physio Provision: STEP' rate and increase the 'Samples per Step' respectively.



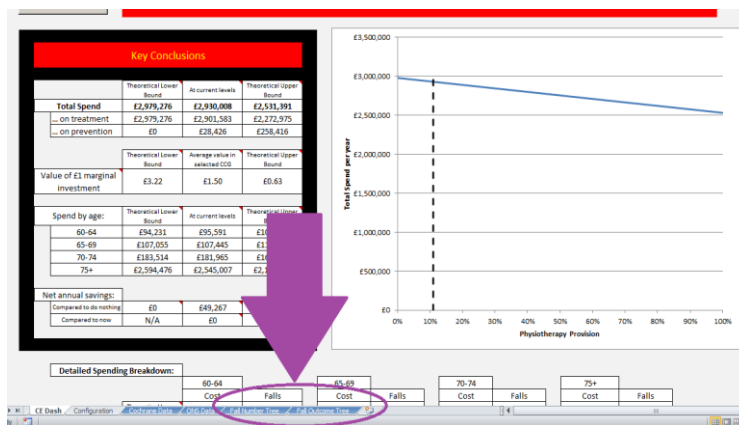
Pat does all of this from the menu on the left. Note that (depending on the settings) PSA can take a VERY long time – it might be worth getting a drink, or performing the calculations before the meeting.

Pat: I'll now run the model by pressing the 'Run' button... here we are.

Alex: Brilliant, it looks like the high-spend outlier events all cluster around the low-percentage physio provision and the low-spend outliers all cluster around the high-spend physio provision. This is really useful information for where to focus my research.

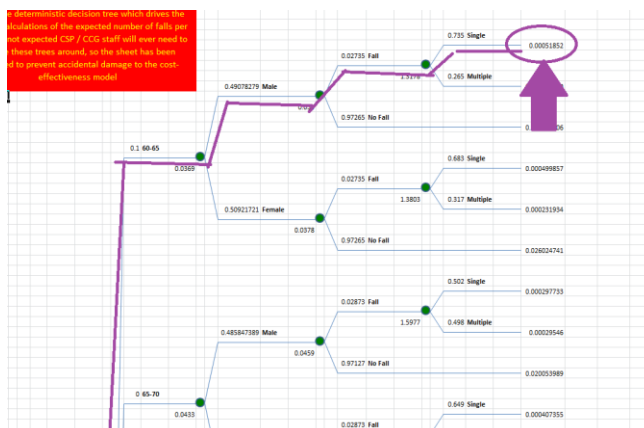
Alex: I have another question for you if you don't mind; can you please tell me the probability of having exactly one fall in a year in the 60-64 male demographic range, assuming no physiotherapy?

Pat: Of course, let me bring up the decision trees for you...



Once again, Pat is going 'off-script' by showing Alex some of the background mechanics of the model. In this case, Pat wants to click on either 'Fall Number Tree' or 'Fall Outcome Tree' to look at the estimations for fall rate and hospitalisation rates respectively. Both are very similar, so we will assume Pat is demonstrating the 'Fall Number Tree'

Pat: I've brought up the underlying decision tree which drives the model's estimation of how many falls are likely to accrue to each age group. For example if we want to calculate the probability that a 60-64 year old male who has not had physiotherapy has a single fall in a year we read across the columns like so, and we discover that the probability is 0.05%



This illustrates how to read off a decision tree. Once again, if the commissioner isn't specifically asking questions that require decision-tree determined answers, it is probably better to stick to the main presentation slides, but there is much less chance of misinterpreting a decision tree

Pat: I hope that answers your questions

Alex: It does, thank you so much for your time!