Infusion device project
Notes to accompany spreadsheet tool
In order to aid Trusts with the economic appraisal of locally-implemented solutions, a simple spreadsheet tool has been developed. The spreadsheet requires the entry of a range of local data (relating to current stock of infusion devices, current utilisation rates, equipment library set-up costs, staffing requirements and so on). It then calculates the profiles of costs and financial savings, appropriately discounted, over a period of eight years.

Incremental financial costs come mainly from the costs of setting up and running new equipment libraries. There will also be costs associated with new purchasing groups which will oversee centralised purchasing within Trusts. All costs will obviously vary by Trust.

There are several sources of potential financial savings. Firstly, improvements in purchasing and stock management will significantly reduce the number of infusion devices required. Associated maintenance costs will also fall. It is likely that coordination of purchasing and reduction of range will also reduce unit purchase costs by harnessing monopsony (buyer power).

Better stock management might also achieve significant savings in nurse time. Data from one pilot Trust suggested that potential savings might be as much as two whole time-equivalent nurses.

There are also likely financial savings associated with reduced non-fatal infusion device errors. Some research from the US suggests that medical device errors increase average length of stay by 2.2 days. Fewer errors are also likely to reduce costs associated with litigation and compensation, though there is insufficient data to model this effect.

Improving patient safety is central to the project. It is estimated that there are at least ten deaths annually as a direct result of infusion device errors and thousands of non-fatal over-infusion errors. Greatly reducing or eradicating these errors would save lives, curb unnecessary injuries and reduce extended lengths of stay. Though some modelling work has attempted to quantify benefits to patients at a national level, data limitations make it difficult to estimate these benefits accurately at a local level. Therefore, the spreadsheet tool does not attempt to quantify non-financial patient benefits.

The spreadsheet contains three worksheets:

- **Assumptions** – This is the worksheet in which all local data is entered. Yellow cells are those in which data can be inputted. Further details of required input data are outlined below.

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1. Pilot data suggest that current average utilisation rates are only 35% and can safely be increased to 70%.
2. Tentative data show that unit cost reductions of perhaps 15% might be achievable.
• **Costs and benefits** – This worksheet uses the local data inputted in the ‘Assumptions’ sheet to calculates the profile of costs and financial savings over time. This sheet cannot be altered by the user.

• **Summary** – This sheet provides a summary table of costs and financial benefits. Again, this sheet cannot be changed by the user.

**Input data**

**Profile of infusion devices**

- Initial stock of infusion devices – the default is set to 1,065 which was the average across six pilot Trusts.
- Current utilisation rate – the default is set to 35%, the average in the pilot Trusts.
- Target utilisation rate – evidence from pilots suggests that 70% is achievable. Trusts should not deviate significantly from this target without good reason.
- Current obsolescence rate – the proportion of the current stock of infusion devices over ten years old. Default set to 20%.
- Average lifetime of infusion device – currently set to ten years.
- Average unit cost – the average price paid for current infusion devices. The default is set to the pilot Trust average of £1,519.
- Monopsony unit cost reduction – the estimated reduction in unit cost achievable as a result of centralised purchasing and a smaller range of devices. Pilot Trust data suggest that 15% may be achievable, which is the current default value.

**Infusion device maintenance**

- Annual maintenance unit cost – the cost of maintaining each device (excluding training costs). Default is £50.

**Staff unit costs**

- Nurse (grade E) salary – used to calculate staffing costs of equipment libraries and also financial savings from freed nurse time. Default is £17,979 and comes from Netten et al (2002).
- Porter salary – used in calculating staffing costs for equipment library. Default is £11,000.
- Purchasing group cost – this is the average hourly unit cost of individuals sitting on new purchasing group. Default is £20.
**Equipment library staffing requirement**

- Nurse equipment manager – number of whole time equivalents (WTEs). Default is one.

- Porters – number of WTEs. Default set to two.

  If other staff groups are used, this can be incorporated by changing the relevant unit costs above.

**Purchasing group**

- Number of members – default is six.

- Number of meeting per annum – default is six.

- Length of meetings – default is two hours.

**Nurse time saved**

- Number of WTE nurses – this refers to the estimated time saving as a result of reduced search time etc. The default is two WTE nurses and is based upon data from one pilot Trust.

**Capital set-up costs**

- Total set-up costs – these should include all up-front set-up costs, including construction/renovation of equipment library space, IT equipment and other equipment. The default is currently £44,100, based upon the costs occurred in one pilot Trust.

**Non-staff running costs**

- Total non-staff related running costs – these should include all recurrent non-staff related costs, such as software support and maintenance, equipment replacement and so on. The default is set at £3,500 based upon data from one pilot Trust.

**Financial savings from reduced errors**

- Number of over-infusions – the annual number of over-infusion incidents. The current default is 16, which is the average number of reported over-infusion incidents in pilot Trusts.

- Target over-infusions – the default is 0 after eight years

- Progression to target – default is ‘linear’ which assumes that the number of over-infusions falls linearly to the target over eight years. If anything else is entered, the assumption is that the target is reached in the first year and maintained thereafter.
• Additional average length of stay due to error – the average number of days by which hospital stays are extended as a result of over-infusion errors. The default is set to 2.2 days based upon evidence from the US.

• Average cost per inpatient day – used to calculate potential savings from reduced over-infusion errors. Current default is £273, based upon Netten et al (2002) average cost of an inpatient bed day in ‘generic’ specialty.
The National Patient Safety Agency

We recognise that healthcare will always involve risks. But that these risks can be reduced by analysing and tackling the root causes of patient safety incidents. We are working with NHS staff and organisations to promote an open and fair culture, and to encourage staff to inform their local organisations and the NPSA when things have gone wrong. In this way, we can build a better picture of the patient safety issues that need to be addressed.