

Developing and Implementing a Spreadsheet Application for Rapid Updating of Inventory Stockholdings

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Background

There are increasing pressures on pharmacy departments to fine-tune inventory levels to maximise stock turns and prevent the holding of excessive stock. Traditionally, adjusting minimum (min) and maximum (max) stock levels is undertaken using reports generated by the dispensing system. However these lack nuance and fail to take into account changing trends in the use of drugs, especially periods of high demand.

Adjusting min-max levels is a time-consuming yet vital procedure within any stock control system. Stockholdings in excess of routine requirements (set as 14 day's supply in our hospital) are wasteful and result in an unnecessarily high inventory value. We resolved to employ the standard features of Microsoft Excel to generate a worksheet rich with visual indicators of the appropriateness of min and max stock levels

Description and Action

A spreadsheet solution was developed that allows purchasing officers to visualise trends in drug usage over a 6-month period. Optimal min and max stock levels are set as a percentage of the maximum use in any fortnight. This establishes a buffer that ensures stock levels are not set too low, as can happen when historical averages are used. Conditional formatting highlights target stock levels that are currently set outside the min and max boundaries.

Three iPharmacy reports are used to construct the spreadsheet. Pivot and lookup tables summarise data, and trends are visualised using sparklines. Formulas express the current min and max levels as a percentage of maximum fortnightly use and calculate the value of stock at current maximum stockholdings. Users then establish new min max levels and calculate the one-off inventory savings achieved if the maximum stock levels are adjusted downwards.

Designing the spreadsheet

Spin buttons are used to set the desired min and max stockholdings. These are expressed as a percentage of the maximum fortnightly use.

The value of the spin button is also expressed in days for ease of interpretation

Conditional formatting assigns a colour to the current max stockholding value that reflects the value of the spin button setting

Note that the minimum and maximum stock-on-hand figures used in this example are fictitious and have been set at the levels shown in order to demonstrate the functionality of the tool

The process can be repeated for various stores

ProdID is the key that links three iPharmacy reports via lookup tables

The cost per unit value has been hidden to protect commercial-in-confidence information

Excel's ability to group pivot data by date ranges is employed to summarise the data into fortnightly sets

Sparklines are used to provide a visual indication of drug use trends

The inventory value of each product at its current maximum level is shown

Items with red formatting represent drugs that have levels set above the desired setting and are targeted for a re-evaluation of their inventory levels

Undertaking the review

Department Min-Max Stockholding Review Tool

Levels expressed as a percentage of the maximum fortnightly usage of the drug. As an example, setting the maximum to 100% indicates you want the maximum stock on hand to be sufficient to cover the maximum fortnightly use over the measurement period.

Min set at: 7.0 days
Max set at: 14.0 days

Above maximum bound
Between bounds
Below minimum bound

Purple formatting indicates those items that have maximum stock levels set at 0 or 1 and can be ignored

New min and max levels are entered. Conditional formatting shows whether targets have been reached.

The new SOH value at max stockholdings is calculated and potential savings displayed

Evaluation

The visual style of the application and ease of use was considered an advantage over the previous method that employed the average annual turnover. The use of sparklines to demonstrate trends, combined with the setting of levels based on the maximum fortnightly use, was seen as a more valid method of setting realistic maximum and minimum levels.

Operators simply had to set new suggested min and max levels in the worksheet then observe whether the new levels returned a value that was within the green conditional formatting range. If the new levels were considered satisfactory they were then transcribed into the dispensing system. The system also calculated the potential savings at maximum stock holdings.

The system was trialled by our purchasing officers in April 2019. By sorting the spreadsheet by value and concentrating on 101 high cost drugs, they achieved a reduction in the total value of inventory (at max stock levels) of \$109K (12% reduction in total inventory value). This exercise was completed in four and a half hours.

A second series of assessments realised a potential cost saving of \$32K over the next 66 stock items. This work was completed in approximately three hours.

Future Prospects

This exercise will be undertaken annually at our site. Further development of the application is underway to streamline the creation of the worksheets in order for it to be trialled in other hospitals across the state