Hospital Logistics System “MegaOak-M3”

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Abstract

MegaOak-M3 is a Hospital logistics system for use in controlling the flow of the pharmaceuticals, medical materials and Medical Equipment (ME) etc. used in hospitals. This paper discusses how it is able to improve medical safety, prevent medical billing omissions and reduce item wastage, when linked to an electronic medical records system (or medical ordering system).

Keywords

management analysis, barcode, linkage, medical safety, billing omissions

1. Introduction

In its initial stage, systematization of hospital logistics has focused on warehouse activities. A clinic requests items, which are then output from the warehouse. When the quantity of items in the warehouse is reduced, the warehouse places an order via the purchase department for the supplier to supply replacements for the deficient items, receives the delivery and passes the order bill to the accounting department. In short, the previous hospital logistics system has been focused on identification and quantification of items in the warehouse. Lately, the need to save labor for hospital logistics has been emphasized, and the focus of the system has been shifting from warehouse management to the integrated management of items throughout the entire hospital system. At present, the hospital logistics system is noteworthy for its two main effects of management support and medical safety. NEC’s Hospital logistics system, MegaOak-M3 is capable of the systematic implementation of management support and medical safety based on linkage with medical records, ordering and medical billing systems. The following sections describe these systems in detail.

2. Approach to Management Support

Fig. 1 shows the ratio of payments for items to the total expenses of the hospital in accordance with the Report on a Factual Survey of Hospital Management 2007 [1] conducted by the Japanese Ministry of Health, Labour and Welfare (MHLW). The total expenses of a model hospital of the 300 beds category is about 440 million yen per month and the cost

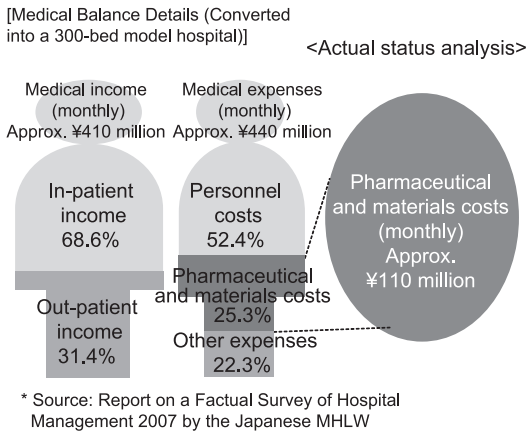

Fig. 1 Results of the survey on purchases of pharmaceuticals and medical materials.

of materials including pharmaceuticals occupies 25.3% of the total expenditure, or about 110 million yen per month. It is therefore very effective for improving the hospital management to reduce these costs. In particular, medical materials payments are a key point for improvement because it is estimated that medical billing omissions may be as high as 20% in certain hospitals.

Now let us consider the losses related to medical materials (**Fig. 2**). Some of the items output from the warehouse department are not billed medically due to a lack of execution, disposal, destruction or loss. Identification of actual item status would lead to an overall improvement in a hospital management.

Loss analysis is performed in the following steps.

First, determine and quantify the medical materials that are presenting significant differences in the billing amount and

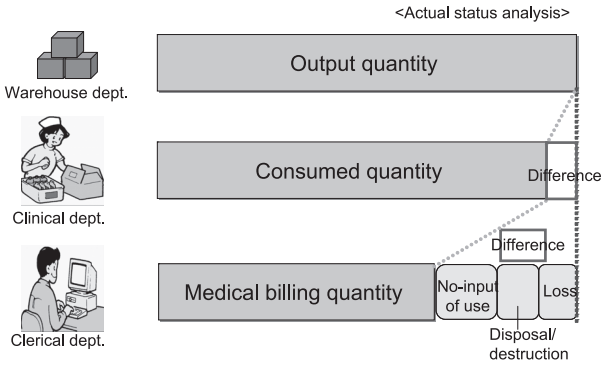

Fig. 2 Analysis of losses related to medical materials.

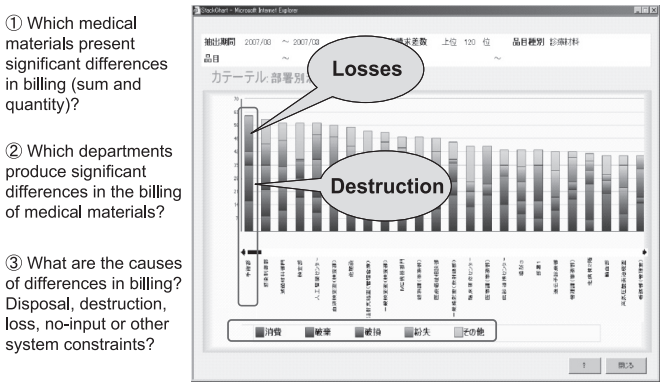

Fig. 3 Procedure and results of analysis of medical materials related losses.

then investigate those departments that are involved. Next, apply meticulous analysis to these departments in order to identify the causes of any significant differences, such as disposal, destruction or loss.

MegaOak-M3 performs this analysis by linking up with the medical billing and ordering systems.

Fig. 3 shows a graph of catheter consumption per department, obtained as a result of analysis using MegaOak-M3. The graph lists the departments in order of output quantity and classifies the results into consumption, disposal, destruction, loss and other causes. The example of the graph used here shows that disposal and loss are most noticeable in the surgery department. A large disposals figure may indicate that the sizes of the purchased catheters should be reviewed and a large loss figure may mean that the items should be stored and managed by improving the key locking procedures. Clarifying the causes of damage in this way will help find means of improving the management system.

3. Approach to Medical Safety

Securing traceability is an important factor in medical safety. The Japanese MHLW has issued a notice entitled "Enforcement of Barcode Indication on Medical Pharmaceuticals" [2] on September 15, 2006, to make the use of barcodes obligatory for the purpose of securing traceability. This notice defines how to apply barcode indications on pharmaceuticals for use in medical treatments in order to prevent medical incidents due to confusion of pharmaceuticals and to secure traceability by recording the flow from manufacturing and distribution to the administration of patients. It prescribes the following four main points.

1) Definition of the information to be indicated per type and packaging presentation of medical pharmaceuticals.
2) Definition via a 14-digit merchandise code, which is composed of the JAN code (13 digits) commencing with the packaging unit identifier (1 digit). And by the addition of the expiration date, quantity and manufacturing number to the merchandise code.
3) Definition of the barcode symbol system based on the packaging unit and indicated items.
4) Application of barcode indication to all merchandise shipped from the manufacturers for September 2008 and after (Internal medication and external medication will be detailed in separate notifications).

Fig. 4 shows the merchandise coding system using the new barcodes.

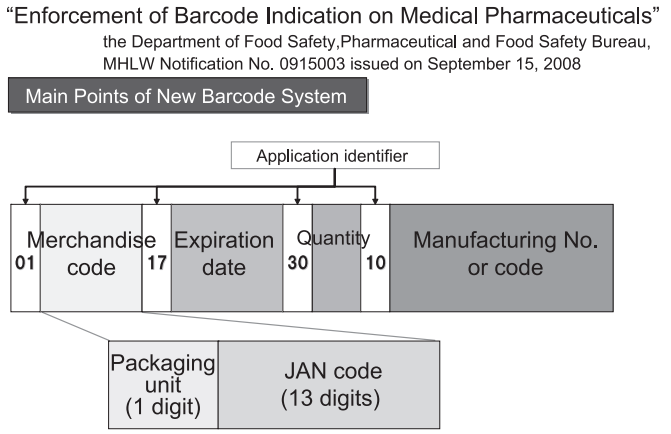

Fig. 4 New barcode merchandise coding system.

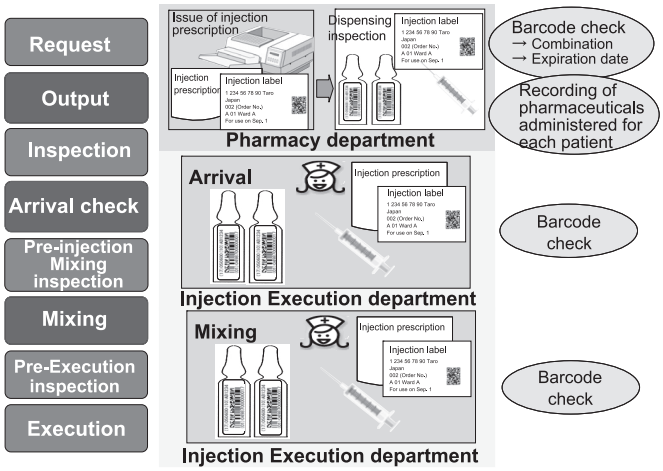

Fig. 5 Example of medical safety in injection job.

MegaOak-M3 has been designed to be capable of reading the new barcodes, managing the information effectively and also in order to enhance medical safety in accordance with the job flow in hospitals. For instance, a general injection flow begins with a “Request” and progresses to “Output,” “Inspection,” “Arrival check,” “Mixing” and “Execution” as shown in **Fig. 5** . In this flow, most of the operations for checking the arrival of correct items have previously been done visually. However, a system capable of reading a new barcode can recognize information on “the pharmaceuticals to be used for specific patients” in the 2D barcode on the injection label as well as to identify the correct combination by collating information with the new barcode on the pharmaceutical. Additionally, the new barcodes also include expiration date information so that an expiration check may be performed in order to manage optimum use of the pharmaceuticals. If no error is discovered in the collation, the system is able to record and manage the pharmaceuticals to be used for each patient.

In the department controlling injections where most of the jobs have previously been based on visual checking, the capability of reading the new barcodes on the labels will make it possible to confirm arrival of the correct pharmaceuticals.

Similarly, the new barcodes can also be used to control the injection mixing. In this way, the accurate handling of the information provided in the new barcodes together with the Hospital logistics system makes it possible to prevent medical incidents due to confusion of pharmaceuticals and secure traceability is also offered.

4. Conclusion

As described above, NEC’s Hospital logistics system MegaOak-M3 provides a system that contributes effectively to both hospital management and medical safety. Nevertheless, since the use of the new barcodes is not mandatory for certain articles, it is for the present not possible to apply barcode-based systematic management to all of the relevant items. It is therefore desirable that new barcodes are applied to all medical items as early as possible.

References

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