Process Cost Analysis

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Process cost analysis reprocessing of flexible endoscopes in the CSSD

Problem & Objective

Nowadays, high demands are placed on the reprocessing of flexible endoscopes in order to be able to guarantee hygienically flawless medical products and thus safe interventions. Costs are also rising steadily as reprocessing efforts increase. At the same time, the reprocessing costs are not, or only insufficiently, taken into account in the remuneration of services. Physicians in private practice are therefore protesting against the non-reimbursable hygiene costs for endoscopic procedures and are increasingly performing only urgently necessary examinations in their practices [1].

In hospitals, the reprocessing of medical devices is in principle included in the flat rates. However, the amount earmarked for medical infrastructure is divided by many cost centers indirectly involved in a treatment, which means that the hygiene costs incurred are not likely to be covered [2]. For the reasons mentioned above, the question arises for operators and users of hospitals and medical practices as to whether it makes economic sense to reprocess flexible endoscopes in-house. In order to answer this question, it is advisable to **determine the cost price of reprocessing per endoscope.** In this way, cost drivers in the reprocessing process can be identified and process flows optimized. In addition, the use of disposable products and the outsourcing of reprocessing.

Methodology

The reprocessing of each endoscope incurs costs, as resources such as machines, energy, licenses, personnel, etc. are required. A reliable calculation of the costs per reprocessing process is possible in the present example by evaluating the production statistics, which show the number of reprocessings per endoscope type (TEE probes, gastro/colo/bronchoscopes, nasopharyngoscopes). In this way, costs for consumed materials or depreciation for used devices can be directly assigned to the reprocessing process of an endoscope type.

In order to obtain a valid estimate of the costs per reprocessing, however, it is necessary to also include so called indirect costs, e.g. for the energy supply of the CSSD and administrative processes of the administration, since these "hidden" costs account for a not inconsiderable share. In order to distribute these indirectly attributable costs, so-called allocation keys (time per preparation, square meter area of the CSSD, full-force value) must be used in addition to the production statistics. These auxiliary keys enable the indirect costs, which are posted to cost centers, to be allocated to the reprocessing of an endoscope. All costs calculated above refer to one fiscal year. To determine the cost price per reprocessing, the total costs per year must be divided by the number of reprocessed endoscopes per year.

Results

In the case of the present practical example, the cost price per reprocessing could be determined after taking into account the relevant costs. These amount to approx. **€33 for the TEE probes, approx. €29 for the nasopharyngoscopes and approx. €40 for the multichannel endoscopes per reprocessing**. As expected, the personnel costs including in-house transport of the endoscopes could be identified as the largest cost driver with approx. 31%, followed by the depreciation costs for the equipment park with 20%. In addition, process chemistry, maintenance and material costs account for a significant share of costs (see Figure 1).

Discussion

In the conventional case, the costs determined are converted to a unit of production using sterilization units (STE), which are intended to represent the effort required to reprocess a certain number of medical devices. However, since STE are defined as a volume measure and do not allow a direct conclusion to be drawn about their content, this can be subject to extreme fluctuations and thus lead to inaccuracies, even if a factor for the expected effort is applied as a function of the number of instruments. In contrast, the process cost analysis presented previously offers the possibility to consider each endoscope type individually, which leads to a considerably more accurate result.

However, not all costs incurred could be fully taken into account in the process cost analysis. In this case, the indirect costs were distributed on the basis of allocation and quantity keys. These make it possible to distribute indirectly attributable costs as fairly as possible.

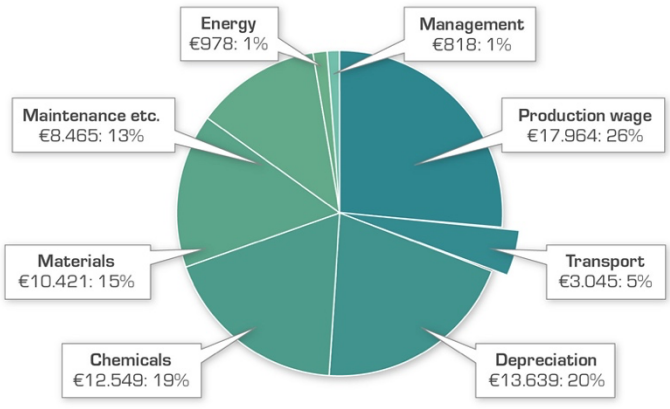

Fig. 1: Cost shares of reprocessing gastro/colo/bronchoscopes

[1] Berufsverband Niedergelassener Gastroenterologen Deutschlandse. V., „Protestaktion wegen unbeglichener Hygiene-DIENSTAC • i 0 4.10.22 • 09.25 - 09.50Wi-\ 1kosten - Magenspiegelungen gibt es nur noch, wenn es dringendist. Pressemitteilung," 2021. [Online]. Available: https://www.magen-darm-aerzte.de/aktuell/protestaktionwegen-unbeglichener-hygienekosten.html. [Zugriff am18.02.2022].

[2] Deutsche Krankenhausgesellschaft (DKG); Spitzenverbände der Krankenkassen (GKV); Verband der privaten Krankenversicherung (PKV), Kalkulation von Behandlungskosten: Handbuch zur Anwendung in Krankenhäusern, Düsseldorf: Deutsche Krankenhaus Verlagsgesellschaft mbH, 2016.

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It is also possible to allocate the costs incurred to the reprocessing of an endoscope. However, this results in minor inaccuracies, for example, in the determination and allocation of the personnel costs actually incurred in the reprocessing process. In the present case, the working minutes per reprocessing operation were first calculated.

In the next step, the personnel costs per reprocessing process could be determined. In addition, infrastructure processes to be worked on, such as daily maintenance, were calculated. Costs of machinery were not taken into account.

The results themselves show some peculiarities. Personnel costs are the biggest cost driver. However, they are significantly below the level expected in hospitals. On the one hand, this could result from the aforementioned limitations of the methodology, or on the other hand, it could be an indication of the comparatively small role of the human factor in an otherwise machine-based process. Due to the new acquisition of the entire machine equipment, the depreciation costs follow as the second largest factor. Cost drivers, which, however, will be reduced in the future or, in the best case, should be omitted.

What is also striking is the significant cost share of process chemistry in the total costs, especially in cases where manual pre-cleaning is performed.

Sustainability in the hospital and the CSSD – a spirit of optimism

Sustainability is on everyone's lips, the term is used almost inflationarily. But what exactly do we mean by sustainability and what does "suitable for grandchildren" mean? The United Nations' understanding can be used as a guiding principle. According to this, sustainability is a development "that meets the needs of the present without compromising the ability of future generations to meet their own needs". In reality, however, humanity globally consumes far more natural resources than the planet can regenerate.

If all countries needed so many resources, it would actually take 3.2 Earths to cover the demand without harming the future. This is far from a way of life suitable for grandchildren. In order to achieve a change here, politics, business, and civil society are equally called upon.

The health sector is responsible for 4.4% of greenhouse gas emissions worldwide, more than air or sea transport. Thus, the health sector itself contributes significantly to the climate crisis. These are already clearly noticeable and will continue to increase in the coming years. Heat waves, will occur more and more frequently in the future. They lead to physical heat stress, which can have serious health consequences. Heatstrokes, heart attacks, and premature births increase during heat waves, and heat stress exacerbates the effects of many other chronic diseases. Similarly, climate change is causing infectious diseases to become more widespread globally. The WBGU (German Advisory Council on Global Change) puts it succinctly: Healthy people only exist on a healthy planet. Climate protection should therefore be particularly close to the hearts of health care institutions that are committed to keeping the population healthy.

There is also little incentive for manufacturers to offer more sustainable reusable products. Disposable products also offer some advantages for regulatory reasons, through time and cost savings as well as simpler processes on the part of consumers. But the sustainability debate is also gaining momentum in the healthcare sector - more and more hospitals are striving to achieve ambitious climate targets and are also looking for sustainable alternatives in purchasing.

Supply bottlenecks and rising prices for raw materials and logistics also contribute to the fact that reprocessing and recycling of medical products will become more important in the long term. The CSSD will be in particular demand here to use its experience and to (co-)develop innovative solutions in dialogue with users, purchasing, and manufacturers. In this context, it is important to analyze the products and processes in the CSSD itself, on the stations, and in the operating theatre, and to uncover sustainability potentials.

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