ORIGINAL ARTICLE

The Importance of Clinical Documentation in the MalaysianDRG Casemix System: A Sequential Explanatory Mixed-Method Study of Ministry of Health Hospitals in Malaysia

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ABSTRACT

Introduction: The Ministry of Health (MOH) implemented the MalaysianDRG casemix system in 2010, and two national target indicators on the accuracy and completeness of clinical documentation were introduced to measure its performance. This study aims to show the trend of casemix performance in MOH hospitals and to explore the challenges in meeting these targets. **Methods:** The study design was sequential explanatory mixed-method design. First, a cross-sectional study described the trend of casemix performance in five MOH hospitals in Malaysia. Second, a single holistic case study of the hospital with the lowest casemix system performance was conducted to explore the perceptions of clinicians regarding the MalaysianDRG casemix and the challenges pertaining to clinical documentation. Purposive sampling was employed, and the case study data collection was carried out using in-depth-interviews, observation, and document reviews. **Results:** Two hospitals achieved the target in the accuracy of clinical documentation for the main condition (≥90%). For completeness in clinical documentation, four out of five MOH hospitals performed below the target (≤ 60%). Thematic analysis of the data found poor commitment of clinicians towards casemix and a multitude of obstacles in performing clinical documentations. **Conclusion:** After a decade of its implementation, the performance of the MalaysianDRG casemix system in MOH hospitals is still moderate due to inaccurate and incomplete clinical documentations. The study findings may be used to spread awareness and devise tailored solutions to assist clinicians in paving the way towards future excellence in MalaysianDRG casemix system.

Keywords: Casemix, MalaysianDRG, Clinical documentation, Mixed-method, Case study

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INTRODUCTION

Casemix is a term referring to a system that combines information about patients and their associated procedures into groups, based on the type and mix of patients. It provides the healthcare industry with a consistent method of classifying types of patients, their treatments and associated costs. It has been an integral part of the hospital financing and successfully used in more than 25 countries including the United States of America, Western European countries, Australia, Eastern Europe and in Asia (1).

In October 2010, the Ministry of Health (MOH) introduced the MalaysianDRG casemix system and gradually expanded its implementation to the whole country (2). The casemix system was piloted in six hospitals in 2010. Currently the MalaysianDRG casemix system is implemented in 49 hospitals; 13 state hospitals, nine major specialist hospitals, six minor specialist hospitals, 21 non-specialist hospitals, and one medical institution (3). The casemix system was proposed to assist the MOH in identifying variations and quality of health care so that they can be addressed and resolved quickly. Hospitals can standardize care processes through the implementation of clinical guidelines and pathways based on best practices to ensure that patients receive cost-effective treatment and good clinical outcomes. Moreover, the MOH will be able to measure and compare the performance of each hospital, thus further enhance the quality of its hospital (2).

The performance of the MalaysianDRG casemix system in Malaysia is measured using four national target indicators. The first two indicators; i) accuracy of

clinical documentation for the main condition ≥ 90%; and ii) completeness of clinical documentation for other conditions ≥ 60%, reflect the work of clinicians for each episode of patient care in the discharge summary, the Patient Entry Record and Patient Discharge (PERPD 301) form and patients' case notes (4). Based on the ICD 10 classifications, main condition is defined as the condition diagnosed at the end of episode of care, primarily responsible for the patient's need for treatment or investigation. Other conditions refer to disease(s) that accompanies the main diagnosis which requires treatment and additional care, in addition to the treatment provided for the condition of which the patient was admitted. These two target indicators were chosen because accuracy and completeness of clinical documentation are the prerequisites in generating correct Diagnosis Related Groups (DRGs) codes in the casemix system. Each DRG is allocated a 'cost weight' that eventually estimates the actual cost of treatment rendered to patients. There are multiple uses of these data; government-funded hospitals utilize this data in the annual budget application and financial planning. Whereas for private (or semi-private) hospitals, it is used to set hospital tariffs for billing patients.

Nevertheless, many clinicians failed to realize the significance of ensuring accurate and complete clinical documentation in achieving national targets of the MalaysianDRG casemix system. To date there is no publication on the performance of the MalaysianDRG casemix system in MOH hospitals. Past studies regarding casemix system in Malaysia mainly delved into costing studies and coding errors in a teaching hospital in the Klang Valley (5-7). Hence, issues pertaining to the performance of casemix in MOH hospitals and the challenges in ensuring the accuracy and completeness of clinical documentation, have remained unknown due to lack of exposure. As a result, clinicians continued to be in the dark and casemix improvement initiatives are stuck at a standstill. This study hopes to remedy these issues by presenting the first publication on the casemix performance in MOH hospitals. The study objectives are twofold; 1) to describe the trend of casemix performance of five MOH hospitals following the two national targets (accuracy of clinical documentation for the main condition ≥ 90%; and clinical documentation completeness for other conditions ≥60%); and 2) to explore the perception and challenges faced by clinicians in meeting these KPI targets. Findings from this study may be used to educate clinicians and inform healthcare managers towards improving the casemix system especially with the expansion of the MalaysianDRG casemix system to all hospitals and primary care facilities in Malaysia.

MATERIALS AND METHODS

The study design was sequential explanatory mixed-methods; conducted in two phases; 1) a cross-sectional study to describe the 2016-2018 trend of casemix performance according to two national targets in five MOH hospitals in Malaysia; and 2) a single holistic case study to explore factors and challenges faced by clinicians in writing accurate and complete clinical documentation.

This study was conducted from January to May 2019. In the cross-sectional study, multistage sampling was performed to select five MOH hospitals from 13 hospitals which have implemented casemix for more than five years (4). All 13 hospitals were stratified according to regions: East, West, South, North, and East Malaysia. Five hospitals were then selected using simple random sampling at each region (Hospital E, Hospital W, Hospital S, Hospital N, and Hospital EM). Secondary data on the accuracy and completeness of the clinical documentation were obtained from the 2016-2018 MalaysianDRG casemix audit reports. Data were entered into SPSS software version 24 and the trend of casemix performance based on two KPIs were displayed from 2016 until 2018 in each selected hospital.

The holistic single case study was conducted using the Robert Yin (2003, 2006) approach. Based on the results of the cross-sectional study, the hospital with the lowest casemix performance was chosen to explore the perception of clinicians regarding the MalaysianDRG casemix and the challenges in writing accurate and complete clinical documentation. In order to provide the richness and the depth of the case study, we used multiple methods in collecting the data: 1) document reviews on materials related to MalaysianDRG casemix system, 2) in-depth interviews; and 3) observation to validate the information obtained during the document reviews and interviews.

For data collection, patients' audit forms were selected using simple random sampling. Subsequently patients' case notes were retrieved using the health information system (HIS) software. All the selected case notes were reviewed and flaws in the clinical documentation were followed up. Data collection was obtained in three ways: via document review, observation, and in-depth interviews. A total of 120 casemix audit forms, 15 case notes from HIS software, 15 discharge forms, and 15 discharge summaries were reviewed. Interviews were conducted with clinicians, including house officers (HO), medical officers (MO), and specialists. There were a total of eight clinicians involved in this study. The interviews were recorded using an audio recorder and transcribed verbatim. Observation of casemix meetings, discharge processes in wards, ward rounds, and the process of diagnosis verification by specialists were done throughout the study. Finally, the researcher used thematic analysis to analyze the interview transcripts and triangulation method to combine all data from documents review, observation and the interview transcripts.

RESULTS

The first part of the study presents the performance of the MalaysianDRG casemix at five MOH hospitals from 2016 until 2018. Figure 1 shows the accuracy of the clinical documentation of the main condition. The performance of all hospitals fluctuates at each point, though maintained well above 70%. At the latest audit performed in 2018, only two hospitals achieved the KPI target (≥ 90%); Hospital EM and Hospital S.
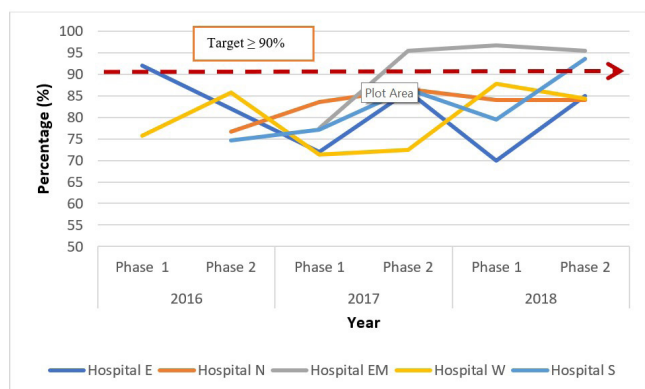

Figure I: The performance of MOH hospitals on the accuracy of clinical documentation for main condition, 2016-2018

Figure 2 demonstrates the trend of completeness in clinical documentation for other condition. Four out of five MOH hospitals performed below the KPI's target level (≥60%). However, towards 2018, two hospitals managed to surpass the KPI's target which were Hospital EM and Hospital N.
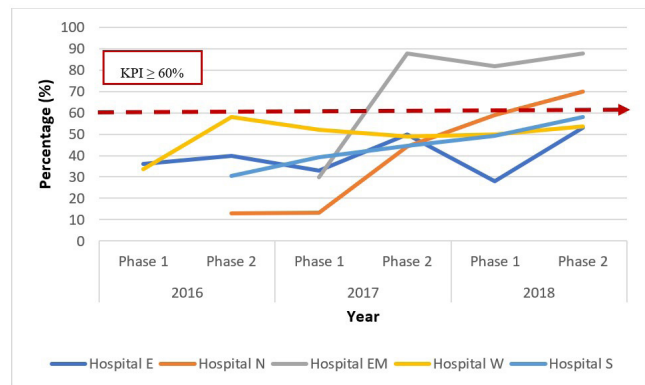

Figure 2: The performance of MOH hospitals on the completeness of clinical documentation for other condition, 2016-2018

From the data on accuracy and completeness of clinical documentation, the average score for each hospital was calculated using data from Phase 1 and 2 in 2017 and Phase 1 and 2 in 2018 (since few hospitals did not have the data for 2016). Based on the average score for both KPIs, the lowest performance for clinical documentation was Hospital E; (clinical documentation accuracy for the main condition was 78.3% and completeness in clinical
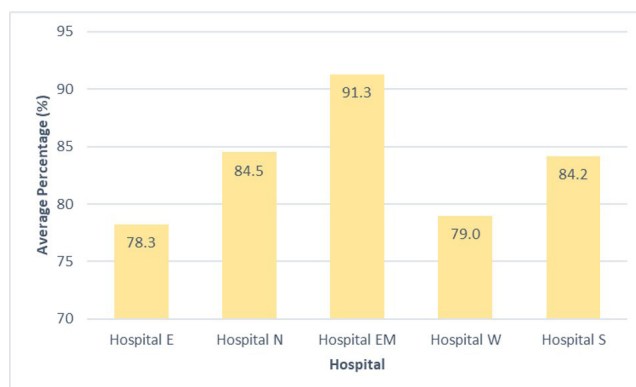

Figure 3: Average score in the accuracy of clinical documentation for main condition in MOH hospitals
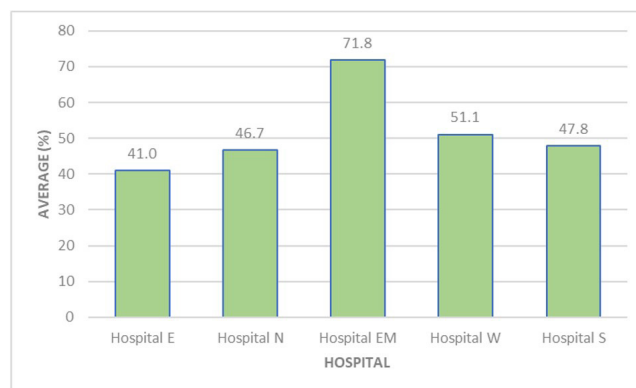

Figure 4: Average score in the completeness of clinical documentation for other condition in MOH hospitals

documentation was 41%), as shown in Figures 3 and 4. For the second phase of this study, Hospital E was selected as the subject of the case study in view of its lowest performance in clinical documentation. Hospital E is a state hospital and one of the referral hospitals in Malaysia. In 2010, the hospital was gazetted as one of the information technology (IT) hospitals which meant all medical records, laboratory results and radiological reports are computerized in two systems; FiSicien Electonic Medical Record, Health Information System (HIS), and *Sistem Maklumat Rekod Pesakit* (SMRP). Hospital E has three systems integrated into managing patients' data which are the HIS, SMRP and MalaysianDRG casemix system.

Following the thematic analysis of the in-depth interviews, document reviews, and observations at Hospital E, there are two themes befittingly explained the perception of clinicians on the MalaysianDRG casemix and the challenges in meeting the national targets relating to clinical documentation. The two themes and its subthemes were presented in Table 1.

Theme 1: Poor commitment of clinicians
Clinicians admitted that they are not fully committed towards casemix and clinical documentations. Many regarded casemix as unimportant, a perception that

Table I: Themes and subthemes from the case study of Hospital E

Themes	Sub-themes
Poor commitment of clinicians	1. Casemix is not a priority 2. Heavy workload 3. Roles of the superiors
Obstacles in the work process	1. Inadequate, outdated and damaged laptops 2. System failures 3. Insufficient training in clinical documentation

may have stemmed from their medical training, lack of understanding, heavy workload and the working culture between their superiors. The sub themes were described in the following paragraphs.

Subtheme 1: Casemix is not a priority
Most of the clinicians claimed that they had their own work priorities and casemix was not at the top of their list. Medical officers in certain departments were consumed by their high clinical workload, therefore they found casemix and clinical documentation were too demanding. They seemed reluctant to carry out the work and believed that it should not be made part of their job description. As claimed by one of the respondents:
"We have such a clinical mindset from the beginning… when it comes to documentation, to write all those things, to have it signed, to verify…at times we are reluctant to do it…our clinical work is piling up…so these things (casemix) are not really our priority…such works are meant for the administrative lot" (190513_001 line73-75)

Subtheme 2: Heavy workload
From the observation, we found that completing the clinical documentation was a taxing process. For example, in the medical department, all discharges must have three documents; the first was the prescription for medicine, the second was the memo to the primary clinic, and the third was the clinical discharge summary. If applicable, a fourth and last document was needed, the date for the next appointment. Often HOs will partially fill the discharge summary to expedite patients discharge. Once HOs had finished other tasks they will resume the completion of the discharge summary within 72 hours. They were asked to fill in the clinical discharge summary which consisted of hospital admission diagnosis, history of present illness, hospital course, medication on discharge, and care plan. Other than that, they had to fill in the discharge form, which consisted of the main and other diagnosis, the code for each diagnosis stated, and the procedures involved during the hospital stay. All these documents (clinical discharge summary and discharge forms) were then verified by the MOs or specialists in the ward. The overall process of completing the discharge summaries and forms was very time-consuming and the heavy patient workload made matters worse. Issues regarding heavy workload were commonly brought up during the

interviews. One of the medical officers claimed that total patient discharges were high, sometimes reaching 70 patients per day:
"Aah..the workload is heavy. Let's say if peads ward in general, usually patients came with bronchiolitis … just simple bronchiolitis...they were admitted for one day for nebs [nebulizer] then discharged home…hmm we have around 20–30 cases like that. But if at SCN [Special Care Nursery], it's usually babies with jaundice, in one day it can be up to 60–70 patients." (190513_002 line 69-72)

Subtheme 3: Roles of the superiors
In wards, it was the responsibility of HOs to fill in the case notes, discharge summaries, and discharge forms when patients were allowed to be discharged. Most HOs claimed that their method of completing the documentation and data entry depended on which specialist who were in charge of verifying the forms. If the specialist were strict, the HOs would attempt to complete the documentation and data entry more cautiously:
"It depends. ..if the specialist is strict, we will write complete documentation, but if we've got a specialist who isn't very particular and will verify the document as is, then we just simply do it (the documentation) nonchalantly" (190503_003 line 495-461)

There was also low acceptance of casemix among specialists, who claimed that only those in charge of casemix will be truly committed to the responsibility:
"There is less sense of responsibility when people are not in charge (of casemix) ...besides, these things are not really part of our job" (190530_006 line 132)

Theme 2: Obstacles in work process
This study revealed that there were many obstacles in work process that interfered with writing accurate and complete clinical documentations. Hardware (laptop), software (system) and trainings issues were quoted as the main obstacles in performing clinical documentations.

Subtheme 1: Inadequate, outdated and damaged laptops
Almost all respondents claimed that there were not enough laptops to go around. The observation in a medical ward discovered that although there were five laptops, only three were functioning. Worse, the available laptops had missing letters and insensitive keyboards making it difficult to type on. The touchpads were not working, using an USB mouse took more space on the trolley. The performance of the laptops was also slow, taking between 20 to 30 seconds to display a new window. The laptops' batteries were problematic, requiring constant charging with the extension wires whereby almost causing one of the visitors to trip over.
"It is just that in medical, its laptops are old and very low quality … we have to buy our own extension, the extension wire that they have is very short for us to use to

charge the laptops ... very old and heavy." (190513_003 line 234-235)

The laptops also went on and off and shut down by themselves, making it even slower to finish ward rounds. Not only did the HOs struggled to catch up with the MOs' and specialists' orders, these non-performing laptops also interfered with the process of writing accurate and complete clinical documentation.

Subtheme 2: System failure

Issues regarding system failure were mostly brought up by HOs and MOs in-charge of entering patients' conditions and discharge summaries in wards. Hospital E is an IT hospital with an integrated networking between SMRP, HIS and MalaysianDRG casemix systems, hence any system failure would be an inconvenience during data entry leading to poor clinical documentation.

One of the issues mentioned by respondents was about the drop-down button in the HIS system. Since HOs or MOs were unable to write down the diagnosis based on case notes, they had to select the diagnosis from the system which were based on ICD-10 classification. There were many diagnosis and codes which were similar to each other in the drop-down button of the HIS system. Poor understanding on ICD-10 classification made it difficult for HOs and MOs to choose and often resulted in the wrong selection of diagnosis in the system. One of the HOs admittedly said,

"Aah...the other day, I had patient's final diagnosis which consists of so many complications until I did not know what to write, I tried to search from the drop-down options, but the coding was not there. So at last I just clicked on coding which almost similar..." (190513_003 line 82-84)

Subtheme 3: Insufficient trainings in clinical documentation

Based on the review of training schedules, the researcher noticed that the 2-hour training on proper diagnosis documentation and procedure (*Taklimat Dokumentasi Diagnosis dan Prosedur Pegawai Perubatan Siswazah*) was only done once for every new HOs. This 2-hour training during the HOs orientation session was found to be inadequate for HOs to fully grasp the concept of proper clinical documentation; to cope with this problem, HOs had to self-taught with the help from their seniors and MOs. One of the people in charge of the casemix claimed,

"They (HOs) may not understand it (the training) very well, because during the orientation, the HOs are not in the ward yet. The training should be conducted when the HOs are already in the ward...but when the HOs started to work in the ward, it would be difficult for us to brief them." (190529_001 line 75-78)

DISCUSSION

The performance of the MalaysianDRG casemix in five MOH hospitals is moderate. Only two hospitals achieved the target for the first indicator on the accuracy of clinical documentation for main condition. Since this indicator reflects the ability of clinicians to write patients' diagnosis which are based on clinical signs and symptoms, findings of this study alluded the fact that some MOH medical doctors were incapable of writing patients' diagnoses. This is unfortunate considering making a diagnosis is a crucial learning point which must be achieved during medical school. A similar study in England by Nouraei et al. (2015) showed that documentation of records was mainly done by junior doctors. The study noted that junior doctors displayed "diagnostic hesitancy" towards patients' illness, whereby they often treated patients based on laboratory investigations rather than committing to a specific diagnosis (8).

The second indicator, completeness in clinical documentation of other conditions, reflect the ability of clinicians to complete patients' conditions. According to the World Health Organization (8), all conditions relating to a patient's care must be written clearly so that another doctor who has not treated the patient is able to keep track of the patient's overall episode of care. Failure to do so will prevent another doctor from understanding the current patient's status or prognosis. Since four out of five MOH hospitals achieved less than 50% in the completeness of clinical documentation, medical doctors in MOH hospitals may have been incompetent in completing the clinical documentation regarding other conditions. Similar finding was observed in Nouraei et al. (2015) study which highlighted poor clinical documentation of complications such as acute kidney injury and septic shock among clinicians. Our finding was also lower compared to those by Hariez, Mansur (9) who reported the percentage of completeness of the principle diagnosis medical record by physicians in an Indonesian private hospital ranged between to 60-75%.

Findings from the case study found two themes that explained the challenges in meeting the casemix national targets. The first relates to clinicians' commitments and perception regarding the importance of casemix and clinical documentation. Clinicians claimed that casemix was not their priority, and documenting a complete diagnosis was a burdensome task. This sentiment was shared in a study by Hatton (10) regarding physicians' perceptions of technology in medical practices who were reluctant to write complete diagnosis due to the fact that it would take more of their time. Clinicians also believed that it was not their responsibility to ensure accurate and complete clinical documentation related to casemix. This is a valid argument, as casemix is indeed time-consuming and clinicians alone should not be held responsible. Other health professionals may be appointed for this purpose. For example hospitals in

New Zealand appointed nurses and medical assistants to be in charge of clinical documentation and coding in the casemix system (11). Gaining clinicians acceptance and commitments towards casemix initiative is not an easy task, one that require major change management efforts. There may be low acceptance at the beginning of implementation; which will rise steadily until all clinicians are palatable about casemix input, process and the use of its output (12). Yet this was easier said than done. It was discovered that after years of data collection, and after constant requests for input data without witnessing any tangible or usable output, clinical staff became disillusioned with the casemix information system, perceiving it as just another management tool rather than a system with direct clinical benefit (13).

Pertaining to the heavy workload clinicians in this study claimed that they were very busy and did not have the luxury time to complete the clinical documentation. Working as a clinician is a hands-on work. Excessive workloads can negatively affect employees' health, productivity and morale. As found by Swanson and Power (14), time spent during on-calls, the ethical commitment to medicine, and work intruding into family time were identified as major causes of clinicians' work conflict. Moreover, clinicians in tertiary hospitals were especially overworked due to long working hours and suffered the most serious burnout putting them more at risk of making medical mistakes (15).

We also discovered that the effort shown by HOs and MOs in writing accurate and complete documentation depended on the roles of their superior. This attitude may stem from the lack of maturity as HOs are young adults. As portrayed by Ryan et al. (16) senior doctors who were in their second year of postgraduate medical training were more confident in making diagnosis and managing patients and had lower error rate compared to junior doctors. It was also postulated that most junior doctors in training, believed that neither they nor their patients would suffer serious consequences as a result of their mistakes (15).

The second theme revolved around the obstacles in performing the process of clinical documentation. Hospital E was an IT hospital, it was thought that the integration between the electronic medical record and the MalaysianDRG casemix system may ease the work process of clinical documentation. Yet surprisingly issues such as inadequate, outdated and damaged laptops, system failures and insufficient training in clinical documentation still exist and contributed to poor clinical documentation. This was confirmed by a literature review on electronic health record by Taylor (16) who demonstrated that incorrect use of software, faulty implementation, workflow burdens and insufficient training negatively affect the quality of the health record. Even though electronic medical records may improve quality of care and enhance the productivity of physician's practice (17), it may actually cause doctors to work more slowly as they need to gather more information for each patient (10). Example from computerized casemix system in New Zealand also found the expensive initiative produced little tangible clinical benefit and exuded poor track record (13).

The major strength of the study lies in the study design. Findings from both quantitative and qualitative approaches provide a complete understanding on the performance of the MalaysianDRG casemix system, its relevance to clinical documentation and the challenges in meeting the national targets. The limitation of study was the lack of generalizability of the qualitative findings.

CONCLUSION

It can be concluded that even though the performance of the MalaysianDRG casemix system in MOH hospitals is far from ideal, the trend on its KPI performance is showing positive signs of improvement. Since the national targets consisted of accurate and complete clinical documentation, clinicians must be made to understand the importance of clinical documentations in meeting these targets. However ensuring accurate and complete clinical documentation too has its challenges, made worse by a multitude of obstacles. Strategies to increase acceptance of casemix is crucial, as clinicians may not always be committed to this cause. Creating awareness and simplifying the work process on clinical documentation are highly recommended to reduce workload and resistance among clinicians. Adequate functioning laptops and a more user-friendly HIS must be supplied to ease the clinical documentation process. Trainings must be conducted regularly so that clinicians become more competent at diagnosing patient's main and other conditions. All these initiatives require top management support and hospital directors who embraced the casemix system. The MalaysianDRG casemix system is the way forward in health-care management; it serves as a budgeting tool, which if utilized properly may yield great financial benefits to the hospital.

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