



Financial incentives and patient selection: Hospital physicians' views on cream skimming and economic management focus in Norway

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ABSTRACT

This paper uses survey data to analyse physician views on the risk of cream skimming under a system with activity based financing (ABF) for hospital services. We used data from two nation-wide physician surveys. A survey undertaken in 2006 captures views following a large NPM-inspired structural reform in 2002. In contrast, a survey undertaken in 2016 captures views after a period of a higher degree of institutional and financial stability. We find that the majority of physicians believed that the 2002 reform both provided incentives for and led to more cream skimming. In 2016, however there is less consensus among physicians about the extent of cream skimming. Looking at different types of physicians we find some indications that physicians in leading positions are less likely to view cream skimming as a problem. However, there is concern that hospital management in general puts too much emphasis on economic issues.

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1. Introduction

Physicians are key decision makers in a hospital, and one would expect their decisions to be based on clinical judgements concerning what is best for their patients. However, physicians operate within the boundaries of an organizational and financial framework, and there may be a conflict between clinical autonomy and the incentives provided by governance and management structures. How physicians view and adjust to different organizational and financial environments is therefore of interest to policy makers.

Increased emphasis on economic incentives through the use of activity-based financing (ABF), often combined with increased institutional autonomy, has been a central characteristic of hospital payment models for the past 20 years [1,2]. ABF links hospital income directly to the level of activity and thus introduces a financial incentive into what otherwise would have been a purely medical decision process. There is a small literature on the managerial perspectives on the implementation of ABF in hospitals [3]. However, less is known about physician views. The contribution of this paper is that it explores physicians' views on whether the economic incentives in ABF lead to cream skimming through selection

of profitable patients, and to what extent they feel that hospital management generally puts emphasis on financial performance. The setting is the Norwegian public health care system.

We ask three questions: first, whether physicians believe the payment system to *encourage* prioritisation of profitable patient groups, and second, whether they believe that it *actually leads to* prioritisation of profitable groups. Finally, we ask to what extent physicians feel that hospital management puts emphasis on the financial performance of the hospital.

Views may change over time, as both organizations and professions adapt to new organizational and financial models. A central issue in this paper is therefore to explore physician views in different contextual settings within the same country. The Norwegian health care system was characterized by several NPM inspired reforms in the late 1990s and early 2000s. First, ABF was introduced in 1997, which implied that a proportion of the block grant from central government was replaced by a matching grant depending upon the number and composition of hospital treatments measured by the DRG system. Then, in 2002 hospital ownership was centralized from the county to the state level, and hospitals organized as regional and local trusts. We utilised data from a survey in 2006 to explore how a reform that changed both the ownership and governance of hospitals changed physician perceptions of the incentives in the financing system. Furthermore we used data from a similar survey in 2016 to see how physicians view the incentives

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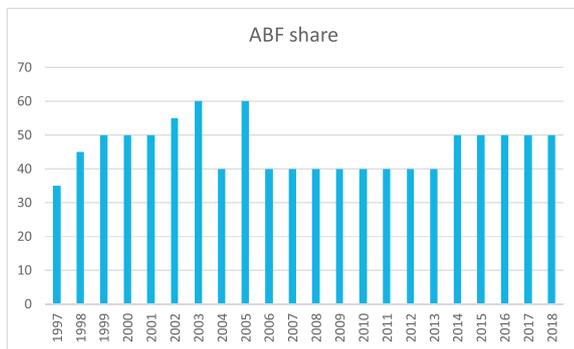


Fig. 1. ABF share.

in the financing system after a period of stability, i.e. with no major reforms.

2. Institutional Background

The Norwegian healthcare system is tax based and characterised by a predominantly public production of services. The state is responsible for the provision of specialised care through four (initially five) regional health authorities (RHAs). These RHAs are organised as independent enterprises (“trusts”). Each RHA owns a number of local hospital trusts. Physicians are publicly salaried employees. The present structure came into place with the hospital reform in 2002. The reform was a combination of centralization of ownership from 19 counties to the state, administrative decentralization through the five regional health authorities (RHAs) and a change of governance structure through the organization of the RHAs in trusts [4]. In 2007 two of the RHAs were merged; the resulting RHA South-East covers approximately 55 % of the total population.

The state finances the RHAs partly through risk-adjusted capitation and partly by ABF. The RHAs finance their hospital trusts based on the same principles. ABF was introduced in 1997, and the main motivation was to provide incentives for hospitals to simultaneously increase activity and efficiency. The payment system is based on diagnosis related groups (DRG), and the share of ABF has varied between 30 % in 1997 and 60 % in 2003 and 2005 (Fig. 1). In the initial years with ABF, the share changed almost annually. After 2006, the share remained stable at 40 % until it was increased to 50 % in 2013.

Put simply, the thinking behind ABF is as follows: First, when hospital income depends on the level of activity, there will be an incentive to increase activity. Second, since hospital income per patient is fixed, there is an incentive to decrease costs, i.e. increase efficiency. However, given that there is heterogeneity both between and within DRGs, hospitals may also increase their income by cream-skimming. This can be done by focusing on the less costly patients within a DRG, by focusing on DRGs where average cost is believed to be lower than the reimbursement rates or by adjusting diagnostic coding so that patients are grouped in DRGs with higher reimbursements.

As noted, ABF was introduced in Norway in 1997 followed by an ownership reform in 2002. There is a relatively small strand of papers looking at the effects of the introduction of ABF and the ownership reform in Norway (see e.g. [1,3,5,6]). In his review Jacobsen [1] showed that the literature displays a more positive association between ABF and technical efficiency than cost efficiency. This is most likely due to the way inflationary pressure on input markets negates cost efficiency improvement when activity is increased.

A potential side-effect of ABF is cream-skimming of profitable patients. Anthun et al. [7] studied the extent of cream-skimming

by looking at changes in coding practice on an aggregate level. They found little evidence that changes in expected profitability affects coding practice on a systematic level. Melberg et al. [8] on the other hand found that hospitals responded to increased DRG-prices by increasing activity more in groups where prices increased than in groups where prices decrease or remain unchanged. Focusing on day surgical DRGs, Martinussen and Hagen [9] investigated whether cream skimming occurred after the introduction of ABF in 1997 and if the problem further increased after the 2002 organizational reform when hospitals were turned into trusts. The analysis gave some evidence of cream skimming in the first period of ABF, but it did not increase after the 2002 organizational reform. A softening of budget constraints after the hospital reform of 2002 may explain why cream skimming did not increase after the reform.

While there is a strand of literature that has focused on hospital or system level effects of ABF, little is known about how the system is viewed by physicians. By providing a physician perspective on these issues we believe that our analysis supplements the existing literature.

3. Materials and methods

Our data comes from two surveys conducted among hospital physicians in 2006 and 2016 [6,10]. Both studies used Questback, and respondents were recruited indiscriminately through the membership register of the Norwegian Medical Association (NMA). The respondents were either members of the Norwegian Junior Doctors' Association or the Norwegian Association of Senior Hospital Physicians, and they were all employed by a Regional Health Authority (RHA). The surveys were conducted anonymously and in cooperation with the NMA.

The data from 2006 is based on a survey distributed among randomised 2500 NMA members, while the survey from 2016 was sent to 3000 randomised NMA members. The response rate was 53 % and 33 %, respectively. The questions in the 2006 survey were phrased leaving the respondents to compare the situation in 2006 with the situation before the hospital reform in 2002 [7]. Although the response rate was as low as 33 % in 2016, studies show that non-response can, but does not necessarily have to, induce response bias in a survey [11]. The representativeness of the respondents was checked and qualified by matching it to the NMA register. The respondents differ little in terms of characteristics of members in the registry, but the deviation is greatest in terms of regional health authority affiliation. Compared to the NMA register, Oslo University Hospital is especially underrepresented and so is south eastern Norway RHA in general [4].

3.1. Dependent variables

The three questions in focus were asked in both surveys, although the framing and to some extent wording differed. The questions used from the 2006-survey were:

- “Does the reform encourage prioritisation of ‘more profitable diagnostic groups’ more or less than before, or is there no change?”
- “Has the reform actually led to ‘more profitable diagnostic groups’ being prioritised in a lower or higher extent than earlier, or is there no change?”
- “In your opinion, to what extent does the senior management emphasise financial management, accounting and budgeting?”

In 2016 the questions were phrased as the following statements:

- “Today’s form of organisation encourages prioritising of ‘profitable diagnostic groups’”.

- “Profitable diagnostic groups’ are being prioritised because of today’s form of organisation.”
- “In your opinion, to what extent does the senior management emphasise financial management, accounting and budgeting?”

We note that the 2006 questions were specifically asking about the impact of the hospital reform in 2002, while the 2016 questions referred to today’s system phrased as “form of organisation”, respectively. The third question is framed identically in the two surveys. The answer options were also phrased differently. In 2006, the questions asked whether the statements were lower, higher or if there had been no change since before the reform. In the survey from 2006 the respondents could choose between: “much lower” (1), “lower” (2), “unchanged” (3), “higher” (4) or “much higher” (5). In 2016 the questions asked for the degree to which the respondents agreed with the statements made. In this questionnaire, the respondents could choose between “to a very small extent” (1), “to a small extent” (2), “to some extent” (3), “to a large extent” (4) and “to a very large extent” (5).

Given these differences we shall refrain from interpreting differences between 2006 and 2016 as changes in physician perceptions. In some respects, however, differences between 2006 and 2016 are still worth pointing out.

3.2. Explanatory variables

Following previous studies on profession-based subcultures in medicine [12–15], we expect that the views on both cream skimming and management focus may depend on the respondents’ position in the organization. Based on the findings of Degeling et al. [14,15] that medical managers are strongly committed to a financial realist stance, we expected the department chief physicians and clinical leaders, in comparison with their colleagues, to evaluate cream skimming and management less critically. Our explanatory variable of main interest is thus whether the respondent is in a leadership position or not. Leaders might have a different perspective on clinical practice as well as a deeper economical understanding, therefore giving them a different view on the impact of ABF. Leadership role was captured through a dummy-variable with clinical leaders, heads of department and heads of section assigned the value of 1, and 0 to the rest.

We furthermore wanted to investigate the role of *speciality*, more specifically whether the physician is a surgeon or not. The DRG system is generally thought to perform better in terms of medical homogeneity on surgical patient groups. Speciality entered the model as a dummy-variable with the value of 1 assigned to those with surgery as field, and other specialities as the reference category.

In addition to leadership position and speciality, many other factors may also contribute to hospital physicians’ views on cream skimming and management focus, such as working hours, frequency of night shifts, salary, etc. Obviously, dissatisfied physicians could be more liable to view cream skimming and economic focus as more problematic than those who are content. It would therefore be relevant to control for organizational commitment, work environment and organizational climate, but unfortunately no such information was available in our data. In order to control for organizational climate, we instead included a variable that reflects whether the respondents had *intention to leave*. This variable was based on a question with the following wording: “Are you currently having plans or wishes to leave this hospital in order to go to another workplace?” (1 = ‘yes’, 2 = ‘no’, 3 = ‘don’t know’). The variable capturing turnover intent was recoded into a dummy-variable, with the value of 1 assigned to respondents with intention to leave the hospital.

We also included a variable to reflect whether the respondent had a *foreign medical exam*. This is to control for the possibility that physicians with medical education from outside of Norway may have adopted different cultures and perspectives, and could thus potentially view the issues of cream skimming and management focus differently. This dummy-variable takes the value of 1 for respondents reporting to have a medical exam outside Norway.

The respondents’ *demographic background* is taken into account through age and gender. Age was measured through a dummy-variable that takes the value of 1 for respondents 40 years and under. This is a proxy to capture junior doctors, as we do not have specific information on whether they had finished their training. The variable for gender assigns the value of 1 for female respondents and 0 for males.

Finally, we also included dummy-variables for the different *hospitals*. These may capture cultural differences in the hospitals, and we are particularly interested in whether the merger of two RHAs into RHA South-East in 2007 and the merger of the three large hospitals in the capital of Oslo in 2010 have affected physicians’ views.

4. Results

We first present the physicians’ view on cream skimming and economic management in 2006 and 2016 (Table 1). As can be observed, there are differences between the two periods in the share of physician answers in categories 4 and 5. In 2006, more than 61 % reported that the reform to a “higher” or “much higher” extent encouraged the prioritisation of “more profitable diagnosis groups”. In 2016 only 46 % reported that the present system to a “large” or “very large” extent encouraged prioritisation of more profitable diagnosis groups.

The same pattern also applies to the question of whether cream skimming *did* take place: 46 % of the 2006 respondents reported that the reform to a “higher” or “much higher” extent actually led to “more profitable diagnosis groups” being prioritised. The corresponding share that answered to “large” or “very large” extent in 2016 was less than 30 %.

Turning to the perceptions of economic management, we on the other hand notice the opposite trend. Here the questions were identical in both years, which allows for better comparison. In 2006, less than 30 % reported that the management to a “large” or “very large” extent emphasised “financial management, accounting and budgeting”. In 2016, the corresponding share had increased to almost 84 %, of which as many as 44 % scored category 5. Hence, there was more than a 50 percentage point increase in the share of hospital physicians that viewed their closest managers to give priority to economic issues.

Next, we wanted to investigate whether the physicians’ perceptions of cream skimming and management focus on economy varied with relevant background variables. Analyses were performed separately on the 2006 and 2016 surveys, and results are shown in Tables 2, 3. Given that the dependent variables are dichotomous, the model was estimated via logistic regression. The estimates in the table thus express the odds ratios for reporting cream skimming and management focus on economy. The models were furthermore estimated as fixed effects with dummy-variables for each of the hospitals in order to control for possible variation between hospitals not accounted for in the analyses. The estimates for the hospital dummies are not reported in the tables.

Starting with the 2006 survey, few of the background variables seems to affect the perception of cream skimming after the hospital reform. The exception is age, where being a younger physician is associated with a higher probability of believing that the payments system encourages cream skimming. Notably, being a leader does

Table 1
Perceptions of cream skimming and economic management, 2006 and 2016. Percentage with frequency in parenthesis.

	(1)		(2)		(3)		(4)		(5)	
	2006	2016	2006	2016	2006	2016	2006	2016	2006	2016
Encourage cream skimming	0.2 (2)	5.5 (52)	0.6 (7)	11.1 (105)	37.9 (423)	37.1 (352)	48.3 (539)	34.5 (328)	13.1 (146)	11.9 (113)
Actual cream skimming	0.3 (3)	7.9 (74)	1.1 (12)	18.8 (176)	53.9 (598)	43.5 (408)	37.3 (414)	23.6 (221)	7.5 (83)	6.3 (59)
Economic management	0.9 (11)	0.4 (4)	4.2 (53)	1.9 (18)	17.7 (224)	14.1 (133)	47.3 (597)	39.8 (376)	29.8 (377)	43.8 (414)

Table 2
2006 survey Odds ratios with 95 % confidence intervals in parenthesis.

	«Encouraged cream skimming»	«Led to cream skimming»	«Higher management focus on economic matters»
Leader	.94 (.69–1.28)	.94(.68–1.29)	.86(.60–1.24)
Surgery	1.06 (.74–1.54)	.93(.65–1.35)	.89(.60–1.34)
Age < 40	1.65** (1.21–2.25)	2.10** (1.56–2.84)	1.04(.75–1.43)
Female	1.30 (.98–1.74)	.96(.73–1.28)	.90(.66–1.21)
Intention to leave	1.20 (.85–1.70)	1.45* (1.03–2.03)	1.12(.77–1.62)
Foreign medical exam	.91 (.68–1.21)	.95(.71–1.26)	.88(.65–1.20)
Constant	1.22	.67	2.85**
Nagelkerke R ²	.06	.09	.07
N	1069	1061	1213

* $p < .05$.** $p < .01$.**Table 3**
2016 survey. Odds ratios with 95 % confidence intervals in parenthesis.

	«Encouraged cream skimming»	«Led to cream skimming»	«Higher management focus on economic matters»
Leader	.66* (.47–.92)	.61** (.41–.89)	.95(.61–1.46)
Surgery	1.23 (.93–1.64)	1.42* (1.04–1.94)	1.06(.73–1.56)
Age < 40	.92 (.64–1.31)	.81(.54–1.21)	.84(.52–1.34)
Female	.77 (.57–1.03)	.71* (.51–.99)	1.20(.81–1.77)
Intention to leave	1.24 (.88–1.76)	1.49* (1.03–2.17)	1.69*(1.02–2.80)
Foreign medical exam	1.31 (.97–1.77)	1.17(.84–1.63)	.99(.66–1.47)
Constant	.73	.40**	4.31**
Nagelkerke R ²	.05	.10	.05
N	872	861	870

* $p < .05$.** $p < .01$.

not seem to affect the perception of the incentives and effects of the reform. Intention to leave is positively related to the likelihood of experiencing cream skimming taking place, with a reported odds ratio of 1.45, and significant at the 95 %-level.

For the 2016 survey the picture is somewhat different. Now holding a leader position is associated both with a lower probability of believing that the system provides incentives for and actually leads to cream skimming. Also, younger physicians no longer differ in their perceptions of the incentives in the system. Speciality furthermore appears to be of relevance for the question of actual cream skimming taking place, with respondents of surgical background having a higher probability of experiencing this than those

from other specialities (OR = 1.42, $p = .05$). We furthermore observe a negative relationship for female physicians, with a reported odds ratio of .71 ($p < .05$). Intention to leave is positively related to the likelihood of experiencing cream skimming taking place, with an odds ratio of 1.49, significant at the 95 %-level.

It appears that the variables included in our model are of little relevance for how management focus on economic matters is perceived. The only significant relationship is found for intention to leave, and only in the 2016 sample: as could be expected, having quitting intentions increases the probability of perceiving the management as emphasising economic matters (OR = 1.69, $p < .05$).

5. Discussion

We begin by discussing the results from the 2006 survey. We note that almost two out of three (61 per cent) of the physicians felt that the hospital reform in 2002 led to “higher/much higher” incentives to prioritize profitable patient groups. However, the share of physicians who experienced that the reform actually led to such prioritization was substantially lower at around 45 per cent. Thus, although a large number of physicians expressed concern about the incentives in the system, a smaller number actually believed that the change in incentives also had led to an actual change in behaviour. Still, one may argue that 45 per cent of physicians believing that the system actually leads hospitals to prioritize profitable patients is still quite a high number.

Very few physicians (around one in a hundred) felt that the reform led to “lower/much lower” incentives to prioritize profitable patient groups, with similar numbers for actual prioritization. As noted, when the reform was implemented in 2002, ABF had already been in place for nearly five years. As such the reform did not represent a change in financing system but rather in the model of governance. Thus, one interpretation of our data is that the combination of centralized ownership and organizing hospitals as trusts have strengthened the inherent incentives of cream skimming in ABF.

This could be related to the fact that more than 75 per cent of the physicians reported that the hospital reform led to a “higher/much higher” focus on economic matters. This is a high number, but not surprising. One of the main motivations of the reform was to reduce budget deficits and what was perceived as a gaming of the system from both hospitals and counties [16]. As noted in section 2 the empirical literature on cream skimming in Norway is conflicting. Some authors [8,10] find indications of cream skimming for specific groups, but it does not seem to be of a magnitude that manifests itself in analyses of aggregated data [7]. Furthermore, of these only Hagen and Martinussen [10] looked at changes before and after the hospital reform and they were unable to find any effect of the reform.

The results of the 2016 survey shows that ten years later, the share of physicians experiencing that the present organization to a “large” or “very large” extent provides incentives or leads to profitable patients being prioritized is around 45 per cent and 30 per cent, respectively. Notably, nearly one out of six believe that the system only to a “very small/small” extent provides incentives to prioritize profitable patients, and one out of four believe that the system only to a “very small/small” extent actually leads to a prioritization of profitable patients.

Thus, while a majority of physicians viewed the changes initiated by the hospital reform in 2002 negatively, the views on the present system seems to be more nuanced. There are, however, differences in how physicians perceive the incentives in the system and the degree to which they believe that hospitals actually act on them. Thus, the share of physicians who perceive that the present organization to a “high/very high” degree encourages the treatment of profitable patients is almost three times as high as those who answer “very small/small” (46 vs 17 per cent). The corresponding shares when asked whether the system actually leads to the prioritization of profitable patients are 30 and 27 per cent.

It is tempting to suggest that physician views have changed in the period from 2006 to 2016. However, due both to the different phrasing of the questions and response categories, this is not an interpretation that follows from the data. For instance, it is possible to assess the present system to only provide weak incentives for treating profitable patients and at the same time experiencing that the incentives to do so were strengthened after the 2002 reform. It does seem, however, that while physicians overall reacted negatively to the hospital reform in 2002, there is now a substantial

variation and not a clear picture on how they view the incentives in the present organizational and financial model.

Lastly, we note that six out of seven physicians consider hospital management to emphasize economic matters to a “high/very high” degree. Combined with the results from the 2006 survey it points to an environment where physicians experience that the economic focus has increased and remains at a very high level in hospitals. Unfortunately, the survey does not allow us to conclude whether they regard that this focus as appropriate or not.

Turning to the results from the regression analysis we note that physicians who are leaders are not different from other physicians when it comes to the perceived effects of the reform in 2002. However, the 2016 survey indicates that leaders are less likely to believe that ABF provides incentives for and leads to cream skimming, than non-leaders. This provides some support for our hypotheses that leaders will be more favourable to economic incentives than non-leaders. We note, however, no difference in how they view management focus on financial performance. This is in line with findings in similar studies from Norway [16,17].

Few of the other background variables are statistically significant. Young physicians are more likely to believe that the reform in 2002 provides stronger incentives for cream skimming. However their assessment of the present organization does not differ from older physicians. Also there is some support from the analysis that surgeons are more likely to believe that the system promotes and leads to cream skimming. Again, this is in line with our hypotheses, where the DRG-system is assumed to be more homogenous for surgical than for medical patients, and thus more prone to cream-skimming.

It is commonly argued that medical doctors will resist market-inspired reforms in healthcare [18,19]. The reason is that these types of changes tend to challenge their role, identity and autonomy. There is a concern that such reforms will increase the emphasis on economic aspects of health care and thus may challenge the medical principles that guide hospital activities, even if the reforms were typically motivated by a need to improve equity, quality and efficiency [12]. Our results seem to warrant such concerns, since hospital physicians both experience that patient selection takes place and that there is an increasing management focus on financial issues.

The study of cream skimming has traditionally been rooted in the economic literature, with the main ambition being the development of financing systems that reduces the scope for such behaviour (e.g. [20–23]). Few earlier studies have explored the actual extent of cream skimming building on the experience of the hospital physicians. Clearly, with their closeness to and insight into the clinical activities and daily experience with patient priorities, the hospital physicians’ own assessments may provide a more realistic picture of patient selection than aggregated hospital data can.

The research on health reforms has documented that both managers and hospital physicians have had to adapt to the new institutional logics following the increasing demands for efficiency and budgetary discipline [24–26]. However, to our knowledge, few earlier studies have explored how hospital physicians themselves assess their management’s focus on financial issues. Physician turnover is a critical issue in health care systems globally, and a recent Norwegian study shows that a «professional-supportive» management focus – as opposed to a «economic-operational» management focus – increases hospital physicians’ probability of reporting intentions to leave their job [27]. The general perception among hospital physicians of an increasing management emphasis on economic issues, as documented in this study, may thus cause some concern.

Finally, our study also adds to the literature addressing the professional subcultures in medicine, which has investigated whether

assessments of health reform differ between medical doctors with managerial responsibilities and their colleagues. This literature distinguishes between the “hybridization thesis”, which posits that medical professionals in general adopt management accounting techniques in the context of NPM reforms, thereby fundamentally altering the nature of the medical profession [28], and the “polarization thesis”, which proposes that separate subgroups instead emerge to manage financial and administrative responsibilities, leaving the fundamental values and practices of the wider profession unchanged [29–31]. Our results lend partial support to the latter perspective, as we found significant differences between leaders and non-leaders in their perceptions of cream skimming taking place. On the other hand, the lack of such differences in the view of economic management focus seems to contradict this.

6. Concluding comments

This analysis adds to the literature on the effects of health care reform and hospital payment systems by focusing on the perspective of the physicians. Although the two surveys are similar in many respects they are sufficiently different to preclude any conclusions about how physician attitudes have evolved in the period after the reform, as physicians have become more familiar with both the payment and the governance model. Subsequent studies should focus on whether perceptions are stable over time as well as whether they are aligned with actual physician behaviour.

Credit author statement

GHT and JB: Did the literature review, wrote the original draft.
 PEM: Designed the survey and performed the regression analysis.
 JM: Conceived the analysis, reviewed and edited the original draft.

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