An Effective System to Measure and Report Quality Indicators in Acute Medical Units

J Atkinson, L Barton, A Harrison & N Roper

Abstract

The Society for Acute Medicine has developed a number of clinical quality indicators by which all UK Acute Medicine Units can bench mark their activity. These will help to ensure high quality care for patients, inform the continuing development of acute medical services and demonstrate the positive impact of this new specialty. Prospective collection of these data may be a challenge for many busy units. This paper describes a local solution developed in house in a North East hospital. It demonstrates how the data collected can be analysed to assess the effect of changes in consultant presence on the unit and also time taken for patients to be seen by a doctor. The limitations of the system and potential for future development are considered.

Keywords

Quality indicators, patient flow, acute medicine units, reporting

Introduction

Acute Internal Medicine is a new and rapidly growing hospital speciality. Acute Medical Units (AMUs) are now established in many UK hospitals[1] with the rate of expansion in acute and general medical consultants in the UK now above that seen in other specialities.[2] It has been suggested that AMUs can reduce in-patient mortality, length of stay and emergency department access without increasing readmission rates but robust multi-site data is lacking.[1] As acute medical services develop there is an urgent need to define and measure key performance indicators. These should enable the identification of high quality, safe and effective patient care and also inform the continuing development of acute medical services. As a specialty we should aim to measure and publish this information systematically, to allow benchmarking, sharing of good practice and demonstration of improvements. Achieving this is practically and efficiently is a key challenge for Acute Medicine.

The Society for Acute Medicine (SAM) has developed four clinical indicators (Figure 1) as a minimum standard.[5] It is envisaged that these will be expanded with time. Within local organizations 'Clinical Dashboards' have been recommended as a simple graphical tool to inform daily decisions that drive quality improvement within teams.[6]

The challenge for many AMUs is how to collect and process the data generated by the large volume of patients admitted on a daily basis. Retrospective and paper based collection is time consuming and risks bias due to incomplete documentation. Prospective, data collection requires information technology and systems designed to work in the "real world" environment of a busy AMU.

North Tees and Hartlepool NHS Trust in the North East of the United Kingdom has developed a local solution to address these issues.

One working solution

North Tees and Hartlepool NHS trust has two district general hospital in the North East of England, admitting an average of 60 patients per day over both sites. We developed a bespoke Bed Management solution during the summer of 2009

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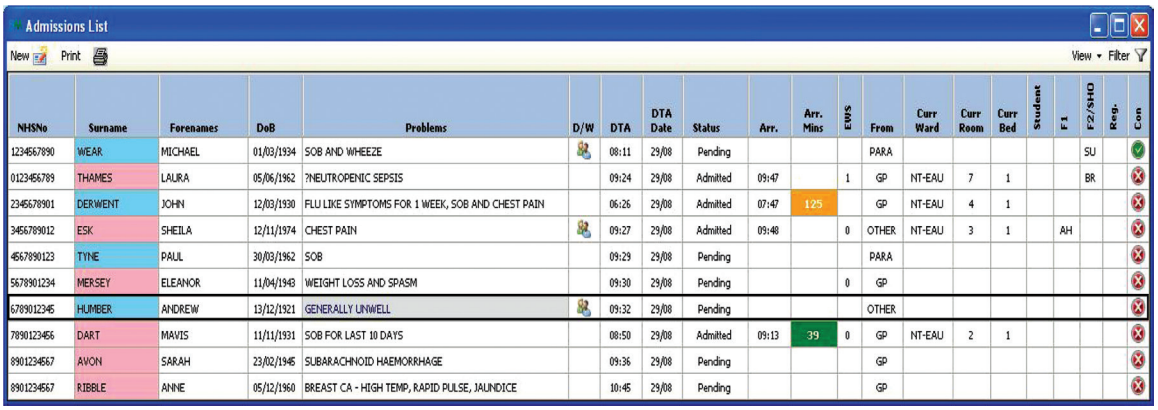
1. All patients should have an early warning score measured and documented upon arrival on the Acute Medical Unit (AMU).
2. All patients should have undergone full clinical assessment and have a management plan initiated within 4 hours of their arrival on the AMU.
3. All Patients should be reviewed by the admitting consultant physician or an appropriate speciality consultant physician within 14 hours of their arrival on the AMU.
4. All acute medical units should collect the following data:
   - Hospital mortality rates for all patients admitted via the AMU
   - Proportion of patients discharged from the AMU within 48 hours of admission
   - Proportion of patients readmitted to hospital within 7 days of discharge from the AMU

Figure 1. Minimum suggested standards for Quality Indicators in Acute Medicine[5]



Admissions List

New Print View Filter

NHSNo	Surname	Forenames	DoB	Problems	D/W	DTA	DTA Date	Status	Arr.	Arr. Mins	EWS	From	Curr Ward	Curr Room	Curr Bed	Student	F1	F2/SHO	Reg.	Con
1234567890	WEAR	MICHAEL	01/03/1934	SOB AND WHEEZE		08:11	29/08	Pending				PARA						SU		
0123456789	THAMES	LAURA	05/06/1962	?NEUTROPENIC SEPSIS		09:24	29/08	Admitted	09:47		1	GP	NT-EAU	7	1			BR		
2345678901	DERWENT	JOHN	12/03/1930	FLU LIKE SYMPTOMS FOR 1 WEEK, SOB AND CHEST PAIN		06:26	29/08	Admitted	07:47	125		GP	NT-EAU	4	1					
3456789012	ESK	SHEILA	12/11/1974	CHEST PAIN		09:27	29/08	Admitted	09:48		0	OTHER	NT-EAU	3	1		AH			
4567890123	TYNE	PAUL	30/03/1962	SOB		09:29	29/08	Pending				PARA								
5678901234	MERSEY	ELEANOR	11/04/1943	WEIGHT LOSS AND SPASM		09:30	29/08	Pending			0	GP								
6789012345	HUMBER	ANDREW	13/12/1921	GENERALLY UNWELL		09:32	29/08	Pending				OTHER								
7890123456	DART	MAVIS	11/11/1931	SOB FOR LAST 10 DAYS		08:50	29/08	Admitted	09:13	39	0	GP	NT-EAU	2	1					
8901234567	AVON	SARAH	23/02/1945	SUBARACHNOID HAEMORRHAGE		09:36	29/08	Pending				GP								
8901234567	RIBBLE	ANNE	05/12/1960	BREAST CA - HIGH TEMP, RAPID PULSE, JAUNDICE		10:45	29/08	Pending				GP								

Figure 2. Example of admissions list view, using fictitious data

to provide a real time trust wide view of current bed occupancy, as subsequently recommended nationally.[7] This software was subsequently tailored to meet the specific needs of the Trust's AMUs. A set of user defined filters allow views of the patient information most pertinent to individual roles; administrative staff can focus on referral information; ward coordinators on bed allocation; and an admissions list ensures patients are seen in a clear and timely manner. A public and private view is incorporated to ensure compliance with information governance and patient confidentiality. The system can be accessed and modified from desktop computers but is also displayed on centrally located large screen displays. Any changes automatically update all views.

Once the nurse coordinator admits a patient onto the system, a timer starts. This is initially green, if the patient is still waiting to be seen after 2 hours it turns amber, and after 4 hours it turns red; this provides a clear visual prompt to the whole team. Patients are tracked so that any transfers off AMU prior to consultant review are highlighted and remain on the admission list, until the senior review has occurred. These data feed into metric driven analysis via the Trust's Intranet based reporting system which updates daily (Figure 3).

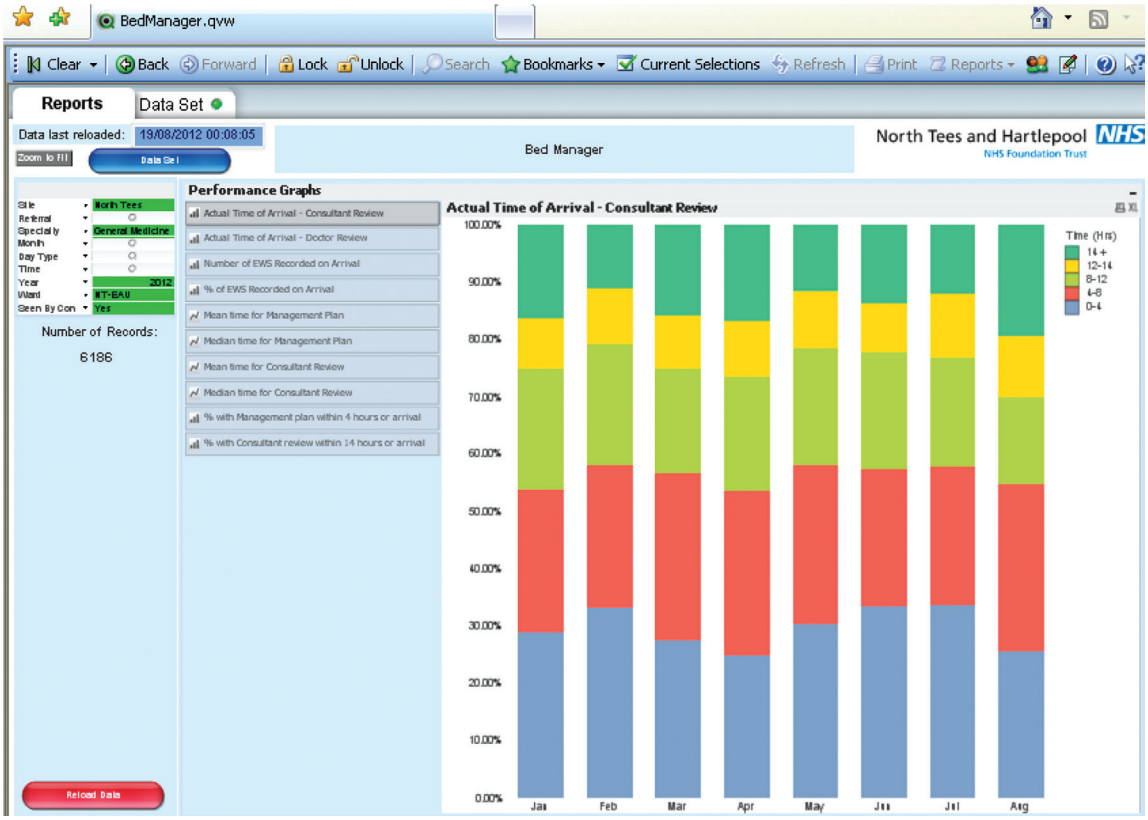


Figure 3. Bed manager reporting system.

This system allows rapid and flexible interrogation of the data.

Filters allow easy manipulation of the data to analyse the quality indicators described by SAM:

- time and source of patient referral
- time of patient arrival on AMU
- time patient first seen by a junior doctor, reviewed by a registrar and seen by a consultant
- time and destination of patient discharge from AMU

The system does not currently enable monitoring of hospital mortality rates for all patients admitted via the AMU, proportion of patients discharged from the AMU within 48 hours of admission and proportion of patients readmitted to hospital within 7 days of discharge from the AMU. These are currently monitored via Dr Foster but more detailed information should be possible with further development of the local bespoke system.

Clinical Quality Indicators in Practice

To illustrate this local system we will describe data addressing quality indicators 2 and 3 and also show how the system can quantify outcome measures following changes in consultant working pattern.

We reviewed the time taken to see a doctor and to consultant review for the three months before and after August 2011 as this was when the consultant presence on AMU was extended from 5pm to 8.30pm.

In this period at North Tees Hospital 66% of patients were seen by a doctor within 1 hour of AMU admission and 99.6% within 4 hours (see Figure 4). There is no significant variation in the time taken for review over the study period, particularly considering the August change over date for new junior doctors. This data set, with the presumption that when a patient is seen a management plan is then initiated, addresses quality indicator 2.

These data can be interrogated further looking at differing time of the day (day shift or night shift) (Figure 5). At North Tees there is no significant difference in the time patients wait for their initial medical assessment comparing daytime and nighttime (t-test: $p<0.005$). These data can be used to monitor out of hours working and plan staffing.

Using established prospective data collection within the trust we were able to monitor the effect of the increasing the duration of consultant presence on the AMU.(Figure 6).

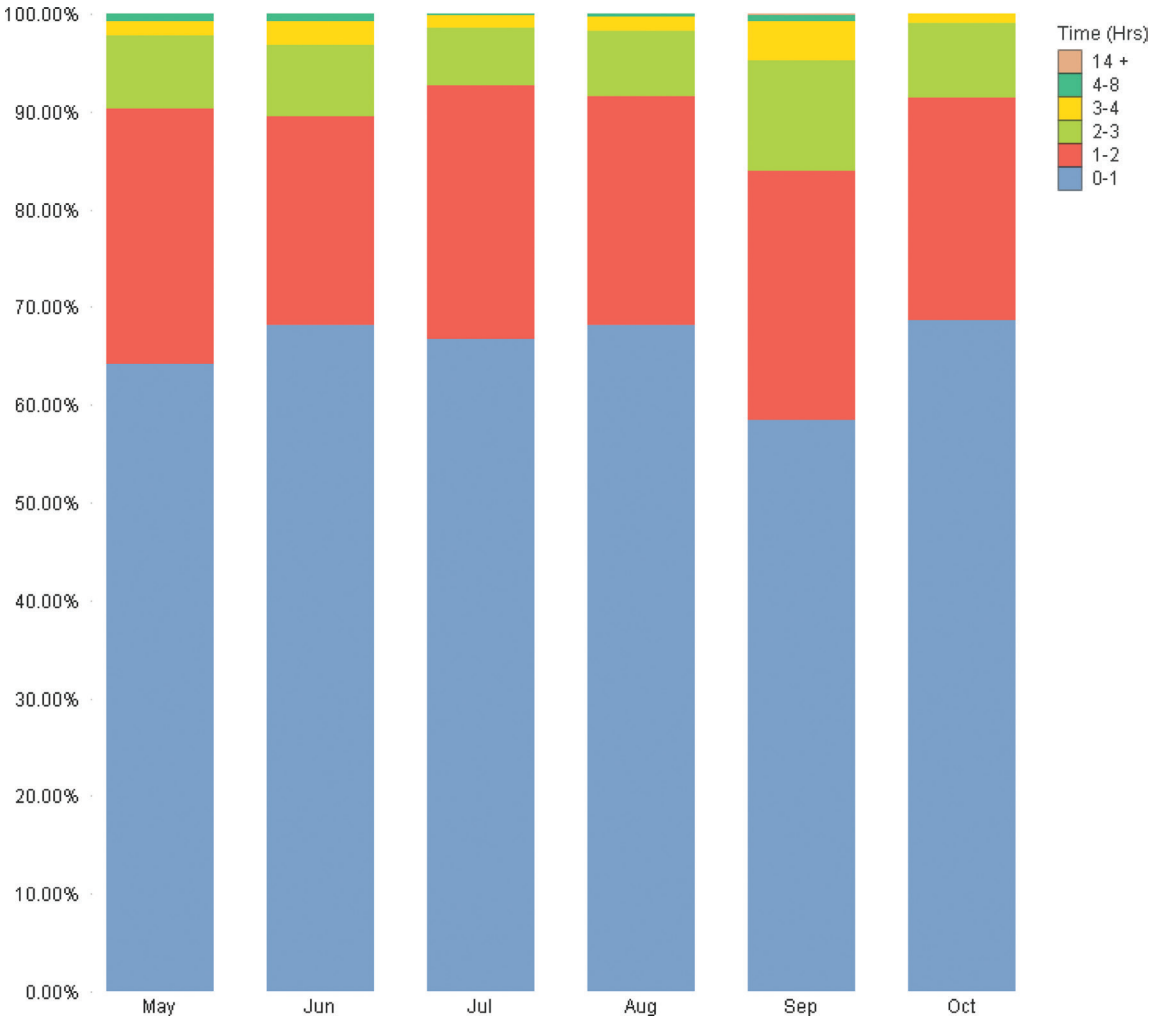


Figure 4. Time between patient arrival on AMU and initial assessment by first doctor (any grade)

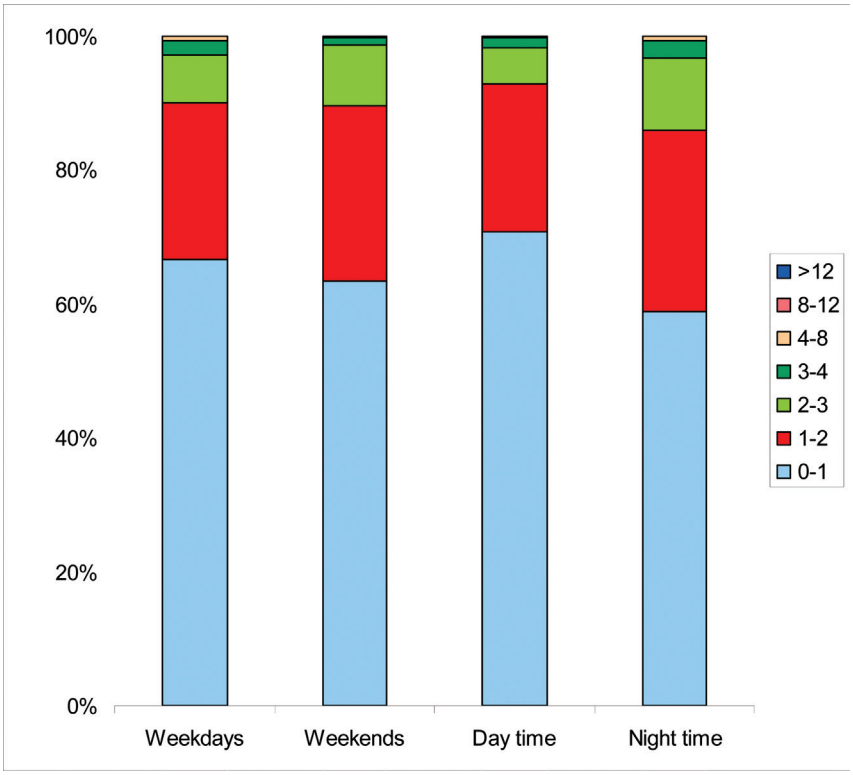


Figure 5. Time between AMU arrival and initial assessment by first doctor comparing out of hours and weekend data (May to October 2011)

Prior to August 2011, 26% of admitted patients were seen by a consultant within 4 hours and 77% within 14 hours. Since the extension of consultant working hours in August 2011 this has improved to 31% and 86% respectively (Figure 7).

Further interrogation of the data shows that this improvement is only statistically significant on weekdays, the improvement seen at weekends has not met significance (Figure 8). This difference may represent the additional duties of consultants at weekends such as a ward round on the short stay unit as well as reviews on ITU and other wards.

Discussion

The aim of this paper was to demonstrate how our local bespoke system can address the clinical quality indicators set out by SAM. It is also to demonstrate how the same system can assess the effect of changes made to the service.

We can demonstrate that at North Tees hospital 99.6% of patients are seen by a doctor within 4 hours of arrival on AMU. There is no significant difference out of hours. We are able to monitor this target in real time and can highlight cases or time periods where we fall outside this for further investigation, These data can also be used to motivate local teams. In future it is possible that the system can be developed to include data on laboratory and radiology work to give further depth to the efficiency and quality of the assessment taking place.

Since the extension of on site consultant working hours on the AMU we can demonstrate that the proportion of patients reviewed within 14 hours had risen from 73.6% to 86.4%. These data can also allow cost effectiveness calculations to be made.

Limitations

The quality of any data analysis is only as good as the information fed into it. Realistically there are times when a junior may allocate themselves to a patient but then is asked to do some other task; resulting in an underestimation of the time the patient was seen. Time of first assessment is a marker of efficiency rather than necessarily quality of care (i.e the actual management provided), although it is hoped that as soon as the doctor makes contact with the patient they will be performing an initial ABC assessment, which forms part of the initial management plan. It is known that in a number of diseases, such as sepsis, delay directly effects outcome.[8] Additionally on a post take ward round the recording of the time at which patients are seen may be "batched"; the time being recorded after an entire bay of patients has been seen. However this will tend to overestimate any delay which may have occurred.

Future plans include the development of a "virtual short stay ward" to facilitate weekend discharges and to incorportate a handover "jobs list" which will follow the patient after transfer to another ward.

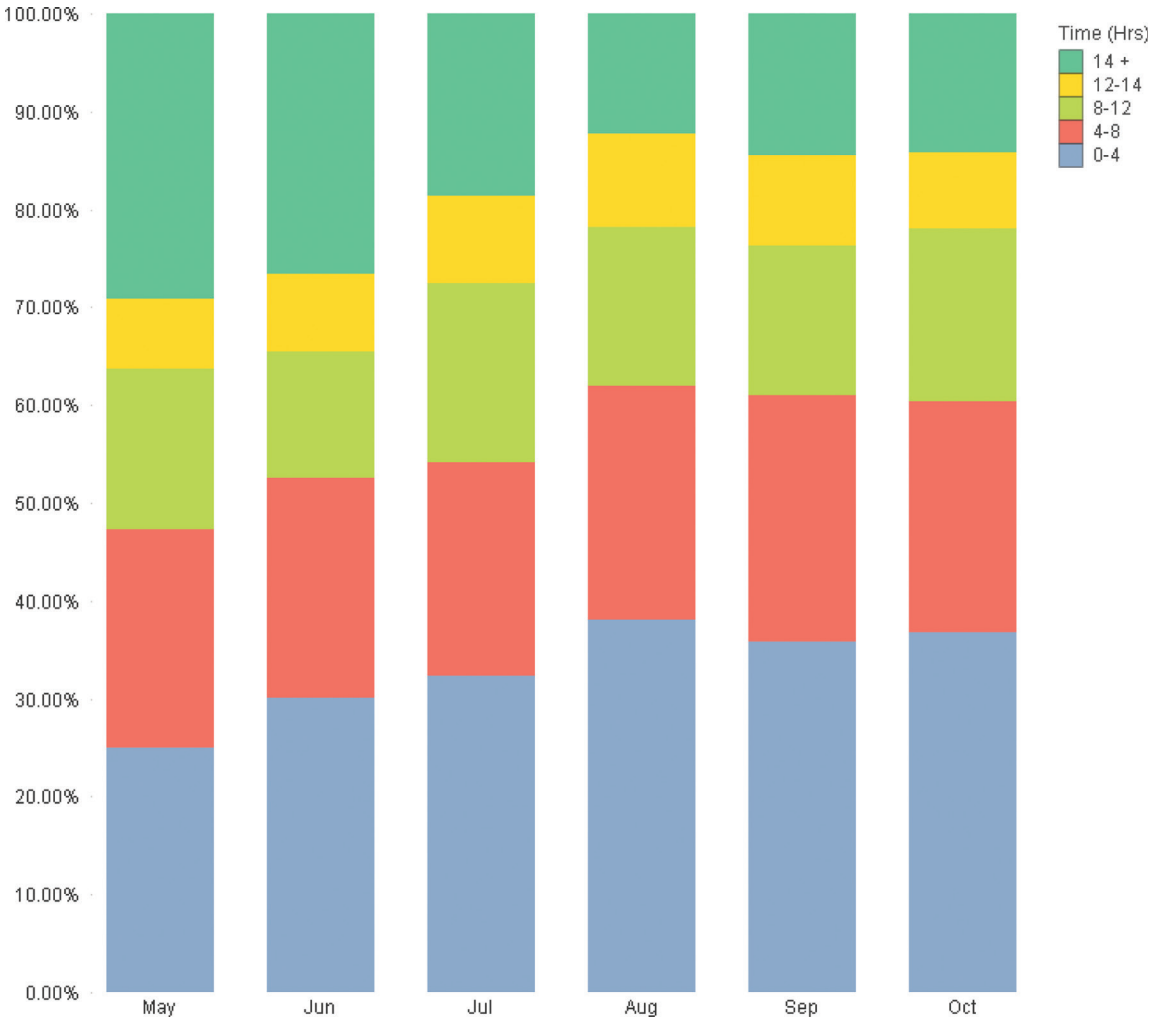


Figure 6. Time from AMU admission to first review by Consultant

	May-July	August-October
Total admissions seen by consultant	2278	2282
seen within 4hrs (%)	584(26)	717(31)
seen within 14hrs (%)	1747(77)	1969(86)

Figure 7. Time to consultant review

Conclusion

The bespoke local system described in this paper has enabled prospective collection of data relating to the SAM Clinical Quality Indicators. These data can be used locally to assess the effect of interventions such as changes in staffing levels and timings of shift patterns. Use of such systems across the UK will enable the development of a national perspective on the quality of care on the Acute Medical Unit, and allow benchmarking of practice between different Units.

	Median time to see consultant (June – August) (min)	Median time to see consultant (August-October) (min)	P value
All	492	408	<0.001
Weekdays	503	372	<0.001
Weekends	463	457	<0.28 (NS)

Figure 8. Time to consultant review on weekdays and weekends

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