Palliative Care in the HSMR Discussion

December 2022

Health UK

HSMR Methodology Update

This palliative care review is part of a wider HSMR methodology update. In this methodology update, we are reviewing and updating the HSMR based on a number of areas, such as:

- Updating the diagnosis groups included in the model

- Reviewing how we will include palliative care in model

- Updating deprivation quintiles from Carstairs to IMD

- Updating comorbidity groups and weights from Charlson to Elixhauser

This is not an exhaustive list of changes, but we will publish guidance and documentation once the changes and updates have been made.

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Palliative Care – Current Picture

In the HSMR model currently, palliative care is defined as follows:

- A flag for the **entire superspell** when **any spell** within the superspell has a **treatment function code 315** or contains **Z515** in **any** of the **diagnosis** fields.

The most recent 12 months of data show palliative care proportions vary across the country from 0.9% to 5.7%.

Diagnoses - HSMR | Mortality (in-hospital) | Sep 2021 - Aug 2022 | ALL (acute, non-specialist) by Palliative care

Palliative care = Palliative

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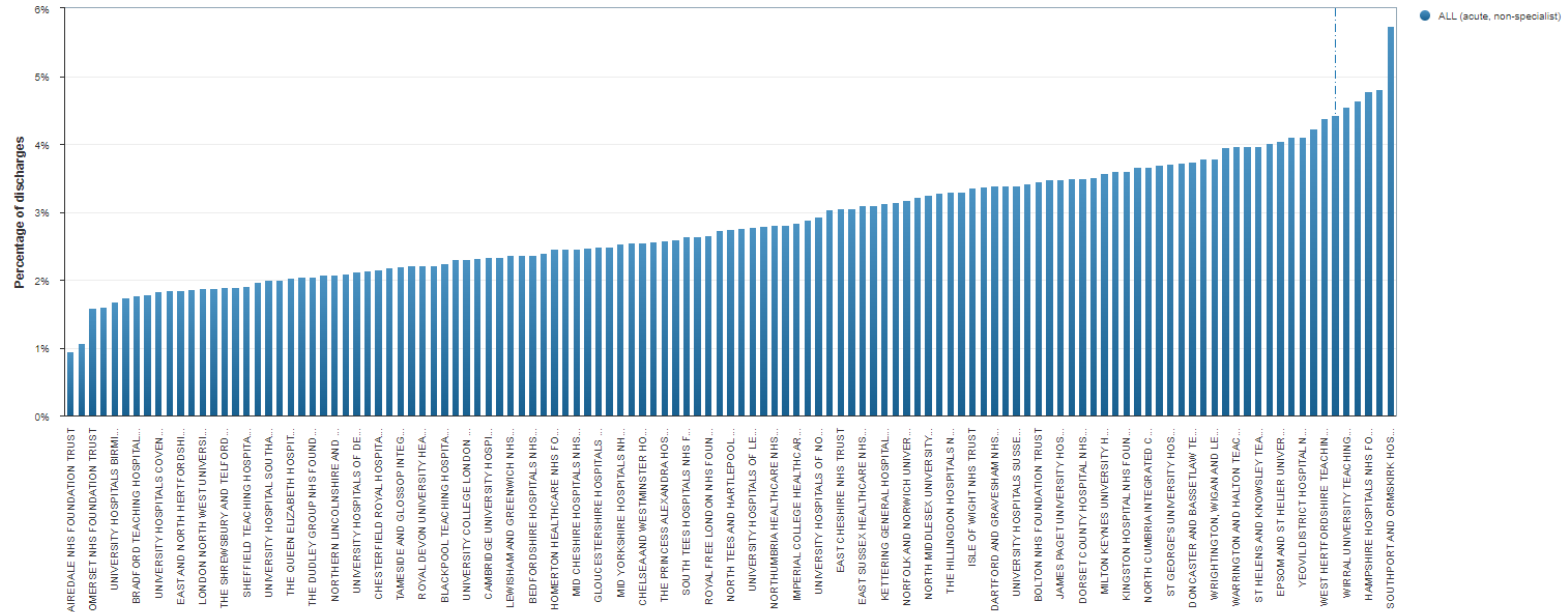
Palliative Care - Review

- Palliative care is not consistently recorded between trusts, with trusts that have an on-site palliative care team more likely to record palliative care flags. It is harder for trusts without an on-site team to flag patients as palliative.

- Therefore, to make the use of palliative care in the model fairer, we decided to scope out how we can change the palliative flag.

- Some suggestions for changes were:
  – Removing palliative care from the model altogether
  – Expand the flag to also include non-specialist palliative care. This would then create an 'end-of-life' flag.
  – Instead of flagging if a palliative code appears at any point in the spell, limit this to episodes that start on the admission date or the following date.
  – Limit the flag to appearing only on admission – so in the first episode of care

- It is important to remember, when considering these changes, this isn't the only change that will be made to the HSMR model. Other changes will be made, such as the diagnosis group changes, deprivation changes and comorbidity methodology changes.

Removing Palliative Care

We have reviewed models with and without the palliative care flag included.

We reviewed C-statistics and AIC values from the models to make our decision.

- C-statistics are a measure of good fit, to show how well the model is predicting values. The closer the value is to 1, the better the model is.

- AIC values are used to compare regression models, with the lowest AIC value considered the best fit.

We found:

• Removing palliative care from the model made each model performance worse

- C-statistics were lower and AIC values were higher for each diagnosis group model with palliative care removed
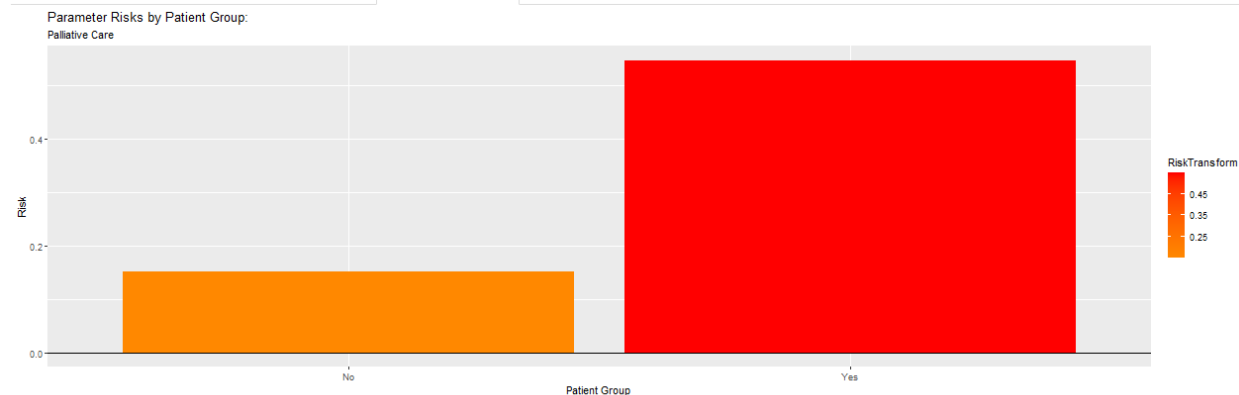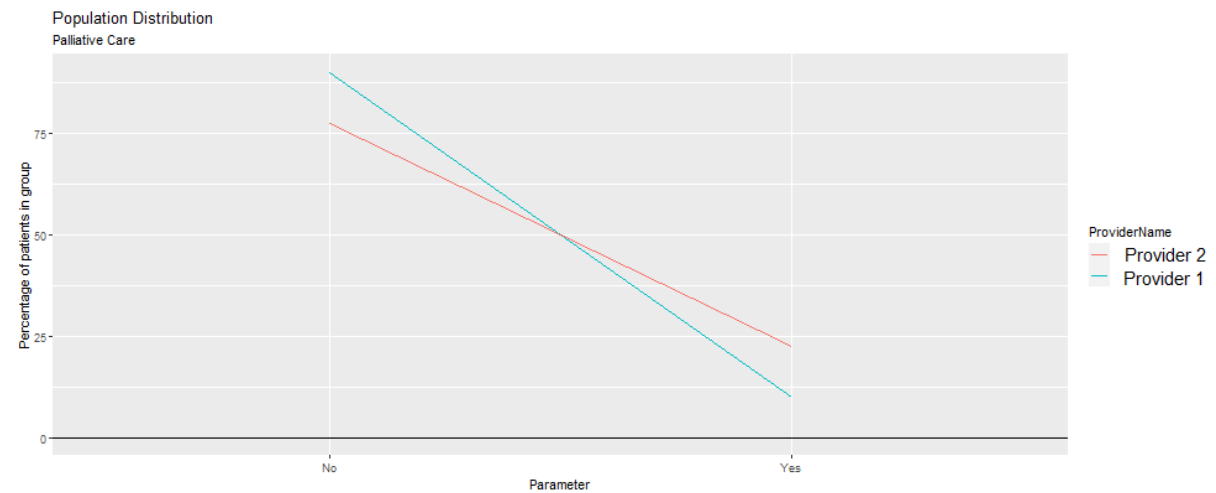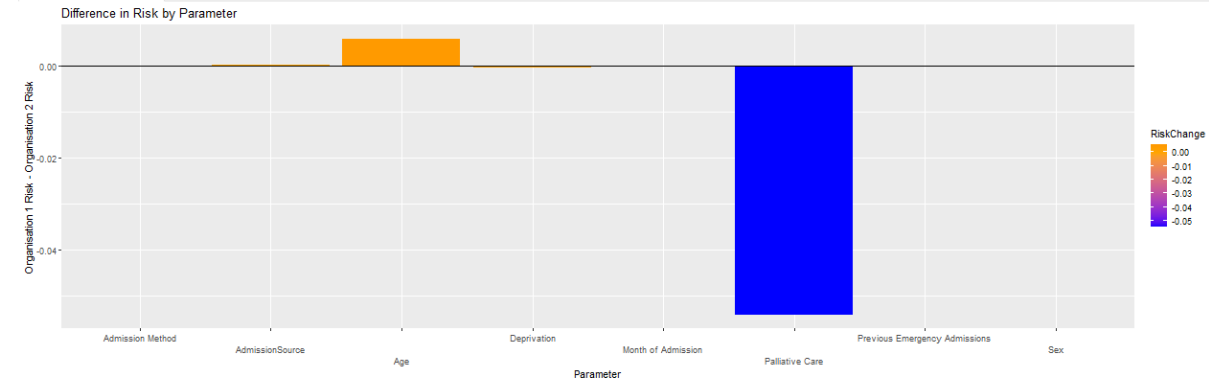
Removing Palliative Care

We have done some analysis looking at how palliative care impacts the model when comparing two providers:

- Septicaemia diagnosis group
- Similar superspell counts
- Both have 'as expected HSMR values'
- Provider 2 has an expected value 130 points higher

From the top chart, we can see palliative care massively contributes to provider 2's expected risk.

The middle chart shows the proportion of cases with a palliative flag is much higher for provider 2

The bottom chart shows the differences in the risk of death by palliative flag, with those with the flag 4 times more likely to die than those without the flag.
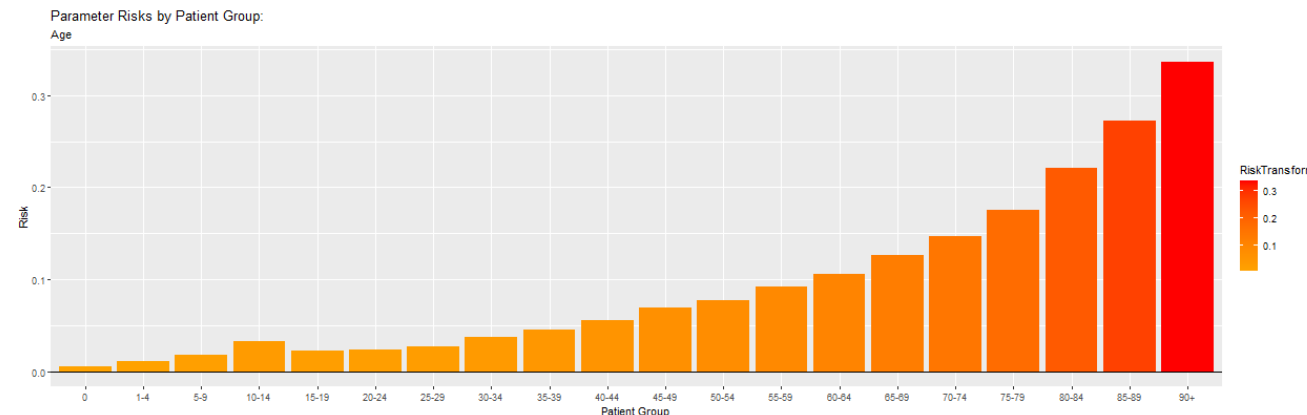
Removing Palliative Care

We compare another two providers, providers 3 and 4:

- Septicaemia diagnosis group
- Both have 'as expected HSMR values'
- Similar superspell
- Provider 4 has a higher expected value which could be due to palliative care.

The top chart shows palliative care does contribute to provider 4's expected risk, however, age has over 1.5 times more of an impact than palliative care does.

The middle chart shows the differences in age groups between the two providers, which provider 4 having an older population.

The bottom chart shows the risk of death increases with age
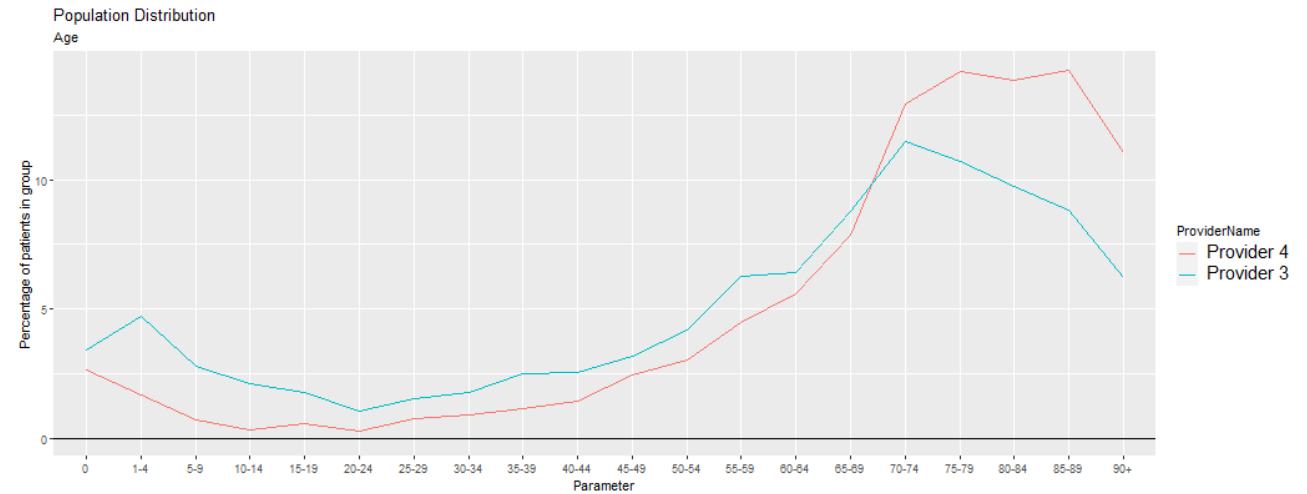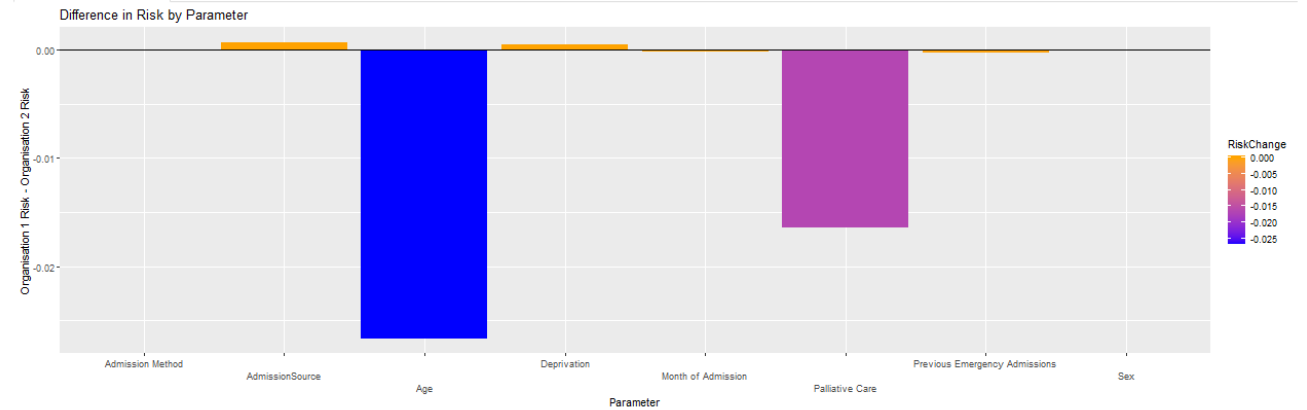
Removing Palliative Care

The examples we have shown aim to demonstrate that the impact of palliative care on the model is too great to ignore.

Whilst including palliative care in the model can result in some trusts being penalised for not having 'enough' palliative care patients, excluding palliative care would lead to the opposite problem – trusts with more palliative care patients would have a higher HSMR due to the large differences in risk that a patient in palliative care poses.

Therefore, based on these examples and the improvements we saw in model performance, we would recommend still including palliative care in the model. We can explore options for amending this flag but it is our opinion that palliative care should be included in the model**.**

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End of Life Flag

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Instead of a specialist palliative care flag, we reviewed changing the flag to include non-specialist palliative care, essentially creating an 'end-of-life' flag instead.

- Variability was increased when we changed the flag to include non-specialist palliative care.

- Looking over all trusts:

	Current Palliative Flag	Palliative Flag including Z518	Palliative within day of admission including Z518	Palliative on admission only including Z518
Min Value	1.2%	2.1%	1.8%	0.7%
Max Value	5.3%	10.1%	7.4%	5.3%
Range	4.1%	8.0%	5.6%	4.6%

- Limiting an end of life flag to on admission only decreases the variability but is still similar to the current flag.

- We would recommend not changing this to include non-specialist palliative care as variability between trusts has not changed with this inclusion.

Palliative Care Flag Options

This leaves us with three potential options

- **Keeping the flag as its current definition**
  - We may find that the current flag is the best or only option we have, and we can leave it as is currently.

- **Changing it to palliative on admission only**
  - This would keep the same definition as above but only limit this to the diagnosis dominant episode of care.

- **Changing it to palliative within one day of admission**
  - This would change to allow for the inclusion of any palliative care codes recorded in any episodes with the admission date or the following date.

Palliative Care

All diagnosis groups

This table shows:

– The current palliative flag, based on the current definition

– Limit the palliative flag to episodes that start on the admission date or the following date.

– Limiting the flag to appearing only on admission – so in the diagnosis dominant episode of care

• This analysis is limited to acute, non-specialist trusts

	Current palliative flag	Palliative on admission date or next day	Palliative on admission only
2012/13	0.7%	0.5%	0.4%
2013/14	0.8%	0.6%	0.4%
2014/15	0.9%	0.6%	0.5%
2015/16	0.9%	0.6%	0.5%
2016/17	1.0%	0.7%	0.5%
2017/18	1.1%	0.8%	0.6%
2018/19	1.1%	0.8%	0.6%
2019/20	1.1%	0.8%	0.6%
2020/21	1.6%	1.1%	0.8%
2021/22	1.3%	0.9%	0.7%
Combined Total	1.0%	0.7%	0.6%

Palliative Care

All diagnosis groups

By limiting the definition, we reduce the number of spells included in the flag.

For the latest full financial year, if we limited to looking at those who are flagged as palliative within a day of admission, we reduce the proportion of spells flagged as palliative from 1.3% to 0.9%

	Current palliative flag	Palliative on admission date or next day	Palliative on admission only
2012/13	0.7%	0.5%	0.4%
2013/14	0.8%	0.6%	0.4%
2014/15	0.9%	0.6%	0.5%
2015/16	0.9%	0.6%	0.5%
2016/17	1.0%	0.7%	0.5%
2017/18	1.1%	0.8%	0.6%
2018/19	1.1%	0.8%	0.6%
2019/20	1.1%	0.8%	0.6%
2020/21	1.6%	1.1%	0.8%
2021/22	1.3%	0.9%	0.7%
Combined Total	1.0%	0.7%	0.6%

Palliative Care

HSMR diagnosis groups

This table shows:

- – Limit the palliative flag to episodes that start on the admission date or the following date.

- – Limiting the flag to appearing only on admission – so in the diagnosis dominant episode of care

- – The current palliative flag, based on the current definition

- This analysis is limited to acute, non-specialist trusts

	Current palliative flag	Palliative on admission date or next day	Palliative on admission only
2012/13	1.7%	1.3%	1.0%
2013/14	1.9%	1.4%	1.1%
2014/15	2.1%	1.5%	1.1%
2015/16	2.2%	1.5%	1.1%
2016/17	2.3%	1.7%	1.2%
2017/18	2.5%	1.8%	1.3%
2018/19	2.5%	1.8%	1.3%
2019/20	2.6%	1.8%	1.3%
2020/21	3.0%	2.1%	1.6%
2021/22	2.8%	2.0%	1.5%
Combined Total	2.4%	1.7%	1.3%

Palliative Care

HSMR diagnosis groups

By limiting the definition, we reduce the number of spells included in the flag.

For the latest full financial year, if we limited to looking at those who are flagged as palliative within a day of admission, we reduce the proportion of spells flagged as palliative from 2.3% to 1.6%

	Current palliative flag	Palliative on admission date or next day	Palliative on admission only
2012/13	1.7%	1.3%	1.0%
2013/14	1.9%	1.4%	1.1%
2014/15	2.1%	1.5%	1.1%
2015/16	2.2%	1.5%	1.1%
2016/17	2.3%	1.7%	1.2%
2017/18	2.5%	1.8%	1.3%
2018/19	2.5%	1.8%	1.3%
2019/20	2.6%	1.8%	1.3%
2020/21	3.0%	2.1%	1.6%
2021/22	2.8%	2.0%	1.5%
Combined Total	2.4%	1.7%	1.3%

Palliative Care

We can also look at the variation between trusts for the different flags.

	Current Palliative Flag	Palliative within one day of admission	Palliative on admission only
Min Value	1.2%	0.7%	0.4%
Max Value	3.8%	3.1%	3.0%
Range	2.6%	2.4%	2.6%

Discussion

Appendix

HSMR vs. SHMI

The HSMR model has advantages over the SHMI:

- The HSMR uses more data in the model which improves the accuracy of the model (10 years vs. 3 years)

- The HSMR accounts for more patient case mix factors by including
  - Deprivation
  - Palliative Care
  - Previous emergency admissions

  These are not included in the SHMI, which makes comparing hospitals harder, when these case mix factors may be an underlying issue.

- The model accounts for more seasonality by including both year and month as variables.

	SHMI	HSMR
Death included	100% + 30 days after discharge	80%
Deaths and activity excluded	Day cases	Days cases
	Regular Attenders	Regular attenders
	Still births	Smaller CCS groups
Model methodology	Backwards stepwise regression	Backwards stepwise regression
Data Period	3 years (Acute Trusts only)	10 years
Factors included	Age	Age
	Admission Method	Admission Method
	Diagnosis group (150 CCS groups)	Diagnosis group (56 CCS groups)
	Sex	Sex
	Comorbidity (Charlson 3-categories)	Comorbidity (Charlson continuous)
	Year	Deprivation Quintile
		Palliative Care flag
		Previous Emergency Admissions
		Year
		Month
		Admission Source