Submission to the Independent Hospital Pricing Authority on the Pricing Framework for Australian Public Hospital Services 2021-22

By

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1.1 General comment

This submission identifies shortfalls and methodological considerations to improve risk adjustment in relation to hospital-acquired complications outlined in Section 12.3 of the 'Consultation Paper on the Pricing Framework for Australian Public Hospital Services 2021–22'[1] and Chapters 4 to 7 of the 'Pricing and funding for safety and quality – risk adjustment model for hospital-acquired complications – March 2020'.[2] We direct your attention to HAC03 (healthcare-associated infections) in a cancer casemix.

Patients with haematological or solid tumour malignancies are particularly susceptible to healthcare-associated infection ascribed to unique risk factors including frequent attendance for day therapies or chemotherapy, the need for cannulation and other invasive procedures, periods of cumulative immunosuppression and high risk, an ageing population, diminished microbiome as a result of broad-spectrum antimicrobial prophylaxis and the surgical debridement of metastatic tissue.[3] Therefore, it is essential that any discontinued activity-based funding (ABF) reimbursements ascribed to HAC03s provide meaningful and accurate funding signals to guide infection prevention initiatives in hospitals and local hospital networks (LHN) managing a large cancer casemix.

1.2 Pricing and funding approaches for safety and quality

1.2.1 Harmonising Australian Coding Standards with consensus surveillance criteria for healthcare-associated infections to safeguard financial fidelity

The disconnect between Australian Coding Standards (ACS) and consensus surveillance definitions for key healthcare-associated infections risks clinical overcoding of HAC03 in at-risk cancer casemixes and larger withheld ABF reimbursements. Even in the case of positive microbiology specimens, coding standards require that diagnosis codes be assigned to patient extracts only if the diagnosis is substantiated in the medical record by documentation from the treating physician,[4] but this strict criterion often does not match with consensus surveillance criteria. Thus, it is likely that a significant number of HAC03 coded hospitalisations do not satisfy consensus surveillance criteria for healthcare-associated infection, meaning the ICD-10-AM codes may be an unreliable proxy to measure quality improvement and therefore gauge the level of discontinued ABF payments. We encourage the IHPA and Australian Commission on Safety and Quality in Health Care (ACSQHC) to consider harmonising surveillance definitions adapted and endorsed by the ACSQHC and the U.S. Centers for Disease Control and Prevention's National Healthcare Safety Network (CDC/NHSN) as a strategic imperative to mitigate erroneous HAC coding.

1.2.2 Refinements to existing HAC risk adjustment methodology for consideration

1.2.2.1 Funding for discrete HAC03 sub-classifications

The existing HAC risk adjustment model does not account for differing risk associated with discrete healthcare-associated infections. We commend the IHPA's integration of dampening factors and complexity scores into the negative funding adjustment algorithm to balance the inherent risk of HAC03s across distinct patient casemixes.[2] On closer inspection, this model funds healthcare-associated infections as a clinically homogenous group, meaning the amount lost in HAC penalties may not reflect the incremental cost associated with specific healthcare-associated infections defined in the ACSQHC's HAC list.[5] We recommend the IHPA consider dampening factors which adjust for the eight discrete healthcare-associated infections in ongoing refinements of the HAC risk adjustment methodology.

1.2.2.2 Preventing the 'unpreventable' in a cancer casemix

Focusing on the *reducibility* of complications has the advantage of avoiding the vexed issue of debating and defining what is *preventable*,[6] but the same cannot be said for patients with cancer. One of the ACSQHC's criteria for a HAC states that *the strength of external influences (e.g. patient factors) does not unduly affect the hospital's ability to avoid the HAC.*[7] This statement is at odds with the epidemiology of healthcare-associated infections in haematology-oncology patients due to the myriad of risk factors

in this population. The ACSQHC maintains that all Australian hospitals work towards reducing HAC03 rates comparable with the top quartile of peer facilities.[8] We advocate against this 'one size fits all approach' insofar as patient safety priorities should be tailored at the hospital-level, enabling individual facilities to focus on areas where they have the greatest scope to improve based on their patient casemix. Therefore, the ability to prevent HAC03s is a matter of degree than the absolute, and what is truly preventable, particularly in haematology-oncology patients, must be clearly defined in the HAC list.

1.2.2.3 Inclusion of MBI-LCBI in the HAC03 list

The eight prescribed HAC03s are somewhat idiosyncratic and likely detract attention away from other, equally significant, infections in a cancer casemix. Inclusion of mucosal barrier injury laboratory-confirmed bloodstream infection (MBI-LCBI) in the HAC03 list would provide a meaningful metric for cancer units to measure their performance. MBI-LCBI is a frequent complication in hospitalised haematology-oncology patients due to chemotherapy-induced mucositis and irradiation which damages the intestinal epithelium, allowing pathogens to transmigrate into the circulatory system, thereby causing bacteraemia.[9] Assuming no change to the existing HAC methodology, a significant number of cancer patients presenting with this aetiology would be coded as central line-associated bloodstream infection (CLABSI; HAC 3.5), given MBI-LCBI is *not* a prescribed HAC and the cause of the bloodstream infection may be inconsequentially interpreted as a direct effect of cannulation by clinical coders.[10] Under the assumption that the sensitivity and positive predictive value of ICD-10-AM codes for classification of MBI-LCBI is high, it is reasonable to assume the HAC model to be more reflective of healthcare-associated infection burden in a cancer casemix. Indeed, rates of MBI-LCBI in cancer patients far exceed that of some current prescribed HAC03s,[9] with retrospective chart reviews indicating that 71%,[11] 53%[12] and 45%[13] of CLABSI cases (HAC 3.5) in patients with haematological malignancy meeting CDC/NHSN criteria for MBI-LCBI. From a HAC policy perspective, this means a significant number of MBI-LCBI cases are counted as CLABSI (HAC 3.5), meaning hospitals managing a large cancer casemix are unable to discern MBI-LCBI rates from CLABSI rates. This is contrary to the intended effect of the HAC policy: if the data provide little-to-no indication of highly prevalent HACs which are obscured in other HAC classifications, such as MBI-LCBI as CLABSI, it is difficult for hospitals and LHNs, particularly haematology-oncology facilities, to use the HAC programme as a model with which to optimise targeted infection control interventions. To this end, we advocate the relevance and importance of modifying the existing HAC03 list in collaboration with the ACSQHC to include MBI-LCBI as a HAC in a cancer casemix.

1.2.2.4 Inclusion of cancer Principal Diagnosis codes (ACS 0001 Principal diagnosis)

Use of MDC codes to discriminate cancer with non-cancer admissions when calculating the magnitude of negative funding adjustments is noteworthy;[2] however, MDC codes are an amalgamation of AR-DRG codes, which are further amalgamated from a combination of principal and secondary diagnosis ICD-10-AM codes. Currently, the MDC 17 code (denoting cancer) is the only cancer-specific covariate included in the HAC logistic regression model.[2] The trouble in this approach is the limited specificity of

the MDC 17 code to discriminate the amount of withheld ABF reimbursements based on underlying malignancy. For example, infection risk is traditionally higher in patients with haematological malignancy versus solid tumours,[14-18] which cannot be discerned from MDC codes alone and requires a more granular tool to make that distinction. In order that we utilise existing and available data, we recommend the IHPA consider the inclusion of principal diagnosis codes (ACS 0001 *Principal diagnosis*) for cancer (C00.x - C76.x, C80.x, C81.x [0/1] - C88.x [0/1], C90.x [0/1] - C96.x [0/1], and D46) in replace of MDC 17 in the logistic regression model to generate more granular complexity scores (i.e. β-coefficients), which may more accurately reflect variation in healthcare-associated infection risk across different cancer streams.

1.2.2.5 Revisiting quantile cut-off points for cancer hospitalisations

Reducing the quantile cut-off points for the HAC03 classification for episodes assigned an MDC 17 code may minimise undue shortfalls in ABF reimbursements. By reducing the quantile cut-off points for HAC03 in a cancer casemix, assuming the parameter β-coefficients from the logistic regression remain fixed, the likelihood of a cancer admission complicated by a HAC03 assigned to a 'high' complexity group increases, thereby reducing the final negative funding adjustment from 8.1% ('low' complexity group) to 2.9% ('moderate' complexity group) or 1.4% ('high' complexity group).[2] This could be achieved either by (i) deriving complexity scores from logistic regression models applied to cancer hospitalisations only (in order that the β-coefficients are a more accurate reflection of disease burden in a cancer casemix), or (ii) by a more crude adjustment on existing complexity scores. The logic behind this modification pertains to the fact that the majority of cancer hospitalisations are at high risk for healthcare-associated infection as previously described, and assuming that there is no adjustment for underlying malignancy in determining the complexity scores, cancer hospitalisations are at greater risk of being assigned a low to moderate complexity group, thereby attracting greater discontinued ABF payments. Therefore, it is worthwhile to investigate whether adjusting quantile cut-off points according to revised complexity scores in a cancer casemix have any measurable effect on hospitalisations assigned to high, moderate and low complexity groups.

1.2.2.6 Rationale to assess calibration and discrimination power at the individual HAC03 level

The calibration and discrimination power of the IHPA's logistic regression model for discrete HAC03 codes is required, particularly in cancer populations. Only the generic pooled HAC03 model has been evaluated in terms of its discrimination power (0.85).[2] Admittedly, a discrimination power of 0.85[2] is moderately high, suggesting the current HAC03 model correctly discriminates 85% of patients at high and low risk of a coded healthcare-associated infection. However, this is likely to change at a more granular infection/HAC03 level. The classification performance of composite HAC codes varies according to the type of healthcare-associated infection,[19,20] with published sensitivity estimates spanning 29.3%, 35.6%, 55%, 58% and 78% for healthcare-associated urinary tract infection,[21] *Clostridioides difficile* infection,[22] *Staphylococcus aureus* bacteraemia,[23] ventilator-associated pneumonia[24] and sepsis,[25] respectively. We recommend the IHPA test the calibration and

discrimination power of the HAC03 logistic regression model for each of the eight prescribed HAC03s to be confident that the ACSQHC's HAC list correctly classifies cases of each healthcare-associated infection.

1.3 Concluding remarks

Withheld hospital remuneration for HAC03 reflects a controversial change in cancer hospital reimbursement structures. Paradoxically, restricted remuneration ascribed to HAC03s diminishes the financial scope for hospitals to implement quality improvement programmes in order to prevent the occurrence of HACs. In doing so, hospitals managing large, at-risk cancer casemixes are left with the impending challenge of balancing reduced financial scope against the scalability of HAC prevention interventions. We stress the importance of the aforementioned modifications to existing HAC risk adjustment methods pertaining to healthcare-associated infections in a cancer casemix as strategic imperatives to safeguard financial fidelity whilst ensuring that the HAC coding algorithm is a meaningful measure to drive infection prevention interventions.

1.4 References

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