**Title:** The use of investigative technology in the emergency department and it's impact on resource use.

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**Introduction:**

The emergency department (ED) within a hospital provides care to patients, focusing particularly on urgent and traumatic care. In this setting, the use of investigative technology (IT) such as magnetic resonance imaging (MRI), computer axial tomography (CAT), and/or X-rays are critical to the diagnosis and treatment. Among the services provided in the ED setting, these IT services can significantly increase resources use.

Since 2018, the CACS grouping logic was expanded to include NACRS level 2 reporting. Unlike level 3 ambulatory care reporting, level 2 does not report the full ICD-10-CA diagnosis nor CCI intervention codes but provides the opportunity to submit a smaller sub-set of these codes. However, most facilities reporting level 2 data often do not include any intervention reporting. The purpose of this work is to estimate how this lack of investigative technology reporting influences resources estimates.

**Methods:**

In this analysis, the past 4 years of NACRS data grouped to CACS 2025 were explored with a focus on key differences between level 2 and level 3 reporting of interventions. The level 3 data was analysed to identify the prevalence and relative resource contribution of investigative technology in unscheduled ED CACS groups. The Canadian Patient Cost data was further explored to identify the reported average costs associated with IT, as well as the variations in costs that are observed.

**Results:**

An analysis of Level 3 ambulatory data indicates that nearly all IT reporting originates from unscheduled ED visits and spans all ED CACS cells, highlighting the significance of IT in the ED setting. More than 42% of Level 3 unscheduled ED cases report at least one IT. In contrast, Level 2 data show virtually no IT reporting, which results in lower RIWs for these cases, and introduces a bias when using case mix indicators from these cases.

For CPCD unscheduled ED data, IT reporting was, on average, higher at 48%, with IT cases costing more than double the costs of non-IT cases. The cost increase varies significantly by IT type—nuclear IT procedures were nearly four times more expensive, whereas x-rays increased costs by just over 50%.

**Conclusions:** Investigative technology are a critical component of ED services where they are used extensively. Many CACS groups have a significant portion of cases weights adjusted for investigative technology, and these cost adjustments are often as large as the CACS cost themselves. It is estimated that without critical IT intervention data in level 2 reporting, resource weights are significantly under-estimated, and any use of RIW with level 2 NACRS submissions needs to take this RIW limitation into consideration.