

## APPENDIX 1 – A guide to applying filters for hospitalisations in the NMDS (National Minimum Dataset – Hospital Inpatient Events)

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Applying filters should be considered when working with the NMDS as it improves the quality of data that we analyse. In particular, it helps reduce over counting of hospitalisation events. The filters that our team currently consider for exclusion before analysis are:

1. Transfers (within or between hospitals)
2. Emergency Department Short stays
3. Day cases
4. Deaths
5. Overseas patients
6. Readmissions for the same condition
7. Waiting list / Elective cases

We recommend excluding these filters from the dataset in the order that is listed above. Deciding which filters to apply depends on the purpose of each project and should be peer-reviewed by the team.

A detailed methodology, rationale and when to apply each filter are described below.

Filter	Method	Rationale	When to apply filter
<p>Transfers</p> <p>- Combine transfers into a single event (one row) in the NMDS dataset by retaining the last event, unless otherwise appropriate. This single event will reflect the corrected start and end dates, length of stay, end type and the first principal diagnosis.</p> <p>This filter is assumed to be applied before the filters below are applied.</p>	<p>Identify transfers for an individual in two ways:</p> <ul style="list-style-type: none"> <li>(i) Event end type of first admission in (DA, DF, DT, DW, DP, EA, ET), or</li> <li>(ii) Admission source code of subsequent (i.e. transfer) admission is "T"; <b>and</b> event start date of the subsequent admission is the same day as the event end date of previous admission</li> </ul>	<p>Transfers between hospitals, and/or between services within the same hospital, are sometimes recorded as separate events in the NMDS. These events are combined into a single event.<sup>1</sup></p> <p>A summary of the Ministry of Health filters states that 'transferrals are joined if it is found that a patient is moved on the same or following day to a hospital within the same DHB, with a discharge type equal to that for a transfer.'<sup>2</sup> However, in some instances, patients are transferred between DHBs (as some specialist services are only provided in select DHBs), so this particular criteria has not been used in our filter.</p>	<p>It is a good idea to remove transfers for most (if not all) analyses; otherwise the rates tend to be overestimated due to double-counting.</p> <p><i>Event end types used to identify transfers:</i></p> <ul style="list-style-type: none"> <li>DA = Discharge to an acute facility</li> <li>DF = Statistical discharge for change in funder</li> <li>DT = Discharge of patient to another healthcare facility</li> <li>DW = Discharge to other service within the same facility</li> <li>DP = Psychiatric patient transferred for further psychiatric care</li> <li>EA = Discharge from ED acute facility to specialist facility for neonates and burns only</li> <li>ET = Discharge from ED acute facility to another healthcare facility</li> </ul> <p><i>Admission source code for transfers:</i></p> <ul style="list-style-type: none"> <li>T = Transfer</li> </ul>
ED short stays (where the patient is seen in ED and discharged on the same or next day, without admission as an inpatient)	<p>ED short stays are defined with three criteria<sup>3</sup>:</p> <ul style="list-style-type: none"> <li>(i) Health specialty code on discharge is Emergency Medicine (i.e. M05, M06, M07, M08);</li> <li>(ii) Length of stay was 0 or 1 (i.e. same day or next day)<sup>4</sup>; and</li> <li>(iii) Patient discharged from hospital alive</li> </ul>	<p>Reporting of ED short stays has been inconsistent across time and DHB. In 1999, one DHB started reporting ED visits of 3+ hours to the NMDS; by 2008, about half of all DHBs were doing so. From July 2009, reporting short-stay ED events to the NMDS has been compulsory.<sup>5</sup> Note that for medical admissions, access to a specialist Paediatric Emergency Department can impact on these results and should be included (e.g. may see much lower rates in Auckland if excluding all ED cases).<sup>3</sup></p>	<p>It is a good idea to exclude ED short stays, particularly when looking at trends over time.</p> <p>Often will need some investigation of rates by DHB and year, to check that the results look sound, and that there aren't any massive spikes in hospitalisations (by DHB and over time).</p>
Day cases	<p>Day cases are defined as:</p> <ul style="list-style-type: none"> <li>(i) Length of stay was 0 (i.e. event start and end dates the same); and</li> <li>(ii) Patient discharged from hospital alive</li> </ul>	<p>Day cases include less serious events, as well as multiple day-case admissions (e.g. for dialysis, chemotherapy, radiotherapy, blood transfusions). Recording of day cases is also not very consistent across time and DHBs (see below for more details).<sup>1</sup></p>	<p>It is also a good idea to at least consider excluding day cases, as there has been a large amount of inconsistency in what is reported to the NMDS over time.</p>

Filter	Method	Rationale	When to apply filter
Deaths	Deaths are defined as having an event end type in (DD, DO, ED).	Excluding deaths can help to avoid double-counting individuals in both the hospitalisation and mortality datasets. Note that DO is for organ donations (for people declared brain dead on their death certificate).	Deaths are good to exclude, particularly if you are also reporting mortality data as well (so as to avoid double-counting). <i>Event end types used to identify deaths:</i> DD = Died DO = Discharge of a patient for organ donation ED = Died while still in Emergency department acute facility
Overseas patients	Identify overseas patients as domicile codes with "9999".	The population denominator for rate calculations is the usually resident population, which do not take into account overseas visitors. <sup>1</sup>	Best to exclude overseas patients in all analyses, unless you have a specific reason for including them.
Readmissions for the same condition within 30 days of being discharged alive from hospital  This filter is assumed to be applied after the filters above are applied.	Readmissions are identified for an individual using the following criteria: (i) There were 30 days or less between visits; and (ii) Patient readmitted for same-cause (i.e. first 3 characters of principal diagnosis the same)	Readmissions for the same health condition are often an indicator of quality of care, and are generally events that ideally would be avoided. Removing these events helps to identify the incident events. Different time periods can be selected (often readmissions within 28 days <sup>6</sup> , 30 days <sup>7</sup> or 90 days <sup>7</sup> are used within the NZ context). Readmissions outside of this time period are not excluded (except in the special cases of injuries). <sup>1</sup> We have decided to use a 30-day period as default; however, other time periods could be used if appropriate for the particular analysis.	There are no hard and fast rules about this – it depends on what you want to capture. If you are only interested in incident cases, it could be a good idea to exclude readmissions.  Note that often researchers examining the issue of readmissions will look at all acute readmissions.  We have taken the conservative approach of using a 30 day period, and only including readmissions for the same health condition.
Waiting list / electives cases (i.e. only include acute and arranged admissions) (only for use in certain analyses)	We can identify acute and arranged admissions as an admission type in (AA, AC) (and until 2004, ZA, ZC, which refer to ACC-funded admissions)	For medical conditions, often only acute and arranged admissions are included, as waiting list admissions tend to reflect service capacity rather than actual health need. <sup>2</sup> The exception is sometimes dental electives (ie ASH often only includes acute and arranged admissions, except for dental admissions, which can be electives).	This is specific to the topic area, and depends on what you want to capture. It is often a good idea to look at only acute and arranged admissions for medical conditions.

Changes in column names to the original NMDS received from the Ministry of Health are:

Original NMDS	Modified NMDS	Description of modified column
EVSTDATE	_evstdate_	Event Start Date (after combining transfers into one event)
EVENDATE	_evendate_	Event End Date (after combining transfers into one event)
END_TYPE	_endtype_	Event End Type (after combining transfers into one event)
LENGTH_OF_STAY	_LOS_	Event Length of Stay (recalculated as the difference between _evendate_ and _evstdate_ )

Additional columns to the original NMDS received from the Ministry of Health are:

Column name	Description	Values
Prin_Diag	Principal Diagnosis - defined as the 'diagnosis established after study to be chiefly responsible for causing the patient's episode of care in hospital'. Most analyses are based on the principal diagnosis <sup>1</sup> , however it can sometimes be useful to look at both primary and all diagnoses.	The corresponding clinical code with a diagnosis type of 'A' for an event (Other relevant diagnoses are diagnosis type of 'B'; for injuries, the external cause is diagnosis type of 'E')
_Transfer_	Transfer flag	"First", "Yes", or "Last" if it is a transfer (recommended to keep "Last"); "No" if not
t_firstPrinDiag	First Principal Diagnosis of Transfer	The corresponding clinical code with a diagnosis type of 'A' for the first event of a transfer
_EDShortStay_	ED Short Stay flag	"Yes" if it is an ED short stay; "No" if not
_DayCase_	Day Case flag	"Yes" if it is a day case; "No" if not
_Death_	Death flag	"Yes" if it is a death; "No" if not
_Overseas_	Overseas Patient flag	"Yes" if it is an overseas patient; "No" if not

## References

1. Baker MG, Telfar Barnard L, Kvalsvig A, et al. 2012. Increasing incidence of serious infectious diseases and inequalities in New Zealand: a national epidemiological study (supplementary webappendix). *Lancet* 379(9821):1112–1119.
2. Ministry of Health Hospital Throughput figures, Appendix 1: Filtering of Hospital Discharge Data. <http://www.health.govt.nz/system/files/documents/publications/hospital-throuhout-0304.pdf>
3. Craig E, Dell R, Reddington A, Adams J et al. 2012. *The Determinants of Health for Children and Young People in the Hutt Valley and Capital and Coast DHBs*. Dunedin: University of Otago.
4. Ministry of Health. 2015. Factsheet: Short stay emergency department events. <http://www.health.govt.nz/publication/factsheet-short-stay-emergency-department-events>
5. Public Hospital Discharge Data Specific Notes. <https://blogs.otago.ac.nz/ipru/statistics/understanding-our-data>
6. HQSC. 2012. *Describing the quality of New Zealand's health and disability services*. Wellington: Health Quality and Safety Commission New Zealand.
7. Robinson T, Kerse N. 2012. Medical readmissions amongst older New Zealanders: a descriptive analysis. *New Zealand Medical Journal*. 124(1367): 24–34.