A report to Healthdirect Australia

Audit of the *healthdirect* nurse triage service outcome "attend the emergency department immediately"

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Melbourne School of Population and Global Health
Centre for Health Policy

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Executive Summary

Healthdirect Australia has commissioned the Centre for Health Policy at the University of Melbourne to undertake a follow up audit of calls to *healthdirect* with an "attend emergency department immediately" final outcome, subsequent to a 2021 audit with the same focus. This is the fifth clinical review of the *healthdirect* service undertaken by the Centre for Health Policy.

Objectives

- To assess whether service improvement recommendations following the audit in 2021 has impacted the *healthdirect* nurse triage service "Attend an Emergency Department immediately" outcome.
- Establish the extent to which Emergency Department triage outcomes (including initial dispositions) are clinically reasonable and appropriate.
- Establish the extent to which callers not triaged to an Emergency Department disposition but reached a final outcome of attending an Emergency Department, were supported to have their health issues addressed with lower acuity healthcare (also considering the caller's unique circumstances and original intention).
- Determine the impact of the expanded after-hours GP service in NSW, since its implementation in late September 2022. This service offers callers across NSW (with no access in the recommended timeframe to a regular GP), access to a virtual GP call back service.

Methods

The sampling scheme was derived from the 2021 sampling approach, which in turn was developed based on a dataset of more than 50,000 calls in a six-month period from the top 7 triage guidelines in use by *healthdirect*. In 2023 Healthdirect Australia provided a sample of more than 44,000 calls for the period September 2022 to end February 2023 across all jurisdictions for the three commonly occurring triage guidelines included in the audit: abdominal pain (adult), limb pain (adult) and vomiting toddler (paediatric). This dataset followed the logic of the sampling scheme and included only those calls which commenced with initial dispositions of interest to the audit: See a doctor within 12, 6, or 2 hours and attend the emergency department immediately. A sample of 200 calls was extracted using an adapted case-control design, incorporating two call pathways that were upgraded to "attend emergency department immediately" at final disposition (case pathway 1) and final outcome (case pathway 2), along with two control pathways representing calls with a "see doctor in 2, 6 or 12 hours" (control pathway 1) and "attend emergency department immediately" (control pathway 2) across the full triage pathway. Cases and controls were further differentiated between NSW and the rest of Australia. Forty percent of sampled calls originated in NSW. Four experienced clinicians assessed the clinical appropriateness and communication quality of the calls using an assessment instrument verified in previous audits.

To enable comparison of broad trends at a jurisdictional level between 2021 and 2023, the 2021 large call set was filtered to include only those call types included in the 2023 large dataset – calls initially triaged to the dispositions see a doctor in 12, 6 or 2 hours and attend the emergency department immediately, for the three guidelines of interest.[1] The national datasets were analysed in Stata and the 2023 sample dataset was analysed in Excel for descriptive and summary statistics. Free text assessor comments were reviewed to provide richer context to nurse and caller decision-making resulting in upgraded final dispositions and outcomes.

[1] National call sets were provided by Healthdirect Australia and may not be exactly comparable if different inclusion or exclusion criteria were used at the point of data extraction. Proportions of calls for the three different guidelines and for jurisdictions vary between the two time periods.

Results

Key findings – national and NSW datasets

- At a national level dispositions and final outcomes resulting in "attend the emergency department immediately" have increased since 2021. Almost 60% of calls were initially disposed to this outcome. Nurse input did not significantly reduce this at final disposition and at final outcome "attend the emergency department immediately" comprised just over 50% of outcomes.
- The abdominal pain guideline was a key driver of emergency department outcomes. Almost three quarters of this large call sub-set were initially disposed to the emergency department. There was minimal diversion from this disposition by the nurse and at final outcome the combination of emergency department and 000 outcomes resulted in 68% of calls designated as high-urgency.
- The main drivers of "attend the emergency department immediately" outcomes were the initial disposition generated by the algorithm and patient input at final outcome, although it can be assumed that a contributor to patient-nurse agreement at this final point decision was lack of availability of a suitable lesser urgency service.
- In comparison to the 2021 call dataset, upgrading to an emergency department outcome has decreased in all jurisdictions since 2021, but emergency department outcomes are greatly increased confirming that the algorithm-generated initial disposition is the principal driver of an "attend the emergency department immediately" final outcome.

Comparisons with NSW

- NSW had a higher proportion of emergency department outcomes than the rest of Australia at final outcome and a higher proportion of upgrades by both the nurse and patient, the latter being most significant.
- In NSW, neither the clinical judgement of the nurse at final disposition or the availability of afterhours GP advice and telehealth service options substantially reduced high-urgency final outcomes, which were driven largely, first by the algorithm and then by patient decision-making. It could be assumed that a shortage of alternative lesser urgency options in NSW are, at least in part, contributing to high-urgency final outcomes.
- In 2021 upgrades to an emergency department outcome were higher in NSW than for the rest of Australia but have followed the trend apparent across the rest of Australia and are lower in 2023.

Key findings - sample dataset

Clinical appropriateness of "attend the emergency department immediately" dispositions and outcomes

- 67% of calls were assessed as appropriately triaged at final outcome compared with 83% in 2021.
- 32.5% of calls were assessed as over-triaged at final outcome compared with 15% in 2021.
- Just over a third of calls (35%) of calls in the case 1 pathway (upgraded to the emergency department at final disposition by the nurse), and 17% of calls in the case 2 pathway (upgraded to the emergency department with patient input at final outcome) were assessed as undertriaged at initial disposition.
- At final disposition, the nurse used clinical judgement to rectify under-triaging in every under-triaged call in the case 1 pathway, although 15% of calls for the case 2 pathway remained under-triaged at final disposition, but were all downgraded with patient input, except for one call, at final outcome.
- Control calls where "see a doctor 2, 6 or 12 hours" (control 1) or "attend the emergency department immediately" (control 2) was maintained throughout the triage pathway were found to be completely safe, with no under-triaging identified. However, over-triaging was identified in 25% to 40% of calls right across the control triage pathways.
- Overall, the proportion of calls assessed as undertriaged across all pathways was closely matched across the 2021 and 2023 audits.

- Under-triage findings confirm that *healthdirect* continues to offer a very safe service.
- Patterns of over-triaging across case 1 and case 2 pathways varied, with patient input reducing assessed levels of over-triage in case 1, but increasing levels of assessed over-triage for case 2. A similar pattern was found in 2021.
- Across the three triage guidelines, abdominal pain had the highest level of appropriateness at initial disposition (66%) with limb pain and vomiting toddler sitting at approximately half of calls assessed as appropriate.
- At final disposition the input of the nurse saw the appropriateness of all calls increase across each guideline, particularly for vomiting toddler (72%), suggesting a high degree of safety for this vulnerable user group.
- At final outcome there was a slight decrease in appropriateness for vomiting toddler, an increase in appropriateness for limb pain of 10%, to 68%, but a decrease in appropriateness of the abdominal pain guideline of almost 10%, to 58%.
- The *healthdirect* service did not perform as well in assessment of clinical appropriateness in 2023 as it did in 2021 due to the increased proportion of calls assessed as over-triaged and decreased appropriateness.

Factors contributing to upgraded final disposition and final outcomes

- When considering factors contributing to triage outcomes associated with upgrades to emergency department at final disposition and final outcome, the single biggest factor was unavailability of an alternative lower urgency health service, followed by nurse clinical judgment, not unexpected given that all final disposition cases involved upgrading by the nurse. The third largest contributory factor to upgrade was nurse failure to assist in locating an appropriate service. A range of patient factors, including patient anxiety and frailty and prior intention, followed closely in influencing upgrades to the emergency department.

Communication

- Communication of nurses was generally highly rated, as in previous audits.
- There was a decline, compared with the 2021 assessment, in communication for the elements "nurse cares about the caller and their problem"; "nurse confirms understanding of caller's need and situation" and "nurse is responsive, taking account of callers cues and expectation".
- Each of these elements were also the poorest performing domains of communication in the 2021 audit but have declined further in 2023.
- Provision of advice to caller improved on three of the five elements of this important domain of communication. Signposting was used in more than two thirds of the calls that were assessed, a substantial increase on the 41% of calls that were well-signposted in 2021, but our assessors observed that this proportion ideally should be increased. Provision of an action plan had increased to 98% of all calls compared with 96% in 2021. Caller agreement with advice also increased (81% in 2021 to 88% in 2023).
- Provision of safety net advice was provided for 94% of calls, similar to 2021, but confirmation of caller understanding had reduced by about 5% to 71% of calls.
- Overall communication results suggest a slightly lower level of engagement with the caller than was found in 2021.

Discussion and conclusion

The *healthdirect* nurse triage and advice line has been operating in recent years in a challenging health system environment. In this repeat audit of the *healthdirect "*attend the emergency department immediately triage outcome", these pressures are apparent. Overall, addressing the objectives of the audit, this study has not found a positive shift in distribution of *healthdirect* outcomes, with an increase in "attend the emergency department immediately" outcome at a national level, and an increase in assessed over-triage in a sample call set of upgraded and non-upgraded calls.

Key factors driving upgrading of calls to an attend emergency department outcome, are the initial algorithm process, followed by health service unavailability at the final outcome point of the pathway, followed by nurse factors, including clinical judgement, followed by patient-related factors, both circumstances (anxiety, frailty, lack of transport) and preferences (prior intention to attend ED). Nurse clinical judgement is a crucial component of a telephone triage service. However, while this audit shows that nurses continue to play a vital role in ensuring the safety of the service, there was less use of clinical judgement to reduce over-triaging and divert callers to lower urgency options.

The pilot in NSW of virtual GP advice to callers who do not have access to a primary care service had not yet, in the initial 6 months of operation, reduced high-urgency outcomes to similar or lower levels than across rest of Australia. While there is some diversion to afterhours and telehealth GP services this is not yet counteracting the initial algorithm generating emergency department dispositions.

The *healthdirect* service continues to provide safe, and on the whole, high quality service. From a policy perspective, key objectives of a national primary care triage and advice service are demand-management and supporting access to appropriate, timely, care. Within the 2022-2023 audit time frame, in the context of Australian healthcare and resource constraints, this audit suggests that *healthdirect* clinical decision software settings and workforce preparation are in need of some revision if these policy objectives are to be fully met. Recent initiatives by Healthdirect Australia to introduce a more sophisticated clinical decision support system, increase connections to afterhours primary care and telehealth services and put in place a new model of workforce engagement may well have a positive impact. These initiatives should support broader health system reforms. Continued monitoring and evaluation of *healthdirect* outcomes is required to determine if these initiatives are having a positive effect.

Recommendations

Immediate

- Continue workforce training to develop nurse capacity to guide callers to an appropriate outcome and confirm caller understanding of advice provided.

Medium term

- Investigate nurse attitudes, skills and decision-making to better understand the role of nurses in upgrades to high urgency outcomes.
- Undertake a longitudinal evaluation of triage pathways and emergency department outcomes in NSW*.
- Undertake an economic evaluation of *healthdirect* to determine its contribution to:
    - demand management for emergency department care and
    - population-wide access to appropriate care*

*Acknowledging that these are government policy considerations and should be funded accordingly.

Background

Healthdirect Australia, a company established by the Council of Australian Governments in 2007, is a national not-for-profit organisation providing a range of telephone and digital health information and advice services to the Australian community. The *healthdirect* nurse triage and advice line provides health assessment, triage and advice. It is one of a suite of telephone help and advisory services operated by Healthdirect Australia that collectively received 5.7 million calls in 2022-2023.[1] In 2023 Healthdirect Australia brought all aspects of clinical workforce employment and service delivery inhouse. Previously clinical workforce and service delivery of *healthdirect* was subcontracted to another provider. Between 2018 and early 2023 Healthdirect Australia used clinical decision support triage software developed inhouse and refined over ensuing years. In March 2023 a new Clinical Decision Support System (CDSS) was introduced, based on probabilistic reasoning principles, taking account of multiple symptoms, risk factors and regional geographic location.[1]

In 2023 Healthdirect Australia commissioned a repeat audit of a sample of calls from the *healthdirect* helpline to assess changes in *healthdirect* final dispositions and final outcomes since a prior audit undertaken by the University of Melbourne in 2021. As in the 2021 audit, this review focused on the clinical safety and appropriateness of the management of callers who reach a final outcome (either as a result of the initial triage or as a result of further advice from the nurse, or through patient decision-making) of attending an emergency department.

The 2023 audit of the clinical safety and appropriateness of *healthdirect* is the fifth review of primary care telephone advice undertaken by the Centre for Health Policy at the University of Melbourne for Healthdirect Australia. Previous reviews were undertaken in 2012-13, 2015, 2018 and 2021, with the first three based on a review method developed by the University of Melbourne which used simulated patient calls as the principal method for review.[2] The 2015 and 2018 reviews also included a communication assessment of simulated patient calls using an assessment tool developed by the University of Melbourne. Following an increase in the proportion of callers reaching a triage assessment, or a final outcome, of attending an emergency department, Healthdirect Australia commissioned the 2021 audit to gain a better understanding of the factors contributing to an upgrade from an initial disposition of "see a GP" within hours to "attend the emergency department immediately" at final disposition or final outcome, with final disposition upgrades initiated by the nurse and final outcome upgrades driven by the patient.

The 2021 audit found that a number of nurse, patient and health system factors were associated with upgraded dispositions and outcomes to "attend the emergency department immediately".

While nurse clinical judgement was a positive factor in addressing under-triage at initial disposition, nurse provision of insufficient assistance to the patient to locate appropriate care was a contributor to upgrading of final outcome and over-triage. Patient prior intention, patient anxiety, patient disability and caller/patient caring responsibilities also contributed to upgrading of final outcome and over-triage. Patient factors made a slightly larger contribution to upgrades of final outcome than nurse factors. Limited access to primary care services particularly in rural and regional areas and in the afterhours period was an existing recognised contributor to upgrade to "attend the emergency department immediately" final outcome.

Since receiving the findings of the 2021 audit, Healthdirect Australia has undertaken training of its *healthdirect* nurse workforce on supporting patients to find appropriate services and managing patient behaviours that may contribute to upgrading of final outcomes in the triage process. In addition, in 2022, Healthdirect Australia commenced a pilot to expand the afterhours GP Helpline (AGPH) to support potential upgrades from the *healthdirect* helpline for NSW callers triaged as requiring an urgent medical assessment, who could not access a GP in this timeframe. The project comprised *healthdirect* nurses using the National Health Services Directory (NHSD) to identify care providers in the caller's region, including the availability of medical

deputising services funded by Primary Health Networks (PHNs). If a GP service could not be identified, the consumer was offered an AGPH consultation. The service was available to all NSW postcodes across all hours. This is now an ongoing service in NSW and differs from other states where eligibility for the AGPH is based on postcode.

The 2023 audit examined a sample of "attend the emergency department immediately" outcomes drawn from the time period September 2022 to February 2023 (i.e. prior to the commencement of the new CDSS) to determine changes since 2021, including the impact of the NSW afterhours pilot, and to identify service improvement opportunities, in keeping with the continuous improvement focus of Healthdirect Australia.

Ensuring appropriate use of Emergency Department capacity continues to be a major policy challenge for Governments around the world.[3] Telephone triage and advice lines have been used as one mechanism to manage demand for Emergency Department services and refer patients to timely and appropriate services in the healthcare system.[4] Telehealth services such as *healthdirec*t also offer improved access to healthcare, and environmental, economic and societal benefits through reduction of consumer travel and lost productivity.[5] Healthdirect Australia seeks to ensure that advice to attend Emergency Departments is clinically appropriate and reasonable and that patients are supported to locate the service they need within a given timeframe.

Objectives

- To assess whether service improvement recommendations following the audit in 2021 has impacted the *healthdirect* nurse triage service "attend the emergency department immediately" outcome.
- Establish the extent to which emergency department triage outcomes (including initial dispositions) are clinically reasonable and appropriate.
- Establish the extent to which callers not triaged to an emergency department disposition but reached a final outcome of attending an emergency department, were supported to have their health issues addressed with lower acuity healthcare (also considering the caller's unique circumstances and original intention).
- Determine the impact of the expanded after-hours GP service in NSW, since its implementation in late September 2022. This service offers callers across NSW (with no access in the recommended timeframe to a regular GP), access to a virtual GP call back service.

Methods

Ethics Approval

Ethics approval was obtained from the University of Melbourne Human Research Ethics Committee (LNR 4C) in October 2021 and re-confirmed in September 2023, reference number: 2021-22671-22401-2.

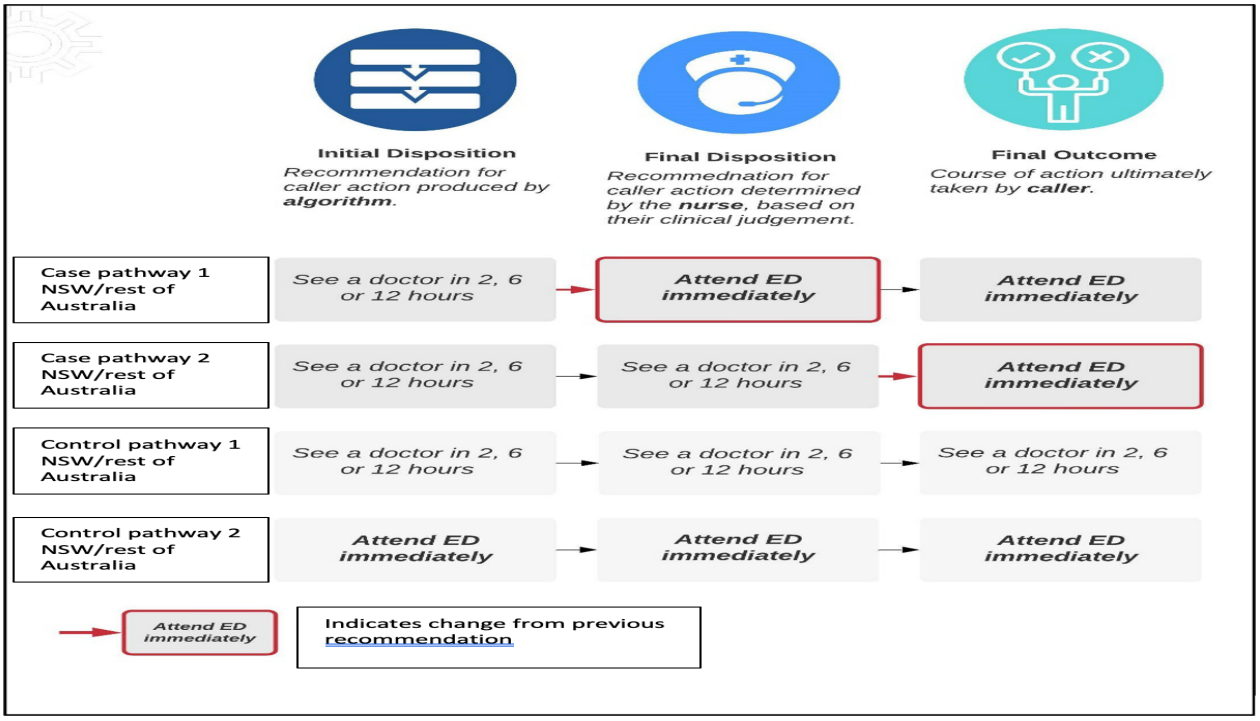
Sampling scheme

A modified case-control study design was employed, with the sampling approach based on the framework employed in the 2021 audit of the "attend the emergency department immediately", with case and control sample call recordings totalling 200 calls, and a 3:1 case: control distribution, as shown in Table 1. Fewer controls were selected in 2023 to contain project costs and reduce burden of call retrieval on the service provider. Calls were selected from the *healthdirect* call dataset September 2022 to February 2023 for three triage guidelines with dispositions and outcomes of interest to the audit, covering the final 6 months in which service delivery/workforce supply was contracted to an external provider and the period in which the pilot NSW afterhours referral pilot was conducted. The three triage guidelines were also used in the 2021 audit: Abdominal pain (adult), Limb pain (adult) and Vomiting toddler (paediatric). These triage guidelines are consistently within the top five triage guidelines used to respond to *healthdirect* callers. Three triage guidelines were selected by a Clinical Advisory Committee in 2021 to increase statistical power and clinical reliability of the audit. For comparative purposes the same triage guidelines were used in the 2023 audit. Figure 1 depicts the triage pathways, (initial disposition to final disposition, to final outcome) for the case and control sub-samples. The full sampling scheme is found in Appendix 1.

Table 1. Sample size for each combination of factors

September 2202 - February 2023	**Case 1**	**Case 2**	**Control 1**	**Control 2**	**Total N (%)**
NSW	*30*	*30*	*10*	*10*	**80 (40%)**
Rest of Australia	*45*	*45*	*15*	*15*	**120 (60%)**
Total sample	***75***	***75***	***25***	***25***	**200 (100)**

Figure 1. Case-Control triage pathways



Summary call dataset for the period September 2022-February 2023

To facilitate understanding of broader trends in call patterns and to make comparisons between NSW and the rest of Australia, Healthdirect Australia provided a summary secondary dataset of 44,412 calls received for the three triage guidelines with initial dispositions of interest: “see a doctor within 12, 6 or 2 hours” and “attend the emergency department immediately” during the study focus period of September 2022 to end February 2023. The dataset did not include time of call or afterhours designation. Data were analysed in Stata to determine triage pathways, points of upgrade and comparisons for NSW and the remaining Australian jurisdictions. To enable broad comparison of trends in upgraded pathways between the 2021 and 2023 audits, the 2021 large call set used to determine the sampling approach at that time, was filtered to match the variables included in the 2022/23 dataset, drawing upon only those calls for the guidelines abdominal pain (adult) , limb pain (adult) and vomiting toddler (paediatric) and commencing with an initial disposition of see a doctor with 12, 6 or 2 hours or attend the emergency department immediately. The 2021 call set was reduced by two thirds, from 50, 487 to 16,743 calls by filtering for variables of interest to the current audit.

Audit call extraction

The audit call set of 200 calls was randomly selected by Healthdirect Australia from the larger 2022-23 set following the sampling scheme provided by the researchers. The service provider for the time period under review then extracted the calls, de-identified them and provided them as digital audio files to the audit team.

Call assessment

The call assessment tool was first created in 2021 as a RedCap survey for ease of completion and data extraction. The same tool was used in 2023 to enable comparison of findings across the two audits and is found in Appendix 2.

The tool contains three domains for assessment:

Domain 1: Clinical Appropriateness
Assessors used their clinical judgement of the call to determine whether each disposition/outcome was appropriate, under-triage (required higher acuity care than suggested) or over-triage (required lower acuity triage than suggested).

Domain 2: Communication
Quality of communication between nurse and caller was rated using a five-point Likert scale for questions related to client-centredness, active listening and language comprehensibility, and binary Yes/No questions related to the clarity of advice provided by the nurse.

Domain 3: Factors contributing to a final outcome of “attend the emergency department immediately”
Assessors recorded features of the call that they thought impacted the outcome, in cases of upgrade. These were separated into patient, nurse and system/service factors, factors previously identified by a Clinical Advisory Panel in the 2021 audit. Assessors were also able to add free text notes to contextualise or elaborate on their responses.

Clinical assessors

Four assessors each completed an approximately equal number of call assessments.
Dr Dianne Crellin is Clinical Associate Professor in the Department of Nursing in the Melbourne School of Health Sciences at the University of Melbourne and Nurse Practitioner in the Emergency Department of the Royal Children’s Hospital. Dr Crellin has held leadership positions in Emergency Nursing in Australia and has published her research on the Australasian Triage Scale.

Mr John Thompson is a lecturer in the Department of Nursing of the Melbourne School of Health Sciences and an Emergency Nurse Practitioner in the Emergency Department of the Royal Melbourne Hospital. Ms Rachel McKittrick (MPH) is a registered nurse with both practice and research experience in aged care and primary care, currently undertaking a PhD on the role of primary care nurses in the health workforce. Dr Natasha Rabbige is a general medical practitioner of 20 year's experience who is currently completing her MPH. Assessors Crellin, Thompson and McKittrick worked on the 2021 audit of "attend the emergency department immediately" triage outcome.

Data analysis

Quantitative data

Audit data were tabulated in Microsoft Excel to produce descriptive and summary statistics by frequency and proportion for each assessment item.

Qualitative data

Free text comments were reviewed to gain greater contextual understanding of assessors' determination on both clinical appropriateness and communication.

Inter-rater reliability

A sub-sample of 16 calls were initially assessed by all assessors, 4 calls from each assessor call set, to familiarise assessors with the call process and the assessment tool. The calls and coding were discussed at subsequent meetings. Multiples of assessed calls were removed from the final dataset. An initial Kappa test of interrater reliability found fair agreement of 0.23-0.37 across five variables, noting that the large number of variables under assessment and four assessors are unlikely to produce full agreement. Subsequent assessor group discussion of calls and approaches to assessment aimed to reduce variation across assessors. Intraclass correlations were also undertaken for continuous variables in the communications domain, which showed good reliability with 95% confidence intervals of 0.2-0.8. Intraclass correlation estimate correlations between individual measurements and between average measurements made on the same target. Continuous communication between assessors and the project manager and project lead throughout the assessment maintained strong quality assurance over the assessment process.

Results

All call dataset September 2022- February 2023

Data were provided for calls triaged in the three triage guidelines, Abdominal pain (adult), Limb pain (adult) and Vomiting toddler (paediatric) and for the initial dispositions of "see a doctor within 12, 6 or 2 hours" and "attend the emergency department immediately", following the logic of the sampling approach. These triage guidelines are consistently within the top five triage guidelines used to respond to *healthdirect* callers. A total of 44, 412 *healthdirect* calls from the period September 2022 and February 2023 for the guidelines and initial dispositions of interest were in the dataset provided by Healthdirect Australia. Table 2 provides a summary of dispositions and outcomes.

Table 2: Triage dispositions and outcomes of all calls of interest, September 2022 - February 2023

	N (%)
	44,412 (100%)
Group guideline	
Abdominal Pain	22,520 (50.7%)
Limb Pain	14,818 (33.4%)
Vomiting Toddler	7,074 (15.9%)
Initial disposition (algorithm)	
See a doctor within the next 12 hours	7,947 (17.9%)
See a doctor within the next 6 hours	4,956 (11.2%)
See a doctor within the next 2 hours	4,849 (10.9%)
Contact doctor/surgery for a telephone consultation within 12 hours	85 (0.2%)
Contact doctor/surgery for a telephone consultation within 6 hours	166 (0.4%)
Contact doctor/surgery for a telephone consultation within 2 hours	50 (0.1%)
Attend emergency department immediately	26,359 (59.4%)
Final disposition (nurse)	
See a doctor within the next 1-3 days	81 (0.2%)
See a doctor within the next 12 hours	7,462 (16.8%)
See a doctor within the next 6 hours	4,917 (11.1%)
See a doctor within the next 2 hours	5,426 (12.2%)
Contact doctor/surgery for a telephone consultation within 12 hours	84 (0.2%)
Contact doctor/surgery for a telephone consultation within 6 hours	154 (0.3%)
Contact doctor/surgery for a telephone consultation within 2 hours	47 (0.1%)
Attend emergency department immediately	26,116 (58.8%)
Activate 000	125 (0.3%)
Final outcome (patient)	
Transfer to AHGP, GPAT nurse, TeleHealth GP or GPAT	6,605 (14.9%)
See a doctor within the next 1-3 days	1,861 (4.2%)
See a doctor within the next 12 hours	2,548 (5.7%)
See a doctor within the next 6 hours	1,870 (4.2%)
See a doctor within the next 2 hours	4,002 (9.0%)
Contact doctor/surgery for a telephone consultation within 12 hours	32 (0.1%)
Contact doctor/surgery for a telephone consultation within 6 hours	42 (0.1%)
Contact doctor/surgery for a telephone consultation within 2 hours	12 (0.0%)
Attend emergency department immediately	22,437 (50.5%)
Activate 000	3,393 (7.6%)
Refer to other service	1,610 (3.6%)

Upgraded to ED by nurse	
No	43,718 (98.4%)
Yes	694 (1.6%)
Upgraded to ED by patient	
No	39,658 (89.3%)
Yes	4,754 (10.7%)

Close to half of the calls were for adult abdominal pain (50.7%). Almost 60% of all calls were initially disposed by the computerised clinical decision platform to "attend the emergency department immediately". At final disposition (based on the nurse's clinical judgment) "attend the emergency department immediately" remained at close to 60% with proportions of dispositions in the "See doctor within 2, 6 or 12 hours" categories remaining stable at 40% of calls. At final outcome, where the patient/caller's views and capacity mediate the triage process, "attend the emergency department immediately" had reduced to approximately 51%. Close to 15% of callers were diverted to afterhours and telehealth service final outcomes, and 4% of patients determined to visit a doctor in 1-3 days, with an endpoint reduction in "attend the emergency department immediately" of 9% from the initial disposition, to 51%. "Activate 000" represented almost 8% of final outcomes.

When considering the drivers of a final attend the emergency department outcome, it is clear that the initial algorithm-generated disposition is the principal trigger. Nurses upgraded approximately 700 calls to the emergency department at final disposition and upgraded 125 calls to "activate 000", these two upgrade pathways representing just under 2% of calls. Nurses downgraded only 118 calls (0.3%) from "attend the emergency department" to less urgent primary care options at final disposition. At final outcome, patient-mediated "attend the emergency department" outcomes represented a reduction of 8% from final disposition, noting however that almost 8% of final outcomes were to "activate 000", indicating that patient factors play a part in upgrades to high-urgency outcomes.

When triage distribution is analysed by guideline, it is found that 73.5% of calls for abdominal pain were initially disposed to "attend the emergency department immediately". This was reduced by only 354 calls (1.5%) by the nurse at final disposition, with 0.2 % calls activating a 000 response by the nurse. At final outcome, mediated by the caller/patient, 68% of all abdominal pain calls were a high-urgency outcome, with 62.5% of calls and 5.8% of calls resulting in "attend the emergency department immediately" or "activate 000" respectively.

For limb pain, initial disposition to "attend the emergency department immediately" was lower but still substantial, at close to 40% of dispositions. While the nurse downgraded a small proportion of calls from the emergency department disposition, to see a doctor in 2 hours, a further 518 calls were upgraded by the nurse to ED, leading to a small increase (1.6%) in calls upgraded to "attend the emergency department" at final disposition. At final outcome, almost a quarter of calls were diverted to afterhours and telehealth options, and outcomes to "attend the emergency department immediately" were reduced by 10%, however a further 1946 calls resulted in a final outcome of "activate 000", resulting in 13.6% of calls with an activate 000 response. This is not surprising given limb pain may be associated with limitations on mobility and capacity to travel independently to an emergency department.

For the vomiting toddler guideline, 56% of calls were triaged at initial disposition to "attend the emergency department immediately". This was reduced slightly by the nurse at final disposition, with a further small reduction at final outcome to 54%. At final outcome, afterhours primary care services and telehealth options accounted for 12% of calls, diverted mainly from "see a doctor within 2 hours" and "attend the emergency department immediately" outcomes. For this guideline "activate 000" was a much smaller component (0.8%) of final outcomes than for the adult guidelines, possibly reflecting that most child patients have an adult carer

with capacity to transport them to an emergency department. Detailed breakdown of the triage pathway by guidelines are found in Tables 1-A3-3-A3 in Appendix 3.

Comparison between NSW and the rest of Australia

When comparing NSW to the other states and territories combined (rest of Australia) it was found that NSW had a higher proportion of upgrades to "attend the emergency department immediately". Table 3 shows a comparison of "attend the emergency department immediately" at key triage points between NSW and the rest of Australia. NSW calls had a higher proportion of upgrades overall than the rest of Australia. While relatively low levels of upgrading were driven by the nurse at final disposition, the patient mediated final outcomes were much more likely to be upgraded in NSW, with 18% of NSW calls upgraded to attend emergency department at final outcome, almost 3 times higher proportionally than for calls from the rest of Australia. Limb pain, with almost a third of calls upgraded by the caller to attend the emergency department, was the main driver of a higher level of upgrading in NSW, followed by abdominal pain.

Table 3: Upgrading to the emergency department at key triage points, NSW and the rest of Australia, 2022-2023

Guideline	All states/territories except New South Wales		New South Wales		Difference % (95% confidence interval)
	Total calls	Number upgraded (%)	Total calls	Number upgraded (%)	
Final disposition (nurse)					
All calls	29,442	329 (1.1)	14,970	365 (2.4)	1.3 (1.0 to 1.6)
Abdominal Pain	16,085	75 (0.5)	6,435	47 (0.7)	0.3 (0 to 0.5)
Limb Pain	8,838	222 (2.5)	5,980	296 (4.9)	2.4 (1.8 to 3.1)
Vomiting Toddler	4,519	32 (0.7)	2,555	22 (0.9)	0.2 (-0.3 to 0.6)
Final outcome (patient-mediated)					
All calls	29,442	1,973 (6.7)	14,970	2,781 (18.6)	11.9 (11.0 to 12.3)
Abdominal Pain	16,085	940 (5.8)	6,435	716 (11.1)	5.3 (4.0 to 5.8)
Limb Pain	8,838	872 (9.9)	5,980	1,943 (32.5)	22.6 (22.2 to 24.7)
Vomiting Toddler	4,519	161 (3.6)	2,555	122 (4.8)	1.2 (0.6 to 1.6)

Tables (4-9-A3) in Appendix 3 present the detailed triage pathways for all states and territories, for NSW alone, and for states and territories excluding NSW (the rest of Australia). In terms of transitions and diversions across the triage pathway, when comparing NSW with the rest of Australia, the afterhours primary care advice, service and telehealth options in NSW (Transfer to AHGP, GPAT nurse, TeleHealth GP or GPAT) were the final outcomes for 56% of callers triaged initially to "see a doctor within the next 12 hours" and 66% of callers initially triaged to "see a doctor within the next 6 hours" accounting for 2,638 callers. However 72% of the 8,800 callers in NSW triaged initially to "attend the emergency department immediately" proceeded to the same final outcome and a further 20% of this group proceeded to "activate 000" indicating that in NSW, neither the clinical judgement of the nurse at final disposition or the availability of afterhours GP advice and service options substantially reduced high-urgency final outcomes, which were driven largely, first by the algorithm and then by patient factors (Table 7-A3). Lower proportions of transfers to afterhours primary care and telehealth were final outcomes for calls initially disposed to primary care options for the rest of Australia (Table 9-A3) However a similar pattern to NSW is found for initial disposition-final outcome pathways for the rest of Australia in relation to calls initially disposed to attend the emergency department immediately , with 84% of initial dispositions for "attend the emergency department immediately" remaining the same at final

outcome. A lower proportion of calls disposed to attend the emergency department immediately resulted in an "activate 000" final outcome (5.85%) for the rest of Australia than for NSW.

Comparisons with 2021 audit findings

A dataset of 16,743 calls was extracted from the original 2021 dataset of seven triage guidelines (used at that time to determine the sampling approach), filtered to match the initial dispositions of calls included in the 2023 large dataset provided by Healthdirect Australia for the three guidelines of interest in the audit. Summary characteristics of this dataset are shown in Table 4. Proportions of guidelines for calls in the 2021 dataset were differently distributed compared with 2023, with a lower proportion of abdominal pain guideline calls, a higher proportion of limb pain calls and a higher proportion of vomiting toddler calls. Although not exactly matched, numbers are sufficient to make comparisons between the two time periods, assuming no other un-stated inclusion or exclusion criteria were applied by Healthdirect Australia prior to provision of data. In 2021 "attend the emergency department immediately" proportions were lower than in 2023 at each point in the triage pathway, with 31% of calls resulting in a final outcome of "attend the emergency department immediately" in 2021, compared with 50.5% in 2023. "Activate 000" final outcomes were slightly higher in 2021 (9.5%) than in 2023 (7.6%). Limb pain had the highest proportions of the three guidelines for upgrading at both final disposition and final outcome. Detailed breakdown of the triage pathway by guidelines are found in Tables 1-A4-3-A4 in Appendix 4.

Table 4: Triage dispositions and outcomes of all calls of interest, April - July 2021

	Summary
N	16,743
Group guideline	
Abdominal Pain	5,933 (35.4%)
Limb Pain	6,797 (40.6%)
Vomiting Toddler	4,013 (24.0%)
Initial disposition (algorithm)*	
See a doctor within the next 12 hours	3,866 (23.1%)
See a doctor within the next 6 hours	4,698 (28.1%)
See a doctor within the next 2 hours	3,366 (20.1%)
Attend emergency department immediately	4,813 (28.7%)
Final disposition (nurse)	
See a doctor within the next 12 hours	3,569 (21.3%)
See a doctor within the next 6 hours	4,261 (25.4%)
See a doctor within the next 2 hours	3,177 (19.0%)
Attend emergency department immediately	5,677 (33.9%)
Activate 000	59 (0.4%)
Final outcome (patient)	
Transfer to AHGP, GPAT nurse, TeleHealth GP or GPAT	3,268 (19.5%)
See a doctor within the next 1-3 days	437 (2.6%)
See a doctor within the next 12 hours	2,134 (12.7%)
See a doctor within the next 6 hours	2,145 (12.8%)
See a doctor within the next 2 hours	1,563 (9.3%)
Attend emergency department immediately	5,176 (30.9%)
Activate 000	1,585 (9.5%)
Refer to other service	435 (2.6%)
Upgraded to ED by nurse	

No	15,788 (94.3%)
Yes	955 (5.7%)
Upgraded to ED by patient	
No	13,808 (82.5%)
Yes	2,935 (17.5%)

*Note: The initial dispositions "Contact doctor/surgery for a telephone consultation in 12, 6 or 2 hours" were not present in the 2021 dataset but represented less than 1.0 % of dispositions in the 2023 dataset.

Table 5 presents upgrades to the emergency department at final disposition and final outcome for NSW and all other states and territories in the 2021 dataset. At this time, upgrading to attend the emergency department was higher in NSW than in other states and territories, with a similar pattern also found in 2023. When compared with 2023 (same results shown for 2023 in Table 3 above) upgrades to "attend the emergency department immediately" were proportionally higher in 2021 than in 2023, across all jurisdictions.

Table 5: Upgrading to the emergency department, NSW and all other states and territories, 2021

Guideline	All states/territories except New South Wales		New South Wales		Difference (95% confidence interval)
	Total calls	Number upgraded (%)	Total calls	Number upgraded (%)	
Upgraded to ED by nurse					
All calls	8,578	344 (4.0)	8,165	611 (7.5)	7.5% (2.8% to 4.2%)
Abdominal Pain	3,500	129 (3.7)	2,433	118 (4.8)	1.2% (0.1% to 2.2%)
Limb Pain	3,070	131 (4.3)	3,727	397 (10.7)	6.4% (5.2% to 7.6%)
Vomiting	2,008	84 (4.2)	2,005	96 (4.8)	4.8% (-0.7% to 1.9%)
Upgraded to ED by patient					
All calls	8,578	861 (10.0)	8,165	2,074 (25.4)	15.4% (14.2% to 16.5%)
Abdominal Pain	3,500	304 (8.7)	2,433	365 (15.0)	6.3% (4.6% to 8.0%)
Limb Pain	3,070	343 (11.2)	3,727	1,469 (39.4)	28.2% (26.3% to 30.2%)
Vomiting	2,008	214 (10.7)	2,005	240 (12.0)	1.3% (-0.6% to 3.3%)

Audit sample dataset

Two hundred calls were received matched to the specified sampling frame. The summary distribution of calls is shown in Table 6.

Table 6: Characteristics of calls in sample dataset, 2022-2023

N	**200**
Group guideline	
Abdominal Pain	47 (23.6%)
Limb Pain	103 (51.5%)
Vomiting	50 (25%)
Initial disposition (algorithm)	
See a doctor within the next 12 hours	28 (14%)
See a doctor within the next 6 hours	13 (6.5%)
See a doctor within the next 2 hours	115 (57.5%)
Contact doctor/surgery for a telephone consultation within 12 hours	11 (5.5%)
Contact doctor/surgery for a telephone consultation within 6 hours	5 (2.5%)
Contact doctor/surgery for a telephone consultation within 2 hours	3 (1.5%)
Attend emergency department immediately	25 (12.5%)
Final disposition (nurse)	
See a doctor within the next 12 hours	9 (4.5%)
See a doctor within the next 6 hours	4 (2.0%)
See a doctor within the next 2 hours	73 (36.7%)
Contact doctor/surgery for a telephone consultation within 12 hours	9 (4.5%)
Contact doctor/surgery for a telephone consultation within 6 hours	3 (1.5%)
Contact doctor/surgery for a telephone consultation within 2 hours	2 (1.0%)
Attend emergency department immediately	100 (50%)
Final outcome (patient)	
See a doctor within the next 12 hours	2 (1.0%)
See a doctor within the next 2 hours	12 (6.0%)
Contact doctor/surgery for a telephone consultation within 12 hours	8 (4.0%)
Contact doctor/surgery for a telephone consultation within 6 hours	2 (1.0%)
Contact doctor/surgery for a telephone consultation within 2 hours	1 (0.5%)
Attend emergency department immediately	175 (87.5%)

Appropriateness of dispositions and outcomes

Calls were assessed based on appropriateness of each call at the point of initial disposition, final disposition and final outcome. At each point, the assessors rated the advice provided as appropriate, over-triage (meaning lower acuity care would have been most suitable) or under-triage (meaning higher acuity triage would have been most suitable).

Appropriateness ratings at each point of disposition/outcome inform our understanding of the ability of the triage algorithm to provide clinically safe and appropriate advice without any other input (initial disposition), the soundness of the nurse's clinical judgement with regard to the advice provided by the algorithm (final disposition) and caller's decision or preference to take a course of action based on the nurse's advice (final outcome). The initial disposition is not provided to the caller but is recorded in the call database and was made available to assessors. Final disposition and final outcome are in most cases audible in the course of the call but were also recorded in the call data provided to assessors. Table 7 shows the distribution of appropriateness assessment across all pathways, both case and control at final outcome.

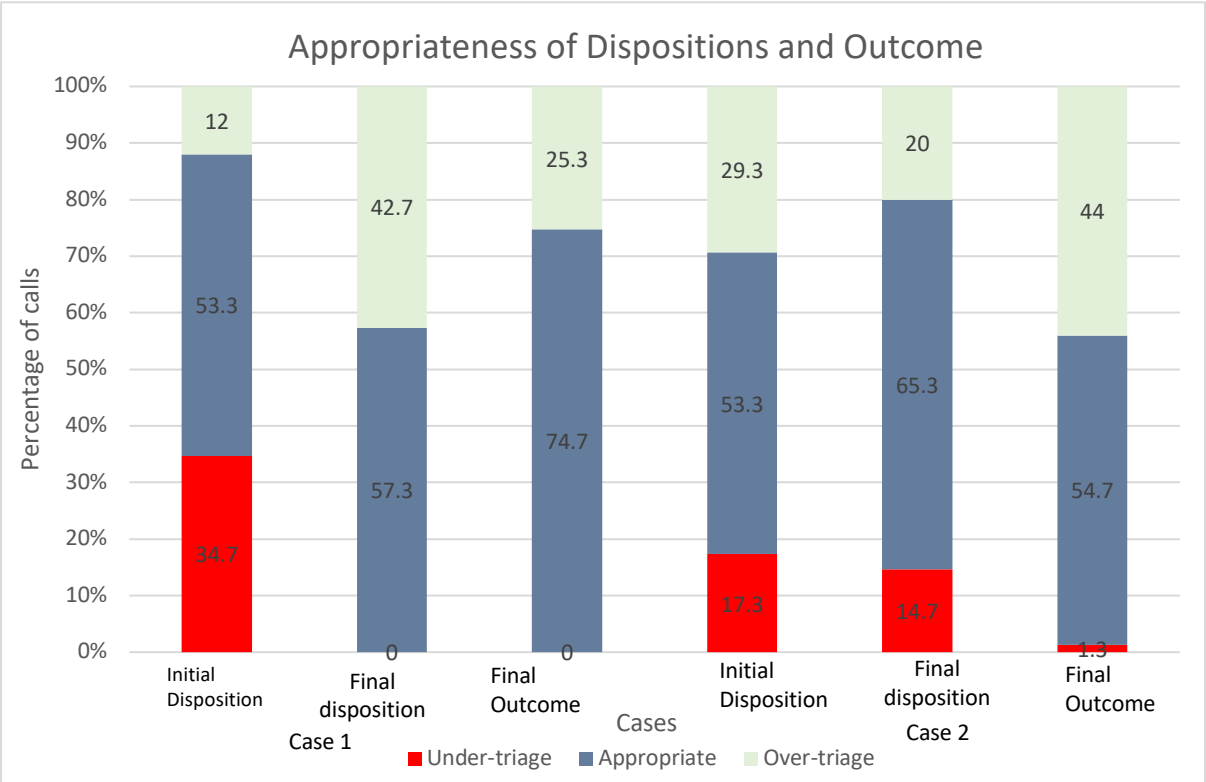
Table 7: Appropriateness assessments at final outcome, all calls, 2023

	Appropriate (%)	**Over-triage (%)**	**Under-triage (%)**
Case 1 (n=75)	56 (75%)	19 (25%)	0
Case 2 (n=75)	41 (55%)	33 (44%)	1 (1.3%)
Control 1 (n=25)	19 (76%)	6 (24%)	0
Control 2 (n=25)	18 (72%)	7 (28%)	0
Total (N=200)	**134 (67%)**	**65 (32.5%)**	**1 (0.5%)**

Figure 2 shows the assessment of all case calls, i.e. those calls that were upgraded to "attend the emergency department immediately" either at final disposition or final outcome. For case 1 (calls that were initially disposed as see a doctor within 2, 6 or 12 hours), more than a third of calls were assessed as under-triaged at initial disposition (34.7%), more than half (53%) were assessed as appropriate and 12.3 % were assessed as over-triaged. At final disposition for case 1 calls, when the nurse has exercised clinical judgement, all under-triaged calls were adjusted by the nurse and the nurse-determined final disposition was assessed as appropriate in 57% of cases. However, case 1 calls involved upgrading by the nurse to the emergency department at final disposition, and 43% of these upgrades were considered over-triage.

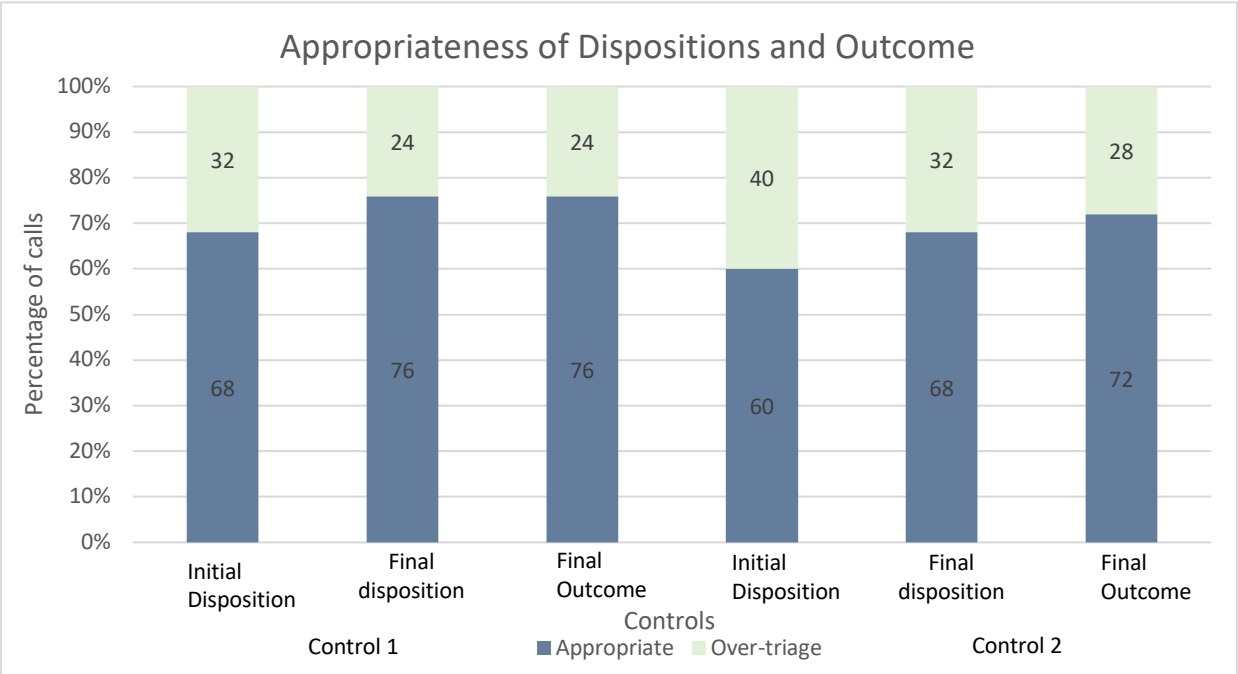
For case 2 calls (where an upgrade to the emergency department occurred at the final outcome, mediated by the patient) 17% of calls were assessed as undertriaged at initial disposition, more than half (53.3%) were considered appropriately disposed and 29% were assessed as over-triage. At final disposition nurse judgement resulted in a small reduction of calls assessed as under-triaged, to 14.7%; 65% were judged to be appropriate and 20% over-triaged, again reduced by nurse judgement. At final outcome, with patient input, our assessors determined that only 1 call was under-triaged, 55% of calls were appropriate, and 44% of calls were over-triaged, indicating that patient input was a significant driver of over-triage.

Figure 2: Call assessment of appropriateness - cases



For control calls, where the two pathways consisted of calls triaged at every point as "see a doctor within 2, 6 or 12 hours" (control 1) and calls triaged as "attend the emergency department immediately" at every point (control 2), no calls were assessed as under-triaged, with the majority of calls at final disposition and final outcome considered appropriately triaged, although a substantial proportion - 40%, 32% and 28% - were assessed as over-triaged at initial disposition, final disposition and final outcome respectively (figure 3).

Figure 3: Call assessment of appropriateness - controls



When considering appropriateness of disposition and outcome by guideline, case calls for vomiting toddler guideline had the highest level of under-triage (28%), while abdominal pain was most likely to be initially appropriately triaged by the algorithm (66%) and limb pain had the highest level of over-triage (29.1%). At final disposition, nurse judgement substantially reduced under-triage across all three guidelines and increased appropriateness While patient decision somewhat reduced appropriateness for the vomiting toddler guideline calls, patient input increased appropriateness for limb pain, but increased over-triage for abdominal pain by just over 10%. Figures 4, 5 and 6 present the findings.

Figure 4: Appropriateness of initial disposition by guideline

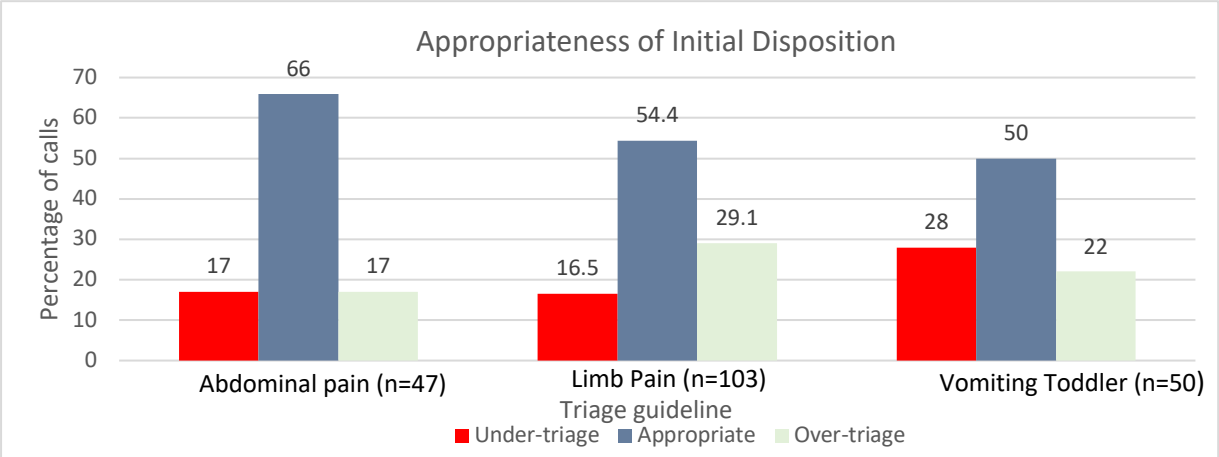


Figure 5: Appropriateness of final disposition by guideline

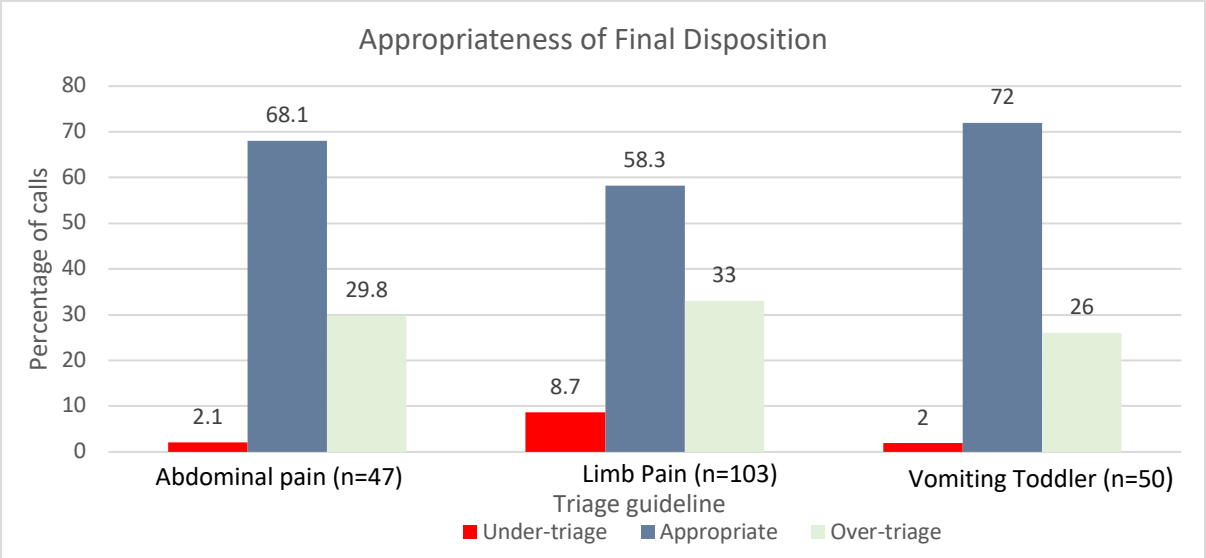
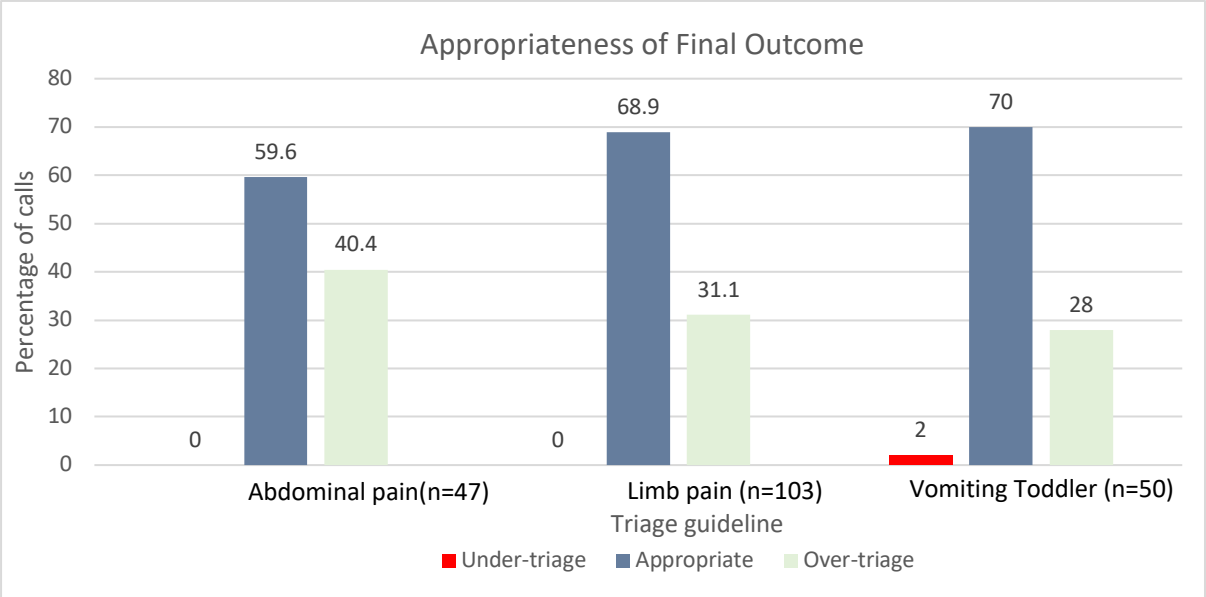


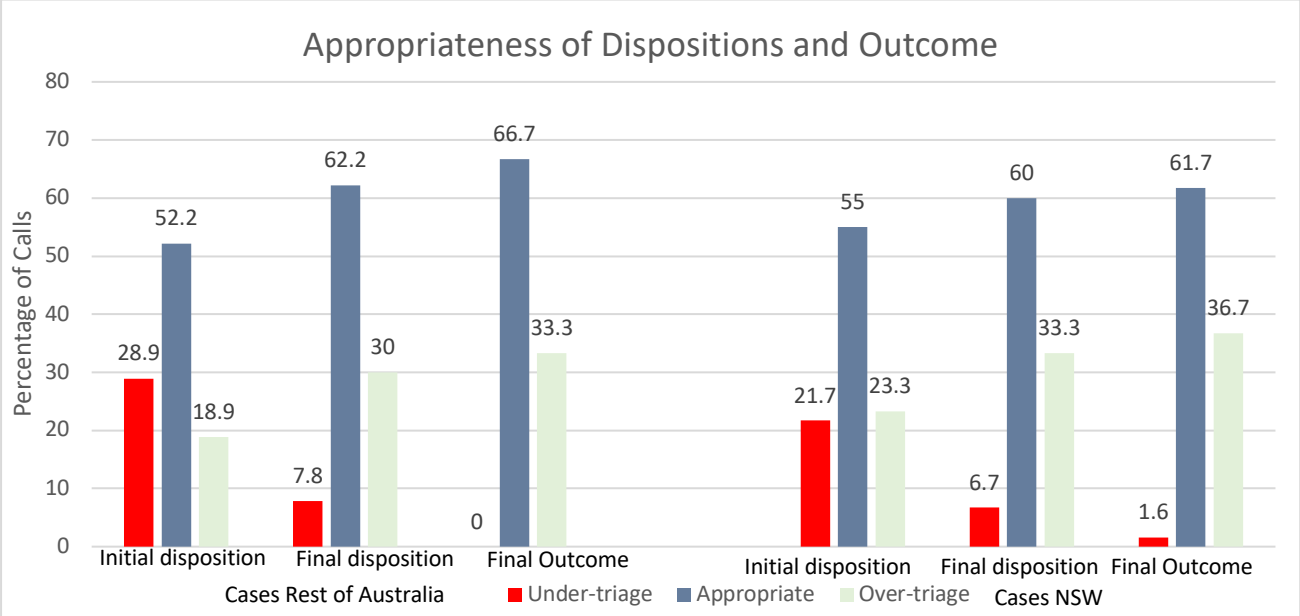
Figure 6: Appropriateness of final outcome by guideline



Comparison between NSW and the rest of Australia

Case dispositions and outcomes for calls from NSW were compared with combined jurisdictions of the rest of Australia. As shown in figure 7, levels of appropriateness were a little lower in NSW at each point in the triage pathway and levels of over-triage proportionately higher. Under-triage at initial disposition is higher across the rest of Australia, despite the same clinical decision-software being in use. This is likely to relate to varying call characteristics across jurisdictions.

Figure 7: Appropriateness of dispositions and outcome - rest of Australia v's NSW



Comparison with 2021 findings for appropriateness

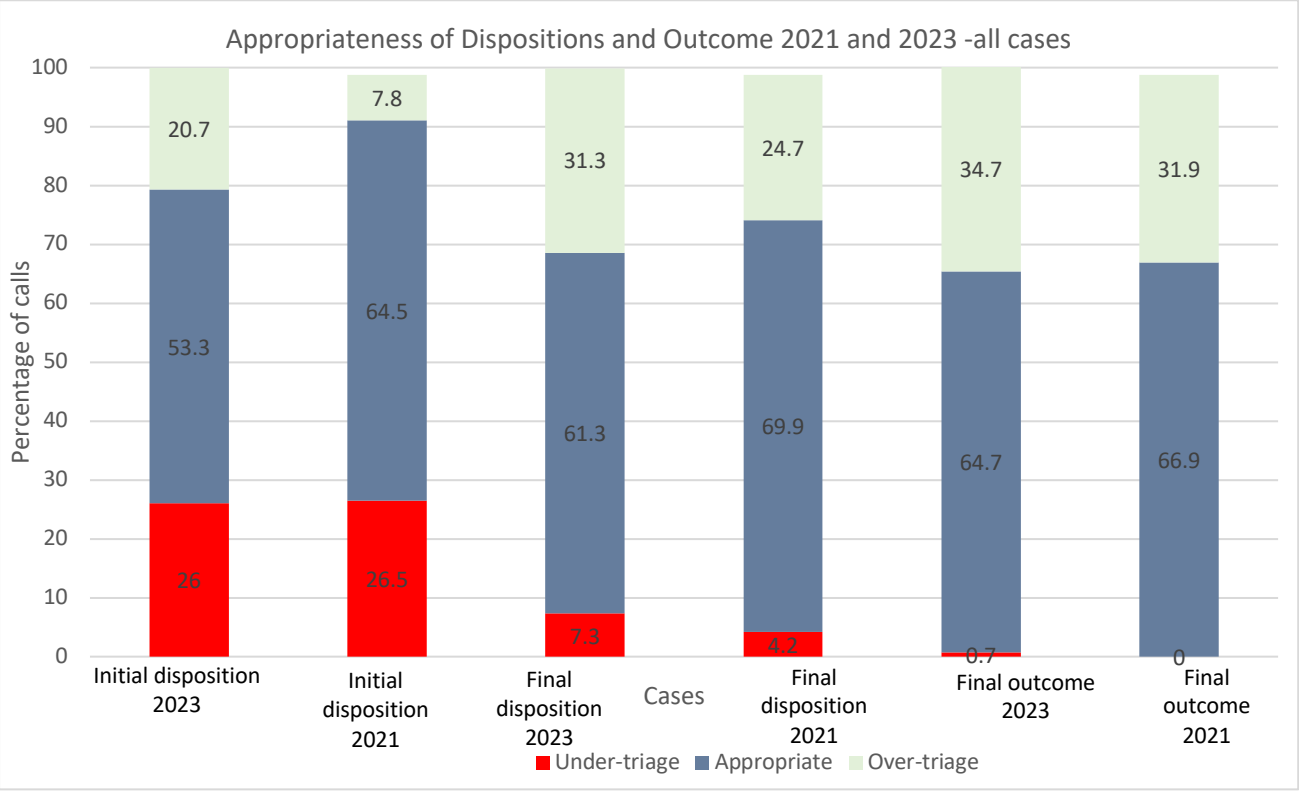
In 2023, appropriateness of all calls reduced from 83% in 2021 to 67% and over-triaging increased from 15% in 2021 to 32.5%. Table 8 shows appropriateness of final outcomes for all calls in 2021 and 2023. Over-triage was generally higher across case calls than in 2021. Appropriateness was also lower for case calls in 2023.

Under-triage was fairly closely matched across both audits, noting that in both time frames under-triage was substantially reduced by the nurse at final disposition in the case pathways, as shown in Figure 8.

Table 8: Appropriateness at final outcome, all calls, 2021 (N= 291) and 2023 (N=200)

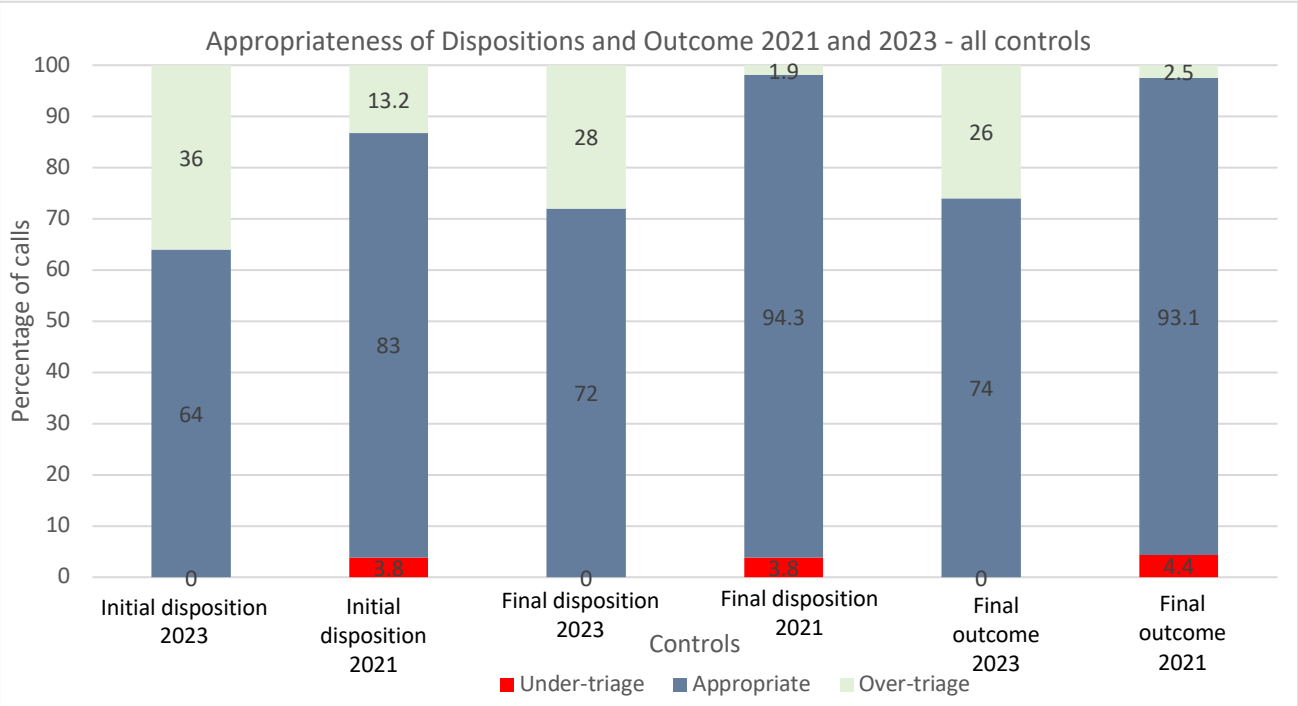
Number of calls		**Appropriate (%)**		**Over-triage (%)**		**Under-triage (%)**	
2021	2023	2021	2023	2021	2023	2021	2023
Case 1 n=75	Case 1 n=75	57 (76%)	56 (75%)	17 (23%)	19 (25%)	1(1%)	0
Case 2 n=74	Case 2 (n=75)	49 (66%)	41 (55%)	25 (34%)	33 (44%)	0	1 (1.3%)
Control 1 n=69	Control 1 n=25	62 (90%)	19 (76%)	3 (4%)	6 (24%)	4 (6%)	0
Control 2 n=73	Control 2 n=25	73 (100%)	18 (72%)	0	7 (28%)	0	0
Total N=291	**Total (N=200)**	**241 (83%)**	**134 (67%)**	**45 (15%)**	**65 (32.5%)**	**5 (2%)**	**1 (0.5%)**

Figure 8: Appropriateness of dispositions and outcomes 2021 and 2023 – all case calls



When comparing control appropriateness of dispositions and outcomes between 2021 and 2023, the most notable feature is the increase in assessed over-triage across all points of the triage pathway in 2023, and to a lesser extent, the absence of under-triage at all points of the pathway in 2023, as shown in Figure 9.

Figure 9. Appropriateness of dispositions and outcomes 2021 and 2023 – all control calls



Factors influencing upgrade of dispositions and outcome

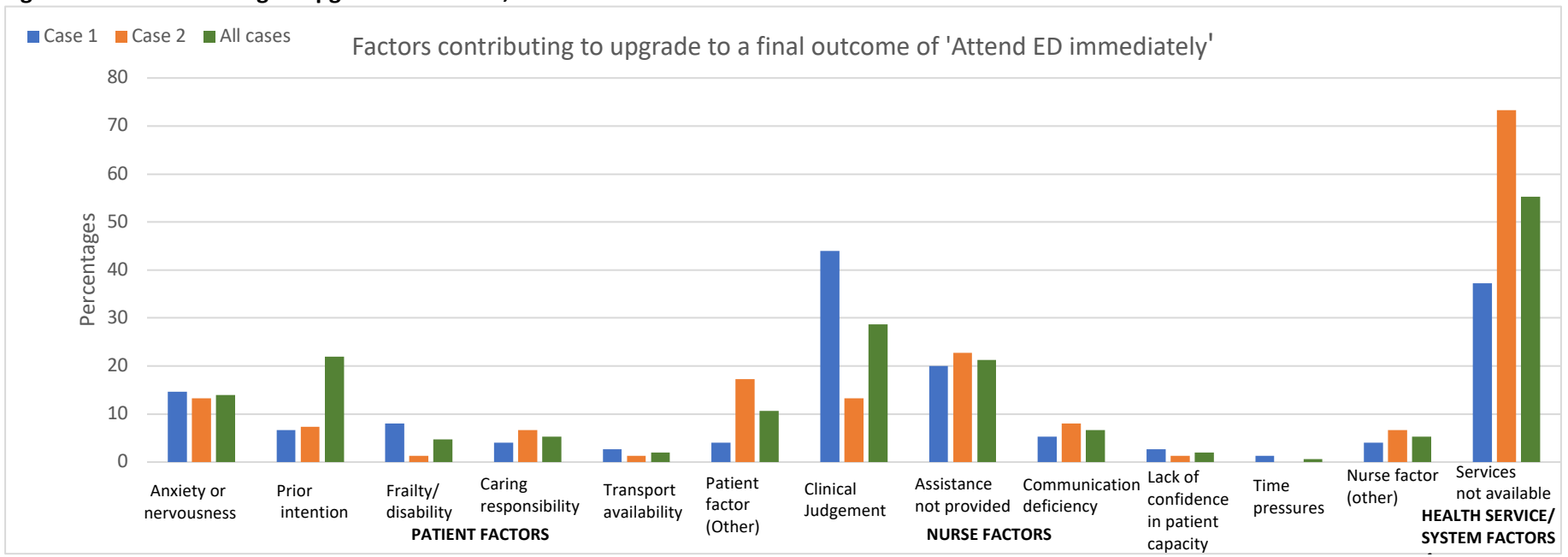
Assessment of upgraded calls (case 1 and case 2) included identification of nurse, patient and health service/system factors that have contributed to the upgrade. As part of the 2021 Clinical Advisory Group development of the call assessment tool, a range of possible sub-factors were identified in the nurse and patient factors categories, which have again been used in 2023 call assessment, as shown in Table 9. As would be expected, upgrades that occurred at final disposition, determined by the nurse were largely nurse-related factors, and in particular the clinical judgment of the nurse, but not exclusively so. In some calls the constraints on a patient or the non-availability of health services was apparent early in the call (for example a rural location), and therefore some patient and health service-related factors were recorded for case 1 calls. Similarly, while most upgrades at final outcome were driven by patient factors, some nurse related factors were influential. Lack of availability of an appropriate service, generally a primary care service, was the single most influential factor in upgrades, followed by nurse clinical judgement and nurse failure to assist in the location of an appropriate service. Figure 10 presents all factors contributing to upgraded dispositions and outcomes.

Table 9: Factors leading to upgrades – all cases, 2022-23

Patient factors*						**Nurse factors***						**Health service/system factors**
Anxiety or nervousness	Prior Intention	Frailty/ disability	Caring responsibility/ needs of dependents	Transport availability	Patient factor (Other)	Clinical judgement	Assistance not provided to find lower urgency health service	Communicat-ion deficiency on part of nurse	Lack of confidence in patient capacity	Time pressures	Nurse factor (Other)	Service not available
CASE 1 n(%) N=75												
11(14.7)	5(6.7)	6(8.0)	3(4)	2(2.7)	3(4)	33(44)	15(20)	4(5.3)	2(2.7)	1(1.3)	3(4)	28(37.3)
CASE 2 n(%) N=75												
10(13.3)	28(37.3)	1(1.3)	5(6.7)	1(1.3)	13(17.3)	10(13.3)	17(22.7)	6(8)	1(1.3)	0	5(6.7)	55(73.3)
ALL CASES n(%) N=150												
21 (14)	33 (22)	7 (4.7)	8 (5.3)	3 (2.0)	16(10.7)	43(28.7)	32(21.3)	10(6.7)	3(2.0)	1(0.6)	8(5.3)	83(55.3)

*Note assessors could select more than one factor

Figure 10: Factors leading to upgrades - all cases, 2022-23



Call communication assessment

Nurse communication during each call was assessed using a combination of five-point Likert scales and yes/no responses for the presence or absence of a number of communication features that represent client-centredness, active listening, appropriate language and advice (clarity and confirmation).

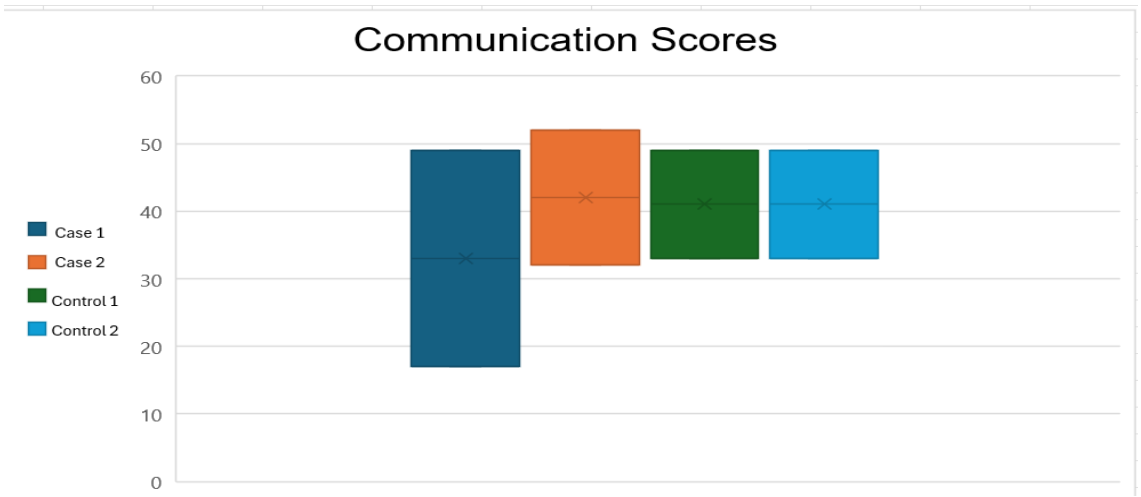
Client-centredness relates to use of the caller's name, tone of voice of voice (friendly, calm, professional, respectful) while responsiveness (takes account of caller cues such as anxiety, fear, distress) and takes account of caller expectations (what does the caller feel needs to be done; what were they seeking from ringing the helpline). The caller should feel that the nurse cares about them.

Active listening relates to the nurse giving the caller time to explain the problem; encouraging provision of information; the nurse doesn't interrupt unnecessarily and confirms that the caller's needs are understood by summarising and seeking confirmation from the caller that this is a correct representation of the problem.

Language comprehensibility relates to the degree to which the nurse can be understood or comprehended by the caller, covering aspects such as accent of the nurse, speed of delivery of information, use of plain language (not complex medical terminology) and enunciation (clear, not mumbling, provides smooth flow of information). Advice – its clarity and confirmation - relates to the nurse's advice and suggested course of action that is provided to the caller.

Assessment of the quality of communication of the nurse was positive overall. The total scores were higher for case 2 compared to controls, but there was a greater range of communication scores across cases, particularly for case 1 (figure 11.) Communication appeared to be more consistent across control calls, suggesting that calls associated with upgrades are more demanding of nurse communication with the patient.

Figure 11: Communication total scores for all calls – cases and controls

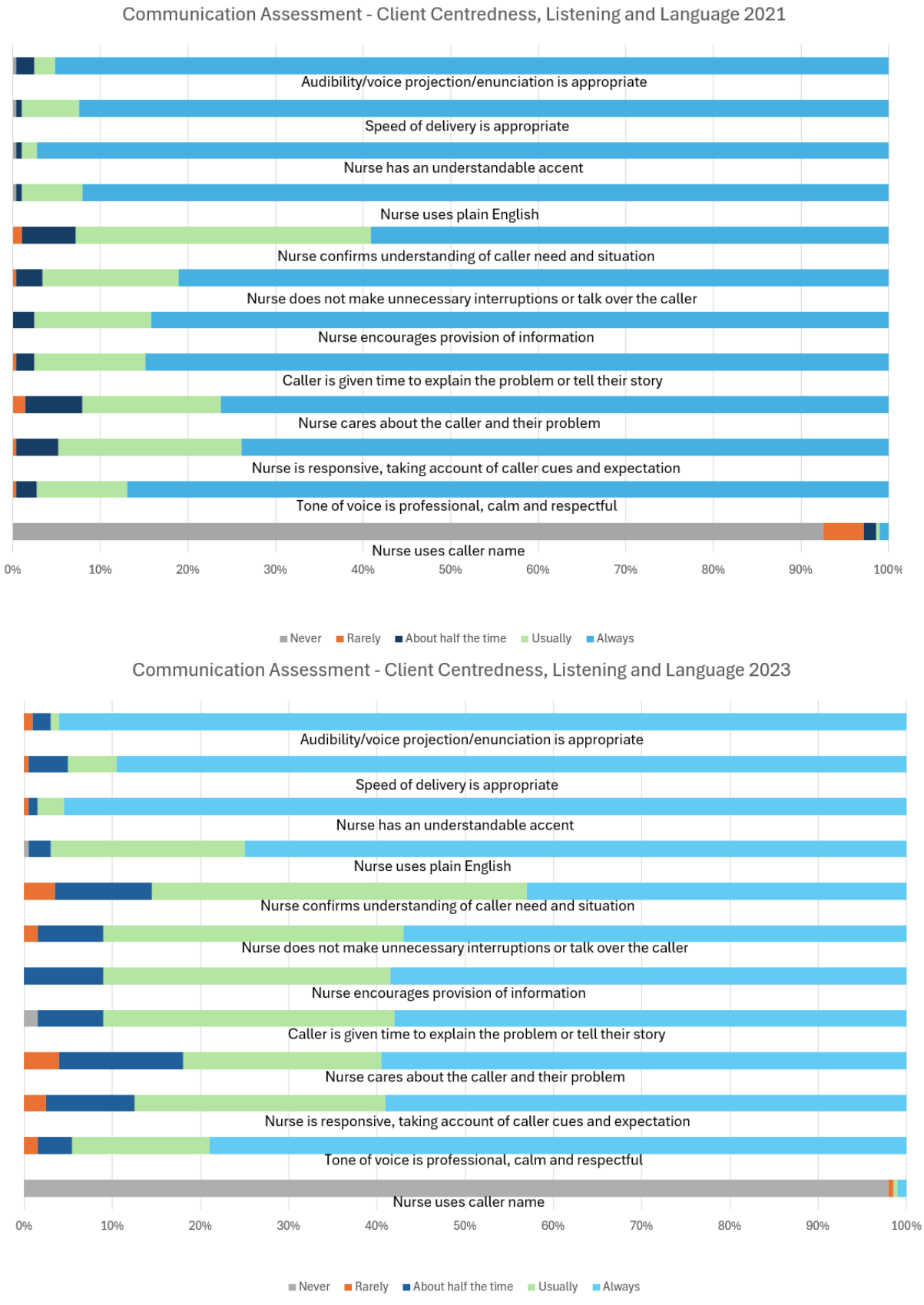


*Note: Total communication scores: *Maximum possible score = 53. Likert Scoring: Always = 4, Usually = 3, About half the time = 2, Rarely = 1, Never = 0 Binary scoring: Yes = 1, No = 0*

Figure 12 shows the proportion of calls which were assessed as including each of the identified communication features, “Always”, “Usually”, “About half the time”, “Rarely” or “Never” in 2023 and 2021. Features were present always or usually in most communication elements in over 90% of calls in both time frames. However, there was a decline, compared with the 2021 assessment, in communication for the elements “nurse cares about the caller and their problem”; “nurse confirms understanding of caller’s need and situation” and “nurse is responsive, taking account of callers cues and expectation”. Each of these elements were also the poorest performing domains of communication in the 2021 audit but have declined further in 2023. We were mainly

unable to assess the nurse's use of the caller's name, as first names were redacted from call recordings although a small proportion of nurses used the caller's name during or at the conclusion of the call.

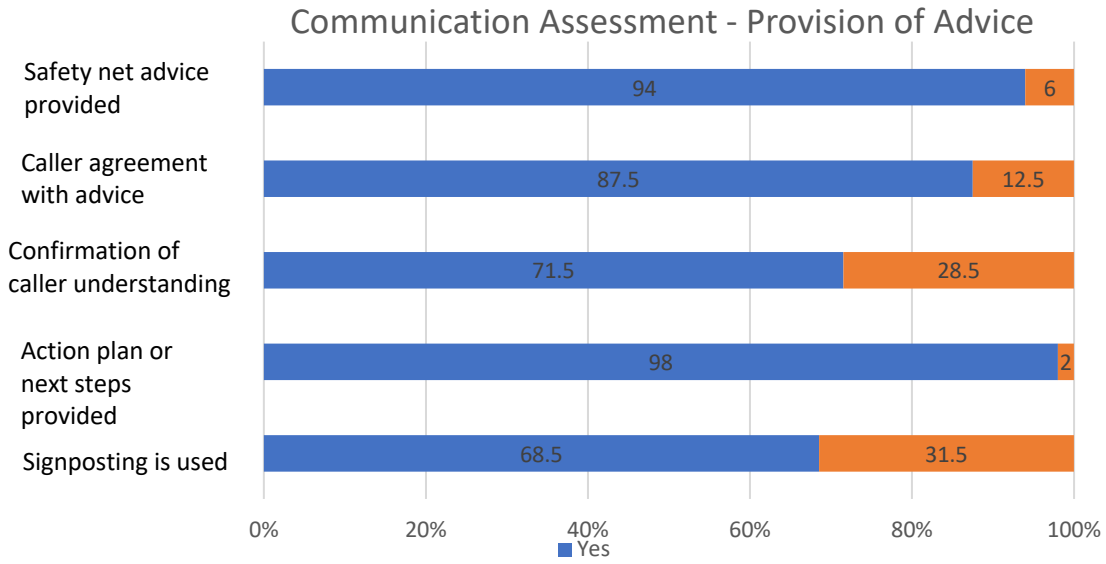
Figure 12: Communication assessment - client centredness, listening and language 2021 and 2023



Provision of advice to caller

Five communication features were assessed with a yes/no binary rather than a Likert scale and these are shown in Figure 13. Signposting is the use of explicit statements by health providers to inform a patient what they are about to say or do and may also be referred to as "call management". Signposting was identified as an important element of communication in a phone consultation, as it provides structure, engages the patient and helps them to understand the direction the consultation is going, as well as allowing the nurse to share their thoughts and gather important details to inform their clinical decision making. Signposting was used in more than two thirds of the calls that were assessed, a substantial increase on the 41% of calls that were well-signposted in 2021, but our assessors observed that this proportion ideally should be increased further. Provision of a verbal action plan had increased to 98% of all calls compared with 96% in 2021. Caller agreement with advice also increased (81% in 2021 to 88% in 2023) but confirmation of caller understanding had reduced by about 5% to 71% of calls. Importantly, safety net advice was provided for 94% of calls.

Figure 13: Provision of advice to caller



Assessor communication observations

There were 123 free text assessor comments in total. The majority of these (100) noted a concern or deficit about at least one aspect of the conduct of the call. Nonetheless, communication scores were overall high and the assessors remarked in 23 free text comments on professional, caring and clear interactions conducted by the nurse. Box 1 provides a selection of assessor comments both positive and negative.

Three of our assessors also undertook assessment in the 2021 audit. In regular meetings during the assessment process, these assessors commented that they felt nurse engagement with the caller was somewhat reduced overall and this was reflected in assessor free text comments. In addition, one call was highlighted as being inappropriate for the circumstances. Without identifying the call, it was apparent that a caller with advanced metastatic cancer was increasingly distressed by pain whilst on the call. The triage guideline for abdominal pain seemed not to encompass cancer-related pain and the nurse proceeded with all questions in the guideline, including asking whether the caller had recently been scuba-diving. There was no acknowledgement by the nurse of the caller's pain and increasing distress, and minimal use of clinical judgement on the part of the nurse. The call eventually reached an "attend the emergency department immediately" final outcome after receiving an "attend doctor in hours" for both initial and final disposition. Our assessors suggest that a cancer-related triage guideline for pain would have been a more appropriate triage guideline in this circumstance.

Box 1. Assessor free-text comments on communication

Positive assessor observations	Negative assessor observations
Nurse very engaged, paying attention and conveyed concern - "Are you concerned?", "You've given the antihistamine so that's great work." No formal signposting but flowed well and nurse clearly re-sequenced and prefaced questions to make things seem relevant etc. Presented plan well - rapidly adapted to parent's desire to go to ED (could have explored telehealth a bit more). *Nurse used clear simple questions and asked them again when needed without sounding impatient or dismissing what the caller had said. Also used clear directions when asking her to compare arms etc. Very efficient and businesslike - not uncaring but limited warmth.* *Very gentle and caring tone. Caller not keen to go to ED 'too busy' - nurse handles this well and resists his attempt to have telehealth.* *Lovely tone and manner - can I just pause you there for minute - clear and paying attention - reiterating what the caller said demonstrating that she is listening, beautiful signposting - I'm going to ask some yes/no questions to help with this assessment so I give you the right advice. I know you just said but to confirm ....* *Interview seems organised and is logical - even says 'SCUBA diving - it's a funny one'.* *Nice sequencing of questions, nice tone and engaging.*	*Response of nurse on some occasions seem to show no regard for the relevance of the information e.g. is she SOB = yes, nurse just asks next question. Asks compound questions and some complicated questions and then asks [caller] to explain which part she responded yes to! Sounds a bit disinterested at times.* *Nurse did not sound engaged and rushed through assessment and provided very little feedback to family.* *Cut him off a couple of times. Reading advice - no connection with caller. Tone suggested was disinterested in his pain - cut him off when he was saying pain was excruciating - caller makes it clear that he considers some q irrelevant 'already know I have kidney stones' - no attempt to explain line of questioning and .. dismisses his attempt to redirect to his issue ….* *Disinterested tone. Lengthy pauses which nurse doesn't explain - just goes quiet.* *No explanation or discussion of symptoms and decisions. Lack of listening - poor history taking.* *Did not respond to fact that caller was in obvious pain.* *Nurse not taking account or giving caller time to deal with unwell child while on the phone, a bit rude at times when caller perhaps couldn't quite understand terms used/English or articulate themselves Mumbled when talking about urgent/priority care clinic. … Then rushed final bit of info. Pace varied a lot during the call.* *The nurse was almost "over calm", including at the end of the call when she didn't express any care/understanding .. in terms of the caller's challenges to get to the ED i.e. didn't really help to problem solve, ? due to time/KPI pressure (couldn't drive with the pain, husband needed to care for two young children)* *Questions & advice delivered all very quickly, hard to keep up, although caller seemed to understand.* *No help given to locate alternative (to caller's regular) GP, open on a Saturday - just said go to ED.* *Big pause - not sure what the nurse was doing - had previously said she was going to start asking questions. Followed by regular pauses. Extremely hard to understand what the nurse was asking …. seemed to be stumbling over words & also due to a heavy accent, which additionally was muffled.*

Discussion

The *healthdirect* nurse triage and advice line has been operating in recent years in a challenging health system environment. The impact of the Covid 19 pandemic, associated health workforce fatigue and attrition, increasing levels of chronic disease in an ageing population and a dramatic decline in bulkbilling in general practice have placed great pressure on primary care and hospital services alike. Emergency Department demand in particular has grown as general practice fees have increased and bulkbilling has diminished. In this repeat audit of the *healthdirect "*attend the emergency department immediately triage outcome", these pressures are apparent, however the impact of clinical decision support software is also apparent.

We have found higher proportions of "attend the emergency department" at initial disposition, final disposition and final outcome, in the large dataset for three commonly used triage guidelines in the time period September 2022-February 2023 than for a very similar dataset for the same three guidelines for calls in April -July 2021. In 2023 we have found a lower proportion of upgrades along the triage pathway than in 2021, but less intervention by the nurse's use of clinical judgement at final disposition to reduce "attend the emergency department" initial triage results. Although at final outcome in 2023 we see some diversion to afterhours, primary care and telehealth services, this did not substantially reduce final outcomes recommending an immediate emergency department visit.

The substantial 2023 increase on the 2021 large dataset results in the initial disposition "attend the emergency department immediately" suggests the clinical decision support algorithm is more risk averse in its decision pathways than previously, or that callers are presenting with more acute symptoms. The CDSS introduced in 2023 after the audit time period of focus may well address limitations in the platform in use in the audit period, but evaluation over time is required to determine its impact. Patient determination to go to the emergency department at final outcome was also a strong driver of upgraded outcomes, particularly for the two adult guidelines, following the principal influence of the initial disposition. This may well reflect lack of availability of affordable primary care. The abdominal pain triage guideline alone was a significant driver of a very high initial disposition to the emergency department, while limb pain generated the highest proportion of patient-mediated upgrades at final outcome.

Separation of the 2022-2023 larger dataset into calls from NSW and calls from all other jurisdictions found that in NSW, initial disposition to "attend the emergency department immediately" was higher than in other states and territories and remained higher at final outcome, even though a proportion of calls were diverted to afterhours primary care and telehealth options. We did not have a dataset that recently preceded the pilot project in NSW, but on the basis of call outcomes during the pilot period we could find no evidence that the pilot project diverting patients to afterhours services was substantially reducing high urgency outcomes.

The audit of a 200-call sample, of which 150 contained an upgrade to "attend the emergency department immediately" found that *healthdirect* continues to provide a safe triage and advice service. Assessors found that nurses demonstrated use of clinical judgement to reduce under-triage, although an increase in over-triage was found in both case and control calls.

In relation to communication, communication scores were, as in previous audits, very positive, however there was an emerging trend of some lack of nurse empathy and engagement during a minority of calls, which was also picked up in assessor observations and written comments. This may reflect higher workloads or higher complexity of calls, which may be linked to disposition and outcome upgrades. Delivery of final advice improved overall with higher rates of provision of action plans, signposting and caller agreement with advice, but confirmation of caller understanding remained lower than other elements of advice, although improved on 2021 levels. Increased focus on ensuring callers understand the advice and referrals given may help to reduce patient upgrades to the emergency department at final outcome. The recent initiative to include

formal agreement between patient and nurse on an action plan should provide an opportunity for the nurse to confirm the callers understanding of the urgency of their need and the recommended next steps.

In terms of the factors driving high proportions of calls to an "attend the emergency department" final outcome, audit findings indicate that the key drivers are the initial algorithm process, followed by health service unavailability at the final outcome point of the pathway, followed by nurse factors, including clinical judgement, followed by patient-related factors, both circumstances (anxiety, frailty, lack of transport) and preferences (prior intention to attend ED). Nurse clinical judgement is a crucial component of a telephone triage service. As noted, nurse intervention in diverting callers to lower urgency options after the initial algorithm triaged a high urgency disposition was minimal in the large all-jurisdictions dataset. In the sample dataset we did however see nurses using clinical judgement to address under-triage, but also contributing a higher over-triage rate than in 2021. Nurse failure to assist in locating a suitable service at the final outcome was, as in 2021, the second most influential nurse factor in determining triage outcome. It is possible that nurses, too, are risk averse or that time pressures may incline nurses to a stay with the initial disposition to reach a speedier conclusion to the call. Nurse capacity to help the patient reach an appropriate final outcome may also need to be boosted by further training. The recent Healthdirect Australia decision to introduce a formal action plan step in the triage pathway before a final outcome is reached may better support patients in their decision-making. Further investigation of nurse attitudes, skills and decision-making during a call may help to shed light on the role of nurses in both final disposition and final outcome decision points.

In relation to communication, communication scores were, as in previous audits, very positive, however there was an emerging trend of some lack of nurse empathy and engagement during a minority of calls, which was also picked up in assessor observations and written comments. This may reflect higher workloads or higher complexity of calls, which also flows through to higher urgency upgrades. Delivery of final advice improved overall with higher rates of provision of action plans, signposting and caller agreement with advice, but confirmation of caller understanding remained lower than other elements of advice, although improved on 2021 levels. Increased focus on ensuring callers understand the advice and referrals given may help to reduce patient upgrades to the emergency department at final outcome. The recent initiative to include formal agreement between patient and nurse on an action plan should provide an opportunity for the nurse to confirm the callers understanding of the urgency of their need and the recommended next steps.

Overall, addressing the objectives of the audit, this study has not found a positive shift in distribution of *healthdirect* outcomes, with an increase in "attend the emergency department immediately" at national level, and an increase in assessed over-triage in a sample call set of upgraded and non-upgraded calls. While the majority of sample calls were considered appropriately triaged at final disposition and final outcome, assessors found more than 40% of upgraded calls were over-triaged at both points. In calls with no upgrades in the triage pathway, a quarter to 40% were assessed as over-triaged. Lack of availability of a suitable health service is an upgrade to emergency department driver that is largely outside the control of Healthdirect Australia. However, nurse assistance to locate a lower acuity service for callers whose outcome is upgraded to "attend the emergency department immediately" could be improved. Insufficient assistance to locate a suitable primary care option at final outcome continues to be a prominent nurse factor in emergency department outcomes, although it is apparent that caller circumstances and preferences are influential in this final step and that nurses do take account of these circumstances and preferences in their interaction with the caller at final outcome.

The pilot in NSW of virtual GP advice to callers who do not have access to a primary care service had not yet, in the initial 6 months of operation, reduced emergency department outcomes to similar or lower levels than across rest of Australia, noting that across Australia, emergency department outcomes are considerably higher than they were in 2021. These are however driven primarily by the very high initial disposition to "attend the emergency department immediately", which is not substantially reduced by the nurse at final disposition.

While there was some diversion to afterhours and telehealth GP services, this did not appear to be counteracting the algorithm generating emergency department dispositions.

Limitations of the study

The audit encountered two challenges with the data provided for the study. The large national dataset included only calls from September 2022 to February 2023 for the three guidelines of interest commencing with the initial dispositions of interest; not all initial dispositions for calls during that period pertaining to the guidelines of interest. This did not match our request for a duplicate dataset to that used in 2021, obtained at that time to determine our sampling approach. To overcome this limitation, the large dataset from 2021 was filtered to include only the three guidelines of interest and initial dispositions of interest, to obtain a dataset with similar key characteristics to the 2023 dataset. The two datasets were then used to compare triage pathways and outcomes for the two time periods. It acknowledged that other characteristics of the two datasets, such as number of calls per guideline and overall number of calls in each dataset are not exactly the same. The datasets are of sufficient size to make broad comparisons, however if other inclusion and exclusion criteria were used to create the data provided, it is possible that interpretation may be affected. The second limitation relates to lack of provision of time of day of calls both in the large 2023 national dataset and the sample of calls received for analysis. Nonetheless, it is known that approximately 70% of calls to *healthdirect* occur in the afterhours period[(1)] and it could be expected that random selection of calls according to the sampling scheme would be representative of call patterns in- and out-of-hours. Our assessors advise that time of the call was usually discernible from the call interaction and afterhours timing was an expected contributor to lack of availability of services.

Assessment of appropriateness of real calls present its own challenges in terms of the vast variation and combinations of symptoms and callers, as well as the size and diversity of the *healthdirect* nurse workforce. In previous evaluations (2012, 2015 and 2018) a methodology was designed to minimise variation and increase reliability of call assessment, involving use of a small number of clinically validated scenarios, with a pre-determined appropriate outcome, presented repeatedly by trained simulated patients. Assessment of real calls cannot be controlled in the same way, but we have sought to make the assessment process as rigorous as possible by engaging four clinicians who are expert in triage in emergency departments and with extensive experience in primary care, three of whom have worked on previous audits. Our assessors are trained for the audit and engage in shared moderation and review of some calls and regularly meet with the project lead. A further challenge in audio assessment is that the assessors do not have visibility of the clinical decision support system used by the nurses, so we are unable to confirm the fidelity of the nurse's use of decision-making pathways in a particular guideline. The nurse may also be privy to unseen information about service availability which may not be shared with a caller but may influence the nurse's interactions with the caller at the point of determining a final outcome. Overall, the assessment approach was as robust as possible within the constraints of real-world retrospective audio assessment of 200 calls.

Conclusion

The findings of this audit cannot be viewed in isolation from the broader healthcare system and its current challenges. The *healthdirect* service continues to provide safe, and on the whole, high quality advice and service referral to callers. From a policy perspective, key objectives of a national primary care triage and advice service are demand-management and supporting access to appropriate, timely, care. In the audit timeframe, in the context of Australian healthcare and resource constraints, this audit suggests that *healthdirect* clinical decision software settings and workforce preparation are in need of some revision if these objectives are to be fully met. Recent initiatives by Healthdirect Australia to introduce a more sophisticated clinical decision support system, increase connections to afterhours primary care and telehealth services and put in place a new model of workforce engagement may well have a positive impact. These initiatives should support broader health system reforms. Continued monitoring and evaluation of *healthdirect* outcomes is required to determine if these initiatives are having a positive effect.

Recommendations

Immediate

- Continue workforce training to develop nurse capacity to guide callers to an appropriate outcome and confirm caller understanding of advice provided.

Medium term

- Investigate nurse attitudes, skills and decision-making to better understand the role of nurses in upgrades to high urgency outcomes.
- Undertake a longitudinal evaluation of triage pathways and emergency department outcomes in NSW*.
- Undertake an economic evaluation of *healthdirect* to determine its contribution to:
    - demand management for emergency department care and
    - population-wide access to appropriate care*.

*Acknowledging that these are government policy considerations and should be funded accordingly.

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Appendix 1 – Sampling scheme

Sampling scheme for *healthdirect* "Go to ED" audit, 2023

The sampling frame closely follows the approach taken in the first Audit of the *healthdirect* Go to Emergency Department outcome, undertaken by the University of Melbourne for Healthdirect Australia in 2021. This will enable direct comparison with the 2021 audit results. As in 2021, we will focus on two distinct patterns of upgrades or pathways (which we will refer to as Case1 and Case2) and aim to compare each of these with two distinct non-upgraded patterns or pathways (which we will refer to as Control1 and Control2). Case1 pathway focuses on upgrades at the point of final disposition, which we expect to be determined by nurse clinical judgement and Case2 pathway focuses on upgrades at the point of final outcome, which we expect to be influenced by patient factors, nurse-patient interaction factors, or service/system factors such as access, as shown in Table 1.

Table 1. Pathways of interest

Nurse clinical judgement

Patient/caller factors
Nurse factors
System/service factors

Pathway 1 (Case1)		
Initial disposition	**Final disposition**	**Final outcome**
See doctor in 2 hours	Attend ED immediately	Attend ED immediately
See doctor in 6 hours		
See doctor in 12 hours		
Pathway 2 (Case2)		
Initial disposition	**Final disposition**	**Final outcome**
See doctor in 2 hours	See doctor in 2 hours	Attend ED immediately
See doctor in 6 hours	See doctor in 6 hours	
See doctor in 12 hours	See doctor in 12 hours	
Control pathway 1 (Control1)		
Initial disposition	**Final disposition**	**Final outcome**
See doctor in 2 hours	See doctor in 2 hours	See doctor in 2 hours
See doctor in 6 hours	See doctor in 6 hours	See doctor in 6 hours
See doctor in 12 hours	See doctor in 12 hours	See doctor in 12 hours
Control pathway 2 (Control2)		
Initial disposition	**Final disposition**	**Final outcome**
Attend ED immediately	Attend ED immediately	Attend ED immediately

We would like to sample 200 calls in total, comprising 75 calls from each case pathway, and 25 calls from each control pathway, within the following criteria.

Sampling instructions

Consider calls for the time period September 2022, to the end of February 2023

1) Let each pathway be defined as follows:
    a. Pathway 1 (Case1): (Initial disposition = See doctor in 2 hours OR See doctor in 6 hours OR See doctor 12 hours) AND (Final disposition = Attend ED immediately) AND (Final outcome = Attend ED immediately).

b. Pathway 2 (Case2): (Initial disposition = See doctor in 2 hours OR See doctor in 6 hours OR See doctor 12 hours) AND (Final disposition = See doctor in 2 hours OR See doctor in 6 hours OR See doctor 12 hours) AND (Final outcome = Attend ED immediately).

c. Control pathway 1 (Control1): (Initial disposition = See doctor in 2 hours OR See doctor in 6 hours OR See doctor 12 hours) AND (Final disposition = See doctor in 2 hours OR See doctor in 6 hours OR See doctor 12 hours) AND (Final outcome = See doctor in 2 hours OR See doctor in 6 hours OR See doctor 12 hours).

d. Control pathway 2 (Control2): (Initial disposition = Attend ED immediately) AND (Final disposition = Attend ED immediately) AND (Final outcome = Attend ED immediately).

2) Keep only those calls in Case Pathway 1 OR Case Pathway 2 OR Control pathway 1 OR Control pathway 2

3) Keep only those calls that used **guidelines for either limb pain OR vomiting toddler OR abdominal pain in adults.** (These were the selected most common guidelines which were upgraded in 2021, and comprised 24%, 19% and 16% of the cases respectively, covering 60% of total cases at that time.) This will enable direct comparison with the 2021 audit findings.

4) For each of the two case pathways, randomly select 75 calls, 30 from NSW and 45 from the rest of Australia.

5) For each of the two control pathways, randomly select 25 calls, 10 from NSW and 15 from the rest of Australia.

a. Do not aim for a balanced sample in terms of sex, age, time of day, metro/rural or Aboriginal status. Within each case/control group, we are aiming to achieve an approximately representative sample in terms of these factors, and this will be best achieved via random sampling with regard to these factors. This will also allow us to investigate the association of these factors with upgraded outcomes, which will not be possible if samples are balanced for these factors.

However, given we wish to investigate the impact of the expanded Afterhours GP Helpline (AGPH) service in NSW, we will, sample a larger number of calls from NSW, with 40% to come from this jurisdiction. In call analysis, we will investigate NSW versus other jurisdiction findings.
We will also seek the full *healthdirect* call dataset from September 2022 (from date of expanded AGPH commencement) to end February 2023 to undertake a full jurisdictional analysis of triage pathways.

We expect that this design will achieve the best possible power to assess nurse and patient factors associated with upgrades to a higher urgency outcome.

Final sampling domains

The final sampling cells are shown in Table 2.

Table 2. Required sample size for each combination of factors.

	Case1	**Case2**	**Control1**	**Control2**	**Total**
NSW	*30*	*30*	*10*	*10*	**80**
Rest of Australia	*45*	*45*	*15*	*15*	**120**
Total sample Sept 2202 - end Feb 2023	*75*	*75*	*25*	*25*	**200**

Identifying codes

The following codes should be used as a prefix to each call identifier to denote the cell in the sampling frame, as follows:

Case1 - NSW

Ca1N-1, Ca1N-2, Ca1N-3- through to Ca1N-30

Case 1 -rest of Australia

Ca1-1, Ca1-2 Ca1-3 through to Ca1-45

Case2 - NSW

Ca2N-1, Ca2N-2, Ca2N-3- through to Ca2N-30

Case2 -rest of Australia

Ca2-1, Ca2-2, Ca2-3- through to Ca2-45

Control1 - NSW

Cn1N-1, Cn1N-2, Cn1N-3- through to Cn1N-10

Control1 – rest of Australia

Cn1-1, Cn1-2, Cn1-3- through to Cn1-15

Control2 - NSW

Cn2N-1, Cn2N-2, Cn2N-3- through to Cn2N-10

Control2 -rest of Australia

Cn2-1, Cn2-2, Cn2-3- through to Cn2-15

As with the 2021 audit, we also seek the de-identified call record for each of the calls included in the sample.

Should Healthdirect Australia require assistance with the approach to random sampling for each cell, please contact us.

Appendix 2 – Call Assessment Instrument

PDF to be inserted pages 41 to 47

Appendix 3 – Detailed tables: Summary dataset of all calls September 2022 – February 2023

Table 1 – A3: Characteristics of calls for abdominal pain

	Summary
N	22,520
Initial disposition (algorithm)	
See a doctor within the next 12 hours	1,868 (8.3%)
See a doctor within the next 6 hours	2,230 (9.9%)
See a doctor within the next 2 hours	1,852 (8.2%)
Contact doctor/surgery for a telephone consultation within 6 hours	7 (0.0%)
Attend emergency department immediately	16,563 (73.5%)
Final disposition (nurse)	
See a doctor within the next 1-3 days	47 (0.2%)
See a doctor within the next 12 hours	1,824 (8.1%)
See a doctor within the next 6 hours	2,233 (9.9%)
See a doctor within the next 2 hours	2,201 (9.8%)
Contact doctor/surgery for a telephone consultation within 6 hours	6 (0.0%)
Attend emergency department immediately	16,161 (71.8%)
Activate 000	48 (0.2%)
Final outcome (patient)	
Transfer to AHGP, GPAT nurse, TeleHealth GP or GPAT	2,153 (9.6%)
See a doctor within the next 1-3 days	843 (3.7%)
See a doctor within the next 12 hours	722 (3.2%)
See a doctor within the next 6 hours	977 (4.3%)
See a doctor within the next 2 hours	1,599 (7.1%)
Contact doctor/surgery for a telephone consultation within 6 hours	1 (0.0%)
Attend emergency department immediately	14,072 (62.5%)
Activate 000	1,315 (5.8%)
Refer to other service	838 (3.7%)
Upgraded to ED by nurse	
No	22,398 (99.5%)
Yes	122 (0.5%)
Upgraded to ED by patient	
No	20,864 (92.6%)
Yes	1,656 (7.4%)

Table 2 -A3: Characteristics of calls for limb pain

	Summary
N	14,818
Initial disposition (algorithm)	
See a doctor within the next 12 hours	5,798 (39.1%)
See a doctor within the next 6 hours	1,780 (12.0%)
See a doctor within the next 2 hours	1,272 (8.6%)
Contact doctor/surgery for a telephone consultation within 12 hours	85 (0.6%)
Contact doctor/surgery for a telephone consultation within 6 hours	5 (0.0%)
Contact doctor/surgery for a telephone consultation within 2 hours	50 (0.3%)
Attend emergency department immediately	5,828 (39.3%)
Final disposition (nurse)	
See a doctor within the next 1-3 days	33 (0.2%)
See a doctor within the next 12 hours	5,353 (36.1%)
See a doctor within the next 6 hours	1,684 (11.4%)
See a doctor within the next 2 hours	1,482 (10.0%)
Contact doctor/surgery for a telephone consultation within 12 hours	80 (0.5%)
Contact doctor/surgery for a telephone consultation within 6 hours	5 (0.0%)
Contact doctor/surgery for a telephone consultation within 2 hours	47 (0.3%)
Attend emergency department immediately	6,059 (40.9%)
Activate 000	75 (0.5%)
Final outcome (patient)	
Transfer to AHGP, GPAT nurse, TeleHealth GP or GPAT	3,579 (24.2%)
See a doctor within the next 1-3 days	833 (5.6%)
See a doctor within the next 12 hours	1,722 (11.6%)
See a doctor within the next 6 hours	579 (3.9%)
See a doctor within the next 2 hours	966 (6.5%)
Contact doctor/surgery for a telephone consultation within 12 hours	29 (0.2%)
Contact doctor/surgery for a telephone consultation within 6 hours	1 (0.0%)
Contact doctor/surgery for a telephone consultation within 2 hours	12 (0.1%)
Attend emergency department immediately	4,527 (30.6%)
Activate 000	2,021 (13.6%)
Refer to other service	549 (3.7%)
Upgraded to ED by nurse	
No	14,300 (96.5%)
Yes	518 (3.5%)
Upgraded to ED by patient	
No	12,003 (81.0%)
Yes	2,815 (19.0%)

Table 3 -A3: Characteristics of calls for vomiting toddler

	Summary
N	7,074
Initial disposition (algorithm)	
See a doctor within the next 12 hours	281 (4.0%)
See a doctor within the next 6 hours	946 (13.4%)
See a doctor within the next 2 hours	1,725 (24.4%)
Contact doctor/surgery for a telephone consultation within 6 hours	154 (2.2%)
Attend emergency department immediately	3,968 (56.1%)
Final disposition (nurse)	
See a doctor within the next 1-3 days	1 (0.0%)
See a doctor within the next 12 hours	285 (4.0%)
See a doctor within the next 6 hours	1,000 (14.1%)
See a doctor within the next 2 hours	1,743 (24.6%)
Contact doctor/surgery for a telephone consultation within 12 hours	4 (0.1%)
Contact doctor/surgery for a telephone consultation within 6 hours	143 (2.0%)
Attend emergency department immediately	3,896 (55.1%)
Activate 000	2 (0.0%)
Final outcome (patient)	
Transfer to AHGP, GPAT nurse, TeleHealth GP or GPAT	873 (12.3%)
See a doctor within the next 1-3 days	185 (2.6%)
See a doctor within the next 12 hours	104 (1.5%)
See a doctor within the next 6 hours	314 (4.4%)
See a doctor within the next 2 hours	1,437 (20.3%)
Contact doctor/surgery for a telephone consultation within 12 hours	3 (0.0%)
Contact doctor/surgery for a telephone consultation within 6 hours	40 (0.6%)
Attend emergency department immediately	3,838 (54.3%)
Activate 000	57 (0.8%)
Refer to other service	223 (3.2%)
Upgraded to ED by nurse	
No	7,020 (99.2%)
Yes	54 (0.8%)
Upgraded to ED by patient	
No	6,791 (96.0%)
Yes	283 (4.0%)

Table 4 -A3: Transitions from initial disposition to final disposition - all states and territories

	Final disposition (nurse)									
Initial disposition (algorithm)	See a doctor within the next 1-3 days	See a doctor within the next 12 hours	See a doctor within the next 6 hours	See a doctor within the next 2 hours	Contact doctor for a telephone consultation within 12 hours	Contact doctor for a telephone consultation within 6 hours	Contact doctor for a telephone consultation within 2 hours	Attend emergency department immediately	Activate 000	Total
See a doctor within next 12 hours										
Frequency	81	7,382	0	208	0	0	0	259	17	7,947
Percent	1.02%	92.89%		2.62%				3.26%	0.21%	100%
See a doctor within the next 6 hours										
Frequency	0	74	4,746	0	0	0	0	134	2	4,956
Percent		1.49%	95.76%					2.70%	0.04%	100%
See a doctor within the next 2 hours										
Frequency	0	0	171	4,509	0	0	0	167	2	4,849
Percent			3.53%	92.99%				3.44%	0.04%	100%
Contact doctor/surgery for a telephone consultation within 12 hours										
Frequency	0	0	0	1	80	0	0	4	0	85
Percent				1.18%	94.12%			4.71%		100%
Contact doctor/surgery for a telephone consultation within 6 hours										
Frequency	0	6	0	0	4	154	0	2	0	166
Percent		3.61%			2.41%	92.77%		1.20%		100%
Contact doctor/surgery for a telephone consultation within 2 hours										
Frequency	0	0	0	0	0	0	47	3	0	50
Percent							94.00%	6.00%		100%
Attend emergency department immediately										
Frequency	0	0	0	708	0	0	0	25,547	104	26,359
Percent				2.69%				96.92%	0.39%	100%

Table 5 -A3: Transitions from initial disposition to final outcome - all states and territories

	Final outcome (patient)											
Initial disposition (algorithm)	Transfer to AHGP, GPAT nurse, TeleHealth GP or GPAT	See a doctor within next 1-3 days	See a doctor within next 12 hours	See a doctor within next 6 hours	See a doctor within next 2 hours	Contact doctor for a telephone consultation within 12 hours	Contact doctor for a telephone consultation within 6 hours	Contact doctor for a telephone consultation within 2 hours	Attend emergency department immediately	Activate 000	Refer to other service	Total
See a doctor within the next 12 hours												
Frequency	3,638	654	2,490	0	130	0	0	0	521	352	262	7,947
Percent	45.78%	8.23%	31.33%		1.64%				5.30%	4.43%	3.30%	100%
See a doctor within the next 6 hours												
Frequency	2,369	267	52	1,720	0	0	0	0	238	110	200	4,956
Percent	47.80%	5.39%	1.05%	34.71%					4.80%	2.22%	4.04%	100%
See a doctor within the next 2 hours												
Frequency	186	193	0	150	3,284	0	0	0	690	151	195	4,849
Percent	3.84%	3.98%		3.09%	67.73%				14.23%	3.11%	4.02%	100%
Contact doctor for a telephone consultation within 12 hours												
Frequency	36	8	0	0	1	29	0	0	6	4	1	85
Percent	42.35%	9.41%			1.18%	34.12%			7.06%	4.71%	1.18%	100%
Contact doctor for a telephone consultation within 6 hours												
Frequency	100	10	6	0	0	3	42	0	3	0	2	166
Percent	60.24%	6.02%	3.61%			1.81%	25.30%		1.81%		1.20%	100%
Contact doctor for a telephone consultation within 2 hours												
Frequency	28	1	0	0	0	0	0	12	3	4	2	50
Percent	56.00%	2.00%						24.00%	6.00%	8.00%	4.00%	100%
Attend emergency department immediately												
Frequency	248	728	0	0	587	0	0	0	21,076	2,772	948	26,359
Percent	0.94%	2.76%			2.23%				79.96%	10.52%	3.60%	100%

Table 6 -A3: Transitions from initial disposition to final disposition – New South Wales

	Final disposition (nurse)									
Initial disposition (algorithm)	See a doctor within the next 1-3 days	See a doctor within the next 12 hours	See a doctor within the next 6 hours	See a doctor within the next 2 hours	Contact doctor/surgery for a telephone consultation within 12 hours	Contact doctor/surgery for a telephone consultation within 6 hours	Contact doctor/surgery for a telephone consultation within 2 hours	Attend emergency department immediately	Activate 000	Total
See a doctor within the next 12 hours										
Frequency	21	2,547	0	85	0	0	0	150	13	2,816
Percent	0.75%	90.45%		3.02%				5.33%	0.46%	100.00%
See a doctor within the next 6 hours										
Frequency	0	14	1,510	0	0	0	0	65	2	1,591
Percent		0.88%	94.91%					4.09%	0.13%	100.00%
See a doctor within the next 2 hours										
Frequency	0	0	47	1,465	0	0	0	70	1	1,583
Percent			2.97%	92.55%				4.42%	0.06%	100.00%
Contact doctor/surgery for a telephone consultation within 12 hours										
Frequency	0	0	0	0	25	0	0	2	0	27
Percent					92.59%			7.41%		100.00%
Contact doctor/surgery for a telephone consultation within 6 hours										
Frequency	0	2	0	0	0	57	0	0	0	59
Percent		3.39%				96.61%				100.00%
Contact doctor/surgery for a telephone consultation within 2 hours										
Frequency	0	0	0	0	0	0	13	1	0	14
Percent							92.86%	7.14%		100.00%
Attend emergency department immediately										
Frequency	0	0	0	229	0	0	0	8,590	61	8,880
Percent				2.58%				96.73%	0.69%	100.00%

Table 7 -A3: Transitions from initial disposition to final outcome – New South Wales

	Final outcome (patient)									
Initial disposition (algorithm)	Transfer to AHGP, GPAT nurse, TeleHealth GP or GPAT	See a doctor within the next 1-3 days	See a doctor within the next 12 hours	See a doctor within the next 6 hours	See a doctor within the next 2 hours	Contact doctor/surgery for a telephone consultation within 12 hours	Attend emergency department immediately	Activate 000	Refer to other service	Total
See a doctor within the next 12 hours										
Frequency	1,589	255	333	0	44	0	177	308	110	2,816
Percent	56.43%	9.06%	11.83%		1.56%		6.29%	10.94%	3.91%	100.00%
See a doctor within the next 6 hours										
Frequency	1,049	117	3	128	0	0	85	95	114	1,591
Percent	65.93%	7.35%	0.19%	8.05%			5.34%	5.97%	7.17%	100.00%
See a doctor within the next 2 hours										
Frequency	61	43	0	36	1,046	0	230	118	49	1,583
Percent	3.85%	2.72%		2.27%	66.08%		14.53%	7.45%	3.10%	100.00%
Contact doctor/surgery for a telephone consultation within 12 hours										
Frequency	15	3	0	0	0	4	2	3	0	27
Percent	55.56%	11.11%				14.81%	7.41%	11.11%		100.00%
Contact doctor/surgery for a telephone consultation within 6 hours										
Frequency	47	7	2	0	0	0	1	0	2	59
Percent	79.66%	11.86%	3.39%				1.69%		3.39%	100.00%
Contact doctor/surgery for a telephone consultation within 2 hours										
Frequency	12	0	0	0	0	0	1	1	0	14
Percent	85.71%						7.14%	7.14%		100.00%
Attend emergency department immediately										
Frequency	0	208	0	0	198	0	6,401	1,760	313	8,880
Percent		2.34%			2.23%		72.08%	19.82%	3.52%	100.00%

Table 8-A3: Transitions from initial disposition to final disposition – all states and territories except New South Wales

	Final disposition (nurse)									
Initial disposition (algorithm)	See a doctor within the next 1-3 days	See a doctor within the next 12 hours	See a doctor within the next 6 hours	See a doctor within the next 2 hours	Contact doctor/surgery for a telephone consultation within 12 hours	Contact doctor/surgery for a telephone consultation within 6 hours	Contact doctor/surgery for a telephone consultation within 2 hours	Attend emergency department immediately	Activate 000	Total
See a doctor within the next 12 hours										
Frequency	60	4,835	0	123	0	0	0	109	4	5,131
Percent	1.17%	94.23%		2.40%				2.12%	0.08%	100.00%
See a doctor within the next 6 hours										
Frequency	0	60	3,236	0	0	0	0	69	0	3,365
Percent		1.78%	96.17%					2.05%		100.00%
See a doctor within the next 2 hours										
Frequency	0	0	124	3,044	0	0	0	97	1	3,266
Percent			3.80%	93.20%				2.97%	0.03%	100.00%
Contact doctor/surgery for a telephone consultation within 12 hours										
Frequency	0	0	0	1	55	0	0	2	0	58
Percent				1.72%	94.83%			3.45%		100.00%
Contact doctor/surgery for a telephone consultation within 6 hours										
Frequency	0	4	0	0	4	97	0	2	0	107
Percent		3.74%			3.74%	90.65%		1.87%		100.00%
Contact doctor/surgery for a telephone consultation within 2 hours										
Frequency	0	0	0	0	0	0	34	2	0	36
Percent							94.44%	5.56%		100.00%
Attend emergency department immediately										
Frequency	0	0	0	479	0	0	0	16,957	43	17,479
Percent				2.74%				97.01%	0.25%	100.00%

Table 9 -A3: Transitions from initial disposition to final outcome – all states and territories except New South Wales

	Final outcome (patient)											
Initial disposition (algorithm)	Transfer to AHGP, GPAT nurse, TeleHealth GP or GPAT	See a doctor within the next 1-3 days	See a doctor within the next 12 hours	See a doctor within the next 6 hours	See a doctor within the next 2 hours	Contact doctor/surgery for a telephone consultation within 12 hours	Contact doctor/surgery for a telephone consultation within 6 hours	Contact doctor/surgery for a telephone consultation within 2 hours	Attend emergency department immediately	Activate 000	Refer to other service	Total
See a doctor within the next 12 hours												
Frequency	2,049	399	2,157	0	86	0	0	0	244	44	152	5,131
Percent	39.93%	7.78%	42.04%		1.68%				4.76%	0.86%	2.96%	100.00%
See a doctor within the next 6 hours												
Frequency	1,320	150	49	1,592	0	0	0	0	153	15	86	3,365
Percent	39.23%	4.46%	1.46%	47.31%					4.55%	0.45%	2.56%	100.00%
See a doctor within the next 2 hours												
Frequency	125	150	0	114	2,238	0	0	0	460	33	146	3,266
Percent	3.83%	4.59%		3.49%	68.52%				14.08%	1.01%	4.47%	100.00%
Contact doctor/surgery for a telephone consultation within 12 hours												
Frequency	21	5	0	0	1	25	0	0	4	1	1	58
Percent	36.21%	8.62%			1.72%	43.10%			6.90%	1.72%	1.72%	100.00%
Contact doctor/surgery for a telephone consultation within 6 hours												
Frequency	53	3	4	0	0	3	42	0	2	0	0	107
Percent	49.53%	2.80%	3.74%			2.80%	39.25%		1.87%			100.00%
Contact doctor/surgery for a telephone consultation within 2 hours												
Frequency	16	1	0	0	0	0	0	12	2	3	2	36
Percent	44.44%	2.78%						33.33%	5.56%	8.33%	5.56%	100.00%
Attend emergency department immediately												
Frequency	248	520	0	0	389	0	0	0	14,675	1,012	635	17,479
Percent	1.42%	2.97%			2.23%				83.96%	5.79%	3.63%	100.00%

Appendix 4 – Summary tables by guideline for 2021 dataset

Table 1-A4: Characteristics of calls for abdominal pain (2021 data)

	Summary
N	5,933
Initial disposition (algorithm)	
See a doctor within the next 12 hours	762 (12.8%)
See a doctor within the next 6 hours	2,136 (36.0%)
See a doctor within the next 2 hours	49 (0.8%)
Attend emergency department immediately	2,986 (50.3%)
Final disposition (nurse)	
See a doctor within the next 12 hours	692 (11.7%)
See a doctor within the next 6 hours	1,953 (32.9%)
See a doctor within the next 2 hours	72 (1.2%)
Attend emergency department immediately	3,196 (53.9%)
Activate 000	20 (0.3%)
Final outcome (patient)	
Transfer to AHGP, GPAT nurse, TeleHealth GP or GPAT	1,136 (19.1%)
See a doctor within the next 1-3 days	119 (2.0%)
See a doctor within the next 12 hours	328 (5.5%)
See a doctor within the next 6 hours	986 (16.6%)
See a doctor within the next 2 hours	51 (0.9%)
Attend emergency department immediately	2,858 (48.2%)
Activate 000	303 (5.1%)
Refer to other service	152 (2.6%)
Upgraded to ED by nurse	
No	5,686 (95.8%)
Yes	247 (4.2%)
Upgraded to ED by patient	
No	5,264 (88.7%)
Yes	669 (11.3%)

Table 2-A4: Characteristics of calls for limb pain (2021 data)

	Summary
N	6,797
Initial disposition (algorithm)	
See a doctor within the next 12 hours	2,545 (37.4%)
See a doctor within the next 6 hours	1,821 (26.8%)
See a doctor within the next 2 hours	1,435 (21.1%)
Attend emergency department immediately	996 (14.7%)
Final disposition (nurse)	
See a doctor within the next 12 hours	2,336 (34.4%)
See a doctor within the next 6 hours	1,584 (23.3%)
See a doctor within the next 2 hours	1,367 (20.1%)
Attend emergency department immediately	1,473 (21.7%)
Activate 000	37 (0.5%)
Final outcome (patient)	
Transfer to AHGP, GPAT nurse, TeleHealth GP or GPAT	1,231 (18.1%)
See a doctor within the next 1-3 days	228 (3.4%)
See a doctor within the next 12 hours	1,533 (22.6%)
See a doctor within the next 6 hours	760 (11.2%)
See a doctor within the next 2 hours	474 (7.0%)
Attend emergency department immediately	1,125 (16.6%)
Activate 000	1,253 (18.4%)
Refer to other service	193 (2.8%)
Upgraded to ED by nurse	
No	6,269 (92.2%)
Yes	528 (7.8%)
Upgraded to ED by patient	
No	4,985 (73.3%)
Yes	1,812 (26.7%)

Table 3-A4: Characteristics of calls for vomiting toddler (2021 data)

	Summary
N	4,013
Initial disposition (algorithm)	
See a doctor within the next 12 hours	559 (13.9%)
See a doctor within the next 6 hours	741 (18.5%)
See a doctor within the next 2 hours	1,882 (46.9%)
Attend emergency department immediately	831 (20.7%)
Final disposition (nurse)	
See a doctor within the next 12 hours	541 (13.5%)
See a doctor within the next 6 hours	724 (18.0%)
See a doctor within the next 2 hours	1,738 (43.3%)
Attend emergency department immediately	1,008 (25.1%)
Activate 000	2 (0.0%)
Final outcome (patient)	
Transfer to AHGP, GPAT nurse, TeleHealth GP or GPAT	901 (22.5%)
See a doctor within the next 1-3 days	90 (2.2%)
See a doctor within the next 12 hours	273 (6.8%)
See a doctor within the next 6 hours	399 (9.9%)
See a doctor within the next 2 hours	1,038 (25.9%)
Attend emergency department immediately	1,193 (29.7%)
Activate 000	29 (0.7%)
Refer to other service	90 (2.2%)
Upgraded to ED by nurse	
No	3,833 (95.5%)
Yes	180 (4.5%)
Upgraded to ED by patient	
No	3,559 (88.7%)
Yes	454 (11.3%)