NSW TAG

# Wherefore art thee, MUE?:

# Report on support and resources allocation for Medicines Use Evaluations

# in ACT, NSW, and QLD public hospitals

December 2021

NSW Therapeutic Advisory Group Inc.

Advancing quality use of medicines in NSW

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New South Wales Therapeutic Advisory Group Inc. is an initiative of NSW clinical pharmacologists and pharmacists and is funded by NSW Health.

**Address**:
NSW TAG
26 Leichhardt Street
Darlinghurst NSW, Australia, 2010

**Phone:** (02) 8382 2852
**Email:** nswtag@stvincents.com.au
**Web:** www.nswtag.org.au
**ABN:** 82 707 308 091

## Disclosure

The development of this report was funded by NSW Health.

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## Suggested citation

NSW Therapeutic Advisory Group. *Wherefore art thee, MUE?: Report on support and resources allocation for Medicines Use Evaluations in ACT, NSW, and QLD public hospitals.* NSW TAG. December 2021.

This document is available on the NSW Therapeutic Advisory Group website at www.nswtag.org.au

ISBN 978-0-6480174-5-5 (Online)

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# List of abbreviations and acronyms

| Abbreviation/ Acronym | Term |
|---|---|
| **ADR** | Adverse drug reaction |
| **AMS** | Antimicrobial stewardship |
| **BPMH** | Best possible medication history |
| **CEC** | Clinical Excellence Commission |
| **CEQ** | Clinical Excellence Queensland |
| **CNC** | Clinical Nurse Consultant |
| **DTC** | Drug and Therapeutics Committee |
| **DUE** | Drug Use Evaluation (synonymous with MUE = Medicines Use Evaluation) |
| **DUESC** | Drug Use Evaluation Subcommittee |
| **eMR** | Electronic medical records |
| **FTE** | Full-time equivalent |
| **HETI** | Health Education and Training Institute |
| **HSO** | Health Service Organisation |
| **IPU** | Individual Patient Use (sometimes called Individual Patient Application (IPA) in other jurisdictions) |
| **JMO** | Junior medical officer |
| **KPI** | Key performance indicator |
| **NAPS** | National Antimicrobial Prescribing Survey |
| **NAUSP** | National Antimicrobial Utilisation Surveillance Program |
| **NSMC** | National Standard Medication Chart |
| **NSQHSS** | National Safety and Quality Health Service Standards |
| **NSW TAG** | New South Wales Therapeutic Advisory Group |
| **NQUM** | National Quality Use of Medicines |
| **MSSA** | Medication Safety Self Assessment® |
| **MUE** | Medicines Use Evaluation (synonymous with DUE = Drug Use Evaluation) |
| **PBS** | Pharmaceutical Benefits Scheme |
| **SHPA** | Society of Hospital Pharmacists of Australia |
| **QARS** | Quality Audit Reporting System |
| **QI** | Quality improvement |
| **QIDS** | Quality Improvement Data System |
| **QUM** | Quality use of medicines |
| **VTE** | Venous thromboembolism |

# Executive Summary

Medicines Use Evaluation (MUE), previously known as Drug Use Evaluation (DUE), is a structured and ongoing audit and feedback process designed to improve the quality, safety, and cost-effectiveness of medicine use, thereby improving patient care.[1] In 2020, New South Wales Therapeutic Advisory Group (NSW TAG) surveyed NSW, ACT, and QLD public hospitals to investigate the activity and current support and resource allocation (measured using full-time equivalent allocations) to quality use of medicines (QUM)/MUE and other medicine-related stewardship positions (such as antimicrobial stewardship (AMS) and medication safety positions) as well as the barriers and enablers for MUE activities. A similar survey was conducted in 2015 for NSW and ACT public hospitals. The 2020 survey and results analysis were complicated by the advent of COVID-19. Nevertheless, this survey has important findings that can inform further advocacy for implementing, maintaining and supporting medicine stewardship programs within hospitals/districts including therapeutic-specific stewardship programs.

Twenty-seven responses (25 hospital employees and 2 health district employees) from NSW, ACT and Queensland health service organisations (HSOs), a response rate of 26%, were received in the 2020 survey (compared to 25 responses from a potential 67 HSOs in NSW and ACT in 2015, 37% response rate).

Analysis of the survey responses show that:

- there is under-resourcing of MUE/QUM pharmacist positions, which are either not appointed or overburdened with multiple functions to fulfil;
- there is under-resourcing of medication safety pharmacist/nurse positions;
- the bulk of medicine stewardship work relies on frontline clinicians, particularly pharmacists;
- those working in MUE-related positions perceive that there should be greater MUE activity in their HSOs;
- there is a disparity between MUE activity in metropolitan and non-metropolitan sites; and
- there is a lack of dedicated resources for any medicine stewardship positions in many rural HSOs.

These findings also align with other evidence of patient and service outcome discrepancies between metropolitan and non-metropolitan hospitals, more generally.[2,3]

Respondents acknowledged the accreditation cycle leads to a greater awareness of MUE activity, by providing required evidence to meet National Safety and Quality Health Service (NSQHS) Standard 4: *Medication Safety* and Standard 3: *Preventing and Controlling Health Care Associated Infections*.[4] Despite this, additional resources dedicated to MUE activities have not been allocated, especially in rural hospitals. Participants reported there is an expectation MUE activities are performed, regardless of the availability of designated resources.

Although limited by a poor response rate (influenced by COVID-19 pandemic) comparison of the responses received in the 2020 and 2015 surveys suggest the following:

- Little improvement in MUE resourcing has occurred in NSW hospitals with only 30% reporting QUM/MUE positions. This compares with a 32% result in 2015. These QUM/MUE positions often have multiple functions in 2020 (and in 2015).
- The number of AMS hospital/district positions appear to be similar (71% of hospitals have designated AMS positions in 2020 compared with 76% in 2015).
- Despite a limited portfolio of medicines to address, AMS positions have almost double the FTE allocations compared to dedicated MUE or medication safety FTE allocations. A similar result was found in the 2015 survey.

A comparison between the jurisdictions indicated that:

- ACT had the highest allocations for QUM/MUE, AMS, and medication safety positions, noting this represents data from only one of a possible 2 hospitals.
- QLD hospitals had a higher mean FTE allocation for QUM/MUE, AMS, and medication safety positions compared to NSW hospitals.

There has been growing advocacy for other hospital-based therapeutic-specific stewardship programs.[5] Three hospitals had dedicated opioid/analgesia or venous thromboembolism (VTE) stewardship positions. Two of these were in QLD and one in NSW. All were metropolitan hospitals with FTE allocations for these positions ranging from 0.5 to 1.0 FTE pharmacists or nurses (i.e. resourcing of 19 to 38 hours per week).

Based upon the results of this survey, MUE activity across NSW, ACT and QLD are achieving patient centred outcomes for patients within relevant hospitals. Barriers identified in relation to development and implementation of these roles highlights the need for a broad, collaborative, pragmatic evaluation of the relevant MUE roles and their associated outcomes for patients and organisations. It is only with this approach that the value of investment in dedicated roles such as these will support further development and implementation.

Antimicrobials represent only one component of the many medicines that represent high risk to patient safety. However, local, jurisdictional, and national resources for AMS have consistently shown greater support and activity over the last decade. The need for greater activity for medication safety and quality use of medicines has been recognised by the World Health Organisation's Global Patient Safety Challenge for Medication Without Harm[6] and Australia's 10th National Health Priority.[7] Embedding a medicine safety and quality culture driven by frontline clinicians with resourcing and training to support medicine stewardship activities are therefore critical for Australian hospitals. To improve medication safety and QUM, more resources on a local, jurisdictional, and national level should be assigned that provide a cohesive framework to address gaps. The recent advances and initiatives made for AMS provide a framework on which to inform increased activity and resourcing. A multidisciplinary approach and clinical championing on a background culture of safety and quality improvement are critical components. All high-risk medicines, costly medicines, areas where medication use is likely inappropriate and those where supply is critical should be high priority areas. Inequity between jurisdictions and regions should be addressed in the implementation and maintenance of the quality improvement and safety culture in HSOs.

The NSW TAG survey report of 2015 MUE activity, published in January 2017, provided guidance on how to establish an MUE program, underscored the need for collaboration and outlined the drivers needed to prioritise MUE, up-skill clinicians, publish MUE outcomes and embed MUE in quality improvement.[8] The driver diagram in the 2017 report is reproduced in this 2021 report as these same considerations to address MUE under-activity remain valid (Appendix 2). In addition, the inequity in MUE capacity and activity in hospitals demonstrates that additional incentives are required. NSW TAG recommends that a national minimum standard requirement for dedicated MUE activity be implemented in Australian hospitals that includes a national minimum standard for local programs that address local gaps in care as well as jurisdictional programs. The resourcing of AMS over the last decade demonstrates that increased activity can be achieved if a national focus including standards are applied.[9] Under Australia's 10th National Health Priority remit, the same focus is now required for non-AMS medicines use to achieve optimal safe and effective patient-centred medicines use in Australia.

The current situation for QUM and other non-AMS medicine stewardship activities in NSW and QLD hospitals is analogous to 'the boy trying to plug the hole in the dike'- despite heroic attempts, the work is vital but overwhelming and more help is required. Given the results regarding under-resourcing for MUE and non-AMS stewardship activities in hospital, it is imperative that data from electronic medical records (that includes medication records) be routinely harnessed and presented in an actionable format to improve medication-related outcomes. Currently, despite the best attempts of QUM and medicine stewardship clinicians, they have little time left for implementing quality improvement strategies to address identified gaps in care. We also recommend consideration of a national minimum standard requirement for dedicated MUE activity in Australian hospitals.

# Background

Medicines Use Evaluations (MUEs) have been recognised as an essential component of clinical pharmacy practice in Australian hospitals since the 1990s.[10] MUEs are underpinned by quality and safety principles, and in countries such as the USA and Canada, MUE programs are mandated by institutional accrediting bodies.[10,11] Although MUE programs in Australian hospitals are not mandated by National Safety and Quality Health Service Standards, output from MUE activities provides evidence for accreditation.[4] Antimicrobial stewardship (AMS) programs frequently use MUE methodology to assist their activities to improve the quality of antimicrobial use. Health service organisations (HSOs) have also used MUEs for analysis of high-risk medicines using medication safety services and more recently, targeted medicine-related stewardship programs e.g. opioid stewardship.

The development and implementation of Antimicrobial Stewardship (AMS) programs for safe and appropriate prescribing of antimicrobials have been mandated since 2012.[4] Hospitals and health districts have responded by allocating dedicated resources to AMS programs, including the introduction of AMS pharmacist positions in many facilities. AMS pharmacists focus on antimicrobial use in a clinical setting and can be described as a subgroup of MUE practitioners. Medication safety has recently become a national health priority[7] and some health service organisations (HSOs) are employing medication safety pharmacists as well as developing and implementing targeted medicine-related stewardship programs, such as analgesic/opioid and anticoagulant stewardship programs. Pharmacists in these positions also use MUE methodology. However, resource depletion has altered priorities, and a lack of a multidisciplinary approach threatens the sustainability of MUE activities.[8]

The roles and responsibilities of QUM/MUE, medication safety, and AMS pharmacists cross over. Broadly they are medicine stewardship positions with all promoting quality use of medicines and medication safety within their HSO by applying knowledge, skills, professional judgement, and initiatives to improve patient outcomes. The delineation between roles has not been clearly defined by professional organisations and varies between HSOs. However, for this report they can be defined as follows:

- QUM or MUE pharmacists:
  - coordinate and develop the quality use of medicines service by performing quality; improvement programs and medicine use evaluation activities;
  - monitor drug expenditure and prescribing trends e.g. individual patient usage approvals, DTC decision and formulary approvals;
  - manage stock shortages and other QUM issues; and/or,
  - develop and participate in education and promotional activities aimed at achieving appropriate, cost-effective drug usage.

- Medication Safety pharmacists:
  - coordinate and develop medication safety projects, audits, and MUE activities;

- review medication-related incidents;
- identify priority areas for improving practice in medicine use and implementing programs to address these areas; and/or
- assist in the review of organisations policies, procedures, and guidelines to ensure medication safety principles are implemented and regulatory requirements are met.

- AMS pharmacists:
  - support and contribute to the multidisciplinary AMS services;
  - assist in policy review and development concerning antimicrobial therapy;
  - assist with advice on dose-individualisation and appropriateness of antimicrobial therapies; and/or
  - provide support for Quality Improvement (QI) programs and MUE activities relating to antimicrobial therapy.

There has been a move by some HSOs to further delineate the QUM pharmacist responsibilities to address specific contemporary hospital QUM issues relating to anticoagulation and opioid usage (identified by various national clinical indicators and the hospital-acquired complications [HACs] list).[12,13] This has been achieved by developing anticoagulation/VTE and opioid/analgesic stewardship pharmacist positions. These staff may also coordinate activities such as audits, improvement strategies and perform incident reviews, staff education, documentation, and risk management, following governance processes relating to their specialty area.

In January 2015, NSW TAG surveyed NSW and ACT public hospitals to investigate support, resource allocation, perceptions towards MUE, and the barriers and enablers for MUE activity. The survey identified a diminished capacity of many hospitals to undertake quality improvement informed by MUEs and a shift in resourcing and activity from allocated MUE positions towards AMS positions.[8] A review of this kind has not previously been performed in Queensland (QLD). QLD Health differs from NSW Health in that it has participated in PBS Pharmaceutical Reform, which enables supply of PBS medicines to hospital patients at discharge and improved continuity of medication management between hospital and the community.[14] It has also provided an additional source of funding for PBS Reform hospitals[15] with potential for funding more medicine-related positions and activities. Hence resourcing for MUE, AMS, and other medication-related stewardship activities may differ between jurisdictions. A comparative review of current support, resource allocation, and perceptions of MUE, AMS, and medicine-related stewardship activities between jurisdictional health systems is worthy of investigation.

## Aims

The project sought to:

- describe current QUM/MUE, AMS, and medication safety and targeted stewardship activities in NSW, ACT, and QLD public hospitals with on-site pharmacy services;
- describe current support, resource allocation to, and perceptions of QUM/MUE, AMS, and medication safety and targeted stewardship activities; and,
- identify barriers and enablers for QUM/MUE, AMS, and medication safety and targeted stewardship activities in participating jurisdictions and identify changes since 2015.

## Method

An online questionnaire (on the Survey Monkey platform) was distributed in February 2020, via email, to clinicians most likely to be aware of QUM, MUE, AMS, and medication safety and targeted stewardship activities within NSW, ACT, and QLD public hospitals with onsite pharmacy services via NSW TAG contacts and the QLD Director of Pharmacy Forum. The types of eligible hospitals included principal referral, major, district and specialist (paediatric and maternity, not rehabilitation) hospitals. The targeted clinicians included pharmacy directors, and QUM/MUE, AMS, and medication safety and stewardship clinicians (pharmacists, doctors, and/or nurses) involved in relevant programs. It is estimated that there were 104 eligible hospitals (78 eligible NSW hospitals, 2 eligible ACT hospitals and 24 eligible QLD hospitals) during 2020.

The questionnaire addressed: a) descriptions of current QUM/MUE, AMS and medication safety and targeted stewardship activities and relevant resource allocation for completion of these activities; b) ways to improve QUM/MUE, AMS and medication safety and targeted stewardship activities; and 3) prioritisation and facilitators of QUM/MUE, AMS and medication safety and targeted stewardship activities. Descriptions and data analysis was undertaken according to different positions and activities defined for each role (see background section). Hospitals were categorised according to their jurisdiction or locality (metropolitan versus rural).

The questionnaire was re-distributed to QLD hospitals and health districts in September 2020 following an initially low response rate, likely due to the reallocation of resources to assist with COVID-19 pandemic preparedness.

Ethics approval as a low risk study was obtained from the St Vincent's Hospital Human Research Ethics Committee, Darlinghurst, 2010.

# Results

Twenty-seven responses were received from pharmacists working in a variety of roles in 25 hospitals (1 hospital in the ACT, 13 hospitals across 10 health districts in NSW, and 13 hospitals across 10 Hospital Health Services in QLD). This represented an overall response rate of 26% with a jurisdictional response rate of 50% for ACT hospitals, 14% for NSW Hospitals and 54% for QLD hospitals. Most respondents were directors of pharmacy (37%), followed by QUM pharmacists (30%), senior pharmacists (19%), medication safety pharmacists (4%), AMS pharmacists (4%), assistant directors of pharmacy (4%), and clinical informatics pharmacists (4%). Two responses were received from pharmacists holding a district position in NSW. Of the 27 responses: 16 were from metropolitan and 11 from rural areas.

## Status of medicine-related stewardship positions

Participants were asked to provide information about medicine stewardship positions and their activities in their hospitals. These encompassed QUM, AMS, medication safety, and targeted medicine stewardship positions such as opioid analgesic stewardship and VTE/anticoagulant stewardship positions.

### QUM (MUE) positions (n=27)

More than half the respondents (15/27, 55%: 4 in NSW, 1 in ACT and 10 in QLD) had a dedicated QUM position at their hospital (n=7) or health district (n=8). Five of these (31%) were stand-alone positions. However, two of those respondents reported occasional clinical responsibilities were required to maintain competence and skills. Another respondent noted the position was temporary with a business case pending. In the remaining 10 HSOs, QUM positions were typically shared with clinical load, AMS duties, medication safety activities, Drug Committee activities, teaching, clinical informatics, and/or other specialist clinical pharmacist positions e.g. clinical trials and clinical governance.

All QUM positions were filled by pharmacists. They ranged from 7.6 to 38 pharmacist hours per week (0.2 to 1.0 full time equivalent [FTE] positions) and had most commonly been in existence for over 3 years (<1 year for one respondent, 1-2 years for one respondent, 2-3 years for two respondents and 3+ years for 11 respondents). One respondent from a NSW metropolitan hospital noted their 1.0 FTE position was split between MUE, AMS, and medication safety roles as well as DTC secretarial duties, pharmacy department support with dispensary duties and guideline development. Another respondent from a QLD metropolitan hospital noted their position was split between QUM, clinical informatics, and business practice improvement.

A significant proportion of the respondents (11/27, 41%) did not have dedicated QUM positions (5 metropolitan and 6 rural) and one HSO (4%) was unsure if there were any QUM positions. For these hospitals, QUM duties were typically performed by Directors of Pharmacy, AMS pharmacists, DTC pharmacists, medication safety pharmacists, senior pharmacists, junior pharmacists with supervision, nurse educators, and nurses. One NSW metropolitan hospital noted there was a QUM pharmacist

resourced for the health district; however, there was only scope for that pharmacist to provide DTC support and they were not adequately resourced to complete MUEs. In the 11 hospitals without dedicated QUM positions, decisions regarding MUE topics were identified through incident reporting systems, NSW TAG forums (including NQUM Indicator audits), high risk working parties, medication safety committee meetings, Key Performance Indicator (KPI) reports, requests for high-cost medicines, reactive brainstorming, clinical need, and NSQHS Standards gap analysis. The following resources or organisations were reported by respondents to assist with this process: Clinical Excellence Commission (CEC), National Antimicrobial Utilisation Surveillance Program (NAUSP), National Antimicrobial Prescribing Service (NAPS), NSW TAG, Queensland Drug Use Evaluation Subcommittee (DUESC), NSQHS Standards, university and university student projects and Society of Hospital Pharmacists of Australia (SHPA).

### AMS positions (n=27)

Over three-quarters of respondents (22/27, 81%:  9 in NSW, 1 in ACT, 12 in QLD) had dedicated AMS positions. Two respondents reported AMS pharmacists at the local hospital and in the district. Four rural hospitals (3 NSW and 1 QLD) reported no dedicated AMS position, and one respondent (4%) was unsure of AMS resources. These five hospitals (19%) were all rural hospitals.

All AMS positions were filled by pharmacists. They ranged from 11.4 to 53.2 pharmacist hours per week (0.3 FTE to 1.4 FTE) and had been in existence for 1-2 years for 1 respondent, 2-3 years for 3 respondents, and 3+ years for 16 respondents (with 2 respondents not specifying the position duration). The 1.4 FTE position was a district position spread across 3 rural hospitals. Four HSOs (15%) reported no dedicated AMS positions.

### Medication Safety positions (n=27)

Over half the respondents (16/27, 59%: 6 in NSW, 1 in ACT, 9 in QLD) reported having a dedicated medication safety position at their hospital and/or health district. Two respondents reported medication safety positions at the local hospital and in the district. Ten HSOs (37%) did not have dedicated medication safety positions and one HSO (4%) was unsure. Seven of these 11 hospitals were rural.

Three of the medication safety positions were filled by nurses and the remainder were pharmacists. They ranged from 19 to 38 pharmacist/nurse hours per week (0.5 FTE to 1.0 FTE) and had been in existence for <1 year for one respondent, 2-3 years for two respondents, and 3+ years for 10 HSOs.

### Other stewardship positions

One QLD metropolitan HSO had a designated pharmacist position for opioid/analgesic stewardship (1.0 FTE) while another QLD HSO had an analgesic stewardship committee without designated resources. Two metropolitan HSOs (one NSW and one QLD) had established VTE/anticoagulant

stewardship positions (1.0 FTE nurse and 0.5 FTE pharmacist). One LHD employed a senior mental health pharmacist.

Four rural HSOs (15%) indicated there were no designated resources for any positions within QUM, AMS, medication safety, or other MUE activities. Table 1 summarises the MUE positions according to health service type. Table 1 illustrated that AMS positions were the most common of the MUE positions.

***Table 1. Dedicated medicine stewardship (MS) positions in ACT, NSW & QLD hospitals, and health districts, n=27***

| Dedicated MS positions[#] | Hospital | Health District | Unsure |
|---|---|---|---|
| **QUM position** | 8 | 8 | 1 |
| **AMS position** | 16 | 8 | 1 |
| **Medication safety position** | 10 | 8 | 1 |
| **Opioid/analgesic stewardship position** | 1 | 0 | 1 |
| **VTE/anticoagulant stewardship position** | 2 | 0 | 1 |
| **Other** | 1* | 1¥ | 0 |

[#] FTE may vary * Drug Committee Pharmacist ¥ Mental Health Pharmacist

## Number of beds covered by medicine stewardship positions (n=27)

Respondents were asked to estimate the number of beds covered by their various medicine stewardship positions, and the corresponding allocated pharmacist hours per week (as full-time equivalents [FTE]) dedicated to these positions (Table 2 and Appendix 1). (Note: The data of specialist MUE positions are excluded for this analysis). It was clear that the number of hours allocated to medicine stewardship positions bears no relationship to the number of beds these positions oversee (Figure 1). Figure 1 illustrates that a big hospital could have relatively few hours allocated to medicine stewardship (e.g. Hospital Participant 15) while a smaller hospital could have at least as many if not more allocated hours (e.g. Hospital Participant 27). Table 2 details the breakdown of the medicine stewardship position's weekly hours by jurisdiction.

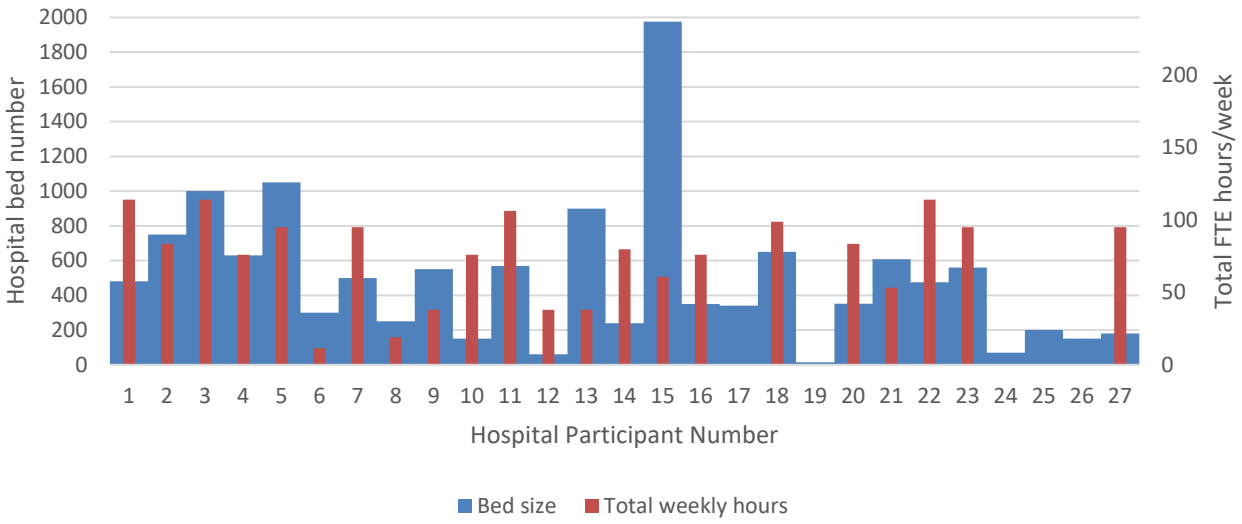


***Figure 1. Correlation between HSO bed size and allocated medicine stewardship position hours per hospital, n=27***

Figure 2 displays the allocation of medicine stewardship hours per 100 beds for each participating hospital. Overall, hours per 100 beds ranged from 0 in 4 NSW hospitals to a maximum of 63 in one NSW hospital. A breakdown according to jurisdictions shows that all but 1 QLD hospital had some hours allocated to this work in every hospital (range: 4-24 hours/100 beds) whereas 4 of the NSW reported no hours were allocated to medicine stewardship activities. (The QLD hospital that had no allocated hours was a small rural hospital). However, when NSW hospitals did allocate hours to medicine stewardship activities, they often allocated more hours per 100 beds than other jurisdictions (e.g. Hospitals 10, 12 and 27). These hospitals had smaller bed numbers (150, 60, and 180).

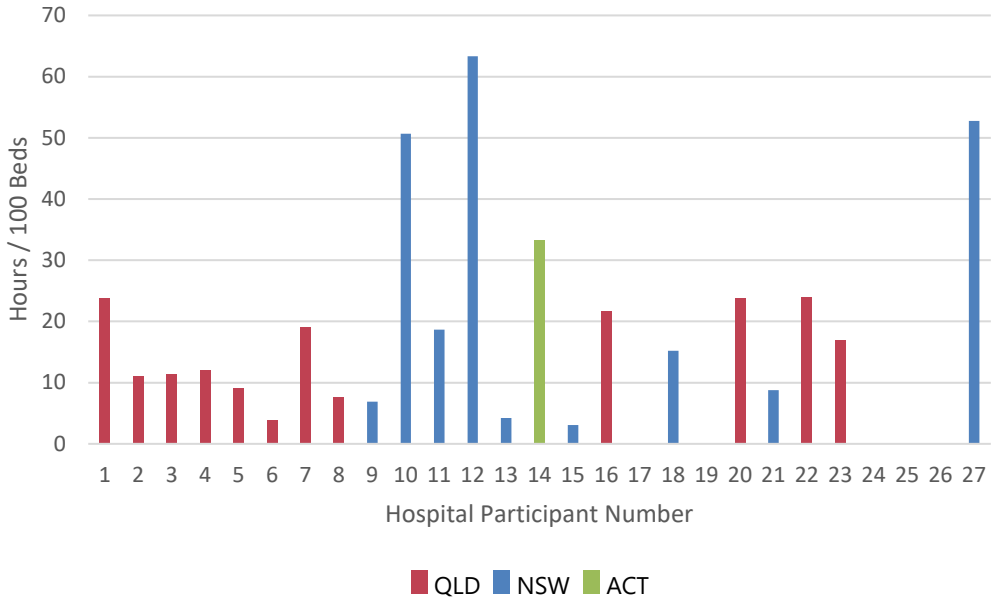


***Figure 2. Medicine stewardship position hours per 100 hospital beds in each participating hospital and according to jurisdiction, n=27***

***Table 2. Breakdown of hours per week allocated to medicine stewardship* (MS) positions in each jurisdiction***

* Does not include specialist medicine stewardship positions for VTE, opioid stewardship, mental health

| Jurisdiction | ACT | QLD | | | | | | | | | | | | | NSW | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Participant no. | 14 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 16 | 19 | 20 | 22 | 23 | 9 | 10 | 11 | 12 | 13 | 15 | 17 | 18 | 21 | 24 | 25 | 26 | 27 |
| Bed number | 240 | 480 | 750 | 1000 | 630 | 1050 | 300 | 500 | 250 | 350 | 15 | 352 | 475 | 560 | 550 | 150 | 570 | 60 | 900 | 1976 | 340 | 650 | 608 | 70 | 200 | 150 | 180 |
| Metropolitan (M) or rural (R) | M | R | M | M | M | M | R | R | M | M | R | M | M | M | M | M | M | M | M | M | R | M | R | R | R | R | R |
| QUM hours | 30.4 | 38 | 7.6 | 38 | 19 | 38 | 0 | 19 | 0 | 38 | 0 | 22.8 | 38 | 19 | 0 | 15.2 | 30.4 | 0 | 0 | 0 | 0 | 22.8 | 0 | 0 | 0 | 0 | 19 |
| AMS hours | 19 | 38 | 38 | 38 | 38 | 38 | 11.4 | 38 | 19 | 38 | 0 | 38 | 38 | 38 | 38 | 19 | 38 | 15.2 | 38 | 38 | 0 | 38 | 53.2 | 0 | 0 | 0 | 38 |
| Medication Safety hours | 30.4 | 38 | 38 | 38 | 19 | 19 | 0 | 38 | 0 | 0 | 0 | 22.8 | 38 | 38 | 0 | 41.8 | 38 | 22.8 | 0 | 22.8 | 0 | 38 | 0 | 0 | 0 | 0 | 38 |
| Total hours* | 79.8 | 114 | 83.6 | 114 | 76 | 95 | 11.4 | 95 | 19 | 76 | 0 | 83.6 | 114 | 95 | 38 | 76 | 106 | 38 | 38 | 60.8 | 0 | 98.8 | 53.2 | 0 | 0 | 0 | 95 |
| MS hours per 100 beds | 33 | 24 | 11 | 11 | 12 | 9 | 4 | 19 | 8 | 22 | 0 | 24 | 24 | 17 | 7 | 51 | 19 | 63 | 4 | 3 | 0 | 15 | 9 | 0 | 0 | 0 | 53 |
| Mean MS Hours/100 beds | 33 | 13 +/- 8 | | | | | | | | | | | | | 19 +/- 23 | | | | | | | | | | | | |
| Median (range) MS Hours/100 beds | 33 | 12 (0-53) | | | | | | | | | | | | | 7 (0-63) | | | | | | | | | | | | |

FTE allocations were greatest for AMS positions (19.6 FTE). Total FTE allocations across the 27 respondents were 10.4 for QUM positions, 19.6 for AMS positions, and 13.7 for medication safety positions (Appendix 1). Table 3 displays the average FTE allocations in each hospital for each jurisdiction.

***Table 3. Mean FTE allocations per hospital for all participants by jurisdiction, n=27***

| JURISDICTION | QUM | | AMS | | MEDICATION SAFETY | |
|---|---|---|---|---|---|---|
| | *Mean* | *SD* | *Mean* | *SD* | *Mean* | *SD* |
| **ACT** | 0.8 | 0 | 0.5 | 0 | 0.8 | 0 |
| **NSW** | 0.2 | 0.3 | 0.6 | 0.5 | 0.4 | 0.5 |
| **QLD** | 0.6 | 0.4 | 0.8 | 0.3 | 0.6 | 0.4 |

## MUE activities performed (n=27)

Respondents reported the number of completed MUE activities during the past year (see Figure 3). These ranged from 0 to 10 or more activities. Sixty percent (15/25) of respondents completed between 0 and 3 projects. This contrasted with the belief of 61% of respondents (14/23) that the optimal annual number of completed MUE activities in their HSO should be 7 or more. For the 5 hospitals that did not complete any MUEs in the previous year, 3 were metropolitan and 2 were rural. None of the hospitals had dedicated local QUM positions, however 3 had district QUM positions. Staff shortages and lack of dedicated staff were cited as contributors to the gaps in delivery of MUE activities in their organisations.

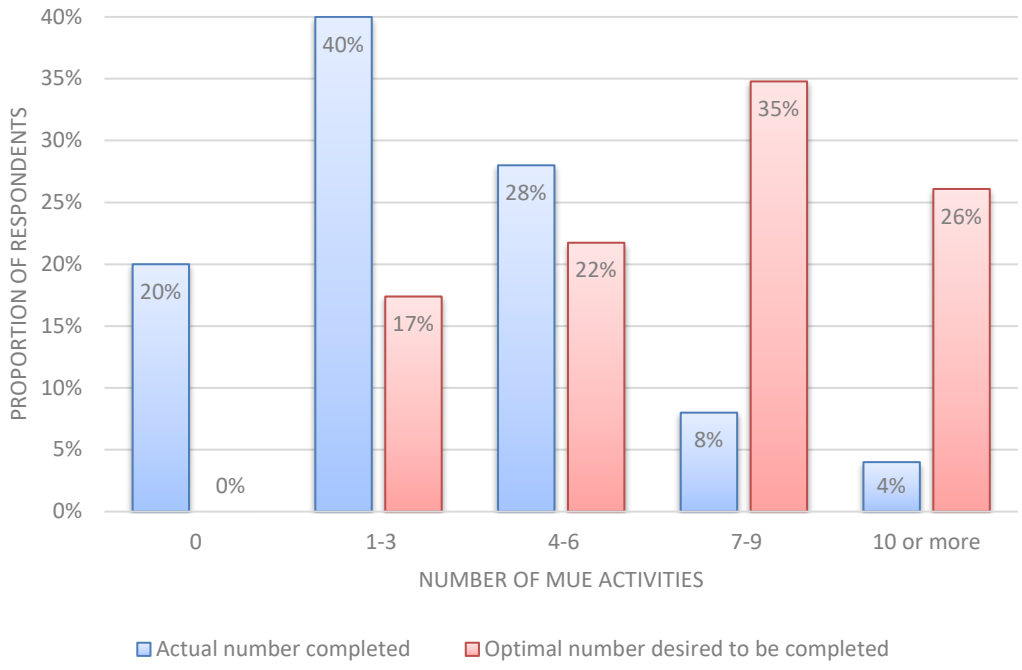


***Figure 3. MUE activities completed in the past year, n=27***

There was a trend for greater MUE activity in metropolitan hospitals than in rural hospitals (43% of metropolitan hospitals having completed 4 or more MUE activities in the previous year, compared with 36% of rural hospitals). This could be due to the higher resourcing for MUE practitioners in metropolitan hospitals/health districts.

## Other clinical audit activities (n=26)

Completion of clinical audits is a responsibility of all MUE practitioners including QUM, AMS, and medications safety pharmacists as they enable data review against set criteria or standards. Audits also assess impact of implemented quality improvement measures addressing identified areas of concern.[16,17] Respondents were asked to report which clinical audit activities were performed at their hospital and indicate which position was responsible for completing these activities. There was a variation in the number of responses received for each activity (see Table 4).

***Table 4. Breakdown of responsibility for clinical audit activities, n=26***

| | Yes activity is undertaken | Responsibility of QUM position | Responsibility of another | Total respondents |
|---|---|---|---|---|
| **NSMC audits** | 18 (95%) | 3 (16%) | 16 (84%) | 19 |
| **AMS audits** | 25 (96%) | 2 (8%) | 24 (92%) | 26 |
| **MSSA audits** | 23 (96%) | 4 (17%) | 19 (79%) | 24 |
| **ADR reporting and analysis** | 18 (100%) | 1 (6%) | 15 (83%) | 18 |
| **QUM indicator data collection** | 20 (95%) | 7 (33%) | 15 (71%) | 21 |
| **Incident activities** | 25 (100%) | 2 (8%) | 22 (88%) | 25 |
| **CEC projects** | 11 (92%) | 0 (0%) | 10 (83%) | 12 |
| **CEQ projects** | 5 (83%) | 0 (0%) | 5 (83%) | 6 |
| **NSW TAG projects** | 9 (90%) | 3 (30%) | 6 (60%) | 10 |
| **QLD DUESC audits** | 9 (90%) | 5 (50%) | 4 (40%) | 10 |

NSMC = National Standard Medication Chart, AMS = Antimicrobial stewardship, MSSA = Medication Safety Self Assessment®, ADR = adverse drug reaction, QUM = quality use of medicines, CEC = NSW Clinical Excellence Commission, CEQ = Clinical Excellence Queensland, NSW TAG = New South Wales Therapeutic Advisory Group, QLD DUESC = Queensland Drug Use Evaluation Subcommittee.

QUM pharmacists were reported as having the most responsibility in QUM indicator data collection, NSW TAG projects, and QLD DUESC audits (33%, 30%, and 50% respectively). For all other clinical audit activities, another position was responsible for the completion of these activities in most hospitals (see Figure 4), noting that some responses were received from hospitals without a dedicated QUM position. Roles of others responsible for these activities included other pharmacists (AMS, medication safety, directors, deputy directors, senior pharmacists, junior pharmacists, intern pharmacists), DTCs, Clinical Nurse Consultants (CNCs), clinical governance staff, and other pharmacy staff.

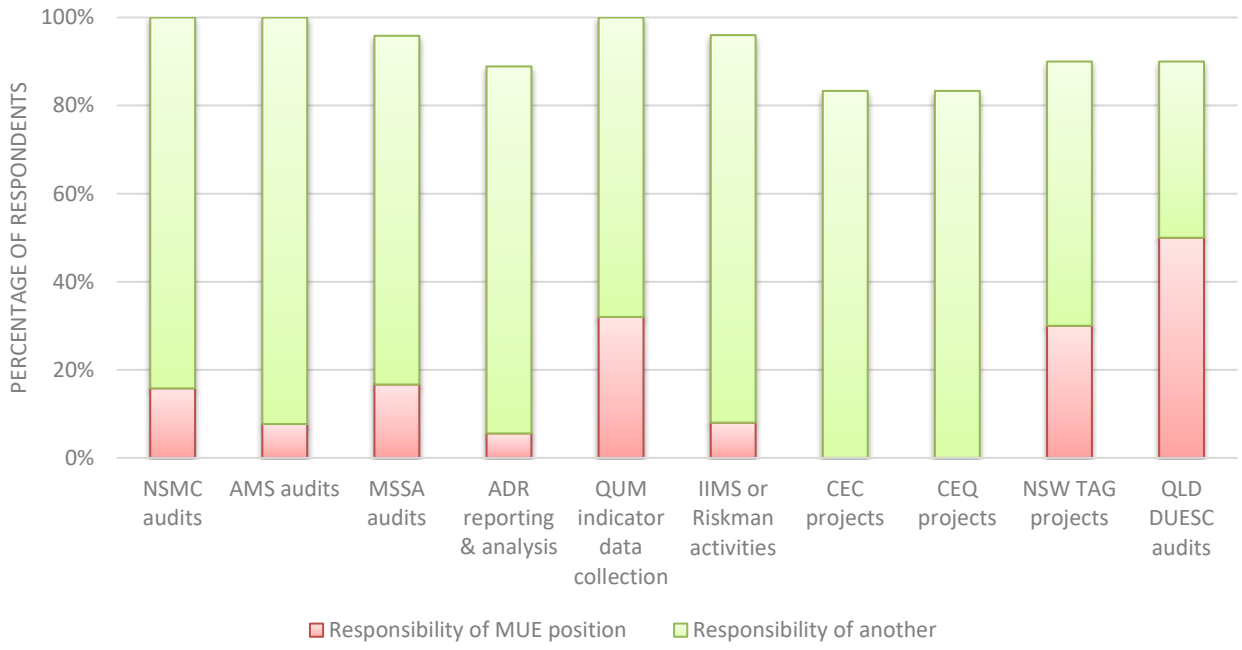


***Figure 4. Summary of responsibility for clinical audit activities, n=26***

Other clinical audit activities NOT included in Figure 4 that fell under the responsibility of the QUM position were outlined by seven respondents. These included:

- Local Quality Audit Reporting System (QARS) audits e.g. neuromuscular blocking agents audit, medication handling, and storage audit, labelling of injectable medicines and lines audit, medication reconciliation audit, and accountable drugs audit
- Other medication reconciliation audit
- VTE audit
- Coordinate QUM projects for pharmacy students in conjunction with education pharmacist
- Clinical leadership program audits
- Procurement, storage, and distribution of medicines reviews and drug expenditure audits.

## Multidisciplinary involvement in MUE activities

Successful MUE programs rely on involvement of a multidisciplinary team including pharmacists, nurses, medical staff, administration, and other health care team members.[18] Multidisciplinary involvement can optimise team or system-wide practices to improve patient outcomes and quality of life through assessment of clinical outcomes.[19] Respondents were asked to outline what multidisciplinary personnel (aside from pharmacists) were involved in different aspects of the MUE cycle at their HSO. Personnel were categorised as the quality and safety team, medical officers, nursing representatives, and others. Respondents clarified "other" personnel as Clinical Nurse Consultants, DTC chair, and university students. However, one respondent reported that all steps are completed exclusively by pharmacy staff including gaining appropriate committee approvals.

Medical staff are more likely to be involved with the planning phase and development, implementation, and education stages. During these stages, multidisciplinary involvement is reportedly spread evenly. Data collection, analysis, and report writing have less multidisciplinary involvement. In general, the Quality and Safety team had the least involvement in the multidisciplinary team (Figure 5).

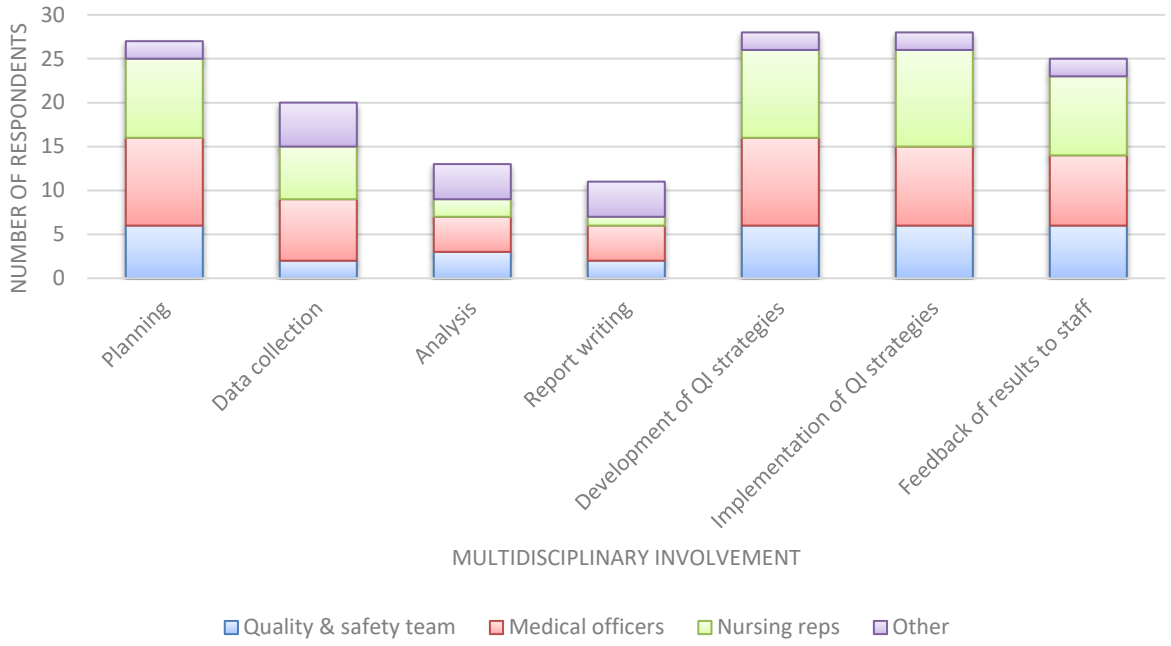


***Figure 5. Summary of multidisciplinary involvement (excluding pharmacists) in MUE activities, n=21***

## Efforts to enhance multidisciplinary involvement (n=17)

Respondents were asked how MUE activities are promoted to enhance multidisciplinary involvement and to provide examples of any multidisciplinary MUE activities undertaken. The following strategies were outlined:

- Pharmacy newsletter publication
- Indirectly through AMS activities that are multidisciplinary with executive sponsorship and involving the DTC Chair
- Activities are completed through the Safe Use of Medicines Committee or the Quality Team as part of accreditation for The NSQHS Standard 4 – Medication Safety
- A range of clinicians are involved with different projects e.g. junior medical officers, consultants, and pharmacists for projects on VTE, osteoporosis management, and iron audit
- Promotion via medicines management committee and medication safety subcommittee
- MUE position directly approaches other disciplines
- Include medical officer membership on DTC
- Imprest reviews include the nurse unit manager
- Engage with other disciplines when activities relate to their specialty e.g. liaise with anaesthetists for projects relating to alternative formulations, or therapeutics alternatives of intensive care medicines
- Promotion via staff meetings, screen savers, and grand rounds presentations to the executive.

## Prioritisation of facilitators for performing MUEs (n=25)

Respondents were asked to consider 5 issues and prioritise which were the greatest drivers for performing MUEs in their HSO. From most important (1) to least important (5), the responses were:

1. improve patient safety
2. align practice with best evidence
3. reduce medicine-related costs
4. meet accreditation requirements
5. develop pharmacy workforce in MUE /research/quality improvement.

Respondents were also asked to outline their current top 3 MUE priorities. Twenty-six participants provided the following priorities:

- Medication specific, including:
    - High-risk medicines including opioids, insulin, anticoagulants
    - Iron infusions
    - Monoclonal antibodies
    - Melatonin
    - Medicinal cannabis
    - Alteplase in acute stroke
    - VTE prophylaxis
    - Sodium chloride intravenous fluids

- Biosimilars
- Antipsychotics
- New drugs on the list of approved medicines
- 'Top 100' drugs.

- Best Possible Medication History, medication reconciliation, and accuracy of discharge summaries
- AMS audits and antimicrobial usage/expenditure
- Oncology
- Improving VTE risk assessments
- Supply of medications considering shortages (including COVID-19 related shortages and price increases)
- Medicines waste reduction
- Falls
- Accreditation
- Medication administration processes
- Reviewing and removing historical non evidence based blanket approval listings.

## Accreditation against the National Safety and Quality Health Service Standards (n=24)

Respondents were asked at what stage of the accreditation cycle was their organisation (Figure 6), and how has the accreditation process influenced planning for, appreciation of the impact, and use of results of MUE activities. Thirteen (54%) respondents were currently preparing for accreditation.

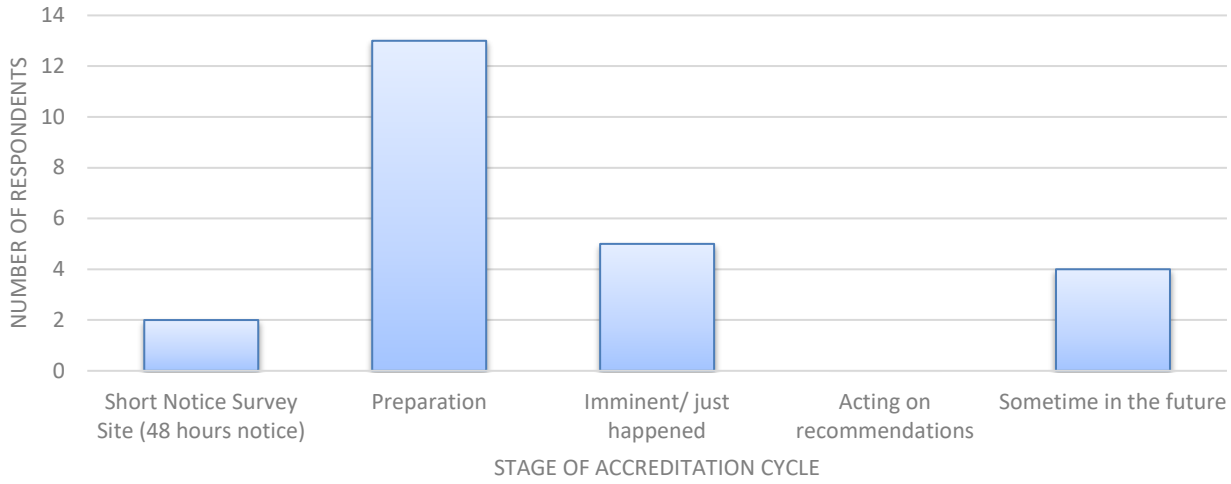


***Figure 6. Accreditation cycle of HSOs, n=24***

Fourteen responses were received regarding the influence of the accreditation process on MUE activities. One HSO noted that moving to short notice in 2020 has meant information is kept up to date and a greater number of smaller projects is anticipated, rather than a few large ones. Four hospitals reported there had been no impact and the current resource allocation was continuing.

Whereas two sites reported all focus had moved to accreditation standards, collating data and evidence and not quality improvement activities. Increased MUE activities around accreditation were noted by two respondents, with one reporting completion of QUM Indicators for their mental health hospital each July and the recent completion of the MSSA®. Three HSOs postponed accreditation until after the COVID-19 recovery phase was reached.

## MUE audit tools (n=24)

Respondents were asked to identify clinical audit tools they currently used for MUE activities. Most respondents used locally developed tools (75%, 18/24), followed by National QUM Indicator tools (56%, 13/24) and CEC tools, only available to NSW clinicians (42%, 10/24). One respondent also listed use of tools from other organisations including NAPS and NAUSP (see Figure 7).

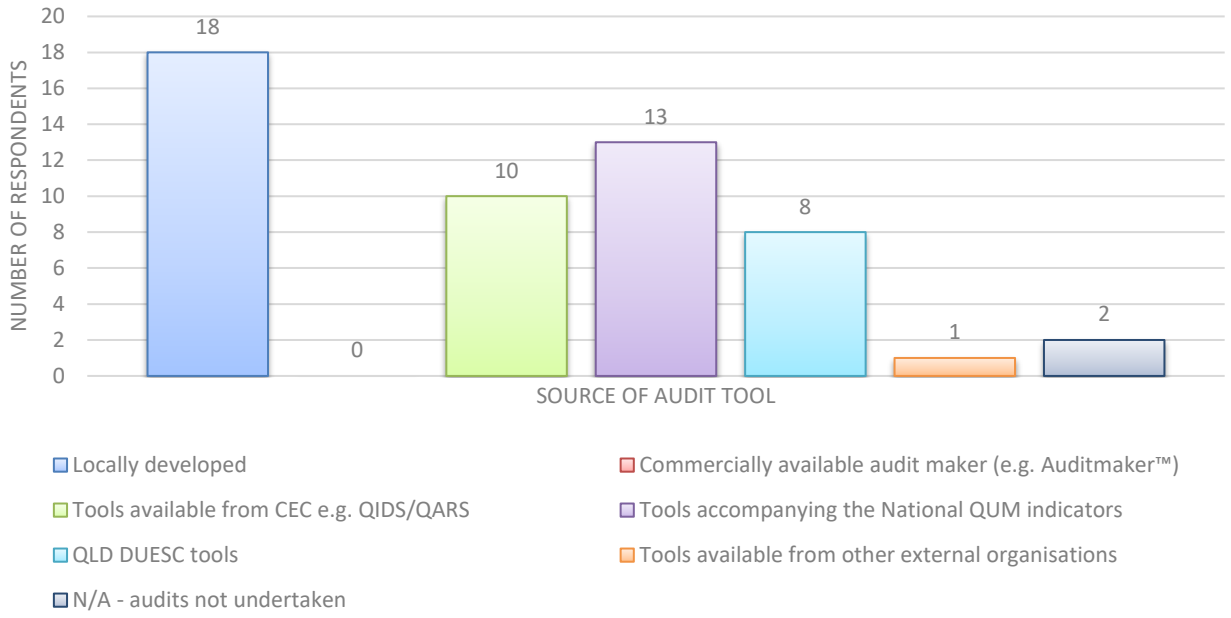


***Figure 7. Audit tools utilised for MUE activities, n=24***

## Support or training for MUE activities by the hospital or health district executive (n=24)

Generally, respondents reported there was support for MUE activity from hospital executives, and a variety of training or financial support was reported. This included: HETI training, provision of clinical leadership program each year, research/QI training through structured programs, funding and study leave to complete a Graduate Certificate in Health Service Research, change management course, and SHPA conference attendance (if presenting). Executive support was also reported to support grant applications. Two hospitals reported support from executives in the form of funding for MUE positions. However, eight respondents (33%) reported there was no support provided by the HSO executive. More than one respondent also noted an expectation that MUE activities be performed, regardless of the lack of designated resources.

## Communicating MUE activities to Drug and Therapeutic Committees (n=27)

Thirteen HSOs (48%) have MUE activity as a standing item on their DTC meeting agenda. Although one of these reported not performing MUEs but instead reporting the top ten most used medicines. Of the remaining 14 respondents (52%), seven HSOs report MUE activity to the DTC when required, one HSO will add it as a standing agenda item once the position became permanent and one HSO only tables the Individual Patient Use (IPU) reports. The remaining five HSOs did not provide additional comments.

## Barriers to MUE activities

### Perceived barriers in the delivery of local MUE activities (n=26)

The most repetitive themes to limit MUE activity were staff shortages (92%, 23/25) and competing priorities (50%, 13/26) such as eMeds implementation and accreditation preparation. Other frequent barriers included a lack of local understanding of the value of MUE, difficulties engaging members of the multidisciplinary team or a clinical champion and ensuring accurate data collection.

#### *Competing priorities*

Competing priorities (50%, 13/26) for MUE activity included eMeds implementation, accreditation preparation, guideline/procedure development, governance processes, and support for AMS and/or other medication safety activities. Competing priorities were reported for pharmacy staff as well as multidisciplinary staff e.g. medical officers who have other projects and limited capability to help with MUEs. One respondent reported that individual clinicians were having to complete MUE projects in their own time with little support.

Increasing stock issues including shortages recalls, alerts, and safety notices were noted as a barrier to MUEs. Although one respondent also noted that these are often the stimulus for MUEs. However, in these instances, they are done swiftly with limited resources and skills, with "desperation being the driver".

#### *Lack of understanding of MUE value for the organisation*

Lack of understanding or disinvestment by DTC or executive of the benefit of MUE activities were also perceived as barriers (15%, 4/26). For example, one respondent reported multiple business cases for AMS pharmacist, medication safety pharmacist, hospital in the home, surgical, emergency department and mental health drug and alcohol community positions were all rejected by the health district, despite support from the general manager. It was reported that "having an MUE pharmacist feels like a luxury at this stage, although perhaps demonstrating cost savings is the only way to get any traction". Another respondent reported that MUEs are not prioritised unless they are directly linked to accreditation and associated Key Performance Indicators. Conversely, one respondent noted that recognition of value for the MUE role was no longer a problem since financial drivers have justified the position.

Difficulty engaging clinical champions or other supports was reported as a barrier. If MUEs were attempted, data collection, report findings, and reassessment were reported as time-intensive and challenging. One respondent also noted MUE fatigue is becoming problematic.

Lastly, difficulty obtaining accurate data was a recurrent theme, along with an inability to implement IT solutions (largely due to funding limitations). However, it was noted that data extraction has become simpler and more reliable in the era of eMeds implementation and Pharmalytix®.

### *Pharmacy workforce*

Lack of dedicated MUE resources/positions and lack of experience or skills in running MUEs (54%, 14/26) were other recurring themes. Support for the MUE position was noted at an organisation level but not actively promoted in one HSO. One respondent also noted a deficiency in departmental upskilling and succession planning for MUE roles.

Respondents were asked if shortages in Pharmacy staff or non-approval of Pharmacy positions impacted the ability of the Pharmacy department to undertake MUE activities. Specifically, have staff shortages led to a) MUE activities being curtailed/ceased; b) other clinicians undertaking MUE activities; and/or c) no effect on MUE activity.

Most respondents (92%, 23/25) indicated that staff shortages have impacted the capacity to undertake MUE activities. In hospitals that had dedicated MUE positions, respondents noted QUM /MUE pharmacists were redeployed to cover clinical and dispensary services. One respondent reported MUE was "considered a luxury or extra-curricular". Another respondent reported the MUE role has been changed to focus on medication safety and accreditation support.

Other barriers to successfully undertaking MUE activities included:

- Lack of dedicated time
- Lack of expertise
- Lack of resources and funding available for MUE position
- Difficulty obtaining accurate data
- Lack of medication safety champions within the pharmacy department
- Lack of multidisciplinary support outside pharmacy
- Unfilled vacancy.

## Enablers for MUE activities

### Strategies to enhance MUE activities (n=25)

Twenty-five respondents outlined various strategies to enhance MUE activities. Several themes were identified from their responses:

1. Strategic planning for hospital pharmacy services to incorporate and prioritise MUE activity. For example:
    - Creation of designated MUE pharmacist positions, rather than incorporating into the already busy schedule of clinical pharmacists.
    - Greater promotion and awareness of the benefits of the MUE role to hospital executives and DTCs, including improved internal publication of MUE outcomes.
    - Reduce reliance on pharmacists for the development and maintenance of procedures and guidelines.
    - Designate time free from the roster to facilitate MUE activities.
    - Greater provision of training and education for MUE methodology and publication skills e.g. site visits, external research skill seminars
2. Centralised coordination of MUE initiatives (jurisdictional or national), like NAPS with pre-prepared databases to complete and allow comparison with peer hospitals.
3. Encourage multi-disciplinary involvement and identification of clinical champions. Suggestions included optimising the availability of students to assist with data collection and approaching medical officers and senior medical champions.
4. Innovative use of resources for MUE activities, for example, data collection and analysis using eMMS for real/near-time monitoring
5. Change MUE practice to become more proactive rather than reactive
6. Clear definition of responsibilities between site and district DTCs concerning MUE and actions to improve systems

# Discussion and conclusion

The results of this survey highlight that despite a slight increase in MUE resourcing in 2020 compared to 2015, MUE activity in many NSW and Queensland HSOs is still less than ideal and there is a necessity for increased resource allocation to MUE activity and QUM/medication safety and stewardship positions.

Analysis of the survey responses show that:

- there is under-resourcing of QUM pharmacist positions, which are either not appointed or overburdened with multiple functions to fulfil;
- those working in MUE positions perceive that there should be greater MUE activity in their HSOs;
- there is a disparity between MUE activity in metropolitan and non-metropolitan sites; and
- there is a lack of dedicated resources for any medicine stewardship positions in many rural HSOs; and
- the bulk of MUE work relies on frontline clinicians particularly pharmacists.

The National Antimicrobial Prescribing Survey (NAPS) has also identified the disparity between metropolitan and non-metropolitan HSOs with increased time required to complete the NAPS data and additional assistance required from NAPS staff for rural/remote hospitals due to hospital size and availability of staff to conduct the survey.[2] This aligns with other evidence of patient and service outcome discrepancies between metropolitan and non-metropolitan hospitals, more generally.[3]

Respondents acknowledged the accreditation cycle leads to a greater awareness of MUE activity, by providing required evidence to meet NSQHS Standard 4: *Medication Safety* and Standard 3: *Preventing and Controlling Health Care Associated Infections*.[4] Despite this, additional resources dedicated to MUE activities have not been allocated, especially in rural hospitals. Participants reported there is an expectation MUE activities are performed, regardless of the availability of designated resources. Furthermore, it is unclear what impact accreditation has on MUE activity and outcomes. There appears to be a need to further articulate and strengthen the importance of MUE activity in the Standards as part of the safety and quality culture of HSOs.

Although limited by a poor response rate (influenced by COVID-19), comparison of the responses received in the 2020 and 2015 surveys suggest that:

- Little improvement in MUE resourcing has occurred in NSW hospitals with only 30% reporting QUM/MUE positions in 2020. (53% reported MUE and/or medication safety positions). This compares with a 32% result for QUM/MUE positions in 2015. These QUM/MUE positions often have multiple functions in 2020 (and in 2015).
- the number of AMS hospital/district positions appear to be similar (71% of hospitals have designated AMS positions in 2020 compared with 76% in 2015).
- despite a limited portfolio of medicines to address, AMS positions have almost double the FTE allocations compared to dedicated MUE or medication safety FTE allocations. A similar result was found in the 2015 survey.

It should be noted that antimicrobials represent only one component of the many medicines that represent high risk to patient safety. However, local, jurisdictional, and national resources for AMS have consistently shown greater support and activity over the last decade.

A comparison between the jurisdictions indicated that:

- ACT had the highest allocations for QUM, AMS, and medication safety positions, noting this represents data from only one hospital.
- QLD hospitals had a higher mean FTE allocation for QUM, AMS, and medication safety positions compared to NSW hospitals.

The disparity between resource allocation in metropolitan and non-metropolitan HSOs as well as inequity between jurisdictions and regions should be addressed in the implementation and maintenance of the quality improvement and safety culture in HSOs. . In addition, a national focus is required similar to that which occurred with antimicrobial stewardship in the early 2000's. A number of relevant Standards were developed and updated to drive AMS activity as well as a national antimicrobial measurement system targeting appropriate and safe use.[9] This same focus is required and should be addressed in the current review of the National Medicine Policy and involvement in the World Health Organisation's Global Patient Safety Challenge for Medication Without Harm[6] and Australia's 10th National Health Priority initiatives.

The findings of this survey and the previous survey suggest a need for a national minimum standard requirement for dedicated MUE/QUM activity in Australian hospital with dedicated activity for local program that address local gaps in care in addition to jurisdictional and national programs. Current accreditation requirements do not appear to adequately address this gap in MUE/QUM activity. Such a standard should help improve MUE activity, minimise inappropriate diversity and reduce inequity. Each health service organisation should have local MUE programs that ensure adequate oversight of non-formulary medicines, review of high cost medicines, education on QUM and the ability to make appropriate cost savings on medicines through medicine governance activity. Possible preliminary suggestions to describe an adequate minimum standard for MUE activity could be:

- 0.5 FTE per 500 beds or 0.5 to 1 FTE for a tertiary facility and 0.3-0.5 FTE for a smaller facility;
- possibly an FTE allocation per dollar medication spend (with a caveat regarding the care for rare diseases requiring very high cost medicines in order not to skew the allocation); or,
- a minimum number of MUE projects per year given the survey respondents suggested that the optimal number for MUE projects per year was 7 or more.

As part of its work supporting the WHO's Global Safety Challenge and improving health service organisation performance, this report's authors recommends the ACSQHC and other jurisdictional quality and safety organisations consider this report and the ways in which they could further drive local MUE activity as they have done with AMS activity.

There has been growing advocacy for other hospital-based therapeutic-specific stewardship programs.[5] Three hospitals had dedicated opioid/analgesia or venous thromboembolism (VTE) stewardship positions. Two of these were in QLD and one in NSW. All were metropolitan hospitals with FTE allocations for these positions ranging from 0.5 to 1.0 FTE pharmacists or nurses (19 to 38 hours per week).

Barriers to completing MUE activities were identified in the survey:

- staff shortages
- lack of dedicated resources and time allocated to MUE activity
- competing priorities such as eMeds implementation, accreditation preparation, guideline/procedure development and prioritisation of governance processes
- diversion of MUE staff to backfill clinical services
- lack of appropriate MUE skills and competency (including research and ethics experience)
- difficulty engaging clinical champions
- disinvestment by Drug and Therapeutics Committees (DTCs) or hospital executive
- difficulty obtaining accurate data

Potential solutions for the highlighted barriers may include:

- HSO funding support for travel and/or backfill as well as locum or casual staff employed to backfill short term staff shortages affecting front line services, thus preserving MUE activity
- Enhancing clinical leadership and research skills for hospital pharmacists by encouraging attendance at research skills seminars
- Greater promotion and awareness of benefits of MUE role to hospital executive
- Embedding a quality improvement culture for medicines quality and safety in the HSO by:
    - Executive-sponsored ongoing quality improvement program with established dedicated positions that assist clinicians to undertake quality improvement projects
    - Annual hospital showcase days of quality improvement projects
    - Standing agenda items for reporting of quality improvement projects to relevant governance committees
- Including the provision of MUE services within the National Standards. This will necessitate ongoing dedicated resourcing to ensure equity of service delivery and implementation of local quality improvement strategies
- Centralised coordination of MUE initiatives at a jurisdictional or national level, e.g. Council of Australian Therapeutic Advisory Groups, NSW TAG-co-ordinated or Queensland DUESC multi-site QUM projects
- Greater uptake of centralised data collection tools/templates e.g. Quality Improvement Data System (QIDS) or Quality Audit Reporting System (QARS) modules
- Greater support for automated data collection from the eMR with the provision of training to auditors or audit support by local IT services
- Facilitating the use of innovative software e.g. National Antimicrobial Prescribing Survey (NAPS) to improve and standardise analysis and reporting of MUE activity and enable benchmarking and comparisons with peer hospitals

- Co-ordinated timely site-specific approvals for multisite low and negligible-risk projects that provide data for accreditation and quality improvement. These projects should measure outcomes that demonstrate the value of such services to DTC and/or hospital executive
- Promoting interprofessional MUE projects using undergraduate students of clinical disciplines and/or early-career clinicians
- Convening a regular dedicated multidisciplinary conference for MUE and medicine-related quality improvement projects and problem-solving workshops

It is evident that there is variability in resource allocation as well as roles and responsibilities for MUE-related pharmacists in NSW, ACT and Queensland. Regardless of the clinical setting, MUE skills including identification of improvement opportunities, forming a team to review and facilitate change, developing an appropriate data collection methodology, data collection, analysis, reporting and proposing and implementing interventions are core to MUE roles. While there is variability in skills, priorities, funding and governance relating to MUE roles across NSW, ACT and Queensland, a core strategy should be to support workforce development and collaboration for both clinical and QUM/MUE roles to achieve optimal medicines use outcomes for patients.

The survey respondents perceived that MUE-related roles across NSW, ACT and Queensland were achieving patient centred outcomes for patients within relevant hospitals. Barriers identified in relation to development and implementation of these roles highlights the need for a broad, collaborative, pragmatic evaluation of the relevant MUE-related roles and their associated outcomes for patients and organisations. It is only with this approach that the value of investment in dedicated roles such as these will support further development and implementation.

There is significant scope for improvement in hospital-based MUE activity with this survey demonstrating only a modest increase in resources allocated to MUE activities over the recent years. MUE activity to support HSO accreditation requirements has not been sufficient to support comprehensive MUE activity. Much of MUE activity is driven externally from national or jurisdictional campaigns and there are insufficient resources (time and staff) to enable completion of more MUEs to target local issues. There is a disproportionate requirement for output from MUE activities compared to the available MUE staff. This is supported by the desire of participants to complete more MUE activities than they currently do. Currently, despite the best attempts by MUE and stewardship clinicians, they have little time left for implementing quality improvement strategies to address identified gaps in care.

These findings were also evident in the NSW TAG report, *Revitalising hospital evaluation of medicine use - the case for DUE*, and the driver diagram developed in the 2015 report has been reproduced in this 2021 report (Appendix 2) as these same considerations to address MUE under-activity remain valid.

The need for greater activity for medication safety and quality use of medicines has been recognised by the World Health Organisation's Global Patient Safety Challenge for Medication Without Harm[6] and Australia's 10th National Health Priority.[7] Embedding a medicine safety and quality culture driven by frontline clinicians with resourcing and training to support medicine stewardship activities are

therefore critical for Australian hospitals. To improve medication safety and quality use of medicines, more resources on a local, jurisdictional, and national level should be assigned that provide a cohesive framework to address gaps. The recent advances and initiatives made for AMS provide a framework on which to inform increased activity and resourcing. A multidisciplinary approach and clinical championing on a background culture of safety and quality improvement are critical components. All high-risk medicines, costly medicines, areas where medication use is likely inappropriate and those where supply is critical should be high priority areas. Inequity between jurisdictions and regions should be addressed in the implementation and maintenance of the quality improvement and safety culture in HSOs.

## Limitations

The survey targeted hospitals with known on-site pharmacy services only. The overall response rate was low at 26% although Queensland and ACT response rates were 50% or over. The small sample size, as well as the omission of answers by some participants, may limit the generalisation of our findings. This may be explained by hospitals lacking designated MUE resources for survey completion as well as the impact the COVID-19 pandemic posed on hospital workload. A further limitation was that survey responses were received from pharmacists only although responses from other clinicians were welcome. However, as pharmacists are primarily concerned with the quality use of medicines, it is reasonable to assume they would be involved in MUE activity undertaken within their hospital and/or district. Furthermore, the results are consistent with the 2015 NSW TAG MUE survey of NSW and ACT hospitals. It is expected that those with an interest in MUE would be more likely to respond and that survey results would be likely to over-estimate MUE activity rather than under-estimate it and that the barriers and enablers to MUE activity are relevant.

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# Acknowledgments


### *Project Team*

Dr Alexandra (Sasha) Bennett, Executive officer, NSW TAG, Darlinghurst, NSW, 2010.

Ms Sharna Glover, Quality Use of Medicines Project officer, NSW TAG, Darlinghurst, NSW 2010.

Ms Sarah Dinh, Quality Use of Medicines Project officer, NSW TAG, Darlinghurst, NSW 2010.

Mr Martin Canning, Co-Chair for the Queensland Drug Use Evaluation Subcommittee; Safety & Quality Pharmacist / Drug Use Evaluation Pharmacist, Safety & Quality Unit, Pharmacy Department, The Prince Charles Hospital, Chermside, Queensland 4032.

Ms Sara Sullivan, Co-Chair for the Queensland Drug Use Evaluation Subcommittee Secretariat and Pharmacist Advanced, Queensland Metro South Health Medicines Management Committee, Eight Mile Plains, QLD, 4113.

### *Expert Advisory Group*

NSW TAG wishes to thank members of the NSW TAG medSMART group for their input into survey design.

### *Other Acknowledgements*

Professor Asad (Sid) Patanwala, Chair, NSW TAG Editorial Committee and Chair of Clinical Pharmacy, The University of Sydney School of Pharmacy and Royal Prince Alfred Hospital, Faculty of Medicine and Health, The University of Sydney, NSW , 2006.

NSW TAG wishes to thank all participating hospitals.

# Appendices

## Appendix 1. MUE and medicines-stewardship position: number of beds covered and FTE

| Hospital/ LHD | Jurisdiction | Bed size | Location M/R** | QUM position FTE | AMS Position FTE | Medication Safety position FTE | Opioid or VTE Stewardship Position FTE | Other position FTE |
|---|---|---|---|---|---|---|---|---|
| **1** | QLD | 480 | R | 1.0 | 1.0 | 1.0 | | |
| **2** | QLD | 750 | M | 0.2 | 1.0 | 1.0 | | |
| **3** | QLD | 1000 | M | 1.0 | 1.0 | 1.0 | | |
| **4** | QLD | 630 | M | 0.5 | 1.0 | 0.5 | | |
| **5** | QLD | 1050 | M | 1.0 | 1.0 | 0.5 | 1.0 | |
| **6** | QLD | 300 | R | 0 | 0.3 | 0 | | |
| **7** | QLD | 500 | R | 0.5 | 1.0 | 1.0 | | |
| **8** | QLD | 250 | M | 0 | 0.5 | 0 | 1.0 | |
| **9** | NSW | 550 | M | 0 | 1.0 | 0 | | |
| **10** | NSW | 150 | M | 0.4 | 0.5 | 1.1¥ | | |
| **11** | NSW | 570 | M | 0.8 | 1.0 | 1.0 | | |
| **12** | NSW | 60 | M | 0 | 0.4 | 0.6 | | |
| **13** | NSW | 900 | M | 0 | 1.0 | 0 | | 0.1 (DTC pharmacist) |
| **14** | ACT | 240 | M | 0.8 | 0.5 | 0.8 | | |
| **15** | NSW | 1976 | M | 0 | 1.0 | 0.6 | 0.5 | |
| **16** | QLD | 350 | R | 1.0 | 1.0 | 0 | | |
| **17** | NSW | 340 | R | 0 | 0 | 0 | | |
| **18** | NSW | 650 | M | 0.6 | 1.0 | 1.0 | | |
| **19** | QLD | 15 | M | 0 | 0 | 0 | | |
| **20** | QLD | 352 | R | 0.6 | 1.0 | 0.6 | | |
| **21** | NSW | 608 | R | 0 | 1.4* | 0 | | 1 (Mental Health) |
| **22** | QLD | 475 | M | 1.0 | 1.0 | 1.0 | | |
| **23** | QLD | 560 | M | 0.5 | 1.0 | 1.0 | | |
| **24** | NSW | 70 | R | 0 | 0 | 0 | | |
| **25** | NSW | 200 | R | 0 | 0 | 0 | | |
| **26** | NSW | 150 | R | 0 | 0 | 0 | | |
| **27** | NSW | 180 | R | 0.5 | 1.0 | 1.0 | | |
| **TOTAL** | | 10772 | | 10.4 | 19.6 | 13.7 | 2.5 | 1.1 |

*1.4 FTE was split between 3 hospitals in the health district

¥ 1.1 FTE comprised 0.1 FTE for the hospital and 1 FTE for the health district

** M= Metropolitan; R= Rural

## Appendix 2. Driver diagram

Reproduced from NSW Therapeutic Advisory Group (NSW TAG). Revitalising hospital evaluation of medicines use – the case for DUE. Darlinghurst NSW: NSW TAG, 2017.[8]