



**Examining the power of
Child-At-Risk electronic medical record (eMR) alerts to
share interpersonal violence, abuse and neglect concerns:
Do child protection alerts help?**

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Acknowledgement of Country

ANROWS acknowledges the traditional owners of the land across Australia on which we work and live. We pay our respects to Aboriginal and Torres Strait Islander elders past, present, and future, and we value Aboriginal and Torres Strait Islander history, culture, and knowledge.

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Examining the power of Child-At-Risk electronic medical record (eMR) alerts to share interpersonal violence, abuse and neglect concerns: Do child protection alerts help?

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It is also important to acknowledge the lives and experiences of the women and children affected by domestic, family, sexual violence and neglect, who are represented in this report. It is important to recognise the individual stories of courage, hope and resilience that form the basis of ANROWS research.

Caution: Some people may find parts of this content confronting or distressing.

Recommended support services include: 1800 RESPECT - 1800 737 732, Lifeline - 13 11 14

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Executive summary

Background

This project sought to understand the impact of a Child-At-Risk electronic medical record (eMR) alert information sharing system on the practice of staff within the Northern New South Wales Local Health District (NNSW LHD) and the perceived outcomes for women and children experiencing interpersonal violence, abuse or neglect. Additionally, information was sought to determine whether other Australian jurisdictions had similar systems in place. The first known study of its kind to date, this project helped to identify effective interventions to support children and pregnant women experiencing violence, abuse and neglect through non-violence specific service delivery within regional, rural and remote areas.

Designed to identify at-risk children and pregnant women, together with their families, the Child-At-Risk eMR alert was introduced by NNSW LHD to indicate wellbeing concerns (e.g. exposure to domestic and family violence, substance abuse, unmanaged mental illness or neglect) to health clinicians. By being alerted to this information, it is expected that clinicians can then provide an enhanced level of care to the child/woman, including early intervention to prevent further harm. The Child-At-Risk eMR alert system requires that staff who report a wellbeing concern to the New South Wales (NSW) Health Child Wellbeing Unit or the NSW Child Protection Helpline also apply a Child-At-Risk alert to the eMR of the reported child/pregnant woman. Other clinicians accessing the client/patient's eMR would then see the Child-At-Risk alert and be encouraged to take appropriate action.

Although the health impacts of violence on women in Australia are known (Webster, 2016), research has established that some women and children living in violent situations are invisible, isolated, hidden from services and face barriers preventing their access to healthcare (Wendt, Chung, Elder & Bryant, 2015). Health services, therefore, need to be able to identify victims of interpersonal violence, abuse and neglect in order to protect the human right of victims to live free from abuse; to prevent further harm; and to provide the opportunity for victims to receive treatment, heal and, in turn, maximise their quality of life. This is not always the case, as highlighted by the literature that continues to identify barriers to professionals

reporting abuse and neglect (McTavish et al., 2017; Tonmyr, Li, Williams, Scott, & Jack, 2010), despite existing guidelines and legislation designed to assist paid workers, volunteers and community members to identify and report abuse (Mathews & Bross, 2014). These barriers to reporting also mean that the sector cannot test what health practitioners are doing to support at-risk patients in lieu of, or in addition to, reporting the abuse. There is very little literature available on the effectiveness of alerts in health systems for groups at risk of interpersonal violence, abuse and neglect; hence this study is the first of its kind.

The project confirmed that many staff within the NNSW LHD are identifying and responding to victims of interpersonal violence, abuse and neglect in their day-to-day work and that the Child-At-Risk alert supplements, rather than replaces, usual care approaches. An important finding of this study was that approximately one-third of the participants reported that the presence of the alert resulted in the adaptation of their practice. In addition, these adaptations to practice were made despite constraints on time and resources.

These findings show the potential of a practice change to improve responses to victims of interpersonal violence, abuse and neglect within large organisations employing thousands of staff.

Method

This project employed a web-based survey to examine the views of staff across the NNSW LHD, and a template to record whether health departments across Australia were using a Child-At Risk eMR alert system.

Informed by the theory of planned behaviour (Ajzen, 1991) and conservation of resources theory (Hobfoll, 1989), and a search of existing literature, the survey was designed specifically to elicit health professionals' views on the impact of the Child-At-Risk eMR alert system on their practice in responding to at-risk women and children.

All health professionals in the NNSW LHD who had applied a Child-At-Risk alert to a client's eMR (Group 1) were invited to respond to a one-off web-based survey. To obtain equal groups for comparison, the same number of participants were invited to participate among staff who had not applied an alert, but had recently provided healthcare to a client who had a Child-At-Risk alert applied to their eMR (Group 2).

In addition to exploring the impact of the systematised healthcare process involving the Child-At-Risk eMR alert within the NNSW LHD setting, the study sought to understand whether other jurisdictions had a similar system in place and/or the potential to apply the approach taken by NNSW LHD to their jurisdiction. Health departments across Australian states and territories were approached to identify where similar systems were operating and what the features of those systems were.

Data analysis

One hundred and eighty (180) complete survey responses were received, representing a completion rate of 74 percent. Both groups were representative of the staffing sample with the exception of a low response rate from medical officers in Group 1. Reflective of the NSW Health workforce, a high proportion of respondents worked in nursing roles, with a smaller representation from allied health and paediatrics. As an exploratory study in a single jurisdiction, the data analysis primarily consisted of summary data on the perceptions of staff, based on their rating of the impact of the alert on client outcomes, and self-reports of confidence levels in discussing sensitive health and social topics with at-risk families.

Descriptive statistics, comprising demographic data on the respondent profile, frequencies of responses and cross-tabulations, formed the basis of analysis for this study. Responses were analysed for participants who had applied a Child-At-Risk alert to a client's eMR (n=101) and participants who had not applied a Child-At-Risk alert to a client's eMR (n=79) to explore whether there were differences in practice for staff who had applied an alert. In addition, responses to open-ended questions were analysed and the major themes emerging from this analysis were summarised. It was most

appropriate to draw comparisons between groups using non-parametric statistical tests and descriptive statistics.

Responses received from other health jurisdictions regarding their use of similar systems were reviewed and collated.

Key findings

Examination of the Child-At-Risk alert system operating in NNSW LHD shows that clinicians agreed the alert provided information that could enable a more comprehensive assessment of the child or at-risk pregnant woman (e.g. the alert provided important and easy-to-access clinical information, the alert allowed the clinician to see immediately the child/woman's child protection status) and improved communication between agencies working with the family (e.g. improved information exchange and referrals to additional services).

Participants who had applied Child-At-Risk alerts to patient eMRs (Group 1) were child and family, community health and mental health staff, whereas Group 2 staff, who were providing healthcare to clients, were doing so predominantly in the emergency department and maternity units, followed by paediatrics. This result shows the potential power of the eMR system to cross-pollinate information spanning community health settings and for that information to be accessible to acute care services such as emergency departments and maternity units. This feature was described as one of the purposes of the alert: to combine disparate pieces of information (e.g. concerns for wellbeing noted by a community health based service) and have that information accessed by clinicians in the acute care setting (e.g. emergency departments), 24 hours a day, 7 days a week.

High levels of knowledge about and agreement that the use of the Child-At-Risk eMR alert system improves practice were found across surveyed staff. Participants who had applied a Child-At-Risk eMR alert reported higher levels of knowledge about the alert system, compared to those who had not applied an alert but had seen an alert applied to a record. This suggests that there may be a relationship between the use of the system and an improved understanding of the system.

Participants who had applied an alert were also more likely to be aware of whether their peers were using the system.

The use of the Child-At-Risk eMR alert system also appeared to have a positive impact on practice. Eighty-seven percent of participants reported that when they saw an alert on the eMR of a client, they actively assessed whether referrals to additional services were necessary, and 75 percent of participants shared information with other prescribed bodies. Sixty percent of participants also reported that when they saw an alert, they tried to actively resolve barriers to appointment attendance.

Half of the participants believed that the alert allowed clinicians to see immediately the child protection status of a child or woman. Forty percent agreed that it provided important and easy-to-access clinical information, and 24 percent agreed that it facilitated improved communication with other service providers. Overall, far more participants (36.5%) felt that the Child-At-Risk eMR alert helps families, than those participants (only one, less than 1%) who felt that the alert did not help families. Thirty-three percent of participants indicated that they did not know if the alert system helped families, with the remainder not responding. This indicates that either those practitioners may not know the outcomes for children and their families, or that the practitioners see the alert more as a benefit to their own practice than for families. Around one-third (37.6%) of participants also felt that children and at-risk pregnant women are safer now that the system is in place.

Two participants (1%) reported that there had been a negative outcome due to the presence of the alert on the client's eMR, suggesting that the experience of negative client outcomes from the alerts had been small. These two participants did not state what the negative outcomes were.

A high proportion of system-users indicated they understood alert systems in general. Thirty-seven percent said they received sufficient support to help them use the Child-At-Risk alert and 34 percent agreed the alert system was easy to use. Fourteen percent of system-user participants said that the Child-At-Risk eMR alert system was hard to use.

With further regard to improving the system, future training and engagement of clinicians with the system should focus on medical officers. The number of doctors responding to the survey in Group 1 (staff who had applied a Child-At-Risk alert to a client eMR) was significantly less than expected – due to the known proportion of doctors employed in the NSW LHD who work with families experiencing vulnerability. Only two percent of participants in Group 1 identified themselves as doctors, which suggests a campaign to train and support doctors in the use of the alert system is warranted. In particular, medical officer training should be undertaken to ensure doctors are aware of the system and are using the system in their everyday interactions with families experiencing vulnerability.

Consistent with existing research, participants in this study expressed that they felt somewhat or very confident discussing a range of issues with clients, including relationship issues (80.3%), parenting behaviour (88.2%) and child wellbeing (80.9%). Participants in both groups felt that they would benefit in their practice from increased professional development and ongoing support in how to engage with families with complex needs.

Although over half (56%) of Group 1 (staff who had applied a Child-At-Risk alert to a client eMR) participants stated they needed more knowledge of the support services available for victims, and to know how to refer to those services, 61 percent also said they felt very confident in discussing referrals with clients. This result may indicate that Group 1 could have been confident in the referrals they were currently making, while also wanting *greater* knowledge of available referral pathways for clients experiencing vulnerability.

No clear differences were observed between participants located in major cities, inner regional or outer regional locations on responses to the alerts or perceived client outcomes, although this may be due to small group sizes in location groups. This was expected, and supports the notion that employing a standardised process would reduce the likelihood that some clients would receive superior care to other clients based on the resources available at the hospital or other healthcare setting where the client presented.

Most of the Australian state and territory health departments indicated that although their eMR systems had the capacity to host an alert system, this capability was not being deployed. Besides NSW, only two health departments had implemented an alert system. This is despite large-scale use of child protection alert systems in the United Kingdom, New Zealand, and in some locations in the United States. Several health departments advised that they did not have enough knowledge of the system to implement a Child-At-Risk eMR alert system.

Implications for policy and practice

Given the positive results on healthcare responses to victims of interpersonal violence, abuse and neglect highlighted by this exploratory study on the NNSW LHD Child-At-Risk eMR alert system, the system may have the potential to be adopted more widely within Australia and internationally. Also, the research findings have identified a number of key implications for policy and practice that can support improved health worker responses to clients and patients experiencing or at risk of experiencing violence, abuse or neglect nationally.

Implication 1: Research using case-file data is needed to determine direct client/patient-level outcomes from the presence of a Child-At-Risk eMR alert

Further research is needed to better understand the direct outcomes for families as a result of referrals, information sharing and the follow-up of missed appointments. Case file reviews that trace the outcomes for the family identified in the alert would strengthen evidence about the usefulness of the alert system. Examples of proxy measures for system efficacy include the uptake of referrals and health-specific family outcomes. This research should precede any expansion of the system to ensure the effectiveness of further roll-out and implementation.

Implication 2: Alert systems should be implemented using established procedures and regular staff training

The introduction of any new child protection information sharing system within an eMR must be based on established processes found within the implementation science literature. Implementation science literature describes the factors that impact successful and sustained implementation of evidence-informed practices into the everyday work of health and social service practitioners. Implementation should include ongoing training, support and other kinds of professional development for healthcare workers using the system. In particular, medical officer training should be undertaken to ensure that doctors are aware of the system and are using it in their everyday interactions with vulnerable families.

Implication 3: Features of the system should meet end-user needs

To optimise the use of the alert, healthcare workers should be consulted about its features. For example, when an alert exists on a client eMR, a “pop-up” alert or a cursor that changes shape could increase the likelihood of clinicians checking the details of the Child-At-Risk alert (thereby offsetting the need to click on the Alerts, Problems, Diagnosis tab to see the alert on the patient’s eMR).

Implication 4: Tracking staff-users should result in a greater understanding of the system’s use

Key performance measures of the alert system within health worker workflow should include tracking the number and profession of staff applying alerts. The latter would allow the monitoring of staff engagement, with the aim of improving the uptake by staff in professions not using the system. This would also help ensure follow-up each time an alert is not applied when it should have been, and assist with the design of ongoing staff training and professional development around effective identification of and response to child protection presentations.

**Implication 5:
Health workers need ongoing training and information on responding to interpersonal violence, abuse and neglect**

In addition to system-related training, the survey responses showed that participants would like more training on how to respond to individuals and families experiencing interpersonal violence, abuse and neglect. Health workers would also benefit from a better understanding of the services available to clients, and access to consultancy on child protection and domestic violence matters.

**Implication 6:
Standardised alert systems could be implemented across states and territories**

Work at a national level would help to progress discussions about the implementation of similar systems in other jurisdictions. These discussions could be led by the federal and state government agencies responsible for the National Framework for Protecting Australia's Children 2009-2020, the National Plan to Reduce Violence against Women and Children 2010-2022 or by key offices such as the office of the National Children's Commissioner. Further discussion of the use and evaluation of Child-At-Risk eMR alert systems should be carried out at national forums in order to increase knowledge dissemination and develop opportunities for implementation across health systems nationally. This work should be undertaken in parallel with further research and evaluation of Child-At-Risk eMR alert systems to help government bodies make decisions about how to optimise the system's potential.

Introduction

Public health services are uniquely positioned to respond to women and children experiencing violence, abuse and neglect and to collaborate with other agencies to prevent further harm (NSW Health, 2013; World Health Organization et al., 2006). The health service response is of further importance given statutory child protection services are only able to provide a face-to-face response to a proportion of the families eligible for their services. For example, the publicly available statutory child protection agency caseworker dashboard data (NSW Department of Family and Community Services, 2018) shows that only approximately 30 percent of those clients who meet the criteria for a statutory response receive a face-to-face assessment by the statutory child protection agency. Therefore, the non-statutory service sector should respond every time they have the family in front of them. Further, 64 percent of clinical decision support tools (in a review of 100 published trials), including alerts and reminders, have been shown to improve clinical decision-making (Garg et al., 2005). Therefore, exploring the potential positive effect of alert systems for the large-scale public health issue of responding to interpersonal violence, abuse and neglect is needed.

Further to the definition in the National Plan to Reduce Violence against Women and Children 2010-2022, and acknowledging there is “no universally accepted definition of domestic violence” (Campo, 2015; Tomison, 2000), interpersonal violence, abuse and neglect in this study is limited to the circumstances that place a child or young person at risk of significant harm according to s. 23 of the *Children and Young Persons (Care and Protection) Act 1998* (NSW) or when the child is the subject of a prenatal report under s. 25 of the Act. These are the circumstances in which health professionals would be required by NSW law to report children at risk. According to the Act, a child is at risk when any of the following conditions are met:

- a. the child’s or young person’s basic physical or psychological needs are not being met or are at risk of not being met;
- b. the parents or other caregivers have not arranged and are unable or unwilling to arrange for the child or young person to receive necessary medical care;
 - b1. in the case of a child or young person who is required to attend school in accordance with the *Education Act 1990* – the parents or other caregivers have not arranged

- and are unable or unwilling to arrange for the child or young person to receive an education in accordance with that Act;
- c. the child or young person has been, or is at risk of being, physically or sexually abused or ill-treated;
- d. the child or young person is living in a household where there have been incidents of domestic violence and, as a consequence, the child or young person is at risk of serious physical or psychological harm;
- e. a parent or other caregiver has behaved in such a way towards the child or young person that the child or young person has suffered or is at risk of suffering serious psychological harm; or
- f. the child was the subject of a prenatal report under s. 25 of the *Children and Young Persons (Care and Protection) Act 1998* and the birth mother of the child did not engage successfully with support services to eliminate, or minimise to the lowest level reasonably practical, the risk factors that gave rise to the report.

The need to identify child victims or those at risk of interpersonal violence, abuse and neglect is even more acute because pre-verbal and non-verbal children have either no, or limited, ways of disclosing that they are a victim of abuse. There is, therefore, a need for a system with the capacity to transmit this information on the infants’ behalf to help prevent further abuse to these children. Research shows that even when a child has been reported and the matter has been investigated but not substantiated by the statutory child protection agency, 81 percent of those children were re-reported and of that 81 percent, almost 66 percent of reports were substantiated (Jedwab, Harrington, & Dubowitz, 2017). This indicates that children can remain at risk even after being screened out by the statutory child protection agency. Healthcare settings are regularly frequented by families, ranging from emergency department visits for injury-related healthcare, infection admissions and parental health issues, through to presenting the child for regular and appropriate healthcare where the presentation is not related to abuse or neglect (O’Donnell et al., 2010). These presentations all provide health workers with opportunities to respond to violence, abuse or neglect.

However, within hospital settings, cases of child abuse and neglect are not always properly documented (McKenzie & Scott, 2012) and not all victims of interpersonal violence, abuse and neglect will advise, or be able to advise, healthcare workers of a direct injury to document. For example, in a retrospective study containing 36 children with injuries sustained from domestic violence and seen by child abuse paediatricians in the US, almost half (44.4%) of the children “had no report of direct injury, a report of a mechanism that did not explain the identified injuries, or a report of trauma without a specific mechanism” (Tiyyagura, Christian, Berger, & Lindberg, 2018, p. 136). Mechanism of injury refers to the way in which an injury was sustained, for example by direct hit, being dropped or burned (Christian, Scribano, Seidl, & Pinto-Martin, 1997). These findings underscore the importance of healthcare providers undertaking comprehensive assessments of families presenting at their services. This assessment is also important because when women and children do overcome these barriers and present to health services, the “first responders” have the opportunity to provide them with support (ANROWS, 2014, p. 25).

Health services are large, complex organisations and are therefore reliant on systematised processes to order their work and record their activity. A shared electronic medical record (eMR, also known as the electronic healthcare record, electronic patient record or computerised patient record), allows a detailed longitudinal view of the healthcare delivered to a patient (Tomines, Readhead, Readhead, & Teutsch, 2013). The eMR also provides an opportunity to illuminate pertinent information to each treating clinician via the use of “alerts”.

The eMR stores vast amounts of patient information, and crucial information can become buried in the record. Employing an alert system to flag a specific concern for a patient, regardless of what the current presentation is for, is a way of sharing information between a multitude of individual clinicians across service streams without relying on verbal or email communication. For example, it is not uncommon for medical officers and paediatric therapists in speech therapy, occupational therapy, social work, child and family health nursing, and mental health to provide healthcare to the same patient.

Information sharing helps children at risk

Information sharing is relied upon worldwide in an attempt to prevent further harm to those experiencing or at risk of experiencing interpersonal violence, abuse and neglect (Adams & Lee-Jones, 2017; Munro, 2011; Thompson, 2013; Wood, 2008). This is evidenced by information exchange provisions embedded in child protection legislation. For example, in NSW, Australia (where this study took place), Chapter 16A of the *Children and Young Persons (Care and Protection) Act 1998* both permits and requires prescribed bodies to share information relevant to the safety, welfare and wellbeing of unborn children, children and young people. This includes the release of information relating to anyone who is deemed a significant other in the child/young person’s life (e.g. parent, carer or extended family member).

Interagency information exchange is one component of the suite of tools used to try to prevent further harm to victims of interpersonal violence, abuse and neglect. However, there has been little attention paid to how large, complex, decentralised organisations, with disparate client/patient databases and information management systems, organise the sharing of interpersonal violence, abuse, and neglect information within that same organisation. This study aimed to examine this in one such service within NSW Health.

NSW Health is the largest public health provider in Australia (NSW Health, 2016). Comprising 17 local health districts and speciality networks, NSW Health delivers health services across NSW on the east coast of Australia. An extensive array of services are provided to its patients and clients, from acute care treatment in hospital facilities, to community-based care where health professionals provide outreach clinics and home visits. Services are delivered to people who have experienced interpersonal violence, abuse and neglect, including in the form:

- of domestic and family violence routine screening;
- hospital and counselling responses; and
- priority programs, such as Aboriginal family wellbeing and violence prevention, sexual assault, child protection, therapeutic services for children and young people aged

10 to 17 years who have engaged in harmful sexual behaviours towards others, and family referral services (NSW Health, 2017).

Child-At-Risk eMR alert information sharing system

Promoting child wellbeing, and identifying and responding to victims of interpersonal violence, abuse and neglect are considered core business for health services (NSW Health, 2013; O'Donnell et al., 2010; World Health Organization et al., 2006). However, according to multiple studies, recording the barriers to identifying and responding to victims of interpersonal violence, and detecting and documenting child abuse and domestic violence concerns remains a challenge for health professionals (Bailhache, Leroy, Pillet, & Salmi, 2013; Bunting, Lazenbatt, & Wallace, 2010; Foster, Olson-Dorff, Reiland, & Budzak-Garza, 2017; Lewis, Greenstock, Caldwell, & Anderson, 2015; Louwers, Affourtit, Moll, de Koning, & Korfage, 2010; McKenzie & Scott, 2012; Tonmyr et al., 2010). Factors proposed to impact on the ability to detect victims of abuse attending healthcare services include: constraints on health practitioners' time to assess and identify risk; a high volume of patients, leading to crowding; provision of healthcare to families who have not previously attended the health facility; health practitioners assessing that the mechanism of the injury is consistent with the explanation provided; and denial by victims of the occurrence of intimate partner violence (Ben Natan, Faour, Naamhah, Grinberg, & Klein-Kremer, 2012; Beynon, Gutmanis, Tutty, Wathen, & Macmillan, 2012; Diderich et al., 2015; Louwers et al., 2014; Louwers, Korfage, de Koning, Affourtit, & Moll, 2012; Turner et al., 2017; Visscher & van Stel, 2017).

The Child-At-Risk eMR alert system requires that staff who report a wellbeing concern to the NSW Health Child Wellbeing Unit or the NSW Child Protection Helpline also apply a Child-At-Risk alert to the eMR of the reported child/pregnant woman. Other clinicians accessing the client/patient's eMR would then see the Child-At-Risk alert and be encouraged to take appropriate action. Treating clinicians were encouraged (in both training and via instructions in the NNSW LHD Child Protection User Guide) to discuss

the needs of the patient/family with the patient and with their colleagues (if necessary) to ascertain what support services the patient could be referred to and make those referrals. These services could be internal health services or external services to assist with the presenting problem/issue. Clinicians were also encouraged to consider whether there was information they could provide to another service under Chapter 16A of the *Children and Young Persons (Care and Protection) Act 1998* to enable another agency to provide a service to the patient; and to assertively follow up missed healthcare appointments by the child or woman.

In the past three years since the system's implementation, 2400 alerts have been applied to patient records by 144 staff. On the surface, this indicates clinicians have engaged with the system and are using it. Inclusive of managerial staff, 1100 staff were trained to use the system, and ongoing training of frontline staff continues, with the goal of increasing the number of staff using the system.

The next section of this report describes the findings of a systematic literature search on child protection and domestic violence eMR alert systems and identifies the paucity of published evaluations on this topic, thereby establishing the state of knowledge about these systems.

State of knowledge review

The information presented in this section is an abridged version of the State of Knowledge review. More details pertaining to the international models identified in the literature review can be found in Flaherty et al. (forthcoming).

Using the eMR to enhance the response to interpersonal violence, abuse and neglect

A preliminary Google search of the term “child protection electronic alert system”¹ revealed that child protection alert systems are operating in at least one site in five countries. The sites/countries identified were: Northern NSW, Australia (Agency for Clinical Innovation, 2017); New Zealand (Frasier, Kelly, Al-Eissa, & Otterman, 2014); England, United Kingdom (UK) (Low, 2016); Pittsburgh Children’s Hospital, Pennsylvania, United States (US) (Berger et al., 2017); and the Children’s Hospital of Eastern Ontario, Canada (Children’s Hospital of Eastern Ontario, 2017). Regarding domestic violence alerts, a Google search using the term “domestic violence electronic alert system”² revealed only those alert systems that were unrelated to the eMRs of victims.

A systematic search of the literature regarding the use of child protection and domestic violence alerts in electronic medical records was then conducted, which informed the methodology and discussion of findings of the web-based survey study conducted with staff in the NNSW LHD, with a focus on implications for practice.

The search strategy was developed using common terms for child abuse and domestic violence, coupled with the eMR search terms used by Boonstra, Versluis and Vos (2014) to locate literature on the implementation of eMRs. Depending on the search fields available for each of the databases, a combination of Subject, Title, Keyword and All Text fields were searched using the terms (child OR unborn OR woman OR patient) AND (welfare OR protection OR abuse

OR maltreatment OR safeguarding OR at-risk OR “spouse abuse” OR “domestic violence” OR “family violence” OR “intimate partner violence”) AND alert AND (“electronic health record” OR “electronic medical record” OR “electronic patient record” OR “computer* patient record” OR system). The search was conducted for literature published between January 2000 and February 2018.

The key databases and journals searched were: ACM Digital Library, The Cochrane Library, Embase, IEEE Xplore[®] Digital Library, Health and Society, Medline, PsychINFO, Scopus, Social Science Database, British Journal of Healthcare Computing, Journal of the American Medical Informatics Association, and SAGE Journals (database). The search strategy included any type of publication (e.g. articles, media releases, applied research papers or efficacy studies) describing child protection and domestic violence eMR alert systems.

The systematic search strategy identified 1096 articles. From those 1096 articles, 346 duplicates were removed and 131 records were excluded for being published prior to 2000, not being in the English language, or due to publication type (book chapters). The remaining 619 articles were screened by title and abstract against the inclusion/exclusion criteria by two members of the research team. Of the 619 remaining articles, 598 were excluded for not being relevant to child protection or domestic violence, for being relevant to child protection or domestic violence but not to an eMR, or due to publication type. Twenty-one articles were retained and examined at the full text level, and a further 17 articles were excluded from these 21 articles. Reasons for exclusion of the 17 articles included that they were not related to eMRs, were not related to child protection or domestic violence, contained insufficient details for data extraction, or were “letter to the editor” style articles. Four articles were retained in the review (Anonymous, 2015; Berger et al., 2017; Dean, 2015; Low, 2016). A manual search of the reference lists of the four retained articles did not identify any additional articles for consideration.

To date, there has been limited assessment of the impact of eMR alert systems on practice in responding to at-risk women and at-risk children. The literature identified that this would be the first study of its kind, contributing to the knowledge

1 The search term “child protection electronic alert system” was an indicative search. More results could be identified using alternate search terms.

2 The search term “domestic violence electronic alert system” was an indicative search. More results could be identified using alternate search terms.

base regarding the effectiveness of such interventions in the prevention of violence, abuse and neglect. The findings of the systematic review of the literature included four publications regarding existing child protection alert systems in England and the US. Three articles described The Child Protection – Information Sharing (CP-IS) System in England and how information technology systems from separate health and child protection departments were linked to enable practitioners from health services to see that a child or at-risk pregnant woman had a child protection plan, and for child protection practitioners to see that their client had visited an unscheduled healthcare setting.³

The remaining article reported the results of a clinical trial of the Clinical Decision Support Child Physical Abuse eMR-based alert system in Pittsburgh (US). Under this system, the treating clinician would be automatically alerted electronically to the possibility of physical abuse if the clinician had entered certain disease codes and orders (for medical tests) into the patient’s eMR.

These two systems appear to be the only systems described in published papers informing the state of knowledge on the topic of the use of child protection alerts in eMRs. Both systems are different from each other, and different from the NNSW LHD alert system. Therefore, their relevance to the Australian context is limited due to this variance in the features of the different systems.

The Child Protection – Information Sharing System (England)

The CP-IS System was implemented in February 2015 across multiple hospital sites in England (Anonymous, 2015). The implementation budget has been reported to be £7 million, and it was expected that by 2018 more than 80 percent of the 1200 “unscheduled” care settings in England would be using the CP-IS alert system (Dean, 2015). At the time of publication of this report, implementation was still underway. The rationale for the system’s implementation arose from a review

of serious cases that found child victims of abuse and neglect were likely to be moved across the statutory child protection boundaries (Dean, 2015). The system links data between the health department and the statutory child protection system (local authorities) via the NHS National Spine, with an aim to help doctors and nurses identify children experiencing abuse and neglect (Anonymous, 2015). The National Spine is the NHS’s online platform IT infrastructure.

Clinical decision support child physical abuse eMR-based alert (Pittsburgh, US)

The systematic literature search regarding the use of child protection and domestic violence alerts in eMRs found one scientific study into the efficacy of a child physical abuse eMR clinical decision support alert system operating in one hospital in the US. Clinical decision support systems alert clinicians to pertinent information at the point of care by “using computerized databases to match individual patient characteristics and clinical data to existing knowledge about diagnostic findings and treatment guidelines” (Koposov et al., 2017, p. 1310). The child physical abuse eMR-based clinical decision support alert system was designed to alert study personnel to the possibility of a patient being a victim of physical abuse. The alert system comprised 30 age-specific triggers embedded into the eMR, which was used by the clinician as per usual when they were recording patient care. The algorithm running in the background of the eMR system would recognise the disease codes entered and medical tests ordered by the clinician and activate a trigger alert, indicating the child could possibly be a victim of physical abuse.

Efficacy of international alert systems

While alert systems have been utilised in countries such as New Zealand (Fanslow, Kelly, & Ministry of Health, 2016) and more recently via a large-scale implementation of the CP-IS system in England (Lewis et al., 2015; Low, 2016), the systematic literature search showed that the peer-reviewed published evidence for the efficacy of these systems is limited. These results identify that there is a paucity of research in the area of eMR child protection and domestic violence alerts, and it is unable to be determined whether that is due to a

³ Unscheduled healthcare settings are defined by the National Health Service (NHS), England, as services where any unplanned contact with the NHS occurs by a person requiring or seeking help, care or advice, including urgent and emergency care.

lack of such alert systems operating in practice, or a lack of the published evaluation of such innovations.

The UK government reports that the CP-IS alert system has been enthusiastically received in England via “widespread stakeholder support from professional health and social care organisations...both nationally and locally” (Low, 2016, p. 295). However, the evidence is still lacking to transform child protection eMR alert systems from good ideas that clinicians and governments embrace into initiatives that establish the alert’s positive impact on service responses to at-risk clients/patients.⁴ Evaluation of the impact of such systems may indicate that child protection eMR alert systems are having no impact on clinical decision-making or on outcomes for victims of interpersonal violence, abuse and neglect. Due to the limited literature on this topic, this project aimed to contribute to the international evidence base on the use of child protection alerts in eMRs.

⁴ Patient is the term typically used when referring to information contained in an eMR. Client is the term used hereafter to identify either a client or patient, as the term “client” is more inclusive and better reflects the service-users of community health and outpatient clinics who are not inpatients of a hospital.

The current study

To date, much research has explored tertiary responses and the intersection between child protection agencies (statutory and non-government) and family violence services (refuges, homelessness services, shelters) responding to risk. The current study aimed to examine the impact of a Child-At-Risk information sharing system on staff practices in responding to women and children experiencing violence, child abuse and neglect. It focused on the internal workings of a large and complex agency, NNSW LHD, where the scale, breadth and depth of services offered can be a barrier to providing a seamless response to women and children.

NNSW LHD seeks to, firstly, inform its clinicians of all relevant information when they provide a health service to a client; and, secondly, to have that information at the clinicians' fingertips to enable them to intervene as early as possible and, where possible, prevent further harm. The alert system achieves these two aims by firstly bringing disparate pieces of information together, and secondly by presenting this information in the eMR, which is available to clinicians 24 hours a day, 7 days a week. However, for eMR alert systems to be effective, they need to positively impact clinicians' behaviour.

As part of this project, in 2017 and 2018, two groups of NNSW LHD staff were surveyed on the impact of the Child-At-Risk eMR alert information sharing system on their practice in responding to violence, abuse and neglect of women and children. These groups included people who had applied an alert (Group 1), and those who had not applied an alert, but had recently provided healthcare to a client who had a Child-At-Risk alert applied to their eMR (Group 2).

Methodology

Case study

To understand the impact of a Child-At-Risk eMR alert information sharing system on outcomes for women and children, a case study was conducted, examining the Child-At-Risk alert system applied to the eMR of children and at-risk pregnant women reported to the NSW Health Child Wellbeing Unit or the NSW Child Protection Helpline.

Study site

The site of this study, the Northern New South Wales Local Health District (NNSW LHD), is located in northern New South Wales (NSW), Australia, and had an estimated resident population of 288,241 in 2011. As a public health organisation of approximately 6900 staff, NNSW LHD has a chief executive and board of management who govern the organisation. In 2015, NNSW LHD's board of management endorsed the chief executive's decision to implement an eMR alert system for children and pregnant women who were at risk of interpersonal violence, abuse or neglect. NSW Health requires a standardised alert or "file flagging" system to be in place in every local health district as stated in policy directives *Health Care Records – Documentation and Management* (NSW Health, 2012a, p. 8) and *Child Wellbeing and Child Protection Policies and Procedures for NSW Health* (NSW Health, 2013, p. 15). However, NNSW LHD is the only local health district in NSW with a comprehensive alert system in place. This is the Child-At-Risk eMR alert.

The Child-At-Risk eMR alert is situated within the Cerner Millennium® eMR system. Cerner Millennium® is the eMR platform that NNSW LHD uses to manage client information. When an "alert" is built within the Cerner Millennium® eMR system, a trigger notification rule can be set for that alert. This trigger rule enables an email notification to be automatically generated each time a client with that specific alert is admitted to a healthcare facility. In NNSW LHD, trigger email notifications have been set on the Child-At-Risk eMR alert. Cerner Millennium® eMR also provides detailed data reports on alert types in order to govern the application, review and removal of alerts on client eMRs.

The Child-At-Risk eMR alert system was designed to mobilise a response to clients each time the health professional had the client/patient in front of them, rather than simply to "identify" and "report" child protection concerns to the statutory child protection agency.

Research questions

To address the main research question of "What is the impact of using a Child-At-Risk eMR alert information sharing system on health professional practice?" the following sub-questions were explored:

1. What was clinicians' understanding of the alert system? Did they agree that the alert system helped improve responses to at-risk women and children?
2. To what extent did seeing an alert on a woman or child's record result in discussing referrals, sharing information or assertively following up missed appointments?
3. What client outcomes were described as resulting from clinicians' use of the alert system? When clinicians noted the Child-At-Risk alert on the eMR, what did they decide to do or not do? How did seeing the alert change their practice?
4. Did responses differ between metropolitan and rural health facilities?
5. What helped or hindered any response to women and children? What supported staff to act? What were the barriers/challenges?
6. What were the gaps in worker confidence in responding to at-risk women and children?
7. What else do health workers need to improve responses to at-risk women and children?
8. Are other health jurisdictions in Australia using an eMR child protection alert? If so, what are the features of those systems? If not, what are the reasons for not having a system in place?

Hypotheses

Based on previous research conducted in the child protection and domestic violence fields on barriers to responding holistically to clients and patients in the healthcare system, as well as the literature on the use of alert systems within the eMR record for other problems, the research team hypothesised that the presence of the alert would:

- result in clinicians discussing referrals, sharing information and assertively following up missed appointments;
- result in clinicians identifying client outcomes from the use of the alert system; and
- mitigate any procedural variation between metropolitan and rural health staff's practice, due to the systematised process of the alert operational procedure.

Furthermore, by surveying a purposive sample of staff who were working directly with clients who had experienced interpersonal violence, abuse or neglect clinicians would:

- identify what helped and hindered healthcare responses to women and children who have experienced interpersonal violence, abuse or neglect – consistent with existing literature on this topic; and
- reveal levels of worker confidence in discussing difficult issues to be similar to those levels found in the published literature.

Survey instrument

In order to answer the research questions, a questionnaire was designed to elicit health professionals' views on the impact of the Child-At-Risk eMR alert system on their practice in responding to at-risk women and children. Health professionals in NNSW LHD were invited to respond to a one-off electronic survey designed specifically for this study.

Survey methodology is a well-established research design (De Vaus, 2002) to elicit the views of staff in relation to child protection. It has also been used extensively to survey staff on reporting behaviours (identifying children at risk of abuse and neglect, and reporting those children to the statutory child protection agency) (Foster et al., 2017; Raman, Holdgate,

& Torrens, 2012; Walsh & Jones, 2015). This study's survey was developed based on items identified in the literature to measure: change in practice (based on the three policy requirements of the system: considering additional referrals, sharing information with other agencies and overcoming barriers to attending appointments); barriers and enablers to responding to wellbeing concerns; and levels of worker confidence when dealing with issues commonly expressed by families experiencing vulnerability (e.g. difficulties with parenting, securing stable housing, legal issues).

Theoretical framework informing survey design

The development of the survey was informed by two theories: the theory of planned behaviour (Ajzen, 1991); and conservation of resources theory (Hobfoll, 1989). These theories are useful in this context because existing literature regarding the use of eMR alerts reveals that there are a number of critical mechanisms influencing the uptake, continued use and effectiveness of alerts in eMRs (Ajami & Arab-Chadegani, 2013; DesRoches et al., 2013). Two of these mechanisms are: 1) staff's planned behaviour, best explained through the theory of planned behaviour (Holden, 2011); and 2) staff's natural proclivity to conserve resources in a high-stress environment where there are competing priorities, complex client presentations (Ancker et al., 2017), time constraints, and a continuous cycle of innovation in healthcare driving efficiencies, conceptualised by the conservation of resources theory (Rathert, Porter, Mittler, & Fleig-Palmer, 2017).

Theory of planned behaviour

There are various types of eMR alert, such as alerts for medication, allergy, advanced care directive, social alert (e.g. a security risk), infection risk or immune-compromised clients. Within the context of the impact of any type of eMR alert on the behaviour of the clinician providing healthcare to that client, the motivations behind the expected behaviour of clinicians need to be considered. Theory of planned behaviour (Ajzen, 1991) holds that human behaviour is based on: beliefs the person has about the consequences of engaging in the expected behaviour; beliefs the person has about whether the behaviour they may engage in is considered the norm

by their peers; and beliefs about the factors that may help or hinder performance of the behaviour. These beliefs are then theorised to result in a:

- a. positive or negative attitude towards the behaviour (e.g. applying a Child-At-Risk alert to an at-risk child's or at-risk pregnant woman's eMR, and consideration of further referrals, information sharing and overcoming obstacles to appointment attendance upon seeing a client who already has a Child-At-Risk alert applied to their eMR);
- b. perceived level of peer engagement with the behaviour, or the subjective norm (e.g. a health professional assessing if applying and responding to alerts is "the done thing", how colleagues are engaging or not engaging with the system, the level of managerial support for the use of the system); and
- c. the perceived level of control the person feels they have over the behaviour. In this case the behaviour being that of applying and responding to Child-At-Risk alerts (e.g. the health professional having access to instructions on which buttons to press to apply the alert, having time to apply the alert, knowing what to do if they see an alert on the eMR of a client).

Together, these three aspects form a health professional's "behavioural intention" to act in a particular way. According to the theory of planned behaviour, if the health professional's attitude towards the behaviour is positive, and peers are performing and supportive of performing the behaviour, the more likely it is that the health professional will intend to behave in that way also. Then, if the health professional has a satisfactory level of control over the behaviour (i.e. having the resources to do the behaviour) the health professional will perform the behaviour as they intended to when the situation next arises (i.e. apply and respond to a Child-At-Risk eMR alert).

Conservation of resources theory

Attitude, subjective norm and intention factors impact on the conduct of behaviour; however, it is well known that there are significant demands on health systems, which might also influence these factors. Due to the finite resources available (e.g. physical resources such as equipment, instruments and

access to technology; and personal levels of competence and energy), the acceptability, implementation and sustained use of any systematised process within health services require clinicians to conserve scarce resources. Therefore, conservation of resources is always front and centre in decision-making when it comes to adopting a new behaviour or complying with a new system.

Conservation of resources theory of stress proposes that perceived levels of loss of resources and anticipated reduced capacity in light of the loss results in stress, strain and burnout (Hobfoll, 1989). Health professionals in acute care and community health services face significant constraints on the time that staff can afford to the assessment of and response to psycho-social needs of clients. Not only is time a constraint, but shift-work, staff changes and breakdowns in communication in the transference of key pieces of information about the client potentially contribute to deficient clinical information being available to all treating clinicians. Despite these challenges, health professionals also assess the impact of the resources required to accommodate a change in practice, to improve this situation. Usually, a change in practice requires health professionals to complete another step, or additional work, to deliver improved healthcare to a client.

The extra step, or additional work, required with the implementation of the Child-At-Risk eMR alert was that clinicians needed to manually apply the alert in the client eMR after reporting the client to the NSW Health Child Wellbeing Unit or the NSW Child Protection Helpline. The application of the alert to the client eMR increased workload. The increased workload could have been perceived by clinicians as a loss of resource (time) to attend to other competing priorities (loss of capacity) in their department. Further, regarding responding to a client who had a Child-At-Risk alert on their eMR, there was a new requirement that clinicians take the extra time to deliberately consider: additional referrals for the client, information sharing with other agencies and how to overcome barriers to attendance at healthcare appointments. Conservation of resources theory also proposes that while staff may understand the logic of a workplace change, the resource gained as a consequence of adopting the new behaviour, system or change in practice

may not be substantive enough to reduce the stress associated with the initial perceived loss of resources (Alvaro et al., 2010).

Together, the theories of planned behaviour and conservation of resources provided an integrated theoretical framework for construction of a survey within which to explore: health professionals' attitudes towards and perceptions of value of the Child-At-Risk eMR alert system; aspects of clinicians' behavioural compliance with the alert procedure; and resources available to operate the system.

Social desirability response bias

Social desirability response bias has been defined as “the tendency for people to present a favourable image of themselves on questionnaires” (van de Mortel, 2008, p. 40), in turn leading to errors in the estimation of the strength of the relationship between the variables measured (underestimation, overestimation or no relationship).

It was anticipated that social desirability response bias would need to be considered when structuring the survey questions and in data collection and analysis to reduce the over-reporting of socially desirable responses and avoid the under-reporting of negative outcomes. This was considered to be of importance due to the nature of the research where the organisation (NNSW LHD) was seeking to understand the impact of the alert system that the organisation itself had implemented. Social desirability response bias can be reduced by allowing respondents to anonymously respond, not cueing respondents on the expectations of the researcher by framing questions and statements in a way that implies a socially desirable response is required, neutral questions (question wording and context), and including a social desirability scale within the survey (King & Bruner, 2000; Krumpal, 2013).

A number of these well-documented techniques for reducing social desirability bias were incorporated into the survey construction. For example, participants were invited to respond voluntarily and anonymously to the survey and advised that non-participation would not affect relationships with any staff of NNSW LHD. The survey incorporated

negatively worded statements as response options, such as “There was a negative patient outcome due to the presence of the alert on the patient's eMR”, to create an authorising environment to provide negative feedback on the system. Some questions commenced with neutral or positive fixed response options, and others commenced with negatively framed fixed response options. Participants were explicitly advised that data would be collected from SurveyMonkey by the research partner (Australian Centre for Child Protection) not the chief investigator who worked for NNSW LHD. Additionally, participants were advised that the survey questions were exploratory, looking at the effect of the alert system on staff's behaviour. They were also informed that there were no right or wrong answers, and that researchers were simply seeking feedback on the staff's experiences of the system and on what they believed the system offered to respond to and prevent further interpersonal violence, abuse or neglect.

Survey questions

Informed by the theoretical framework and giving consideration to social desirability response bias, the survey was built in SurveyMonkey and was designed to take no longer than 15 minutes to complete. Containing 27 questions (see Appendix A), the survey included response formats such as fixed response options, Likert-type rating scales and free-text space for comments.

The first ten questions asked for demographic and employment information, including participants' profession, work or program area, the type of healthcare most frequently provided, and the age group they typically worked with the most. The next questions asked about knowledge of the alert system; client outcomes related to the presence of the alert; and the three policy requirement measures of assessing needs for further referrals, information sharing and overcoming barriers to attendance at healthcare appointments. The questions directly tested whether these three care-enhancing actions were being considered and actioned by staff.

Factors helping and hindering responses to at-risk children and at-risk pregnant women were then explored, along with

practitioners' confidence in discussing issues relating to: parenting needs, maltreatment, social issues (such as financial, housing, legal and transport problems) and cultural-specific needs. The last questions probed participants about what they needed to enable them to respond better to victims of interpersonal violence, abuse and neglect; and about their views on the usefulness or otherwise of the Child-At-Risk eMR alert system.

Participant recruitment

The survey was conducted from November 2017 to January 2018. The way in which clinicians were identified for participation in the case study is explained below.

Eligibility criteria

Two groups of participants were recruited for this study. NNSW LHD health professionals were eligible to participate if they had applied a Child-At-Risk alert to the eMR of a child or at-risk pregnant woman (Group 1), or if they had recently provided healthcare to a client who already had a Child-At-Risk alert applied to their eMR (Group 2).

Participants were excluded from Group 1 if they had **not** applied a Child-At-Risk alert to a client eMR, and were excluded from Group 2 if: a) they **had** applied a Child-At-Risk alert to a client eMR; and b) if they had not recently provided healthcare to a client who had a Child-At-Risk alert applied to their eMR.

Sampling methods

Group 1

Group 1 participants were identified through the Patient by Alert Report (PC 021 Report) within the eMR. This report provides the name, designation and location of the staff member who applied the Child-At-Risk alert to the client eMR. Potential participants for Group 1 were a known quantity as the Cerner Millennium[®] eMR system records the health professional's login detail (name, service location – e.g. child and family, social work, emergency department) at the time

the health professional applies the alert to the client's eMR. The PC 021 Report is generated in a Microsoft Excel spreadsheet file (CSV) and the names of staff who have applied the Child-At-Risk alert appear in column O. Data in column O was then extracted into a separate spreadsheet that became the potential participant list for Group 1 – i.e. clinicians who had applied a Child-At-Risk alert to the client eMR.

Group 2

Group 2 participants were identified by the trigger email notification. Once a trigger email notification (indicating a client who had a Child-At-Risk alert on their eMR had been admitted to an NNSW LHD facility) was received by the NNSW LHD Child Protection Service, the details of the primary clinicians who provided healthcare at that admission were obtained from the eMR. Clinicians were listed according to the order in which each client presented for healthcare and contacted in that order until the same number of clinicians as Group 1 was obtained.

To maximise the opportunity to recruit enough participants, the Dillman method (Dillman, 2007) of engaging participants in surveys was employed. Dillman suggested up to five participant engagement steps:

1. potential survey respondents are primed to expect the survey link to arrive soon via a pre-notice telephone call or email;
2. the survey link is emailed, individualising each message to the potential survey respondent;
3. one week after emailing the survey link, the respondent is thanked (via email) for considering participation;
4. another email with the survey link is sent; and
5. a final contact email is sent, thanking the recipient and advising of the date the survey will close.

Responses were collected between November 2017 and January 2018.

Sample size

One-hundred percent of staff who had applied a Child-At-Risk alert to a client's eMR were included in Group 1, determining

the required number of participants for each group. To obtain another group for comparison, an equivalent number of staff who had not applied a Child-At-Risk alert, but had recently provided healthcare to a client who had a Child-At-Risk alert applied to their eMR, were also invited to participate. Staff who had recently provided healthcare to a client who had a Child-At-Risk alert applied to their eMR (Group 2) were selected by contacting clinicians, listed in chronological order according to when they provided healthcare to a client, until the same number of staff was obtained as Group 1.

For Group 1, 121 NNSW LHD staff who had applied a Child-At-Risk alert to a client's eMR were invited to participate.

For Group 2, 153 NNSW LHD staff who had recently provided healthcare to a client who had a Child-At-Risk alert applied to their eMR, but who had not applied an alert, were invited to participate.

Group 1 participants were invited to participate using the Dillman method. The principal chief investigator telephoned the potential participant to advise how the participant had been identified (that they had applied a Child-At-Risk eMR alert to a client eMR), that the research had received ethical approval, and that they would receive an email inviting participation in the survey. Potential participants were then emailed the link to the survey. Two more emails were sent at weekly intervals to the participant, one as a reminder and one thanking them in advance for their participation.

Group 2 participant recruitment commenced with telephone calls to potential participants to introduce the study, and ask if the clinician would like to participate, or did they need more time to consider, or if the clinician would like to set a convenient time for the chief investigator to call back. The preferred method of contact, nominated by potential participants, was via the email link. Several impediments to being able to talk directly with participants to explain the study verbally included possible participants being located in busy clinical settings, having limited time to conduct administration work (including telephone calls), or working night shifts (contrasting to the research team who did not work night shifts); the recruitment occurring over the

Christmas and New Year holiday season, meaning several potential participants were on recreational leave; and a high percentage of locum and visiting medical officer participants whose rosters were sporadic rather than fixed.

Emails to potential participants advised how they had been identified (that they had recently provided healthcare to a client who had a Child-At-Risk alert on their eMR – known due to the email trigger rule), that the research had received ethical approval, and that the email contained the link to the survey. The survey for Group 2 was identical to the survey for Group 1; the “group” was sorted (for statistical analysis) by the participant's answer to Question Two: “I have applied a Child-At-Risk alert to the eMR of a patient or client”. Group 1 participants answered “yes” to Question Two, and Group 2 participants answered “no” to Question Two. As per Group 1, two more emails were sent at weekly intervals to the potential Group 2 participants.

A spreadsheet containing the dates of emails and telephone calls to potential participants was maintained to guarantee the fidelity of the use of the Dillman approach, and to avoid repeat contact with health professionals in Group 2. Without this measure in place for Group 2 participants, repeat invitations (as opposed to a single invitation) to participate in the study could have occurred. For example, a clinician may have been in Group 1 (having applied a Child-At-Risk alert to a client eMR) while at the same time having provided healthcare to several clients who already had a Child-At-Risk alert applied to their eMR – therefore also qualifying to be a possible Group 2 participant. For example, a physician or social worker in an emergency department may have applied Child-At-Risk alerts to client eMRs and may have also provided care to other clients who had an alert already applied to their eMRs.

Health department consultation

As NNSW LHD was the sole site of the study, other jurisdictions were approached for information on similar systems operating in their area and/or the potential applicability of the NNSW LHD system to their context. This information was collected to provide a national picture of which health departments

were using eMR alerts for children or women experiencing violence, abuse or neglect. The list of agencies was generated by checking the public websites of health departments across Australian states and territories. Telephone calls to these contacts were made, confirming details of the appropriate person to whom correspondence should be sent. Confirming the correct contact persons for health departments continued over a period of three weeks. A list of the agencies approached is contained in Appendix B.

Health departments were sent a letter introducing the study and requesting they complete a simple response template (see Appendix C). The template asked if the health department had a child protection or a domestic violence eMR alert system in place. If so, the health department was asked about the features of the system, and if not, they were asked why such a system had not been considered.

Health departments were sent up to three reminder emails regarding the request for information. Read receipts were attached to each email in order to confirm that the recipient received the email. Telephone calls from health departments to the principal chief investigator of the study were also received. During these telephone calls, departmental representatives confirmed that the research team would be receiving a response to the request for information, or that the departmental representative had forwarded the request to another departmental staff member/committee to respond.

Ethical considerations

Ethics approval to conduct the study was obtained from the North Coast NSW Human Research Ethics Committee (EC00415) and the University of South Australia Human Research Ethics Committee (HREC00121B).

Several ethical considerations were built into the survey to promote participant safety. Specifically, this included ensuring that the research team acknowledged to potential participants (and to the ethics committees in the ethics applications) that any research regarding interpersonal violence has the potential to be upsetting to participants. Participants were provided

with the NNSW LHD Employee Assistance Program (EAP) telephone number should they require it. As the principal chief investigator is a registered psychologist and has a strong curriculum vitae in the provision of counselling services to highly distressed people, there was also the opportunity to respond immediately with empathy to staff who exhibited distress and, with the participant's consent, facilitate referrals to appropriate services.

The survey was designed to remain factual about the alert system, rather than delve into the specifics of child abuse or domestic and family violence against women for whom health professionals had provided healthcare, in an endeavour to reduce the potential for participant distress.

Limitations of the study

This study was an exploratory study of staff perceptions of the value of a Child-At-Risk eMR alert system in one jurisdiction in NSW, Australia. Almost all practitioners who had applied an alert in this jurisdiction were reached. The study was limited in ways that restrict the generalisability of the findings to other jurisdictions.

While deliberate steps were taken to employ methods that reduced social desirability response bias, the study data is based on self-report opinions of clinicians who have become accustomed to using the system over 3 years.

In relation to testing hypotheses, these results were limited by the lack of control groups to compare clients who did not have a Child-At-Risk alert on their eMR, and by the lack of comparison on the expertise, qualifications and experience of the treating clinicians. That is, some clinicians may provide an enhanced level of care to victims of interpersonal violence, abuse and neglect due to having more experience and qualifications when compared to more junior staff – regardless of the presence of a Child-At-Risk alert on the client's eMR.

As evidenced by the results of the systematic literature search, there is a small amount of literature on this topic, and the

systems in place internationally all differ from one another in their features. Future research is required to tease out the tangible benefits to families; however, a major strength of the study was to add to the international evidence base on eMR alerts deployed to enhance the response to victims of interpersonal violence, abuse and neglect.

Data analysis

Descriptive statistics, comprising demographic data on the respondent profile and non-parametric statistical analysis, formed the basis of the analysis of results.

As an exploratory study in a single jurisdiction, the data analysis primarily consisted of summary data on the perceptions of staff based on their rating of the impact of the alert on client outcomes, and self-reports of confidence levels in discussing sensitive health and social topics with at-risk families.

Responses from Survey Monkey were exported to SPSS Statistics Version 22 for data analysis. Data were screened and checked for missing responses. Five incomplete responses, two from Group 1 and three from Group 2, were excluded from analysis as the participants had completed only demographic details. Responses from 180 participants were included in data analysis: 101 of these were from Group 1 and 79 were from Group 2.

Comparison of geographical groups

Postcodes of survey respondents (n=180) were entered into the Lookup Tool located on the webpage of the Psycho-oncology Co-operative Research Group (University of Sydney, 2017). Postcode was selected for “Lookup Type”, and results generated and downloaded via selecting the “Save results to CSV” file function. Participants with postcode areas in major cities, inner regional and outer regional areas were each assigned to the corresponding geographical group.

Statistics

Descriptive analyses were undertaken to assess if the data was normally distributed. As the data was not normally distributed, non-parametric chi-square analyses were conducted. Chi-square analyses were conducted for all categorical variables to compare Group 1 with Group 2 responses. Chi-square analyses were also conducted for all categorical variables to compare the responses of participants in major cities, inner regional and outer regional locations. Only findings which were statistically significant at $p=.001$ are reported in the text.⁵

Analysis of qualitative responses

Qualitative responses provided in the free-text fields were exported from SPSS and content analysed. Similar words and phrases were coded and then grouped within major themes. The number of responses relating to key themes were then counted. Agreement was sought from a second coder for 100 percent of the data.

Analysis of responses from health departments

Responses collected from health departments in other Australian jurisdictions, including tick-box and free-text responses, were collated and summarised in order to explain whether these departments had existing eMR alert systems or were intending to implement systems.

The findings of the current study about the impact of a child protection eMR alert on health professionals’ responses to at-risk children and pregnant women in NSW, Australia, are described next.

⁵ Due to the number of comparisons, statistical significance was set at $p=.001$

Findings

The aim of this research was to assess the impact of the Child-At-Risk eMR alert system on responses to victims of interpersonal violence, abuse, and neglect within the NNSW LHD. This included understanding how staff responded to seeing Child-At-Risk alerts on a client's eMR, what practices were carried out in response and the resulting perceived outcomes for clients. The findings of this research are reported with regard to the aims of the research and the corresponding research questions.

Throughout this report, the findings are informed by data collected using the online survey (NNSW LHD) and the responses collected from health departments (nationwide).

The NNSW LHD Child-At-Risk eMR alert system overview

As described previously, the Child-At-Risk alert is manually applied by the health clinician after making a child protection or prenatal report. Two NSW health policy directives decree that each local health district in NSW is required to have a standardised file flagging system in place in order to “flag” client files where an unborn child high risk birth alert,⁶ or a general alert from the NSW Department of Family and Community Services or the NSW Police Force has been received regarding a child or young person at risk of significant harm (NSW Health, 2013, p. 15). Similarly, clinicians must flag issues that require particular attention or pose a threat to the patient/client, staff or others, including child protection or child wellbeing matters such as: 1) alerts and flags for high risk birth alerts or prenatal reports; 2) children at risk of significant harm; and 3) where NSW Police or the NSW Department of Family and Community Services have issued a general alert to a public health organisation (NSW Health, 2012a, p. 8).

Once an alert is applied to an eMR it is active for 12 months. Each alert is formally reviewed at 12-month intervals by the

NNSW LHD Child Protection Service by interrogating relevant databases and the documentation library within the client's eMR. Based on reviewing associated documentation, the alert is re-applied for a further 12 months if there is evidence of continuing child wellbeing concerns. If there is no evidence that the child remains at risk, the alert is cancelled. Alerts on pregnant women who are the subject of an unborn child high risk birth alert are cancelled upon the birth of the baby.

The NNSW LHD system is supported by a NNSW LHD Alerts Policy. Training (in how to apply the alert) is provided to staff during child protection training (available on a monthly basis, with staff required to attend once) and via the NNSW LHD Child Protection User Guide. The User Guide contains step-by-step screenshots indicating which buttons to click and which fields to fill in within the eMR screens.

After an alert is applied to the eMR, the “Alerts” field on the front page of the client's record turns orange, and the title of the type of alert appears as “Child at Risk”. Figure 1 is a screenshot of the alert on a dummy test patient in the training version of the eMR.

The study site (NNSW LHD) contained a mix of regional, rural and remote (i.e. very isolated communities) locations. Health services are often referred to as “first responders” to victims of interpersonal violence, abuse and neglect due to being one of the first points of call when victims seek help for their injuries and trauma. Being first responders in a healthcare organisation where demand for services often outstrips resources to respond, healthcare clinicians require ready access to all relevant information to enable a high level of care to be provided to the client (Adams, Mann, & Bauchner, 2003; Alpert, 2016; Weinfeld, Davidson, & Mohan, 2012). The eMR has the power to provide critical information to any clinician 24 hours a day, 7 days a week, as evidenced by the large body of research on the implementation, use and effectiveness of eMR systems internationally (Boonstra et al., 2014; Sittig & Singh, 2012).

⁶ Unborn child high risk birth alerts are issued by NSW Department of Family and Community Services under Chapter 16A of the *Children and Young Persons (Care and Protection) Act 1998* (NSW) to NSW Health services to flag that an unborn child is considered by the NSW Department of Family and Community Services as likely to be at risk of significant harm once born.

Figure 1 Dummy test client example of the visual representation of the NSW LHD Child-At-Risk alert in the Cerner Millennium® eMR

The screenshot shows the Cerner Millennium eMR interface for a dummy test client, TESTCHOC, Mr Co. The interface is divided into several sections:

- Header:** Patient name, age (3 years), sex (Male), location (LIS OOH), and MRN (78-19-14).
- Left Sidebar:** Navigation menu with options like Patient Information, Allergies, Alerts, Diagnoses, Problems, and Visits.
- Main Content Area:**
 - Demographics:** Interpreter required (N), Country of Birth (Australia), Preferred Language (English), CALD Status (--), Legal Status (--), Home Risk Assessment (Completed 16/02/2016 12:42).
 - Associated Group:** Children, Chronic Disease for, Aboriginal Health.
 - Visits (10):** Table showing visit dates, types, and locations.

Date	Type	Location
10/09/16	Community	NNSW CPCS LIS OOH
22/08/16	Community	CMN COF Viral Hep Nur/Allied
01/08/16	Community	WCH LIS C&F
 - Alerts (1):** A yellow alert box titled 'Alert: Child at Risk' with the following details:
 - Annotated Display Name: Child at Risk
 - Onset Date: 14/10/2016
 - Last Update: 17/10/2016
 - Responsible Provider:
 - Comments: Report to Child Protection Helpline. Suspected physical abuse. Reference number 1-2345 ZK. Please advise paediatric clinic on (02) 66 XXXX91 if patient presents for treatment, due to previous missed appointments.

Participants' profiles

Survey non-response was calculated based on the number of invitations issued divided by the number of responses received for each group. This was calculated on $n=185$, prior to the data cleaning and preparation for analysis. Invitations for Group 1 (staff who had applied a Child-At-Risk alert) were sent to 121 staff.⁷ Group 1 participants totalled 103, which represents a response rate of 85 percent. Invitations for Group 2 staff (staff who had not applied a Child-At-Risk alert, but who had recently provided healthcare to a client whose eMR contained a Child-At-Risk alert) were sent until 121 staff were reached. Group 2 participants totalled 82, which represents a response rate of 68 percent.⁸

Table 1 describes the demographic characteristics of the study participants, including those in Group 1 (staff who had applied a Child-At-Risk alert to the eMR of a client), and

⁷ Twenty staff who had applied a Child-At-Risk alert had left the organisation, and were, therefore, not invited to participate in the study.

⁸ 101 participants from Group 1 and 79 participants from Group 2 provided sufficiently complete responses to be included in analyses. These represent completion rates of 83% and 65%, respectively.

those in Group 2 (who had not applied a Child-At-Risk alert to the eMR of a client but who had provided healthcare to a client who had a Child-At-Risk alert on their eMR).

Participants in Group 1 were staff who had applied alerts spanning the period of the initial implementation of the alert system in 2015, up until the recruitment period (November 2017). These staff had applied alerts to the full range of clients who were eligible for an alert, those being children (0-16 years of age), young people (16-17 years of age) and at-risk pregnant women. The number of alerts applied by each staff member (from implementation of the system to the commencement of the research study recruitment) ranged from 1-12 alerts applied.

Group 2 participants were primarily staff working (during the study recruitment period) in hospital emergency departments, maternity and children's wards.

The staff invited to participate in the study had seen a combined total of 76 clients with a Child-At-Risk alert on their eMR over the period from November to December

2017. The characteristics of these clients were children and young people (0–17 years) and at-risk pregnant women who had been either prenatally reported or were the subject of an unborn child high-risk birth alert.

The children and young people (n=63) (as defined by the *Children and Young Persons (Care and Protection) Act 1998*), seen by clinicians over the study period were aged from 4 days to 17 years. Risk factors present for the children and young people who presented to the NNSW LHD during the study period were victims of significant and persistent domestic violence, physical abuse, neglect, sexual abuse, self-harm, emotional abuse, carer mental health issues and carer substance abuse issues. These categories of risk factors are those defined by the NSW online Mandatory Reporter Guide Structured Decision Making[®] tool (National Council on Crime and Delinquency – Children’s Research Centre, 2010) used in NSW.

The pregnant women (n=13) seen by clinicians over the study recruitment period were aged from 16–39 years and had multiple serious risk factors identified, including: domestic violence; failure to thrive (in previous children); homelessness and lack of antenatal care; using significant amounts of alcohol and other drugs; living in unhygienic environments with aggressive dogs in the house yards; father of the child and current partner of the expectant woman being identified as a registered child sex offender; and victim of financial abuse by the current partner.

As outlined in Table 1, Groups One and Two were of a similar age (48 years). A very high proportion of participants in Group 1 identified as female (94.1%), and those identifying as female also formed a large percentage of all participants (87.8%). However, this is not inconsistent with the gender workforce percentages of staff working in healthcare. In Australia, in 2016, 78.3 percent of the healthcare and social assistance workforce identified as women, compared with 21.7 percent of the workforce who identified as male (Workplace Gender Equality Agency (WGEA), 2016).

The primary work groupings of participants who had applied Child-At-Risk alerts (Group 1) were child and

family, community health and mental health staff. Group 2 staff who were providing healthcare to clients were mostly doing so in the emergency department and maternity units, followed by paediatrics. This result shows the potential power of the eMR system to cross-pollinate information across community health settings to be accessible by acute care services, such as emergency departments and maternity units. This feature was described as one of the purposes of the alert: to combine disparate pieces of information (e.g. a wellbeing concern noted by a community health based service) and have that information accessible by clinicians in the acute care setting, 24 hours a day, 7 days a week (e.g. in an acute care service such as the emergency department). Given the percentage of medical officers in the health service, we expected a higher number of responses from medical officers in Group 1.

Most participants in both Groups One and Two had worked in their roles for up to 10 years, with primary healthcare being the predominant type of care provided. The proportion of specialist healthcare providers in Groups One and Two, and in the overall sample, were similar, being about one-third of the sample. The professions most represented by study participants were nursing, social work and midwifery, which is consistent with the locations that at-risk children and pregnant women are likely to present for healthcare treatment. A small proportion of Group 1 (16.8% of the sample) and Group 2 (10.1% of the sample) participants provided healthcare to adults only. Most survey respondents were providing healthcare to children and young people in their day-to-day work.

Understanding and perceived use of the alert system

This section describes the findings with regard to staff’s understanding of and responses to the Child-At-Risk eMR alert system, and the impact the system had on their responses to at-risk women and children.

Knowledge and understanding of Child-At-Risk eMR alert

Table 2 describes staff’s understanding of and responses to seeing Child-At-Risk alerts on client eMRs.

Table 1 Participant demographics

	Group 1 (I have applied a Child-At-Risk alert to the eMR of a patient) (n=101)	Group 2 (I have NOT applied a Child-At Risk alert to the eMR of a patient) (n=79)	All participants (n=180)
	Mean (SD)	Mean (SD)	Mean (SD)
Age*	48.0 (9.7)	48.1 (9.4)	48.1 (9.6)
	n (%)	n (%)	n (%)
Gender			
Female	95 (94.1)	63 (79.7)	158 (87.8)
Male	6 (5.9)	16 (20.3)	22 (12.2)
Main work			
Child and family	34 (33.7)	6 (7.6)	40 (22.2)
Emergency	8 (7.9)	29 (36.7)	37 (20.6)
Maternity	8 (7.9)	14 (17.7)	22 (12.2)
Other community health	16 (15.8)	5 (6.3)	21 (11.7)
Mental health	11 (10.9)	6 (7.6)	17 (9.4)
Paediatrics	6 (5.9)	9 (11.4)	15 (8.3)
Allied health	6 (5.9)	4 (5.1)	10 (5.6)
Other hospital	3 (3.0)	5 (6.3)	8 (4.4)
Drug and alcohol	5 (5.0)	0 (0.0)	5 (2.8)
Aboriginal maternal infant health	2 (2.0)	1 (1.3)	3 (1.7)
Aboriginal health services	2 (2.0)	0 (0.0)	2 (1.1)
Profession			
Nurse	32 (31.7)	40 (50.6)	72 (40.0)
Social worker	23 (22.8)	6 (7.6)	29 (16.1)
Midwife	12 (11.9)	12 (15.2)	24 (13.3)
Doctor or surgeon	2 (2.0)	9 (11.4)	11 (6.1)
Psychologist	8 (7.9)	1 (1.3)	9 (5.0)
Speech pathologist	7 (6.9)	2 (2.5)	9 (5.0)
Child protection information exchange	1 (1.0)	0 (0.0)	1 (0.6)
Mental health	1 (1.0)	1 (1.3)	2 (1.1)
Nursing unit manager	1 (1.0)	0 (0.0)	1 (0.6)
Dietitian	2 (2.0)	2 (2.5)	4 (2.2)
Domestic and family violence	1 (1.0)	0 (0.0)	1 (0.6)
Occupational therapist	2 (2.0)	1 (1.3)	3 (1.7)
Counsellor	3 (3.0)	0 (0.0)	3 (1.7)
Administration	2 (2.0)	1 (1.3)	3 (1.7)
Physiotherapist	1 (1.0)	0 (0.0)	1 (0.6)
Other	3 (3.0)	4 (5.1)	7 (3.9)

Time in role*			
Less than 5 years	32 (32.0)	24 (30.4)	56 (31.1)
5 to 10 years	30 (30.0)	23 (29.1)	53 (29.6)
11 to 15 years	17 (17.0)	11(13.9)	28 (15.6)
16 to 20 years	13 (13.0)	10 (12.7)	23 (12.8)
More than 20 years	8 (8.0)	11(13.9)	19 (10.6)
Type of healthcare			
Primary	75 (74.3)	50 (63.3)	125 (69.4)
Specialist	26 (25.7)	29 (36.7)	55 (30.6)
Primary age group served			
Children and adolescents	50 (49.5)	18 (22.8)	68 (37.8)
Adults only (18+)	17 (16.8)	8 (10.1)	25 (13.9)
All age groups	34 (33.7)	53 (67.1)	87 (48.3)
Location			
Major city	20 (19.8)	8 (10.1)	28 (15.6)
Inner regional	51 (50.5)	55 (69.6)	106 (58.9)
Outer regional	30 (29.7)	16 (20.3)	46 (25.6)

*One person did not respond to this question

Table 2 Understanding of the Child-At-Risk eMR alert system

Good understanding of the system	Group 1	Group 2	All
	n (%)	n (%)	n (%)
Yes	48 (47.5)	11 (13.9)	59 (32.8)
Somewhat	45 (44.6)	41 (51.9)	86 (47.8)
Limited	8 (7.9)	27 (34.2)	35 (19.4)

In response to the question about whether they felt they had a good understanding of the Child-At-Risk eMR alert system, survey participants in both groups described at least a somewhat good understanding of the system. The majority of participants in Group 1 (92.1%) felt that they had a good or somewhat good understanding of the system. Sixty-six percent of participants in Group 2 also reported having a somewhat good (51.9%) or good (13.9%) understanding of the system, although a larger proportion of participants in Group 2 reported having a limited understanding of the system (34.2%) compared to those in Group 1 (7.9%). This is expected, since Group 1 comprises those who have applied a Child-At-Risk alert to a client's eMR, whereas Group 2 had not applied an alert, although they had provided health services to a client for whom such an alert had been applied.

In the free-text fields, two participants noted that they had limited knowledge of what the Child-At-Risk eMR alert was

and what to do when an alert was on the system, providing further insight into staff understanding of the system.

Agreement that the Child-At-Risk eMR alert system improves responses to at-risk women and children

Participants were asked about their general attitudes towards the Child-At-Risk eMR alert system, and to what extent they agreed that the system would assist in improving health worker responses to at-risk children and at-risk pregnant women. A summary of responses to this question is provided in Table 3.

Both groups of participants (those who had and had not applied an alert to an eMR) had a high level of agreement that the alert system would assist in improving health worker responses to at-risk clients. Around three-quarters (76.7%) of all participants agreed (53.9%) or strongly agreed (22.8%) with this statement.

Table 3 Agreement that the Child-At-Risk eMR alert system improves health worker responses to women and children

Level of agreement	Group 1	Group 2	All
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Strongly agree	29 (28.7)	12 (15.2)	41 (22.8)
Agree	53 (52.5)	44 (55.7)	97 (53.9)
Disagree	4 (4.0)	3 (3.8)	7 (3.9)
Strongly disagree	1 (1.0)	1 (1.3)	2 (1.1)
I don't know	14 (13.9)	19 (24.1)	33 (18.3)

Table 4 Peer use of the Child-At-Risk eMR alert system

Peers/colleagues are using the system	Group 1	Group 2	All
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Yes	77 (76.2)	37 (46.8)	114 (63.3)
No	4 (4.0)	4 (5.1)	8 (4.4)
I don't know	20 (19.8)	38 (48.1)	58 (32.2)

Table 5 Current practices resulting from seeing a Child-At-Risk eMR alert

	Group 1	Group 2	All
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
<i>Assess necessity of referrals as a result of seeing alert</i>			
Yes	93 (92.1)	64 (81.0)	157 (87.2)
No	8 (7.9)	15 (19.0)	23 (12.8)
<i>Information is shared as a result of seeing alert</i>			
Yes	85 (84.2)	50 (63.3)	135 (75.0)
No	16 (15.8)	29 (36.7)	45 (25.0)
<i>Follow-up missed appointments as a result of seeing alert</i>			
Yes	75 (74.3)	33 (41.8)	108 (60.0)
No	5 (5.0)	22 (27.8)	27 (15.0)
Other	21 (20.8)	24 (30.4)	45 (25.0)

There were similar levels of agreement in both Group 1 and Group 2 that the system would result in improved responses. Only one participant from each group strongly disagreed with the idea that the alert system improves responses by health workers to these clients.

Peer use of Child-At-Risk eMR alerts

Perceived colleague/peer use of the alerts were higher among participants in Group 1 (76.2%) compared with those in Group 2 (46.8%). Around half (48.1%) of participants in Group 2 did not know whether their peers were using the system. Responses to this question are included in Table 4.

Response to alerts

Participants were asked how they respond or what action they take when they see a Child-At-Risk alert on the eMR of an at-risk child or at-risk pregnant woman.

As described in Table 5, the majority of participants in Group 1 reported that when they saw an alert on the eMR of a client, they actively assessed whether referrals to additional services were necessary (92.1%) and shared information with other prescribed bodies (84.2%). Around three-quarters (74.3%) of participants in Group 1 also reported that they tried to

resolve any barriers to client attendance at appointments, to address non-attendance.

Approximately 81 percent of Group 2 participants advised that when they saw an alert, they made referrals. However, participants in Group 2 reported lower levels of practice change in two areas compared to their Group 1 counterparts. Specifically, around two-thirds shared information about clients who had a Child-At-Risk alert applied to their eMR, and only 41.8 percent agreed that they assertively followed up missed appointments. The fact that a smaller number of Group 2 participants followed up missed appointments, could be a reflection of the participants' position descriptions. For example, a clinician working in an emergency department has less scope to follow up missed appointments of clients due to the acute nature of emergency department roles, which do not have responsibility for case management.

Participants who responded "other" in response to the survey items concerning actions taken by health workers as a result of seeing an alert were able to elaborate further with open-ended comments. With regard to referral to other services, participants across both groups reported that the client's current and historical circumstances would be considered. Referral would also depend on the outcome of a discussion with their supervisors.

Information sharing was reported to be influenced by the alert in the open-ended responses. Participants across both groups reported that the alerts prompted them to check for additional information. However, this was dependent on the situation and workload demands. Four participants also reported that confidentiality was a concern in sharing client information.

Finally, in response to following up missed appointments as a result of the alert, participants across both groups reported conducting case planning with other services and discussing problems with clients. Some participants also reported that following up non-attendance at appointments was not applicable to their job role.

Perceived impacts on practice

This section describes the perceived impacts on practice resulting from Child-At-Risk eMR alerts. Participants were invited to tick each statement that they felt applied to their practice.

Responses to this question reveal that participants felt positive actions were taken as a result of using the system. Consistent with the findings on the impact of the alerts on practice, more than one-third of participants (36.7%) reported that the presence of the alert resulted in the adaptation of their practice. Around half of the sample (52.8%) agreed that the alert allowed them to immediately see the child protection status of the client.

Two participants (1%) reported that there had been a negative outcome due to the presence of the alert on the client's eMR, suggesting that the experience of negative client outcomes from the alerts has been small. These two participants did not state what the negative outcomes were.

The proportions of participants reporting each outcome were similar for both groups of participants and are shown in Table 6.

Location-specific use

Frequencies on each variable were compared for participants in major cities, inner regional and outer regional locations. No clear differences were observed between participants located in major cities, inner regional or outer regional locations on responses to the alerts or perceived client outcomes. It is noted that this may have been due to group sizes that were insufficient to draw comparisons.

Factors helping and hindering health worker responses to at-risk women and children, including satisfaction with the system

This study identified the factors that participants thought helped and hindered them in changing their practice towards or responding to at-risk women or at-risk children. Participants

Table 6 Actions and outcomes after seeing a Child-At-Risk alert on a patient eMR*

Statement	Group 1	Group 2	All
	n (%)	n (%)	n (%)
There was a negative patient outcome due to the presence of the alert on the patient's eMR	2 (2.0)	0 (0.0)	2 (1.1)
The alert changed my approach to my assessment of the patient	36 (35.6)	30 (38.0)	66 (36.7)
The alert provided important and easy-to-access clinical information	50 (49.5)	22 (27.8)	72 (40.0)
The alert made no difference to my approach to the assessment of the patient	11 (10.9)	15 (19.0)	26 (14.4)
I made referrals to additional support services after seeing the alert	29 (28.7)	20 (25.3)	49 (27.2)
The alert allowed me to see immediately the child's/ woman's child protection status	61 (60.4)	34 (43.0)	95 (52.8)
The alert allowed me to communicate with other services more easily	30 (29.7)	13 (16.5)	43 (23.9)
No patient outcomes were related to the presence of the alert	14 (13.9)	22 (27.8)	36 (20.0)

*Participants could endorse as many responses applied to their experience

were asked to review a list of both helping and hindering factors, and tick all that apply. In addition, they were asked about the usefulness of the alert system and any problems or dissatisfactions with how the alert system is used in practice.

Factors helping health worker responses

Around three-quarters of participants identified that the training they received (73.3%), workplace policies and guidelines (77.2%), the support they received from their colleagues and peers (72.8%), and to a lesser extent the supervision they received (31.7%), all assisted them in responding effectively to at-risk women or at-risk children.

Thirty-one participants also suggested additional helping factors in the free-text response field. Almost 60 percent of those highlighted the importance of professional experience. Professional experience included the experience, knowledge and professional judgement of respondents gained through working in related areas (e.g. statutory child protection services, within the health service, psychology) over time.

Having access to other services, such as multidisciplinary teams that may have additional expertise, as well as support to attend relevant professional development were also seen as helping factors by six participants.

Factors hindering health worker responses

The factors or circumstances that hindered participants' capacity to respond to at-risk clients included lack of training (37.2%),⁹ lack of collegiate support (19.4%), lack of workplace policies and guidelines (17.2%) and lack of supervision (15.6%).

Seventy-six participants described additional hindering factors in the free-text response field. The most commonly reported additional hindering factor was lack of time. Participants considered ability to respond to the alerts to also be influenced by a number of competing workload demands including client load, inadequate staffing, cumbersome administrative processes and interactions with the statutory child protection service.

Of these 76 participants, one also identified a hindering factor specific to the alerts, noting that when client files were crowded with alerts it made it difficult to easily identify clients requiring a response. Cross-border issues were also highlighted, where clients involved with child protection systems in one state (Queensland) attended health services in another state (NSW), or vice versa, with no legislative information exchange provisions allowing transfer of client information across state borders.

⁹ This was a hindrance for a higher proportion of Group 2 (53.2%) than Group 1 (24.8%) participants.

Table 7 Health worker satisfaction with the Child-At-Risk eMR alert system* †

Statement	Group 1	Group 2	All
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
I understand alert systems in general	79 (79.0)	42 (53.8)	121 (68.0)
I don't understand alert systems in general	5 (5.0)	8 (10.3)	13 (7.3)
The Child-At-Risk eMR alert is easy to use	44 (44.0)	16 (20.5)	60 (33.7)
The Child-At-Risk eMR alert is hard to use	19 (19.0)	6 (7.7)	25 (14.0)
I've received sufficient support to help me use the Child-At-Risk eMR alert system	52 (52.0)	15 (19.2)	67 (37.6)
I haven't received enough support to help me use the Child-At-Risk eMR alert system	17 (17.0)	38 (48.7)	55 (30.9)
The Child-At-Risk eMR alert helps families	46 (46.0)	19 (24.4)	65 (36.5)
The Child-At-Risk eMR alert does not help families	1 (1.0)	0 (0.0)	1 (0.6)
I don't know if the Child-At-Risk eMR alert helps families	32 (32.0)	28 (35.9)	60 (33.7)
At-risk children and at-risk pregnant women are safer now the Child-At-Risk eMR alert system is in place	48 (48.0)	19 (24.4)	67 (37.6)
At-risk children and at-risk pregnant women are no safer now the Child-At-Risk eMR alert system is in place	4 (4.0)	4 (5.1)	8 (4.5)
The presence of the Child-At-Risk eMR alert makes no difference to how I assess the family	11 (11.0)	11 (14.1)	22 (12.4)
The Child-At-Risk eMR alert should be a pop-up alert	36 (36.0)	33 (42.3)	69 (38.8)
The Child-At-Risk eMR alert should not be a pop-up alert	20 (20.0)	4 (5.1)	24 (13.5)
Clinicians will continue to use the Child-At-Risk eMR alert; they won't tire of it	37 (37.0)	16 (20.5)	53 (29.8)
Clinicians will get alert fatigue in relation to the Child-At-Risk eMR alert, and stop using it or taking notice of it	11 (11.0)	7 (9.0)	18 (10.1)

*For each item, a participant from Group 1 and a participant from Group 2 did not respond

† Participants could endorse as many responses as applied to their experience

Satisfaction with the Child-At-Risk eMR alert system

Participants also selected the statements they felt applied to the overall perceived usefulness of the system, or any problems or dissatisfactions they had in using the system. Responses to this question are presented in Table 7.

Many more participants (36.5%) felt that the Child-At-Risk eMR alert helped families, compared to only one (less than 1%) who felt that alerts did not help.¹⁰ One-third (37.6%) of the sample also felt that children and at-risk pregnant women were safer with the system in place.

While over one-third of participants (37.6%) felt they had received enough support to help them use the alert system, around a third of the sample (30.9%) indicated that they had not received enough support to help them use the system.

There were significant differences in the proportions of Group 1 and Group 2 respondents on their understanding of alert systems, perceived ease of use and lack of support to use the Child-At-Risk eMR, and the perceptions of improved safety of at risk children and women.

Confidence in responding to at-risk pregnant women and at-risk children

Survey participants were asked to rate their confidence from "not at all confident" to "very confident" in having conversations with families in five different areas. Responses to this question are presented in Table 8.

Both groups expressed being somewhat confident (47.8%) or very confident (33.1%) in discussing concerns about

¹⁰ Remainder (62.5%) unknown: See Table 7.

Table 8 Participant confidence in discussing issues with clients or patients

Discussion Area	Group 1 (n=100)	Group 2 (n=78)	All (n=178)
<i>Parenting behaviours*</i>			
Not at all confident	2 (2.0)	1 (1.3)	3 (1.7)
Not very confident	4 (4.0)	14 (17.7)	18 (10.1)
Somewhat confident	39 (39.0)	45 (57.0)	84 (46.9)
Very confident	55 (55.0)	19 (24.1)	74 (41.3)
<i>Child wellbeing, child welfare or child maltreatment†</i>			
Not at all confident	1 (1.0)	1 (1.3)	2 (1.1)
Not very confident	13 (13.0)	19 (24.4)	32 (18.0)
Somewhat confident	45 (45.0)	40 (51.3)	85 (47.8)
Very confident	41 (41.0)	18 (23.1)	59 (33.1)
<i>Social issues†</i>			
Not at all confident	5 (5.0)	5 (6.4)	10 (5.6)
Not very confident	13 (13.0)	15 (19.2)	28 (15.7)
Somewhat confident	32 (32.0)	43 (55.1)	75 (42.1)
Very confident	50 (50.0)	15 (19.2)	65 (36.5)
<i>Relationship issues†</i>			
Not at all confident	3 (3.0)	3 (3.8)	6 (3.4)
Not very confident	11 (11.0)	18 (23.1)	29 (16.3)
Somewhat confident	37 (37.0)	41 (52.6)	78 (43.8)
Very confident	49 (49.0)	16 (20.5)	65 (36.5)
<i>Referral†</i>			
Not at all confident	2 (2.0)	4 (5.1)	6 (3.4)
Not very confident	5 (5.0)	13 (16.7)	18 (10.1)
Somewhat confident	32 (32.0)	39 (50.0)	71 (39.9)
Very confident	61 (61.0)	22 (28.2)	83 (46.6)
<i>Cultural-specific needs†</i>			
Not at all confident	3 (3.0)	3 (3.8)	6 (3.4)
Not very confident	15 (15.0)	17 (21.8)	32 (18.0)
Somewhat confident	57 (57.0)	40 (51.3)	97 (54.5)
Very confident	25 (25.0)	18 (23.1)	43 (24.2)

*One person from Group 1 did not respond to this question

†One person from Group 1 and one person from Group 2 did not respond to this question

Table 9 Needs of health workers responding to interpersonal violence, abuse and neglect* †

Area of need	Group 1 (n=100)	Group 2 (n=78)	All (n=178)
More time to spend with the patient	48 (48.0)	42 (53.8)	90 (50.6)
Ongoing professional development in the area of violence, abuse, and neglect	63 (63.0)	49 (62.8)	112 (62.9)
Being observed doing my job and receiving feedback on my work	9 (9.0)	12 (15.4)	21 (11.8)
A changed job description	2 (2.0)	4 (5.1)	6 (3.4)
Supervision	30 (30.0)	16 (20.5)	46 (25.8)
Knowledge of the support services available for victims and to know how to refer to those services	56 (56.0)	51 (65.4)	107 (60.1)
Resources (e.g. manuals, child/family-friendly consultation spaces)	46 (46.0)	34 (43.6)	80 (44.9)
I have everything I need. I do not need anything to be better able to respond to victims of interpersonal violence, abuse, and neglect	8 (8.0)	5 (6.4)	13 (7.3)

*For each item, a participant from Group 1 and a participant from Group 2 did not respond

†Participants could endorse as many responses as applied to their experience

child wellbeing, child welfare or child maltreatment with their clients.

Participants also reported feeling somewhat confident (46.9%) or very confident (41.3%) in discussing parenting behaviours and parenting needs.

A higher proportion of Group 1 than Group 2 reported being very confident in all of these areas, with the exception of cultural-specific needs, in which there was no difference between groups.

Needs of health workers responding to interpersonal violence, abuse and neglect

Participants were asked what they needed in order to better respond to victims of interpersonal violence, abuse and neglect. Table 9 summarises the needs indicated by participants overall, and in Group 1 and Group 2.

Although participants reported feeling somewhat or very confident in discussing a range of topics with clients, they still indicated that there were a number of factors that could support them in improving their response to interpersonal violence, abuse and neglect.

Overall, the greatest area of need reported by participants (62.9%) was ongoing professional development in the area of violence, abuse and neglect. Also, almost two-thirds (60.1%) of the participants indicated that knowledge of the support services available for victims of interpersonal violence, abuse and neglect would help them to better assist clients. Half of participants (50.6%) indicated that they needed to spend more time with clients.

Fewer participants indicated that supervision (25.8%), having their work observed (11.8%) or a changed job description (3.4%) would assist them in responding to victims of interpersonal violence, abuse and neglect.

Participants also suggested improvements to the system. Thirty-nine percent of participants indicated that the alert should be a pop-up alert, suggesting that this may assist them in responding to the alerts.

Use of alerts in other jurisdictions

In addition to exploring the impact of the systematised healthcare process involving the Child-At-Risk eMR alert within the NSW LHD setting, the study sought to understand whether other jurisdictions had a similar system in place and/or the potential applicability of the Northern NSW approach to their jurisdiction. Health departments across Australian states and territories were approached for this

information. All seven health departments, outside NSW, responded (response rate 100%). The responses received from each jurisdiction with regard to the existence of, or their intention to implement such a system, are summarised below.

Victoria

The Victorian Department of Health reported that their eMR systems were capable of alerting in the manner described in the Child-At-Risk eMR alert system. They also, however, reported that there was no consistency in, or standard for, their use across the department.

Tasmania

Within the Tasmanian Health Service, the Child Health and Parenting Service maintained an eMR. This record was used as a statewide record to provide service continuity for families of children in the 0-5 age group who engaged with the service to receive a range of services including: child health assessments, parenting advice, sleep and settling support, breastfeeding support and assistance with behavioural intervention.

The Child Health and Parenting Service eMR is not a “Child at Risk” electronic alert system. The eMR had been configured to include a number of alerts or flags that assisted the staff to understand where families may require additional support and intervention. Child at risk flags included within the system were raised if the service was informed that clients are known to child protection, are part of the unborn alerts process, are in out-of-home care, have been discussed at a 3-years-old and under panel or where there is a known history of family violence. These flags sat alongside a number of other system flags and alerts that could be raised if a child was not meeting developmental milestones. These flags were either manually raised by staff or were system-raised flags that were triggered when a client met predefined criteria. This may include, for example, a “Did Not Attend” (DNA) flag raised when a client does not attend three appointments in a row; this flag prompts closer attention to the client’s file and family needs by clinicians, allowing for more appropriate and targeted provision of health services.

South Australia

At the time of the study, South Australia (SA) Health had a “child at risk” electronic alert system in place. There were four Local Health Networks within SA that could utilise the system. While each of the four networks had a commitment to using electronic alerts, they had different databases and ways of recording the alerts. The alerts were therefore not necessarily transferred when clients presented at sites across Local Health Network borders.

The alerts pertaining to “risk” related primarily to pregnant women and at-risk infants. In all of the Local Health Networks, there was a process to identify psycho-social risk in the antenatal period (a questionnaire is filled in at the pregnancy booking appointment, which is then reviewed by a multidisciplinary team). The questionnaires were scored and, following review by the multidisciplinary team, a risk rating was determined. An alert was placed on the system if there was medium or high risk. The alert in and of itself did not distinguish between the level of risk, but the accompanying documentation on the system did; thus staff were required to look further than just the alert.

While SA Health had developed a system that worked well for women facing high levels of social risk and for infants at risk, there was not an established electronic system to identify at-risk children interfacing with SA Health. Although there was no such system in place at the time of the study, all SA Health staff are mandated notifiers and undergo training regularly pertaining to child protection obligations. The SA Department for Child Protection also works closely with SA Health when there is a child at risk with whom they are involved.

SA Health reported that the system is very valuable and that it has changed practice over time.

Western Australia

Western Australia (WA) Department of Health was not using a Child-At-Risk eMR alert system at the time of the study. There was considerable interest expressed by a number of WA health service providers in the potential for using electronic alerts for child protection concerns in the future.

A small number of individual health services had developed procedures for using child protection concern alerts, and there had been some ad hoc use of alerts based on requests from the Department of Communities, Child Protection and Family Support but these had not been supported by endorsed procedures. Given the complexity of this issue, a working group is being established in WA to identify the range of interests and concerns that exist in regard to child protection alerts, to identify the pathway forward for progressing work on this issue and to develop a consensus approach.

Queensland

Queensland Health had no state-wide child protection alert system in place at the time of the study. Individual hospital and health services may have had alert systems; however, the respondent was not aware of any. The reason given for why an alert system had not been considered was insufficient knowledge about the system, and the belief that such a system would not be relevant to the core business of the service.

Australian Capital Territory (ACT)

The Child at Risk Health Unit in ACT Health reported that they had not heard of the alert system, and had insufficient knowledge of the system to implement an alert system at the time of the study.

Northern Territory

The Northern Territory Health Department reported that they had not heard of the alert system, and had insufficient knowledge of and evidence for the system to implement an alert system at the time of the study.

Discussion

It is acknowledged that a small number of participants may not have been able to respond to some of the survey questions regarding their responses to alerts, as they may have applied an alert to a client's eMR but may not have seen an alert applied by someone else. It was expected, both for participants who had previously applied an alert and for those who had not previously applied an alert, that seeing a Child-At-Risk alert on a client eMR would lead clinicians to discuss referrals, share information or assertively follow up missed appointments with clients.

With respect to the demographics of participants in this study, it was expected that the number of doctors who had applied a Child-At-Risk alert to a client eMR (respondents in Group 1) would be higher. This is because, according to the *NSW Health Annual Report of 2011-12*, as a proportion of the total NSW Health workforce, medical officers made up approximately 12.8 percent of the clinical workforce (NSW Health, 2012b, p. 35). Even after accounting for the medical officer workforce shortages in rural areas, a response rate of 2 percent of doctors (who had applied a Child-At-Risk alert to a client eMR) for this study was well short of the expected response rate. Whereas, medical officers in Group 2 made up 11.4 percent of respondents, which is more closely aligned with the likely percentage of doctors in the clinical workforce at any one time. A specific campaign promoting the use of the alert system to the medical officer workforce may assist in improving the number of doctors applying alerts and using the system.

Understanding and perceived use of the alert system

Overall, participants indicated they had a good knowledge and understanding of the system. They were also, overall, in agreement with the statement that the system improves health worker responses to clients at risk. Further, at least for Group 1, it was perceived that peers were using the system. Despite this, almost one-third of the sample indicated that they had not received enough support to help them use the Child-At-Risk eMR alert system. Therefore, further training and information sharing about the system may be required to increase the understanding of the system among staff.

Providing staff with a better understanding of the system may encourage and enable an increased confidence in using the system.

Perceived impacts of the Child-At-Risk eMR alerts on practice

A systematic search of the literature exposed a significant gap in the research evaluating the efficacy and outcomes of child protection and domestic violence alerts in eMRs. Survey participants were therefore asked to respond regarding the perceived actions and outcomes resulting from use of the system and the usefulness of the alerts in practice.

As hypothesised, referrals to support services, information sharing and following up missed appointments occurred for clients who had a Child-At-Risk alert on their eMR. However, as there was no comparison with a control group of clients who did not have a Child-At-Risk alert on their eMR, it is not possible to confirm if these actions were as a result of the presence of the Child-At-Risk alert, or were part of treatment-as-usual.

Location-specific use

Employing a systematised process (standardised way of applying and responding to a Child-At-Risk alert on a client's eMR) was hypothesised to reduce the likelihood that some clients would receive superior care to other clients based on the resources available at the hospital or other healthcare setting where the client presented. For example, metropolitan or city hospitals are usually larger, with more equipment, staff and other resources to assist in the delivery of quality healthcare compared with smaller rural centres that have no on-call social work services, fewer staff on shift at any one time, and less access to specialist physicians. As hypothesised, this result shows that regardless of where the participant was working (major city, inner regional or outer regional), their understanding of the Child-At-Risk eMR alert system and their approach to addressing concerns about client safety did not differ.

Factors helping and hindering responses to at-risk women and children

Consistent with existing research (Bunting et al., 2010; Turner et al., 2017) on the factors that help and hinder health worker responses to at-risk women and children, participants in this study identified that the training they received, workplace policies and guidelines, support from their colleagues and peers, and to a lesser extent, the supervision they received, all assisted them in responding effectively to at-risk women or at-risk children.

Time constraints were reported by participants as a barrier to responding to at-risk women and at-risk children, and participants considered this to be influenced by a number of workload demands including client load, inadequate staffing and cumbersome administrative processes.¹¹ This is consistent with responses across the other survey questions, which also indicated that workload demands and time constraints influenced participant ability to adapt their practice in response to alerts. This supports the notion, consistent with conservation of resources theory, that despite positive intentions, staff may find it difficult to allocate time and resources to practice depending on other workload demands.

Participants in Group 1 in this study (those who had applied a Child-At-Risk alert to a client eMR) showed a higher understanding of the system than those participants who had not applied a Child-At-Risk alert. A high proportion of system-users (Group 1 participants) indicated they understood alert systems in general (79%), and approximately half agreed that they received sufficient support to help them use the Child-At-Risk alert (52%), believed the Child-At-Risk alert system helped families (46%), and that at-risk children and at-risk pregnant women are safer now the system is in place (48%). One third of all participants (Groups One and Two combined) said the Child-At-Risk eMR alert system is easy

to use and 14 percent agreed it is hard to use. In future it may be that a clinical decision support tool linked to the completion of child protection reporting documentation in the eMR (that automatically applies a Child-At-Risk alert to the client's eMR) is a superior system, as opposed to the manual application of an alert by the clinician.

Confidence in discussing concerns

One of the purposes of the alert is to enable enhanced care via providing a direct response to families affected by interpersonal violence, abuse and neglect rather than simply reporting the client/family to the statutory Child Protection Helpline. The current study found self-reported high levels of health worker confidence in discussing child maltreatment concerns. This is consistent with existing research such as the Raman et al. (2012) study conducted at Liverpool Hospital (South Western Sydney Local Health District, NSW, Australia, also a public health organisation of NSW Health). This study found that public health medical officers were more confident in identifying child abuse and neglect compared to general practice nurses based in medical surgeries. A study by Foster et al. (2017) conducted in the US found that 57 percent of healthcare professionals (in the sample) felt mostly or very comfortable asking families about child protection risk factors, and 52 percent were mostly or very comfortable discussing those maltreatment issues with families. Confidence to broach, and comfort with broaching, child wellbeing concerns with victims of interpersonal violence, abuse and neglect may be an important factor in improving responses to this client group.

An interesting finding in the confidence levels of clinicians in discussing referrals with clients was that although 61 percent of Group 1 (participants who had applied a Child-At-Risk alert to a client eMR) stated they felt very confident in discussing referrals with clients (Table 8), over half (56%) of those also said they needed more knowledge of the support services available to help clients, and to know how to refer to those services (Table 9). This result could be interpreted as a discrepancy. That is, while indicating they are confident discussing referrals, at the same time Group 1 could be indicating that they have insufficient knowledge of

¹¹ Seventeen participants in their free-text responses raised time constraints as being a particular issue in this regard. In their quantitative responses, 90 participants responded to the question "What do you need to be better able to respond to victims of interpersonal violence, abuse, and neglect?" with "more time to spend with the patient" as one of the options a respondent could choose to answer this question.

service availability. However, this result could also show that clinicians are confident in the referrals they presently make for clients, but would also like to enhance their knowledge of a) current services, and b) the ways in which to refer clients to those services.

Implementation of alert systems

According to the theory of planned behaviour (Ajzen, 1991) the knowledge, understanding and perceived peer use of the system reported by participants suggest staff are likely to have a positive intention to implement the system, despite the need to conserve the resource of time, particularly in acute care settings such as emergency departments. Positive intention towards implementation, according to the theory of planned behaviour, suggests that staff are more likely to implement the system in practice.

Implementation of the alert system is also likely to be supported by several additional critical elements, including:

- basing the system on the policy requirements of NSW Health;
- engaging the executive in sponsoring the implementation and ongoing maintenance of the system;
- ensuring the system is supported by a local NNSW LHD policy inclusive of a formal governance and alert-auditing process;
- ensuring the Child-At-Risk eMR alert system implementation plan is supported by senior managers of NNSW LHD;
- allocating sufficient resources to the development of resources such as the User Guide so that staff have access to instructions on how to use the system;
- provision of training and a helpdesk for ongoing assistance when required by staff; and
- maintaining fidelity of the governance of the system via the review of every alert to ensure each alert's currency.

Needs of health workers responding to at-risk women and children

There were no differences in reported areas of need between Group 1 participants, who had applied a Child-At-Risk alert to a client's eMR, and Group 2 participants, who had not. The majority of participants in both groups indicated that they needed increased knowledge of the available support services.

Overall, the greatest need reported by participants was increased professional development in responding to violence, abuse and neglect. This result is consistent with Turner et al. (2017), who completed a systematic review of interventions to improve the response of professionals to children exposed to domestic violence and abuse. The authors found that training programs involving specialist domestic violence practitioners improve clinical competency.

In addition to their selected survey responses, participants were also able to identify other needs in a free-text field. These responses further indicated that more time was required to respond to at-risk families and that further training was required, specifically regarding when and how to make reports and how to engage with at-risk families.

Participants also suggested other improvements to the service landscape, including increased availability of expert staff, or the ability to consult with expert staff.

This suggests that overall, the needs of health workers in responding to clients are in the areas of professional development and increased knowledge of the service system and referral processes for at-risk families. In addition, there may be pragmatic constraints regarding time and resources to allocate to clients that may need to be overcome in order to improve practice in responding to clients experiencing interpersonal violence, abuse or neglect. Despite this, health workers who are applying or seeing alerts are adapting their responses accordingly.

Use of alerts in other jurisdictions

Data collected from health departments in other jurisdictions revealed that Victoria, Tasmania and South Australia were, at the time of the study, the only jurisdictions with the capability or systems for applying Child-At-Risk alerts to a client's eMR. Within the one/same health department, each geographical region may have different electronic medical record databases that do not share similar data entry fields. Therefore, each health department would need to configure the system (tailor it) within: 1) their eMR system parameters; and 2) the reporting requirements for health practitioners in their state/territory. This suggests that consideration would need to be given to the ability of other jurisdictions to implement similar systems before expansion is considered nationwide.

Conclusion

Findings from this research have confirmed that staff within the NNSW LHD are identifying and responding to victims of interpersonal violence, abuse and neglect in their day-to-day work and that the Child-At-Risk alert supplements, rather than replaces, usual care approaches. This is evidenced by participants indicating that they discuss referrals, share information and follow up missed appointments where possible. Consistent with the aspirations of the CP-IS alert system in England (Low, 2016), the perception of staff who use the Child-At-Risk alert system operating in NNSW LHD is that the alert provides information that can enable a more comprehensive assessment of the child or at-risk pregnant woman (e.g. the alert provided important and easy-to-access clinical information, the alert allowed the clinician to see immediately the child's/woman's child protection status) and improved communication between agencies working with the family (e.g. improved information exchange and referrals to additional services).

An important finding of this study was that approximately one-third of participants reported that the presence of the alert resulted in adaptations to their practice. In addition, these adaptations were made despite constraints on time and resources. This result shows the potential of a practice change to improve responses to victims of interpersonal violence, abuse and neglect within large organisations employing thousands of staff.

The results of this exploratory study on the NNSW LHD Child-At-Risk eMR alert system indicate the system is having a positive impact on healthcare responses to victims of interpersonal violence, abuse and neglect. Given these positive results, the system may have the potential to be adopted more widely within Australia, and internationally.

Implications for policy and practice

Implication 1: Research using case-file data is needed to determine direct client/patient-level outcomes from the presence of a Child-At-Risk eMR alert

While this study showed a) the alert can improve practice, and b) a system can be implemented and sustained in a resource-challenged environment, further research is needed to better understand the direct outcomes for families as a result of referrals, information sharing and follow-up of missed appointments.

Further research into client outcomes is needed that goes beyond the perceptions of system-users to determine the concrete outcomes for families as a result of the alert system being in place. Anecdotal case examples from interagency partners in the statutory child protection and non-government family support service sectors testify to the usefulness of the system, in a number of cases. However, further research would help to better understand the direct outcomes for families as a result of referrals, information sharing and the follow-up of missed appointments. Case file reviews that trace the outcomes for the family identified in the alert would strengthen evidence about the usefulness of the alert system. Examples of proxy measures for system efficacy include the uptake of referrals and health-specific family outcomes. This research should precede any expansion of the system to ensure the effectiveness of further roll-out and implementation.

Implication 2: Alert systems should be implemented using established procedures and regular staff training

The introduction of any new child protection information sharing system within an eMR should be based on established processes found within the implementation science literature (Fixsen, Blase, Naoom, Van Dyke, & Wallace, 2009). Implementation science literature describes the factors that impact successful and sustained implementation of evidence-informed practices into the everyday work of health and social service practitioners. As per the result regarding

participant understanding of the system, where Group 2 participants indicated a lower level of knowledge of peer use of the system, ongoing training and implementation of the system is required in NSW LHD, and would also be an ongoing consideration for other jurisdictions implementing such a system. The responses also highlighted clinician needs for ongoing training and other kinds of professional development.

This study confirmed that staff are using the Child-At-Risk eMR alert system, demonstrating that, notwithstanding the demands on the time of frontline healthcare workers, it is possible to implement and sustain such a system. This study did not focus on the implementation process of the system; however, it is recognised that there are several critical aspects of successful implementation of any new system that would need to be considered (Fixsen et al., 2009).

Implication 3: Features of the system should meet end-user needs

To optimise the use of the alert, healthcare workers should be consulted about its features. For example, when an alert exists on a client eMR, a “pop-up” alert or a cursor that changes shape could increase the likelihood of clinicians checking the details of the Child-At-Risk alert (thereby offsetting the need to click on the Alerts, Problems, Diagnosis tab to see the alert on the patient’s eMR).

Thirty-nine percent of participants in this study indicated that they would like the Child-At-Risk alert to show on the eMR as a “pop-up” alert, rather than the current system where the clinician must notice the orange-coloured alert box, or click on the Alerts, Problems, Diagnosis tab in order to see the Child-At-Risk alert on the client eMR. Depicting the alert as a “pop-up” alert was not progressed by NSW LHD at implementation due to concerns about the sensitive nature of the information within the alert (i.e. that there were wellbeing concerns about the client). However, some eMR systems do have the capacity to signal that an alert exists in other ways, such as the cursor changing shape when an alert exists on a client eMR.

Implication 4: Tracking staff-users should result in a greater understanding of the system’s use

Improved training and workforce development could assist in improving staff ability to use and navigate the system. In particular, medical officer training should be undertaken to ensure doctors are aware of the system and are using the system in their everyday interactions with families experiencing vulnerability.

Key performance measures of the alert system within clinicians’ workflow should include tracking the number and profession of staff applying alerts. The latter would allow the monitoring of staff engagement, with the aim of improving the uptake by staff in professions not using the system. This would also help ensure follow-up each time an alert is not applied when it should have been.

Feedback could then be obtained on the user-experience, thereby informing improvements to the system.

Implication 5: Health workers need ongoing training and information on responding to interpersonal violence, abuse and neglect

Participants in this study indicated they were using the alert system and were confident in discussing sensitive issues with clients/patients, such as parenting behaviours, child wellbeing, welfare, maltreatment, social and relationship issues and referrals to support services. However, survey responses also showed that regardless of current confidence levels in these areas, participants want more training, a better understanding of the services available to which they can refer clients, and access to consultancy on child protection and domestic violence matters. Therefore, a key component of the wrap-around support for clinicians using a Child-At-Risk eMR alert system is ongoing investment in training and consultation on identifying and responding to interpersonal violence, abuse and neglect, and up-to-date information on referral pathways to support services that assist at-risk individuals and families.

**Implication 6:
Standardised alert systems could be
implemented across states and territories**

Work at a national level is recommended to progress the discussion and consideration of the implementation of systems in other jurisdictions. These discussions could be led by the agencies responsible for the National Framework for Protecting Australia's Children 2009-2020, the National Plan to Reduce Violence against Women and Children 2010-2022 or by key offices such as the office of the National Children's Commissioner. Discussion of the use and evaluation of Child-At-Risk eMR alert systems should be carried out at national forums to increase dissemination of knowledge and develop opportunities for implementation across health systems nationally. This work should be undertaken in parallel with further research and evaluation of Child-At-Risk eMR alert systems to enable decision-making about how to optimise the systems' potential to alert clinicians to the wellbeing of children and at-risk pregnant women every time the clinician has the family in front of them, 24 hours a day, 7 days a week.

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Appendix A

Copy of survey instrument

Dear NNSW LHD staff member,

You are invited to participate in a study evaluating whether the use of the Child-At-Risk (CAR) electronic medical record (eMR) alert results in improved outcomes for at-risk children and at-risk pregnant women. We hope to learn about your experience of the CAR eMR alert system.

Participation is voluntary. You were selected as a possible participant in this study because you have either used the CAR eMR alert system or recently seen a patient who has a CAR alert applied to their eMR. There are no right or wrong answers, we are appreciative of any feedback you can provide. Criticism of the system is welcomed as equally as comments expressing satisfaction with the system.

If you would like to participate, you would be required to complete a short online survey of approximately 15 minutes' duration. The questions in the survey cover things like your experience of the CAR eMR alert system, what patient outcomes resulted from the alert system and what helped or hindered your ability to respond to clients/patients experiencing violence, abuse and neglect.

We acknowledge that the subject of violence, abuse and neglect should always be treated with sensitivity and can be upsetting for some people. In the event that participation upsets you, please contact the NNSW LHD Employee Assistance Program provided by Optum on 1300 361 008.

Any information that is obtained in connection with this study will be anonymous. Information you provide will be analysed and only aggregated data will be reported. We plan to publish the results in academic presentations and articles. In any publication, information will be provided in such a way that you cannot be identified. Data will be harvested from SurveyMonkey by the Australian Centre for Child Protection (research partner) not by staff of the NNSW LHD Child Protection Service.

This project has been approved by the North Coast New South Wales Human Research Ethics Committee: LNR159. If you have any ethical concerns about the project or questions about your rights as a participant please contact: Ms Rebecca Lavery, A/Research Governance Officer, C/-Murwillumbah District Hospital, PO Box 821, Murwillumbah, NSW, 2484.

If you have any questions about participation in the study, please email the Chief Investigator for the study, Rosa Flaherty at e-mail: rosemaria.flaherty@ncahs.health.nsw.gov.au or telephone: (02) 66418702.

Thank you for your time.

I consent to participate (Y / N)

Q1: I have applied a Child-At-Risk alert to the electronic Medical Record (eMR) of a patient or client (Y / N)

Q2: Postcode of your main work location

Q3: What is your profession?

Q4: Where do you mainly work?

Q5: Which type of healthcare do you most frequently provide?

Q6: What age group do you typically provide healthcare to?

- Q7: How many years have you been in your current position?
- Q8: Since leaving high-school, which of the following have you completed? (Degree level qualifications / TAFE level qualifications / Other (please specify))
- Q9: What is your age?
- Q10: What is your sex?
- Q11: We would like to know the extent of your knowledge of the CAR eMR alert system. Please state to what extent you agree or disagree with the following statement:
I have a good understanding of the CAR eMR alert system (Yes / Somewhat / Limited)
- Q12: Thinking about the CAR eMR alert system, please state to what extent you agree or disagree with the following statement:
The CAR eMR alert system improves responses from health workers to at-risk children and at-risk pregnant women (Strongly agree / Agree / Disagree / Strongly disagree / I don't know)
- Q13: When you see a CAR eMR alert on an at-risk child's or an at-risk pregnant woman's eMR do you:
Assess whether referrals to additional services are necessary? (this could include a discussion with the family) (Y / N / Other)
- Q14: When you see a CAR eMR alert on an at-risk child's or an at-risk pregnant woman's eMR: do you ask yourself if you have useful information to provide to other prescribed bodies? (Y / N / Other)
- Q15: When you see a CAR eMR alert on an at-risk child's or an at-risk pregnant woman's eMR and note that there have been missed appointments with yours or another service: do you try to resolve any barriers to attendance e.g. relax failure to attend rules? (Y / N / Other)
- Q16: My colleagues/peers use the CAR eMR alert system (Y / N / I don't know)
- Q17: What client/patient outcomes have you noticed that are related to the presence of the CAR alert on the patient's eMR? (There was a negative patient outcome due to the presence of the alert on the patient's eMR; The alert changed my approach to my assessment of the patient; The alert provided important and easy-to-access clinical information; The alert made no difference to my approach to the assessment of the patient; I made referrals to additional support services after seeing the alert; The alert allowed me to see immediately the child's/woman's child protection status; The alert allowed me to communicate with other services more easily; No patient outcomes were related to the presence of the alert; I have a de-identified case example I would like to provide - free text box)
- Q18: What factors or circumstances help you to respond to at-risk children and at-risk pregnant women? (The training I receive / My workplace policies, guidelines and resources to support my practice / The supervision I receive / My colleagues e.g. collegiate support, the opportunity for consultation on cases / Other - free text box)
- Q19: What factors or circumstances hinder your capacity to respond to at-risk children and at-risk pregnant women? (Lack of training / Lack of workplace policies, guidelines and resources to support my practice / Lack of supervision / Lack of collegiate support, lack of opportunity for consultation on cases / Other - free text box)
- Q20: Please rate your level of confidence in discussing the following issues with your clients/patients:
Parenting behaviours and parenting needs (Not at all confident / Not very confident / Somewhat confident / Very confident)

- Q21: Child well-being/welfare/maltreatment concerns (Not at all confident / Not very confident / Somewhat confident / Very confident)
- Q22: Social issues such as financial, housing, legal and transport problems (Not at all confident / Not very confident / Somewhat confident / Very confident)
- Q23: Relationships such as exposure to domestic and family violence (Not at all confident / Not very confident / Somewhat confident / Very confident)
- Q24: Referrals to other child and family support services (e.g. counselling, medical, child care, domestic violence services, housing, legal, drug and alcohol services, grief and loss support, problem gambling support etc.) (Not at all confident / Not very confident / Somewhat confident / Very confident)
- Q25: Cultural-specific needs such as providing assistance to Indigenous families in a culturally safe way (Not at all confident / Not very confident / Somewhat confident / Very confident)
- Q26: What do you need to be better able to respond to victims of interpersonal violence, abuse and neglect? (More time to spend with the patient / Ongoing professional development in the area of violence, abuse and neglect / Being observed doing my job and receiving feedback on my work (competency based assessment with reflective practice) / A changed job description / Supervision / Knowledge of the support services available for victims and to know how to refer to those services / Resources (e.g. manuals, child/family-friendly consultation spaces) / I have everything I need. I do not need anything to be better able to respond to victims of interpersonal violence, abuse and neglect / Other - free text box)
- Q27: Finally, we would like to know about the usefulness of the CAR eMR alert system. We would also like to know about any problems or dissatisfactions you have with the system. (Please tick all that apply: I understand eMR alerts systems in general; I don't understand eMR alerts systems in general; The CAR eMR alert is hard to use; The CAR eMR alert is easy to use; I've received sufficient support to help me use the CAR eMR alert system (e.g. technical support, training, informal support from colleagues); I haven't received enough support to help me use the CAR eMR alert system (e.g. technical support, training, informal support from colleagues); The CAR eMR alert helps families; The CAR eMR alert does not help families; I don't know if the CAR eMR alert helps families; At-risk children and at-risk pregnant women are safer now the CAR eMR alert system is in place; At-risk children and at-risk pregnant women are no safer now the CAR eMR alert system is in place than they were before the system was implemented; The presence of a CAR eMR alert makes no difference to how I assess the family; The CAR eMR alert should be a "pop-up" alert, even if the patient could see the alert on a computer screen (e.g. at triage in the emergency department); The CAR eMR alert should not be a "pop-up" alert; Clinicians will continue to use the CAR eMR alert, they won't tire of it; Clinicians will get alert fatigue in relation to the CAR eMR alert, and stop using it or stop taking notice of it.

Appendix B

List of Australian health departments

List of Health Departments contacted for information on the features of any child protection electronic medical record alert systems operating in their state:

1. Australian Capital Territory Health (ACT Health)
<http://www.health.act.gov.au/>
2. Northern Territory Department of Health
<https://health.nt.gov.au/>
3. Queensland Health
<https://www.health.qld.gov.au/>
4. South Australia Health (SA Health)
<http://www.sahealth.sa.gov.au>
5. Tasmania Department of Health and Human Services
<http://www.dhhs.tas.gov.au/>
6. Victoria Department of Health and Human Services
<https://dhhs.vic.gov.au/>
7. Western Australia Department of Health (WA Health)
<http://ww2.health.wa.gov.au/>

Appendix C

Health department response template

Organisation name: _____

Have you heard of or considered a Child-At-Risk eMR alert system in your organisation?

Question	Please tick
Yes, we have heard of this system but have not considered it for our organisation	
Yes, we have heard of this system and we have considered it for our organisation	
No, we have not heard of this system	
We are unsure whether we have heard of this system	
Other (please comment)	

If yes, the contact details for the manager of the alert system are:

Name: _____

Position: _____

Email: _____

If yes, the features of the system are:

If no, could you please elaborate on why?

Question	Please tick
This system is not relevant to our core business	
This system is too expensive/time consuming	
We do not believe this system is effective	
We have insufficient evidence of this system's effectiveness	
We have too little knowledge about this system	
Other (please comment)	

Thankyou. Please return to: Rosemaria.flaherty@ncahs.health.nsw.gov.au

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to Reduce Violence against Women & their Children

