



# KEEP THEM SAFE OUTCOMES EVALUATION

FINAL REPORT – ANNEX C  
NSW DEPARTMENT OF PREMIER AND CABINET

JUNE 2014

## ECONOMIC EVALUATION



#### Authors

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#### Ethics and police clearance

The outcomes evaluation has received human research ethics clearance from the University of New South Wales Ethics Committee. Researchers involved in this project have obtained appropriate clearances (police checks) which are required to work with sensitive datasets.

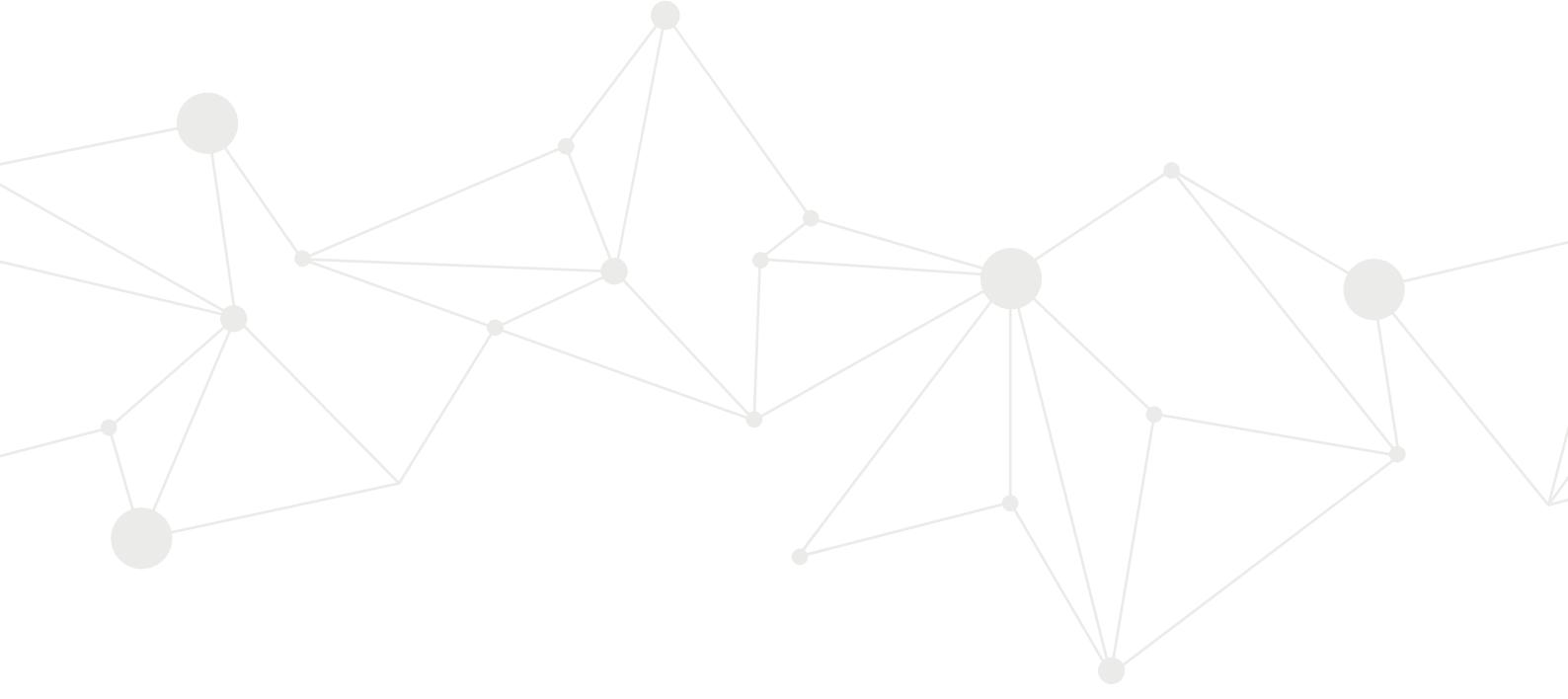


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## Abbreviations

ABS	Australian Bureau of Statistics
AEDI	Australian Early Development Index
CIW	Corporate Information Warehouse
CSGP	Community Services Grants Program
CYP	Children and young people
CWU	Child Wellbeing Unit
DAGJ	NSW Department of Attorney General and Justice
DPC	NSW Department of Premier and Cabinet
DEC	NSW Department of Education and Communities
FACS	NSW Department of Family and Community Services
Health	NSW Ministry of Health
KiDS	Key Information Directory System (KiDS) – Community Services information management system
KTS	Keep Them Safe
LHD	Local Health District
LGA	Local Government Area
NGO	Non-Government Organisation
OOHC	Out-of-Home Care
Police	NSW Police Force
ROH	Risk of Harm
ROSH	Risk of Significant Harm
SEIFA	Socioeconomic Indexes for Areas

# Executive summary



The NSW Government has made a substantial investment towards protecting children from harm through its \$750 million Keep Them Safe child protection initiative. Keep Them Safe (hereafter KTS) was introduced in 2009 as the NSW government's response to the Special Commission of Inquiry into Child Protection Services in NSW undertaken by Justice Wood (Wood Inquiry). A detailed description of KTS is provided in Section 2.1 of the Outcomes Evaluation Final Report.

This is one of eleven evaluation reports that make up the KTS outcomes evaluation. The evaluation involved nine separate yet complimentary methodologies that were designed to address eight evaluation questions and to analyse the various sources of data available to the evaluation team. A detailed description of the evaluation is provided in the KTS Outcomes Evaluation Final Report.

Keep Them Safe Outcomes Evaluation: Final report

- Annex A. KTS Indicators
- Annex B. Unit record Analysis
- Annex C. Economic Evaluation**
- Annex D. Professional Perspectives
- Annex E. Spatial Analysis Report
- Annex F. Synthesis of Evaluations
- Annex G. Report on Clients' Interviews
- Annex H. Data Development
- Annex I. Other NSW Strategies and Initiatives
- Annex J. Literature Review

The health, social and economic benefits (both long and short term) of improved child outcomes are well known and confirmed in an abundance of literature that surrounds the subject. KTS investment has sought to

improve these outcomes. This report seeks to identify the extent to which changes in KTS outcome indicators are attributable to KTS investment.

### **Child protection geographic database**

To test the impact of KTS funding on child wellbeing outcomes, the evaluation team has constructed a unique and extensive area level panel database of KTS outcomes, funding allocations and a range of local demographic and socio-economic indicators across the 153 NSW Local Government Areas (LGAs) between 2006/07 and 2012/13. This database includes unique constructs derived specifically for this project.

### **Treatment of KTS Expenditure**

Over half of KTS funding was able to be allocated to LGAs, using data and intelligence provided by various NSW government departments. These data were assembled within the Child Protection Basefile (CPB) and formed a cohesive and integrated dataset through which to model the impact of KTS programs on child outcomes in NSW using multivariate statistical analysis.

### **Treatment of the relationship between KTS funding and improved child outcomes**

There are two potential sources of bias regarding the estimates of KTS funding. First, allocation of KTS funding is non-random. There may be systematic differences in the characteristics of recipients and non-recipients of KTS funding, which also affect child outcomes; families with higher levels of risk or need may receive more funding. Second, it is likely that the decisions on various types of funding targeted at child outcomes are not independently made – funding may be allocated to areas or programs based on the demographics of the area or the nature of other programs already in place. We exploit the richness of the newly compiled dataset to include proxies for the key characteristics based on which KTS funding is allocated. Furthermore, we control for other funding received by the LGAs. The results presented in this report are robust in accounting for these important sources of bias.

### **Impact of KTS funding on children reported at Risk of Significant Harm (ROSH) in NSW**

The multivariate analysis shows that KTS funding, in particular funding directed towards Prevention and Early Intervention (PEI), has a significant impact on reducing the rate of Reports of Significant Harm (ROSH) across NSW LGAs.

The largest impact of KTS investment is for younger children (aged 0-5 years), where an increase of KTS funding of \$100 per child within a community is significantly associated with a decrease of 9 reports of children at ROSH per 1,000 children.

## **Impact of KTS funding on children re-reported at ROSH in NSW**

Children re-reported at ROSH provides a measure of the success of KTS in helping to protect children who have already been involved with the child protection system. Findings show that PEI funding has a significant impact on reducing children re-reported at ROSH in the KTS intervention period, particularly for older children. A \$100 increase in PEI funding per capita is associated with a decrease of 10.6 children re-reported per 100 children aged 0-17 previously reported at ROSH.

## **Comparing relative KTS investment with child outcomes**

A number of informative patterns are identified when differentiating areas of NSW into those which are characterised by relatively good (or poor) impacts (measured by reductions/increases in children reported at ROSH per 1,000 children over the KTS period), and relatively high (or low) total KTS funding per capita.

Area type	Pattern	Example LGAs
Low impact, high funding	Regional and coastal areas to the North of Sydney	Bourke, Brewarrina, Coonamble, Walgett, Guyra, Greater Taree, Clarence Valley
High impact, low funding	Around Sydney and scattered throughout NSW	Wollondilly, Woollahra, Hawkesbury, Bega Valley, Tweed, Conargo
High impact, high funding	Mid-west NSW and scattered throughout NSW	Lachlan, Central Darling, Carrathool, Bogan, Cobar, Moree, Eurobadalla
Low funding, low impact	Sydney and some regional areas	Blue Mountains, Penrith, Sutherland Shire, Marrickville, Young, Urana

## **Key Determinants of ROSH reports in NSW**

The results of the modelling have shown that other community and household factors, such as socio-economic status, access to services (remoteness), pre-school attendance (to some degree) and the level of other government activity also has significant effects on the rate of reports of ROSH in areas throughout NSW.

## **How this report should be read**

This report is one among many of the suite of reports within the KTS Outcomes Evaluation project. This report does not provide an unqualified answer as to the effectiveness of KTS, but instead offers one of a number of pieces of evidence as to the effectiveness of KTS on child wellbeing in NSW. The Report should be read in conjunction with other reports within the collection, in particular the KTS Indicators Report; Spatial Analysis Report and the Synthesis of Evaluations Report.

## **Limitations**

We recognise that the findings presented in this report are subject to the limitations and assumptions of the underpinning econometric modelling as well as the limitations of the data.

We have sought to identify and minimise, to the greatest extent possible, these limitations. While our work is firmly based on best practice and has been subjected to rigorous quality assurance procedures, the use of different data sets coupled with ongoing developments and improvements in data may potentially produce different results.

# Introduction



## About KTS

The NSW government has made a substantial investment towards protecting children from harm through its \$800m<sup>1</sup> KTS child protection initiative. KTS is arguably the most significant change to child protection policy in NSW since the introduction of mandatory reporting in 1987. It was introduced in 2009 as the NSW government's response to the Special Commission of Inquiry into Child Protection Services in NSW undertaken by Justice Wood. KTS is a five-year plan (2009-14) by government to improve the safety and wellbeing of children and young people (CYP) in NSW.

The KTS initiative includes a number of key elements of reform including:

- Increasing the threshold for reporting children and young people to the Child Protection Helpline from Risk of Harm (ROH) to ROSH
- Establishing Child Wellbeing Units (CWUs) in the major government reporting agencies
- Establishing a network of Family Referral Services
- Enhanced service provision, including PEI services and statutory/tertiary services
- Increasing the role of non-government organisations in delivering services

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<sup>1</sup> Note that this figure reflects actual funding (i.e. nominal dollars). The total KTS funding package was \$750m in constant 2009-10 dollars.

- Changes to Out-of-Home Care (OOHC)
- Changes to processes in the Children’s Court
- Providing better services to Aboriginal children and young people, with the aim of reducing their over-representation in the child protection system

The Outcomes Evaluation is intended to build on Interim Reviews and individual evaluations in order to investigate whether after five years of implementation, KTS has had the intended impact on the service system and ultimately on children in NSW. However, this is not simply a summative evaluation reporting on past performance; a key component of this evaluation is to support funding and policy decisions in the future regarding KTS as a whole and its constituent funded components. More specifically, its purpose is to:

1. Identify whether outcomes for children, young people and their families in NSW have changed since the introduction of KTS;
2. Identify the extent to which these changes are due to KTS;
3. Explain why identified reforms have been successful, within available information, to inform future decisions on the best way to preserve gains; and
4. Explain why some reforms have not been successful, within available information, to inform decisions about what should be done with these initiatives.

This report seeks to address the **second component** of the identified evaluation purposes –that is, to identify the extent to which changes in outcomes for children can be attributed to KTS.

## The Economic Evaluation

The purpose of the economic evaluation is to provide evidence of the cost-effectiveness of both the overall and individually funded aspects of KTS and to inform ongoing budgetary directions for child protection and wellbeing policy in NSW.

A cost-effectiveness framework has been applied to undertake the economic evaluation, whereby the improvement in an invaluable outcome, such as child safety, is reported against the cost of achieving that outcome and in this instance the strength of that relationship tested in a multivariate context.

## Research Objective

The primary research objective is to ascertain whether or not there exists a convincing connection between KTS funding and better outcomes for vulnerable children. We also seek to answer important policy questions relating to the efficiency of KTS and component programs. In particular:

1. Which areas throughout NSW illustrate better outcomes for lower investment?
2. To what extent has KTS investment provided better protection for children and young people in NSW?
3. Has KTS PEI funding resulted in better outcomes for children?
4. Are KTS components more cost-effective for some groups (e.g. younger children)?

The structure of the report is as follows. An Executive Summary including key findings is first provided. An introduction and background to the KTS outcomes evaluation and the overall aim of this report is outlined in this Section. The methodological approach including the unique longitudinal database, CPB, and econometric approach is outlined in Section 3. In Section 4, the results of an analysis of KTS investment are presented. Section 5 provides preliminary findings of the effectiveness of KTS funding and a conclusion is provided in section 6.



# Methodological approach



## Overall model concept

The biggest challenge to evaluating the impact of KTS on children's outcomes is that it is not possible to completely separate the effects of KTS from all other factors which are likely to impact on the wellbeing of children. Because KTS is a state-wide initiative there is no control group against which changes in outcomes can be benchmarked. Without such naturally occurring 'experiments', the solution adopted for this report seeks instead to take advantage of different program and funding combinations over time and across LGAs in order to identify the impact of KTS funding on outcomes.

An econometric model<sup>2</sup> is constructed that seeks to link measurable KTS outcomes to combinations of KTS program funding allocations, taking as much account as data availability allows of additional factors thought likely to influence KTS outcomes over time and across LGAs in NSW.

To test the impact of KTS funding on desired outcomes, the evaluation team has constructed a unique and extensive area level panel CPB that combines information on KTS outcomes, funding allocations and a range of local demographic and socio-economic indicators across 153 LGAs

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The full econometric specification is provided in the technical notes at the end of this report.

in NSW between 2006/07 to 2012/13.<sup>3</sup> The database includes unique variable constructs designed specifically for this economic evaluation project<sup>4</sup>.

The preferred modelling approach uses regression methods to capture the relationship between KTS outcomes and funding allocations, taking as much account as possible of factors other than KTS that are likely to affect each child outcome of interest.

The baseline model is as follows, where an example of testing the impact of KTS funding on children reported at ROSH, controlling for other variables is illustrated:

**ROSH = function of (KTS funding; Federal government activity; socio-economic status; remoteness; pre-school attendance; other)**

A number of statistical methods can be applied to control for variations in the incidence of children reported at ROSH by LGA. Fixed effects methods fully control for systematic LGA variations, but provide little explicit evidence on those factors that contribute to higher or lower numbers of children reported at ROSH.

An alternative is to apply standard regression methods to the cross-LGA panel, with a series of additional control variables to proxy and (more importantly) explain the relationship between KTS child outcomes and local area factors other than KTS programs. The marginal effects of (typically per capita) KTS funding allocations will then be adjusted to take account of these additional factors.

We choose the latter approach, but compare with alternative specifications to validate the robustness of the model's conclusions.

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- 3 It is important to note the different periods over which specific sources of data are observed, some annually over the full course of the KTS program, some over a restricted time period, and some only over one or two Census periods. Some of these indicators have shown little change between the 2006 and 2011 Census periods – for example, SEIFA and Remoteness.
- 4 A technical paper for the NSW CPB constructed by the evaluation team has been prepared to inform the basefile construction and provide a record and definition of all input variables.

## Attribution of KTS investment to outcomes

One of the key requirements in this economic evaluation is to develop and implement a modelling approach that is capable of identifying a causal link between the level of KTS investment in NSW and child protection outcomes. KTS funding allocated to particular localities in NSW is likely to be influenced by local risk profiles, so that LGAs with a higher prevalence of adverse child outcomes will generally attract higher aggregate levels of child protection funding<sup>5</sup>.

Despite this, the modelling approach used in this report has been able to exploit some important features of KTS funding introduced across NSW to establish a causal link between KTS funding and child protection outcomes. Specifically, there exists a degree of variation in the levels of KTS funding across NSW LGAs which have similar risk profiles. This feature derives from the stacking of KTS programs designed to target particular child protection issues, with different program combinations implemented across LGAs. This allows us to say that the level of KTS funding attracted to a particular area is not fully defined by the level of need (for example, ROSH for children living within a given locality). It is also the case that KTS funding represents for some LGAs an incremental stimulus or exogenous ‘shock’ to treat a given level of need. Even though there is a relationship between KTS funding and levels of need or risk across LGAs, there are sufficient variations in levels of funding across LGAs which are not fully (and endogenously) determined by need or risk factors. This variation provides enough statistical power to capture causal links between KTS investment and child outcomes.

The attribution of improved child outcomes to KTS funding in NSW has further been made possible through statistical methods applied to a longitudinal dataset (the Child Protection Basefile) which has been developed specifically for this evaluation. The following sections provide a summary of key elements of the modelling approach used in this report.

### Spill-over Effects

It is likely that there is a degree of geographical clustering of LGAs in NSW with similar socio-economic characteristics, child protection needs and risk profiles. The influence of KTS initiatives in a given LGA may also be felt in neighbouring localities. It follows that the methodological modelling approach should account for a degree of spatial correlation both in KTS funding and child outcomes across neighbouring LGAs.

Funding allocations for a range of individual KTS programs have been attributed to specific LGAs<sup>6</sup>. To account for the presence of ‘spill-over’ effects across neighbouring LGAs in NSW, a series of spatial regression techniques have been used that take explicit account of spatial correlations in child outcomes and KTS funding. Spatial weights were used to take account of the influence of funding data and outcomes across neighbouring LGAs, generated using the ARCGIS spatial toolbox. Using this geographical information, economic models have been estimated with explicit controls for spatial autocorrelation through either lagged KTS funding or child outcomes. A number of tests have been

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<sup>5</sup> This issue is referred in the literature as the problem of *endogeneity*.

<sup>6</sup> A further discussion of the spatial attribution of KTS funding data to NSW LGAs is provided later in this report.

conducted to check the robustness of the reported model estimates, particularly through an examination of the effects of spatial autocorrelation on the impact of KTS funding.

### Lagged responses

It is likely that the full effects of KTS investment will take some time to translate into improved child outcomes, either because of the length of time taken to implement new child protection programs or because the positive impacts of KTS programs are unlikely to be experienced immediately. There are strong arguments to suggest that funding decisions may have a lagged effect on current outcomes. To capture such delayed responses, we experiment with the use of lagged variables in model specifications. For example, current ROSH outcomes are modelled to be a function of KTS investment data for the previous year (at the cost of the loss of one year of outcomes data in the model specification). The use of lagged KTS funding variables in model specifications provides an additional benefit, in that it strengthens the attribution of changes in child protection outcomes to KTS funding.

A number of other explanatory variables have been lagged to account for delays in the impact. These include measures designed to proxy the level of economic activity (net business entries; and adult employment rates for each LGA). Model variants incorporating lags have been tested and are summarised in this report.

### Additional controls

A number of additional controls were considered for inclusion in the cost effectiveness models estimated in this report. Many of these controls have well established links with child wellbeing outcomes. Details can be found in the technical notes at the end of this document.

One of the key challenges of this analysis is to test attribution of observed changes in child outcomes to KTS investment. However, the estimates of KTS funding effects will be biased if characteristics related to the outcomes in the LGA that affect both KTS funding and child outcomes are omitted from the analysis. For example, the degree of social or economic disadvantage is likely to be associated with poorer child outcomes, and it is reasonable to expect that LGAs with higher levels of relative disadvantage receive more KTS funding than less disadvantaged LGAs. We include a measure of relative disadvantage/advantage to mitigate the potential bias from such an omission.

Other investment activity may also have an impact on outcomes, and failure to account for additional interventions other than KTS programs may lead to some bias in the KTS evaluation results. To mitigate this potential problem, we have constructed a proxy variable that measures change in the number of community/welfare workers from federal government per capita of the 0-17 population given information about their place of work in the 2006 and 2011 Censuses. A number of other variables to control for LGA-level heterogeneity are included. The list of the variables included in the model is as follows:

Controls:

- Remoteness (1 = major city; 5= very remote)
- Relative disadvantage/advantage (SEIFA index of economic advantage)
- Developmental vulnerability Australian Early Development Index (AEDI)
- Male/female employment (as a proportion of the LGA population aged 35 to 65)
- Proportion of 3-5 year old children attending pre-school, by LGA
- Federal government activity related to child wellbeing (proxy) proportion of national government-funded (either/both full-time and part-time) community sector workers per capita of the 0-17 population working in each area)
- Economic activity (net business entries (entries minus exits) as a proportion of the number of businesses in each LGA)

## Potential KTS cost-effectiveness models

A number of models have been designed to test the cost-effectiveness of KTS investment. Outcomes (dependent variables) are restricted to KTS indicators available across localities (LGAs) and for more than one point in time. Numerous models have been tested using the outcome indicators listed in Table 1. However some models were not feasible to use given limitations in the quality of available data.

**Table 1** Potential dependent outcome variables available spatially

Outcome Indicator	Outcome
2a AEDI – developmentally vulnerable in 1 or more and 2 or more domains	Children develop well and are ready for school
4a Number and rate of children and young people reported at ROSH	Children and young people are safe from harm and injury
4b Number and rate of children and young people in statutory OOHC	Children and young people are safe from harm and injury
6b Proportion of children and young people whose families have completed a targeted PEI program who are subsequently reported at ROSH	Child safety, welfare and wellbeing concerns are addressed before they escalate to statutory involvement
6c Proportion of children and young people whose families have completed a targeted PEI program who subsequently enter OOHC	Child safety, welfare and wellbeing concerns are addressed before they escalate to statutory involvement
11b Proportion of children and young people who re-enter OOHC	Children in OOHC transition to permanent care
11d Proportion of children in OOHC who have had fewer than 3 placements within 12 months	Children in OOHC transition to permanent care
13d Proportion of children and young people living in statutory OOHC who are placed with and case managed by non-government agencies	Children and young people in OOHC are safe and healthy and have access to the support they need.
15a Number and proportion of ROSH children and young people who receive a face-to-face visit (completed SARA/SAS2)	Children at ROSH are identified and protected
15b Number and proportion of children and young people for whom a secondary assessment determines intervention is required and who participate in a family preservation, Strengthening Families, or a placement prevention intervention.	Children at ROSH are identified and protected
15c Number and proportion of reports of ROSH for children and young people who have already been the subject of a substantiated ROSH report.	Children at ROSH are identified and protected

Source: Population Outcome Indicators Technical Report

## Benefits of reduced child maltreatment



As set out in the introduction of this report, a cost-effectiveness framework has been applied to undertake the economic evaluation of the KTS child protection program. Cost-effectiveness methods seek to report the level of improvement in a targeted outcome, such as child safety, against the costs of achieving that outcome. The strength of that relationship can be tested in a multivariate context, as is the case in this report.

It is understood that the benefits arising from an improvement in child wellbeing – specifically a reduction in child abuse – are likely to extend beyond the individual, family or community to society more broadly. It is also clear that the value from improvements in child outcomes will continue to be realised into the medium and longer term, and through both direct and indirect channels. The benefits, or costs avoided, are diverse and range from reduced expenditure on child protection and OOHC systems due to decreased prevalence and incidence rates of abuse, to higher returns over the child's life course from better educational and labour force outcomes that result in higher life-time earnings, greater tax revenue and individual wealth accumulation.

A number of literature reviews have identified and categorised the numerous costs of child abuse (both social and economic), with the subsequent avoidance of these costs resulting in far-reaching benefits. Consistently identified themes of long-term benefits centre around the prevention of future adverse outcomes including (but not limited to) drug and alcohol abuse; lower cognitive development; mental illness; poor educational and labour force outcomes; productivity loss; relationship dissolution; homelessness and criminal activity (see Hunter 2014; Goldman et al. 2003; and Gilbert et al. 2008 for examples). Often, as is the case with cost-effectiveness analyses these benefits are difficult to monetise.

There have been attempts to quantify the annual cost of child abuse and neglect in NSW. One such report valued the prevalence costs from child abuse incurred in a single year at around \$1.3 billion, and

a lifetime incidence cost of \$2.2 billion for children abused for the first time in 2007 (Taylor et al. 2008). However, these 'best' estimates sit within broad lower and upper bounds (particularly if additional health cost burdens are factored into overall costs), and emphasises the extreme difficulties in attaching monetary values to the benefits from a reduction in child maltreatment.

Given the challenges of monetising benefit components, together with the strong assumptions that underpin cost benefit analysis and the difficulties in attaching a degree of confidence to projections of costs/benefits, this economic evaluation has instead been conducted using a cost-effectiveness method. Nevertheless, it is important to note the high value of projected benefits from reducing child abuse, in both social and economic terms. If KTS can be shown to improve child outcomes in NSW, the costs from introducing the KTS initiative are likely have been significantly lower than the benefits produced. Consequently, the question posed in this report is not whether the benefits outweigh the costs, but rather, how successful a finite investment of resource has been in improving the wellbeing and safety of children in NSW.

Further, as the aim of this evaluation is to examine the overall impact of KTS as a system intervention. It is beyond the scope of this report to examine each program individually<sup>7</sup>. However, program funding by broad service element (for example PEI) has been differentiated in this cost-effectiveness analysis to test these impacts separately.

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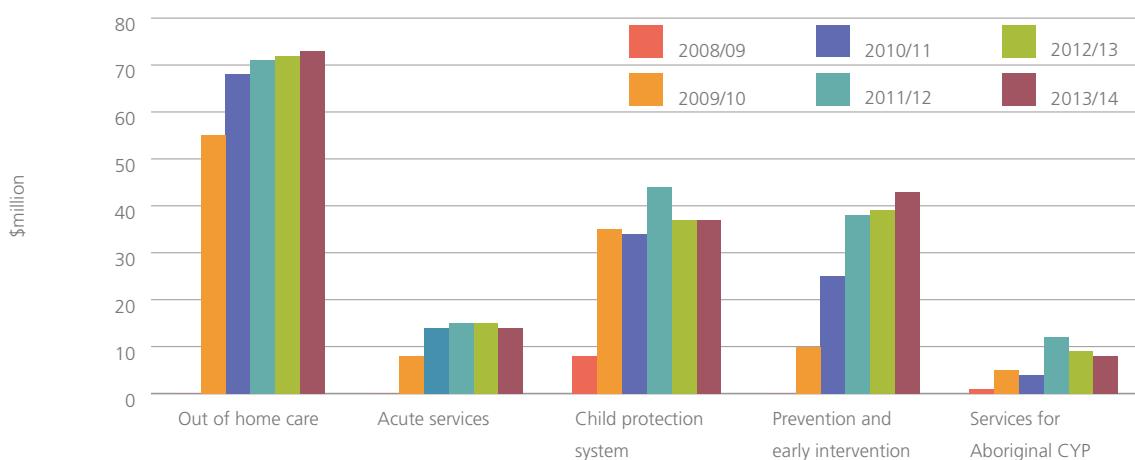
<sup>7</sup> Individual program evaluations have been undertaken and a synthesis and appraisal of these evaluations, including a summary of each program has been compiled as part of the overall KTS Evaluation. See Cassells R, Duncan A, Katz I, Keegan M, Mavisakalyan A, Macvean M, Middleton R and valentine k (2014), '*Keep Them Safe Outcomes Evaluation: Synthesis of Evaluations Final Report, Annex F*', Sydney: NSW Department of Premier and Cabinet.

## Investment in KTS



This analysis considers funding spent from 2008-09 to 2012-13, as well as allocated expenditure in 2013-14. In total, KTS has spent or has planned to spend almost \$800 million from 2008-09 to 2013-14 (Figure 1). The greatest share of this funding has gone towards enhancements to the OOHC system, to a total of \$336 million over the six years of the KTS. Around half of this funding was involved in supporting Non-Government Organisations (NGOs) in taking a greater responsibility for OOHC, as well as OOHC by Community Services (formerly Department of Community Services) (\$87m) and greater funding for Community Services caseworkers (\$38m).

**Figure 1** KTS funding by service type, 2008/09–2013/14



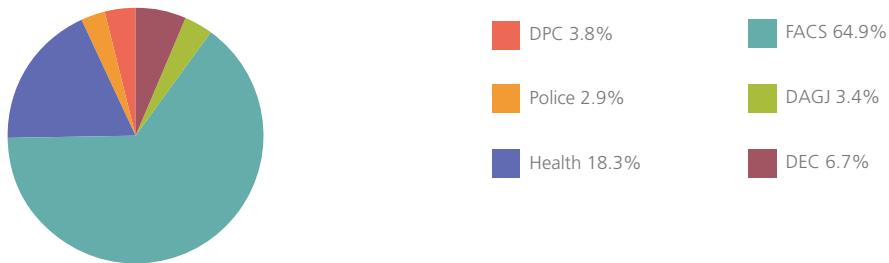
Note: 2013-14 figures are budgeted amounts.

Source: NSW government data.

Over six years, \$196 million has been allocated to improving the child protection system, which identifies children and young people at ROSH and endeavours to improve their situation by supporting their families or removing them to alternative care. Another \$156 million has been spent on prevention and early intervention; that is, new programs and enhancements for existing programs designed to identify families that may be having difficulties and support them in dealing with these problems, and diverting them to services which will help to prevent the children entering the child protection system. Smaller amounts have been spent on acute services that support children who are already in difficult situations, and programs specifically targeted to Aboriginal children and young people.

The total amount of funding has varied over the years due to some programs receiving gradually increasing funding (for example, caseworkers and OOHC) and some programs running for trial periods only or one-off expenses to change existing systems (for example, training in new procedures for Child Protection Helpline workers and program evaluations).

Most of the funds attributed to KTS are allocated and managed by the Department of Family and Community Services (FACS). Ministry of Health (Health) were also responsible for managing substantial KTS funding, with Education, NSW Police (Police), Department of Premier and Cabinet (DPC) and Department of Attorney General and Justice (DAGJ) responsible for smaller amounts (Figure 2).

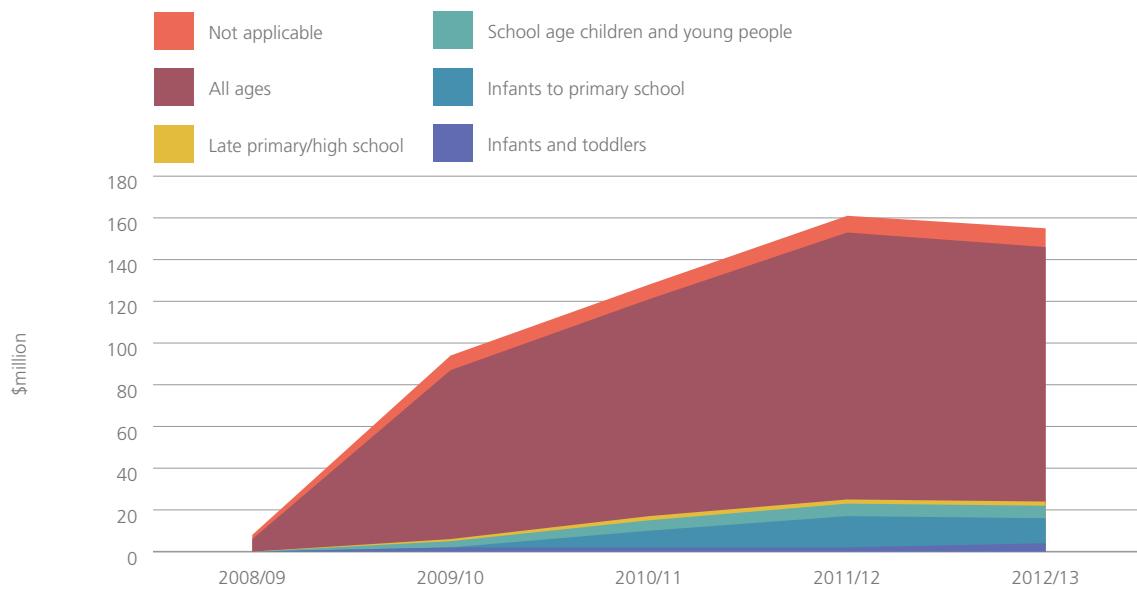
**Figure 2** Share of KTS funding by department, 2008/09 to 2013/14

Note: 2013-14 figures are budgeted amounts.

Source: NSW government data.

One of the focuses of KTS is early intervention – providing assistance to families and children when difficulties are first apparent, rather than when problems become intractable. As Figure 3 shows, while most of the funding (excluding OOHC funding) has gone towards programs targeted at all age groups, a substantial minority is directed towards programs targeted at young children. The aim of such programs is usually to identify children and their families who may be at risk and provide support at an early stage. Programs aimed at school-aged children tend to be education-based programs, so that families in difficulty can be identified and supported through the education system. Funding designated as ‘not applicable’ are mostly programs designed to improve the welfare of children indirectly, such as governance and training for those working in child protection.

**Figure 3** KTS funding by target age group, excluding out OOHC funding, 2008/09-2012/13



Note: 2013-14 figures are budgeted amounts.

Source: NSW government data.

As discussed above, the largest areas of expenditure were OOHC provided by NGOs and Community Services. The largest program was the CWU, for which Department of Education and Communities (DEC), Health, FACS and Police received funding; followed by Family Referral Services, managed by Health, which refers families whose children are not at ROSH to appropriate support services if they are in difficulty (Table 2).

**Table 2** Areas of KTS expenditure in excess of \$20 million from 2008-09 to 2013-14

Department	Program	\$million <sup>1</sup>
FaCS	OOHC – NGOs	174.7
FaCS	OOHC – Community Services	86.9
FaCS, Police, Education, Health	CWU	65.6
Health	Family Referral Services	39.5
FaCS	Community Services Caseworkers (69)	38.7
FaCS	Brighter Futures	36.7
FaCS	Intensive Family Preservation	30.8
Health	Whole Family Teams (drug and alcohol intensive interventions)	27.1

1 Total funding (\$m) 2008-09 to 2013-14.

Source: NSW government data. 2013-14 figures are budgeted amounts.

## Spatial Attribution of KTS funding

Conducting this cost-effectiveness analysis at small area level requires data on financial expenditure of as many KTS programs as possible to be mapped at the same level, in this case LGAs. If KTS is effective, one would expect that LGAs that received high levels of funding would show greater improvement in child outcomes than one with less funding.

Funding for KTS programs was not evenly distributed across New South Wales. Some programs were pilot projects focused on specific regions or LGAs; others targeted children and young people in particular circumstances who tend to be concentrated in certain areas; and regional families are much more likely to find that their nearest service is too far away for them to access. To analyse the impact of KTS funding across New South Wales, we needed to come up with reasonable estimates of how KTS spending over the range of programs affected children in different LGAs. One would expect LGAs which received substantial KTS funding per child resident to show stronger improvements than LGAs that received little.

Not all programs were able to be mapped – some programs were centrally-based, such as the CWU program, and some programs related to more administrative activities, such as IT upgrades and training. It was feasible to map around 56 percent of total KTS expenditure.

It should be noted that the funding mapped in this report is actual expenditure as indicated by departments, not budgeted expenditure. We have been informed that some departments have topped up KTS funding with their own funding, or that some programs have underspent, overspent or transferred funding to other programs, so budgeted and actual expenditure will differ.

## **Methods used**

Agencies involved in KTS funded programs were asked to provide information on KTS regional expenditure by program, for at least the period from 2008/09 to 2013/14. Departments were asked for earlier data if available to establish a baseline, but this was not available for most programs. The data provided was typically not provided at LGA level, but some other regional classification, such as Health's Local Health Districts (LHDs) or FACS' CSNs, or by name of town. Alternatively, total data for NSW was provided but the nature of the service provided or the clients seen to mean that the area benefiting from the service could be identified, and expenditure was mapped to that LGA.

Where funding was provided for regional groups that were larger than LGAs, the common method used to map by LGA was to:

1. Identify the group of children targeted, e.g. all children, school-aged children, Aboriginal children or children in OOHC;
2. Use data on the percentage of children in a given region that live in that LGA, for example, Census data shows that 20% of children in the Western LHD region are located in the LGA of Dubbo;
3. Map expenditure for LGAs by multiplying the percentages calculated in (2) by funding for the region. For example, if the Western LHD received \$500,000 in funding for a particular program, \$100,000 of that funding would be mapped to the Dubbo LHD.

Many mapping processes differed from this to adapt to the financial data available or the nature of the program, so this section describes the assumptions made in estimating which LGAs received the benefits of KTS spending for each program. This is based on data provided by the departments administering the programs, our understanding of how the programs operate based on descriptions from project evaluations and discussions with departments on how funding allocation operates.

## **Earlier analysis**

In 2011, Access Economics undertook a spatial analysis of KTS funding and its impact on outcomes for children and young people in NSW (Access Economics, 2011). As part of this project, Access Economics mapped funding up to 2011/12, and their analysis and methods have informed this analysis. To enable this report to be reasonably comparable to that prepared by Access Economics, we have attempted to use similar assumptions to those used in the Spatial Analysis report. However, in some cases our understanding of the program indicated that Access' methods did not fully capture where the impact of funding was felt, so we used alternative methods. Thus the results presented in the Spatial Analysis report will not necessarily match those in this report. Further, a number of programs had been merged, discontinued, separated and transferred to other departments since they conducted the analysis for the KTS Interim Review, and this has changed some of the parameters used for the analysis.

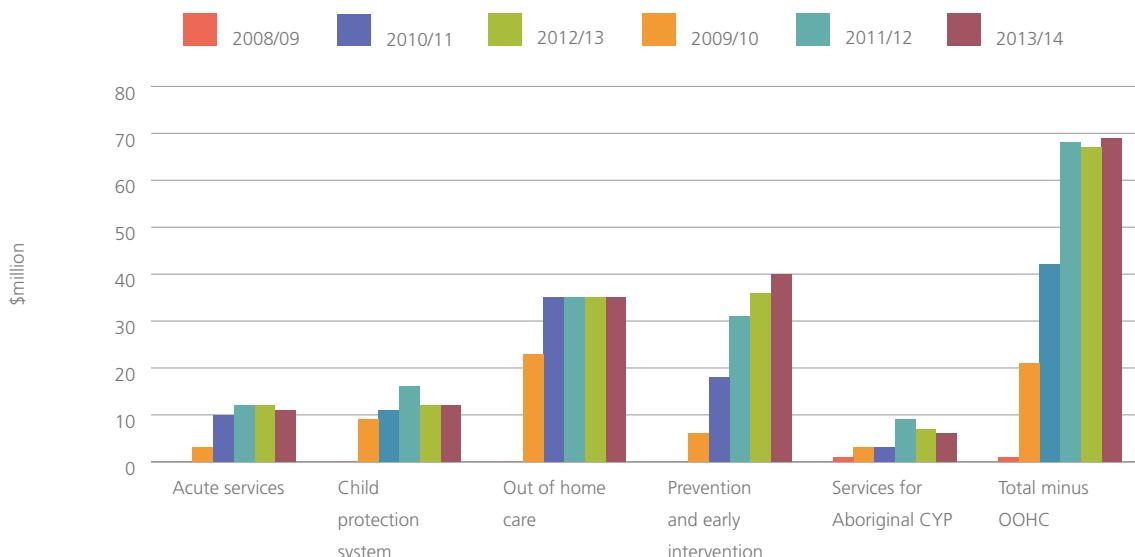
## Limitations

The assumptions used in this mapping exercise reflect the funding data provided by various departments, discussions about the nature and impact of the programs with department representatives and advice from Access Economics about the methods used in the previous review. It is not possible to perfectly allocate KTS expenditure to specific geographic areas, and these assumptions reflect what we believe is the most reasonable method of mapping funding given the information we have available.

## Summary statistics

The amount of KTS funding that was able to be allocated throughout NSW LGAs is illustrated in Figure 4. Overall, around \$400m of KTS funding was allocated spatially, representing just over half of all KTS funding. A decision was made not to include OOHC funding in the modelling exercise, because funding of OOHC is closely related to the location of carers rather than the original homes of the children.

**Figure 4** KTS funding data – mapped data, 2008/09-2012/13

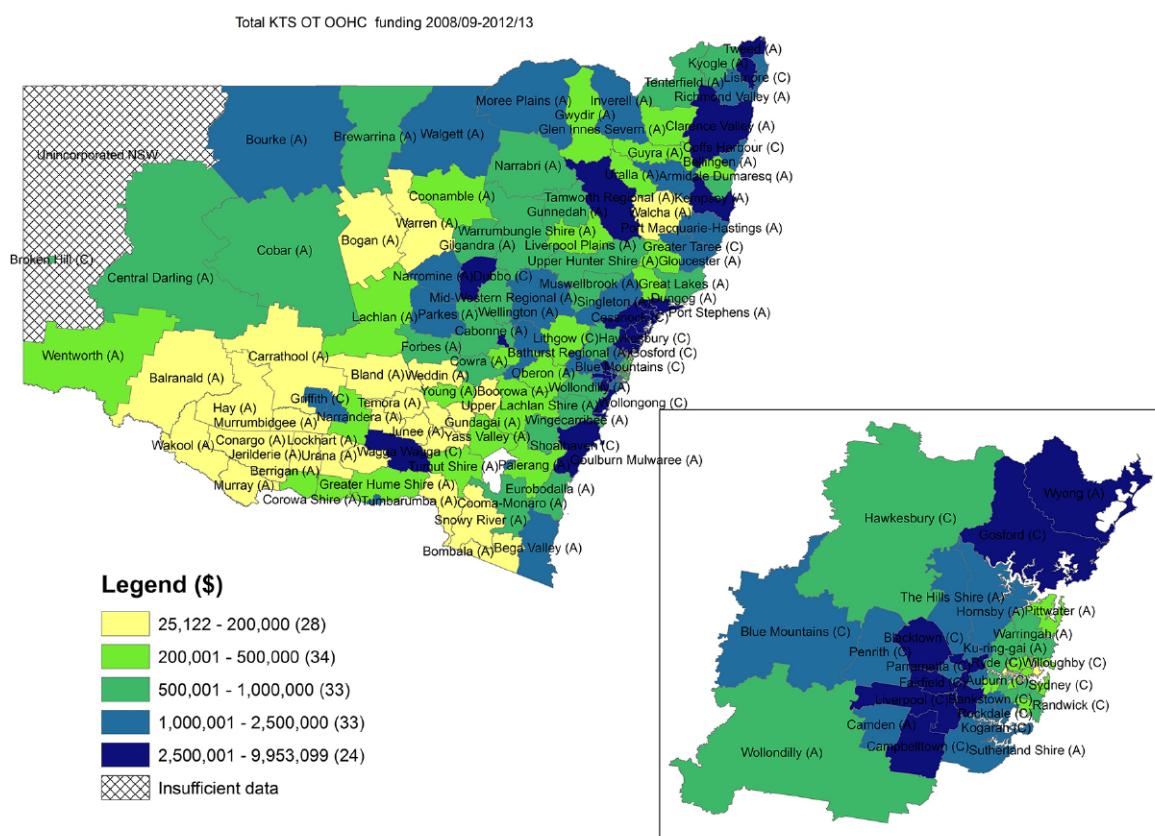


Source: NSW government data. 2013-14 figures are budgeted amounts.

The spatial distribution of total KTS location-specific spending (other than OOHC) between 2008/09 and 2012/13 is shown in Figure 5. As expected, more densely populated areas receive the greatest amount of funding, as do those LGAs associated with higher levels of relative child disadvantage.

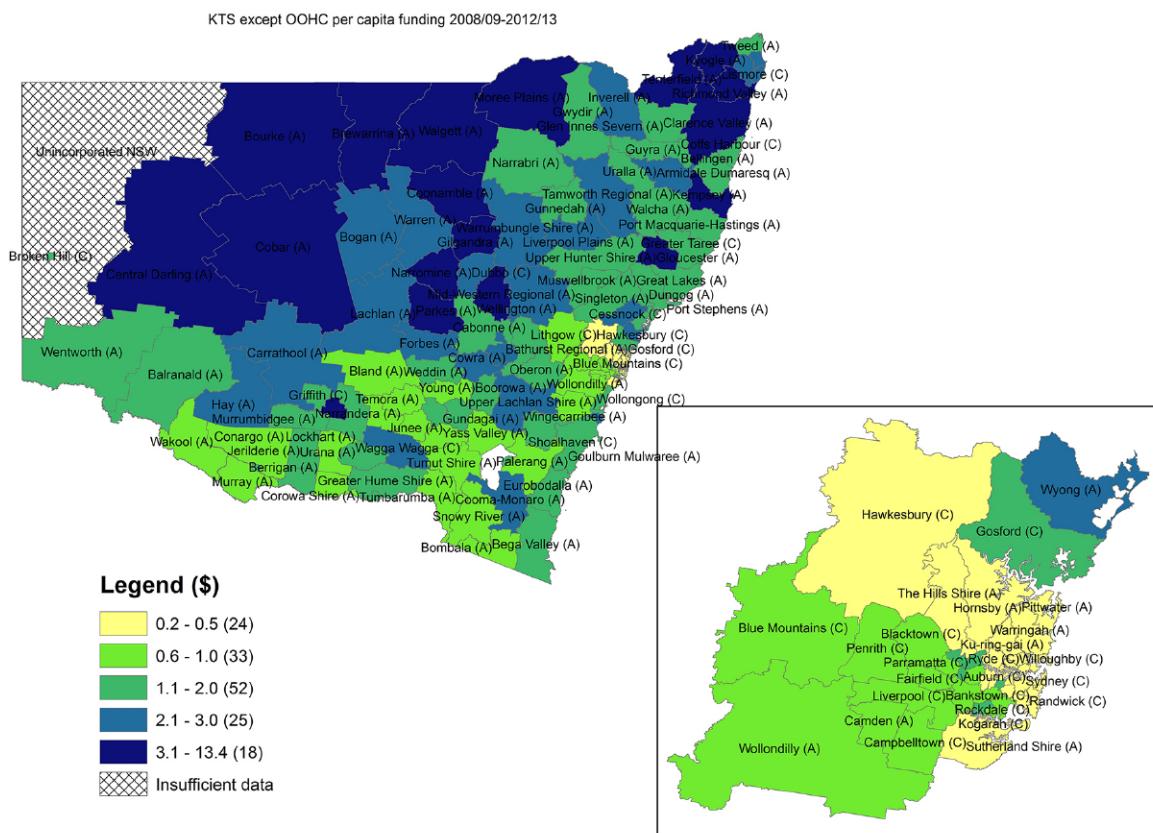
To control for scale differences across LGAs and capture more directly the level of KTS investment per child, Figure 6 reports the spatial distribution of total KTS funding (net of OOHC programs) per capita of the local child population aged 0 to 17 between 2008/09 and 2012/13. This latter spatial breakdown serves to highlight the greater per capita investment in KTS programs in regional areas of inland NSW, particularly to the north and west of Sydney and its surrounding suburbs.

**Figure 5** Overall KTS investment (total KTS spending) by LGA, 2008/09-2012/13



Source: NSW government data.

Note: Excludes OOHC expenditure

**Figure 6** Total KTS investment (per capita, child population) by LGA, 2008/09-2012/13

Source: NSW government data.

Note: Excludes OOHC expenditure.



# Findings



## Comparing relative KTS investment with child outcomes

The analysis presented here represents a powerful piece of information for planning and assessment of KTS investment versus outcomes. However, there is no definitive rule that equates an increase in KTS funding to absolute improvements in child outcomes.

Those areas with low KTS investment and better outcomes are not necessarily the areas where KTS funding is more cost-effective. These areas may be benefitting from other non-KTS government funding, improvements in socio-economic outcomes and greater community initiatives. Similarly, areas with high per capita KTS funding but relatively poor outcomes may not necessarily mean that KTS funding is not effective. Rather it could mean either that the positive effects are yet to happen, or that other factors that drive poorer child outcomes are also in play, creating greater barriers to achieving positive results from KTS. Nevertheless, on average, it would be expected that greater KTS funding should result in better outcomes, taking into account the demographics and additional (non-KTS) funding sources in the community.

As an illustration of these points, Figure 7 seeks to differentiate areas of NSW into combinations of relatively good (or poor) ROSH outcomes (i.e. changes in children reported at ROSH over the KTS period), and relatively high (low) total KTS funding per capita.

To do so, we rank LGAs into the lowest to highest quintiles (fifths) in two dimensions: first, according to total KTS funding other than OOHC per capita of the child population aged 0-17; and second, according to the relative improvement in children reported per 1,000 children aged 0-17 between 2010/11 and 2012/13. This allows us to categorise LGAs into the following four categories:

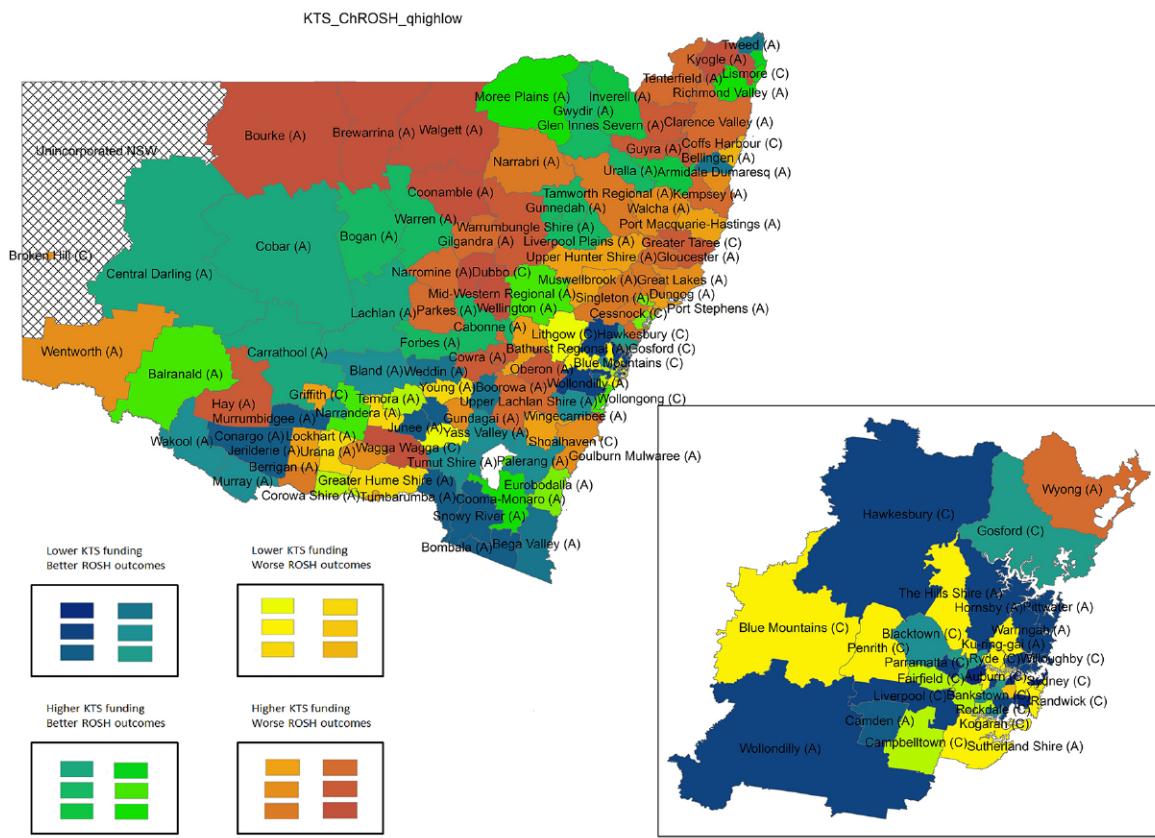
- Relatively better ROSH outcomes and lower per capita KTS funding (blues)
- Relatively better ROSH outcomes and higher per capita KTS funding (greens)
- Relatively poor ROSH outcomes and lower per capita KTS funding (oranges)
- Relatively poor ROSH outcomes and higher per capita KTS funding (reds)

To read the map, one should focus in particular on the deeper shades of blue, indicating those LGAs for which children reported have improved (i.e. rates per 1000 declined) and total KTS funding per capita has been relatively low. These should be contrasted with the deeper shades of red indicating a combination of relatively poor child outcomes (higher rates of children reported at ROSH per 1000) between 2010/11 and 2012/13 and relatively high total KTS funding.

Some interesting and revealing patterns emerge, with regional areas to the North and West of Sydney in particular showing worse child outcomes despite high per capita KTS funding (e.g. Bourke, Brewarrina or Coonamble). These contrast with localities around Sydney (e.g. Wollondilly, Woollahra or Hawkesbury), where improvements in children reported at ROSH combined with lower per capita KTS funding, are observed. Strong ROSH improvements between 2010/11 and 2012/13 also occurred in the mid-west of NSW (around Lachlan, Central Darling and Carrathool), with relatively high levels of KTS investment per capita, whereas Marrickville, Young and Urana are flagged as LGAs for which children reported at ROSH have increased under relatively low levels of KTS funding.

It is worth bearing in mind that there may well be a relationship between greater investment and activity and child contact with mandatory reporters (known as the surveillance effect) – therefore the rate of children reported at ROSH will potentially be higher in areas where there is more funding due to this factor.

**Figure 7** Combinations of total KTS funding per capita (2008/09-2012/13) and changes in ROSH per 1000 between 2010/11 and 2012/13, by LGA



Source: NSW government data.

An important implication can be drawn from the representation in Figure 7 of the prevalent combinations of per capita KTS investment and ROSH outcomes across LGAs in NSW. Specifically, it is clear that there exists a good degree of variation in relative per capita KTS funding among LGAs that have similar risk profiles. It is also apparent that a given level of KTS funding is associated with a broad range of changes in children reported at ROSH over the period between 2010/11 and 2012/13. This highlights the different relative per capita KTS funding for LGAs with a given risk profile.

Taken together with the arguments presented in the introduction to this report, these two observations reinforce the assertion that there exists sufficient variation in KTS funding across LGAs with a given level of need to support the identification of KTS funding effects.

The next sections of this report turn to a quantification of such associations, for two indicators in particular –

- (i) Changes in the number of children reported to be at ROSH; and
- (ii) Changes in the number of children who are re-reported at ROSH having been reported in the previous year.

## Effectiveness of overall<sup>8</sup> KTS funding on children reported at ROSH

### Summary results

KTS funding overall is estimated to significantly reduce the count of children and young people reported at ROSH per 1,000 of the full child population across LGAs in NSW, with greater reductions for younger children at ROSH. Quantifying the effectiveness of KTS funding overall, all else being equal, a \$100 increase in funding per capita is associated with the following impacts:

- a decrease of 9 CYP reported at ROSH per 1,000 children aged 0-5
- a decrease of 7 CYP reported at ROSH per 1,000 children aged 6-12
- a decrease of 5.5 CYP reported at ROSH per 1,000 children aged 13-17
- a decrease of 7 CYP reported at ROSH per 1,000 children aged 0-17

### Model specification

- **Dependent variable:**
  - CYP reported at ROSH per 1,000 of the 0-17 child population, by LGA:
  - Separate models for CYP at ROSH by age of child 0-5, 6-12, 13-17
  - Aggregated models for all children (both Aboriginal and non-Aboriginal children)<sup>9</sup>
- **Funding variables:**
  - All KTS funding other than OOHC<sup>10</sup>, per capita of the 0-17 population

8 Excluding OOHC.

9 Separate model specifications for Aboriginal children have not been able to be developed due to inaccurate child population counts at the LGA level.

10 As OOHC funding is directly related to the provision of OOHC places, we chose not to include these funding amounts.

- **During-ROSH:**
  - Dummy to control for threshold change from ROH to ROSH
  - Included as a robustness check for model variants that have been estimated over a time period that covers the change in ROH/ROSH reporting practice
- **Spatial controls:**
  - Reported models account for spill over effects, captured through the use of spatial regression methods that control for the impact of KTS funding in adjacent LGAs, and spatial correlations in child outcomes (dependent variables) in neighbouring LGAs
  - Spatial weights are used to capture the influence of KTS funding and other socio-economic variables in neighbouring (*contiguous*) LGAs on CYP at ROSH.
- **Lagged variables:**
  - Included – both for KTS funding variables (one year lag) and for additional controls (net business variables and male/female employment by LGA)

## Summary of results

Table 3 summarises the aggregate cost effectiveness of KTS funding in reducing the number of children reported to be at ROSH (KTS Indicator 4a). Reported results capture the impact of KTS funding on children reported, using an aggregate of children reported at ROSH for Aboriginal and Non-Aboriginal children. Ideally, we would also be able to assess separately the impact of funding on the Aboriginal population, but due to difficulties with enumerating this population, we are unable to pursue this as an option at this time.

### Socio-economic disadvantage

Turning first to the relationship between non-KTS factors and child outcomes, Table 3 shows that the number of children reported at ROSH per 1,000 of the child population in NSW declines as socio-economic advantage in the area rises (according to the SEIFA index of disadvantage/advantage). This result remains consistent across children reported at ROSH for all child age groups 0-5, 6-12, and 13-17, with the biggest impact for children aged 0-5 years. An improvement in SEIFA advantage levels of ten points is associated with a reduction in the rate of children reported at ROSH for all 0-5 year old children by 2.4 per 1,000 children.

### Pre-school attendance

The proportion of children aged 3-5 attending pre-school has a weaker association with a reduction in children reported at ROSH. A one per cent increase in the proportion of 3-5 year old children attending pre-school has the effect of reducing children reported at ROSH by up to 0.13 in every 1,000 for school aged children, all else being equal. It is likely that pre-school attendance is working as a strong protective factor, and also links with higher labour force participation and educational attainment of parents with pre-school aged children. Federal and State government activities towards enhancing pre-school access for young children, are likely to see many gains, including the potential to reduce child maltreatment and serve as a mechanism to identify the need for early intervention.

### **Remoteness**

Remoteness is a strong proxy for the ability to access particular services, and has proven associations with the level of relative disadvantage a community experiences. Children reported at ROSH significantly increase with remoteness for the full child population. An increase towards remoteness of one unit increases the rate of children reported at ROSH by 18.1 per 1,000 of the 0-17 year child population. These changes in children reported at ROSH are consistently significant and strong across child age groupings, with the highest impact on children aged 6-12 years. These results are consistent with what we observe in the spatial distribution of children reported at ROSH, where the more remote the LGA in which children live, the more likely they are to be reported at ROSH (see Appendix Figure 9).

### **Economic activity**

The level of economic activity has been measured through annual changes in the male and female employment rates as well as net business entries. There is some limited evidence of a negative relationship between new business entries and reports of ROSH, although the association is insignificant overall. Stronger (and contrasting) evidence suggests a significant reduction in children reported at ROSH as male employment rates rise, but an increase in reports of children at ROSH with higher rates of female employment, significantly so in the case of school aged children reported at ROSH. This raises the possibility that women as primary carers provide some protection to children being reported at ROSH.

### **Other government activity**

To control for the level of Federal investment in child protection and community services, we model children reported at ROSH as a function of the increase between 2006 and 2011 in the number of Federal government-funded community sector workers in each LGA per capita of the 0-17 population. See technical notes at the end of this report for further details. We find that a net increase in federal government community sector workers has impact on decreasing the rates of ROSH per 1,000 children by between 1.2 and 2.4 reports (with larger effects for the youngest children). For the most sophisticated model variant reported in Table 3, these impacts are insignificant. However, other modelling variants do reveal a significant association.

### **KTS funding**

Turning to the main indicator of interest, total KTS mapped funding is shown to have a significant effect on reducing children reported at ROSH when controlling for other factors. This effect is more dominant for the younger age group, where an additional \$100 per capita of KTS funding (excluding OOHC funding) decreases children reported at ROSH for 0-5 year olds by 8.8 in every 1,000. The effect of KTS funding remains significant across age groups, but diminishes as children age. This finding is examined in later sections of this cost-effective analysis, which seeks to determine which aspect of KTS funding has the largest effect on ROSH outcomes.

**Table 3** Impact of KTS funding on ROSH, All children (indicator 4a): 2010/11 to 2012/13

Control factor	ROSH outcomes – child age categories			
	0-5	6-12	13-17	All (0-17)
Index of socio-economic advantage	-0.24**	-0.22**	-0.18**	-0.20**
Index of early child development	0.046	0.02	0.02	0.04
Increase of children in pre-school	0.01	0.13	0.11	0.00
Net business entries	0.38	-0.66	-1.56**	-0.33
Male employment (aged 35-64)	-0.64	-0.72**	-0.74**	-0.72**
Female employment (aged 35-64)	0.28	0.71	0.86**	0.63*
Remoteness (1 = city; 5 = very remote)	20.26**	20.68**	13.42**	18.13**
Increase in Federal community workers	-2.39	-1.19	-1.71	-1.85
All KTS funding (\$100s per capita, 0-17 pop)	-8.83**	-7.08**	-5.60**	-6.73**
Constant	106.62*	100.68**	69.78*	110.09**
Sample size	456	456	456	608
Overall R-squared	0.6210	0.6751	0.6564	0.695
Spatial correlation	0.349	0.281	0.406	0.172
p-value (spatial correlation)	0.055	0.054	0.050	0.064

Notes: Dependent variables are the counts of children reported at ROSH per 1,000 of all children for each of 153 LGAs in NSW. Each column reports children reported at ROSH per 1,000 estimates for counts in each of the four child age categories 0-5, 6-12, 13-17 and 0-17. The funding variable included in each model is aggregate KTS funding per capita of the LGA child population allocated to each LGA (with units scaled to \$100's). Other controls are as described in the text.

Sources: FACS, KiDS – CIW annual data and ABS Australian Demographic Statistics, ABS Censuses of Population and Housing; ABS National Regional Profile data and the Australian Early Development Index.

### Sensitivity Analysis

To assess the robustness of the evaluation findings reported in Table 3, we examine a range of modelling variants against which to compare the size and significance of KTS funding and other socio-economic variables on the number of children assessed to be at ROSH. These modelling variants cover a progression of specifications, starting with a simple regression of children assessed at ROSH as a function of current KTS funding on the CPB panel of LGA data from 2009 to 2012 ("baseline" in Table 4). This model is then compared with a variant that incorporates an additional indicator of early child development to the set of existing controls ("adding AEDI"). As highlighted earlier, our chosen indicator for this particular variant is the proportion of children in each LGA reported to be developmentally vulnerable on two or more domains. Both models produce similar results, with significant funding effects around a fifth higher than those reported in Table 3 and a positive relationship between children reported at ROSH and the proportion of children who are developmentally vulnerable. That is, greater developmental vulnerability within an area has a significant association (all else being equal) with higher proportions of children reported at ROSH.

Our third robustness test seeks to confirm the attribution of improvements in child outcomes to KTS funding through a variant that links current children reported at ROSH with KTS funding during the previous year ("Lagged funding") rather than the current period. This latter variant results in the loss of a year of data in model estimation (2010 to 2012), given the need to derive lagged KTS funding using data from 2009 to 2011 but serves to strengthen the attribution of the number of reports of significant harm to prior years' KTS funding (which is by definition exogenous, even if correlated over time). The effect of lagging the funding variable is to reduce the estimated impact of KTS funding on children reported at ROSH by around seventeen per cent (to 7.9 from 9.5), but with maintained significance.

The final column of Table 4 repeats the full specification reported in Table 3 for all children aged 0-17, with the inclusion of explicit controls for spill-over effects from KTS funding and programs in neighbouring areas. This provides the most conservative specification given that it incorporates the full range of controls for model specification, causality and spatial correlations.

**Table 4** Impact of KTS funding on ROSH, model variants: 2009/10 to 2012/13

Control factor	ROSH outcomes – child age categories 0-17			
	Baseline model	Adding AEDI	Lagged funding	Lags and spatial controls
Index of socio-economic advantage	-0.19**	-0.17**	-0.15**	-0.20**
Index of early child development	-	0.04**	0.03**	0.04
Increase of children in pre-school	-0.04	-0.05	-0.06	0.00
Net business entries	-0.33	-0.34	-0.30	-0.33
Male employment (aged 35-64)	0.11	-0.05	0.10	-0.72**
Female employment (aged 35-64)	-0.05	0.10	-0.19	0.63*
Remoteness (1 = city; 5 = very remote)	13.86**	15.66**	16.00**	18.13**
Increase in Federal community workers	-2.72**	-2.46**	-2.51**	-1.85
During ROSH	-18.58**	-18.69**	-	-
All KTS funding (\$100s per capita, 0-17 pop)	-9.78**	-9.53**	-7.87**	-6.73**
Constant	214.02**	192.35**	161.66**	110.09**
Sample size	608	608	456	456
F statistic (9,602)	165.3	151.7	110.6	-
p-value (F statistic)	0.000	0.000	0.000	-
Overall R-squared	0.789	0.718	0.684	0.695
Spatial correlation	-	-	-	0.172
p-value (spatial correlation)	-	-	-	0.008

## Effectiveness of PEI funding on children at ROSH

KTS has implemented or enhanced a number of PEI programs, totalling \$156m dollars in combination across the KTS lifespan. Of this amount, a high proportion was able to be allocated throughout NSW LGAs using intelligence gathered from NSW departments. Significant PEI programs funded by KTS include Brighter Futures (\$36.7m); CSGP sustained home visiting (\$18.8m); Family Referral Services (\$39.5m); and Home School Liaison Officers<sup>11</sup> (\$11.6m).

This next series of cost-effectiveness evaluations seeks to differentiate funding impacts between PEI programs and others in the KTS program portfolio. The levels of PEI and non-PEI funding naturally have a relatively high degree of correlation. Despite this caveat, there exists some variation between the two funding measures that provides a basis for the separate identification of funding effects.

### Summary results

KTS PEI funding is estimated to reduce significantly the count of children reported at ROSH per 1,000 of the full child population across LGAs in NSW, with greater reductions in children reported at ROSH for younger children and those of older school age. Quantifying the effectiveness of KTS PEI funding, all else being equal a \$100 increase in funding per capita has the following impacts:

- a decrease of 8.8 children reported at ROSH per 1,000 among children aged 0-5
- a decrease of 6.4 children reported at ROSH per 1,000 among children aged 6-12
- a decrease of 9.3 children reported at ROSH per 1,000 among children aged 13-17
- a decrease of 8.2 children reported at ROSH per 1,000 among children aged 0-17

## Model specification

- **Dependent variable:**
  - Children reported at ROSH per 1000 of the 0-17 child population, by LGA:
  - Separate models for children at ROSH by age of child 0-5, 6-12, 13-17
  - Aggregated models for ALL children (both Aboriginal and Non-Aboriginal children)
- **Funding variables:**
  - KTS funding allocated to PEI programs, per capita of the 0-17 child population
  - KTS funding allocated to all programs *other than* PEI, per capita of the 0-17 child population

11 It is noted that the DEC co-funded additional School Liaison Officers.

- Other model specification elements:
  - As per previous model

## Summary of results

Table 5 seeks to tease out the impacts of different KTS reform area funding, through separately testing PEI and all other KTS funding (excluding OOHC). These results capture the impact of KTS PEI funding on Children reported at ROSH for both Aboriginal and non-Aboriginal children.

The results are very similar to those set out in Table 3, with the majority of the indicators showing the same level and strength of significance. The exception here is the PEI funding variable, which constitutes more than half of all KTS funding that was able to be allocated to LGAs.

KTS PEI mapped funding is shown to have a significant effect on reducing children reported at ROSH when controlling for other factors. This effect is more dominant for the younger age group and those of high-school age, where an additional \$100 per capita of KTS PEI funding decreases children reported at ROSH for 0-5 year olds by 8.8 in every 1,000. The effect of KTS funding remains significant across age groups, diminishing for children of primary school age before increasing with older school aged children. Other KTS funding remains significant (with lower impacts), for younger and older children.

Remoteness and relative advantage/disadvantage within an area remain consistent, strong and significant markers of children reported at ROSH. For all children aged 0-17 years, an increase in remoteness by one point has the effect of increasing children at ROSH by 19.4 per 1,000 of the child population.

Increased male employment rates also have a significant impact on reducing children at ROSH for school-aged children. Female employment rates, again show a significant relationship in increasing children at ROSH for school aged children, which again raises the possibility that women as primary carers provide some protection to children being reported at ROSH.

**Table 5** Impact of PEI and other KTS funding on ROSH (indicator 4a): 09/10 to 12/13

Control factor	ROSH outcomes – child age categories			
	0-5	6-12	13-17	All (0-17)
Index of socio-economic advantage	-0.25**	-0.22**	-0.18**	-0.19**
Index of early child development	0.047	0.02	0.02	0.04
Increase of children in pre-school	0.01	0.13	0.11	0.00
Net business entries	0.44	-0.64	-1.52**	-0.26
Male employment (aged 35-64)	-0.68	-0.73**	-0.75**	-0.56**
Female employment (aged 35-64)	0.40	0.77	0.91**	0.60*
Remoteness (1 = city; 5 = very remote)	20.68**	21.00**	13.75**	19.39**
Increase in Federal community workers	-2.40	-1.19	-1.72	-2.19
All KTS funding (\$100s per capita, 0-17 pop)	-8.78**	-6.39**	-9.29**	-8.16**
Other KTS funding (\$100s per capita, 0-17 pop)	-2.36**	-0.21**	-0.54**	-0.40**
Constant	133.53*	116.16**	89.43*	109.09**
Sample size	456	456	456	608
Overall R-squared	0.6108	0.6727	0.6540	0.678
Spatial correlation	0.320	0.257	0.370	0.101
p-value (spatial correlation)	0.056	0.056	0.053	0.068

Notes: Dependent variables are the counts of Children reported at ROSH per 1,000 of the child population for each of 153 LGAs in NSW. Each column reports ROSH per 1,000 estimates for counts in each of the four child age categories 0-5, 6-12, 13-17 and 0-17. The funding variable included in each model is KTS funding on PEI programs per capita of the LGA child population allocated to each LGA (units scaled to \$100s). Other controls as described in the text.

Sources: FACS, KiDS – CIW annual data and ABS Australian Demographic Statistics, ABS Censuses of Population and Housing; ABS National Regional Profile data and the Australian Early Development Index.

**Table 6** Impact of KTS funding on ROSH, model variants: 2009/10 to 2012/13

Control factor	ROSH outcomes – child age categories 0-17			
	Baseline model	Adding AEDI	Lagged funding	Lags and spatial controls
Index of socio-economic advantage	-0.17**	-0.16**	-0.14**	-0.19**
Index of early child development	-	0.04**	0.04**	0.04
Increase of children in pre-school	-0.03	-0.05	-0.05	0.00
Net business entries	-0.55	-0.56*	-0.53	-0.26
Male employment (aged 35-64)	0.07	-0.09	0.09	-0.56**
Female employment (aged 35-64)	-0.01	0.15	-0.15	0.60*
Remoteness (1 = city; 5 = very remote)	12.26**	14.08**	14.98**	19.39**
Increase in Federal community workers	-2.75**	-2.50**	-2.60**	-2.19
During ROSH	-23.83**	-23.95**	-	-
All KTS funding (\$100s per capita, 0-17 pop)	-8.07**	-8.02**	-7.25**	-8.16**
Other KTS funding (\$100s per capita, 0-17 pop)	1.50**	-1.45**	1.20**	-0.40**
Constant	199.09**	177.28**	143.27**	109.03**
Sample size	608	608	456	456
F statistic (9,602)	163.5	151.8	110.3	-
p-value (F statistic)	0.000	0.000	0.000	-
Overall R-squared	0.733	0.737	0.713	0.678
Spatial correlation	-	-	-	0.101
p-value (spatial correlation)	-	-	-	0.135

### Sensitivity Analysis

The results reported in Table 6 above explore the impact of changing specifications on the drivers of ROSH outcomes among children aged 0-17, and provide context to the main findings for the split KTS funding model in Table 5. Two features are worthy of particular comment.

Firstly, the strength of the association between PEI funding and children reported at ROSH remain consistently strong and significant across all model variants, whether or not spatial controls or lagged funding variables are introduced as a development of the baseline model specification. Secondly, a number of explanatory variables are seen to strengthen their impact on ROSH outcomes for the full model with spatial controls – particularly remoteness, male/female employment and socio-economic advantage/disadvantage. This suggests a degree of spatial correlation between these regional and economic variables in particular, which serves to draw additional significance towards the modelled parameters.

## Effectiveness of KTS funding on re-reports among children at ROSH

### ROSH re-reports among children previously identified at ROSH

Breaking the cycle of persistent and ongoing ROSH provides one of the more distilled and concentrated measures of the success of the KTS initiative for children and young people in NSW. Indeed, this measure is known to conform to international benchmarks for the success of child protection programs. The research team has been provided with data at an LGA level on the proportion children re-reported at ROSH among children and young people who have already been the subject of a substantiated report of significant harm in the previous year.

Taken together with other LGA indicators collected in the CPB, these child outcome indicators provide us with an opportunity to assess whether or not KTS interventions have protected children who have been identified to be at ROSH. The range of modelling approaches for this outcome matches those implemented earlier in this report to capture the drivers of the number of children at ROSH.

#### Summary results

KTS funding is shown to decrease the count of children and young people re-reported at ROSH per 100 of the child population reported previously at ROSH across LGAs in NSW. Greater reductions were estimated for children in older age categories. A \$100 increase in funding per capita is associated with the following impacts:

- a decrease of 5.3 children re-reported per 100 CYP aged 0-5 previously reported at ROSH
- a decrease of 7.2 children re-reported per 100 CYP aged 6-12 previously reported at ROSH
- a decrease of 11.5 children re-reported per 100 CYP aged 13-17 previously reported at ROSH
- a decrease of 10.6 children re-reported per 100 CYP aged 0-17 previously reported at ROSH

### Model specification

- **Dependent variable:**
  - The number of CYP re-reported at ROSH per 100 of the 0-17 child population with substantiated children reported at ROSH in the previous year, by LGA:
  - Separate models for ROSH re-reports by age of child 0-5, 6-12, 13-17
  - Aggregated models for ALL children (both Aboriginal and non-Aboriginal children)

- **Funding variables:**
  - All KTS funding other than OOHC, per capita of the 0-17 population
- **Other model specification elements:**
  - As per previous models

## **Summary of results**

Table 7 reports estimates of the aggregate cost effectiveness of KTS funding on ROSH re-reports among children previously reported at ROSH outcomes (KTS Indicator 15c). ROSH re-report indicators are for the combined population of Aboriginal and non-Aboriginal children, in common with earlier estimates in this report.

The proportion of CYP re-reported at ROSH is a more volatile indicator than the earlier ROSH measure, due principally to the smaller numbers of ROSH re-reports across LGAs in NSW. As a consequence of the volatile properties of this child outcome indicator, the ROSH re-report models summarised in this report have lower explanatory power. Despite this, a number of significant associations are worth highlighting from an examination of the series of modelled cost-effectiveness evaluations in Table 7.

### **Socio-economic disadvantage**

The number of children reported at ROSH per 100 of the child population in NSW reported at ROSH during the previous year is modelled to decline as socio-economic (SEIFA) advantage rises. This result is significant and similar for children of primary and high school age (6-12 and 13-17). In quantitative terms, an improvement in SEIFA by ten points reduces the rate of children re-reported at ROSH by between 13 and 14 per 100 children of school age who were reported at ROSH previously.

### **Pre-school attendance**

An increase of ten per cent in the proportion of children aged 3-5 attending pre-school reduces the proportion of children re-reported at ROSH by 2.8 for every 100 children previously reported at ROSH, all else being equal.

### **Remoteness**

Rates of children re-reported at ROSH increase significantly in more remote areas of NSW. An increase of one unit in the remoteness indicator (from remote to very remote, for example) is estimated to increases the rate of children re-reported at ROSH by 6.3 per 100 of the 13-17 year child population at previous ROSH. The rate for the full 0-17 child population at previous ROSH is around half of the high school rate, at around 3.2 per 100.

### **KTS funding**

Higher levels of KTS funding are shown to have a significant negative effect on children re-reported at ROSH, holding constant other controls in the cost-effectiveness model. The effect rises with the age of the child, with an increase of \$100 per capita in KTS funding associated with a decrease of 11.5 in the number of children re-reported at ROSH per 100 of the population of 13-17 year olds who were previously reported to be at ROSH.

**Table 7** Impact of KTS funding on ROSH re-reports (indicator 15c): 2009/10 to 2012/13

	ROSH re-reports – child age categories			
Control factor	0-5	6-12	13-17	All (0-17)
Index of socio-economic advantage	-0.34	-1.29**	-0.38**	-1.03**
Index of early child development	-0.003	-0.03	0.02	-0.01
Increase of children in pre-school	-0.10	-0.30	-0.23	-0.28**
Net business entries	-0.99	-1.41	0.79	-0.58
Male employment (aged 35-64)	0.31	-0.19	0.14	0.01
Female employment (aged 35-64)	0.50	0.62	0.39	0.58
Remoteness (1 = city; 5 = very remote)	-0.01	3.73	6.33*	3.22*
Increase in Federal community workers	1.04	-2.88	0.53	-0.11
All KTS funding (\$100s per capita, 0-17 pop)	-5.39	-7.16**	-11.47**	-10.60*
Constant	46.13	62.22	38.98	60.16*
Sample size	456	456	456	456
Overall R-squared	0.0462	0.0794	0.0557	0.109
Spatial correlation	0.033	0.116	0.099	0.050
p-value (spatial correlation)	0.627	0.082	0.139	0.139

Notes: Dependent variables are the number of children re-reported at ROSH per 100 of the Aboriginal and non-Aboriginal child population reported previously (within 12 months) to be at ROSH for each LGA in NSW. Each column reports children re-reported at ROSH separately for each of the four child age categories 0-5, 6-12, 13-17 and 0-17. The funding variable included in each model is aggregate KTS funding per capita of the LGA child population allocated to each LGA (with units scaled to \$100's). Other controls are as described in the text.

Sources: FACS, KiDS – CIW annual data and ABS Australian Demographic Statistics, ABS Censuses of Population and Housing; ABS National Regional Profile data and the Australian Early Development Index.

**Table 8** Impact of KTS funding on ROSH re-reports, model variants: 2009/10 to 2012/13

Control factor	ROSH re-reports – child age categories 0-17			
	Baseline model	Adding AEDI	Lagged funding	Lags and spatial controls
Index of socio-economic advantage	-0.72**	-0.73**	-0.71**	-1.03**
Index of early child development	-	0.01**	0.04	-0.06
Increase of children in pre-school	-0.20	-0.20	-0.25**	-0.28**
Net business entries	1.44**	1.44**	0.49	-0.58
Male employment (aged 35-64)	0.27	0.27	0.01	0.01
Female employment (aged 35-64)	0.47	0.46	0.47	0.58
Remoteness (1 = city; 5 = very remote)	4.14*	4.09*	2.53	3.22*
Increase in Federal community workers	-0.23	-0.24	0.20	-0.11
During ROSH	-29.52**	-29.52**	-	-
All KTS funding (\$100s per capita, 0-17 pop)	-10.50**	-10.49**	-13.22**	-10.60**
Constant	84.77**	85.28**	99.32**	60.16**
Sample size	608	608	456	456
F statistic (9,602)	13.4	12.0	40.3	-
p-value (F statistic)	0.000	0.000	0.000	-
Overall R-squared	0.155	0.168	0.067	0.109
Spatial correlation	-	-	-	0.050
p-value (spatial correlation)	-	-	-	0.474

### Sensitivity Analysis

Table 8 compares the main findings for ROSH re-reports among children aged 0-17 at previous ROSH with alternative specifications under different (simpler) modelling scenarios.

The strength of the association between KTS funding and ROSH re-reports is again consistently strong and significant across all model variants, whether or not spatial controls or lagged funding variables are introduced. It is noticeable that the impact of socio-economic advantage/disadvantage on ROSH re-reports strengthens for the full model with spatial controls, whereas in contrast, remoteness loses a degree of significance relative to the baseline specification.

## Effectiveness of KTS PEI funding on re-reports among children at ROSH

### Summary results

Greater KTS funding on PEI programs has the effect of reducing the count of children and young people re-reported at ROSH per 100 of the full child population at prior ROSH across LGAs in NSW. Greater reductions were again estimated for children in older age categories. A \$100 increase in PEI funding per capita is associated with the following impacts:

- a decrease of 6.4 in re-reports per 100 children aged 0-5 previously reported at ROSH
- a decrease of 8.5 in re-reports per 100 children aged 6-12 previously reported at ROSH
- a decrease of 12 in re-reports per 100 children aged 13-17 previously reported at ROSH
- a decrease of 10.6 in re-reports per 100 CYP aged 0-17 previously reported at ROSH

### Model specification

- **Dependent variable:**
  - The number of children re-reported at ROSH per 100 of the 0-17 child population who were the subject of a substantiated ROSH report in the previous year, by LGA:
  - Separate models for ROSH re-reports by age of child 0-5, 6-12, 13-17
  - Aggregated models for ALL children (both Aboriginal and non-Aboriginal children)
- **Funding variables:**
  - KTS funding allocated to PEI programs, per capita of the 0-17 child population
  - KTS funding allocated to all programs other than PEI, per capita of the 0-17 child population
- **Other model specification elements:**
  - As per previous models

## Summary of results

Results from a series of regression models of children re-reported at ROSH including spatial controls and split PEI and non-PEI funding for all children aged 0-17 at previous ROSH are presented in Table 9. These compare very closely with earlier estimates based on a single KTS funding indicator (Table 7), despite the relatively low explanatory power in both sets of models.

The influences of socio-economic advantage are significant across the entire child population and for school aged children, with greater advantage resulting in lower re-reports. The proportion of children attending pre-school are significant only for the aggregated model across all child age ranges from 0-17.

The higher the female employment rate, other things equal, the higher is the rate of children re-reported at ROSH, however this finding is only significant for all children and the strength of the coefficient is weaker.

We find there to be a maintained significant and negative association between PEI funding and the number of children re-reported at ROSH per 100 of children at prior ROSH. The greatest effect occurs among children aged 13-17, with an increase of \$100 in per capita PEI funding leading to a reduction of 12 children re-reported at ROSH.

**Table 9** Impact of PEI and other KTS funding on ROSH re-reports (indicator 15c): 09/10 to 12/13

Control factor	ROSH re-reports – child age categories			
	0-5	6-12	13-17	All (0-17)
Index of socio-economic advantage	-0.14	-1.06**	-1.18**	-1.00**
Index of early child development	-0.005	-0.04	0.01	-0.01
Increase of children in pre-school	-0.09	-0.29	-0.22	-0.28**
Net business entries	-1.06	-1.51	0.70	-0.64
Male employment (aged 35-64)	0.38	-0.09	0.19	0.02
Female employment (aged 35-64)	0.24	0.30	0.17	0.61*
Remoteness (1 = city; 5 = very remote)	0.66	4.64	6.89*	3.01
Increase in Federal community workers	1.13	-2.78	0.59	-0.15
All KTS funding (\$100s per capita, 0-17 pop)	-6.41	-8.52*	-12.05**	-10.60*
Other KTS funding (\$100s per capita, 0-17 pop)	-2.56	-3.98*	-1.75**	-2.27
Constant	40.80	57.59	23.52	45.66
Sample size	456	456	456	456
Overall R-squared	0.0367	0.0577	0.0546	0.1211
Spatial correlation	0.051	0.146	0.107	0.030
p-value (spatial correlation)	0.068	0.066	0.066	0.070

Notes: Dependent variables are the number of children re-reported at ROSH per 100 of the Aboriginal and non-Aboriginal child population reported previously (within 12 months) to be at ROSH for each LGA in NSW. Each column reports children re-reported at ROSH separately for each of the four child age categories 0-5, 6-12, 13-17 and 0-17. The funding variable included in each model is KTS funding on PEI programs per capita of the LGA child population allocated to each LGA (units scaled to \$100s). Other controls as described in the text.

Sources: FACS, KiDS – CIW annual data and ABS Australian Demographic Statistics, ABS Censuses of Population and Housing; ABS National Regional Profile data and the Australian Early Development Index.

# Conclusions



The primary research objective in this report was to ascertain whether or not a convincing connection between KTS funding and better outcomes for vulnerable children exists. In particular, we sought to examine what impact KTS investment has had on providing better protection for children and young people in NSW, and whether or not particular components of KTS funding were more effective. We also tested differences in outcomes across different age groups and tested the robustness of each model by controlling for lagged and spatial correlation effects.

The data source assembled for this economic evaluation provides us with a unique opportunity to identify the link between KTS funding and improved child outcomes in NSW, taking account of the range of additional factors that contribute to greater or poorer levels of child wellbeing among vulnerable children in NSW.

Differentiating areas of NSW into combinations of relatively good (or poor) ROSH outcomes, and relatively high (low) total KTS funding per capita we observe a number of informative patterns. Regional areas to the North and West of Sydney in particular show worse child outcomes despite high per capita KTS funding (e.g. Bourke, Brewarrina or Coonamble). These contrast with localities around Sydney (e.g. Wollondilly, Woollahra or Hawkesbury), where improvements in children reported at ROSH combine with lower per capita KTS funding. Strong ROSH improvements between 2010/11 and 2012/13 also occurred in the mid-west of NSW (around Lachlan, Central Darling and Carrathool), with relatively high levels of KTS investment per capita, whereas Marrickville, Young and Urana are flagged as LGAs for which children reported at ROSH have increased under relatively low levels of KTS funding.

The multivariate analysis shows that KTS funding, in particular funding directed towards PEI, makes a significant contribution to reducing the rate of children reported at ROSH across NSW LGAs. The greatest impact of KTS investment is for younger children aged 0-5 years and those aged 13-17, where

an increase in \$100 per child within a community is associated with a significant decrease of 9 children reported at ROSH per 1,000 between 2009/10 and 2012/13.

Model variants, which seek to add additional controls, including the AEDI, as well as spatial and temporal lags demonstrate that the findings within the report are robust. Controlling for spill-over effects between KTS Indicators (funding and outcomes) and economic variables in particular, has in some instances served to draw additional significance towards the modelled parameters.

Children re-reported at ROSH provides a more distilled and concentrated measures of the success of the KTS initiative for children and young people in NSW and has also been assessed within the report. Our results show that PEI funding has a significant impact on reducing children re-reported at ROSH in the KTS intervention period, particularly for older children.

Our modelling has served to highlight the relative importance of other community and household factors that drive good or poor child outcomes in NSW. such as socio-economic status, access to services (remoteness), pre-school attendance and child development (to some degree) and the level of other government activity. These are all shown to have appreciable effects on the rate of reports and re-reports of significant harm in areas throughout NSW.

At this point in time, we have not been able to develop statistically reliable models for Aboriginal children separately, due to inaccurate child population counts at the LGA level over time. While the 2011 Census has gone a long way towards ameliorating this issue, it nevertheless provides only one point in time that accurate geographic data is available.

The NSW CPB and model development provides a unique opportunity for ongoing monitoring and assessment of regional trends in child wellbeing and protection outcomes and their associations with other factors, including government investment.

## References



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## Technical notes



Full econometric specification:

$$Y_{jt} = \beta_0 + \beta_1 KTS\_DF_{jt} + \beta_2 KTS\_OF_{jt} + \beta_3 SES_{jt} + X_{jt} \beta + \alpha_{jt} \quad [eq.1]$$

$$\Delta Y_{jt} = \beta_0 + \beta_1 \Delta KTS\_DF_{jt} + \beta_2 \Delta KTS\_OF_{jt} + \beta_3 \Delta SES_{jt} + \Delta X_{jt} \beta + \alpha_{jt} \quad [eq.2]$$

where:

- $Y_{jt}$  represents the KTS outcome of interest dependent variable,  $j$ =spatial unit and  $t$ =time;
- $KTS\_TF_{jt}$  represents KTS funding in a particular area ( $j$ ) at a particular time ( $t$ ) targeted specifically at the outcome;
- $KTS\_OF_{jt}$  represents other KTS funding in a particular area ( $j$ ) at a particular time ( $t$ ) that may also impact upon the outcome;
- $SES_{jt}$  represents the socio-economic status of a particular area ( $j$ ) at a particular time ( $t$ );
- $X_{jt}$  represents other control variables that are able to be included in the model in a particular area ( $j$ ) at a particular time ( $t$ ); and
- $\alpha_{jt}$  is the error term.

## Variable constructs

### Remoteness

The concept of remoteness is an important dimension of policy development in Australia. The provision of many government services is influenced by the typically long distances that people are required to travel outside the major metropolitan areas. The degrees of remoteness range from 'Major Cities' (highly accessible) to 'Very Remote', and has been determined using the Accessibility/Remoteness Index of Australia (ARIA).

0 to 0.2	Major Cities of Australia
greater than 0.2 and less than or equal to 2.4	Inner Regional Australia
greater than 2.4 and less than or equal to 5.92	Outer Regional Australia
greater than 5.92 and less than or equal to 10.53	Remote Australia
greater than 10.53	Very Remote Australia

### SEIFA

The 2006 and 2011 Index of Relative Socio-Economic Advantage and Disadvantage (SEIFA IRSAD) have been used as an indicator for the relative advantage/disadvantage of a community. Variables included in the SEIFA index cover equivalised income, mortgage or rent payments to assess housing costs, highest level of educational attainment, occupations, overcrowding, car ownership, disability, internet connection among others (ABS 2011). A low index score refers to a relatively greater disadvantage and lack of advantage. For example, areas with low scores may be characterised by a high proportion of people with low household income and a lower proportion of people employed as managers or professionals, among other things.

### AEDI

AEDI is a full population census of children's health and development in their first year of formal full-time schooling. It provides a comprehensive map of early developmental outcomes across Australia. The AEDI reports on five domains of children's development: physical health and wellbeing, social competence, emotional maturity, language and cognitive skills (school-based), and communication skills and general knowledge. These five developmental domains are closely linked to the predictors of good adult health, education and social outcomes. Teachers complete the AEDI checklist made up of approximately 100 questions for each child in their class. Each of the five AEDI domains has a corresponding set of questions from the AEDI checklist. All the children's AEDI domain scores were ranked from the lowest to highest score and scores ranked in the lowest 10 per cent were classified as developmentally vulnerable. The proportion of children developmentally vulnerable on two or more domains is tested as a predictor (and potentially a screening tool) for the prevalence of child maltreatment within an area.

## Federal government activity

Persons with occupation codes in social welfare, health and community services as defined by the ANZSCO 4-digit occupation code were selected in both the 2006 and 2011 Census, cross-classified by place of work and government sector (GNGP). The change in the number of workers between the Census periods, as a proportion of the child (0-17 year) population was used to determine whether welfare activity had increased or decreased. This indicator serves as a proxy for the on-the-ground change in non-KTS Federal government investment.

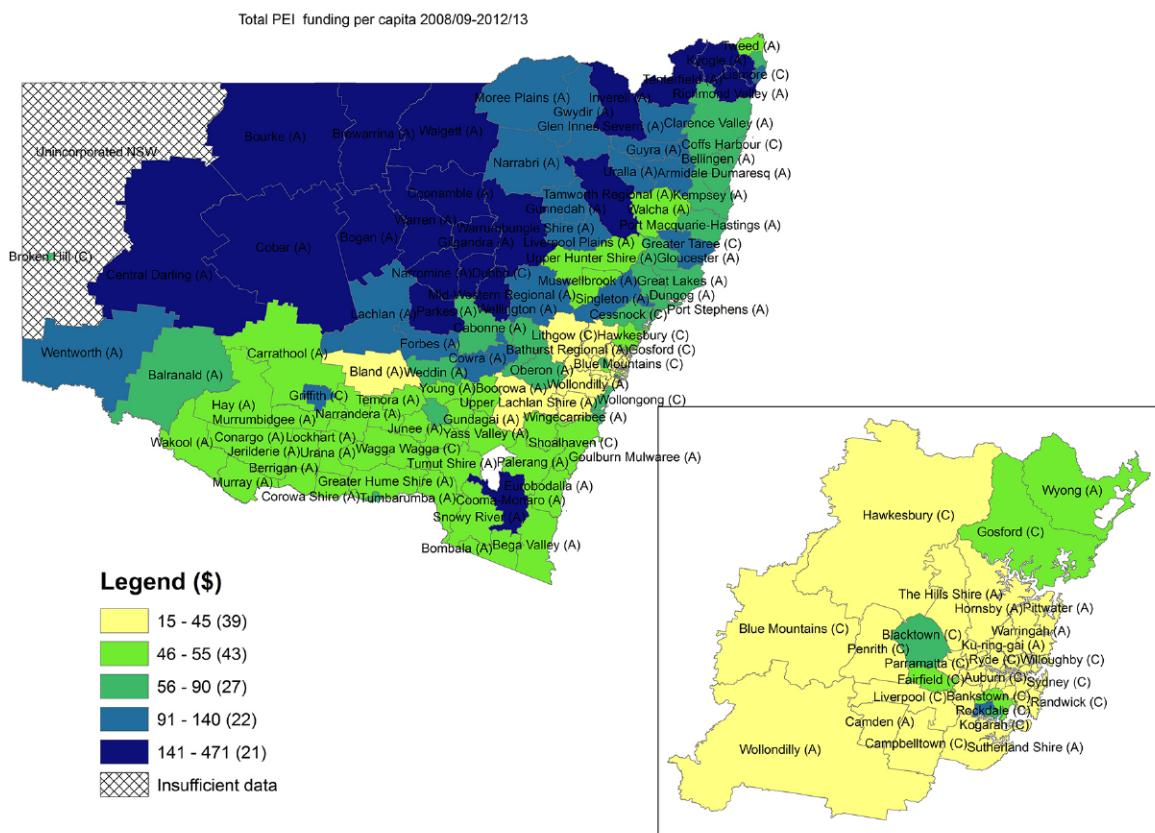
## Pre-school attendance

The change in proportion of children attending pre-school was gathered from the 2006 and 2011 Censuses, using information about the type of educational institution a child was attending (TYPP). Three, four and five year olds were selected and proportions of the total 3, 4 and five year old population were calculated. It is noted that there are no clear delineations between child care and pre-school and that some children attending child care (with or without a pre-school program) may be included in the count.



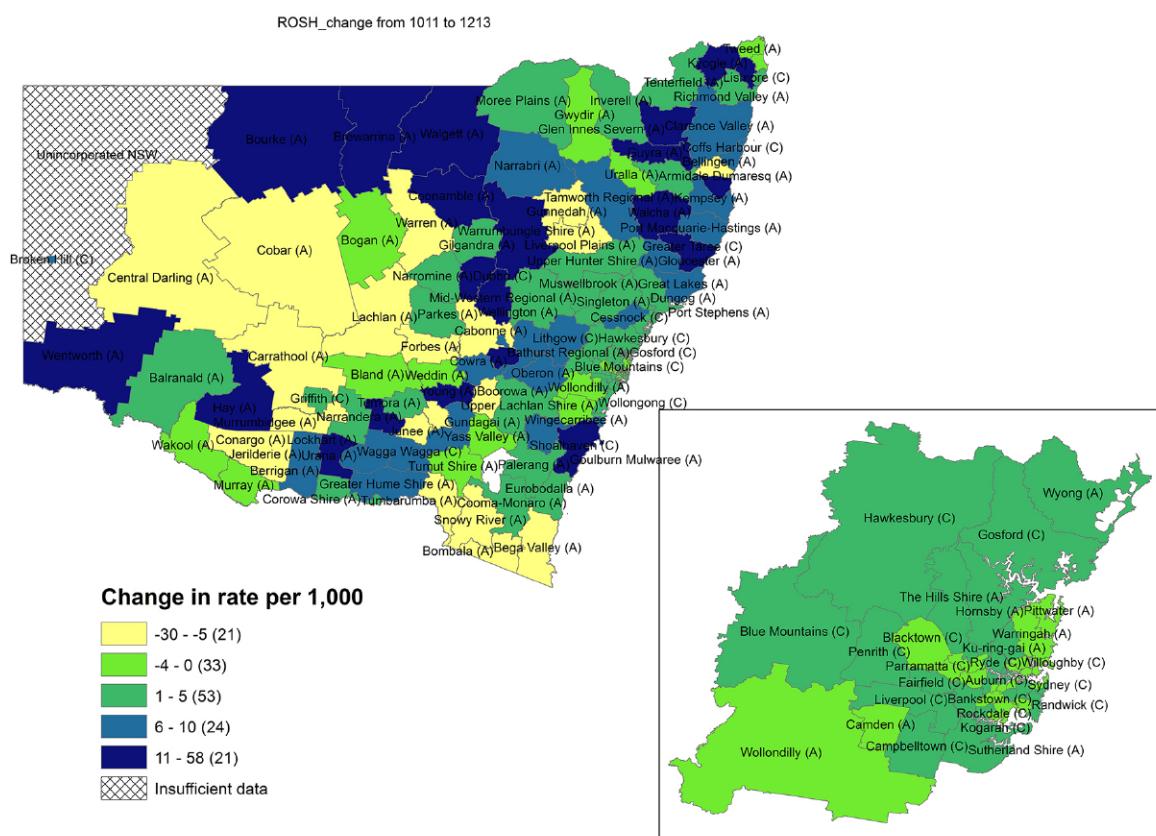
## Appendix A

**Figure 8** KTS PEI funding per capita, by LGA: 2008/09 to 2012/13



Source: NSW government data.

**Figure 9** Change in the rate of ROSH reports per 1000, by LGA: 2010/11 to 2012/13



Source: FaCS KiDS data.