



WORKING PAPER SERIES

OUTREACH IN EARLY YEARS SERVICES: A SYSTEMATIC REVIEW

Paula Wyndow

Telethon Kids Institute, The University of Western Australia

Joel Stafford

Telethon Kids Institute, The University of Western Australia

Catherine Taylor

Telethon Kids Institute, The University of Western Australia

No. 2020-01

January 2020



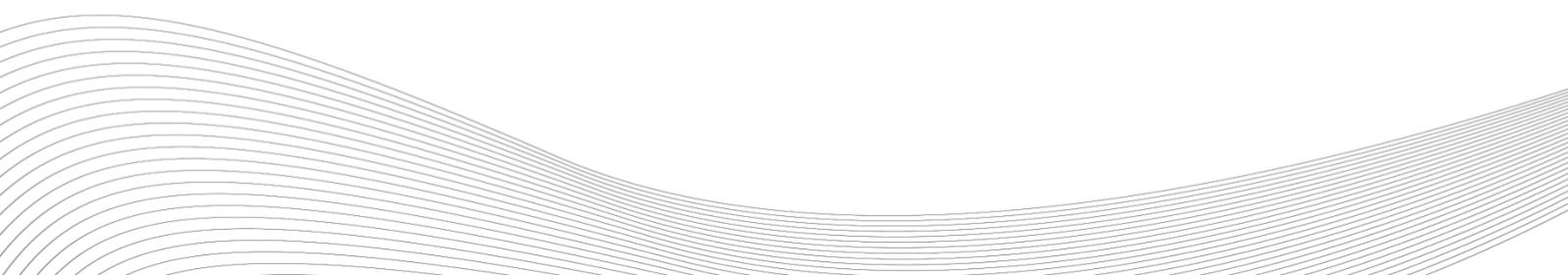
NON-TECHNICAL SUMMARY

Despite a significant investment in early years services in Tasmania, there is still a less than optimal uptake of health and education services across the general population, and the reach has been insufficient to capture vulnerable or disadvantaged families. Outreach is one of many strategies to facilitate engagement, however, its effectiveness in improving child health and education outcomes is less well known.

A systematic review of the effectiveness of outreach activities in improving child health and education outcomes aimed at families with children aged 0-8 years was conducted. Nine databases (Medline, Embase, PsycInfo, CINAHL, Sociological Abstracts, ERIC, Lowitja Institute, Scopus, Primary Health Care Research and Information Service) were searched in December 2017. Studies were included if outreach strategies facilitated access to universal early education, care and health services for families with children aged 0-8 years and showed evidence of impact on child health or education outcomes. A narrative approach was used to synthesise the results.

39 studies were included in the review. Almost three quarters of studies were conducted in the USA, and almost all studies had primary outcomes relating to either childhood vaccination or immunisations rates. No studies reported primary outcomes relating to developmental or education outcomes. The majority of studies found that any type of outreach strategy had a positive impact on immunisation uptake, and clinic attendance, although to varying degrees.

The scarcity of studies reporting on the effectiveness of outreach activities to improve child outcomes in the early years education sector is an important finding of this review and highlights the challenges in measuring the impact of outreach strategies to engage families in universal services beyond the health sector.



ABOUT THE AUTHORS

Paula Wyndow is a Senior Researcher at Telethon Kids Institute who has led and collaborated on a range of research projects. Since completing her PhD, Dr Wyndow's research interests have focus primarily on practical and applied research in partnership with communities to improve health outcomes for mothers and their families, particularly Aboriginal families living in rural and remote communities. A strong advocate for gender equity, she received the inaugural AFGW top-up research scholarship for research that benefits women and has made a significant contribution as a member of the Athena Swan SAT Committee. Dr Wyndow also brings over 15 years' experience working in the not for profit sector in a wide range of roles, both locally and internationally. Her experience and skills developed in the community sector, especially in mental health and community development, equips her with keen insights and understandings about the people that her research intends to benefit. Email: Paula.Wyndow@telethonkids.org.au

Joel Stafford is a data analyst with the Human Capability Team at Telethon Kids Institute and works on the Tassie Kids project in partnership with Tasmanian state government agencies. Prior to joining Telethon Kids Institute Joel worked as a survey coordinator with the Australian Bureau of Statistics, participated in program evaluations of homeless services operated by the NGO sector in Tasmania, and was employed as a Tasmanian Government public servant. Email: joel.stafford@education.tas.gov.au

Catherine (Cate) Taylor is a Senior Principal Research Fellow at the Telethon Kids Institute and The University of Western Australia. She is Co-Head of the Human Capability Team at Telethon Kids and an ARC Life Course Chief Investigator. She specialises in large-scale population level longitudinal studies of children's health, development, and education. In partnership with government agencies, she uses linked cross-sectoral government agency datasets to provide practical analysis and insights into early childhood service provision. Email: Cate.Taylor@telethonkids.org.au

ACKNOWLEDGEMENTS

This work was supported by funding for the Pathways to better health and education outcomes for Tasmania's children project (NHMRC Partnership Projects: H0016195, H0016203) and by the Tasmanian Government, and has benefitted from the support of staff working in early years services in Tasmania.

DISCLAIMER: The content of this Working Paper does not necessarily reflect the views and opinions of the Life Course Centre. Responsibility for any information and views expressed in this Working Paper lies entirely with the author(s).



ABSTRACT

Despite a significant investment in early years services in Tasmania, there is still a less than optimal uptake of health and education services across the general population, and the reach has been insufficient to capture vulnerable or disadvantaged families. Outreach is one of many strategies to facilitate engagement, however, its effectiveness in improving child health and education outcomes is less well known. This systematic review of outreach in child health and education services finds that studies reporting on the effectiveness of outreach activities to improve child outcomes in the early years education sector are scarce and highlights the challenges in measuring the impact of outreach strategies to engage families in universal services beyond the health sector.

Keywords: outreach; early years policy; child health and education services; Australia

Suggested citation: Wyndow, P., Stafford, J., & Taylor, C. (2020). 'Outreach in Early Years Services: A Systematic Review'. *Life Course Centre Working Paper Series*, 2020-01. Institute for Social Science Research, The University of Queensland.

Introduction

Children's earliest life experiences can have lasting effects on their future health and wellbeing, education and employment (Fair Society 2010; National Research Council 2000). There is a substantial body of evidence that shows that high quality comprehensive early childhood programs are effective in enhancing children's physical, social and cognitive outcomes (Anderson *et al.* 2003; Komro *et al.* 2013). However, it is typically families with children at a greater risk of poorer developmental outcomes who are less likely to attend. These underserved populations are often referred to as, "hard to reach", or 'hard to engage" (Boag-Munroe and Evangelou 2012). This may include those who are typically under-represented in the service population due to economic or social disadvantage, those 'invisible' to the system and unable to articulate their needs, those unwilling to engage with services because of prior negative experiences or who face structural barriers to accessing services (Doherty *et al.* 2003). Hard to engage families can appear in administrative data holdings in one or a number of distinct early years services and display sporadic contacts interspersed with long service gaps, or balking, such that initial service contacts do not result in sustained service use (Toros *et al.* 2018).

Prior Systematic reviews

A search of scholarly databases for existing systematic reviews was conducted to determine if any previous reviews had been undertaken in this area. A search of the Database of Abstracts of Reviews of Effects (DARE), the Cochrane Database of Systematic Reviews (CSDR), Evidence for Policy and Practice Information (EPPI) Centre, Campbell Collaboration, DOPHER, and JBI Library of Systematic Reviews uncovered only one relevant review - Carr *et al.* (2014), which is a synthesis of outreach programmes to improve the health of a specified group, in this case, traveller communities. The justification the authors offer for employing this approach to conducting a review of outreach relates to the contextual nature of outreach (Lhussier *et al.* 2016) such that what may work for one group in one area, may not work for another group in a different area (Pawson 2006). The approach we adopted to identify publications of the effectiveness of outreach strategies in the early years sector more broadly returned no other reviews.

Stakeholder engagement

To guide and inform our review of outreach in early years services a stakeholder advisory group was established. This group comprised individuals from the health, education and childcare sectors in Tasmania.

The purpose of the initial meeting of the advisory group was to establish its terms of reference and to determine what was known and understood by the term 'outreach' among group members. While there was considerable variation in meaning, with group members seeing it both as a strategy and an outcome, the consensus was that outreach involved some form of 'reaching out' from a service operation to people in the community to connect them with the service. This reaching out may be intentional, through targeted activities, promotional, incidental as part of wider service delivery operations, or accidental such as when an opportunistic chat at the school gate occurs.

Participants in the advisory group acknowledged that there are many families who are not engaged in their organisation's services for a range of reasons and that outreach is seen as a way of ensuring that families who may benefit from their programs or services can access them. Consequently, for the purpose of this systematic review, a starting definition is 'outreach' will encompass all activities that occur beyond the physical building of the service organisation, and that act as a mechanism to connect the service provider and the targeted group.

During a subsequent stakeholder meeting, to further refine the review's question and its scope, the working group focussed on identifying and ranking, in order of priority, the problem/s members are trying to solve by undertaking the review. Because outreach strategies can be so varied, Mackenzie *et al.* (2011) propose a continuum of complexity to understand the problems that outreach seeks to address and to organise strategies according to which those problems might be tackled. The problems range from those that are easier to address, such as intended service recipients being unaware of a service, to more complex challenges such as intended service recipients facing multiple psychosocial and structural barriers to engagement.

Some of the key reasons nominated by the working group as to why families do not access or engage with programs or services included that families are aware of a universal service but do not know they are eligible to access the service, barriers to participation such as transport, program participation not leading to positive changes for families, a lack of a holistic approach such that families with multiple needs are not referred on, or introduced to, the service offerings of other support agencies, and services not equipped with sufficient information to identify families who are not receiving additional services that they may need (Boag-Munroe and Evangelou 2012). Although a consensus about the most important problems that outreach was seeking to address did not occur, what did emerge from the group was that evidence of the effectiveness of outreach strategies in producing positive health and education outcomes (impact) for families with children aged 0-8 years was needed. The group also anticipated that by undertaking a review of outreach strategies a greater shared understanding of outreach would emerge.

Systematic review Protocol

A direct outcome of the work undertaken by the stakeholder research advisory group was a systematic review protocol encoding the PRISMA-P guidelines (Preferred Reporting Items for Systematic Reviews and Meta-analyses for protocols) 2015 (Moher *et al.* 2015). The review protocol enabled the authors to draft a search strategy with guidance and quality assurance by librarians at the University of Western Australia.

Objectives of the review

The aim of this systematic review is to determine what evidence exists to support outreach as a strategy to improve health and education outcomes for children aged 0-8 years.

This review is focused on the effectiveness of outreach to:

1. Facilitate access to universal early education, care, and health services for families with children aged 0-8 years, excluding targeted programs such as those for mental health or disability,

2. Initiate social change processes that lead to improvements in child health and education outcomes including changes in knowledge, attitudes, beliefs or behaviour,
3. Reduce child health or education inequities,
4. Where practicable, examine the cost-benefits of outreach strategies.

Methods

To be eligible for inclusion in the review, papers were selected according to the following criteria:

1. Their objective must be to report on the effective approaches between *universal* health, education, and childcare services and families with children,
2. Publications must include a clearly articulated study design and participant identification and may include families consisting of expectant parents and any other person that has primary caregiving responsibilities for at least one child aged 0-8 years,
3. Publications must have at least one of the following outcomes:
 - a. children or families accessing universal early education, care, or health services;
 - b. education, health or wellbeing outcomes for children aged 0-8 years;
 - c. the cost-benefits of outreach on child health or education outcomes.

PICOS

Participants: Families include expectant parents and any other person that has primary caregiving responsibilities for a child or children. Children refers to those aged 0-8 years.

Interventions: Outreach strategies are organised interventions that take place beyond usual service deliverables aimed at the target group that have an explicit child health or education focus. These may include one-to-one or group interventions involving at least one worker going to places where the target group live or gather. Technology strategies may be included if they are specifically targeted to individuals or families such as via text or email reminders. These outreach strategies may be

delivered by a range of people, including professionals, para-professionals and people within a designated community.

Studies that form part of a broader intervention or combine that intervention with other interventions or components are to be included if the effectiveness of outreach is measured independently to other factors. Studies to be excluded are those that evaluate stand-alone outreach programs, such as, for example, home visiting, targeted programs, interventions without an explicit child health or education focus, interventions that are not outreach, or health promotion activities that are delivered solely through posters or advertising, or as part of a mass media campaign.

Comparators/controls: Comparators as defined in individual studies, are usually either:

- a) control sites with no, or limited, attempt to conduct outreach, or
- b) the situation prior to outreach efforts, or
- c) families not receiving any outreach and/or those accessing universal or standard care.

Study design/Research methods: Quantitative studies in-scope include randomised and non-randomised controlled trials, cluster randomised controlled trials, pre-post study designs, interrupted time series, cohort studies, case control studies, mixed methods studies, quasi-experimental studies and evaluative designs. Cluster studies are only included when there are at least two intervention sites and two control sites. Qualitative studies in-scope include ethnographic, phenomenological, grounded theory, and participatory action research and its derivatives (e.g., CBPAR). However, studies that only describe the process of implementing the intervention with no outcomes reported are excluded.

Settings: Study settings in-scope are universal health, education and childcare service settings.

Other criteria: Letters, other reviews, opinion pieces and theses are excluded from the scope of the review. Articles published in languages other than English will not

be extracted or reviewed. The search is limited to a publication year from 1980 onwards with no limit on country of publication.

Search strategy

Information sources

The search period covered January 1980 to January 2018, as the outreach literature only started to emerge during the 1980s. Due to resource limits the search was restricted to English language publications and studies involving humans. The information sources were stored on the following nine databases: EMBASE, MEDLINE and PsycINFO on Ovid, Education Resources Information Center (ERIC), and Sociological Abstracts on ProQuest and CINAHL Plus on EBSCO, the Primary Health Care Research and Information Service (PHC Search Filter), Lowitja Institute, and Scopus (See Chart 1.0).

Search terms

The search terms were developed from scoping the outreach literature and from MeSH subject headings. To identify appropriate search terms the review first identified terms deployed in similar reviews and used them in a trial search process. Key words related to our inclusion criteria were ‘outreach’, and terms related to the kinds of activities undertaken to engage with families, such as ‘home visit’ and various cognates. Other key terms included ‘child health’ and ‘education’ and terms related to programme evaluation.

Results

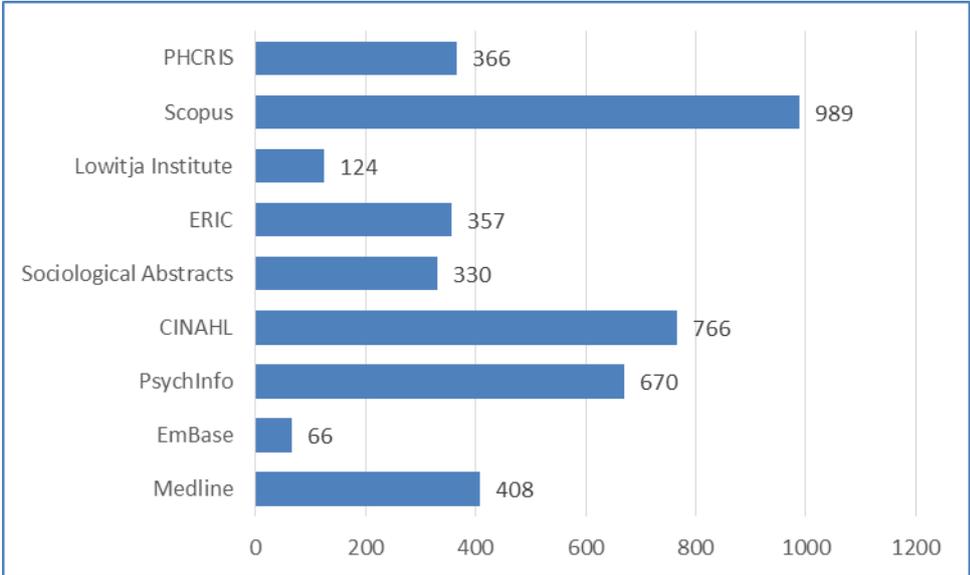
Administering the search strategy on the data sources cited above resulted in 4076 items. Chart 1.0 describes the databases and the gross number of publications retrieved from each.

Study selection and screening

The 4076 publications identified were exported to Endnote version X8 for removal of duplicates and screening.

A total of 638 duplicates were identified and removed together with another 30 articles identified to be brochures, articles with missing information, press releases, news briefs and several articles published before 1980. This left 3432 articles.

Chart 1.0: Database Search Results



The remaining articles were then screened by title and abstract and given a star rating as being:

- ***** Relevant
- *** Possibly relevant
- * Not relevant

This process reduced the number to 141. Two researchers then reviewed the full text of each of these articles and rated them independently. Any differences in rating applied by the two researchers were discussed and resolved. Neither of the reviewers were blind to the articles' journal titles, authors or institutions. This step reduced the list to nine publications. The main reasons for exclusion were failure to report interventions or outcomes of interest, and poor study design. An additional 18 articles were found from the reference and citation lists of publications identified as relevant. A further 12 articles were found through searching relevant systematic reviews. The final number of articles acquired via this process was 39. Fig 1.0 represents a flowchart of the search results.

In parallel to the main search process, a search for grey literature was conducted using Google Scholar, Open Grey, Worldcat, and Microsoft Academia. This search netted no additional articles that met the search criteria.

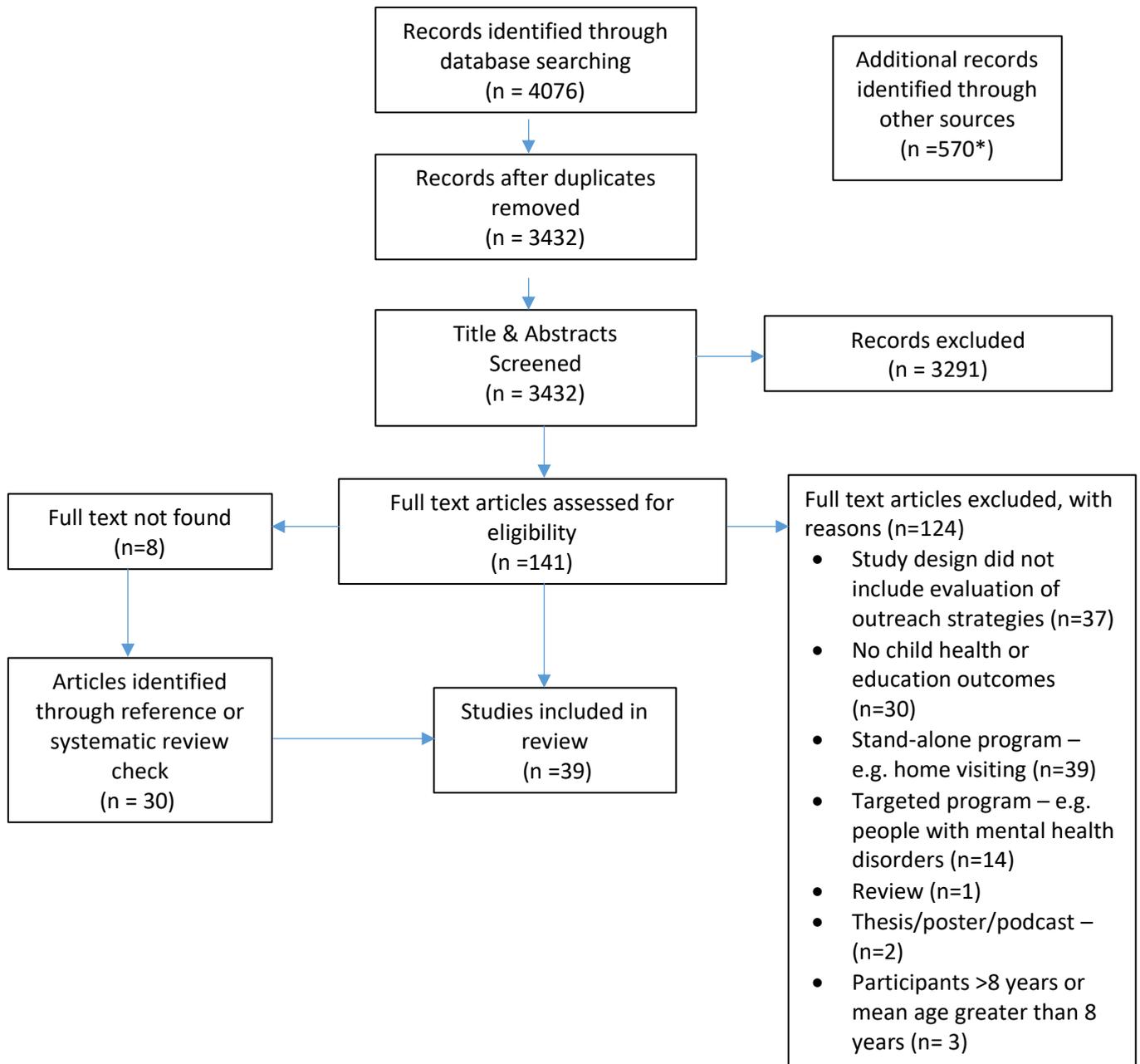


Fig 1.0 Flow chart of search results

Studies excluded

As shown in Fig 1.0, studies were excluded from the review for three main reasons. First, the study did not measure any child health or education outcomes. Second, the study did not measure the effect of outreach strategies on outcome. Third, the study focussed on a stand-alone program. About 30 per cent of studies were comprehensive stand-alone programs that included outreach, but also included a range of other strategies such as case management, education, or regular home visiting. Studies were also excluded if they targeted a particular group of people for specialised services, for example, children with asthma.

Description of studies included

The search process extracted data from the in-scope data sources about the article author, publication year, country where the study was conducted, the study setting, the study intervention and comparator, the kinds of outcomes of interest (e.g., child development outcomes, service utilisation and cost benefit analysis) and the study results. Table 1.0 summarises the main characteristics of the studies in-scope for the review and Table 1.2 expands on the data extracted for each publication.

Table 1.0 Characteristics of included studies

Variable	Number	Percent
Decade of Publication		
2010	8	21%
2000	9	23%
1990	20	51%
1980	2	5%
Study Design		
RCT	26	67%
Non-RCT	13	33%
Qualitative	-	-
Country		
US	29	74%
UK	2	5%
Australia	2	5%
India	1	2.5%
Bangladesh	1	2.5%
Canada	1	2.5%
Pakistan	1	2.5%
Zimbabwe	1	2.5%
Kenya	1	2.5%
Total	39	100%

Characteristics of studies included

The majority of studies were from the United States of America (74%), and just over half of all the studies occurred in the 1990s. Two thirds were Randomised Controlled Trials (RCT), and one third were a mix of before and after studies, cohort studies, intervention studies and non-randomised trials. The comparators reported in each study were typically groups of people receiving usual or standard care. Sometimes this involved no outreach and sometimes outreach was already included as an element of usual care.

Participants

The sample size of studies which reported outcomes for individual participants (either children or mothers/parents) ranged from 163 to 27,596 with a median of 596 and a combined total of 92,689 people.

Outcomes

From the 39 studies within the scope of the review, 92% reported a primary outcome, all of which pertained to either childhood vaccination or immunisation rates. No studies reported primary outcomes relating to developmental or education outcomes. Secondary outcomes were reported in 11 (28%) of studies and most of these (82%) were related to clinic attendance. Two studies measured the number of health assessments completed and three measured the number of screenings for health, anaemia, or lead.

Types of outreach

A wide range of outreach strategies were identified. Sending generic letters and making telephone calls were the most common strategies reported, with some studies reporting providing an escort (CoAG 2009), extending clinic hours (Linkins et al. 1994) and hosting an immunisation camp (Boag-Monroe and Evangelou 2012). Home visits were reported in twenty percent of the studies. Most of the studies compared one type of outreach strategy, such as making phone calls, with other strategies, such as home visits, or sending letters. Half of the studies used at least two or three strategies in combination, and these were often stepped; first a letter is sent, which was followed up with a phone call, and then a home visit. The strategies employed in various studies also reflect changes in technology that have

taken place during the review interval, with computer generated or automated messages being used in the 1990s and early 2000s, followed by short messaging services (sms) being used in more recent years.

Impact

A majority of studies found that any type of outreach strategy had a positive impact on immunisation uptake, and clinic attendance, although to varying degrees. Generic letters appeared to have the least success in significantly raising immunisation rates, (Department of Education Tasmania 2017, Abramson et al. 1995, Kempe et al. 2013, Linkins et al. 1994) with personalised letters, telephone calls and computer-generated messages more likely to be effective (NRC IM CISECD 2000, Lhussier et al. 2016, Mackenzie et al. 2011, Bangure et al. 2015, Dini et al. 2000, Ferson et al. 1995, Gibson et al. 2017, Hawe et al. 1998, Hoekstra et al. 1999, Kempe et al. 2013, LeBaron et al. 2004, Linkins et al. 1994). Postcards were more likely to have a positive and significant impact on outcomes where they were personalised or were sent out continuously (Alto et al. 1994, Bangure et al. 2015, Lever and Moore 2005). Families escorted to the clinic were five times more likely to receive measles vaccination (CoAG 2009).

What is important to note is that home visits, on their own, were not as effective as when used in conjunction with other strategies such as phone calls or education interventions (Moher et al. 2015, Daley et al. 2002, Dini et al. 2000, Irigoyen et al. 2000, Irigoyen et al. 2006). A typical finding was that employing multiple strategies was also more effective than using one strategy (Boag-Monroe and Evangelou 2012, Mackenzie et al. 2011, Abramson et al. 1995, Gibson et al. 2017, Lieu et al. 1998).

Cost benefit analysis

A wide range of methods were used across those studies that included analysis of the economic effectiveness of outreach strategies making it difficult to draw meaningful comparisons. The methods used included, crude cost effectiveness, break even analysis, cost benefit comparison, cost per child, cost per additional child vaccinated, cost effectiveness ratios, and return on investment. In addition, several studies reported on the excess time involved in identifying their target group due to incorrect immunisation status or contact information (Moher et al. 2015, Daley et al. 2002, LeBaron et al. 2004, Lieu et al. 1998).

Table 1.2 Table of studies extracted

Author	Country/Setting	Study Design/Population	Intervention and Comparator	Main Outcome	Result Summary
Abramson <i>et al.</i> (1995)	Forsyth County, North Carolina; USA	RCT Infants receiving care at 2 health centres Low SES parents of infants aged 0-7mths (n=601)	Intervention: Coordinator introduce self at birth in hospital setting Immunisation reminder card sent 1wk prior to due date Second reminder sent on no-show Parents receive weekly phone call until immunisation complete for 1mth-7mth overdue (n=302) Comparator: standard immunisation reminder (n=299)	Child Development Outcome: Proportion of infants receiving immunisation at appropriate milestone Cost Benefit Analysis: cost of follow up	By 7mths 91% of intervention infants met milestones compared with 72% of comparator infants. Cost of follow up for intervention infants was \$18.05, Fewer intervention infants missed appointments relative to comparator infants.
Alemi <i>et al.</i> (1996)	Urban paediatric clinic; USA	Non-RCT Mothers with infants <6mth first outpatient clinic visit (n=213)	Intervention: mothers contacted and enrolled in study by medical assistant. Received automated reminder 2 days prior to appointment and again for no-shows (n=124) Comparator: standard practice - no reminder (n=89)	Child Development Outcome: Proportion of infants receiving immunisation at appropriate milestone Service Utilisation: clinic attendance rate	82% of intervention group attended versus 72% of comparator group 68% on-time attendance for intervention group versus 43% of comparator group
Alto <i>et al.</i> (1994)	USA	Prospective cohort study Children aged 2mth-7yrs attending 4 outpatient clinic appointments with immunisation 1mth overdue (n=464)	Intervention: mailed postcard of immunisation schedule, phoned up to 3 times in 8wk window (n=231) Comparator: standard immunisation schedule with no reminder (n=233)	Child Development Outcome: proportion of children receiving immunisation on schedule 8mths after intervention Service Utilisation: number of clinic visits	Proportion on-time immunisation increased from 11% to 19% after 6mth

Author	Country/Setting	Study Design/Population	Intervention and Comparator	Main Outcome	Result Summary
Barnes <i>et al.</i> (1999)	Paediatric clinics; USA	RCT Children aged <2yrs enrolled at clinic with no-show at appointment or overdue for vaccination (n=163)	Intervention: Immunisation tracking, and follow-up provided by community volunteers Comparator: Notification of immunisation status at enrolment with no further contact	Child Development Outcome: Immunisation status at 6mths following clinic enrolment	75% of intervention children met immunisation schedule for age compared to 54% of comparator group
Banerjee <i>et al.</i> (2010)	India	Clustered RCT children aged between 1 and 3yrs (n=1,640)	Intervention: 134 villages randomised into one of three groups: no immunisation intervention group (n=860); monthly immunisation group (n=379); monthly immunisation with incentives group (n=382)	Child Development Outcome: Proportion of children partially or fully immunised Cost Benefit Analysis: Average cost per immunisation Surveys of immunisation status taken randomly at baseline and 18mths post intervention	Monthly immunisation group 18% fully immunised Monthly immunisation with incentives group fully 39% immunised No immunisation intervention group 6% fully immunised Cost Benefit Analysis: Average costs per immunisation for Monthly immunisation group \$56; Average cost per immunisation for Monthly immunisation with incentives group \$28
Bangure <i>et al.</i> (2015)	Zimbabwe	RCT women with a live birth (n=304)	Intervention: SMS reminders sent at 6, 10 and 14wks with routine health education schedule (n=152) Comparator: routine health education schedule with no SMS contact (n=152)	Child Development Outcome: Immunisation rate	Intervention group attained 97% immunisation rate at 6wks, compared with 82% immunisation rate for comparator group.
Birkhead (1995)	6 volunteer Women Infants and Children sites; USA	Intervention trial Children aged 12 to 59 months on site between April and Sept 1991, eligible for measles vaccination (n=6,181)	Intervention: Child escorted to clinic for immunisation. Parent receives monthly voucher Comparator: Standard practice voucher bi-monthly	Child Development Outcome: Proportion of children receiving measles vaccination	Intervention group attained 74% immunisation rate.

Author	Country/Setting	Study Design/Population	Intervention and Comparator	Main Outcome	Result Summary
Bjornson <i>et al.</i> (1999)	Canada	Prospective RCT Children aged under 2yrs Two convenience cohorts due to receive MMR vaccine at 12mths or booster vaccine at 18mths (n=320)	Intervention: Reminder notice sent 4wks prior to vaccination Comparator: No reminder notice.	Child Development Outcome: Uptake at 8wks post immunisation due date	No difference reported.
Campbell <i>et al.</i> (1994)	Paediatric clinic New York; USA	RCT Newborns enrolled at clinic (n=288)	Intervention: Tailored reminder letters sent 1wk prior to due (n=87); Postcard reminders sent 1wk prior to due (n=96); Comparator: No reminders sent (n=105)	Child Development Outcome: Proportion of children receiving 3 immunisations by age 7mths Service Utilisation: Proportion of appointments kept	Intervention group attained 63% (letters) and 59% (postcards) immunised compared with 57% immunised. Cost Benefit: Cost reduction of \$6,806 with postcards.
Daley <i>et al.</i> (2002)	Primary Care Clinic, Colorado; USA	RCT Children aged 6wks to 22mths (n= 1,234)	Intervention: Reminder letters with phone follow up (n=140) Comparator: Standard care (n=126)	Child Development Outcome: Proportion immunised with one or more doses.	Intervention group attained 23% immunised with at least one dose compared with 20% of the comparator group.
Dini <i>et al.</i> (2000)	Country Health Department 1993-1996; USA	RCT and Mixed Methods Children aged 60-90days who received first dose DTP or polio vaccine (n= 1,227)	Intervention: Group A phone messages and letters; Group B phone; Group C letters Comparator: No contact 10% of immunised group contacted and surveyed	Child Development Outcome: Proportion completed immunisation at 24mths Cost Benefit Analysis: Cost per additional child completing immunisation by 24mths	Intervention group 21% more likely to complete series by 24mths than comparator.
Drezner <i>et al.</i> (2015)	Pennsylvania, 2008-2012; USA	Retrospective Cohort Study Children aged 10-15mths (n=1,100)	Intervention: Outreach workers provide education and referral Comparator: No outreach	Child Development Outcome: Proportion vaccinated at 6, 15, and 18mths of age	Intervention children had significantly higher vaccination rates across the vaccination schedule.

Author	Country/Setting	Study Design/Population	Intervention and Comparator	Main Outcome	Result Summary
Ferson <i>et al.</i> (1995)	Sydney; Australia	RT Children aged 5yrs attending primary school who are under-immunised or overdue (n=239)	Intervention: Random assigned groups; Group 1 passive contact letter and leaflet; Group 2 active contact letter, leaflet and phone call Comparator: None	Child Development Outcome: Uptake of booster or MMR vaccination.	Passive intervention group attained 37% vaccinated compared with 71% vaccinated in the active intervention group.
Gibson <i>et al.</i> (2017)	Villages; Kenya	RCT Children aged under 5wks (n=2,188)	Intervention: Group 1 sms only; Group 2 sms and 75 shillings; Group 3 sms and 200 shillings Comparator: no contact	Child Development Outcome: Full immunisation by 12 months	Children in Group 3 attained 90% fully vaccinated compared with 82% fully vaccinated in the control group.
Hawe <i>et al.</i> (1998)	Public vaccination clinic; Ballarat, Australia	RCT Children due for measles vaccination (n=259)	Intervention: Personalised health belief model reminder card Comparator: usual reminder card	Child Development Outcome: Proportion of children vaccinated for MMR in 5wks post reminder	Children in the Intervention group attained 79% compared with 67% in the comparator group.
Hoekstra <i>et al.</i> (1999)	Women Infant and Children sites in Chicago; USA	RCT Infants aged 3-15mths 95% Hispanic ethnicity (n=565)	Intervention: Group 1 food voucher incentive and reminder phone call/letter; Group 2 food voucher Comparator: none	Child Development Outcome: Proportion immunised	Intervention raised vaccination coverage 33% with no difference between groups
Hutchins <i>et al.</i> (1999)	Women Infant and Children sites; Chicago, USA	RCT Children aged on average 23-27mths	Intervention: Children screened for vaccination status at every visit and referred for vaccination and given food voucher incentive	Child Development Outcome: Vaccination coverage at 1 st and 2 nd birthday post intervention	Intervention increased vaccination coverage at 1 st birthday from 59% to 69%, and increased coverage at 2 nd birthday from 37% to 60%.
Irigoyen <i>et al.</i> (2000)	Paediatric clinic in low income community; NY, USA	Non-RCT Children aged 4-18mths listed in clinic appointment book (n=1,273)	Intervention: Group 1 postcard (n=314); Group 2 phone call (n=307); Group 3 postcard and phone call (n=306) Comparator: no reminder (n=346)	Child Development Outcome: Vaccination coverage	Group 3 1.75 times more likely to keep appointment than no reminder group/

Author	Country/Setting	Study Design/Population	Intervention and Comparator	Main Outcome	Result Summary
Irigoyen <i>et al.</i> (2006)	Inner city community medical practices; NY, USA	RCT Children aged 6wks to 15mths due or late for DTaP vaccination (n=1,662)	Intervention: Group 1 continuing postcard reminders (n=549); Group 2 limit of 3 postcard reminders (n=552) Comparator: No reminders (n=561)	Child Development Outcome: Proportion receiving any vaccinations post reminder at 3mths and 6mths	Univariate response improved vaccination coverage for Group 1 (45% vs 51%). Multivariate response showed no difference between groups.
Jones <i>et al.</i> (2015)	Urban family medicine residency clinics; Utah, USA	Prospective Cohort Study Children aged under 3yrs behind on recommended schedule at age (n=457)	Intervention: Immunisation explanation letter sent to parents of under-immunised children with booking how-to; follow-up phone call for remainder not immunised at 6wks post letter Comparator: None	Child Development Outcome: Proportion immunised Cost Benefit Analysis: Break-even point	Immunisation rate increased from 75% to 92%
Kempe <i>et al.</i> (2013)	14 counties; Colorado, USA	Stratified, cluster-randomised pragmatic trial with in-county randomisation Children aged 19-35mths at June 2010 (n= 31,567)	Intervention: Group 1 population based recall Group 2 training of practice sites to conduct recalls	Child Development Outcome: Scheduled immunisation status; new vaccination 6mths past intervention for children not meeting scheduled immunisations	Modelled population based strategy more effective than clinic recall method. Cost of modelled population based strategy \$17 per child meeting schedule compared with \$62 per child meeting schedule via clinic recall method.
Kolasa <i>et al.</i> (2009)	Philadelphia; USA	Pre-post Intervention Children aged 13mths (n=1,988)	Intervention: Multiple agencies undertake 3 phone calls, 3 letters, and 3 visits (n=480) Comparator: single outreach contact (n=1508)	Child Development Outcome: proportion immunised at 10 and 13mths Proportion meeting immunisation schedule at 19mths	Intervention group attained 31% meeting schedule at 19mths compared to 21% of comparator group.

Author	Country/Setting	Study Design/Population	Intervention and Comparator	Main Outcome	Result Summary
LeBaron <i>et al.</i> (2004)	Georgia; USA	RCT Children aged 1-14mths receiving health care (n=3,050)	Intervention: Group 1 automated phone or mail reminder recall (n=763); Group 2 Person to person phone and home visit recall (n=760); Group 3 combination automated call, person-to-person and home visit Comparator: usual care (n=763)	Child Development Outcome: meet immunisation schedule for child aged 24mths Cost Benefit: Cost per additional child vaccinated	Group 2 increased immunisation for DTP vaccine compared with comparator group.
Lever and Moore (2005)	Sure Start; UK	Cohort Children aged 3yrs (n=243)	Intervention: Home visit prior to 3 year old check (n=114) Comparator: No visit prior to 3 year old check (n=129)	Service Utilisation: Attendance rate at 3 year old check	No significant difference between intervention and comparator
Lieu <i>et al.</i> (1997)	Health Maintenance Organisation; USA	RCT Parents of children aged 20mths not vaccinated and identifiable via electronic records (n=289)	Intervention: Personalised letters with recommendation and request for appointment (n=153) Comparator: no reminder (n=136)	Child Development Outcome: Children receive MMR vaccination between age 20mths and 24mths	Intervention group who received letters (82 of 153) 54% were vaccinated compared with 25% of comparator group.
Lieu <i>et al.</i> (1998)	Health Maintenance Organisation; USA	RCT Children under-immunised at age 20mths (n=648)	Intervention: Group 1 automated phone message; Group 2 letter; Group 3 automated phone message followed by letter; Group 4 letter followed by automated phone message Comparator: standard practice	Child Development Outcome: Proportion of children meeting immunisation schedule Cost Benefit Analysis: Cost per child	Group 4 attained 54% immunisation compared with 36% immunisation. Cost per child immunised was \$7 for Group 4, \$9.80 per child for Group 1, \$10.50 per child for Group 2.

Author	Country/Setting	Study Design/Population	Intervention and Comparator	Main Outcome	Result Summary
Linkins <i>et al.</i> (1994)	Rural sites in Georgia; USA	RCT Under-immunised children ages under 2yrs (n=8,002)	Intervention: Randomly selected group receiving automated phone reminder, recall 1 day prior to due date and trailing call for missed appointments Comparator: No contact	Child Development Outcome: Immunisation rate during 30day follow up	36% of Intervention group attended health department within 30 days if contact compared with 28% of comparator group.
Morgan and Evans (1998)	Wales; UK	Blind RCT Children aged 9-21mths not vaccinated (n=451)	Intervention: Non-directive call (n=153); mailed reminder (n=159) Comparator: standard care (n=139)	Child Development Outcome: Proportion immunised by 12mths or proportion MMR immunised by 24mths	No significant difference between groups
Oda <i>et al.</i> (1995)	California; USA	RCT Children aged 0-7yrs (n=1,654)	Intervention: Group 1 phone call; Group 2 home visit Comparator: no intervention	Service Utilisation: Health assessment rates within 6 months of treatment	Group 1 attained 36% assessment rate, Group 2 attained 40% compared with 40% assessment rate for the comparator.
Owais <i>et al.</i> (2011)	Study conducted in 2008; Pakistan	RCT Mother infant pairs aged less than 6wks (n=366)	Intervention: Home visit with three targeted pictorial messages regarding vaccination (n=183) Comparator: Verbally delivered non-targeted health promotion messages (n=183)	Child Development Outcome: Immunisation rates for DPT and Hep B	72% of intervention group attained immunisation schedule by age 4mths compared with 52% of comparator group.
Rodewald <i>et al.</i> (1999)	Primary care facilities Rochester, New York; USA	Cohort Children aged 0-12mths (n=3,015)	Intervention: Group 1 prompting only; Group 2 tracking/outreach only; Group 3 combined prompting and tracking/outreach Comparator: standards care	Child Development Outcome: Immunisation status for age; days delay in attaining immunisation Cost Benefit Analysis: cost per additional child immunised	Final series complete immunisation rates Group 1 attained 76%, Group 2 attained 95%, and Group 3 attained 95% compared with comparator group attained 74%.

Author	Country/Setting	Study Design/Population	Intervention and Comparator	Main Outcome	Result Summary
Saliterman <i>et al.</i> (1980)	Health Maintenance Organisation, Minnesota; USA	Pre/Post Intervention Study Children aged 18-24mths (n=173)	Intervention: phone call and follow-up calls with preventative care message. Postcard asking for appointment booking	Child Development Outcome: Immunisation status	Pre-intervention baseline 38% met schedule. 73% met schedule after one phone contact. 76% met schedule after two phone contacts. 90% met schedule after two phone calls and postcard.
Selby-Harrington <i>et al.</i> (1995)	Rural North Carolina; USA	RCT Families with child overdue for Well Child screening (n=2,053)	Intervention: Group 1 standard pamphlet mail out (n=294); Group 2 phone contact (n=284); Group 3 home visit (n=307) Comparator: standard practices (n=298)	Child Development Outcome: Health screening status within 4mths of intervention Cost Benefit Analysis: Cost effectiveness ratio	Intervention group improved number screened compare with comparator group Not cost effective with only 16 screenings per 100 families visited compared with 5 per 100 for comparator group.
Shefer <i>et al.</i> (2002)	Women Infant and Children sites, Milwaukee, USA	Cohort Children aged 0-2yrs (n=596)	Intervention: reminder phone call with reminder mail out to unreachable families Comparator: standard practice	Child Development Outcome: Number of children meeting immunisation schedule Service Utilisation: number of Well Child visits, number of health screenings	Intervention group increased visits by 1.83 compared to comparator group.
Stehr-Green <i>et al.</i> (1993)	Health clinics, Atlanta; USA	RCT Parents of children aged less than 12mths and due for DTP, OPV, or MMR (n=222)	Intervention: computer generated reminder contact 1 day before due continued up to nine contacts (n=112) Comparator: no contacts (n=110)	Child Development Outcome: Proportion children meeting immunisation schedule within 4wks of due date	Intervention group successfully contacted attained 53% vaccinated compared with 41% of comparator group.
Tollerstrup and Hubbard (1991)	Washington State; USA	RCT Children aged under 5yrs with no siblings (n=393)	Intervention: postcard reminder at 1mth followed by another postcard contact after one month (n=182) Comparator: no contacts (n=211)	Child Development Status: proportion meeting immunisation schedule	Intervention group attained 65% immunised compared with 32% immunised.

Author	Country/Setting	Study Design/Population	Intervention and Comparator	Main Outcome	Result Summary
Uddin <i>et al.</i> (2016)	Bangladesh	Quasi-experimental Pre/Post study, pregnant women with child aged 0-11mths (n=8,360)	Intervention: smart phone registration of pregnant women, notification by mothers via phone message of birth event, automated phone message reminder to mother and health worker	Child Development Outcome: Full immunisation coverage	Full vaccination coverage increased in intervention group.
Vivier <i>et al.</i> (2000)	Hospital based Medicaid managed care practice Rhode Island; USA	RCT Children aged under 6yrs not meeting immunisation schedule and enrolled in Medicaid (n=264)	Intervention: Group 1 phone reminder (n=60), Group 2 mail reminder (n=63), Group 3 mail and phone contact (n=70) Comparator: no intervention (n=71)	Child Development Outcome: Immunisation received during follow-up and immunisation status at end of follow-up	Group 1 attained 17% immunised, Group 2 attained 19%, and Group 3 26% immunised compared with comparator group attained 4% immunised.
Yokley and Glenwick (1984)	Public Health Clinic, Midwestern city; USA	RCT Preschool children aged under 5yrs not meeting immunisation schedule (n=1,133)	Intervention: Group 1 general prompt via mail (n=195); Group 2 specific prompt via mail (n=190); Group 3 specific prompt via mail with expanded clinic hours (n=185); Group 4 specific prompt via mail and monetary incentive (n=183) Comparator: Group 1 phone contact only (n=189) Group 2 routine care (n=191)	Child Development Outcome: Number of children receiving one or more immunisations; Total immunisations delivered Service Utilisation: Number of targeted children attending the clinic	Treatment groups increased number receiving immunisations relative to comparator groups.

Discussion

The scarcity of studies reporting on the effectiveness of outreach strategies as a means of improving outcomes for children in the education sector of early years services is an important finding of this review. All studies included in the review had outcomes related to health, primarily immunisation rates, with no studies reporting any education or other developmental outcomes. This may be because outreach work is typically targeted to those who are the most vulnerable, underserved or hard to reach, with the aim of overcoming structural inequalities (Harrison and Waller 2017). Often this is done by providing a service where people reside, for example, home visiting programs, or connecting them to specialised services such as alcohol and other drug services, HIV or mental health services. Indeed, many studies *excluded* from this review fell into this category. Consequently, the focus on the effectiveness of outreach as a means of improving child outcomes through engagement with *universal services*, illustrates a natural division in the focus of research studies that involve outreach. On reflection, this issue may follow from the definition of outreach chosen to inform the systematic review criteria. Universal services, especially school based compulsory education services, would have a need for outreach as we define it, only if families are exempted from a legal compulsion to attend.

A natural reading of the definition we have used requires an actual service facility from which ‘outreach’ services are extend to places beyond its boundaries. Consequently, alternative models of service delivery, such as community co-governance models, and virtual or online services, may undertake work readily recognised as engagement, but not as outreach. In such cases, systematic search for ‘outreach’ services will be ineffective (Alameda-Lawson and Lawson 2019; Bruno *et al.* 2019; Dyer and Echessa 2018).

The outreach activities that do occur in the education sector are focussed on re-engaging older children who are excluded from attendance via formal school sanction, or who disengage following key transition points later in their compulsory school career. In these instances, exposure to outreach activities for children aged eight years or younger is likely to take place only in families with the right age spacing among siblings.

Another reason for the paucity of studies in this area is the difficulty in measuring the effectiveness of outreach activities in complex social settings (Pawson 2013). Harrison and Waller (2017) argue that confounding factors and the assumption of a positive and linear effect of activities on outcomes makes conclusions about causality and effectiveness of outreach strategies problematic.

Many studies were excluded from this review because of the conflation of outreach with a range of other activities such as education, advertising, case management, treatment and incentives (Harrison and Waller 2017). This made it difficult to establish a causal link between the outreach activities *per se* and the service operation's desired outcomes. For instance, there are a wide range of factors that influence a family's decision to get their children vaccinated, and finding a direct causal link between the intervention and outcome is more plausible when the outreach activity is specific, such as is the case with letter delivery or calls reminding families to take their child for their immunisation, and where outcome measurement takes place shortly after the intervention (measured vaccination rates). This argument should be of concern to many approaches to performance measurement deployed in government services settings.

It appears that almost any strategy used to reach out to families to create awareness of their child's immunisation status and to encourage attendance at a clinic resulted in improvements in vaccination rates. Despite this, across all studies measuring the effect of interventions on immunisation rates, on average, only about two thirds of the target population were immunised. Immunisation coverage after the interventions ranged from 19% (Alto *et al.* 1994) to 97% (Birkhead 1995), and this difference is likely to be attributable to the age of the children in the studies (immunisation rates decrease as children get older) and the difference in baseline rates, with some regions starting from a very low base and others from a very high baseline immunisation rate. What these results do show is that although the outreach strategies were for the most part, successful in increasing immunisation rates, a large proportion of children were still being missed.

The paper by Owais *et al.* (2011) supports the claim that outreach activities are effective when the purpose of the outreach is clear and targeted at the right level.

In this study the authors compared health workers going to homes and showing families three targeted pictorial messages about vaccines for five minutes, with health workers delivering general health promotion messages verbally for 15 minutes. They found that by four months, 72% of those who had received the targeted pictorial messages had received all three doses of DPT/Hepatitis B compared to 51.7% of the other group. Perhaps for families dealing with a myriad of other social issues, families with low levels of literacy or those where English is their second language, receiving clear and specific messages are more effective than more general preventative health messages, which families may not view as being a high priority when they have more pressing needs.

Andersson (2013) identifies three main tasks performed by people engaging in outreach work. These are contact making, initiating social change processes with the intent to improve people's lives, and establishing and maintaining social support. The contact making, the reaching out to people who are not currently accessing a service and who may benefit from attending appears to be central to understanding what outreach is. In this review, this is where most of the services directed their energies. Outreach can lead to participation without requiring a greater level of commitment or engagement from families (Lhussier *et al.* 2016). However, for many families their reasons for not immunising their child may be more complex and harder to address through contact making activities alone. Consequently, a deeper level of contact and engagement from parents and service provider may be required (Lhussier *et al.* 2016).

Andersson's (2013) second task for outreach, 'initiating social processes to improve people's lives', suggests we view outreach more as a series of processes that occur over time. This approach recognises that changing people's knowledge, attitudes, and behaviours can require significant time especially when engaging with firmly held beliefs or external pressures (Gorard *et al.* 2007). It is through these 'social processes', consisting of ongoing interactions between familiar people, that relationships of trust are developed and the level of engagement with services changes. Using Fredricks' typology of individual engagement (Fredricks *et al.* 2004), Lhussier *et al.* (2016) offer an exploratory framework for outreach interventions in 'Traveller Communities', identifying changes in engagement at a behavioural,

emotional, and cognitive level to effect changes in behaviour, social capital and participation. In this study, the trust of workers and long established relationships emerged as critical to changing behaviours or building the social capital of the community. These ways of working, although not evident from this review, have also been found to be critical factors for engagement. The juxtaposition of a rational/technical aim, typically defined by those offering a service, with social practices closer to those of family and friend relationships of mutual trust and intersubjectivity is a defining characteristic of this approach to outreach. Similarly, practitioners working in ways that showed competence and valuing of the parent, and working in a way that engenders safety, trust and enjoyment were key factors that determined whether a service would be attractive to service recipients (Houle *et al.* 2018).

Among more disadvantaged groups there is evidence of lower uptake of preventive services, and of higher use of accident and emergency services, emergency admissions and out-of-hours services (Dixon-Woods *et al.* 2006). This suggests that amongst this group there is a tendency to seek help only when necessary. This practice relates to the issue of service eligibility or ‘candidacy’ for a service. Dixon-Woods describes candidacy as, “... the ways in which people’s eligibility for medical attention and intervention is jointly negotiated between individuals and health services” (Dixon-Woods 2006: 12). What this means is that a family may have a different interpretation of their current needs and circumstances compared to a service provider, and consequently, a different perception of their eligibility for a particular service. This may be more pronounced in areas where poorer health or lower levels of education are common, but this may also be true for parents who do not face these challenges but have children with high needs. For example, there may be a universal education and care service in their area but from their perspective they may not see themselves as being eligible for that service due to the complex needs of their child. It is in these kinds of circumstances where a deeper level of engagement and trust may support greater understanding between service provider and family, or help configure activities that connect with families at the point in time they are most likely to be required.

Whilst the United States (US) does not have a universal health care system, the majority of American children do access health care through health insurance provided under Medicaid, the Children's Health Insurance Program (CHIP), or from private health insurance companies (Jenkins 2018). The overall rise in health insurance enrolment recorded in the US has increased the uptake of preventative care (Kaiser Family Foundation 2016), and this has been a driver of the strong push to ensure parents register their children for health insurance. A recent study indicated that an outreach intervention was effective at increasing both enrolment in CHIP and Medicaid for kindergarten-aged children, as well as increasing preventive care use (Jenkins 2018). This school-based intervention illustrated how different agencies and government departments working together can achieve improvements across a range of indicators. Partnering with hospitals to offer child health insurance outreach in an emergency department setting has also been shown to be effective at increasing enrolments (Gordon and Dupuie 2001). This approach offers some promise for contacting families who are more likely to present to emergency departments than to alternative kinds of medical practice.

Andersson (2013) proposes that the fundamental idea of outreach is "... to start a process of social interaction between people in need, on the one hand, and some kind of support-oriented organizational body on the other" (Andersson 2013: 175). However, this claim can be contested because the term 'in need' may include those who need to know about a service (i.e., be aware that it exists) as well as a family struggling to cope with a child with severe behavioural problems (i.e., a family in need of more intensive support). Who defines what 'in-need' means may also be contested, especially where the definition allows *ad hoc* application or when the intended service community disagrees.

This highlights the importance of organisations being clear about the vision they have for their outreach activities and what is feasible. For example, the 'Keep well' program in the United Kingdom identified two purposes for their outreach activities (Mackenzie *et al.* 2011). The first was to increase the uptake of health checks by removing barriers to participation and making the service more accessible. The second aim was to achieve improvements in health by using counselling techniques and referring people to other services when required. An assertive outreach program

targeted to families with serious problems in the Netherlands also had a clear goal in implementing their outreach strategy (Rots-de Vries *et al.* 2011). The overarching aim of the outreach program was to contact families in the first instance, and then motivate them to accept care and liaise on their behalf. Two models of outreach provision were then identified, one which was a kind of service broker model - linking people to existing services, and another which required longer term engagement through an extended care package.

Despite the use of patient registries and in-house databases to monitor patient data, several studies reported encountering significant challenges from incorrect patient information, which in one study amounted to 40% of children having an incorrect official record (Drezner *et al.* 2015). What this means is that the outreach activity may have erroneously included individuals who were already planning to vaccinate their children, thus making it difficult to draw any conclusions about the effectiveness of the strategy in engaging with families not already engaged with service. In the Alto study (Commission on Population 1981), for example, there was a contamination effect because the siblings were not controlled for and the main means of outreach contact was potentially exposed to non-target family members and to neighbours. Therefore, before service providers can successfully make contact with the target group, sufficient time and resources need to be allocated to ensure that the target group has been identified correctly.

Analytical methodologies also need to be correctly matched to the setting under evaluation, especially where it is known, for example, that contamination effects can occur. By sharing resources, and integrating services where feasible, partnerships across agencies that foster shared leadership, synergies and building relationships play an important role in supporting these contact-making and case finding activities (Kelaher *et al.* 2009). Across the globe the use of GIS/Geospatial mapping is emerging as potential means to identify gaps in service delivery (Sasaki *et al.* 2011; DeGuzman *et al.* 2017; Mahler *et al.* 2015). Partnerships are also highlighting the importance of sharing and linking service administrative data to ensure that the most appropriate measures affecting service outcomes are included in service evaluations and service planning.

The outreach strategies employed in the selected studies track the changes in technology that have taken place across communities where outreach activities have been studied. Perhaps the most obvious example of this shift has occurred with mobile communication networks, with computer generated/automated messages being used in the 1990s and early 2000s and short messaging services (SMS) being used in more recent years, giving way to application-based messaging associated with social media. Today, with the rise in mobile phone ownership (Fair Society 2010), there is greater scope to use technology in creative ways to engage with people who have traditionally been hard to contact. For example, one of the studies included in this review from Bangladesh used software named “mTika” to electronically register each child’s birth, and remind mothers about upcoming vaccination dates via text messages (Uddin 2016). The service provider then taught mothers who were illiterate to use symbols upon registration and these were used in SMS messages to contact women about appointments. Qualitative data showed the intervention was well-accepted, suggesting that this approach could be used to engage with other groups of people who have low literacy levels or for whom the official language spoken in their region is not their first language.

The Tasmanian Government’s *Early Years Strategy* (Department of Education Tasmania 2017), is aimed at ensuring children in Tasmania thrive in strong, connected communities with three key focus areas, quality, equity and partnerships. The Strategy’s purpose is to strengthen the provision of programs and services for children and their families and to increase collaboration across a variety of key stakeholders. To achieve this, services need to be responsive to the needs of local communities and work in ways that encourage community engagement with the services and programs available to them. Outreach is one of a number of strategies to facilitate engagement. However, at present, early years practitioners in Tasmania do not share a common understanding of outreach, and there has been no systematic review of its effectiveness in improving the health and educational outcomes for children in Tasmania (Jose *et al.*, manuscript under review).

This review has provided examples of activities that focus on contact making, or bridging the gap between service providers and families, for the most part for the purpose of effective immunisation. This brings us back to the challenge of having a

shared understanding of what outreach is. As Mackenzie proposes, should we approach outreach as a mechanism to solve local problems (Mackenzie *et al.* 2011), in some cases a specific strategy for a specific target group? (Carr *et al.* 2017). Or, do we view outreach more broadly as a general means of reducing social inequalities in society? (Grymonprez *et al.* 2017). In the absence of clear confirming examples, it remains an open question whether it is feasible to establish a shared understanding across disparate disciplines such as education and health. Andersson (2010) proposes the following broad, but non-specific definition of outreach, perhaps in recognition of that challenge:

“Outreach work is a contact-making and resource mediating social activity performed in surroundings and situations that the outreach worker does not control or organise, and targeted at individuals and groups who otherwise are hard to reach and who need easy accessible linkage to support” (Andersson 2010: 68).

At the heart of this definition is relationship formation. If we agree to this view of outreach, then we have an opportunity to measure outreach activities in terms of their ability to establish or facilitate sustained relationships with people, whether or not those relationships affect changes in child health or education outcomes. This suggests that whatever outreach activity is proposed, it is informed by a clearly articulated theory of change underpinning each activity, which has as its focus the activities undertaken to establish and maintain relationships with clients, and their responses to those activities (Harrison and Waller 2017).

Finally, to determine which outreach strategies are effective in engaging families in the early years sector, it may be that a different kind of review is needed. Two examples from articles uncovered by this review reached this conclusion. After a systematic search of the literature investigating the effectiveness of outreach programs for the health improvement of traveller communities, Lhussier *et al.* (2015) determined that as a result of the paucity and quality of material, a ‘realist review’ would provide more useful information to develop and provide robust explanations for how, why, for whom and in what circumstances an outreach intervention may be successful (Lhussier *et al.* 2016). In contrast, Dixon-Woods *et al.* (2006) propose that

for topics that are wide-ranging, complex, and often unclear or ambiguous, a ‘critical interpretive synthesis’ may be a more useful approach (Dixon-Woods *et al.* 2006). We note, given that outreach depends on a specific kind of centre-based service operation, the desired aim of outreach activities for those kinds of operations might also be achieved by adapting the model of service operation to formats that better engage parents with young children by design.

Strengths and limitations

The conclusions in this systematic review are limited by methodological choices made on the basis of time and on scoping decisions affecting the kind of outreach practice relevant to early years services in Tasmania. A thorough and systematic search was undertaken of the most relevant publication data stores within the agreed scope. To test the findings returned were exhaustive of the search within that scope, we expanded the search to include reference lists, citations and relevant systematic reviews and this strengthened our assurance that there exists only a narrow selection of research article publications on health or education outreach practices, in this case focussed on immunisation rates.

The review was also limited to English language articles and so it remains possible that relevant evidence from non-English publications may have been missed. While the search across literature databases was methodical, the differences in labelling and terms used to identify some outreach activities means that some resources that used synonyms not conceived by our team or identified by contemporary database search algorithms may have been missed during this process.

This review also did not explore the quality of the studies as many of the studies came from already published systematic reviews where their quality had been assessed as being low to moderate. Very few studies returned had been judged as high quality (Williams *et al.* 2011; Harvey *et al.* 2015; Bright *et al.* 2017). Thus, any findings or conclusions drawn from this review need to be interpreted with caution.

Conclusion

That there are very few studies reporting on the effectiveness of outreach activities to improve child outcomes in the early years education sector is an important finding of this review and highlights the challenges in measuring the impact of outreach strategies to engage families in universal services beyond the health sector. Future research related to outreach in early years services may benefit from this finding by examining the extent to which the service operations under consideration exemplify business models and service ecosystems appropriate for outreach activities.

References

- Abramson J.S., O'Shea T.M., Ratledge D.L., Lawless M.R., and Givner L.B. (1995) "Development of a vaccine tracking system to improve the rate of age-appropriate primary immunization in children of lower socioeconomic status" *The Journal of Pediatrics* (126: 4: 583-6).
- Alameda-Lawson, T. and Lawson M.A. (2019) "Ecologies of Collective Parent Engagement in Urban Education" *Urban Education* (54: 8: 1085-1120).
- Alemi F., Alemagno S.A., Goldhagen J., Ash L, Alemi F., Alemagno S.A., *et al.* (1996) "Computer Reminders Improve On-Time Immunization Rates" *Medical Care* (34:10 Supp: OS45-OS51).
- Alto W.A., Fury D., Condo A., Doran M., Aduddell M. (1994) "Improving the immunization coverage of children less than 7 years old in a family practice residency" *The Journal of the American Board of Family Practice* (7: 6: 472-7).
- Andersson B. (2013) "Finding ways to the hard to reach—considerations on the content and concept of outreach work" *European Journal of Social Work* (16: 2: 171-186).
- Andersson B. (2010) *Experiences from Outreach Work with Adults and Young Adults: A report based on five research circles about outreach work*. Gothenburg: FoU i Väst/GR.
- Anderson L.M., Shinn C., Fullilove M.T., Scrimshaw S.C., Fielding J.E., Normand J., *et al.* (2003) "The effectiveness of early childhood development programs: A systematic review" *American journal of preventive medicine* (24: 3: 32-46).
- Banerjee A.V., Duflo E., Glennerster R., Kothari D. (2010) "Improving immunisation coverage in rural India: clustered randomised controlled evaluation of immunisation campaigns with and without incentives" *British Medical Journal* (340: c2220).
- Bangure D., Chirundu D., Gombe N., Marufu T., Mandozana G., Tshimanga M., *et al.* (2015) "Effectiveness of short message services reminder on childhood immunization programme in Kadoma, Zimbabwe—a randomized controlled trial" *BMC Public Health* (15: 1: 137).
- Barnes K., Friedman S.M., Brickner-Namerow P., and Honig J. (1999) "Impact of community volunteers on immunization rates of children younger than 2 years" *Arch Pediatr Adolesc Med* (153: 5: 518-24).
- Birkhead G.S. (1995) "The immunization of children enrolled in the Special Supplemental Food Program for Women, Infants, and Children (WIC): The impact of

different strategies” *The Journal of the American Medical Association* (274: 4: 312-6).

Bjornson G.L., Scheifele D.W., LaJeunesse C., and Bell A. (1999) “Effect of reminder notices on the timeliness of early childhood immunizations” *Paediatrics & Child Health* (4: 6: 400-5).

Boag-Munroe G., and Evangelou M. (2012) “From hard to reach to how to reach: A systematic review of the literature on hard-to-reach families” *Research Papers in Education* (27: 2: 209-39).

Bright T., Felix L., Kuper H., and Polack S. (2017) “A systematic review of strategies to increase access to health services among children in low and middle-income countries” *BMC Health Services Research* (17: 1: 252).

Bruno, A.J., Serkin, C., Kahn, N., Troxel, M., and Shank, J. (2019) “Tracking Progress in peer-delivered family-to-family support” *Psychological Services* (16: 3: 388-401).

Campbell J.R., Szilagyi P.G., Rodewald L.E., Doane C., and Roghmann K.J. (1994) “Patient-Specific Reminder Letters and Pediatric Well-Child-Care Show Rates” *Clinical Pediatrics* (33: 5: 268-72).

Carr S.M., Lhussier M., and Forster N. (2017) “Lay Health Advisers: scoping the role and intervention landscape” *Journal of Healthcare Leadership* (9: 59).

Carr S., Lhussier M., Forster N., Goodall D., Geddes L., and Pennington M. (2014) “Outreach programmes for health improvement of Traveller Communities: a synthesis of evidence” *Public Health Research* (2: 3: 1-168).

Coalition of Australian Governments (2009) *Investing in the early years-A national early childhood development strategy*. Commonwealth of Australia, Canberra, ACT: Australia.

Commission on Population (1981) “Population planning II: impact assessment” *Population forum: A monthly newsletter of the Commission on Population* (7: 2: 25-28).

Daley M.F., Steiner J.F., Brayden R.M., Xu S., Morrison S., and Kempe A. (2002) “Immunization Registry-Based Recall for a New Vaccine” *Ambulatory Pediatrics* (2: 6: 438-43).

DeGuzman P.B., Altrui P., Allen M., Deagle C.R., and Keim-Malpass J. (2017) “Mapping Geospatial Gaps in Early Identification of Children with Autism Spectrum Disorder” *Journal of Pediatric Health Care* (31: 6: 663-670).

Department of Education Tasmania (2017) *Tasmania's Strategy for Children - Pregnancy to Eight Years 2018-2021*. Hobart: Tasmania.

Dini, E.F., Linkins, R.W., and Sigafoos, J. (2000) "The impact of computer-generated messages on childhood immunization coverage" *American Journal of Preventive Medicine* (18: 2: 132-9).

Dixon-Woods M., Cavers D., Agarwal S., Annandale E., Arthur A., and Harvey J., *et al.* (2006) "Conducting a critical interpretive synthesis of the literature on access to healthcare by vulnerable groups" *BMC Medical Research Methodology* (6: 1: 35).

Doherty P., Hall M., and Kinder K. (2003) *On track thematic report: Assessment, referral and hard-to-reach groups*. Department for Education and Skills.

Drezner K., Newbern E.C., Ossa A., and Johnson C. (2015) "Evaluation of a community immunization outreach program - Philadelphia, Pennsylvania" *Journal of Public Health Management and Practice* (21: 3: 263-8).

Dyer, C. and Echessa, E. (2018) "Sustaining learner participation and progression through networked schooling: A systemic approach for Mobile out of School Children" *International Journal of Educational Development* (64: 8-16).

Fair Society (2010) "Healthy Lives" [press release].

Ferson M.J., Fitzsimmons G., Christie D., and Woollett H. (1995) "School health nurse interventions to increase immunisation uptake in school entrants" *Public Health* (109: 1: 25-9).

Fredricks J.A., Blumenfeld P.C., and Paris A.H. (2004) "School engagement: Potential of the concept, state of the evidence" *Review of Educational Research* (74: 1: 59-109).

Gibson D.G., Ochieng B., Kagucia E.W., Were J., Hayford K., and Moulton L.H., *et al.* (2017) "Mobile phone-delivered reminders and incentives to improve childhood immunisation coverage and timeliness in Kenya (M-SIMU): A cluster randomised controlled trial" *The Lancet Global Health* (5: 4: e428-e38).

Gorard S., Adnett N., May H., Slack K., Smith E., and Thomas L. (2007) *Overcoming the barriers to higher education*. Trentham Books: Stoke-on-Trent.

Gordon J.A., and Dupuie T.A. (2001) "Child Health Insurance Outreach through the Emergency Department: A Pilot Study" *Academic Emergency Medicine* (8: 11: 1088-1090).

Grymonprez H., Roose, R., and Roets, G. (2017) “Outreach Social Work: From managing access to practices of accessibility” *European Journal of Social Work* (20: 4: 461-471).

Harrison N., and Waller R. (2017) “Evaluating outreach activities: overcoming challenges through a realist ‘small steps’ approach” *Perspectives: Policy and Practice in Higher Education* (21: 2-3: 81-7).

Harvey H., Reissland N., and Mason J. (2015) “Parental reminder, recall and educational interventions to improve early childhood immunisation uptake: a systematic review and meta-analysis” *Vaccine* (33: 25: 2862-2880).

Hawe P., McKenzie N., and Scurry R. (1998) “Randomised controlled trial of the use of a modified postal reminder card on the uptake of measles vaccination” *Archives of Disease in Childhood* (79: 2: 136).

Hoekstra E.J., LeBaron C.W., and Johnson-Partlow T. (1999) “Does reminder-recall augment the impact of voucher incentives on immunization rates among inner-city infants enrolled in WIC?” *The Journal of Pediatrics* (135: 2: 261-3).

Houle A-A., Besnard T., Bérubé A., and Dagenais C. (2018) “Factors that influence parent recruitment into prevention programs in early childhood: A concept map of parents', practitioners', and administrators' points of view” *Children and Youth Services Review* (85: 127-36).

Hutchins S.S., Rosenthal J., Eason P., Swint E., Guerrero H., and Hadler S. (1999) “Effectiveness and Cost-Effectiveness of Linking the Special Supplemental Program for Women, Infants, and Children (WIC) and Immunization Activities” *Journal of Public Health Policy* (20: 4: 408-426).

Irigoyen M.M., Findley S., Earle B., Stambaugh K., and Vaughan R. (2000) “Impact of Appointment Reminders on Vaccination Coverage at an Urban Clinic” *Pediatrics* (106: Supp 3: 919).

Irigoyen M.M., Findley S., Wang D., Chen S., Chimkin F., and Pena O., *et al.* (2006) “Challenges and Successes of Immunization Registry Reminders at Inner-City Practices” *Ambulatory Pediatrics* (6: 2: 100-104).

Jenkins J.M. (2018) “Healthy and Ready to Learn: Effects of a School-Based Public Health Insurance Outreach Program for Kindergarten-Aged Children” *Journal of School Health* (88: 1: 44-53).

Jones K.B., Spain C., Wright H., and Gren L.H. (2015) “Improving Immunizations in Children: A Clinical Break-even Analysis” *Clin Med Res.* (13: 2: 51-57).

Lieu T.A., Capra A.M., Makol J., Black S.B., and Shinefield H.R. (1998) “Effectiveness and Cost-effectiveness of Letters, Automated Telephone Messages, or Both for Under immunized Children in a Health Maintenance Organization” *Pediatrics* (101: 4: E3).

Linkins R.W., Dini E.F., Watson G., and Patriarca P.A. (1994) “A randomized trial of the effectiveness of computer generated telephone messages in increasing immunization visits among preschool children” *Arch Pediatr Adolesc Med.* (148: 908-914).

Mackenzie M., Turner F., Platt S., Reid M., Wang Y., and Clark J., *et al.* (2011) “What is ‘the problem’ that outreach work seeks to address and how might it be tackled? Seeking theory in a primary health prevention programme” *BMC Health Services Research* (11: 1: 350).

Mahler H., Searle S., Plotkin M., Kulindwa Y., Greenberg S., and Mlangi E., *et al.* (2015) “Covering the Last Kilometre: Using GIS to scale-up voluntary medical male circumcision services in Iringa and Njombe Regions, Tanzania” *Global Health Science and Practice* (3:3: 503-515).

Moher D., Shamseer L., Clarke M., Ghersi D., Liberati A., and Petticrew M., *et al.* (2015) “Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement” *Systematic reviews* (4: 1: 1).

Morgan M.Z., and Evans M.R. (1998) “Initiatives to improve childhood immunisation uptake: a randomised controlled trial” *British Medical Journal* (316: 7144: 1569-1570).

National Research Council (US) and Institute of Medicine (US) Committee on Integrating the Science of Early Childhood Development (2000) “The Developing Brain” In Shonkoff J.P., and Phillips D.A., (eds) *Neurons to Neighbourhoods: The Science of Early Childhood Development*. Washington DC: National Academies Press.

Oda D.S., Heilbron D.C., and Taylor H.J. (1995) “A preventive child health program: The effect of telephone and home visits by public health nurses” *American Journal of Public Health* (85: 6: 854-5).

Owais A., Hanif B., Siddiqui A.R., Agha A., and Zaidi A.K. (2011) “Does improving maternal knowledge of vaccines impact infant immunization rates? A community-based randomized-controlled trial in Karachi, Pakistan” *BMC Public Health* (11: 1: 239).

Pawson R. (2013) *The science of evaluation: A realist manifesto*. London: Sage.

Pawson, R. (2006) *Evidence-based policy: A realist perspective*. Sage.

Rodewald L.E., Szilagyi P.G., Humiston S.G., Barth R., Kraus R., and Raubertas R.F. (1999) "A randomized study of tracking with outreach and provider prompting to improve immunization coverage and primary care" *Pediatrics* (103: 1: 31-38).

Rots-de Vries C., van de Goor I., Stronks K., and Garretsen H. (2011) "Evaluation of an assertive outreach intervention for problem families: intervention methods and early outcomes" *Scandinavian Journal of Caring Sciences* (25: 2: 211-219).

Saliterman L.S., London A., and Peterson M. (1980) "Immunization outreach program in health maintenance organization" *Pediatrics* (65:2: 338-339).

Sasaki S., Igarashi K., Fujino Y., Comber A.J., Brunsdon C., and Muleya C.M., *et al.* (2011) "The impact of community-based outreach immunisation services on immunisation coverage with GIS network accessibility analysis in peri-urban areas, Zambia" *Journal of Epidemiology and Community Health* (65: 12: 1171-1178).

Selby-Harrington M., Sorenson J.R., Quade D., Stearns S.C., Tesh A.S., and Donat P.L. (1995) "Increasing Medicaid child health screenings: the effectiveness of mailed pamphlets, phone calls, and home visits" *American Journal of Public Health* (85: 10: 1412-1417).

Shefer A.M., Fritchley J., Stevenson J., Lyons B., Friedman R., and Hopfensperger D., *et al.* (2002) "Linking WIC and immunization services to improve preventive health care among low-income children in WIC" *Journal of Public Health Management and Practice* (8: 2: 56-65).

Stehr-Green P.A., Dini E.F., Lindegren M.L., and Patriarca P.A. (1993) "Evaluation of telephoned computer-generated reminders to improve immunization coverage at inner-city clinics" *Public Health Rep.* (108: 4: 426-430).

Tollestrup K., and Hubbard B. (1991) "Evaluation of a follow-up system in a county health department's immunization clinic" *American Journal of Preventative Medicine* (7: 1: 724-728).

Toros, K., DiNitto, D.M., and Tiko, A. (2018) "Family engagement in the child welfare system: A scoping review" *Children and Youth Service Review* (88: 598-607).

Uddin M.J., Shamsuzzaman M., Horng L., Labrique A., Vasudevan L., and Zeller K., *et al.* (2016) "Use of mobile phones for improving vaccination coverage among children living in rural hard-to-reach areas and urban streets of Bangladesh" *Vaccine* (34:2: 276-283).

Vivier P.M., Alario A.J., O'Haire C., Dansereau L.M., Jakum E.B., and Peter G. (2000) "The impact of outreach efforts in reaching under immunized children in a Medicaid managed care practice" *Arch Pediatr Adolesc Med.* (154: 12: 1243-1247).

Williams N., Woodward H., Majeed A., and Saxena S. (2011) “Primary care strategies to improve childhood immunisation uptake in developed countries: systematic review” *JRSM Short Reports* (2: 10: 1-21).

Yokley J.M., and Glenwick D.S. (1984) “Increasing the immunization of preschool children: an evaluation of applied community interventions” *Journal of Applied Behavioural Analysis* (17: 3: 313- 325).