



Health Services Research Unit Our Work and Impact: 2015 - 2021

August 2021



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From the Inaugural Director

In 2015, we established The Royal Children's Hospital's (RCH) Health Services Research Unit. The first of its kind in Australia, the Unit was founded to ensure the use of data to identify problems with the quality, value, and accessibility of children's healthcare and to evaluate novel solutions to address these problems.

We started small – with generous support from the Royal Children's Hospital Foundation. We employed a data analyst, research assistant, project assistant and a part-time health economist, clinician scientist, and director. Guidance came from our international advisor – Professor Gary Freed – former Director of the Susan B. Meister Child Health Evaluation and Research Center, University of Michigan, USA – who spent three years in Melbourne and lit the spark for our Unit and our program of health services research.

Even before the COVID-19 pandemic, it was clear that there were under recognised and under managed problems affecting children's healthcare. These include:

- (1) use of low value or wasteful care;
- (2) unsustainable demand on our hospital clinics and emergency departments;
- (3) a lack of equitable access to high quality mental health services for children; and
- (4) measurement, validity and uses of child health-related quality of life in clinical contexts.

Over the last 6 years, we have flourished. We have conducted projects that shine a light on and address these problems. We have established rich partnerships with hospital, community, and university colleagues. Some of these include the RCH Departments of General Medicine, Allergy, Emergency Medicine, Endocrinology, Neurology, Dermatology, the RCH Quality and Safety Unit and Wadja Family Services, the North Western Melbourne Primary Health Network (NWM PHN), the Central and East Sydney PHN, and the Universities of Melbourne, NSW, Oxford and Michigan. We are working closely with Generation Victoria (GenV) – the large, parallel whole-of-state birth and parent cohorts – to embed health services research and improve access to and quality of care for Victorian families.

We have changed practice through new models of care, guidelines, and Communities of Practice. We have conducted 39 projects, attracted \$9M in competitive, external funding and fostered the next generation of health services researchers through 10 student projects.

In 2022, we will roll out the first Health Services Research elective within the University of Melbourne's Master of Public Health – strengthening our relationship with the University and further building the capacity of health services research in Australia.

We look forward to continuing our work as Australia faces significant and ongoing pressures on children's healthcare, arising from the COVID-19 pandemic.



Professor Harriet Hiscock

Director, Health Services Research Unit, The Royal Children's Hospital
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Who we are



The Health Services Research Unit (HSRU) is dedicated to the **development and use of the best available evidence** to increase the **quality, accessibility, and value** of healthcare for children and the healthcare system.



Founded in 2015, the HSRU is the first research group in Australasia dedicated to paediatric health services.



The HSRU works **in partnership with the Murdoch Children's Research Institute and University of Melbourne**, to conduct high quality research to guide approaches to delivering the best and most cost-efficient comprehensive care for children.



The HSRU aims to **reduce inequities and to improve health outcomes** for children across Victoria and Australia.



The HSRU uses evidence-based research to influence policy, increase quality and efficiency of clinical practice, and create a cost-effective health care system.

Our achievements at a glance



6 Years



39 Projects



8 Team members



10 Students



69 Papers



2 Awards



41 Conference presentations and webinars



\$9M in additional grant funding

Our team



Professor Harriet Hiscock
Inaugural Director, Paediatrician,
Clinician Researcher



Associate Professor Kim Dalziel
Health Economist



Professor Gary Freed
Founding Principal Investigator,
Paediatrician, Clinician Researcher



Dr Mary White
Consultant Paediatric Endocrinologist,
Clinician Researcher



Dr Shaoke Lei
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Dr Xinyang Hua
Health Economist



Rachel Pelly
Research Assistant



Stephanie Newman
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Our researcher affiliates



Dr Jonathan Kaufman
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Dr Joanna Lawrence
Paediatrician, The Royal Children's Hospital



Dr Jemimah Ride
Health Economist, University of Melbourne



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Dr Renata Kukuruzovic
Paediatrician, The Royal Children's Hospital



Ms Rachel O'Loughlin
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Health Services Research

Health Services Research is the study of the funding, organisation and delivery of health services and involves multidisciplinary perspectives. It seeks to answer questions like: What kind of health care should we have? How should services be provided? How should services be funded? and Who should receive health care services?

Over the last 6 years, The RCH HSRU has focused on core areas of: reducing low value care; developing and trialling models of care to keep children out of hospital; working to improve access to care, especially for mental health, and improving measurement of quality of life in children. Below we briefly outline our work with the following pages detailing projects and impacts in each core area.

Core areas

Low value care - i.e., care that is wasteful and can cause harm – has been well studied in adults but less so in children. We conducted a systematic review to understand how best to reduce low value care in children and then applied this knowledge to a series of projects that have successfully reduced low value care at The RCH and beyond.

Keeping children out of hospital. The population of children in Victoria has risen by over 116,000 in the past 5 years, with an increase in the number of children with a chronic illness. Despite this, GPs are seeing fewer children for long consultations and demand for specialist paediatric care is increasing with wait times for OP clinic appointments at The RCH ranging from 3 to 18 months, even for relatively simple conditions that should be manageable in primary care. Similar pressures on our Emergency Departments (EDs) for primary care-type conditions are also apparent.

Recognizing this, we have led projects to upskill community providers and reduce demand on hospitals. One such project is Strengthening Care 4 Children - a new model of care that aims to upskill GPs and keep children out of hospital when safe to do so. Other projects include our Allergy in Community Trial and the Childhood Asthma RE-admission (CARE) study.

Improving access to mental health care. Supporting the mental health of children and young people is a top priority for Australian parents and health professionals. Governments have made significant investments into improving mental health services. However, our research tells us that many children and young people with mental health concerns are not receiving the care they need and that multiple challenges contribute to this. We have conducted a series of projects to better understand and tackle these challenges. These include a pioneering study demonstrating increasing mental health demands on Victorian EDs and an interview study with over 72 parents to understand why they bring their child with a mental health problem to the ED. We are now developing solutions such as Australia's first Community of Practice for Child Mental Health professionals that aims to upskill community GPs, paediatricians, nurses and psychologists in managing child mental health, in partnership with RCH Mental Health Services and the NWM PHN.

Measuring quality of care. The QUOKKA research program addresses fundamental issues relating to the measurement and use of health outcomes in making decisions about budget allocations and priority setting for paediatric populations. We are leading a paediatric multi-instrument comparison study (P-MIC) recruiting 1000 patients from the RCH to understand the performance of alternative paediatric Health-Related Quality of Life (HRQoL) measures. A complementary PhD scholarship will assess applicability of measures in the clinical setting.

Our core areas of research

Reducing low value care

Alignment with RCH strategic priorities:

Clinical excellence

Positive experience

A safe place

Sustainable healthcare

Low value care is care that provides little or no benefit, may cause patient harm, or yields marginal benefits at a disproportionately high cost.

The Royal Australasian College of Physicians' EVOLVE initiative has identified a top five list of low value care or 'do not do' treatments in child health. These are, do not routinely...

- Prescribe oral antibiotics in fever without an identified specific bacterial infection
- Undertake a chest x-ray for the diagnosis of bronchiolitis or routinely prescribe salbutamol or systemic corticosteroids to treat bronchiolitis
- Treat gastroesophageal reflux disease (GORD) in infants with acid suppression therapy
- Order a chest x-ray for the diagnosis of asthma
- Order an abdominal x-ray for the diagnosis of non-specific abdominal pain.

The HSRU has conducted **11 projects** examining and reducing low value care:

- Systematic review examining how best to reduce unnecessary imaging and pathology tests in children.
- Measuring the prevalence and direct financial costs of low-value medical care in paediatrics.
- 5 Choosing Wisely projects at The RCH involving measurement of baseline rates and identification of drivers, followed by co-design, implementation and measurement of impact for the following practices: bronchodilators in bronchiolitis, chest x-ray in bronchiolitis, iron studies for the investigation of iron deficiency anaemia, free T3 as a screening test for thyroid problems, electrocardiograms for sleeping bradycardia.
- Examining the overuse of CT scans for atraumatic headache or seizure at The RCH.
- Use of abdominal x-rays in a tertiary hospital: patterns of use and factors associated with unnecessary use.
- An audit into the use, costs, and factors associated with non-indicated acid suppression therapy prescribing at The RCH.
- Behaviour change project to reduce acid suppression therapy in infants (REMEDI study).

Below we highlight 2 projects and their clinical impacts.

Key projects and their clinical and policy impacts

Use, costs, and factors associated with non-indicated acid suppression therapy prescribing in a tertiary paediatric hospital: an audit and costing study.

What we did: We conducted an audit and costing study to examine indicated versus non-indicated prescribing of acid-suppression therapies (AST) at The RCH and explore patient, provider and hospital factors associated with non-indicated prescribing. Through prospective audit of electronic medical records, we found that this low value prescribing was common at The RCH and associated with gastrostomy presence, consultant providers and inpatient status. Annual costs of non-indicated AST for Melbourne's RCH were projected to be \$15,493.

Our impact: The RCH Clinical Practice Guidelines (CPGs) for nephrotic syndrome were changed to advise 'routine use of AST is not indicated unless there are upper gastrointestinal symptoms while on steroid therapy'.

The Neurodevelopmental & Disability department committed to trialling patients off PPI if the only indication was gastrostomy tube placement.

Reducing Medications in Infants (REMEDI Study)

What we did: Funded by Better Care Victoria, the REMEDI project was developed in response to the audit and costing study, designed to understand clinician and patient drivers of prescribing and use this information to develop and test targeted solutions to reduce non-indicated AST prescribing. In partnership with 4 Victorian hospitals, we co-designed, implemented and evaluated a targeted behaviour change intervention to reduce unnecessary prescribing of acid suppression therapy in babies.

Our impact: Through REMEDI, we:

- Reduced unnecessary AST prescribing by 21%
- Improved clinician and parent knowledge of potential harms caused by AST.
- Disseminated a suite of intervention resources for parents, GPs, and hospital clinicians via:
 - (i) state-wide CPGs for VIC, NSW, SA and QLD,
 - (ii) the Victorian government's Better Health Channel,
 - (iii) the NWM PHN HealthPathways (GP CPGs), and
 - (iv) the national, evidence-based parenting website Raising Children Network.

Keeping children out of hospital

Alignment with RCH strategic priorities:

Clinical excellence

Positive experience

A safe place

Timely access

With increasing referrals to outpatient departments and presentations to emergency departments, now more than ever we need to direct children to quality, community-based care, where safe to do so. Strengthening community-based care for children with relatively simple conditions that could be manageable in primary care, such as mild asthma, simple food allergy, and behavioural problems, could improve access to specialist care for children with more complex conditions.

The HSRU has conducted **6 projects** aimed at strengthening community-based care and keeping children out of hospital. Below we highlight 3 projects.

Key projects and their clinical and policy impacts

Strengthening Care for Children (SC4C)

What we did: SC4C commenced with the pilot of an integrated GP-paediatrician model conducted across 5 GP practices, funded by Better Care Victoria, and involving > 900 children. This integrated model upskilled GPs in the care of children via co-consults and case discussions with paediatricians. It successfully reduced GP referrals to hospital emergency departments and improved GP quality of care.

Our impact: Following this pilot, we secured an NHMRC Partnership grant (\$3M, 11 partners) to test the effectiveness of this integrated model of care in 22 general practices (> 110 GPs) in reducing GP referrals to hospitals across Victoria and NSW. If effective, this model will be a game changer for reducing the burden on public hospitals and could be readily translated to other healthcare areas.

We have been instrumental in informing a rural version of SC4C in the Wimmera Southern Mallee which received \$2.9M in the 2021 Victorian state government budget to expand, in recognition of the need to improve access to specialist care in rural communities.

Allergy in the Community Trial

What we did: The prevalence of food allergy is on the rise in Victoria and wait times to access an allergist in the public system are > 12 months. In response to this, we collaborated with RCH allergists to develop and trial a training program for community-based, general paediatricians (n=26) with clinical decision support and parent education materials embedded in an electronic format. This innovative model of care saw children seen 10 months earlier by community vs hospital paediatricians, with no adverse effects, and high parent satisfaction.

Our impact: In recognition of the dearth of evidence-based training programs for child food allergy, we are, in partnership with the RCH Allergy Department and the Education Hub, uploading these clinical care resources to the Hub to make them readily available to paediatricians nationally and internationally.

Child Asthma RE-admissions (CARE) Study

What we did: Asthma is the most common chronic illness in children and is a leading cause of preventable emergency and hospital admissions. Funded by Melbourne Academic Centre

of Health, we studied 776 children's care journey following their index hospital admission for asthma at The RCH, Northern Health, and University Hospital Geelong using mixed methods and linked administrative datasets. We found modifiable gaps in the children's asthma journey including lack of review of overall asthma control and risk factor modification, poor adherence to prescribed preventers based on linked PBS data, lack of integration of care into the community, and poor GP confidence for managing asthma post a hospital admission and asthma management that is inconsistent with best practice guidelines.

Our impact: We have:

- partnered with the Complex Asthma Service, General Medicine, Respiratory, and Emergency at RCH as well as GPs, community asthma nurses and Asthma Australia to establish the multidisciplinary Asthma Quality Improvement Group in 2020.
- launched the outpatient asthma electronic hub in EPIC which automatically captures information regarding a child's severity and risk factors (e.g., asthma hospital/ED visits, asthma control test scores, lung function test results, co-morbidities, environmental risks) and facilitates referral to community asthma programs.

Data from the CARE study has successfully been used to leverage further funding: \$1.8 million from the Department of Health to improve the management of childhood asthma in inner-west communities, and \$1.6 million from NHMRC to study an immune modulator OM85 for the reduction of asthma hospitalisations in preschool children.

Improving access to and quality of healthcare

Alignment with RCH strategic priorities:

Clinical excellence Positive experience A safe place Timely access

The HSRU has conducted **14 projects** aimed first at understanding reasons for poor access to or quality of care and then aimed at improving access to and quality of healthcare. These include projects focused on access to mental health care as well as healthcare more broadly.

Mental health care

- 10-year trends of paediatric presentations to Victorian Emergency Departments
- Why do children come to the ED for anxiety and depression?
- Which children and adolescents re-present to The Royal Children's Hospital Emergency Department with self-harm? Understanding the incidence and predictors using electronic administrative data.
- Modifiable factors associated with paediatric mental health service use: A systematic review
- Retrospective review of patient complexity in RCH Wadja Clinic
- Mental Health Screening in Day Medical Unit
- Understanding parent preferences for accessing mental healthcare for children with a chronic physical health condition – a Discrete Choice Experiment.
- Pilot of a Child Mental Health Community of Practice

Broad healthcare

- Consumers' Views on Telehealth
- Telehealth Quality evaluation
- Changing patterns in health services use and effects of care forgone: The indirect impacts of Covid-19 pandemic restrictions on Victorians' healthcare
- 'Getting to clinic study': A mixed methods study of families who fail to attend hospital outpatient clinics
- Reducing Waitlists and Non-attendance in the General Medicine department
- Outpatient Clinic Efficiency Project

Key projects and their clinical and policy impacts

Caregivers' Views on Telehealth

What we did: The Caregivers' Views on Telehealth study surveyed caregivers of paediatric patients to examine their evaluations of telehealth, preferences for mode of care, and potential cost savings. 2436 caregivers attending an RCH TH appointment in 2020 responded. Telehealth was broadly reported to be convenient, acceptable, and time saving. However, caregivers who spoke a language other than English and patients attending for behavioural and mental health, developmental, or other (e.g., allied health) concerns were more likely to prefer in-person consultations over telehealth.

Reported costs savings on caregiver time were on average of \$145 (SD \$99) per person per

consultation whilst cost savings on transport were on average \$84.9 (SD \$100.7) per family per consultation. Cost savings were greatest for families living in low and middle socioeconomic areas and regional or rural areas. This study was part of a larger study examining adult patients' views on telehealth, led by HSRU in collaboration with Melbourne Health, Royal Women's Hospital, Western Health, and Peninsula Health.

Our impact: Professor Hiscock was invited by the RACP to meet with the federal government Department of Health in November 2020. Using these data, she successfully advocated for ongoing TH Medicare item numbers for paediatric metropolitan patients.

Telehealth Quality Evaluation

What we did: With the rapid transition to telehealth there was limited objective data on the health outcomes of care delivered via telehealth versus in person. We engaged multiple clinicians across 8 RCH departments to co-design the study with a breadth of disease groups including Type 1 Diabetes, asthma, Duchenne Muscular Dystrophy, constipation, obstructive sleep apnoea, faltering growth in babies less than 3 months, undescended testis, anxiety, depression, and Juvenile Idiopathic Arthritis. We compared objective health outcomes of care delivered through telehealth for chronic illnesses and new referrals (e.g. lung function test in asthma, Hba1c in Type 1 Diabetes).

Our impact: Data analysis is in progress. Early results suggest that telehealth is superior in accessibility with the quality-of-care equivalent to in person care in some conditions such as constipation and Type 1 diabetes. In other conditions, the lack of in person care led to more unnecessary investigations, more follow-up appointments in hospitals, and less guideline recommended objective assessments such as in obstructive sleep apnoea, asthma, and Duchenne Muscular Dystrophy. Results will help guide the nuanced implementation of paediatric telehealth which will remain a key method of care delivery beyond the pandemic.

Mental Health Screening in Day Medical Unit

What we did: In response to the upcoming hospital accreditation requirement that all hospitals must screen for mental health issues, the HSRU and Day Medical Unit are piloting a single-item mental health screening question. The screening question will be validated against standardised mental health screening questionnaires.

Our impact: We demonstrated that asking carers about their child's mental health during routine admission process was acceptable to families and feasible for nursing staff. Following formal validation of this screening tool, our findings will be used to inform mental health screening practice at RCH, as well as at external centres.

Retrospective review of patient complexity in RCH Wadja Clinic

What we did: The HSRU hosted Dr Renata Kukuruzovic for her sabbatical, supported the design and conducted the analysis of her review of social and emotional wellbeing in Wadja clients. Findings highlight the large mental health and adverse childhood experiences burden in this cohort.

Our impact: The HSRU team has suggested ways to better support community practitioners in managing Aboriginal children's social and emotional wellbeing given the growing demand for the service. This could include community clinicians attending Wadja clinic, telehealth assisted co-consultations with Wadja staff, and/or a Community of Practice for community clinicians managing Aboriginal child social and emotional health. The review findings and potential solutions have directly informed the funded Campus Mental Health Strategy.

Health economic evaluation and measurement

Alignment with RCH strategic priorities: Sustainable healthcare

The HSRU has conducted **12 evaluations** aimed at understanding the costs, benefits and value of the interventions or programs to the health care system, patients/families, and society.

Economic evaluations

- Cost effectiveness of paediatric head injury decision rules for emergency department
- Cost effectiveness of treatment of low-risk paediatric febrile neutropenia in home versus hospital
- Intravenous ceftriaxone at home versus intravenous flucloxacillin in hospital for children with cellulitis: a cost-effectiveness analysis
- Effectiveness and cost effectiveness of novel urine collection techniques in paediatric emergency departments
- Cost-effectiveness of epileptic surgery compared with medical treatment in children with drug-resistant epilepsy
- Systematic review of cost-effectiveness of food allergy interventions for children
- Aetiologies and cost-effectiveness of genomic testing in severe epilepsies of infancy

Costing studies

- Costs in and out of hospital for Single-Ventricle Patients Surviving the Fontan Procedure in childhood and into adulthood
- Costs of right ventricle-to-pulmonary artery conduit in the first 10 years of life
- The cost differential between warfarin versus aspirin after a Fontan procedure
- Costs of managing ongoing conditions for children born extremely premature
- Costs in and out of hospital associated with childhood allergy

Key projects and their clinical and policy impacts

Transition to Adult Care

What we did: We partnered with the RCH transition service to survey children and their families before and after transition to adult services. We have linked to administrative hospital costing data and have linkage to Medicare data requested. The aims are to demonstrate patient characteristics and how they link to patient health-related quality of life outcomes and the cost of care.

Our impacts: The research on the RCH transition service is being linked to further research investigating better ways to support children and families through transition. Key findings are that children with social complexity experience greater decrements in quality of life. Significant decrements in parent's quality of life are also observed indicating the need also for parental support around transition.

Paediatric head injuries

What we did: In collaboration with ED physicians, we evaluated the cost-effectiveness of the international decision rules used for assessing children who present with head injuries and determining which should receive a CT scan.

Our impacts: Our findings showed that usual care in Australia is more cost-effective than the Paediatric Emergency Care Applied Research Network (PECARN), CATCH or CHALICE international rules. PECARN is currently a Choosing Wisely recommendation which we have shown would lead to more unnecessary imaging and cost. This research is published in the top Emergency Medicine journal with a field weighted citation index of 8.72 and supports current standard care at RCH.

Treatment in hospital versus home

What we did: We have completed two projects looking at the cost effectiveness of treating RCH paediatric populations at home versus hospital: low risk febrile neutropenia and cellulitis. Both evaluations involved quantifying costs and outcomes associated with each mode of treatment.

Our impacts: The results showed that in each case treatment at home was more cost-effective compared to treatment in hospital. This rigorous evidence is being used to design appropriate use of home services at RCH. High level interest has also been shown by the Victorian Department of Health Reform Office impacting how the Department invests in hospital services.

Our 2021+ priorities

The COVID-19 pandemic has seen a “transformative shock” to our healthcare system and children have not been exempt. Whilst few children in Australia contracted SARS-CoV-2, the indirect impacts of pandemic social restrictions including school closures and stay at home orders, continue to affect the delivery of and access to healthcare.

We are leading projects to understand these impacts and to address the surge in mental health presentations to Victorian EDs. We have also commenced internationally leading projects and a PhD program in understanding the validity, feasibility, and usefulness in clinical context of paediatric health-related quality of life. Complimenting this work is our planning for the 2022 Health Services Research elective in the University of Melbourne’s Master of Public Health, which will enable capacity building in a new generation of health services researchers.

Indirect Impacts of COVID-19 on hospital use

This project, funded by the Victorian government’s Department of Health, analyses ED and hospital admission data from 2018, 2019 and 2020 to determine changes in hospital use pre and during COVID-19 pandemic restrictions. We are analysing changes in presentations for a range of child health conditions including mental health, ambulatory care sensitive conditions (e.g., gastroenteritis, urinary tract infections, bronchiolitis, perforated appendix, asthma, diabetic ketoacidosis, dental extractions), vaccine preventable diseases, and infant conditions including non-accidental injury, jaundice, failure to thrive, irritability and distress associated with maternal depression. Findings will inform where best to target resources to address indirect impacts of pandemic restrictions on children’s health and healthcare use.

Child Mental Health Community of Practice

Covid-19 restrictions have seen a surge in mental health presentations to EDs. Pre-pandemic, our work also demonstrated long wait times and out of pocket costs to access mental health care for children in the community. In response to this, we have set up, in collaboration with NWM PHN and RCH Mental Health, Australia’s first Community of Practice for Child Mental Health.

The Community of Practice aims to upskill local GPs, psychologists, paediatricians, nurses and social workers in the management of common child mental health disorders, thereby improving clinician confidence and ultimately reducing referrals to EDs and public mental health services. Sessions have run fortnightly, led by RCH child and adolescent psychiatrists. Topics included: anxiety; aggression and violence; suicidal ideation/self-harm and depression; eating disorders; and complex mental health disorders. Around 50 GPs, paediatricians and psychologists have taken part. The pilot evaluation, funded by the Victorian government’s DFFH, includes clinician pre-post surveys, clinician qualitative interviews and changes in ED and CAMHS presentations/referrals pre and post sessions.

Measurement, validity and use of child health-related quality of life in clinical contexts

Increasingly clinicians and health service providers are interested in the use of patient reported outcomes (PROMs) to inform clinical practice. A program of work has commenced seeking to understand the performance, validity, feasibility, and usefulness of paediatric health-related quality of life measures. The project seeks to recruit 6,200 children and their

families and to provide world first evidence on the validity and feasibility of measures in a range of childhood conditions. A complementary PhD project aims to assess the useability and feasibility of the EQ-5D-Y as a routine patient reported outcome measure (PROM) in managing clinical care in a tertiary paediatric children's hospital using analysis of the above data in conjunction with qualitative research with clinicians and families.

Health Services Research training

The HSRU is developing an elective subject for the Master of Public Health at the University of Melbourne. This elective will commence Semester 2, 2022 and cover skills including research design, qualitative and quantitative data collection, using administrative and linked datasets, analysing data, health economics, implementation science, and evaluating health services research.

Appendices

Appendix 1: List of Publications

1. Chen K, Saxon L, Robertson C, Hiscock H. Reducing asthma hospitalisations in at-risk children: A systematic review. *Journal of Pediatrics and Child Health* 2021 Aug 5. doi: 10.1111/jpc.15666. PMID: 34351019
2. Bourke EM, Say DF, Carison A, Hill A, Craig S, Hiscock H, Babl FE, O'Donnell SM. Emergency mental health presentations in children with autism spectrum disorder and attention deficit hyperactivity disorder. *Journal of Paediatrics and Child Health* 2021 May 8. doi: 10.1111/jpc.15535 PMID: 33963626
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14. Hiscock H, Connolly AS, Dunlop K, Perera P, O'Loughlin R, Brown SJ, Krieser DM, West A, Chapman P, Lawford R, Cheek JA. Parent perspectives on children and young people's mental health services in Victoria – what's wrong and how to fix it: A multi-site qualitative study. *Journal of Paediatrics and Child Health* 26 February 2020 doi:10.1111/jpc.14835 PMID: 32100422
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Appendix 2: Grants Attracted

Measuring and valuing changes in child health to facilitate robust decision making (2021-26)

MRFF

CI: Nancy Devlin, Richard Norman, Rosalie Viney, Julie Ratcliffe, Kim Dalziel, Brendan Mulhern, Harriet Hiscock, Deborah Street, Gang Chen

Amount: \$2,352,349

Strengthening Care for Children: A stepped-wedge translational trial to reduce hospital burden. (2020-24)

NHMRC Partnership grant application

CI: Harriet Hiscock, Raghu Lingam, Lena Sancı, Susan Woolfenden, Yvonne Zurynski, Kim Dalziel, Siaw-Teng Liaw, Katherine Lee, Douglas Boyle, Gary Freed

Amount: \$3,430,871.80 (NHMRC Contributions \$1,432,584.80)

Developing and testing a version of EQ-5D-Y for use in children aged 2-5 years using a mixed methods approach 2020-22

EuroQol Research Foundation

CI: Kim Dalziel, Nancy Devlin, Michael Herdman, Oliver Rivero-Arias, Li Huang, Harriet Hiscock

Amount: €87,200 (\$141,403 AUD)

Improving the care of children with frequent asthma admissions through partnerships with hospitals, GPs, and families. Extension for the design of partnership interventions 2019-21

Melbourne Academic Centre for Health

CI: Harriet Hiscock, Katherine Chen, Colin Robertson, Peter Vullermin, David Tran, David Fuller, John Carlin, Lena Sancı

Amount: \$75,000

Strengthening Primary Care to Reduce Paediatric Outpatient and Emergency Department Referrals Pilot Extension 2018-19

North Western Melbourne Primary Health Network

CI: Harriet Hiscock

Amount: \$165,961

RCH Health Services Research Unit 2018-23

The Royal Children's Hospital Foundation

CI: Harriet Hiscock

Amount: \$2,825,095.26

Improving the care of children with frequent asthma admissions through partnerships with hospitals, GPs, and families 2019-20

Melbourne Academic Centre for Health

CI: Harriet Hiscock, Katherine Chen, Colin Robertson, Peter Vullermin, David Tran, David Fuller, John Carlin, Lena Sancı

Amount: \$225,000

First do no harm: multisite study to reduce the use of acid suppression therapy in Victorian infants 2018-19

"REducing MEDications in Infants (REMEDI)"

Safer Care Victoria

CI: Harriet Hiscock

Amount: \$250,000

Understanding why children present to the ED with anxiety and depression 2018-19

The Royal Children's Hospital Foundation

CI: Harriet Hiscock

Amount: \$94,962.80

Strengthening Primary Care to Reduce Paediatric Outpatient and Emergency Department Referrals 2017-18

Better Care Victoria Innovation Fund

CI: Harriet Hiscock

Amount: \$392,780

Understanding why children present to the ED with anxiety and Depression 2017-18

The Royal Children's Hospital Foundation

CI: Harriet Hiscock

Amount: \$95,362.80

Workforce Planners Community of Practice 2014-2016

Department of Health, Victoria.

CI Freed

Amount: \$80,755

Analysis of Paediatric Health Services Delivery in Emergency Departments and Specialty Care 2013-2016

Department of Health, Victoria.

CI Freed

Amount: \$550,000

Analysis of Paediatric Health Services Delivery in Emergency Departments and Specialty Care 2013-2016

Royal Children's Hospital Foundation.

CI Freed

Amount: \$625,000

Appendix 3: National and International Conferences and Webinars

1. RACP Congress 2021. The mental health crisis - new, collaborative models of care. (Live webinar) Friday May 7th 2021
2. HSRAANZ Webinar Series. National and International Models of Integrated Care for Child Health: what have we learnt? (Live webinar) Friday 24th July 2020
3. RACP CCCH Satellite Day Webinar Series 2020. Mental health services for Australian Children - what's wrong and how do we fix it? (Live webinar) Tuesday 16th June 2020
4. Better Health North East Melbourne - Children with Developmental Delay – Community of Practice. "Strengthening Care for Children" Wednesday 13th October 2020
5. The Royal Children's Hospital Grand Rounds. "COVID-19 Kids: Have you checked the children? Understanding the unintended consequences of COVID-19" Wednesday 16th September 2020
6. Children's Healthcare Australasia Paediatric Units face to face Insight Forum. Strengthening Care for Children; Pilot of a novel, integrated general practitioner paediatrician model (Keynote). Melbourne, 31st October 2019
7. The Integrated Care Unit of Sydney Children's Hospitals Network. Making integrated care a reality Friday 19th June 2020.
8. The Royal Children's Hospital Grand Rounds. Choosing Wisely – Improving Value of Care following COVID-19. (Live webinar) Wednesday 10th June 2020
9. Melbourne Academic Centre for Health. Reducing asthma re-admissions in children through partnerships with hospitals, GPs, and families (keynote). Melbourne, October 22nd 2019.
10. The Royal Children's Hospital Grand Rounds. Parent perspectives on accessing mental health care for children. Melbourne, October 9th 2019.
11. Department of Health and Human Services. Child mental health: What's wrong with the mental health system and how can we fix it? Melbourne, October 3rd 2019.
12. How long and how much? Wait times and costs to private child mental health specialists. 11th Health Services and Policy Research Conference. Auckland, New Zealand 3-6 December 2019
13. Is 'minimally adequate treatment' really adequate? Investigating the effect of mental health treatment on quality of life for children with mental health problems. 11th Health Services and Policy Research Conference. Auckland, New Zealand 4-6 December, 2019
14. Is 'minimally adequate treatment' really adequate? Investigating the effect of mental health treatment on quality of life for Australian children with mental health symptoms. Faculty of Child and Adolescent Psychiatry Conference 2019 Equity and Access to Care: Pathways and Partnerships. Newcastle, New South Wales, 23-26 October 2019.
15. Is 'minimally adequate treatment' really adequate? Investigating the effect of mental health treatment on quality of life for Australian children with mental health symptoms. 41st Annual Australian Health Economics Society Conference. Melbourne, Australia 24-25 September 2019.
16. The kids are not ok: what do Australian clinicians see as solutions for accessible and effective mental healthcare? Faculty of Child and Adolescent Psychiatry Conference 2019 Equity and Access to Care: Pathways and Partnerships. Newcastle, New South Wales, 23-26 October 2019.
17. Strengthening Care for Children through an integrated paediatrician-GP care model. Submitted 2nd Asia Pacific Conference on Integrated Care. Melbourne, Australia 11-13 November 2019
18. Which children and adolescents re-present to The Royal Children's Hospital Emergency Department with self-harm: understanding the prevalence, risk and protective factors using electronic administrative data. Health Data Analytics 2019. Sydney, New South Wales.

19. Strengthening primary care for children: Cost analysis of a new pilot model to integrate paediatricians within general practice. 11th Health Services and Policy Research Conference. Auckland, New Zealand 3-6 December 2019
20. Strengthening Care for Children: Pilot of a Novel, Integrated General Practitioner-Paediatrician Model. 11th Health Services and Policy Research Conference. Auckland, New Zealand 3-6 December 2019
21. The kids are not ok: what do Australian clinicians see as solutions for accessible and effective mental healthcare? RANZCP Faculty of Child and Adolescent Psychiatry (FCAP) 2019 Conference. 23-26 October 2019 Newcastle, New South Wales
22. Strengthening Care for Children through an integrated paediatrician-GP care model. Submitted 2nd Asia Pacific Conference on Integrated Care. 11-13 November 2019. Melbourne, Australia
23. Understanding parent-reported factors that influence children's anxiety and depression presentations to Emergency Departments: A multi-site mixed-methods study. Pediatric Academic Societies (PAS) Meeting 2019. Apr 24 - May 01, 2019. Baltimore, Maryland.
24. Improving timely access to food allergy care: a before-and-after controlled trial of a community-based model of care compared with standard allergist care. Pediatric Academic Societies (PAS) Meeting 2019. Apr 24 - May 01, 2019. Baltimore, Maryland.
25. Strengthening Care for Children: Pilot of a Novel, Integrated General Practitioner-Paediatrician Model. 19th International Conference on Integrated Care (ICIC19). San Sebastian, Spain 1st April 2019
26. Systematic review of economic evaluations in childhood food allergy. Fanning L, Woods E, Dalziel K. Australian Health Economics Society (AHES) Annual Conference, Melbourne. September 2019
27. Cost effectiveness of international clinical decision rules for pediatric head injury. Dalziel K, Fanning L, Cheek J, Babl F. Society of Medical Decision Making Conference, Pittsburgh October 2017
28. Trends in use of Medicare Benefits Schedule (MBS) services for Australian children with mental health difficulties: who is missing out? 10th Health Services and Policy Research Conference, Gold Coast, Australia, 1-3 November 2017
29. Clinician perspectives on the interface between primary and specialist care for children with complex mental health conditions; a national, qualitative study. 10th Health Services and Policy Research Conference, Gold Coast, Australia, 1-3 November 2017
30. Trends in in paediatric mental and physical health presentations to Victorian Emergency Departments (EDs). 10th Health Services and Policy Research Conference, Gold Coast, Australia, 1-3 November 2017
31. Transition to adult services for young people with dual diagnoses; clinician voices across care sectors. 10th Health Services and Policy Research Conference, Gold Coast, Australia, 1-3 November 2017
32. Trends in paediatric practice in Australia 2008-2013: a national audit from the Australian Paediatric Research Network. Health Services Research Association of Australia and New Zealand biennial Health Services and Policy Research Conference, Melbourne, Australia. December 2015.
33. What research questions matter to Australian paediatricians? National Delphi Study. Health Services Research Association of Australia and New Zealand biennial Health Services and Policy Research Conference, Melbourne, Australia. 7-9 December 2015.
34. Northern Health Research Seminar. Keeping patients out of hospital - two exemplars from a health service systems researcher. Melbourne, 15th November 2018

35. Better Care Victoria. Variation in Paediatric Practice. Melbourne, May 3rd 2017.
36. Primary Care and Population Health Advisory Committee. Increased Paediatric ED Presentations: The Importance of Data in Decision-Making. Western Health, Melbourne 16 March 2017
37. Victorian Heads of Paediatric dinner. The Royal Children's Hospital Health Services Research Unit: A year in review. Melbourne, 9 March 2017
38. Menzies Institute, Sydney University, NSW. Reducing low value care in children. 5 October 2016
39. Health Services Research Association of Australia and New Zealand 9th Health Services and Policy Research Conference. Early Career Funding. Invited breakfast session. Melbourne, December 2015.
40. The Royal Children's Hospital Grand Rounds. Variation in clinical practice – why does it happen and does it matter. Melbourne, 25 November 2015
41. Health Services Research Association of Australia and New Zealand 9th Health Services and Policy Research Conference. From data to delivery: Connecting research, policy and practice for better health outcomes. Chair, "Child Health" Plenary Session. Melbourne, 8 December 2015

Appendix 4: Students

PhD

Jonathan Kaufman

Effectiveness and cost effectiveness of novel urine collection techniques in paediatric emergency departments

Honours

Cindy Lee

How long and how much? Wait times and costs to private child mental health specialists.

Cherry Shi

Overuse of computed tomography brain scans for the evaluation of children with atraumatic headache and first generalized afebrile, atraumatic seizure: current practice and associated factors.

Masters

Peter Summers

Re-admissions to the emergency department for self-harm – rates and associated factors.

Jane Carolan

Trends in PBD and MDB costs for two 'low value' care practises between 2021-2014 in Australian paediatrics care: acid suppressant therapy to treat gastroesophageal reflux disease and chest x-rays for the diagnosis of asthma.

Devika Kumar

The Cost of Childhood Food Allergy in Early Years in Australia From a Societal Perspective.

Joshua Gordon

Economic evaluation of home-based treatment for children with low risk febrile neutropenia.

Rizki Mahardya

Epilepsy Surgery: Cost-effectiveness and implications for funding.

Sangita Shakya

A cost-effectiveness analysis comparing screening for food allergy and current practice for 12 month old infants in Melbourne Australia.

MD Students (Scholarly selective)

Rachel Taylor

Health service use in children with ADHD and sleep problems: does socioeconomic and rural status matter?

Jana Kobras

A systematic review of predictors of paediatric mental health service use.

Paediatric Advanced Trainee Program

Dr Suzi Riess

Use of anti-reflux medications in a tertiary hospital: patterns of prescribing and factors associated with unnecessary prescribing.

Dr Carey-Ann Christie-Johnson

Identifying modifiable factors for failure to attend outpatient clinic appointments.

Dr Emma Weisz

Use of abdominal x-rays in a tertiary hospital: patterns of use and factors associated with unnecessary use.

Dr Robyn Lawford

Parent-reported barriers and experiences of accessing appropriate care for their child's anxiety or depression: A mixed-methods.