Australian Government
Australian Research Council

EI 2018 ENGAGEMENT AND IMPACT

Engagement and Impact 2018

Griffith University

GRF11-PHS (HLS) - Impact

Overview

Title

(Title of the impact study)

Better practices and innovative solutions for vascular access to provide patients with better healthcare experiences and to save costs for healthcare providers

Unit of Assessment

11 - Medical and Health Sciences

Additional FoR codes

(Identify up to two additional two-digit FoRs that relate to the overall content of the impact study.)

Socio-Economic Objective (SEO) Codes

(Choose from the list of two-digit SEO codes that are relevant to the impact study.)

92 - Health

Australian and New Zealand Standard Industrial Classification (ANZSIC) Codes

(Choose from the list of two-digit ANZSIC codes that are relevant to the impact study.)

84 - Hospitals

Keywords

(List up to 10 keywords related to the impact described in Part A.)

intravenous therapy

vascular access

intravenous catheter

Sensitivities

Commercially sensitive

No

Culturally sensitive

No

Sensitivities description

(Please describe any sensitivities in relation to the impact study that need to be considered, including any particular instructions for ARC staff or assessors, or for the impact study to be made publicly available after EI 2018.)

Aboriginal and Torres Strait Islander research flag

(Is this impact study associated with Aboriginal and Torres Strait Islander content?
NOTE - institutions may identify impact studies where the impact, associated research and/or approach to impact relates to Aboriginal and Torres Strait Islander peoples, nations, communities, language, place, culture and knowledges and/or is undertaken with Aboriginal and Torres Strait Islander peoples, nations, and/or communities.)

No

Science and Research Priorities

(Does this impact study fall within one or more of the Science and Research Priorities?)

No

Impact

Summary of the impact

(Briefly describe the specific impact in simple, clear English. This will enable the general community to understand the impact of the research.)

NHMRC-funded nursing research into best protocols for maintaining intravenous (IV) catheters in patients' veins impacted health practice worldwide. Results supported the replacement of IV catheters only for medical reasons instead of routinely, as had been standard practice for decades. This strategy increases patient wellbeing and comfort, and saves time for healthcare staff. Economic studies suggest such a change is also likely to save hundreds of millions of dollars annually in health costs. The work has won the respect of medical authorities and device manufacturers worldwide, and has led to changes in hospital protocols in the UK, NZ, the US, and Australia.

Beneficiaries

(List up to 10 beneficiaries related to the impact study)

Hospitalised Patients

Health systems

Hospitals

Nurses and other medical staff

Doctors

Countries in which the impact occurred

(Search the list of countries and add as many as relate to the location of the impact)

Australia
England
United States of America
New Zealand

Details of the impact

(Provide a narrative that clearly outlines the research impact. The narrative should explain the relationship between the associated research and the impact. It should also identify the contribution the research has made beyond academia, including:
- who or what has benefitted from the results of the research (this should identify relevant research end-users, or beneficiaries from industry, the community, government, wider public etc.)
- the nature or type of impact and how the research made a social, economic, cultural, and/or environmental impact
- the extent of the impact (with specific references to appropriate evidence, such as cost-benefit-analysis, quantity of those affected, reported benefits etc.)

- the dates and time period in which the impact occurred.

NOTE - the narrative must describe only impact that has occurred within the reference period, and must not make aspirational claims.)

Research that began as an 18-month study of the health outcomes of the procedures and protocols associated with using IV catheters has changed health recommendations in the UK, the US, and Queensland. The research has made a notable impact by decreasing unnecessary, time-consuming, painful, and blood vessel-destructive IV catheter replacements, thereby increasing patient wellbeing and satisfaction.. Subsequent economic analysis also demonstrated that the changes in protocol would save hundreds of millions in annual health care costs.

Known as the DRIP Trial, the study was funded by the National Health and Medical Research Council (NHMRC APP481934) and undertaken in 2008–2009 at three Queensland hospitals under the auspices of the-then newly established Alliance for Vascular Access Teaching and Research (AVATAR) at Griffith University. The work was led by Professor Claire Rickard of the University's School of Nursing and Midwifery and the Menzies Health Institute Queensland.

The definitive study, which involved more than 3200 patients, showed there was no medical benefit of the-then standard practice of removing IV catheters and inserting new ones every 3 days. Replacement insertions are painful invasive practices that puncture blood vessels and increase the risk of infection if the technique is not optimal. They also add to the workload of hospital staff. The AVATAR Group showed that an alternative strategy of replacing IV catheters only when there were clinical indications – such as treatment completion, blockages, or inflammation – was less invasive and expensive.

Following publication of these results in The Cochrane Database of Systematic Reviews in 2010 (1) and 2015 (2), and The Lancet in 2012 (3), the impact was widespread. In 2014, the release of the Epic3 Guidelines for hospital infection prevention in the UK made it mandatory for all adult National Health Service hospitals to replace catheters only if clinically indicated.

Four of Prof Rickard's research papers were cited in the US Centres for Disease Control (CDC) Guidelines for the Prevention of Intravascular Catheter-Related Infections in 2011, and 15 in the Infusion Therapy Standards of Practice in 2016, both used worldwide to guide medical practice (4, 5). In particular, the Standards of Practice released by the global Infusion Nursing Society, is the international reference source for this field and has recommended clinically indicated IV catheter replacement since 2011, citing Prof Rickard's work. Many US hospitals now only replace IV catheters when necessary. The uptake has been slower in Australia, but it is now accepted under a Queensland Department of Health Guideline for Peripheral Intravenous Catheters (2013).

The practice of clinically indicated IV replacement has major economic benefits. A 2014 analysis published in Applied Health Economics and Health Policy led by Griffith University health economists Prof Paul Scuffham and Dr Haitham Tuffaha (6) concluded that the savings in the US alone could be $US400 million over 5 years from 2.5 million catheter insertions made unnecessary each year should the policy be accepted at all US hospitals.

IV catheters are the most commonly used medical device in hospitals around the world. An estimated 330 million are sold in the US each year and 14 million in Australia (6). Yet research demonstrates up to 69% failure rate of IV catheters, due to blood clots, vein irritation and inflammation, dislodgement, tissue damage from incorrect placement, and serious infections (7).

The success of the original DRIP Trial encouraged the NHMRC; the Queensland Government; charitable organisations, such as the Queensland Cancer Council; and industry, such as global medical technology companies Becton Dickinson (BD) and AngioDynamics, to fund major studies led by AVATAR. By the end of 2016, AVATAR was involved in 80 studies investigating different types of catheter designs, insertion methods, securement and dressing of catheters, flushing techniques to prevent blockage, blood drawing protocols, infection prevention strategies, and approaches to improving healthcare staff capacity to adhere to best practices, including avoiding catheters altogether where possible.

Other AVATAR projects to the end of 2016 included assessing the special vascular access needs of babies, infants, and children; and a laboratory that conducts forensic and experimental analyses into how and why devices fail. This activity has led to vast expansion of AVATAR. By the end of 2016 it became the world's largest research group in vascular access, with chapters in all Australian mainland states. It had 25 permanent paid staff, 10 PhD students, and more than 100 nurses, doctors, and other health researchers involved in its projects.

"AVATAR research has had a profound impact on patients within my organisation," says Michelle DeVries, Senior Infection Control Officer at Methodist Hospitals in Indiana, USA, "35% of our PVCs [catheters] now remain in

place for 5 days or more, with 20% lasting beyond 7 days. Those patients are saved painful, unnecessary, vessel-destroying, satisfaction-destroying, invasive procedures that would have been required under previous policies."

A study in 2013 of nearly 1200 patients in China by nursing researchers at Xiamen University and Fudan University in Shanghai (8) not only supported AVATAR's results in a developing nation, but concluded that replacement of IV catheters only if clinically indicated "is feasible, and it may reduce nursing staff workload and patient discomfort".
One consequence of AVATAR's expansion and international success has been the capacity to organise multinational studies on aspects of vascular access, such as the One Million Global Peripheral Intravenous Catheter Study in 2014–2015, which provided a snapshot of the use of peripheral IVs on one single day at 415 collaborating hospitals in 51 countries.

Associated research

(Briefly describe the research that led to the impact presented for the UoA. The research must meet the definition of research in Section 1.9 of the EI 2018 Submission Guidelines. The description should include details of:
- what was researched
- when the research occurred
- who conducted the research and what is the association with the institution)

Health guidelines globally had recommended removal of intravenous (IV) catheters every 3 to 4 days as this was thought to prevent vein irritation and bloodstream infection. This required insertion of new IV catheters. In 2010, Prof Rickard and colleagues synthesized their own and other researchers' small trials on the effects of removing IV catheters only when clinically indicated (based on patient need) compared with routinely. Their Cochrane review (five trials, 3408 participants) found no evidence to support the current practice of routine replacement. They proposed that a change in healthcare providers' policy whereby catheters were changed only if clinically indicated, would bring signicant cost savings and would also be welcomed by patients [1]. Their Queensland-based trial with 3283 patients in 2012 [3] confirmed that IV catheters could be removed as clinically indicated, as there was no risk difference compared to routinely removed catheters. In 2015, their Cochrane systematic review and meta-analysis was updated (seven trials; total 4895 patients), with consistent results [2]. The AVATAR group has undertaken a significant program of randomised controlled trials and systematic reviews of the effectiveness of interventions [e.g. 9,10]. Established by Rickard in 2007, the group is led by Griffith researchers (Rickard, Cooke, Bulmer, Ullman, Ray-Barruel), QUT (Keogh) and USC (Wallis), and supported by NHMRC funds.

FoR of associated research

(Up to three two-digit FoRs that best describe the associated research)

11 - Medical and Health Sciences

References (up to 10 references, 350 characters per reference)

(This section should include a list of up to 10 of the most relevant research outputs associated with the impact)

1.Webster J, Osborne S, Hall J, Rickard CM. (2010). Clinically indicated replacement versus routine replacement of peripheral venous catheters. Cochrane Database of Systematic Reviews. Issue 3. Art. No.: CD007798.

2.Webster, J., Osborne, S., Rickard, C.M. & New, K. (2015) Clinically-indicated replacement versus routine replacement of peripheral venous catheters. Cochrane Database of Systematic Reviews. Issue 8. Art. No.: CD007798.

3.Rickard, C.M., Webster, J., Wallis, M.C., Marsh, N., McGrail, M.R., French, V., Foster, L., Gallagher, P., Gowardman, J.R., Zhang, L., McClymont, A. & Whitby M. (2012) Routine versus clinically indicated replacement of peripheral intravenous catheters: a randomised controlled equivalence trial. The Lancet. 380: 1066-1074.

4.O'Grady, NP, Alexander M, Burns LA, Dellinger EP, Garland J, Heard SO, Lipsett PA, Masur H, Mermel LA, Pearson ML, Raad II, Randolph AG, Rupp ME, Saint S, Centers for Disease Control. (2011) Guidelines for the Prevention of Intravascular Catheter-Related Infections. Clinical Infectious Diseases. 52:e162-93

5.Gorski L, Hadaway L, Hagle ME, McGoldrick M, Orr M, Doellman D. (2016) Infusion Therapy Standards of Practice. Journal of Infusion Nursing. 39(1S): 1-159.

6.Tuffaha, H.W., Rickard, C.M., Webster, J., Marsh, N., Gordon, L., Wallis, M. & Scuffham, P.A. (2014) Cost-effectiveness analysis of clinically indicated versus routine replacement of peripheral intravenous catheters. Applied Health Economics and Health Policy. 12: 51–58.

7.Marsh N, Webster J, Mihala G & Rickard C. (2015) Devices and dressings to secure peripheral venous catheters to prevent complications. Cochrane Database of Systematic Reviews. 6: CD011070.

8.Xu L., Hu, Y., Huang, X., Fu J. & Zhang J. (2017) Clinically indicated replacement versus routine replacement of peripheral venous catheters in adults: A non-blinded, cluster randomized trial in China. International Journal of Nursing Practice. 23: e12595.

9.Bugden S, Shean K, Scott M, Fraser JF, Mihala G, Clark S, Johnstone C, Rickard CM. (2016) Skin glue reduces the failure rate of emergency department inserted peripheral intravenous catheters: A randomized controlled trial. Annals of Emergency Medicine. 68:196-201.

10.Ullman AJ, Marsh N, Mihala G, Cooke M, Rickard CM. (2015) Complications of central venous access devices: a systematic review. Pediatrics.136:e1331-44.

Additional impact indicator information

Additional impact indicator information

(Provide information about any indicators not captured above that are relevant to the impact study, for example return on investment, jobs created, improvements in quality of life years (QALYs). Additional indicators should be quantitative in nature and include:
- name of indicator (100 characters)
- data for indicator (200 characters)
- brief description of indicator and how it is calculated (300 characters).)