Evidence for a learning healthcare system

There is increasingly strong evidence that health outcomes are better where health care and health research are connected. For example, there is now substantive evidence that if you are a patient in a setting where clinical trials happen, you have better outcomes. Individual patients don’t have to be involved in research to benefit as long as their hospital, primary health organisation (PHO) or community is engaged. Further, the health research workforce engages in teaching and learning, healthcare delivery, government and industry advice, community leadership and more. The impact goes far beyond research alone. Where research happens, health care – and healthcare outcomes – are better.

The Government's vision is for New Zealand to have a world-leading health research and innovation system that is founded on excellent research and improves the health and wellbeing of all New Zealanders. The New Zealand Health Research Strategy (2017-2027)\(^1\) outlines a set of guiding principles, strategic priorities and immediate actions to help achieve this vision.

The NZHRS has four strategic priorities:
1. investing in research that addresses the health needs of New Zealanders
2. creating a vibrant research environment in the health sector
3. building and strengthening pathways for translating research findings into policy and practice
4. advancing innovative ideas and commercial opportunities.

Strategic Priority 2 recognises that a world-leading health research and innovation system must have a vibrant research environment in the health sector. The health sector is a key part of New Zealand’s national innovation system, performing research, generating knowledge and making the most of innovations. All levels of care, from primary care through to specialist providers, have a role to play in the health research and innovation system.

There are international movements towards ensuring a learning health system where research and evaluation inform how the system, and health care facilities and professionals work to achieve optimal health outcomes for their people. Broadly, two mechanisms are described\(^2\) through which research outputs are proposed to improve healthcare outcomes:

1. **Translational research approach** (direct channel) – clinical research bridges the gap between the lab and the patients. Clinicians apply knowledge generated in the earlier stages of research (basic, pre-clinical and clinical trials) to contribute to treatment improvements.
2. **Absorptive capacity approach** (indirect channel) – involvement in research and development, as well as teaching and training by skilled physicians, generates increases in the hospital’s overall absorptive capacity which facilitates the assimilation and transformation of the global knowledge generated by different sources inside and outside the hospital in effective routines and treatments (ie. development and integration of new clinical guidelines which leads to more effective healthcare outcomes).

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Below are some references of interest on this topic:

1. **Increases in the quantity of research produced in surgical disciplines contributes significantly to the reduction of hospital length-of-stay in surgical specialties.** Researchers looked at data from 189 Spanish public hospitals to estimate the causal effect of both surgical and basic research on hospitals’ efficiency, measuring their impact on the average length of stay. Similar increases in the quantity of basic research also produces efficiency gains (reduction in average LoS). This effect is greater for hospitals with higher absorptive capacity – high R&D investment and R&D skills (capability), and with teaching status. In terms of economic impact, the study found that a one standard deviation increase in the number of publications lead to direct savings of €123.3 million at the national level per year (based on the average annual cost of an additional day of hospital stay). (Garcia-Romero et al. The impact of health research on length of stay in Spanish public hospitals. Research Policy, 2017)

2. **Bowel cancer patients are more likely to survive in research-active hospitals.** And even bowel cancer patients who are not involved in the trials themselves benefit from being in hospitals where a large amount of clinical research is taking place. An NIHR study of over 200,000 patients with colorectal cancer, in 150 NHS trusts, found that patients treated in hospitals where research participation was high, had a mortality rate in the first 30 days after major surgery of 5%, and a survival rate at five years of over 45%, compared to mortality of over 6% and 5 year survival of 41% for trusts with no/little research activity. The effect of research activity is seen after adjusting for medical and social factors such as case-mix, hospital case volume and “centre of excellence” status which may be expected to affect the performance of different institutions. (Downing et al. High hospital research participation and improved colorectal cancer survival outcomes: a population-based study. Colon, 2016).

3. **Research active NHS Trusts have lower risk-adjusted mortality for acute admissions.** These results are still evident after controlling for factors such as Trust size, staffing levels and resources (such as critical care and operating theatre provision or radio-diagnostic utilisation). Research active Trusts were defined as those who received NIHR Comprehensive Clinical Research Network funding and recruited patients to NIHR Clinical Research Network portfolio studies. Better survival was demonstrated in the top funding and patient recruitment tertiles. (Ozdemir et al. Research activity and the association with mortality. PLOS One, 2015).

4. **This study investigated whether clinical research activity was associated with established organisational outcome measures and showed the number of patients recruited into intervention studies is significantly correlated with better Clinical Quality Care ratings and lower mortality indicator scores.** (Jonker, L & Fisher, SJ 2018, ‘The correlation between National Health Service trusts’ clinical trial activity and both mortality rates and care quality commission ratings: a retrospective cross-sectional study’, Public Health, vol. 157, pp. 1-6.)

5. **The US Department of Veterans Affairs has conducted trials that demonstrate how study results can be directly translated into clinical practice as part of a Learning Healthcare System.** Their Point of Care Research uses

6. The value of ‘public good’ research conducted by Clinical Trail Networks has been demonstrated by a report conducted by the Commission on Safety and Quality in Healthcare in which the overall potential return on investment was $5.80 for each dollar invested (a third of the benefits identified arose from savings in direct health costs). (Australian Clinical Trials Alliance. Economic evaluation of investigator-initiated clinical trials conducted by networks. Sydney: ACSQHC; 2017.)