

PROTOCOL: Positive Participatory Organisational Intervention to Reduce Burnout in New Zealand Emergency Department Staff – Multisite Study

QILS4WoWe@NZEDs Intervention study

Version 3.0
24th March 2023

www.woweated.com



Table of Contents

| | |
|--|-----------|
| Administration | 4 |
| Title | 4 |
| Short title | 4 |
| Trial Registration | 4 |
| Protocol Version | 4 |
| Funding | 4 |
| Ethics..... | 4 |
| Roles and Responsibilities | 5 |
| Lead investigator | 5 |
| Investigators: PhD Supervision and Executive Teams | 5 |
| Statistician | 6 |
| Administration and Logistics | 6 |
| Quality Improvement Trainer and Coach | 6 |
| Advisory Team | 6 |
| Plain English Summary of the Study and Design | 10 |
| The problem | 10 |
| A multilevel intervention | 10 |
| Intervention Sites | 11 |
| Assessment methods..... | 12 |
| Study Website www.woweated.com | 12 |
| Introduction | 13 |
| Background | 13 |
| Solutions | 14 |
| Individual-Level Interventions | 17 |
| Whānau/Group/Culture/Team-Level Interventions | 20 |
| System-Level Interventions | 22 |
| The intervention | 25 |
| Research Aims, Objectives, Hypothesis | 26 |
| Hypothesis | 26 |
| Research Questions..... | 26 |
| Methods..... | 28 |
| The Intervention | 28 |
| Individual-Level Component..... | 28 |
| Group-Level Component | 28 |
| System-Level Component..... | 28 |
| Improvement Training and Coaching | 29 |
| Local Champions Group..... | 29 |
| The study website..... | 29 |

| | |
|--|-----------|
| Study Design | 30 |
| Study Setting | 30 |
| Site Selection | 30 |
| Eligibility Criteria for an Emergency Department to be a Study Site | 31 |
| Inclusion..... | 31 |
| Exclusion | 31 |
| Eligibility Criteria for individual staff to participate in research (answer surveys) | 31 |
| Inclusion..... | 31 |
| Exclusion | 31 |
| Outcome | 32 |
| Primary outcome | 32 |
| Secondary outcomes | 32 |
| Participants | 33 |
| Sample Size | 33 |
| Recruitment..... | 33 |
| Māori Participation..... | 33 |
| Timeframe | 34 |
| Implementation | 34 |
| Data collection | 34 |
| Analysis | 35 |
| Statistical methods | 35 |
| Process Evaluation..... | 36 |
| Ethics and dissemination | 37 |
| Safety | 37 |
| Consent..... | 37 |
| Confidentiality | 37 |
| Declaration of interests..... | 37 |
| Access to data..... | 37 |
| Dissemination policy..... | 37 |
| References | 38 |
| | |
| <i>Table 1 Executive Team</i> | 5 |
| <i>Table 2 Advisory Team</i> | 6 |
| <i>Table 3 Abbreviations</i> | 7 |
| <i>Table 4 Glossary of terms</i> | 8 |
| Table 5 Percentage of staff burnout in NZ ED staff compared with other cohorts..... | 14 |
| Table 6 The Sigtuna Principles | 15 |
| Table 7 Research Objectives | 26 |
| Table 8 Research Questions..... | 26 |

Administration

Title

Positive Participatory Organisational Intervention to Reduce Burnout in New Zealand Emergency Department Staff – multisite study

Short title

QILS4WoWe@NZEDs Intervention study

Trial Registration

Australia New Zealand Clinical Trials Registry PENDING: ANZCTR Request number 385090

Protocol Version

Version 2.7
12th February 2023

Funding

Health Research Council Career Development Award HRC22/048 (Nicholls)
A+ Trust. A+ trust 7782

Ethics

HDEC approval number: 2023 EXP 15332
[Link to site](https://nz.forms.ethicalreviewmanager.com/Project/Index/70607) <https://nz.forms.ethicalreviewmanager.com/Project/Index/70607>

Roles and Responsibilities

Lead investigator
Dr Mike Nicholls

Investigators: PhD Supervision and Executive Teams

By contributing perspectives based upon their skillsets, members of the supervision and executive teams facilitate the co-production and implementation of the project assessments and interventions. Executive team meetings are held monthly, and members have access to the study website.

Table 1 Executive Team

| Name | Work Role | Primary relevant skillset | Other skillsets |
|---------------------|--|---|---|
| Dr Kate Allan | EM Physician, Auckland | Emergency Department Clinical Director | ACEM perspective. Chair of NZ faculty |
| Dr Natalie Anderson | ED nurse and university lecturer | Qualitative and mixed methods research | PhD supervisor, ED nursing experience |
| Prof Stu Dalziel | EM Physician | Leading multicentre ED research | PhD supervisor, Senior EM Physician |
| Trish du Temple | Founder of Greenlight Foundation | Consumer (service user) perspective ¹ | Positive psychology Interventions |
| Dr Jo Egan | EM Physician, Waitemata DHB | Positive psychology Interventions | "Chief wellness officer" perspective |
| Dr Eugene Fayerberg | EM Physician, Northland DHB | Medium-census ED perspective | Perspective from USA |
| Polly Grainger | ED nurse, Christchurch | Large-census ED perspective | Quality Improvement, nurse leadership perspective |
| Dr Libby Haskell | ED nurse, Starship | Multisite intervention | Multisite research |
| Dr Rebecca Jarden | Lecturer and research in workplace wellbeing | Workplace wellbeing intervention research | PhD supervisor, ICU nurse |
| Dr Mandy Masters | EM Physician, Rural Hospitalist | Small-census ED perspective | Senior rural physician perspective |
| JoAnn McLean | Clerical staff, Auckland DHB | non-clinical frontline work within ED perspective | Māori perspective |

| | | | |
|------------------|--|---|--------------------------------|
| Leonie Nicholls | Clerical Staff, Starship Children's' ED | non-clinical frontline work within ED perspective | Māori perspective |
| Dr Vanessa Selak | Lecturer in Quality and Quality Improvement, Public Health Physician | Quality Interventions in Healthcare systems | PhD supervisor |
| Marama Tauranga | ED nurse, Bay of Plenty DHB | Māori perspective | Executive level perspective |
| Fay Tomlin | ED nurse, Wairarapa DHB | Small-census ED perspective | Nurse practitioner perspective |

Statistician

Prof Chris Frampton

Administration and Logistics

Alieke Dierckx

Quality Improvement Trainer and Coach

John McTaggart

Advisory Team

Our advisory team will be consulted from time to time about specific aspects relevant to their skill sets.

Table 2 Advisory Team

| | Primary skillset | |
|------------------------|---|--|
| Dr Karen Day | Digital health researcher focusing on human factors of information technology | University lecturer |
| Assoc Prof Peter Jones | Multisite ED research | Lead for NZEMN Senior EM physician perspective |
| Dr Mike Shepherd | Executive level leadership (chief executive officer) | ED clinical director experience; quality and QI lens; |
| Dr Inia Tomash | EM Physician | Lead for Manaaki Mana Kaikōkiri (the ACEM steering group for equity for Māori) |

Table 3 Abbreviations

| | |
|--------|--|
| ACEM | Australasian College for Emergency Medicine |
| AHREC | Auckland Health Research Ethics Committee |
| CBI | Copenhagen Burnout Inventory |
| CD | Clinical Director |
| DHB | District Health Board |
| ED | Emergency Department |
| ELFT | East London Foundation Trust |
| EM | Emergency Medicine |
| FFIT | Fitness For Improvement Tool |
| HDEC | Health and Disability Ethics Committee |
| HQSC | Health Quality and Safety Commission |
| IHI | Institute for Healthcare Improvement |
| ICU | Intensive Care Unit |
| IR | Improvement Readiness scale |
| LCG | Local Champions Group |
| MUSIQ | Model for Understanding Success in Quality |
| NUM | Nurse Unit Manager |
| NZ | New Zealand |
| NZEMN | New Zealand Emergency Medicine Network |
| OSIM | Organisational Strategy for Improvement Matrix |
| PPIs | Positive psychology interventions |
| PPOI | Positive Participatory Organisational Intervention |
| QI | Quality Improvement |
| QIKAT | Quality Improvement Knowledge Assessment Tool |
| QILS | Quality Improvement Learning System |
| REDCap | Research Electronic Data Capture |

Table 4 Glossary of terms

| | |
|--|--|
| <p>Burnout</p> | <p>A syndrome conceptualised as resulting from chronic workplace stress that has not been successfully managed. It is characterized by three dimensions:</p> <ul style="list-style-type: none"> • feelings of energy depletion or exhaustion; • increased mental distance from one’s job, or feelings of negativism or cynicism related to one’s job; and • reduced professional efficacy. <p>Burn-out refers specifically to phenomena in the occupational context and should not be applied to describe experiences in other areas of life”²</p> |
| <p>Copenhagen Burnout Inventory</p> | <p>A validated 19 question instrument measuring burnout in three domains: personal; work-related; and client (patient)-related.³</p> |
| <p>Emergency Department</p> | <p>A dedicated hospital based facility specifically designed and staffed to provide 24-hour emergency care. An Emergency Department cannot operate in isolation and must be part of an integrated health delivery system within a hospital both operationally and structurally.⁴</p> |
| <p>Emergency Department Team</p> | <p>The ED team (workforce) are those staff from diverse workgroups who regularly work in ED.⁵ Work groups include cleaners, clerical staff, doctors, health care assistants, nurses, orderlies, security. Some EDs have physiotherapists, radiographers and social workers who identify as being ED staff.</p> |
| <p>Emergency Medicine</p> | <p>A field of practice based on the knowledge and skills required for the prevention, diagnosis and management of acute and urgent aspects of illness and injury affecting patients of all age groups with a full spectrum of undifferentiated physical and behavioural disorders. It further encompasses an understanding of the development of pre hospital and in-hospital emergency medical systems and the skills necessary for this development.⁴</p> |
| <p>Emergency Medicine Specialist/Emergency Physician</p> | <p>A registered medical practitioner trained and qualified in the specialty of Emergency Medicine. The recognised qualification of an emergency physician in Australasia is the Fellowship of the Australasian College for Emergency Medicine (FACEM).⁴</p> |
| <p>Local Champions Group</p> | <p>Each site will have an LCG that will liaise with the investigators and oversee many parts of the intervention in their ED. Each LCG will include up to 5 personnel and be a diverse composition of the local ED team, including one or more of senior doctors, nurses, other ED team members, consumers, and iwi representatives.</p> |

| | |
|--|--|
| Manaaki Mana Kaikōkiri | The ACEM steering group for equity for Māori in Emergency Departments. ⁶ |
| New Zealand Emergency Medicine Network | A collaborative research network for acute care in New Zealand. https://www.nzemn.org/home |
| Positive Participatory Organisational Intervention | PPOIs focus on improving the work environment and employee well-being through changing work policies, practices, and procedures through a collaborative approach. ⁷ |
| QILS4WoWe@NZEDs | This current study forms part of the initial components of the overall project: Prospective, Multicentre, Mixed Methods Before and After, Insider-Led, Quality Improvement Learning System Intervention to Improve Emergency Department Workforce Wellbeing in Aotearoa New Zealand. Short title: Quality Improvement Learning System for Workplace Wellbeing at Aotearoa New Zealand Emergency Departments study. |
| Quality Improvement | the combined and unceasing efforts of everyone—healthcare professionals, patients and their families, researchers, payers, planners and educators— to make the changes that will lead to better patient outcomes (health), better system performance (care) and better professional development (learning). ⁸ |
| Quality Improvement Learning System (QILS) | The name of a prototype system used at Auckland City Hospital Adult Emergency Department in 2020-21 designed to improve quality of care. Involved: frontline staff; a QILS team; problem identification, notification, solution; and feedback. |
| Quality in healthcare | The extent to which health care services provided to individuals and patient populations improve desired health outcomes. In order to achieve this, health care must be safe, effective, timely, efficient, equitable and people-centred. ⁹ In Aotearoa New Zealand, embedding and enacting Te Tiriti o Waitangi, supporting mana motuhake, is a fundamental component of quality in healthcare. |
| Wellbeing | There is no consensus around a single definition of wellbeing. Here is one: "at minimum, well-being includes the presence of positive emotions and moods (e.g., contentment, happiness), the absence of negative emotions (e.g., depression, anxiety), satisfaction with life, fulfilment and positive functioning." ¹⁰ |

Plain English Summary of the Study and Design

The problem

The wellbeing of staff in New Zealand (NZ) Emergency Departments (ED) is critical to staff retention and provision of excellent care for patients and whānau. Recent evidence indicates that there are problems with the wellbeing of ED staff. High levels of burnout were documented in a 2020 survey of almost 1400 ED staff from 22 EDs around NZ.¹¹ This is a threat to healthcare in NZ. Similar problems are found world-wide. In the US, for example, healthcare worker burnout and workplace wellbeing have been identified as two of the five healthcare priority areas by the US surgeon general.

The causes of burnout are complex and multifactorial, and solutions are not straightforward. While it is probable that many potential solutions are out of the control of those most affected, NZ ED staff have identified three factors they believe contribute to their wellbeing:

- a culture of wellbeing,
- professional development opportunities, and
- the ability to provide high quality healthcare.¹²

How these aspirations are to be achieved in NZ EDs is unproven.

From organisational psychology and improvement literature three features of successful workplace wellbeing interventions are important:

1. interventions must be appropriate for the context,
 - What may work in one setting may not work in another without appropriate modification - one size does not fit all.
2. interventions must target multiple levels within an organisation
 - Interventions for workplace wellbeing are most effective when targeting multiple levels throughout an organisation, including at the individual healthcare worker- (HCW), group-, leadership-, whole of organisation- and outside the organisation- levels.
3. staff most affected must be meaningfully involved with improvement.⁷
 - Frontline staff, and healthcare consumers, are positioned to identify and contribute to prioritising areas for improvement.

Outside the NZ ED context, exemplar healthcare organisations (HCO) with consistently high measures of HCW wellbeing, take a continuous quality improvement approach, and that provide high quality healthcare, (for example, East London Foundation Trust)¹³ approach workplace wellbeing with these three important features.

A multilevel intervention

We propose a **multilevel intervention**, that targets three organisation levels (the individual, the group, and the system levels), that is adaptable to local context, and involves frontline staff and healthcare consumers. We hypothesise this will reduce HCW burnout and improve staff wellbeing by improving workplace culture, provide professional development opportunities, and improve the provision of high-quality care.

Individual-level component

Will consist of a positive psychological intervention available to all ED HCWs at participating sites. Individual HCWs will choose one of 3 positive psychological interventions and participate in what seems most appropriate for them. These are a mindfulness intervention,¹⁴ three good things,¹⁵ or a looking forward¹⁶ intervention. These will be available online.

Whanau/team/group/department/culture-level component

Local champions will decide which group-level intervention their department will use: either a Learning from Excellence¹⁷ or Clinical Event Debriefing¹⁸ intervention.

System-level component

This intervention has several important features that may ultimately empower staff and healthcare consumers to effectively, and efficiently, contribute to improve the quality of healthcare deliverable within their ED and improve workplace wellbeing. This is the Quality Improvement Learning System (QILS).

Features include mechanisms for:

- consumers and frontline staff highlight issues that are important to them and affect quality of care;
- triage and prioritisation of those issues;
- allocation of resource to improvement work;
- staff to lead and participate in improvement work; and
- feedback to staff and consumers.

While each feature of QILS will be adaptable to each context and informed by the most up to date NZ ED-based research, the important features will be present in all cases.

Building capability for improvement will include training and coaching in Quality Improvement (QI) methods, with an emphasis on the local and ED contextual factors. Training and coaching will be delivered online by an expert. Monthly meetings of all Local Champions Group (LCG) personnel will be opportunities to share lessons and build nationwide camaraderie required for sustainability. An estimated 50 hours of training, coaching and project work over 12 weeks (4 hours per week) from March 2023 will be required of each LCG member.

Intervention Sites

There will be 8 ED sites enrolled, from which there will be 900 HCW participants. Sites will be enrolled in waves from March 2023. Interventions will take place over 12 months. Intervention sites will be chosen based upon various criteria, including results from our recent Assessment of Baseline Capability survey, interviews, and focus groups.

In addition to the support of the ED Leadership group, and wider healthcare organisation Quality, Wellbeing and Executive groups, a LCG will be critical to success at each site. The LCG will have up to 5 personnel and be a diverse composition of the local ED team, including one or more of senior doctors, nurses, other ED team members, consumers, and mana whenua. The LCG will be in the best position to understand local needs, liaise with local leaders and the investigators, and oversee many parts of the intervention in their ED. Each member of the LCG will attend the training and coaching program.

It is envisaged that ultimately this work will be incorporated into "business as usual" for members of the LCG. For example, SMOs involved in quality and/or wellbeing portfolios may use their non-clinical time for this work. While each ED will be different, initial set up costs may include the requirement for usual FTE be made available to some members of the LCG.

Each site will have a Local Investigator (LI) who may also be members of the LCG. With the support of the investigation team, LIs will lead the collection of data at their ED. All those who qualify are encouraged to be named authors of this work.¹⁹

Assessment methods

Methods of assessment are surveys of all ED staff at participating sites of baseline and repeat measures of burnout and wellbeing, including staff engagement and empowerment. To clarify the content and fidelity of the interventions a process evaluation will be conducted at each site.

Study Website www.woweated.com

This will be a location for sources of information for all stakeholders.

Our diverse team has considerable experience and success with research.

Introduction

Background

Aside from primary care, emergency medicine (EM) is the specialty with which New Zealand (NZ) health consumers have the greatest interaction, with over 1 million consultations in NZ annually. Central to the delivery of high-quality EM care are emergency department (ED) staff, who need to function optimally in order to deliver high-quality healthcare: that which is safe, timely, effective, equitable, patient-centred and efficient.^{20,21} Yet functioning optimally is not easy in EDs, which are complex, time poor, time-pressured environments, where staff must make rapid decisions, sometimes life and death, often when patients and whānau are at their most vulnerable. EDs provide a "perfect storm" for burnout, a long-term stress reaction defined by emotional exhaustion, depersonalisation, and a lack of sense of personal accomplishment.

Healthcare staff wellbeing is a prerequisite for high-quality healthcare and has advantages for legal, ethical, fiscal, and patient outcomes.^{20,22-26} Staff with high burnout have higher turnover, increased absenteeism, and make more errors. Patients rate communication by staff with higher burnout poorly, and overall patient satisfaction is lower. Hospitals with higher burnout scores have higher avoidable infection rates.²⁰ EM physicians with burnout practice suboptimal care including providing inadequate analgesia, over-testing and unsafe discharging practices.²⁷

Staff wellbeing is recognised internationally as an organisational priority for healthcare systems.^{20,28} Frameworks for delivery of high value healthcare, such as the 'quadruple aim,' recognise the core role that healthcare staff play in providing high-quality care with the overarching goals of improving individual care; improving population health; reducing per capita healthcare cost; and improving the experience of providing care. In NZ the Health Quality and Safety Commission (HQSC) have recognised the threat poor workforce wellbeing poses with respect to errors and low-value healthcare delivery,²³ while within EM, accreditation bodies such as Australasian College for EM (ACEM) have made staff wellbeing a key priority.²⁸

In 2020 members of our team led a nationwide survey of NZ ED staff (n=1,372) to determine rates of burnout. In 22 EDs 711 (52%) nurses, 364 (27%) doctors, and 295 (22%) auxiliary staff were recruited. Overall rates of burnout, as determined by the Copenhagen Burnout Inventory (CBI),³ were very high with 59.5% reporting personal burnout, 54.7% reporting work-related burnout and 19.4% reporting patient-related burnout. Of the three worker cohorts, nurses reported the highest proportion of burnout with 68.8%, 63.0% and 25.8% for personal, work-related, and patient-related domains respectively. These findings are higher than rates seen in Australasian EM doctors, Danish human service sector staff and NZ senior medical officers (Table 5).

Table 5 Percentage of staff burnout in NZ ED staff compared with other cohorts

| CBI Burnout Domain | NZ ED staff 2020¹¹ n=1,372 % (mean, SD) | NZ SMOs 2020²⁹ n=2,102 | NZ SMOs 2015³⁰ n=1,487 | Australasian EM doctors 2019³¹ n=729 | Danish human service sector staff 2004³² n=1,917 |
|---------------------------|---|---|---|---|---|
| Personal | 59.5% (51.5, 17.7) | 49.3% | 50.1% | 45% | 22.2% |
| Work-related | 54.7% (49.9, 19.1) | 43.5% | 42.0% | 50% | 19.8% |
| Patient-related | 19.4% (31.0, 18.9) | 16.7% | 15.7% | 13% | 15.9% |

NZ=New Zealand; ED=Emergency Department; CBI=Copenhagen Burnout Inventory; SMOs=Senior Medical Officers; SD=Standard Deviation.

Post COVID-19 pandemic, the US Surgeon General has identified healthcare worker burnout as one of four priority areas in healthcare in USA.³³ In NZ, our new health system (Te Whatu Ora, Te Aka Whai Ora) identifies “develop an inclusive health workforce” as one of six priority actions.³⁴

Solutions

Problems with workplace wellbeing and burnout are complex, multi-factorial, with no easy solutions.²⁰ While there is a paucity of high-quality evidence involving our population (staff who work in emergency departments) an outline of salient literature and concepts related to interventions to improve wellbeing and reduce burnout in healthcare staff assists directing future research.

Emergency Department Setting

This 2020 paper "*Effectiveness of interventions to reduce emergency department staff occupational stress and/or burnout: a systematic review*"³⁵ included only English language studies in an ED setting since 2008. Fourteen randomised or quasi-randomised studies were included, investigating individual-focused (n=10) and organisation-focused (n=4) interventions, with a total of 1033 participants. Individual focused interventions were mindfulness-based (n=4) or educational based (n=6) interventions. Only two studies included all ED staff groups, including allied health and non-clinical staff. Two studies were set in Australia, none in New Zealand.

The authors found individual-focused interventions resulted in improvements in burnout. Organisation-level interventions improved stress but had no improvement or worsened burnout. Low quality studies limiting recommendations for practice. The authors suggested that individual focused interventions may be more feasible, whereas organisation-level intervention are generally more resource intense and harder to implement, especially with fatigued staff.

However, a sole focus on individual-level interventions may not be acceptable to ED staff. This sentiment is crystallised in the title of this Australian ED opinion-piece "*Burnout is the canary in the coalmine; the solution is not stronger canaries*",³⁶ a quote attributed to Christine Maslach, a pioneer in burnout research.

For physicians in healthcare generally, a 2016 systematic review and meta-analysis of 15 RCTs and 37 cohort studies found evidence of benefit of individual and organisation-level interventions on physician burnout.³⁷ For example, overall burnout was reduced from 54% to 44% (-10% 95%CI -14, -5, p<0.0001, I²=15%) among those 14 studies that reported overall burnout measure. Organisational-level interventions were slightly more effective than individual-level interventions, (p=0.03 I²=79%). The authors concluded that while there was evidence for improvement in physician burnout, further research is required to establish which interventions may be effective in specific populations, also how individual- and organisation-level interventions can be combined for optimal effect.³⁷

Conceptualising professional fulfillment as comprised of interconnected domains of "personal resilience, a supportive team culture and the efficiency of practice" is helpful.³⁸

While tempting to focus on literature from within healthcare, organisational psychology researchers have been investigating workplace improvement for decades.³⁹ The 2021 article "*How to design, implement and evaluate organizational interventions for maximum impact: the Sigtuna Principles*"⁴⁰ provides useful guidance to improve workplaces. These are summarised in the 10 Sigtuna Principles (so called because a meeting was held in the town of Sigtuna, Sweden).

Table 6 The Sigtuna Principles

| | |
|-----|---|
| 1. | <i>Ensure active engagement and participation among key stakeholders;</i> |
| 2. | <i>Understand the situation (starting points and objectives);</i> |
| 3. | <i>Align the intervention with existing organizational objectives;</i> |
| 4. | <i>Explicate the program logic;</i> |
| 5. | <i>Prioritize intervention activities based on effort-gain balance;</i> |
| 6. | <i>Work with existing practices, processes, and mindsets;</i> |
| 7. | <i>Iteratively observe, reflect, and adapt;</i> |
| 8. | <i>Develop organizational learning capabilities;</i> |
| 9. | <i>Evaluate the interaction between intervention, process, and context;</i> |
| 10. | <i>Transfer knowledge beyond the specific organization.</i> |

These principles will be referred to along with other guidance regarding evaluation of interventions in complex systems.⁴¹

Positive Participatory Organisational Interventions

The interconnectedness of the individual, the team, and the system means that interventions that focus on multiple domains are required.^{7,38} Positive Participatory Organisational Interventions (PPOIs) focus on improving the work environment and employee well-being through changing work policies, practices, and procedures through a collaborative approach.⁷ Requiring a collaborative approach among workers and employers, they work at multiple levels throughout an organisation, at the Individual, Group, Leadership, Organisation and Outside the organisation (IGLOO).⁷

A 2022 systematic review of group- and organisation-level workplace interventions to improve worker wellbeing identified 83 studies in 68 articles. This nuanced study was not a meta-analysis, and defined workplace interventions as those targeting the workplace rather than the individual worker. The authors aimed to examine which interventions had been investigated and which were most effective, and which outcome measures have been used for assessment. Among many insights, they conclude that *"Regardless of type, interventions involving increased control and opportunities for workers' voice and participation more reliably improve worker well-being, suggesting these components are critical drivers of well-being."*(page 30)⁴²

While the interconnectedness of the individual, the team, and the system means that interventions that focus on multiple domains are considered most effective, a brief summary of interventions at each of these three levels provides important detail.

Individual-Level Interventions

Interventions targeting individuals, and outcome measures, are numerous and diverse.

A 2021 review "*A systematic review and meta-analysis of psychological interventions to improve mental wellbeing*" highlights a range of possible individual-focused interventions from 419 randomised controlled trial (RCTs) involving 53000 participants from clinical and non-clinical populations.⁴³ Five studies were conducted in NZ. Interventions were based upon numerous theoretical psychological constructs. Among numerous findings, Mindfulness-Based Interventions (MBIs) showed small-to-moderate effect sizes on subjective wellbeing among non-clinical populations compared to controls (Hedges $g=0.42$ 99%CI 0.29-0.55 $p=0.000$). Three Good Things (Hedges $g=0.138$ 99%CI -0.04, 0.31 $p=0.048$) and Optimism/Best Possible Selves ($g=0.213$ 99%CI -0.02, 0.45 $p=0.018$) interventions showed small effect sizes that were not statistically significant compared to controls.

Positive psychological interventions

Positive psychological interventions use pathways consistent with positive psychology theory to achieve the goal of wellbeing enhancement.⁴⁴ PPIs can be classed based upon the type of intervention. For example a 2021 systematic review involving 72000 participants from 347 controlled studies classified PPIs into 10 types, including optimism/hope, gratitude, strengths, savouring, etc.⁴⁴ Among many findings, at post-test, overall PPIs had a significant small to medium effect on wellbeing ($g = 0.39$) which was maintained at 3 months. Savouring ($g= 0.77$ 95%CI 0.49, 1.05 $p<0.001$) and optimism/hope ($g= 0.51$ 95%CI 0.35, 0.69 $p<0.001$) interventions had large and medium significant effects, respectively, on increasing wellbeing.⁴⁴

Several other systematic review and meta-analyses of positive psychological interventions have been performed. These have differed based upon the participant populations (clinical and non-clinical populations, and non-clinical populations only), in work-based populations only, and based upon the delivery (e.g. peer-led interventions⁴⁵).

A 2019 meta-analysis included only studies ($n=22$) evaluating work-based positive psychological interventions.⁴⁶ The authors hypothesised interventions would improve work outcomes (including wellbeing, performance, engagement, etc); effects of interventions may vary based upon the theoretical construct of the study; and may vary depending upon mode of delivery (online, to individuals or groups in person). They concluded that overall PPIs had a small to moderate effect on work outcomes (Hedges' $g= 0.31$, 95%CI 0.24, 0.38, $p < 0.001$). There were no statistically significant differences on work outcomes between theory type, and all three modes of delivery were effective, with group-based interventions slightly more effective. Feasibility of any intervention is important, so while group-based long-term interventions may be most desirable in research studies to assess efficacy, given our constraints brief individual online interventions are more feasible.

One of the challenges with research with PPIs is the need to cater to different needs and interests between individuals. Authors of an editorial point out that "*positive psychology interventions cannot be based on a one-size-fits-all approach to well-being but need to be tailored to the needs of the individual and the needs of the organization.*"⁴⁷ To cater for individual needs as well as feasibility for busy healthcare professionals multicomponent PPIs can be used, as exemplified by

a team at Duke University. Participants are given the option of choosing suitable PPIs from a suite of brief web-based individual interventions. Research on this intervention is ongoing, and originally included six interventions (including Three Good Things, Gratitude, etc). In a pragmatic wait-list randomised control study of 471 HCWs in 2 cohorts from Neonatal Intensive Care Units, there were statistically significant reductions in burnout (Emotional Exhaustion -5.21 95%CI $-7.92, -2.51$ $p<0.001$) and other measures at 1 month, which endured at 6 months.⁴⁸

Potentially feasible and effective PPIs for HCWs include Three Good Things (TGT)^{15,16,49} and Looking Forward (LF) interventions.¹⁶ TGT is a brief low cost intervention that requires daily participation by writing down and considering what is going well in a participants life, and their role in that. By deliberately focussing on things that are going well, the intervention promotes reflection, gratitude, and savouring positive emotion. Benefits of a 15-day intervention of HCP participants ($n=228$) demonstrated improved emotional exhaustion (Cohen's $d=0.2$ $p<0.05$) that continued at 12 months.¹⁵

By encouraging consideration of optimal future at different time periods, LF is a brief online intervention that promotes hope/optimism and goal setting. In a single centre study of 123 HCWs there were significant improvements in depression and optimism (*paired t*(51) $=-2.49$ $p<0.05$) at day 28.¹⁶ While limited by a lack of control group these findings are consistent with other hope/optimism interventions that demonstrate improved wellbeing measures ($g=0.51$) as noted above.⁴⁴

Mindfulness at work

Mindfulness can be defined as *"the ability to observe thoughts, bodily sensations or feelings in the present moment with an open and accepting orientation toward one's experiences."*⁵⁰

Online MBI have positive effects on stress. A 2016 meta-analysis of 15 RCTs involving 2360 participants *"Effectiveness of online mindfulness-based interventions in improving mental health: A review and meta-analysis of randomised controlled trials"* found small-to-moderate significant positive effects on wellbeing (Hedge's $g=0.23$ 95%CI 0.09, 0.38 $p<0.01$) and stress ($g=0.51$ 95%CI 0.26, 0.75 $p<0.001$) compared to controls.⁵⁰

In NZ, The Mental Health Foundation and Health Promotion Agency recommend "Taking Notice" as one of the "5 Ways to Wellbeing at Work".¹⁴ One recommendation associated with this is to *"Introduce mindful awareness through a breathing or mindfulness exercise at the start of meetings"* (page 15)¹⁴. In UK, National Institute for Health and Care Excellence (NICE) recommends that employers make mindfulness available to all employees, to support mental wellbeing at work.⁵¹

In healthcare, a 2019 systematic review of mindfulness based interventions for healthcare professionals ($n=34$ studies, 1439 participants) concluded that there was insufficient evidence of effect of MBIs on burnout in HCPs.⁵² Thirteen studies had a control group, including 9 RCTs, and most MBIs were 8-week MBSR courses. A recent RCT of 2182 NHS staff comparing the mindfulness training app Headspace with an NHS-based work stress internet resource (Moodzone) as an active control demonstrated improved stress and other measures, but not

burnout.⁵³ The challenges of feasibility with mindfulness training was highlighted by a small study of 33 paediatric residents who used a 10-day online free app program (Headspace). Only 11 participants completed follow up, most citing time as a limitation, and there were no significant changes in burnout.⁵⁴

Requirements of individual-level interventions include that a range of options must be available to individuals to be acceptable, interventions must be feasible, and such interventions must be considered a part of greater whole that includes group- and organisation-level interventions.

Group-level interventions are those "*interventions that emphasise how groups or teams work together and those that promote supportive interactions within those units.*" (page 32) ⁴²

Qualitative data from our unpublished research in 2022 suggest that "whānau" may be a preferred term in some settings to name this level, rather than the word "team" which to some had an impersonal, non-Māori, "corporate" air. There are many opportunities to promote supportive interactions at work in healthcare organisations. Potential interventions at the whānau level in NZEDs include Clinical Event Debriefing (CED) and Learning from Excellence (LfE).

Clinical Event Debriefing.

CED is considered useful in acute care settings, including EDs, ^{18,55,56} and is recommended as a quality standard by ACEM.⁵ For example, in a 2022 qualitative Canadian study, participants (n=30 multidisciplinary ED HCWs from a single site) were interviewed to assess their perceptions of a debrief method that had been used at the ED for several years.⁵⁶ The majority of interviewees believed it contributed improving patient care (29/30, 97%), improved psychological safety and teamwork (26/30, 87%) and improved coping with stress (90%).

There are barriers to making this happens, though. All participants in the above study highlighted time constraints as a barrier.⁵⁶ Our recent Assessment of Baseline Capability (ABC) survey of 59 participants from 29 NZEDs (unpublished data) questioned participants about s CED. A median of 50 (IQR 26.5-75.5 range 1-100) from 55 respondents agreed that there are opportunities to debrief (scale of 0-100, disagree strongly - agree strongly), while a median 60.5 (n=50, IQR 31.5-81.75 range 9-100) agree that debriefing addresses emotional and clinical issues.

Qualitative feedback from the same study includes:

"Debriefing is unfortunately not a routine or frequent occurrence within the department. There are a few clinicians who themselves instigate debriefs following stressful events, however this is not yet routine, and there have not yet been conversations around making this routine."

Although challenging in a busy ED, CED is a low-cost intervention that is not universally practiced in NZEDs that may support ED staff through improved psychological safety, teamwork and stress management, and improve patient care.

Positive feedback: Learning from Excellence

Civility saves lives⁵⁷ is a movement that recognises the deleterious impact of rudeness on all stakeholders in healthcare. For example, in a RCT of 34 NICU teams in a simulation setting those exposed to rudeness performed worse compared to controls in various measures of procedural and diagnostic performance (composite scores 2.8 vs 3.3, p=0.008, and 2.6 vs 3.2 p=0.005 respectively).^{58,59}

Learning From Excellence is considered an antidote to rudeness in healthcare and is based upon the concept of safety-2.⁵⁸ That is, learning from what goes well in healthcare in addition to the more traditional learning from what goes wrong. LfE systematically captures what goes well in a department and provides positive feedback to staff.

A 2016 paper outlines how such an approach has worked in an ICU.¹⁷ Rather than focus on what was not going well, a focus on what went well was instituted. A survey one year into the pilot (229/339 PICU staff members responded) demonstrated clear support for the LfE initiative. Staff strongly supported the hypothesis that excellence reporting can improve staff morale (93% agree or strongly agree) and improve quality of care (87% agree or strongly agree). Based upon LfE, an intervention to improve "Gold Standard" antibiotic prescribing resulted in an improvement from 18% to 35% ($p=0.045$; χ^2) post intervention.

A 2022 study of a French NICU/PICU-based program based upon LfE demonstrated the program was feasible, 93% of respondent staff were satisfied ($n=52$), 93% agreed that it improved communication among staff and showed a non-statistically significant improvement in staff burnout.⁶⁰

An audit of the "Greatix" system of department-wide positive feedback, based upon LfE, 6 months after its introduction to a London paediatric ED demonstrated that most of the 261 submissions were for positive non-technical skills.⁶¹ The system has since been introduced throughout the hospital and Adult ED.

Although systems for positive feedback exist in many NZEDs, room for improvement seems to exist. From our recent survey, responses to the statement "the improvement environment allows us to gain important insights into what we do well" from the Improvement Readiness (IR) scale, less than half of the 59 respondents agreed ($n=24$) or strongly agreed ($n=1$), while the majority, ($n=34$), were either neutral ($n=19$), disagreed ($n=12$), or strongly disagreed ($n=3$).

Qualitative feedback re-enforces the challenges with communication within the department, particularly among different staff groups:

"Communication within the department is not straightforward - there is a gap between nursing and doctoring staff, which means that often as staff members we are not aware of what is truly going on within the department, particularly in terms of improvement projects."

This highlights a potential area for improvement within NZ EDs that may be challenging to implement but seems relatively low-cost and is potentially beneficial to staff morale and quality of patient care.

System-Level Interventions

As outlined above, while there is evidence for improvement in wellbeing with individual-focussed positive psychology interventions (PPIs), such as mindfulness, and PPIs^{46,62} a systems approach is considered necessary to sustain HCW wellbeing at scale.^{20,28,29,63,64}

Despite examination of evidence and calls for investment in organisation level research, consistent and specific recommendations for systems interventions have been lacking.²⁰ As well, recommendations such as imploring HCOs to invest in and prioritise HCW wellbeing by, for example, encouraging clinician leadership and having dedicated clinician Chief Wellbeing Officers rely upon board level decision making.⁶⁵⁻⁶⁷ While ownership of what is in one's sphere of influence is called for, many system-level decisions and changes are out of the control of most frontline workers such as ED staff.

Following lessons from the COVID-19 pandemic, a 2022 advisory from the US surgeon general makes several recommendations.³³ One such recommendation is "*Transform workplace culture to empower health workers and be responsive to their voices and needs.*"(page 21) Another is "*Show health workers how much they are valued.*"(page 21) While these are laudable, logical and much needed aspirations, how are such recommendations to be achieved, particularly in settings with high levels of staff burnout¹¹ a stretched financial situation and major changes in the NZ health system?

Improving Quality of Care

NZ ED staff have identified three key facilitators of improved wellbeing: a supportive team culture, professional development opportunities and delivering excellent patient-centred (high-quality) care.⁶⁸ Interventions targeting these three facilitators are aligned with the goals of all emergency care stakeholders. Ensuring system-level interventions enable frontline staff to participate in improving the quality of care provided may improve wellbeing.

Improving healthcare quality is challenging,⁶⁹ especially in complex systems, such as EDs.⁷⁰ A complexity lens differs from traditional "reductionist" views of systems and improvement, and includes: the critical role diverse voices from a range of staff play in improvement; an iterative approach adaptable to local needs, strengths and priorities, rather than a linear "one size fits all" or "top-down" approach; and embracing, rather than attempting to reduce, uncertainty, diversity and unpredictability.⁷¹ These caveats make research in complex systems challenging.⁷²

During the United Kingdom (UK) response to COVID-19, a system dependent upon the voice of frontline workers, focussed on rapidly identifying and solving problems, with the goal of the improvement of healthcare quality was established in acute care settings.⁷³ Staff identified problems, problems were assessed by decision makers, solutions were enacted, feedback to the frontline by dedicated "bedside learning coordinators" closed the loop.⁷⁴ Identification of problems, efficient communication with those with the ability to effect change, and feedback with front-line workforce were key to making this pragmatic approach to an evolving crisis workable.

The benefits to wellbeing of quality improvement (QI) initiatives have been described. In a cluster RCT of 166 clinicians in 34 primary care clinics in the United States clinicians exposed to a multifaceted intervention focussing on organisation change, communication, workflow redesign and targeted quality improvement projects were more likely to demonstrate reduced burnout compared to controls (Odd's ratio 4.8, 95% confidence interval 1.3-18).⁷⁵

Four healthcare initiatives (1 in the US and 3 in the UK) that relied upon staff involvement and quality improvement approaches to improving staff wellbeing were described in a case study report that found improvements in staff wellbeing as well as quality of care in all four cases.⁷⁶ Ideas for improvements were based upon staff input and suggestions, and all used digital platforms to share ideas and enhance communication among staff about improvements. The authors highlighted the challenge of measurement and survey fatigue and conclude that "*applying a systematic approach through quality improvement enables ownership by staff, creative idea generation and rigour around testing and measurement*". Of these four initiatives, two based their work upon the Institute for Healthcare Improvement (IHI) Joy in Work Framework.

The Joy in Work Framework outlines a quality improvement approach to improving wellbeing at work.⁷⁷ Staff are included by asking what matters most to them, while QI methods such as using small tests of change and measuring effects of changes are encouraged. The Framework was the basis for recent initiatives in various health settings in the UK, with demonstrable improvements in measures of staff wellbeing.

The quality team at East London Foundation Trust (ELFT) has demonstrated improvement of various measures of quality using QI methods that meaningfully included staff, healthcare consumers and their carers.^{78,79} They have recognised the importance of both top-down and bottom-up buy-in for successful QI. Their initiatives are primarily focussed on improving care, and have resulted in improved outcomes for healthcare consumers, staff, and financial performance. For example, reduced incidence of violence towards staff, which benefits all stakeholders, was demonstrated from an inpatient ward. ELFT has consistently scored among the best for staff engagement and staff turnover across the UK in annual NHS surveys.^{13,79}

The Enjoying Work Collaborative^{13,80} began at ELFT and was subsequently led outside ELFT by the Royal College of Psychiatrists. Throughout England and Wales 38 teams in 16 healthcare organisations took part in the 12-month program in 2021-22. Led centrally, teams prioritised and worked upon locally important initiatives, supported by coaches, and informed by intermittent training via zoom. Weekly measures (for example of burnout using the Mini-Z scale) as well as before- and after- assessments (for example recommendations as this as a place to work) demonstrated some improvements. For example, staff who were extremely likely to recommend their team as a place to work increased from 31% to 41 %, while those with no symptoms of burnout increased from 24% to 33%. (Sample size varied each week). This work was conducted during the COVID-19 pandemic in the UK.

In New Zealand EDs, two initiatives are salient. From late 2020 members of our team led a pilot, known as Quality Improvement Learning System (QILS), in a single large volume NZ ED, that encouraged identification of problems and suggestions for improvement from frontline staff. In 6 months, 322 problems in ED care were identified, with solutions enacted for 176 (55%) (data unpublished). Staff feedback was generally positive, such as ease of use for highlighting on-the-floor problems by frontline staff.

A mechanism similar to QILS, to enable staff to identify problems and help with solutions, was introduced during the "migration" of a further single large volume NZ ED to a new building in late 2020.⁸¹ Staff were kept updated about the latest changes using feedback boards. A well-used system, in 6 months over 550 service improvement "tickets" were lodged electronically by staff. Issues were assessed in "huddles" by a dedicated team who decided upon the outcome (approve, investigate, or decline). Issues were then referred to the ED post-migration team for prioritisation, which depended on how quickly the issues could be resolved (ranging from immediate, achievable now to achievable within 1 year, to extensive work required). While the project was not formally evaluated, informal feedback about this improvement initiative was positive from staff, and departmental leaders want to re-institute a similar program in the future.

Our initial research

Quality Improvement in healthcare is challenging, and results of QI are often mixed.^{69,82} In addition to the content of any improvement initiative, how and within what context QI is implemented is important. An understanding of context, defined as "all factors that are not part of a QI intervention itself"⁸³ when planning, implementing, evaluating and researching QI initiatives is widely acknowledged as vital to success in QI.^{82,84-91} An ideal tool to assess our ED context would have been previously assessed for validity and reliability in NZ ED settings. No such tool exists to our knowledge.

Given the importance of context for workplace wellbeing and quality improvement, our initial research has focused on assessment of ED departmental capability for workplace wellbeing and improvement. A survey was undertaken. In order to assess NZ ED QI capability we modified questions and statements from the IHI self-assessment tool, the IR scale, and the ACEM Quality Standards Implementation Toolkit.⁹²⁻⁹⁴ No robust tool exists to assess ED-level workplace wellbeing capability. We based survey questions and statements upon the "era" of workplace wellbeing described by Shanafelt,⁶⁵ the Joy in Medicine Health System Recognition Program⁹⁵ and the ACEM Quality Standards Implementation Toolkit.⁹⁴

In September 2022, two senior (medical and nursing) staff from each ED in NZ were surveyed to clarify needs and capabilities. Of the 35 EDs in NZ with an annual census of >5000 patients, 59 staff from 29 EDs responded to the survey. In addition, staff were interviewed individually and in a focus group in October 2022. Interviews are ongoing, data are being analysed and are contributing to the refinement of small parts of our intervention. Results will assist with decisions about readiness for site enrolment in future research.

The intervention

*"Think of physician well-being as a three-legged stool. Improvement efforts should focus on all three domains to achieve best results."*³⁸

We propose a multicomponent intervention that addresses individuals' needs, is adaptable to local context, and that targets three organisation levels: the individual, the group/whānau, and the system. We hypothesise this intervention will reduce burnout and contribute toward the three areas NZ ED staff previously identified as beneficial to wellbeing, that is, a supportive team culture, provide professional development opportunities, and improve the provision of high-quality care.¹² This is described in detail in Methods.

Research Aims, Objectives, Hypothesis

The aim is to investigate if a multicomponent positive participatory organisational intervention aimed at improving the delivery of high-quality care, that is insider-led, includes the voice of frontline staff and accounts for complexity, will improve NZ ED staff burnout as determined by pre- and post-intervention assessment using the Copenhagen Burnout Inventory (CBI).

Hypothesis

Implementation of a multicomponent positive participatory organisational intervention will improve ED staff workplace wellbeing and burnout.

Table 7 Research Objectives

| |
|---|
| <p>The Objectives of this research are to:</p> <ul style="list-style-type: none">• Refine and use a multicomponent positive participatory organisational intervention package, based on individual, group and system-level components, in participating NZ EDs.• Undertake a before and after study of the multicomponent intervention package in NZ EDs, including:<ul style="list-style-type: none">○ A quantitative assessment of the intervention package on staff burnout, wellbeing, and ED quality measures.○ A mixed methods process evaluation of the intervention package examining fidelity and staff acceptability. |
|---|

Research Questions

Table 8 Research Questions

| |
|---|
| <p>Primary research question:</p> <ul style="list-style-type: none">• Does a multicomponent positive participatory organisational intervention package, based on individual, group and system-level components, improve burnout in NZ ED staff? <p>Primary hypothesis:</p> <ul style="list-style-type: none">• That a multicomponent positive participatory organisational intervention package improves workplace wellbeing, as determined by the CBI, in NZ ED staff. <p>Secondary research questions:</p> <ul style="list-style-type: none">• Does a multicomponent positive participatory organisational intervention package improve workplace wellbeing in NZ ED staff?• Does a multicomponent positive participatory organisational intervention package improve quality in ED systems?• Is a multicomponent positive participatory organisational intervention package feasible in a NZ ED setting? |
|---|

- Is a multicomponent positive participatory organisational intervention package acceptable to NZ ED staff?

Secondary hypotheses:

- That a multicomponent positive participatory organisational intervention package improves workplace wellbeing in NZ ED staff.
- That a multicomponent positive participatory organisational intervention package improves ED quality.
- That a multicomponent positive participatory organisational intervention package is feasible in a NZ ED setting.
- That a multicomponent positive participatory organisational intervention package is acceptable to NZ ED staff.

Methods

The Intervention

The intervention package will consist of three components targeting different levels of the HCO: the individual, the group, and the system. An initial Engagement visit to sites by the PI will involve presentations made to stakeholders and opportunities to discuss the intervention. A study start time will be established for each site in consultation with the Local Champions Group. It is anticipated that this will be within 2 months of the site Engagement visit. The intervention will take place over 12 months.

Individual-Level Component

Individual interventions must be acceptable, relevant and feasible for a given individual. An ability for participants to choose an intervention most acceptable to them is important.⁴⁷ Staff will be offered an opportunity to participate in an individual intervention. (Details and evidence for each are provided in the Individual-Level Interventions section). Participants will choose one of three possible interventions. These are:

- Three Good Things^{15,16,96}
 - Requires daily participation by writing down and considering what is going well in a participants life, and their role in that, for 15 days.
- Mindfulness⁵⁰
 - An online guided MBI for 10 minutes per day for 10 days.
- Looking forward¹⁶
 - An optimism/hope intervention that requires consideration of hoped-for future goals and experiences. Participants are prompted to engage 7 times over 28 days to consider and write about something they are looking forward to at different future time points.

Group-Level Component

Local Champions are key to the success of the program. In consultation with their local stakeholders, and mindful of acceptability and achievability, they will decide upon an intervention targeting the group as a whole. (Details and evidence can be found in the Whānau/Group/Culture/Team-Level Interventions section). LCs will choose one from the following:

- Clinical Event Debriefing (CED)¹⁸
 - Structured debriefing for all team members following important clinical events is challenging in a busy ED environment. Addressing barriers to implementation of usable debriefing tools is required for this to become embedded in ED culture.
- Learning from Excellence⁵⁸
 - A system which can effectively and efficiently capture and feedback to staff episodes of excellent care, as determined by peers, is required.

System-Level Component

This is aimed at improving the capability for all ED staff to engage in meaningful quality improvement. The Quality Improvement Learning System (QILS) is characterised by the following features:

- consumers and frontline staff highlight issues that affect quality of care.
- triage and prioritisation of those issues.
- allocation resource for work on prioritised improvement initiatives.
- staff participation and leadership in improvement work.
- feedback to staff and consumers.
- improvement training for staff.

While each feature of QILS will be adaptable to each context and informed by our recent research, the important characteristics will be present in all cases.

Improvement Training and Coaching

Training in Quality Improvement (QI) methods, with an emphasis on the local and ED contextual factors, will be delivered by an expert in QI training. Training will be delivered online. Individual and group coaching will be delivered by trained QI coaches. Monthly meetings of all LCG personnel will be opportunities to share lessons and build camaraderie required for sustainability. Further details of the training and coaching components are found elsewhere.

Local Champions Group

A Local Champions Group (LCG) will be critical to success at each site. The LCG will have up to 5 personnel and be a diverse composition of the local ED team, including one or more of senior doctors, nurses, other ED team members, consumers, and mana whenua. The LCG will be in the best position to understand local needs, liaise with local leaders, liaise with the investigators, and oversee many parts of the intervention in their ED. Each member of the LCG will attend the training and coaching program.

The study website

The study website provides a repository of important information for all those involved in the research. Established in 2020 and hosted by Squarespace, the website can be accessed via QR code or via the web address (www.woweated.com).

Access to open and password protected pages enables different groups access to relevant information. Participant information including about the various individual-level interventions will be available to participants, accessible via a QR code or the web address. Electronic links will allow participants to provide informed consent and access the intervention of their choice. In addition, Local Champions will have access to other information, for example group-level intervention information and links, and requirements for QI training and coaching.

The site will be maintained and modified by the PI, with advice from our University of Auckland IT specialist when required.

Study Design

A prospective multisite before and after study, using mixed methods, of the multicomponent intervention package in NZ EDs. The logistics of introducing a complex intervention into a series of EDs make compliance with randomisation, as in a randomised stepped wedge cluster study, impractical and unrealistic.

Study Setting

Individual NZ Emergency Departments will be the setting.

Site Selection

This intervention requires significant buy-in by all parties, particularly those in leadership positions within the ED and elsewhere within HCOs. Criteria for site selection are based on our previous research. As suggested by Shah,⁹⁷ and consistent with the theory of Diffusion of Innovations,⁹⁸ those departments that self-select, have relatively stable leadership, and are in the best position to make the required changes will be selected initially. It is hoped that feasibility and success at these "innovator" and "early adopter" sites will encourage an "early majority" to participate at a later date.

Eligibility Criteria for an Emergency Department to be a Study Site

Inclusion

1. Hospitals with an ED census of >5,000 presentations per year, (n=35 potential sites).
2. A LCG able to facilitate the implementation of the intervention.
3. Agreement from ED medical and nursing directors to support the intervention within current ED projects and to attempt to implement any suggested changes.
4. Ability to provide departmental data.
5. Executive agreement, at the directorate level and hospital level.
6. Locality approval for research

Exclusion

1. Be averse to implementing the intervention
2. Inability to provide departmental data.

Eligibility Criteria for individual staff to participate in research (answer surveys)

Inclusion

1. identify as a member of the ED staff and work there regularly
 - a. at least 1 shift per fortnight, or equivalent
2. current member of ED staff

Exclusion

1. ED is not considered primary place of work, outside the home

Outcome

Primary outcome

Mean change in CBI³ (work-related burnout domain) of all ED staff (nurse, doctor, other clinical, other non-clinical) 12 months post roll-out of intervention.

Secondary outcomes

Secondary outcomes are for all ED staff and each staff subgroup (nurse, doctor, other clinical, other non-clinical)

ED Staff

- Mean change in CBI (personal and patient-related domains) at 12 months.
- Utrecht Work Engagement Scale (UWES) 9-item short form⁹⁹ at 0 and 12 months.
- Psychological empowerment in the workplace¹⁰⁰ at 0 and 12 months.
- Mean change in WHO-5 Wellbeing Index (general wellbeing)¹⁰¹ at 12 months.

Department

- Number of issues raised via QILS
 - by staff
 - by patients, whānau and carers
- Number of QILS solutions
- Departmental demographics
 - patient census,
 - triage proportions,
 - triage time compliance,
 - admission rate,
 - intensive care unit (ICU) admission rate,
 - patient did not wait rates, and
 - ED length of stay (LOS) over intervention year.
 - Seasonally adjusted daily staff absence, vacancies, monthly resignations, and Bradford Scale Score.
 - Compliance with the 6 targets of Te Tumu Whakarae for Māori workforce development.¹⁰²

Participants

Sample Size

Power

Differences of ≥ 5 on the CBI work-related burnout scale are considered clinically significant.¹² A sample size of 900 staff participants over 8 EDs will have 90% power to detect a change of ≥ 5 (2-tail $\alpha=0.05$).

Recruitment

Site selection is discussed above. All staff at each study site are eligible for the interventions. Participation of staff will rely upon local champions. REDCap Public Survey Links for survey distribution to participants will be used to maximise usability, anonymity and the ability to collect data. Participation by staff will be voluntary.

Māori Participation

Recruiting and retaining a Māori ED health workforce is fundamental to the advancement of Māori health and are tenets of the Ministry of Health He Korowai Oranga framework, the ACEM Te Rautaki Manaaki Mana (Māori Health Strategy),⁶ and the Māori Workforce development targets agreed to by DHBs.¹⁰² While Māori are currently under-represented in the NZ ED workforce, by maximising workplace wellbeing and reducing burnout, staff and patients benefit, particularly Māori, who most stand to benefit by health systems that are responsive to Māori needs and healthcare aspirations now and far into the future. The team has active involvement of experienced Māori emergency care leaders in clinical care, advocacy and research.

Interventions that may benefit Māori staff and patients can be undertaken by participating individuals and departments. For example, an area for improvement related to Te Ao Māori may be identified by staff, and an improvement program undertaken.

Timeframe

Implementation

Two waves of implementation will begin in March 2023 and 2024 respectively. Each wave will have between three and five EDs. Lessons learned from wave 1 will inform the implementation of interventions in wave 2. The intervention and study periods will be for 12 months.

Data collection

Via RedCAP survey software. Staff survey at baseline (demographics: age range, gender,¹⁰³ work group, ethnicity,¹⁰⁴ years of experience at current ED) and 12 months of CBI and other measures. Routine ED data for triage compliance, did not wait rate, ED LOS, staff absence and resignations and Te Tumu Whakarae targets.

Analysis

Statistical methods

The primary and secondary outcomes will be compared pre and post intervention using a general linear mixed model with site as a random factor. Additional analyses of the primary outcome will be undertaken based on workforce group (nurse vs. other), and ethnicity (Māori vs. non-Māori), to test for differential effects of the intervention among these subgroups.

Longitudinal measurement of outcomes for individuals, that is, data-linkage and comparing results from the pre-and post-intervention surveys, is required for robust assessment of effects of the intervention. Balanced with the need for robust assessment is the need for participant confidentiality.

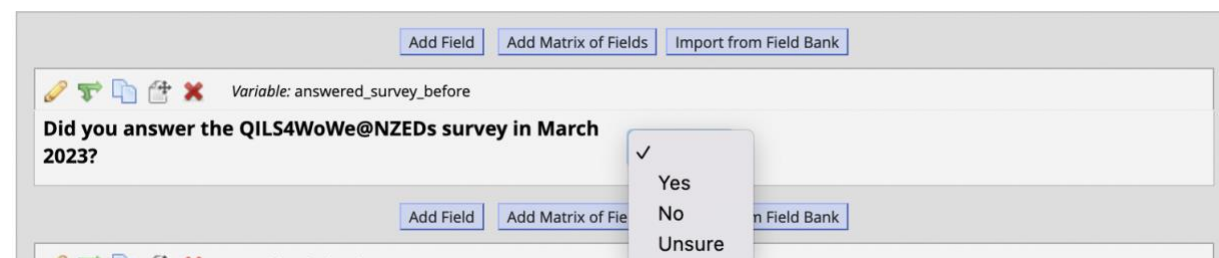
REDCap Public Survey Links for survey distribution to participants will be used to maximise usability, anonymity and the ability to collect data. The answers to the following two questions will be individually consistent, enabling data-linkage of coded participant data.



The screenshot shows two separate survey questions in a REDCap interface. The first question is 'What is the name of your first primary school' with a text input field. The second question is 'In which year was your mother born?' with a text input field. Both questions have a toolbar above them with icons for edit, copy, paste, and delete, and a label 'Variable: first_primary_school' and 'Variable: mother_birth_year' respectively. Below each question are buttons for 'Add Field', 'Add Matrix of Fields', and 'Import from Field Bank'.

Figure 1 Two data points for data linkage

A Public Survey Link will again be used to distribute the post-intervention survey. Respondents will be asked if they participated in the pre-intervention survey. All demographic questions will be the same as the pre-intervention survey.



The screenshot shows a survey question in a REDCap interface: 'Did you answer the QILS4WoWe@NZEDs survey in March 2023?'. A dropdown menu is open over the question, showing three options: 'Yes' (selected with a checkmark), 'No', and 'Unsure'. The question has a toolbar above it with icons for edit, copy, paste, and delete, and a label 'Variable: answered_survey_before'. Below the question are buttons for 'Add Field', 'Add Matrix of Fields', and 'Import from Field Bank'.

Figure 2 Post-intervention survey question about prior participation

The answers to the two questions that generate data points for data linkage questions (Figure 1) will be asked and can be matched and used to aggregate data from the pre- and post-intervention survey for analysis.

In the rare instance when data from these questions are not precise enough to discriminate between respondents, in addition, other demographic data will be used for data linkage. These will be questions about gender and profession.

Process Evaluation.

As well as understanding the direction and magnitude of effects of the proposed interventions, an understanding of what hindered and facilitated these effects, and how and why these effects occurred is important for a full understanding of the research.¹⁰⁵ We propose a process evaluation.

Data collected for the process evaluation will be quantitative, and include the following:

- Quantitative data relevant to the workings of the LCG will be collected in an excel sheet:
 - log of activities
 - training and coaching sessions provided
 - proportion of LCG attendance at each session
 - number of meetings
- Individual-level component of the intervention:
 - number of hits on website containing individual level intervention
- Group-level component of the intervention:
 - number of debriefs recorded; or
 - number of responses recorded
- System-level component of the intervention:
 - summary of:
 - problems identified,
 - solutions enacted,
 - effect of solutions.

Results will be anonymised by hospital.

Ethics and dissemination

Safety

All ED staff have access to Employee Assistance Programs. In addition, participants will be informed of and encouraged to seek help from other local sources, such as colleagues and participant's GP. Some departments also have a departmental psychologist who all staff can access.

Consent

Participant information will be available online prior to consent, as well as presented at engagement meetings. Electronic consent will be required of all participants prior to participation.

Confidentiality

No identifiable features will be captured via REDCap

Declaration of interests

No member of the research team has any conflicts to declare.

Access to data

Electronic data are stored in password-controlled computers and cloud storage. Data are accessible to the PI and statistician.

Dissemination policy

Dissemination of findings will primarily be through publication in peer-reviewed journals, and presentation at national and international hui and scientific meetings. Individual site feedback will be provided to each participating ED, and hospital executive leadership.

Further dissemination priorities will include:

- potentially national roll-out via the NZEMN if intervention successful
- potentially national roll-out via the HQSC to other hospital areas if intervention is successful
- writing commentaries and editorials in which the research findings can be further disseminated, via established links with international journals, and
- presenting findings to lay audiences through established media links.

References

1. HQSC. Engaging With Consumers. A guide for district health boards. Health Quality & Safety Commission, 2015.
2. WHO. ICD-11. (<https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/129180281>).
3. Kristensen TS, Borritz M, Villadsen E, Christensen KB. The Copenhagen Burnout Inventory: A new tool for the assessment of burnout. *Work & Stress* 2005;19(3):192-207. DOI: 10.1080/02678370500297720.
4. ACEM. Standard Terminology for Emergency Departments Policy (P02). Australasian College for Emergency Medicine; 2019.
5. ACEM. Quality Standards for Emergency Departments and Hospital-Based Emergency Care Services. <https://acem.org.au/Content-Sources/Advancing-Emergency-Medicine/Better-Outcomes-for-Patients/Quality-Standards2022>.
6. ACEM. Te Rautaki Manaaki Mana Excellence in Emergency Care for Māori. 2019.
7. Nielsen K, Christensen M. Positive Participatory Organizational Interventions: A Multilevel Approach for Creating Healthy Workplaces. *Front Psychol* 2021;12:696245. (In eng). DOI: 10.3389/fpsyg.2021.696245.
8. HQSC. Mō mātou About us Health Quality and Safety Commission. (<https://www.hqsc.govt.nz/about-us/>).
9. WHO. What is Quality of Care and why is it important? World Health Organisation. (https://www.who.int/health-topics/quality-of-care#tab=tab_1).
10. CDC. Well-Being Concepts. Centers for Disease Control and Prevention, US Government. (<https://www.cdc.gov/hrqol/wellbeing.htm>).
11. Nicholls M, Hamilton S, Jones PG, et al. Workplace Wellbeing in Emergency Departments in Aotearoa New Zealand. *NZMJ* 2021;134(1541) (<https://journal.nzma.org.nz/journal->

[articles/workplace-wellbeing-in-emergency-departments-in-aotearoa-new-zealand-2020](#)).

12. Anderson N, Pio F, Jones P, et al. Facilitators, barriers and opportunities in workplace wellbeing: A national survey of emergency department staff. *International Emergency Nursing* 2021;57:101046. DOI: <https://doi.org/10.1016/j.ienj.2021.101046>.
13. Aurelio M, Ballingall N, Chitewe A, Heaney C, Shah A. Using quality improvement to deliver a systematic organisational approach to enjoying work in healthcare. *British Journal of Healthcare Management* 2022;28(11):292-304. DOI: 10.12968/bjhc.2022.0072.
14. MHF. Five Ways to Wellbeing at Work Toolkit. Wellington, NZ: Mental Health Foundation, Health Promotion Agency, 2018.
15. Sexton JB, Adair KC. Forty-five good things: a prospective pilot study of the Three Good Things well-being intervention in the USA for healthcare worker emotional exhaustion, depression, work–life balance and happiness. *BMJ Open* 2019;9(3):e022695. DOI: 10.1136/bmjopen-2018-022695.
16. Adair KC, Kennedy LA, Sexton JB. Three Good Tools: Positively reflecting backwards and forwards is associated with robust improvements in well-being across three distinct interventions. *The Journal of Positive Psychology* 2020;15(5):613-622. DOI: 10.1080/17439760.2020.1789707.
17. Kelly N, Blake S, Plunkett A. Learning from excellence in healthcare: a new approach to incident reporting. *Archives of Disease in Childhood* 2016;101(9):788-791. DOI: 10.1136/archdischild-2015-310021.
18. Petrosioniak A, Gabriel J, Purdy E. Stop asking if it works, start making it happen: exploring barriers to clinical event debriefing in the ED. *Canadian Journal of Emergency Medicine* 2022. DOI: 10.1007/s43678-022-00396-9.

19. ICMJE. Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals. In: ICMJE, ed. 2019.
20. National_Academies_of_Sciences_Engineering_and_Medicine. Taking Action Against Clinician Burnout: A Systems Approach to Professional Well-Being. The National Academies Press, 2019. (<https://doi.org/10.17226/25521>).
21. IOM. Crossing the Quality Chasm: A New Health System for the 21st Century. Washington (DC): National Academies Press (US), 2001.
22. Sikka R, Morath JM, Leape L. The Quadruple Aim: care, health, cost and meaning in work. *BMJ Quality & Safety* 2015;24(10):608-610. DOI: 10.1136/bmjqs-2015-004160.
23. HQSCNZ. A Window on the Quality of New Zealand's Health Care. A Window on the Quality of Health Care. <https://www.hqsc.govt.nz/our-programmes/health-quality-evaluation/>; 2018. (<https://www.hqsc.govt.nz/our-programmes/health-quality-evaluation/publications-and-resources/publication/3364/>).
24. NZ_Government. Health and Safety at Work Act. In: Ministry of Business I, and Employment., ed. Wellington, NZ.: NZ_Government; 2015.
25. Shanafelt T, Goh J, Sinsky C. The Business Case for Investing in Physician Well-being. *JAMA Internal Medicine* 2017;177(12):1826-1832. DOI: 10.1001/jamainternmed.2017.4340.
26. Hall LH JJ, Watt I, Tsipa A, O'Connor, DB. Healthcare staff wellbeing, burnout, and patient safety: a systematic review. *PLoS One* 2016;11(7):e0159015. . DOI: 10.1371/journal.pone.0159015.
27. Lu DW, Dresden S, McCloskey C, Branzetti J, Gisondi MA. Impact of Burnout on Self-Reported Patient Care Among Emergency Physicians. *Western Journal of Emergency Medicine* 2015;16(7):996-1001. DOI: 10.5811/westjem.2015.9.27945.

28. ACEM. The Health of Emergency Physicians and its Impact on Patient Care: A Call to Action. Australasian College for Emergency Medicine, The Royal College of Emergency Medicine, American College of Emergency Physicians, Canadian Association of Emergency Physicians, 2020.
29. Chambers C. "My employer is exhausting" Burnout in the senior medical workforce five years on. Health Dialogue. ASMS: Association of Salaried Medical Specialists, 2021. (Issue 17).
30. Chambers CNL, Frampton CMA, Barclay M, McKee M. Burnout prevalence in New Zealand's public hospital senior medical workforce: a cross-sectional mixed methods study. *BMJ Open* 2016;6(11). DOI: 10.1136/bmjopen-2016-013947.
31. ACEM. 2019 Sustainable Workforce Survey Report. 2020.
32. Borritz M, Rugulies R, Bjorner JB, Villadsen E, Mikkelsen OA, Kristensen TS. Burnout among employees in human service work: design and baseline findings of the PUMA study. *Scandinavian Journal of Public Health* 2006;34(1):49-58. DOI: 10.1080/14034940510032275.
33. Murthy V. Addressing Health Worker Burnout: The U.S. Surgeon General's Advisory on Building a Thriving Health Workforce. 2022.
34. Te Pae Tata. Interim New Zealand Health Plan 2022. Te Whatu Ora; 2022.
35. Xu H, Kynoch K, Tuckett A, Eley R. Effectiveness of interventions to reduce emergency department staff occupational stress and/or burnout: a systematic review. *JBIC Evidence Synthesis* 2020;18(6):1156-1188. DOI: 10.11124/jbisrir-d-19-00252.
36. Douros G. Burnout is the canary in the coalmine; the solution is not stronger canaries. *Emergency Medicine Australasia* 2020;32(3):518-519. DOI: 10.1111/1742-6723.13500.
37. West CP, Dyrbye LN, Erwin PJ, Shanafelt TD. Interventions to prevent and reduce physician burnout: a systematic review and meta-analysis. *The Lancet* 2016. DOI: [http://dx.doi.org/10.1016/S0140-6736\(16\)31279-X](http://dx.doi.org/10.1016/S0140-6736(16)31279-X).

38. Bohman B, Dyrbye L, Sinsky CA, et al. Physician Well-Being: The Reciprocity of Practice Efficiency, Culture of Wellness, and Personal Resilience. *NEJM Catalyst* 2017;August 7 (<https://catalyst.nejm.org/physician-well-being-efficiency-wellness-resilience/>).
39. Jex SM. *Organizational psychology : a scientist-practitioner approach*. Third edition.. ed: Hoboken, New Jersey : Wiley. 2014. ©2014, 2014.
40. von Thiele Schwarz U, Nielsen K, Edwards K, et al. How to design, implement and evaluate organizational interventions for maximum impact: the Sigtuna Principles. *Eur J Work Organ Psychol* 2021;30(3):415-427. (In eng). DOI: 10.1080/1359432x.2020.1803960.
41. Moore GF, Audrey S, Barker M, et al. Process evaluation of complex interventions: Medical Research Council guidance. *BMJ : British Medical Journal* 2015;350. DOI: 10.1136/bmj.h1258.
42. Fox KE, Johnson ST, Berkman LF, et al. Organisational- and group-level workplace interventions and their effect on multiple domains of worker well-being: A systematic review. *Work & Stress* 2022;36(1):30-59. DOI: 10.1080/02678373.2021.1969476.
43. van Agteren J, Iasiello M, Lo L, et al. A systematic review and meta-analysis of psychological interventions to improve mental wellbeing. *Nature Human Behaviour* 2021;5(5):631-652. DOI: 10.1038/s41562-021-01093-w.
44. Carr A, Cullen K, Keeney C, et al. Effectiveness of positive psychology interventions: a systematic review and meta-analysis. *The Journal of Positive Psychology* 2021;16(6):749-769. DOI: 10.1080/17439760.2020.1818807.
45. Neuhaus M, Young T, Ferris LJ, Grimm CLM, Reid N. A Narrative Review of Peer-Led Positive Psychology Interventions: Current Evidence, Potential, and Future Directions. *International Journal of Environmental Research and Public Health* 2022;19(13):8065. (<https://www.mdpi.com/1660-4601/19/13/8065>).

46. Donaldson SI, Lee JY, Donaldson SI. Evaluating Positive Psychology Interventions at Work: a Systematic Review and Meta-Analysis. *International Journal of Applied Positive Psychology* 2019;4(3). DOI: 10.1007/s41042-019-00021-8.
47. van Woerkom M, Bakker AB, Leiter MP. Positive psychology interventions in organizations. *Journal of Occupational and Organizational Psychology* 2021;94(2):221-229. DOI: <https://doi.org/10.1111/joop.12350>.
48. Profit J, Adair KC, Cui X, et al. Randomized controlled trial of the “WISER” intervention to reduce healthcare worker burnout. *Journal of Perinatology* 2021;41(9):2225-2234. DOI: 10.1038/s41372-021-01100-y.
49. Seligman M, Steen T, Park N, Peterson C. Positive Psychology Progress: Empirical Validation of Interventions. *The American Psychologist* 2005;60:410-21. DOI: 10.1037/0003-066X.60.5.410.
50. Spijkerman MPJ, Pots WTM, Bohlmeijer ET. Effectiveness of online mindfulness-based interventions in improving mental health: A review and meta-analysis of randomised controlled trials. *Clinical Psychology Review* 2016;45:102-114. DOI: <https://doi.org/10.1016/j.cpr.2016.03.009>.
51. NICE. Mindfulness. (<https://www.nhs.uk/mental-health/self-help/tips-and-support/mindfulness/>).
52. Klein A, Taieb O, Xavier S, Baubet T, Reyre A. The benefits of mindfulness-based interventions on burnout among health professionals: A systematic review. *EXPLORE* 2020;16(1):35-43. DOI: <https://doi.org/10.1016/j.explore.2019.09.002>.
53. Taylor H, Cavanagh K, Field AP, Strauss C. Health Care Workers' Need for Headspace: Findings From a Multisite Definitive Randomized Controlled Trial of an Unguided Digital Mindfulness-Based Self-help App to Reduce Healthcare Worker Stress. *JMIR Mhealth Uhealth* 2022;10(8):e31744. (In eng). DOI: 10.2196/31744.

54. Taylor M, Hageman JR, Brown M. A Mindfulness Intervention for Residents: Relevance for Pediatricians. *Pediatric Annals* 2016;45(10):e373-376. (In English). DOI: <https://doi.org/10.3928/19382359-20160912-01>.
55. Gilmartin S, Martin L, Kenny S, Callanan I, Salter N. Promoting hot debriefing in an emergency department. *BMJ Open Quality* 2020;9(3):e000913. DOI: 10.1136/bmjoq-2020-000913.
56. Rose SC, Ashari NA, Davies JM, Solis L, O'Neill TA. Interprofessional clinical event debriefing-does it make a difference? Attitudes of emergency department care providers to INFO clinical event debriefings. *Cjem* 2022;24(7):695-701. (In eng). DOI: 10.1007/s43678-022-00361-6.
57. civilitysaveslives. (<https://www.civilitysaveslives.com/>).
58. Learning from Excellence. (<https://learningfromexcellence.com/>).
59. Riskin A, Erez A, Foulk TA, et al. The Impact of Rudeness on Medical Team Performance: A Randomized Trial. *Pediatrics* 2015;136(3):487-95. (In eng). DOI: 10.1542/peds.2015-1385.
60. Breinig S, Pinot A, Pujol J, Ikhlef H, Blasy C, Marcoux MO. The “3R Team” in action! Implementation of a program of learning from excellence in a neonatal and pediatric intensive care unit in France. *Archives de Pédiatrie* 2022;29(3):225-229. DOI: <https://doi.org/10.1016/j.arcped.2022.01.005>.
61. Mckinnon K, Waddington A, Schofield J, Davis T. Positive feedback in the paediatric emergency department. *Archives of Disease in Childhood* 2019;104(11):1120-1122. DOI: 10.1136/archdischild-2019-317904.
62. Ciarrochi J, Hayes SC, Oades LG, Hofmann SG. Toward a Unified Framework for Positive Psychology Interventions: Evidence-Based Processes of Change in Coaching, Prevention, and Training. *Frontiers in Psychology* 2022;12 (Review) (In English). DOI: 10.3389/fpsyg.2021.809362.
63. Kristine Olson, Daniel Marchalik, Heather Farley, et al. Organizational strategies to reduce physician burnout and improve

- professional fulfillment. *Current Problems in Pediatric and Adolescent Health Care* 2019;49:12
(<https://doi.org/10.1016/j.cppeds.2019.100664>.
(<https://www.sciencedirect.com/science/article/pii/S1538544219301051>)).
64. Rehder K, Adair KC, Sexton JB. The Science of Health Care Worker Burnout: Assessing and Improving Health Care Worker Well-Being. *Archives of Pathology & Laboratory Medicine* 2021;145(9):1095-1109. DOI: 10.5858/arpa.2020-0557-RA.
 65. Shanafelt TD. Physician Well-being 2.0: Where Are We and Where Are We Going? *Mayo Clin Proc* 2021;96(10)
(<https://doi.org/10.1016/j.mayocp.2021.06.005>).
 66. Shanafelt TD, Dyrbye LN, West CP. Addressing Physician Burnout: The Way Forward. *JAMA* 2017;317(9):901-902. DOI: 10.1001/jama.2017.0076.
 67. Shanafelt TD, Noseworthy JH. Executive Leadership and Physician Well-being. *Mayo Clinic Proceedings* 2017;92(1):129-146. DOI: 10.1016/j.mayocp.2016.10.004.
 68. Anderson N, Pio F, Tan E, et al. Facilitators, barriers and opportunities in workplace wellbeing: A national survey of emergency department staff. *International Emergency Nursing Journal* 2021;accepted. DOI: IENJ_101046.
 69. Akmal A, Podgorodnichenko N, Foote J, Greatbanks R, Stokes T, Gauld R. Why is Quality Improvement so Challenging? *Health Policy* 2021;125(5). DOI: 10.1016/j.healthpol.2021.03.015.
 70. Widmer MA, Swanson RC, Zink BJ, Pines JM. Complex systems thinking in emergency medicine. *Journal of Evaluation in Clinical Practice* 2018;24(3):629-634. (Article). DOI: 10.1111/jep.12862.
 71. Plsek PE, Greenhalgh T. The challenge of complexity in health care. *BMJ* 2001;323(7313):625-628. DOI: 10.1136/bmj.323.7313.625.
 72. Kernick D. Wanted—new methodologies for health service research. Is complexity theory the answer? *Family Practice* 2006;23(3):385-390. DOI: 10.1093/fampra/cml011.

73. Bohmer R, Shand J, Allwood D, Wragg A, Mountford J. Learning Systems: Managing Uncertainty in the New Normal of Covid-19. NEJM Catalyst 2020;July 16 (<https://catalyst.nejm.org/doi/full/10.1056/CAT.20.0318>).
74. Shand J, Allwood D, Lee N, et al. Systematically capturing and acting on insights from front-line staff: the 'Bedside Learning Coordinator'. BMJ Quality & Safety 2021;30(6):509-512. DOI: 10.1136/bmjqs-2020-011966.
75. Linzer M, Poplau S, Grossman E, et al. A Cluster Randomized Trial of Interventions to Improve Work Conditions and Clinician Burnout in Primary Care. J Gen Intern Med 2015;30(8):1105-11. (In eng). DOI: 10.1007/s11606-015-3235-4.
76. Shah A, Harken J, Nelson Z. Quality improvement in practice—part two: applying the joy in work framework to healthcare. British Journal of Healthcare Management 2021;27(9):234-240. DOI: 10.12968/bjhc.2021.0022.
77. Perlo J BB, Swensen S, Kabcenell A, Landsman J, Feeley D. IHI Framework for Improving Joy in Work. IHI White Paper. Cambridge, Massachusetts: Institute for Healthcare Improvement, 2017. (Available at ihi.org).
78. O'Sullivan OP, Chang NH, Baker P, Shah A. Quality improvement at East London NHS Foundation Trust: the pathway to embedding lasting change. International Journal of Health Governance 2021;26(1):65-72. DOI: 10.1108/IJHG-07-2020-0085.
79. Shah A, Course S. Building the business case for quality improvement: a framework for evaluating return on investment. Future Healthcare Journal 2018;5(2):132-137. DOI: 10.7861/futurehosp.5-2-132.
80. RCPsych. Enjoying Work Collaborative. Royal College of Psychiatrists. (<https://www.rcpsych.ac.uk/improving-care/nccmh/quality-improvement-programmes/rcpsych-enjoying-work>).

81. Grainger P. Notes From The Migration of Christchurch Emergency Department. 2021.
82. Davidoff F, Dixon-Woods M, Leviton L, Michie S. Demystifying theory and its use in improvement. *BMJ Quality & Safety* 2015;24(3):228-238. DOI: 10.1136/bmjqs-2014-003627.
83. Øvretveit J. Understanding the conditions for improvement: research to discover which context influences affect improvement success. *BMJ Quality & Safety* 2011;20(Suppl 1):i18-i23. DOI: 10.1136/bmjqs.2010.045955.
84. Reed JE, Kaplan HC, Ismail SA. A new typology for understanding context: qualitative exploration of the model for understanding success in quality (MUSIQ). *BMC Health Services Research* 2018;18 (Report) (In English) (<https://link.gale.com/apps/doc/A547773169/AONE?u=learn&sid=bookmark-AONE&xid=188656ec>).
85. Kaplan HC, Walsh KE. Context in Implementation Science. *Pediatrics* 2022;149(Suppl 3). DOI: 10.1542/peds.2020-045948c.
86. Kaplan HC, Provost LP, Froehle CM, Margolis PA. The Model for Understanding Success in Quality (MUSIQ): building a theory of context in healthcare quality improvement. *BMJ Quality & Safety* 2012;21(1):13-20. DOI: 10.1136/bmjqs-2011-000010.
87. Wilson WJ, Jayamaha N, Frater G. The effect of contextual factors on quality improvement success in a lean-driven New Zealand healthcare environment. *International Journal of Lean Six Sigma* 2018;9(2):199-220. (In English). DOI: <https://doi.org/10.1108/IJLSS-03-2017-0022>.
88. Rees GH. Organisational readiness and Lean Thinking implementation: Findings from three emergency department case studies in New Zealand. *Health services management research : an official journal of the Association of University Programs in Health Administration* 2014;27(1-2):1-9. DOI: 10.1177/0951484814532624.

89. Coles E, Anderson J, Maxwell M, et al. The influence of contextual factors on healthcare quality improvement initiatives: a realist review. *Systematic reviews* 2020;9(1):94-94. (In eng). DOI: 10.1186/s13643-020-01344-3.
90. Nielsen K, Miraglia M. What works for whom in which circumstances? On the need to move beyond the 'what works?' question in organizational intervention research. *Human Relations* 2017;70(1):40-62. DOI: 10.1177/0018726716670226.
91. Furnival J, Boaden R, Walshe K. Conceptualizing and assessing improvement capability: a review. *International Journal for Quality in Health Care* 2017;29(5):604-611. DOI: 10.1093/intqhc/mzx088.
92. IHI. IHI Improvement Capability Self-Assessment Tool. Institute for Healthcare Improvement; 2014.
93. Adair KC, Quow K, Frankel A, et al. The Improvement Readiness scale of the SCORE survey: a metric to assess capacity for quality improvement in healthcare. *BMC Health Services Research* 2018;18(1):975. DOI: 10.1186/s12913-018-3743-0.
94. ACEM. Quality Standards for Emergency Departments and Hospital-Based Emergency Care Services Toolkit. <https://acem.org.au/Content-Sources/Advancing-Emergency-Medicine/Better-Outcomes-for-Patients/Quality-Standards2022>.
95. American_Medical_Association. Joy in Medicine Health System Recognition Program. (ama-assn.org/amaone/practice-transformation).
96. Well-Being Tools. (<https://hsq.dukehealth.org/tools/>).
97. Shah A. ELFT's approach to QI. ELFT QI 2016:<https://www.youtube.com/watch?v=PsfVsTGAyZs>.
98. Wikipedia. Diffusion of innovations. (https://en.wikipedia.org/wiki/Diffusion_of_innovations).
99. Schaufeli WB, Bakker AB, Salanova M. The Measurement of Work Engagement With a Short Questionnaire:A Cross-National Study. *Educational and Psychological Measurement* 2006;66(4):701-716. DOI: 10.1177/0013164405282471.

100. Spreitzer GM. Psychological Empowerment in the Workplace: Dimensions, Measurement, and Validation. *Academy of Management Journal* 1995;38(5):1442-1465. DOI: 10.5465/256865.
101. Topp CW, Østergaard SD, Søndergaard S, Bech P. The WHO-5 Well-Being Index: A Systematic Review of the Literature. *Psychotherapy and Psychosomatics* 2015;84(3):167-176. DOI: 10.1159/000376585.
102. Technical_Advisory_Services. Te Tumu Whakarae. (<https://tas.health.nz/employment-and-capability-building/workforce-information-and-projects/te-tumu-whakarae/>).
103. Stats_NZ. Statistical standard for gender, sex, and variations of sex characteristics. In: Zealand SN, ed. 2021.
104. MOH. Ethnicity Data Protocols Wellington: NZ Ministry of Health, 2017. (health.govt.nz).
105. Nielsen K, Abildgaard JS. Organizational interventions: A research-based framework for the evaluation of both process and effects. *Work & Stress* 2013;27(3):278-297. DOI: 10.1080/02678373.2013.812358.