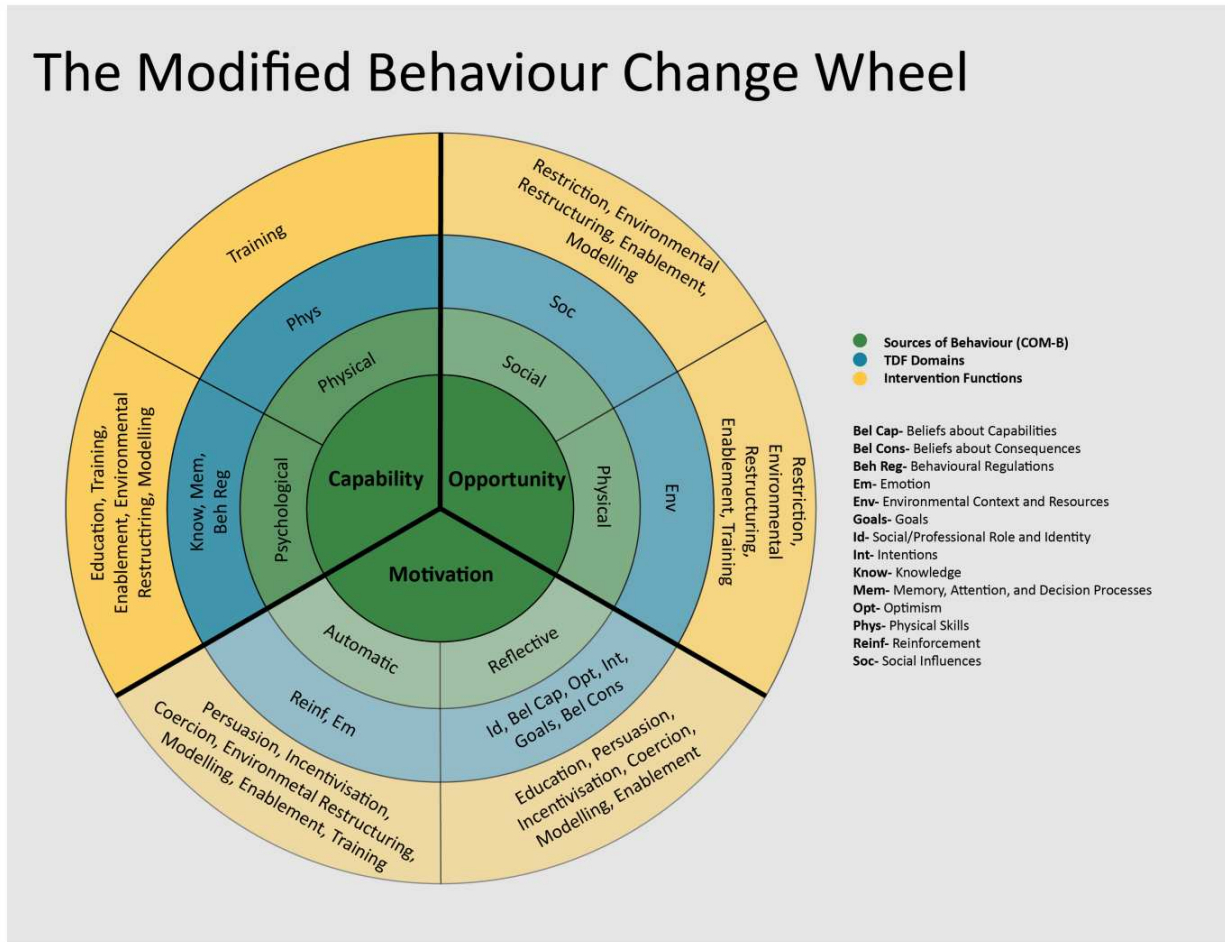


Designing a Behaviour Change Wheel guided implementation strategy for a Hypoxemic Respiratory Failure and ARDS care pathway that targets barriers

Supplemental Material

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eFigure 1. The Modified Behaviour Change Wheel

| Sources of Behaviour (COM-B) | | Theoretical Domains Framework v2 | Intervention Functions |
|------------------------------|---------------|---|---|
| Capability | Psychological | Knowledge (An awareness of the existence of something) | Education |
| | | Memory, attention and decision processes (The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives) | Training Environmental restructuring Enablement |
| | | Behavioural regulation (Anything aimed at managing or changing objectively observed or measured actions) | Education Training Modelling Enablement |
| | Physical | Skills (An ability or proficiency acquired through practice) | Training |
| Opportunity | Social | Social influences (Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviours) | Restriction Environmental restructuring Modelling Enablement |
| | Physical | Environmental context and resources (Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence and adaptive behaviour) | Training Restriction Environmental restructuring Enablement |
| Motivation | Automatic | Emotion (A complex reaction pattern, involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event) | Persuasion Incentivisation Coercion Modelling Enablement |
| | | Reinforcement (Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus) | Training Incentivisation Coercion Environmental restructuring |
| | Reflective | Social/professional role and identity (A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting) | Education Persuasion Modelling |
| | | Beliefs about capabilities (Acceptance of the truth, reality or validity about an ability, talent or facility that a person can put to constructive use) | Education Persuasion Modelling Enablement |
| | | Optimism (The confidence that things will happen for the best or that desired goals will be attained) | Education Persuasion Modelling Enablement |
| | | Beliefs about Consequences (Acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation) | Education Persuasion Modelling |
| | | Intentions (A conscious decision to perform a behaviour or a resolve to act in a certain way) | Education Persuasion Incentivisation Coercion Modelling |
| | | Goals (Mental representations of outcomes or end states that an individual wants to achieve) | Education Persuasion Incentivisation Coercion Modelling Enablement |

eTable 1. COM-B (Capability, Opportunity, Motivation – Behaviour) components mapped to the Theoretical Domains Framework v2 and Intervention Functions^{25,26}

eText 1. Survey open text questions

1. Do you have any comments regarding access to the listed interventions
 - Mechanical ventilation
 - Arterial Blood Gas (ABG) measurement
 - Portable chest x-ray
 - Optimal PEEP Study
 - Esophageal balloon
 - Recruitment maneuvers
 - Neuromuscular blockade
 - Proning
 - Inhaled vasodilators
 - On-site Extracorporeal Membrane Oxygenation (ECMO)
2. Do you have any comments or suggestions regarding documenting height and PBW in mechanically ventilated patients?
3. Do you have any comments or suggestions regarding HRF / ARDS screening?
4. Do you have any comments or suggestions regarding HRF / ARDS goals and early management?
5. Do you have any comments or suggestions regarding monitoring plateau pressures in the management of HRF / ARDS?
6. Do you have any comments or suggestions regarding PEEP management in patients with ARDS?
7. Do you have any comments or suggestions regarding the use of esophageal balloons in the management of ARDS?
8. Do you have any comments or suggestions regarding the use of Recruitments Maneuvers in the management of ARDS?
9. Do you have any comments or suggestions regarding sedatives in the management of ARDS?
10. Do you have any comments or suggestions regarding the use of neuromuscular blockade in the management of ARDS?
11. Do you have any comments or suggestions regarding proning in the management of ARDS?
12. Do you have any comments or suggestions regarding the use of inhaled vasodilators or ECMO in the management of ARDS?

eTable 2. Coding guideline

| Theoretical Domains Framework v2 ¹ | | Example statements made specific to the HRF/ARDS pathway ² |
|--|-----------------------------------|---|
| Knowledge (An awareness of the existence of something) | Including knowledge of condition. | I am aware of the content and objectives of the HRF / ARDS pathway |
| | Procedural knowledge | I know the content and objectives of the HRF / ARDS pathway |
| | | I am aware of how to perform the interventions related to my scope of practice for eligible pts within the timeframes prescribed in the pathway |
| Coded to knowledge during creation of coding guideline during initial coding of 3 responses from each question: | | |
| <i>Q2 R1 Confession: I am personally unclear exactly how to use BOTH [height & PBW] these pieces of data for optimal tidal volume</i> | | |
| <i>Q2 R55 I would say accurate body weight would be more beneficial – RN</i> | | |
| <i>Q3 R53 I do not know what at PF ratio is nor do I calculate the same</i> | | |
| <i>Q11 R41 How long should we be proning patients?</i> | | |
| Memory, attention and decision processes (MAD) (The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives) | Memory | How often do you forget to perform the interventions in the pathway / evidence based care to pts with HRF & ARDS |
| | Attention | |
| | Attention control | When I need to concentrate on providing interventions outlined in the pathway / best practice care to pts with HRF / ARDS I have no trouble focusing my attention |
| | Decision making | When trying to focus my attention on performing pathway interventions / best practice care on pts with HRF / ARDS I have difficulty blocking out distracting thoughts |
| | Cognitive overload/tiredness | The decision supports I have help me remember when to [perform this pathway intervention] |
| Coded to MAD during creation of coding guideline during initial coding of 3 responses from each question: | | |
| <i>Q5 R45 Anyone can run numbers and follow 'recipe' protocols, treating sick patients requires skilled and experienced staff who can make decisions based on patient condition rather than an arbitrary 'Big Brother' protocol.</i> | | |
| <i>Q5 R39 I think this [plateau pressure monitoring] should be a standard in the protocol Q8 R69 RMs need to be standardized across the zone</i> | | |
| <i>Q3 R54 [Screen] Should be initiated when clinically appropriate, blindly screening all patients is wasteful and overrules clinical judgement.</i> | | |
| <i>Q6 R6 Ensure a standardized protocol for PEEP</i> | | |
| <i>Q7 R68 There is a skill to insertion [of Esophageal Balloons], the actual measurements and interpretation; we will need a structured or organized approach (Beliefs about Capabilities, Skills)</i> | | |
| <i>Q7 R70 Guiding Criteria should be available for indications for insertions such as BMI>30, PF ratio etc. Earlier application of this tool could provide better outcome and more preventive measures to worsening hypoxia (Also Beliefs about Consequences)</i> | | |
| <i>Q3 R1 Once diagnosed, screening should stop (Beliefs about Consequences). Once recovering, need a process for reevaluating.</i> | | |
| Behavioural *regulation (BR) (Anything aimed at managing or changing objectively observed or measured actions) | Self-monitoring | I keep track of my overall progress towards ensuring I am providing pathway interventions / best practice care for patients on the pathway |
| | Breaking habit | |
| | Action planning | I am aware of my day-to-day behavior as I work towards providing interventions outlined in the pathway / evidence-based care |
| Coded to BR during creation of coding guideline during initial coding of 3 responses from each question: | | |
| None during initial coding of 3 responses from each question. | | |
| Skills (an ability or proficiency acquired through practice) | Skills development | I have been trained how to perform pathway interventions e.g. LPV, proning, within my scope of practice for pts with HRF / ARDS |
| | Competence | |
| | Ability | I have the skills to perform pathway interventions within my scope of practice for patients with HRF / ARDS |
| | Interpersonal skills | |
| | Practice | I have practiced pathway interventions within my scope of practice in pts with HRF / ARDS [at the right time] |
| | Skill assessment | |

Coded to Skills during creation of coding guideline during initial coding of 3 responses from each question:

Q11 R10 The multidisciplinary team MUST be skilled in proning, especially the RRT who is managing the airway.

| | | |
|---|---------------------|---|
| Social influences (SI) (Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviours) | Social pressure | Most people who are important to me, for eg senior colleagues, think that I should provide the interventions detailed in the pathway / standardized evidence based management to patients with HRF / ARDS |
| | Social norms | |
| | Group conformity | |
| | Social comparisons | |
| | Group norms | Most people whose opinion I value for eg senior colleagues would approve me of providing the interventions detailed in the pathway / standardized evidence based management to patients with HRF / ARDS |
| | Social support | |
| | Power | |
| | Intergroup conflict | |
| | Alienation | |
| | Group identity | |
| | Modelling | |

Coded to SI during creation of coding guideline during initial coding of 3 responses from each question:

Q7 R10 Some Intensivists are not yet on board with Esophageal monitoring, promotion/education for these may be beneficial to patients (Also Social/prof id)

Q2 R2 Inconsistently done; [ht.] rarely measured prior to ventilator being set by RTs

Q2 R3 In theory this should happen but in practice it does not happen at our site (Also Beliefs about Consequences)

Q2 R4 While I agree with this [ht.] is definitely not done (Also Beliefs about Consequences)

Q3 R13 Our ICU rounds does not necessarily involve the RTs but rather nurse, MD and pharmacists. Our multidisciplinary rounds does not involve MDs and is more on care needed by pt. like needing PT, dietitian consults, etc.

Q3 R14 Multidisciplinary rounds are not completed on our unit. Rounds are also rarely done in any capacity

Q4 R1 Drs. here are noncompliant with multidisciplinary rounds. There has not been any clinical education in our ICU regarding Identifying or treating of HRF/ARDS

Q10 R29 [Neuromuscular Blockade is] Rarely required in our experience and no specific paralytic drug needed

Q11 R56 Proning not used in current unit.

| | | |
|---|-----------------------------------|--|
| Environmental context and Resources (ENV) (Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence and adaptive behaviour) | Environmental stressors | The ICU I work in has the necessary equipment to initiate pathway interventions |
| | Resources/material resources | Within my ICU context, with the human resources available in my ICU we can provide all pathway interventions |
| | Organisational culture/climate | Communication (verbal and written) between team members (physician/RT/RN) is clear enough for me to initiate and/or manage prone positioned patients with moderate-severe ARDS |
| | Salient events/critical incidents | |
| | Person x environment interaction | |
| | Barriers and facilitators | |
| | | |
| | | |
| | | |
| | | |
| | | |

Coded to ENV during creation of coding guideline during initial coding of 3 responses from each question:

Q1 R1 I have access to all [interventions on the pathway], some I rarely perform, such as RM.

| | | |
|---|--------------------------|---|
| Emotion (A complex reaction pattern, involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event) | Fear | I feel anxious about providing some of the interventions on the pathway |
| | Anxiety | |
| | Affect | |
| | Stress | |
| | Depression | |
| | Positive/negative affect | |
| | Burn-out | |

Coded to Emotion during creation of coding guideline during initial coding of 3 responses from each question:

Q5 R45 Anyone can run numbers and follow 'recipe' protocols, treating sick patients requires skilled and experienced staff who can make decisions based on patient condition rather than an arbitrary 'Big Brother' protocol. (Also Beliefs about Capabilities, Beliefs about consequences, and Memory, attention, and decision processes)

Q3 R25 PT CONDITION DICTATES TREATMENT, BLIND NUMBERS MARE ONLY NUMBERS. THE OLD MURRAY SCORE WAS SO INACCURATE., AND I HAVE YET TO SEE AN ACCURATE RATING SYSTEM! (Also Beliefs about Capabilities, Beliefs about consequences, and Memory, attention, and decision processes)

Q3 R9 we did the ALI screening every 24 hours a few years ago that were found to be "annoying" as all it did was prove over and over what you already knew. I was not a fan (Also Beliefs about Capabilities, Emotion).

| | | |
|--|---|---|
| Reinforcement* (Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus) | Rewards (proximal/distal, valued/not valued, probable/improbable) Incentives Punishment Consequences Reinforcement Contingencies Sanctions | Interventions on the pathway are valued in my ICU as a life-saving therapies I receive encouragement and support from my ICU to initiate pathway interventions |
|--|---|---|

Coded to Reinforcement during creation of coding guideline during initial coding of 3 responses from each question:

None during initial coding of 3 responses from each question.

| | | |
|---|--|---|
| Social/professional role and Identity (SPR) (A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting) | Professional identity Professional role Social identity Identity Professional boundaries Professional confidence Group identity Leadership Organisational commitment | As a [profession], it is my job to perform pathway interventions in with pts with HRF /ARDS It is my responsibility as a [profession] to perform pathway intervention with HRF /ARDS Doing pathway intervention in with pts with HRF / ARDS is consistent with my [profession] Doing pathway intervention in with pts with HRF / ARDS is consistent with my [profession] |
|---|--|---|

Coded to SPR during creation of coding guideline during initial coding of 3 responses from each question:

Q8 R27 RRTs perform recruitment maneuvers when they are appropriate and patient meets criteria without meeting exclusion criteria. RRTs should only seek approval if any contraindications are present (Also Beliefs about Capabilities)

Q5 R25 [Pathway provides] a good guideline [for performing plateau pressures] then if patient is deteriorating the RT should have the freedom to decide on frequency of plateau pressures (Also Beliefs about Capabilities, Memory and Decision Processes)

Q8 R14 Recruitment maneuvers should be performed as indicated with the permission of the RN to maintain stable hemodynamics. (Also Beliefs about Consequences).

| | | |
|---|---|--|
| Beliefs about capabilities (BCap) (Acceptance of the truth, reality or validity about an ability, talent or facility that a person can put to constructive use) | Self-confidence Perceived competence Self-efficacy Perceived behavioural control Beliefs Self-esteem Empowerment Professional confidence | I am confident that I can perform pathway interventions in patients with HRF / ARDS at the appropriate time and / or threshold when there is little time I am confident that if I wanted I could perform pathway interventions at the appropriate time and / or threshold for patients with HRF / ARDS I am confident that if I wanted I could perform pathway interventions at the appropriate time and / or threshold for patients with HRF / ARDS |
|---|---|--|

Coded to BCap during creation of coding guideline during initial coding of 3 responses from each question:

Q5 R26 In an ideal world, I would like to say the RRT should determine appropriateness in measuring and complete, however, if the goal is to look at a way of standardizing the management, **I feel that there is too much variability in individuals practice as to what may deemed "appropriate."** (Also Social & Professional ID)

Q5 R14 I don't agree that plateau pressures should be measured within 1H of inclusion only because it is not often easy to get a well sedated pt within that time frame.

| | | |
|---|---|---|
| Optimism (The confidence that things will happen for the best or that desired goals will be attained) | Optimism Pessimism Unrealistic optimism Identity | With regard to performing pathway interventions at the appropriate time / threshold I usually expect the best |
|---|---|---|

Coded to Optimism during creation of coding guideline during initial coding of 3 responses from each question:

Q1 R3 We can probably get EB figured out but do not use them

| | | |
|--|---|---|
| Beliefs about consequences (BCon) (Acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation) | Beliefs Outcome expectancies Characteristics of outcome expectancies Anticipated regret Consequents | If I provide pathway interventions to patients with HRF / ARDS at the appropriate time / threshold, it can save lives |
|--|---|---|

Coded to BCon during creation of coding guideline during initial coding of 3 responses from each question:

Q2 R38 Accuracy [PBW] is rather iffy +/-25% -

Q2 R22 [Regarding height and PBW] it is a good idea

Q3 R2 The challenge is not screening but ensuring the correct patients; those with no other cause of HRF

Q3 R7 If it is common practice at sites to do a daily steady-state ABG [SI], then they are already rescreened for HRF even if they were screened negative for ARDS. Re-screening for ARDS should be a discussion with the team if there was a clinical indication other than p/f ratio that the patients condition has changed. If a Q24h ARDS screen was policy, patients who screened negative b/c of heart failure, would be re-screened again the next day. Seems like a waste of time and money when you know the reason for p/f ratio is cardiac in nature.

Q3 R8 I think that you would need to ensure that pts are on an optimal PEEP prior to screenings to ensure that they are adequately recruited. Particularly in the setting of increasing FiO2. Use of esophageal balloons would be helpful. The criteria of a PF ratio of <300 would potentially capture a large population of pts to enter further screening and subject more pt to CXR. For example a pt on 0.30 and having a PaO2 of 80 would fall into the screening category. Might be a tad bit overkill.

Q3 R16 Im not sure that all patients should be automatically screened daily for ARDS.

Many of our ventilated patients require long term ventilation, and many of them do not have an arterial line in place the entire time. I do not believe that a stable patient should be subjected to daily arterial pokes just for the sake of a screening tool that may not ever apply to them. I think the patient's condition and diagnosis should play a part in whether they are screened daily.

Q3 R19 My population has a low rate of ARDS and screening would identify very few such cases (Also Knowledge)

Q4 R4 there is a clear difference between a patient with HRF and a P/F of 270 and an ARDS patient with a P/F of 140. In the former I would be happy with a supported (PSV) rather than a controlled mode of ventilation...Hence, I would recommend separating the 2 types of patients when asking us to complete this survey if you want valuable information to guide practice!

Q4 R16 6-8 ml/kg is to high for current lung protective strategies.

Q4 R25 VT goals of 6-8mL/kg cause a lot of problems on patients that are breathing spontaneously on AC - VC. I find patients on RR=34, PEEP=12, and PIP=18. Pt is clearly struggling to breath. Switched to PCV of 30/12 and VTs are greater than 8mL/kg and the intensivists gets mad. (Also Emotion)

Q5 R21 plateau pressures should only be performed on sedated patients as you cannot get an accurate measurement on a spontaneously breathing patient

Q9 R43 Sedatives may be one option. Would suggest treat pain first with analgesia. With ARDS, NMBA may be required.

Q5 R14 I also don't agree that plateau pressures should be repeated Q12H but instead as needed and more often if goals are not being achieved and adjustments are required.

Q9 R1 I think this is very important and [sedation] goals should be clearly defined and changed as required in the order sets. I believe a RASS of -4 would be more appropriate but that is simply from observing and working with pt with severe ARDS. I believe that time has to be given for ARDS to resolve and sedation with a RASS goal is important. After all we don't expect people to walk with a broken leg after a few days

Q9 R6 Sedatives are a necessary evil. We understand that use of sedatives can effect long term outcomes (issues with delirium and neuropathies). Smallest dose to achieve ventilation/oxygenation goals.

Q10 R28 In addition to pf ratio, ability to ventilate with goal tidal volumes, etc without asynchrony in ARDS pts should be consideration for paralytics

Q12 R33 Again, cannot emphasize enough of taking each individual patient into consideration, examining all relevant factors and pertinent information (i.e.. labs, diagnostics, physical assessment findings, etc.). Are we permitting any individual variation in patient management and care? (Also Memory and Decision Processes, Beliefs about Capabilities, Emotion)

Q1 R5 EB would be highly beneficial!!!

| | | |
|---|---|---|
| Goals* (Mental representations of outcomes or end states that an individual wants to achieve) | Goals (distal/proximal) Goal priority Goal/target setting Goals (autonomous/controlled) Action planning Implementation intentions | High rates of interventions on the pathway, for example proning, should be a goal in my ICU |
| Coded to Goals: None during initial coding of 3 responses from each question. | | |

| | | |
|---|--|--|
| Intentions (A conscious decision to perform a behaviour or a resolve to act in certain way) | Stability of intentions Stages of change model Transtheoretical model and stages of change | I intend to provide pathway care for patients with HRF / ARDS is the next few months |
|---|--|--|

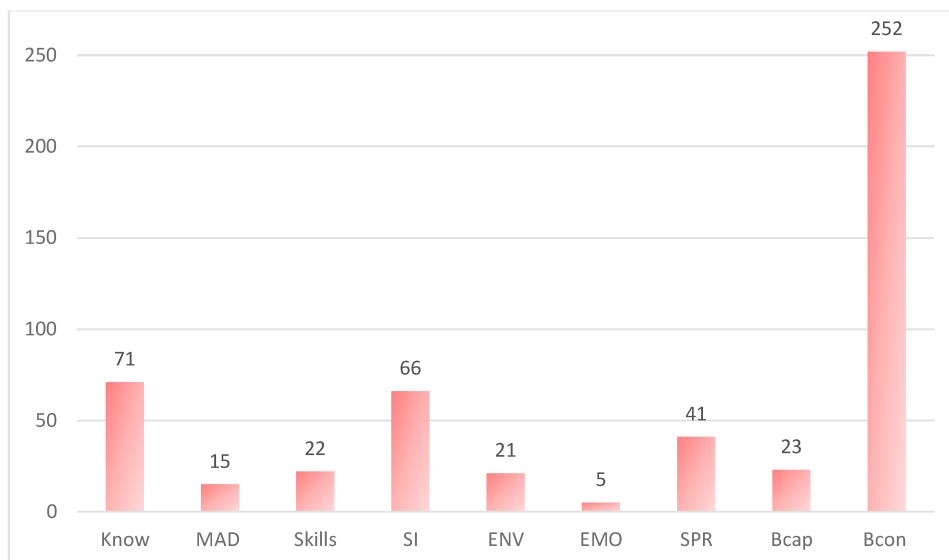
| eTable 3. Matrix of relevant Behaviour Change Techniques for Intervention Functions | |
|--|---|
| Intervention Function | Individual BCTs |
| Education | <p>Most frequently used BCTs:</p> <ul style="list-style-type: none"> • Information about social and environmental consequences • Information about health consequences • Feedback on outcome(s) of the behaviour • Feedback on behaviour • Prompts/cues • Self-monitoring of behaviour <p>Less frequently used BCTs:</p> <ul style="list-style-type: none"> ➤ Biofeedback ➤ Self-monitoring of outcome(s) of behaviour ➤ Cue signalling reward ➤ Satiation ➤ Information about antecedents ➤ Re-attribution ➤ Behavioural experiments ➤ Information about emotional consequences ➤ Information about others' approval |
| Persuasion | <p>Most frequently used BCTs:</p> <ul style="list-style-type: none"> • Credible source • Information about social and environmental consequences • Information about health consequences • Feedback on outcome(s) of the behaviour • Feedback on behaviour <p>Less frequently used BCTs:</p> <ul style="list-style-type: none"> ➤ Biofeedback ➤ Focus on past success ➤ Verbal persuasion about capability ➤ Framing/reframing ➤ Re-attribution ➤ Identity associated with changed behaviour ➤ Information about emotional consequences ➤ Information about others' approval ➤ Identification of self as role model ➤ Salience of consequences ➤ Social comparison |
| Incentivisation | <p>Most frequently used BCTs:</p> <ul style="list-style-type: none"> • Information about health consequences • Feedback on outcome(s) of the behaviour • Feedback on behaviour • Self-monitoring of behaviour • Monitoring of behaviour by others without evidence of feedback <p>Less frequently used BCTs:</p> <ul style="list-style-type: none"> ➤ Biofeedback ➤ Paradoxical instructions ➤ Self-monitoring of outcome(s) of behaviour ➤ Cue signalling reward ➤ Remove aversive stimulus ➤ Reward approximation ➤ Reward completion |

| | |
|-------------|--|
| | <ul style="list-style-type: none"> ➤ Situation specific reward ➤ Reward incompatible behaviour ➤ Reduce reward frequency ➤ Reward alternate behaviour ➤ Remove punishment ➤ Social reward ➤ Material reward ➤ Material reward (outcome) ➤ Self-reward ➤ Non -specific reward ➤ Incentive ➤ Behavioural contract ➤ Commitment ➤ Discrepancy between current behaviour and goal Imaginary reward |
| Coercion | <p>Most frequently used BCTs:</p> <ul style="list-style-type: none"> • Feedback on outcome(s) of the behaviour • Feedback on behaviour • Self-monitoring of behaviour • Monitoring of behaviour by others without evidence of feedback • Monitoring outcome of behaviour by others without evidence of feedback <p>Less frequently used BCTs:</p> <ul style="list-style-type: none"> ➤ Biofeedback ➤ Self-monitoring of outcome(s) of behaviour ➤ Remove access to reward ➤ Punishment ➤ Imaginary punishment ➤ Future punishment ➤ Behaviour cost ➤ Remove reward ➤ Behavioural contract ➤ Commitment ➤ Discrepancy between current behaviour and goal ➤ Incompatible beliefs ➤ Anticipated regret |
| Training | <p>Most frequently used BCTs:</p> <ul style="list-style-type: none"> • Demonstration of the behaviour • Instruction on how to perform a behaviour • Feedback on outcome(s) of the behaviour • Feedback on behaviour • Self-monitoring of behaviour • Behavioural practice/rehearsal <p>Less frequently used BCTs:</p> <ul style="list-style-type: none"> ➤ Biofeedback ➤ Self-monitoring of outcome(s) of behaviour ➤ Habit reversal ➤ Graded tasks ➤ Behavioural experiments ➤ Mental rehearsal of successful performance ➤ Self-talk ➤ Self-reward |
| Restriction | <p><i>No BCTs in BCTTv1 are linked to this intervention function because they are focused on changing the way that people think, feel and react rather than the way the external environment limits their behaviour.</i></p> |

| | |
|-----------------------------|--|
| Environmental restructuring | <p>Most frequently used BCTs:</p> <ul style="list-style-type: none"> • Adding objects to the environment • Prompts/cues • Restructuring the physical environment <p>Less frequently used BCTs:</p> <ul style="list-style-type: none"> ➤ Cue signalling reward ➤ Remove access to the reward ➤ Remove aversive stimulus ➤ Satiation ➤ Exposure ➤ Associative learning ➤ Reduce prompt/cue ➤ Restructuring the social environment |
| Modelling | <p>Most frequently used BCTs:</p> <ul style="list-style-type: none"> • Demonstration of the behaviour |
| Enablement | <p>Most frequently used BCTs:</p> <ul style="list-style-type: none"> • Social support (unspecified) • Social support (practical) • Goal setting (behaviour) • Goal setting (outcome) • Adding objects to the environment • Problem solving • Action planning • Self-monitoring of behaviour • Restructuring the physical environment • Review of behaviour goals • Review outcome goals <p>Less frequently used BCTs:</p> <ul style="list-style-type: none"> ➤ Social support (unspecified) ➤ Reduce negative emotions ➤ Conserve mental resources ➤ Pharmacological support ➤ Self-monitoring of outcome(s) of behaviour ➤ Behaviour substitution ➤ Overcorrection ➤ Generalization of a target behaviour ➤ Graded tasks ➤ Restructuring the social environment ➤ Avoidance/reducing exposure to cues for the behaviour ➤ Distraction ➤ Body changes ➤ Behavioural experiments ➤ Mental rehearsal of successful performance ➤ Focus on past success ➤ Self-talk ➤ Verbal persuasion about capability ➤ Self-reward ➤ Behavioural contract ➤ Commitment ➤ Discrepancy between current behaviour and goal |

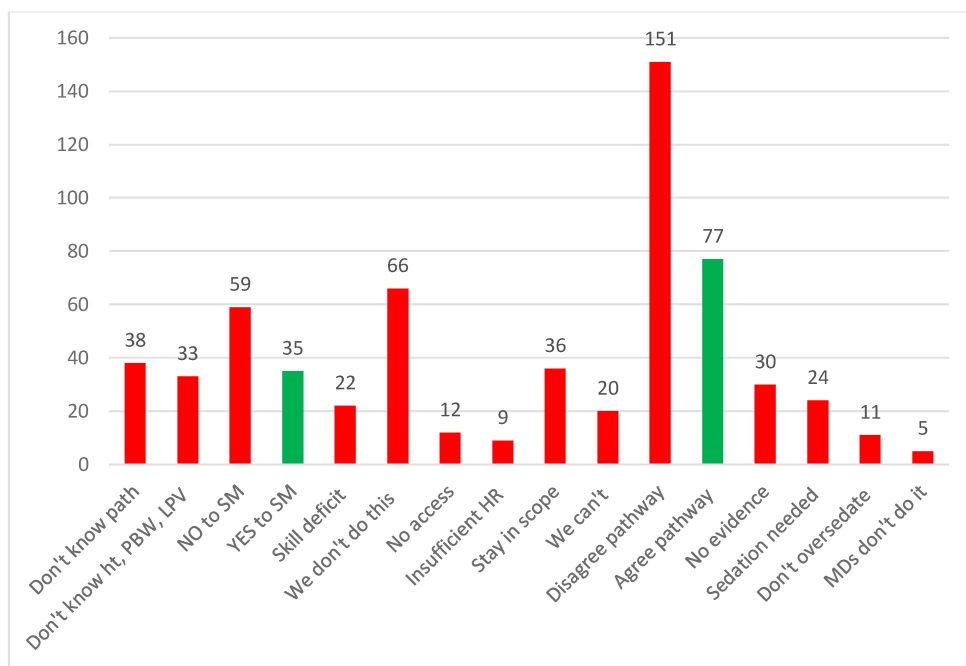
eTable 4. Characteristics of open text survey respondents

| | Survey respondents (n=692) | Survey respondents open text (n=266) |
|-----------------------|----------------------------|--------------------------------------|
| Discipline | Number (%) | Number (%) |
| Nurse Practitioner | 4 (1) | 1 (0.4) |
| Registered Nurse | 410 (59) | 115 (43) |
| Respiratory Therapist | 229 (33) | 123 (46) |
| Physician | 49 (7) | 27 (10) |
| Hospital type | | |
| Tertiary | 335 (48) | 130 (49) |
| Community | 252 (36) | 96 (36) |
| Regional | 105 (15) | 40 (15) |



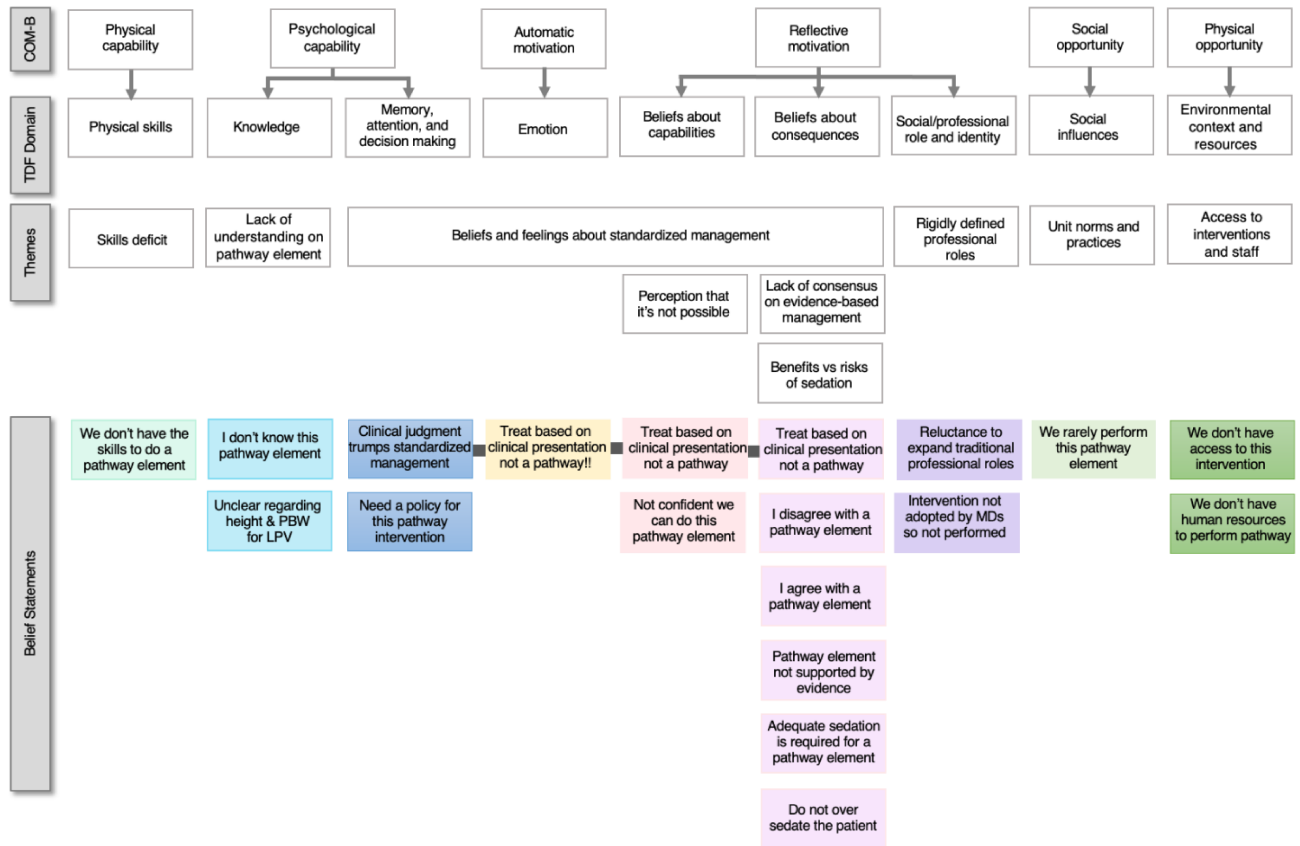
eFigure 2. Frequency and proportion of text excerpts representing a barrier to pathway implementation by TDF domain

Of the 628 text excerpts determined to be relevant to the target behaviour, 516 were determined to be barriers to the target behaviour. Bcap=Beliefs about capabilities. Bcon=Beliefs about consequences. Emo=Emotion. Env=Environmental context and resources. Know=knowledge. MAD=memory, attention, and decision making. SI=Social influences. Skills=physical skills.



eFigure 3. Frequency of text excerpts assigned to belief statements.

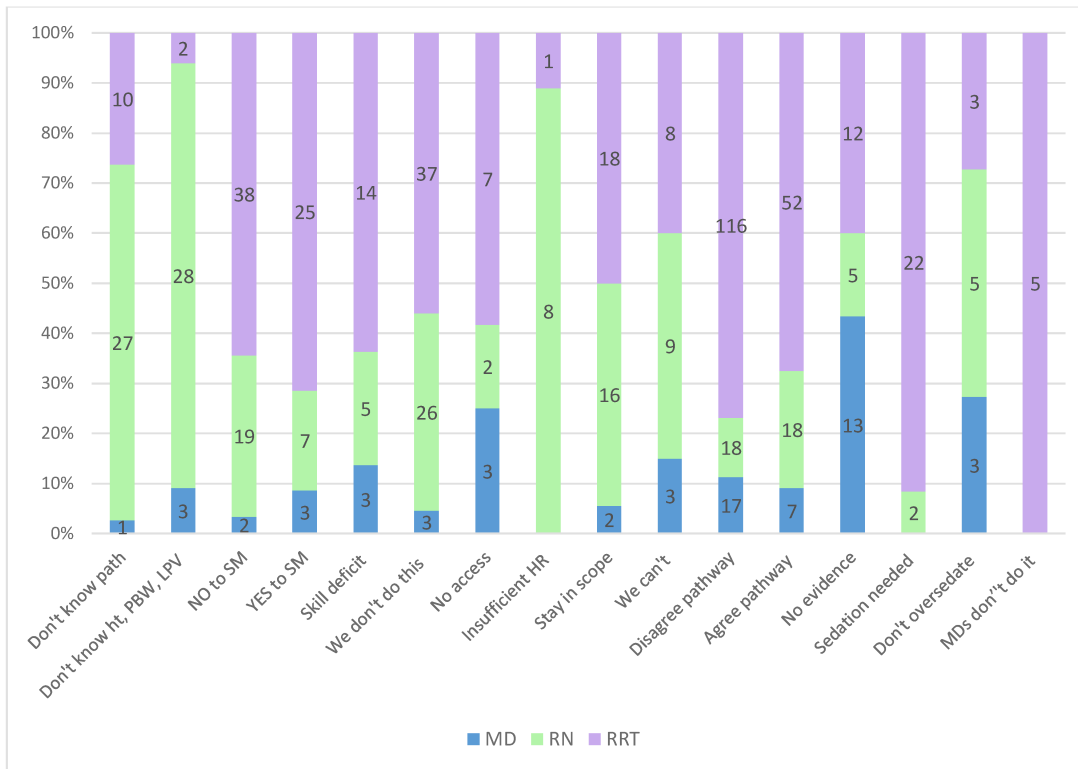
628 text excerpts were determined to be relevant to the relevant to the target behaviour. Ht=height. HR=Human resources. LPV=lung protective ventilation. PBW=predicted body weight. SM=standardized management.



eFigure 4. The relationship between identified belief statements, themes, and relevant TDF domains and COM-B components

eTable 5. Frequency of text excerpts assigned to identified belief statements by discipline and hospital type

| Belief statement | Total | MD | RN | RRT | Comm | Regional | Tertiary |
|---|------------|----|-----|-----|------|----------|----------|
| We (I or my colleagues) don't know a pathway intervention or have the education to perform the pathway. | 38 | 1 | 27 | 10 | 11 | 18 | 9 |
| Unclear on definition and importance of height (ht.) and Predicted Body Weight (PBW) for Lung Protective Ventilation (LPV). | 33 | 3 | 28 | 2 | 16 | 6 | 11 |
| This should be based on individual patient presentation, NOT a threshold in pathway; NO to standardized management! | 59 | 2 | 19 | 38 | 19 | 22 | 18 |
| A guideline or protocol for this pathway intervention is / may be needed. | 35 | 3 | 7 | 25 | 10 | 8 | 17 |
| We do not have the skills to perform this pathway intervention; training is needed (proning, esophageal balloon, optimal PEEP study). | 22 | 3 | 5 | 14 | 9 | 6 | 7 |
| We rarely or never perform this pathway element at my site. | 66 | 3 | 26 | 37 | 22 | 14 | 30 |
| We do not have access to this pathway intervention at my site. | 12 | 3 | 2 | 7 | 6 | 3 | 3 |
| Human resources are not available to perform the pathway. | 9 | | 8 | 1 | | 7 | 2 |
| Reluctance to expand traditional professional roles; stay in your lane. | 36 | 2 | 16 | 18 | 13 | 8 | 15 |
| This pathway intervention has not been adopted by MDs so it's not being done. | 5 | | | 5 | 4 | | 1 |
| Not confident we can do this element of the pathway, especially within this timeframe. | 20 | 3 | 9 | 18 | 9 | 2 | 9 |
| Disagree with a pathway element e.g. procedure, intervention, threshold, criteria, or timing. | 151 | 17 | 18 | 116 | 47 | 19 | 85 |
| Agree with this intervention on the pathway, it would be beneficial. | 77 | 7 | 18 | 52 | 28 | 14 | 35 |
| Is not or might not be supported by evidence; I'm not sure about the accuracy and reliability of this intervention. | 30 | 13 | 5 | 12 | 15 | 6 | 9 |
| Can only perform this pathway intervention if patients are adequately sedated, and often they are not. | 24 | | 2 | 22 | 8 | | 16 |
| Do not over sedate the patient. | 11 | 3 | 5 | 3 | 5 | 2 | 4 |
| | 628 | 63 | 195 | 370 | 222 | 135 | 271 |



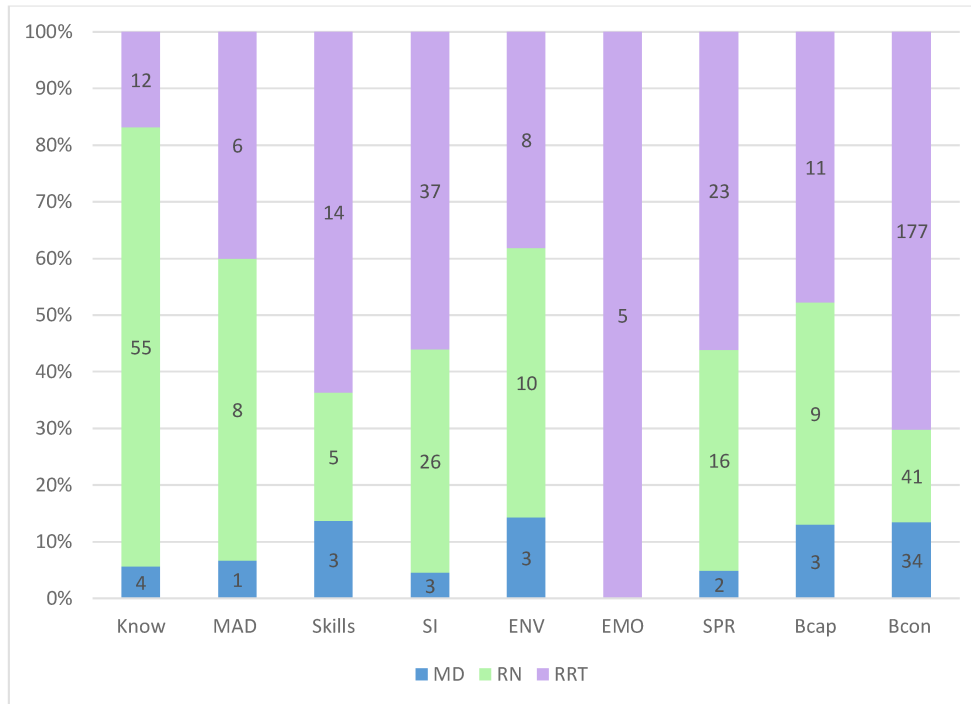
eFigure 5. Frequency and proportion of text excerpts assigned to belief statements by discipline.

628 text excerpts were determined to be relevant to the relevant to the target behaviour. For each belief statement in eFigure 3, we broke our proportions by discipline. Ht=height. HR=Human resources. LPV=lung protective ventilation. PBW=predicted body weight. SM=standardized management.

eTable 6. Belief statements with the highest number of survey text excerpts by discipline

| Belief statements | | |
|-------------------|---|---|
| MD | 1 | I disagree with a pathway element (B) |
| | 2 | Pathway element is not supported by evidence (B) |
| | 3 | I agree with a pathway element (F) |
| RT | 1 | I disagree with a pathway element (B) |
| | 2 | I agree with a pathway element (F) |
| | 3 | Treat based on clinical presentation not a pathway / no to standardized management (B) |
| | 4 | We rarely perform this pathway element (B) |
| RN | 1 | I'm unclear on height and Predicted Body Weight (PBW) for Lung Protective Ventilation (LPV) (B) |
| | 2 | I don't know this pathway element (B) |
| | 3 | We rarely perform this pathway element (B) |

MD=physician. RT=Respiratory Therapist. RN= Registered Nurse. B=barrier. F=facilitator



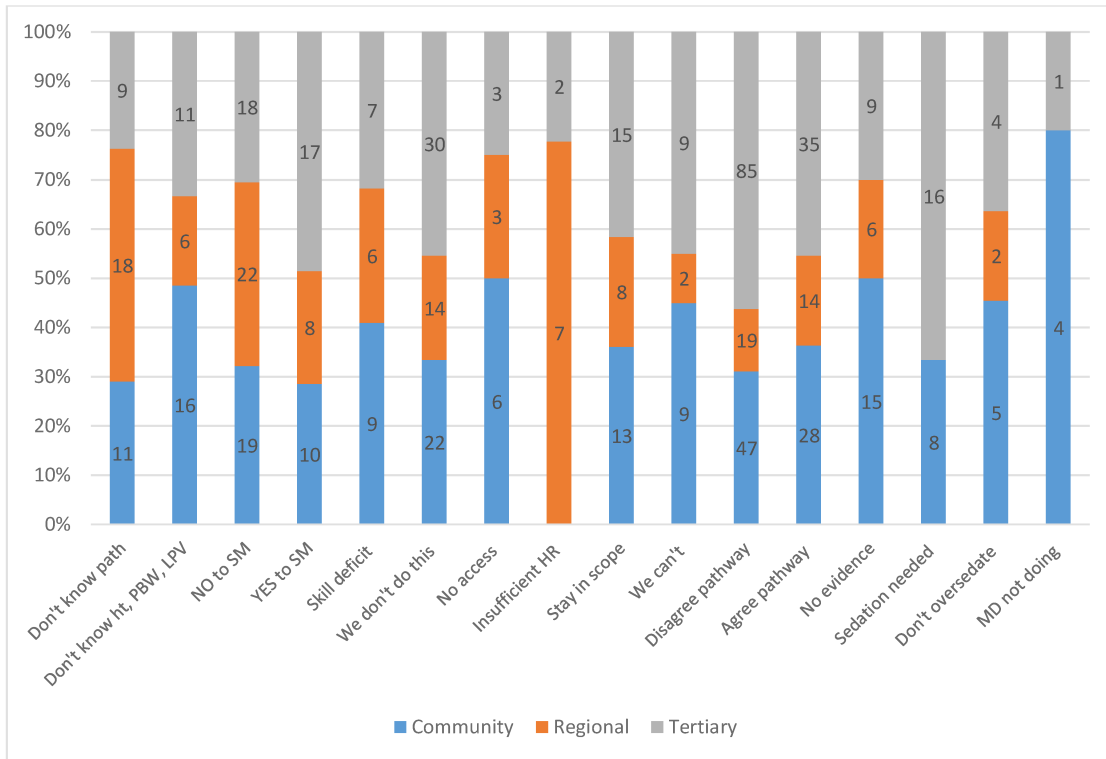
eFigure 6. Frequency and proportion of text excerpts representing a barrier to pathway implementation by discipline by TDF domain.

Of the 628 text excerpts determined to be relevant to the target behaviour, 516 were determined to be barriers to the target behaviour. For each TDF domain in eFigure 2, we broke out proportions by discipline. Bcap=Beliefs about capabilities. Bcon=Beliefs about consequences. Emo=Emotion. Env=Environmental context and resources. Know=knowledge. MAD=memory, attention, and decision making. SI=Social influences. Skills=physical skills. SPR=Social and professional identity.

eTable 7. TDF domains with the highest number of survey text excerpts representing a barrier by discipline

| Discipline | Rank | TDF Domain |
|------------|------|--|
| MD | 1 | Beliefs about consequences (34 excerpts) |
| | 2 | Knowledge (4 excerpts) |
| RT | 1 | Beliefs about consequences (177 excerpts) |
| | 2 | Social Influences (37 excerpts) |
| | 3 | Social and professional identity (23 excerpts) |
| RN | 1 | Knowledge (55 excerpts) |
| | 2 | Beliefs about consequences (41 excerpts) |
| | 3 | Social Influences (26 excerpts) |

MD=physician. RT=Respiratory Therapist. RN=Registered Nurse.



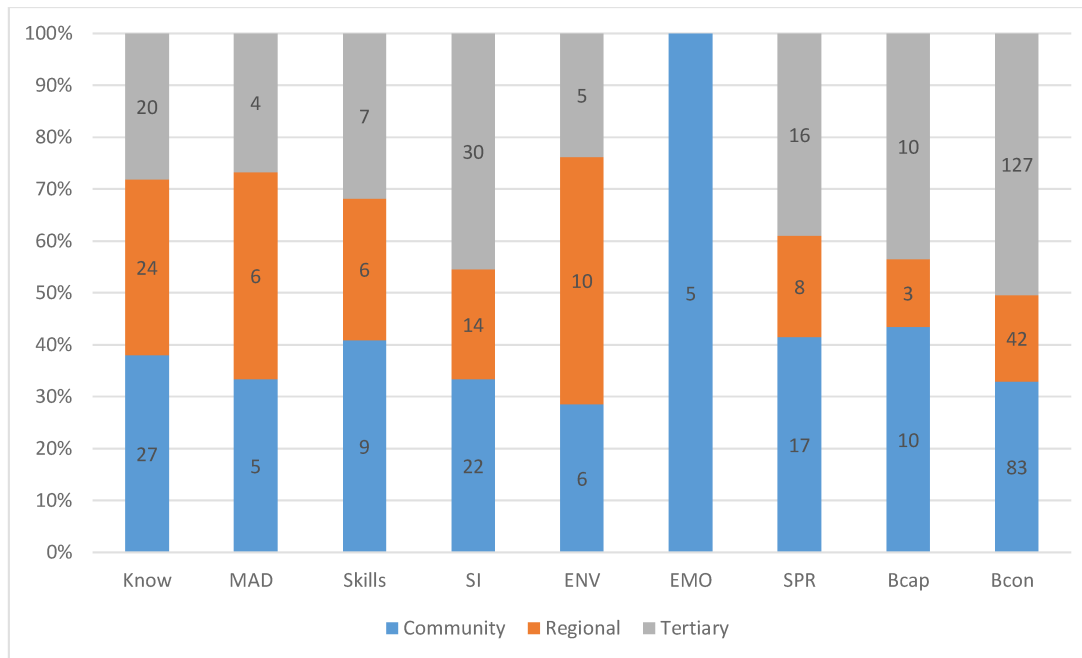
eFigure 7. Frequency and proportion of text excerpts assigned to belief statements by hospital type.

628 text excerpts were determined to be relevant to the relevant to the target behaviour. For each belief statements in eFigure 3, we broke our proportions by hospital type. Ht=height. HR=Human resources. LPV=lung protective ventilation. PBW=predicted body weight. SM=standardized management.

eTable 8. Belief statements with the highest number of survey excerpts by hospital type

| Hospital type | Belief statements |
|---------------|--|
| Regional | 1 Treat based on clinical presentation not a pathway (B) |
| | 2 I disagree with a pathway element (B) |
| | 3 I don't know this pathway element (B) |
| Community | 1 I disagree with a pathway element (B) |
| | 2 We rarely perform this pathway element (B) |
| | 3 Treat based on clinical presentation not a pathway (B) |
| Tertiary | 1 I disagree with a pathway element (B) |
| | 2 We rarely perform this pathway element (B) |
| | 3 Treat based on clinical presentation not a pathway (B) |

B=barrier. F=facilitator



eFigure 8. Proportion of text excerpts representing a barrier to pathway implementation by hospital type and TDF domain
Of the 628 text excerpts determined to be relevant to the target behaviour, 516 were determined to be barriers to the target behaviour. For each TDF domain in eFigure 2, we broke out proportions by hospital type. Bcap=Beliefs about capabilities. Bcon=Beliefs about consequences. Emo=Emotion. Env=Environmental context and resources. Know=knowledge. MAD=memory, attention, and decision making. SI=Social influences. Skills=physical skills. SPR=Social and professional identity.

eTable 9. Theoretical Domains Framework domains with the highest number of survey excerpts representing a **barrier** by hospital type

| Hospital type | TDF Domain |
|---------------|---|
| Regional | 1 Beliefs about Consequences (42 excerpts) |
| | 2 Knowledge (24 excerpts) |
| | 3 Social Influences (14 excerpts) |
| Community | 1 Beliefs about Consequences (83 excerpts) |
| | 2 Knowledge (27 excerpts) |
| | 3 Social Influences (22 excerpts) |
| Tertiary | 1 Beliefs about Consequences (127 excerpts) |
| | 2 Social Influences (30 excerpts) |
| | 3 Knowledge (20 excerpts) |

eTable 10. Behaviour Change Techniques (BCTs) evaluated using the APEASE criteria

| No | Candidate Behaviour Change Technique (BCT) | Meets APEASE criteria | | | | | |
|----|--|-----------------------|-----------|-----------|------------|-----------------------|--------|
| | | Affordable | Practical | Effective | Acceptable | Side effects & Safety | Equity |
| 1 | 1.1 Goals setting (behaviour) | Y | Y | Y | Y | Y | Y |
| 2 | 1.2 Problem solving | Y | Y | Y | Y | Y | Y |
| 3 | 1.3 Goal setting (outcome) | Y | Y | Y | Y | Y | Y |
| 4 | 1.4 Action planning | Y | Y | Y | Y | Y | Y |
| 5 | 2.1 Monitoring of behaviour by others without feedback | N | N | N | N | Y | Y |
| 6 | 2.2 Feedback on Behaviour | Y | Y | Y | Y | Y | Y |
| 7 | 2.3 Self-monitoring of behaviour | Y | Y | Y | Y | Y | Y |
| 8 | 2.5 Monitoring the outcome(s) of behaviour without feedback | N | N | N | N | Y | Y |
| 9 | 2.7 Feedback on outcomes of the behaviour | Y | Y | Y | Y | Y | Y |
| 10 | 3.1 Social support (unspecified) | Y | Y | Y | Y | Y | Y |
| 11 | 3.2 Social support (practical) | Y | Y | Y | Y | Y | Y |
| 12 | 4.1 Instruction on how to perform a behaviour | Y | Y | Y | Y | Y | Y |
| 13 | 5.1 Information about health consequences | Y | Y | Y | Y | Y | Y |
| 14 | 5.2 Salience of consequences | Y | Y | Y | Y | Y | Y |
| 15 | 5.3 Information about social and environmental consequences | Y | N | N | N | Y | Y |
| 16 | 6.1 Demonstration of the behaviour | Y | Y | Y | Y | Y | Y |
| 17 | 6.2 Social comparison/reminder of past success | Y | Y | Y | Y | Y | Y |
| 18 | 7.1 Prompts/cues | Y | Y | Y | Y | Y | Y |
| 19 | 8.1 Behavioural practice / rehearsal | Y | Y | Y | Y | Y | Y |
| 20 | 9.1 Credible source | Y | Y | Y | Y | Y | ? |
| 21 | 10.2 Material reward | Y | Y | Y | Y | Y | Y |
| 22 | 11.5 Review of behaviour goals | Y | Y | Y | Y | Y | Y |
| 23 | 11.7 Review outcome goals | Y | Y | Y | Y | Y | Y |
| 24 | 12.1 Restructuring of the physical environment | Y | Y | Y | Y | Y | Y |
| 25 | 12.2 Restructuring the social environment | Y | Y | Y | Y | Y | Y |
| 26 | 12.5 Adding objects to the environment | Y | Y | Y | Y | Y | Y |

Y=yes, meets this APEASE criterion, N=no, does not meet this APEASE criterion.

Bolded BCTs are frequently used