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Chronic Disease Management and Optimization of Functional Status Before Surgery: Does This Improve Long-Term Postoperative Outcomes?

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Abstract

Purpose of the Review Perioperative care is facing many challenges; these include long surgical wait times, an increasing demand for surgery, a more complex perioperative population, and increased health inequalities. As perioperative care providers, we have an opportunity to shape the future of perioperative care and address these challenges by working to improve the health of those presenting for surgery.

Recent Findings There is equipoise in the literature on the impact of chronic disease management and functional status optimization, but we feel that it is now time to embed these concepts into perioperative care and up-to-date guidance and policy support this.

Summary Clinicians have the opportunity to improve the care of complex patients in the perioperative period, and they can contribute to the development of robust, equitable, and streamlined perioperative pathways. However, perioperative care also affords the opportunity to engage, educate, and empower patients in their health looking beyond purely surgical outcomes, aiming for improved long-term health management and behavioural modification.

Search Strategy This was a narrative review, using a combination of peer-reviewed and grey literature. Themes were explored using search terms as follows:

1) Chronic disease management: Chronic disease*, Co-morbid*, multimorbid*, Long term disease OR illness.
2) Perioperative care: Periop* care, preop* care, and presurgical care, and this was used for the other subsections.
3) Functional status: functional status, functional capacity, fitness, prehabilitation, surgery schools, aerobic fitness, aerobic threshold, nutrition, patient activation, mental health and surgery.
4) Surgical Outcomes: Outcome*, long-term OR long term outcome* Post op* outcome* Late phase outcome* post surgical OR post surgery outcome*.
5) Inequalities in perioperative healthcare: Healthcare disparit* OR inequalit* in periop* care OR preop*care OR presurgical care.
6) Inequalities in surgical outcome: Healthcare disparit* OR inequait* in surger* outcome*.
7) The impact of COVID on surgery: COVID-19, SARS CoV-2, Novel corona virus AND Surgery.
8) Grey literature searches included searching for guidelines and policy from known sources such as NHS England, The Centre for Perioperative Care and the Royal College of Anaesthetists, The perioperative quality initiative (POQI), and the American Society of Anesthesiologists (ASA).
9) Hand searching of citations and other manual searching formed a large part of the search strategy due to breadth of possible search terms and the perioperative literature.

Keywords Perioperative medicine · Postoperative outcomes · Functional status · Functional capacity · Comorbidities · Chronic disease · Long-term conditions · Optimization · Health inequalities

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Introduction

The aim of surgery is to improve the quality or longevity of a patient's life [1]. Clinicians aim to deliver safe, effective, appropriate, and equitable care to patients undergoing procedures; however, for reasons largely out of our control, patients can wait a long time for their procedures, leading to deconditioning and disillusionment. Even worse, once surgery has taken place, postoperative complications can leave patients in a worse condition than before [2•]. Health inequalities which arise from deprivation or protected characteristics are also prevalent [2•]. Thus, it is clear that perioperative care has many challenges, and anesthesiology teams are in a pivotal position to appraise how current evidence can be used to shape improvements in perioperative care.

The volume of Surgery and Long Wait Times

Surgery is one of the commonest reasons that patients attend hospital, and in the United States of America (USA), it has previously been estimated that patients undergo over nine procedures in their lifetime [3] and the demand for surgery is also rising as patients live longer and technology advances. In 2020, COVID-19 caused massive disruption to already pressured surgical pathways; during the peak of the first wave, it was predicted that 28,404,603 operations would be cancelled or postponed globally [4]. Pre-pandemic surgical wait times had already been increasing in the USA [5], and now, postpandemic wait times have further increased [6]. These trends are mirrored in the United Kingdom (UK) [7].

A More Complex Perioperative Population

Patients presenting for surgery now represent a more complex perioperative population than ever before. Data from the UK's 7th National Audit Project confirmed that compared with pre-pandemic, patients undergoing surgery are older and more likely to be obese and have comorbidities [8]. The USA has also noted an increase in comorbidities and obesity in the surgical population [5, 9]. In addition, COVID-19 has had an influence on the declining overall health of the population; lockdowns caused a loss of functional status [2•] and worse health has been noted in those presenting for surgery [10]. The delay in access to medical care and surgery as a result of COVID-19 has also led to a worsening quality of life for many patients [11]. Those living with chronic disease and comorbidity undergoing major surgery represent the "high-risk" surgical population [12]. Although these patients only account for 12.5% of surgery they account for 80% of mortality [13], with data from the USA revealing that mortality in the year following surgery is 7.4% for elective surgery overall, but this increases to 27.6% in the older, comorbid, and frail population[14].

Inequalities in Healthcare

Health inequalities are avoidable differences in health outcomes between populations and have long been documented in medical care. Although quantification of inequalities has been haphazard, we know that people who are from deprived areas have more long-term conditions (LTCs) and a worse quality of life [15] and have less access to health care [16]. Socioeconomic inequalities are further exacerbated in those from minority ethnic backgrounds; the pandemic shone a light on this, with COVID-19 having a greater direct and indirect impact on Black, Hispanic, Asian, and marginalized groups in high-income countries [17]. Perioperative care is not immune to these inequities and the long wait times, and an increasingly complex surgical population, are amplified in non-white groups. In the USA, wait times disproportionately affect Black and Hispanic populations [6, 18] and the impact of the deterioration in health post-COVID is most evident in vulnerable and deprived groups [19, 20]. Postoperative complications disproportionately affect non-white patients, especially African Americans [21–24], and patients from deprived areas have worse short [25] and long-term surgical outcomes [26].

Clinicians seeking to deliver effective perioperative care should accept these challenges and find solutions to them, in order to give patients the best chance of having successful surgery when this is their informed choice [2•]. Treating LTCs and optimizing functional status are a key part of delivering this care and should reduce predictable and preventable surgical complications [27•] and have an impact on perioperative outcomes [28, 29]. The benefits of effective health intervention in the perioperative period can also go beyond surgical outcomes, and we should embrace our role in this wherever possible [2•]. Managing chronic conditions can improve a patient's health-related quality of life and life expectancy [30], and improving health can impact on patients' ability to be economically active [31]. LTCs are a major public health concern [2•] and have implications for the whole health system and cost of care [32, 33]; interventions that can have a lasting effect on disease management may improve the burden of illness on the system as a whole not just in the perioperative period.

The detection, management, and optimization of LTCs and functional status before surgery can be managed quickly and effectively if perioperative pathways are established with this aim [34]. Even quite complex interventions, such as exercise training protocols, can be delivered even in the most urgent cancer pathways [35]. Patients waiting for surgery

which is less urgent are likely to benefit from using the time spent on a waiting list to improve their health, fitness, and psychological preparedness. This time also creates an opportunity to educate and empower patients to take responsibility for their health [36]. This can contribute to improving long-term health and behaviours [37, 38] and create a vital opportunity to start to address health inequalities [39].

To move towards this panacea of perioperative care, we must evaluate current evidence and understand what is meant by long-term outcomes, chronic disease management, and optimization of functional status so that we can decide on the best evidence-based interventions for patients and guide where future research could be needed.

Defining Postoperative Outcomes

Outcomes are the end result of medical care and reflect what has happened to patients as a result of their treatment; outcomes should look at patient's well-being and examine this on an individual basis [40]. Lohr provided this definition in 1988, yet the definition of postoperative outcome continues to vary widely and finding a consensus within research and clinical practice is difficult [41]. Without standardized endpoints, the evaluation of care interventions is difficult, inconsistent, and at risk of bias [42•]. Recent research by the StEP initiative, the COMPAC group, and the Outcomes-4Medicine consensus group have endeavored to standardize the outcomes we assess [41, 42•, 43, 44]. There is, however, still no clear consensus on exact outcome measures and what constitutes short- and long-term measurement[45].

Traditional Outcome Measurements

Outcome definitions can be dependent on whether they are described by patients, clinicians, or institutions [46] and have historically focused on hospital process data. Factors like admission to critical care, length of stay, return to theatre, and readmission are traditionally used and reflect easily accessible organizational data [47]. These measures offer some insight, but they lack the ability to reflect the patients' experience of the underlying cause of any morbidity experienced. While these metrics are important for care planning, they are affected by hospital policies and non-clinical factors [48] and so do not provide a robust system in isolation to assess outcome.

A Move from Mortality Measurement to Morbidity Outcome Measurement

Mortality is another easily defined end-point and outcome measure [49] but it is fortunately rare in the elective surgical population [50] so has limited use when looking at the effect of perioperative care interventions. Therefore, there has been a necessary move to assess morbidity. Systems such as the Clavien-Dindo classification and the Comprehensive Complication Index (CCI) have evidence to support their use in assessing morbidity [42•, 43, 51] and the CCI was developed with patient input.

A Need for Patient-Reported Outcome Measurements (PROMs)

The biggest improvements in perioperative care have come about by focusing on patient-reported outcomes [48] and using these to guide research and care interventions. PROMs allow a quantitative assessment of what is important to the patient and ensure the patient's voice is at the centre of care and decision-making processes [42•]. PROMs also represent outcomes relating to the entire care pathway and so it is crucial that any measurement of long-term outcomes includes PROMs.

Defining Long-Term Postoperative Outcomes

Many studies describe short- and long-term outcomes but do not use a clear timeframe to define them. The only way to guide and assess high-quality care interventions and research [52] is by defining valid outcome measures and their context. Long-term outcomes are usually evaluated using a timepoint from hospital discharge to a return to normal or baseline function [53]; they are generally thought of as being a time point greater than 6 weeks from surgery [54]. Large national studies in the UK, like the Perioperative Quality Improvement Program (PQIP), use 6 months and a year as long-term time points [55]. This is in keeping with most research studies and literature, although some studies do describe long-term outcome time points up to 5 years [45]. We feel that representation of the true long term is important when considering what outcomes to measure but a pragmatic approach is also needed. Patients will be lost to follow-up and the attrition rate increases with time postsurgery so the approach of PQIP, and other studies that use patient-reported outcomes at 1 year, is a sensible way of looking at the long-term impact of interventions and evaluating care.

Chronic Disease and Optimization of Functional Status

The potential short- and long-term benefits of optimization of chronic disease and functional status fall into three categories. The first is the direct impact of health optimization on the likelihood of developing a

Table 1 WHO performance classification (functional status or functional ability) [60]

WHO Performance Classification	Definition
0	Able to carry out normal activities without restriction
1	Restricted in strenuous activity, but ambulatory and able to carry out light work
2	Ambulatory and capable of all self-care but unable to carry out any work activities; up and about more than 50% of waking hours
3	Symptomatic and in a chair or in a bed for greater than 50% of the day but not bedridden
4	Completely disabled, cannot carry out any self-care, totally confined to bed or chair

complication after surgery. The second is mitigation of the clear, reproducible association between postoperative complications and longer-term adverse outcomes including reduced survival and quality of life [56, 57]. The third is the potential longer-term benefit on health and health behaviours. In the section below, we discuss the impact of perioperative health interventions on the first and third of these categories.

Defining Chronic Disease

Current estimates suggest 25% of surgical patients have chronic diseases [58]. Over 50% of Americans have at least one chronic condition and 27.2% of US adults have 2 or more LTCs [59]. Chronic disease can be considered in two categories. First, there are conditions that result from behavioural risk factors such as obesity, smoking, and alcohol use or from poor nutrition, deconditioning, frailty, or drug dependency. Second, there are LTCs due to medical comorbidities. Both categories have a direct impact on a patient's health and many patients will have LTCs from each category or diseases that result from the interplay between the categories. The key for perioperative care clinicians is to assess whether these chronic diseases are controlled or what targeted interventions are needed to move patients down the ASA scoring gradient before their surgery.

Defining Functional Status

Functional status is the ability of a person to perform activities of daily living and can also be described as performance status or functional ability. Table 1 shows the WHO classification of performance status [60]. Functional status can be influenced by many variables including age, genetic predispositions, chronic disease, nutritional status, functional capacity or physical fitness, and mental health. The first two variables are non-modifiable but the others can be improved in the preoperative period [61].

LTCs Category 1: Behavioural, Composite or "Non-medical" Chronic Conditions and Their Management in the Preoperative Period

Deconditioning or Loss of Functional Status

Reduced functional status results in physical and potentially psychological deconditioning. Functional status can be assessed through history, social history, and examination and by assessing functional capacity. This process will yield vital information that can also be used to inform shared decision-making [62], set a baseline for the patient, and help to plan optimization strategies.

Functional Capacity

Functional capacity contributes to functional status and is simply defined as cardiopulmonary fitness [63]. Assessing functional capacity is an important part of risk assessment preoperatively and can inform the need for targeted optimization. Patients who are less physically fit are more likely to have poorer long-term health outcomes as well as a slower recovery from surgery, an increased risk of postoperative complications, and an increased risk of death [64]. All patients should be advised to improve their aerobic fitness before surgery and informed that fitness can improve in as little as 2–3 weeks [65]. Comprehensive guidance is available for optimizing functional capacity preoperatively [61, 64] and patients can also be supported to use local resources and digital tools. Improving aerobic fitness also improves chronic disease management for comorbidities like hypertension, diabetes, heart disease, and obesity as well as improving mental health [66].

Smoking and Alcohol Consumption

Smoking is associated with an increase in postsurgical complications for all types of surgery [67]. However, those who stop smoking, even just 3–4 weeks prior to surgery, can reduce the risk of complications [67]. Excessive alcohol

consumption is also associated with increased postoperative complications [68] which can be reduced by moderation or cessation in the perioperative period. Preoperative education and support should be implemented to help patients address lifestyle choices like smoking and alcohol use to help optimize functional status before surgery.

Obesity

There is an increasing body of opinion that obesity should be recognized as a chronic disease [69] to enable more effective treatment, promote prevention, and remove the stigma associated with it. With the increasing prevalence of obesity and the fact that obese patients are more likely to present for surgery [8], it is important to think about how to manage obesity as well as recognize that it often occurs alongside conditions like diabetes, hypertension, cardiovascular disease, and obstructive sleep apnoea (OSA). Management should be based on current guidance [70] (under review at present) and should involve shared decision-making and patient-facing language at all times. In addition, interventions to optimize functional status such as nutrition advice, exercise, smoking cessation, and giving up alcohol can have a huge benefit in this patient group.

Poor Nutrition

Patients presenting for surgery often present with malnutrition, whether this is sarcopenia, cachexia, or obesity [71] and malnutrition has been identified as a risk factor for worse surgical outcomes [71–73]. Malnutrition can be difficult to diagnose [74] and so all patients presenting to preoperative services should be screened [75] and receive dietary advice, regardless of their nutritional state with targeted interventions for those at highest risk [64]. The preoperative MDT should avoid the assumption that obese patients are well nourished and can use the preoperative period as a time to optimize their nutritional status. Improving nutritional state alone, or in combination with functional capacity, can improve length of stay for patients [76].

Frailty and Its Management in the Preoperative Period

Frailty is a syndrome related to aging where there is a loss of biological reserve. Ten percent of those over 65 years have frailty and this rises to 25–50% of those over 85 years [77]. The loss of reserve and failure of physiological mechanisms lead to these patients being especially vulnerable to external stressors such as surgery and they are at risk of adverse perioperative outcomes [78]. There are guidelines available to help with the management of frail patients preoperatively, involving diagnosis and appropriate referral for optimization by a frailty team. Shared decision-making is also a central tenet of this guidance [78].

Polypharmacy

Polypharmacy is the simultaneous use of multiple medicines, typically five or more [79]. It is an increasing problem, especially in the elderly and frail. Polypharmacy is associated with negative clinical outcomes even after adjusting for health conditions [80] and is viewed as an important patient safety challenge [81]. Preoperative polypharmacy is associated with higher mortality perioperatively and longer hospital stays as well as higher readmission rates [79]. Preoperative assessment is a time when medications are often accurately recorded and reviewed, so perioperative care providers need to be alert to polypharmacy and understand how to manage it in conjunction with patients, primary care providers, pharmacists, and specialists.

Chronic Pain/Opioid Dependency

Acute, uncontrolled, pain in the postoperative period is associated with increased cardiorespiratory stress, postoperative nausea, and vomiting and is a predictor for poorer long-term outcomes [82]. It is also associated with reduced compliance with Drinking, Eating, and Mobilising (DrEaMing) at 24 h postoperatively [83] which, in turn, is related to more complications and longer hospital stay. Those who suffer from greater preoperative pain, use preoperative opioids, and feel helpless due to pain are at greater risk of poor pain control postoperatively [84]. Although the prediction and optimization of postoperative pain are complex [85] and depend on additional intraoperative and postoperative factors, it is important to identify patients with chronic pain and those at risk of postoperative pain to enable shared decision-making and appropriate pain team involvement.

The use of opioids for the management of chronic pain is no longer recommended [86] but due to years of misleading opioid promotion affecting medical education and the legislation surrounding opioid prescription, there have been over 500,000 deaths from opiate use in the USA since 1990 [87]. Opioid prescriptions in the USA peaked in 2012 at 255 million [88] and many patients are still taking these medications, prescribed or illicitly. The national and state governments and the CDC are committed to reducing the use of opioids [89] and we see perioperative care as a key time when opiate use can be documented and reviewed and specialist interventions can be put in place to help the patients affected by opiate misuse.

Table 2 Burden of preoperative chronic disease

Long-term conditions category 1: behavioural, composite, or "non-medical" chronic conditions								
Chronic pain	Deconditioning	Depression and anxiety	Frailty	Obesity	Opioid dependence	Poor nutrition	Polypharmacy	Smoking and alcohol consumption

Long-term conditions category 2: individual comorbidities						
Cardiac disease	**Respiratory disease**	**Vascular disease**	**Liver disease**	**Renal disease**	**Neurological disease**	**Multi-system disease**
Heart failure	Asthma	Peripheral vascular disease	Alcoholic Liver disease	Chronic Kidney disease	Dementia	Anaemia
Hypertension	COPD		Hepatitis	End-stage renal failure	Previous Stroke	Cancer
Myocardial Infarction	OSA		Liver failure			Diabetes
			Non-alcoholic fatty liver disease (NAFLD)			

Cognitive and Psychological

Many patients presenting for surgery are at risk of undiagnosed cognitive concerns. Even those with no cognitive issues preoperatively are at risk of postoperative cognitive dysfunction (POCD) and the risk increases with age and postoperative complications [90]. Therefore, preoperative cognitive screening should be considered in anyone with cognitive concerns and onward referral sought, where appropriate [64]. Cognitive impairment may affect the patient's capacity and ability to contribute to shared decision-making, so it is important these issues are picked up and then incorporated sensitively into perioperative planning. Anaesthetists need to plan appropriately to limit the effect of anaesthesia on cognitive decline.

Psychological factors are recognized to have an effect on surgical outcomes in the short and the long term [91] and anxiety and depression are associated with worse surgical outcomes. All patients presenting for surgery should be screened for psychological problems. Patients should be managed as per up-to-date guidance [92] and advice sought from mental health professionals where needed.

Patient Activation

Patient activation is a behavioural concept and describes an individual's knowledge, skills, and ability to manage their own health [93]. Those who are activated are more likely to engage in measures to optimize functional status and studies have shown that patients with high levels of activation have better outcomes following surgery [94–96]. Interventions can be put in place to improve patients' levels of activation and bring about improvements in health [93].

LTCs Category 2: Individual Comorbidities

From clinical practice and reviewing the literature, the burden of chronic disease from individual comorbidities is centered around the following diseases outlined in Table 2 [58, 79, 97, 98].

For patients undergoing emergency surgery and for some chronic diseases, there may be little that can be done in the preoperative period to "optimize" conditions. However, in the case of most chronic diseases, interventions can be put in place preoperatively to improve management and we discuss some of these below. In addition, for some conditions such as peripheral vascular disease, interventions may not be targeted at managing the condition itself but instead be aimed at modifying risk factors for that disease, e.g., smoking cessation. Furthermore, although the role of the perioperative clinician is not to manage complex diseases alone, by a patient attending a preoperative clinic, this can be used as an opportunity to ensure the most up-to-date chronic disease management in conjunction with other specialists if necessary.

Anaemia Management in the Perioperative Period

Anaemia is present in 1.95–2.36 billion people worldwide [99] and the commonest form is iron deficiency anaemia. It is important to remember that anaemia itself is not a diagnosis and so if the cause is unknown, this must be evaluated in addition to initiating optimization. Anaemia may be the byproduct of the condition the patient is undergoing surgery for, or a separate condition entirely. However, regardless of the cause, anaemia is associated with worse outcomes from

surgery, with an increased risk of blood transfusion, delayed discharge, poor recovery, and complications [100]. Comprehensive guidance exists for the perioperative management of anaemia [101] and this can guide perioperative disease management.

Diabetes Management in the Preoperative Period

Diabetes is the commonest metabolic disorder worldwide and in 2019, 37.3 million people in the USA had a diagnosis, with a further 8.5 million adults thought to be undiagnosed [102]. Not only are poorly controlled diabetes and hyperglaecemia in the perioperative period associated with increased complications and longer hospital stays, but patients with diabetes are at higher risk of requiring surgery [103]. In the UK, CPOC has produced guidelines for the management of diabetes that encompass the entire perioperative period with a focus on HBA1c screening preoperatively [104]. These guidelines also highlight the need for shared decision-making, smoking cessation, weight management, and exercise as key interventions for preoperative optimization.

Hypertension and Its Management in the Preoperative Period

Hypertension affects 48.1% of the US population [105] and is a major contributor to other chronic diseases, e.g., stroke, cardiac disease, and chronic kidney disease [106]. Hypertension is usually asymptomatic, and so previously undiagnosed disease may present as part of routine screening within preoperative pathways [107]. Preoperatively, it is important to consider the impact of hypertension on a patient's cardiovascular risk and to consider comorbidities that can occur because of hypertension. It is also key to think about diseases that can accompany hypertension such as an increased prevalence of type 2 diabetes, obesity, and obstructive sleep apnoea [107] and ensure patients are appropriately screened for these conditions. However, lowering blood pressure preoperatively can be complex and a pragmatic approach, based on the severity of the disease and associated features, is likely to be needed. Lowering preoperative blood pressure does not necessarily reduce risk or morbidity especially in those with stage 1 or stage 2 hypertension without organ dysfunction [108]. Management preoperatively should be based on up-to-date guidelines (currently under review) [97] and involve input from primary care and hypertensive specialists when needed.

Obstructive Sleep Apnoea (OSA) Management in the Preoperative Period

OSA is the commonest sleep disorder, and although obesity is an independent risk factor, OSA can also occur in patients of normal weight [109]. Those with sleep-disordered breathing can be considered in three categories. (1) Those with a known diagnosis and established on treatment where there may be no need for preoperative optimization. (2) Those with a diagnosis but poor compliance with treatment where the preoperative period could be used to help reestablish appropriate treatment with the motivator of reducing surgical risk. (3) Those who are undiagnosed. Roughly 80% of adults with moderate to severe OSA are thought to be undiagnosed [110] and so all patients presenting preoperatively should be screened for OSA. If suspected and subsequently diagnosed, treatment should involve referral to a sleep specialist for the consideration of CPAP, screening for associated conditions, and the use of weight loss, exercise, smoking cessation, and reduction in alcohol consumption. The wait time preoperatively can be used to mitigate anesthetic risk and optimize disease management, but we feel that delaying surgery in the absence of uncontrolled systemic disease is unlikely to be appropriate. As always, a risk–benefit decision is needed, involving the patient and weighing up the anaesthetic risk of poorly controlled OSA versus the urgency of surgery and how their condition is affecting their quality of life.

Conclusions: Does Chronic Disease Management and Optimization of Functional Status Improve Long-Term Outcomes?

We earlier described three mechanisms by which perioperative optimization might improve postoperative outcome: the direct impact on complications, the impact of reducing complications on improving associated longer-term outcomes, and the direct impact of improvements in health and health behaviour during the perioperative period, which might be sustained in the long term. We should need no persuasion that there is vast evidence from the general medical and public health literature which supports the optimization of health and health behaviours to improve longevity, quality of life, and disability-free survival: healthcare systems should all be focusing more on prevention rather than on treatment. The extensive evidence-based guidelines for perioperative care reflect the need for health and disease optimization and the perioperative period also presents a good opportunity to support health optimization in patients who may have had poor access or been disengaged from health care services. Despite this convincing logic, we lack data to show clear benefit for perioperative health optimization in large, randomized trials, both in the short term and the longer term. Compliance with health and behavioural intervention varies and is another source of health inequalities. Co-design of interventions with patients, particularly those who have low health literacy and have previously had reduced healthcare

access, is likely to be of benefit. Longer-term surveillance and support may be necessary to ensure that short-term improvements in health and health behaviours, if they occur, can be sustained. Perhaps, most importantly, health optimization can empower the patient by promoting the improvement of long-term health, health behaviours, and resilience. Health screening, risk assessment, and optimization should therefore become synonymous with perioperative care [111] and the "teachable moment" [112] used to facilitate patient engagement.

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Declarations

Conflict of Interest SRM is the National Clinical Director for Critical and Perioperative Care at NHS England and led the development of national policy on preoperative screening, assessment and optimisation. EW has no conflicts of interest to declare.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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