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# Medical risk assessment

- Patients should be screened, assessed and risk stratified on an individual and holistic basis, considering the impact of the primary disease (indication for surgery), and comorbid disease (e.g. hypertension, diabetes, etc).
- Validated screening tools should aim to identify modifiable risk (e.g. deconditioning, malnutrition, anaemia, smoking, psychosocial needs).
- Patient risk stratification should utilise objective, validated screening tools and assessments of functional capacity in association with clinician judgement. See Patient risk stratification tools below.

## Patient risk stratification tools

### Screening for functional capacity

| Tool | Low risk patient: Universal prehabilitation | Medium risk patient: Targeted prehabilitation | High risk patient: Specialist prehabilitation |
|---|---|---|---|
| DASI[1] Visit website | ≥ 35 | ≤34 | ≤ 34 |
| M-DASI[2] Visit website | 4 | 3 | 0-2 |
| Baseline activity levels | Meets physical activity guidelines e.g. COSA exercise recommendations | | |

Further details of these tools can be found in Exercise screening.

### Assessment of functional capacity – one or more of:

| Tool | Low risk patient: Universal prehabilitation | Medium risk patient: Targeted prehabilitation | High risk patient: Specialist prehabilitation |
|---|---|---|---|
| 6MWT[3] Visit website | >510m | 435-510m | <435m |

| | | | |
|---|---|---|---|
| ISWT[4]<br>Visit website | | | ≤250m |
| 30STS[5]<br>Visit website<br>*varies with age: see referenced link to table of normative values | | | <12 – Females (for age 60-64*)<br><14 – Males (for age 60-64*) |
| CPET[4]<br>For extremes of body weight consider correction to body surface area, where $pVO_2$/BSA (mL/min/$m^2$) <710 may be regarded as high risk | AT > 15 ml/kg/min<br>Peak $VO_2$ > 20 ml/kg/min* | AT 11-15ml/kg/min<br>Peak $VO_2$ 15-20 ml/kg/min* | AT <10-11ml/kg/min<br>Peak $VO_2$<br><15-16ml/kg/min*<br>*OR*<br>Sex-specific peak $VO_2$ cut-offs [6,7]<br>• Females <12.4 ml/kg/min<br>• Males <22.3 ml/kg/min |

*Consider sex-specific peak $VO_2$ cut-offs as per emerging evidence[6,7]

Further details of these tools can be found in Exercise assessment.

## Consider medical comorbidities

| Tool | Low risk patient: Universal prehabilitation | Medium risk patient: Targeted prehabilitation | High risk patient: Specialist prehabilitation |
|---|---|---|---|
| ASA-PS classification<br>Visit website | 1-2 | 2-3 | 3-4 |
| CFS<br>Visit website | 1-3 | 4-5 | ≥6 |
| NT-pro-BNP | <100 ng/L | 100-300 ng/L | >300 ng/L |
| VQ mismatch in CPET – $VE/VCO_2$ at AT | ≤34* | >34* | >>34* |

*Consider individuals at risk of impact from neo-adjuvant treatment

## Global risk assessment

| Tool | Low risk patient: Universal prehabilitation | Medium risk patient: Targeted prehabilitation | High risk patient: Specialist prehabilitation |
|---|---|---|---|

| | | | |
|---|---|---|---|
| NSQIP predicted 30-day morbidity<br>Visit website | <5% | 5-10% | >10% |
| NSQIP predicted 30-day mortality<br>Visit website | <1% | 1-4% | >4% |
| SORT predicted 30-day mortality<br>Visit website | <1% | 1-4% | >4% |
| RCRI 30-day risk of death, MI or cardiac arrest<br>Visit website | Class I = 3.9% | Class II = 6.0% | Class III = 10.1%<br>Class IV = 15.0% |
| Surprise Question[8]:<br>*"Would I be surprised if this patient did not survive the next 12 months?"* | Answer "Yes" | Answer "Uncertain" | Answer "No" |

## Abbreviations and resources

30STS: 30-second sit-to-stand

60STS: 60-second sit-to-stand

6MWT: 6-minute walk test

ASA-PS Classification: American Society of Anesthesiologists Physical Status Classification ASA statement

AT: anaerobic threshold

COSA: Clinical Oncology Society of Australia COSA Position Statement on Exercise in Cancer Care

CFS: Clinical Frailty Scale

CPET: Cardiopulmonary Exercise Testing

DASI: Duke Activity Status Index

ISWT: Incremental Shuttle Walk Test

M-DASI: Modified-Duke Activity Status Index

NSQIP: National Surgical Quality Improvement Program

RCRI: Revised Cardiac Risk Index

SORT: Surgical Outcomes Risk Tool

## Risk stratification and prehabilitation level

The patient's risk category, along with the grade of proposed surgery, then determines the level of prehabilitation interventions as per the stepped MacMillan model[9].

- The cut-offs used to determine an individual's risk level, and thus the level of prehabilitation interventions, can be adjusted to fit the resources available at individual health services.

Risk level may change through the preoperative phase.

- Risk level may decrease through optimisation of comorbidities (e.g. anaemia, cardiac failure) and modifiable risk factors such as improvement in functional capacity and nutritional status through prehabilitation.
- Increase in risk level may also occur (e.g. from effects of chemotherapy or physical or psychological deterioration as per the stepped MacMillan model[9], see figure below).

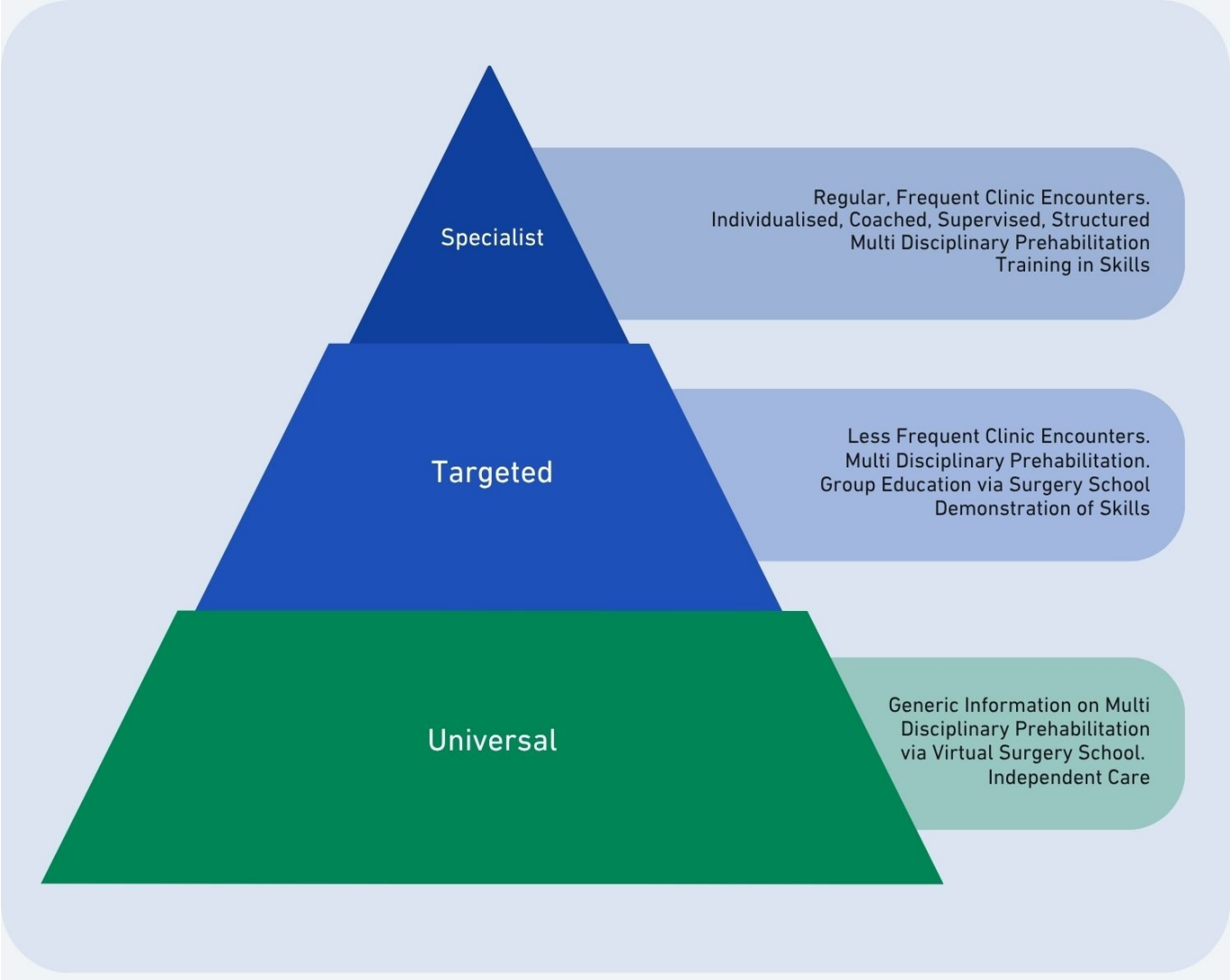


Figure 1. Modified from MacMillan prehabilitation interventions triangle[9]

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