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Taipei Municipal Wan fang Hospital (Managed by Taipei Medical University)

Oxygen therapy for acutely ill medical patients:
a clinical practice guideline

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引言人:陳秀鉛 2019.01.8

前言

- 氧氣於19世紀開始用於醫療用途，20世紀初變為常規
- >25%的病人在急診室接受氧療，氧氣常用於中風、低血氧、及幾乎所有心肌梗塞的病人
- 有許多醫療人員認為氧氣對急性成年病人幾乎不會成造傷害，但是，氧氣並不是用越多越好
- 不適當的氧氣濃度
  - 抑制呼吸中樞，導致二氧化碳累積而昏迷
  - 肺膨脹不全
  - 100%氧氣導致肺纖維化
  - 呼吸窘迫症候群
- 氧氣的使用應比照藥物，以最小的氧氣濃度達到足夠的組織氧氣供應，以避免可能的氧氣併發症

臨床問題

- In acutely ill patients, when should oxygen therapy be started?
- What is the lower limit of peripheral capillary oxygen saturation (SpO_2)?
  - 急性成年病人，何時應開始氧氣治療？
  - 周邊血氧飽和度 (SpO_2)下限是多少？
- In acutely ill patients receiving oxygen therapy, how much oxygen should be given?
- What is the upper limit of SpO_2 ?
  - 接受氧療的急性病人中，應給予多少氧氣？
  - SpO_2的上限是多少？

Oxygen therapy for acutely ill medical patients: a clinical practice guideline

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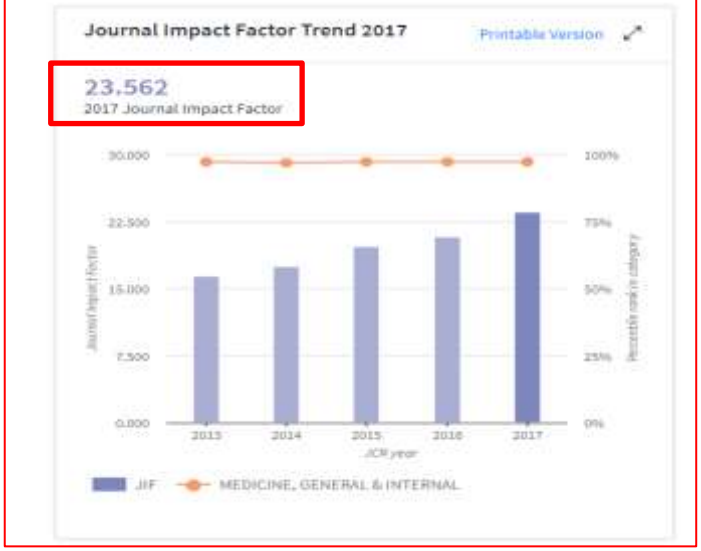
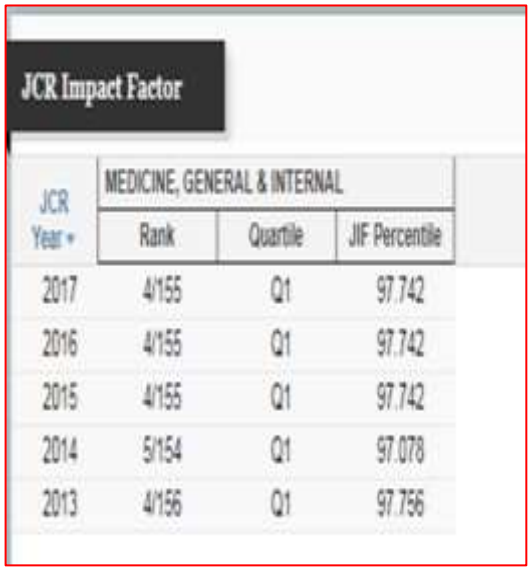
BMJ (IF)

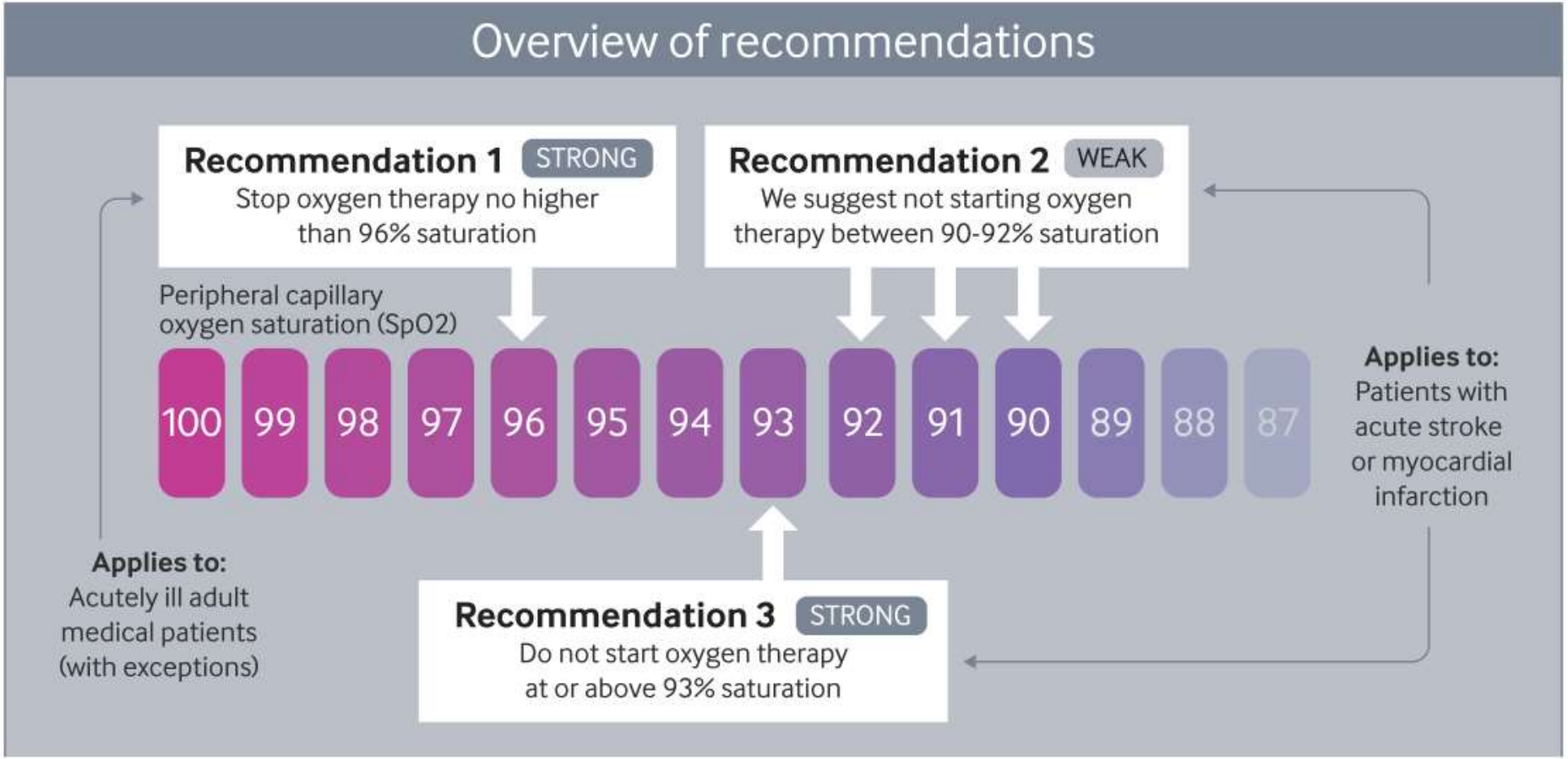




Oxygen therapy for acutely ill medical patients: a clinical practice guideline

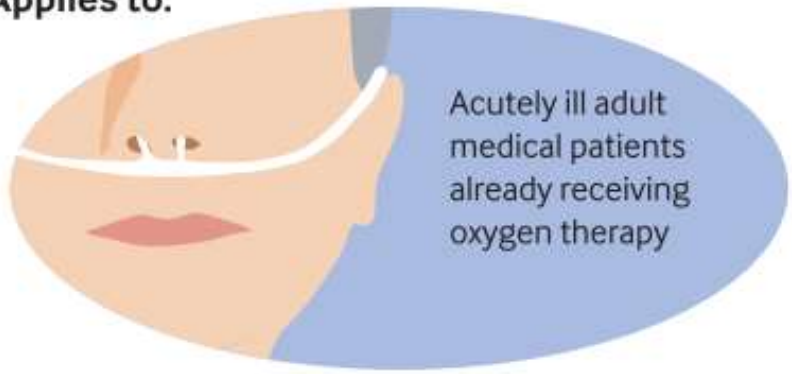
氧氣治療指引重點摘要

RAPID RECOMMENDATIONS



Recommendation 1 - upper limit

Applies to:



Acutely ill adult medical patients already receiving oxygen therapy

Including:

- ✓ Critically ill surgical patients

Does not apply to patients with:

- ✗ Carbon monoxide poisoning
- ✗ Cluster headaches
- ✗ Sickle cell crisis
- ✗ Pneumothorax

≥97% target

An upper limit of oxygen saturation target 97% or higher

or

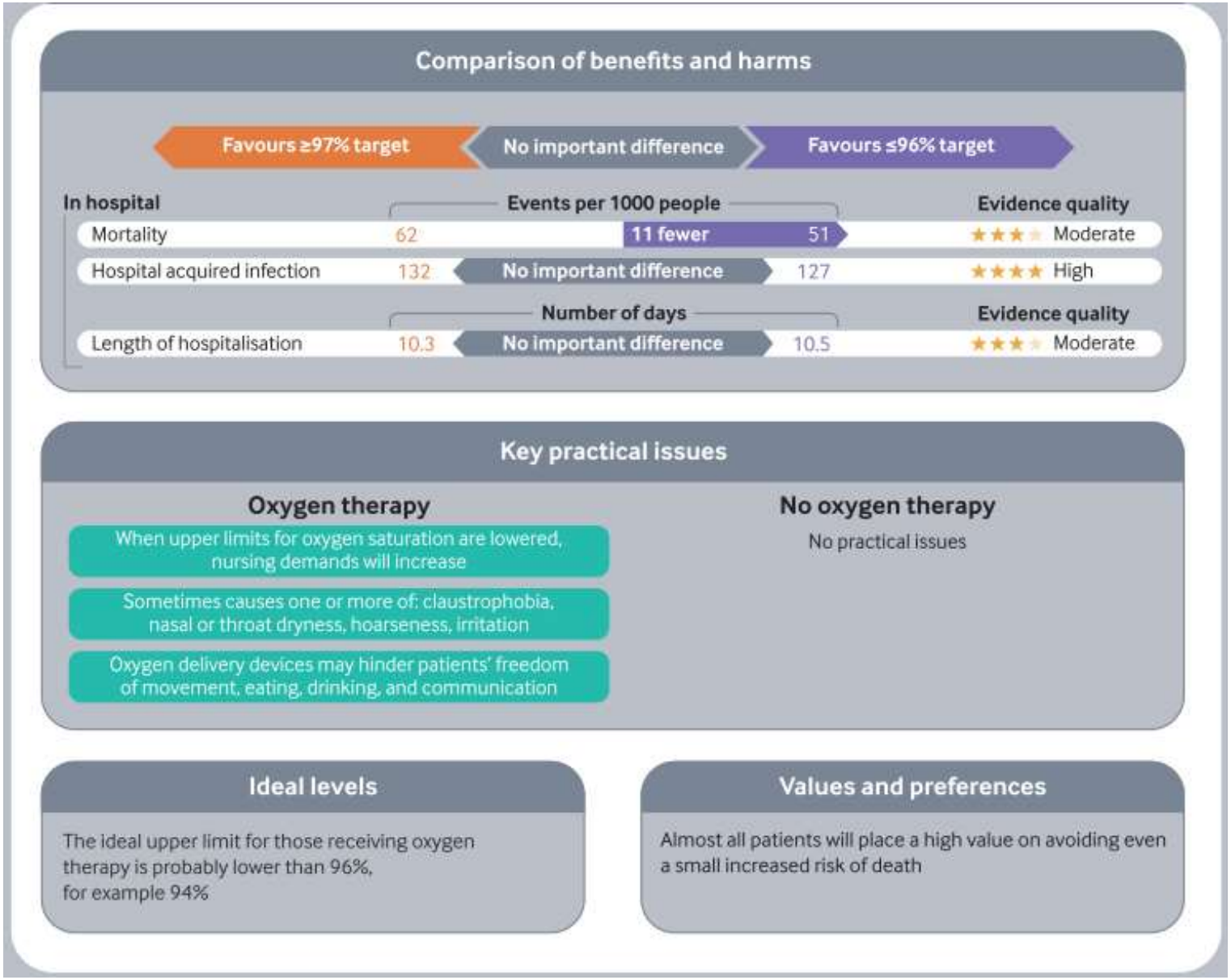
≤96% target

An upper limit of oxygen saturation target of no more than 96%

≥97% target		≤96% target	
Strong	Weak	Weak	Strong

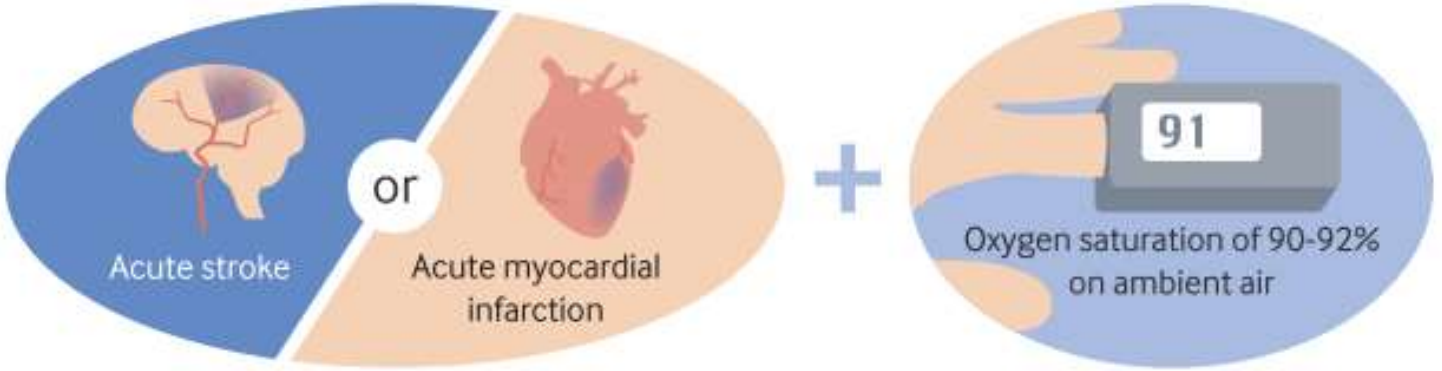
We recommend that oxygen saturation be maintained no higher than 96%

Recommendation 1 - upper limit



Recommendation 2 - lower limit (90-92%)

Applies to people with:



Oxygen therapy

Provision of supplemental oxygen

or

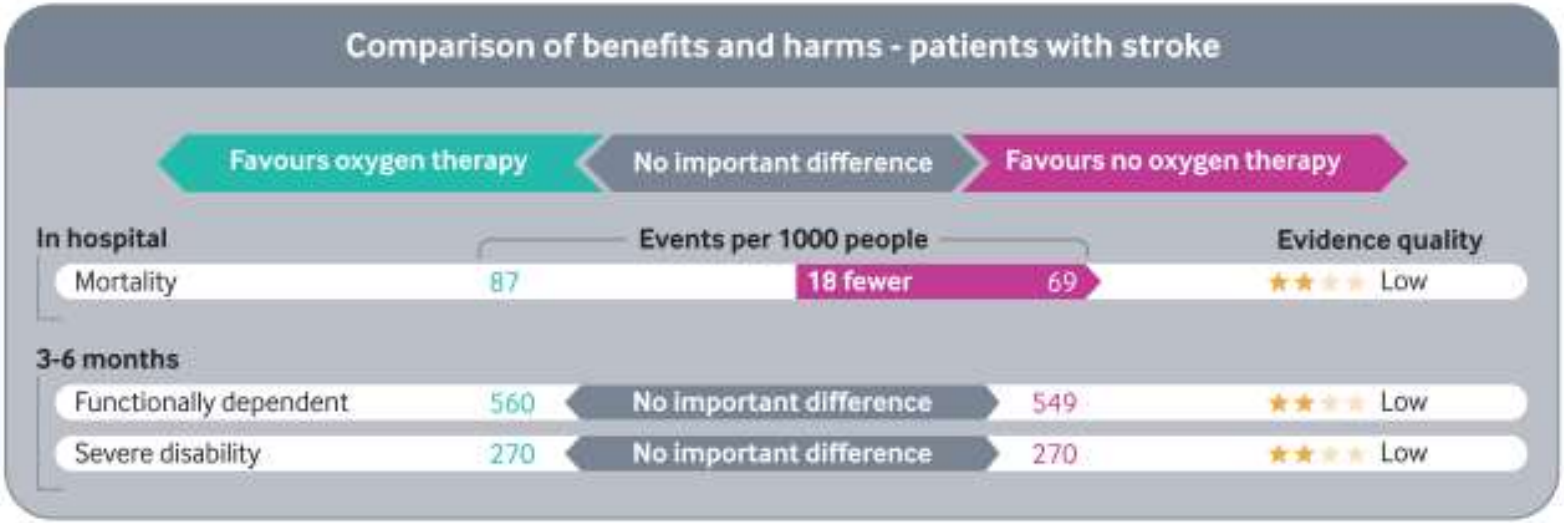
No oxygen therapy

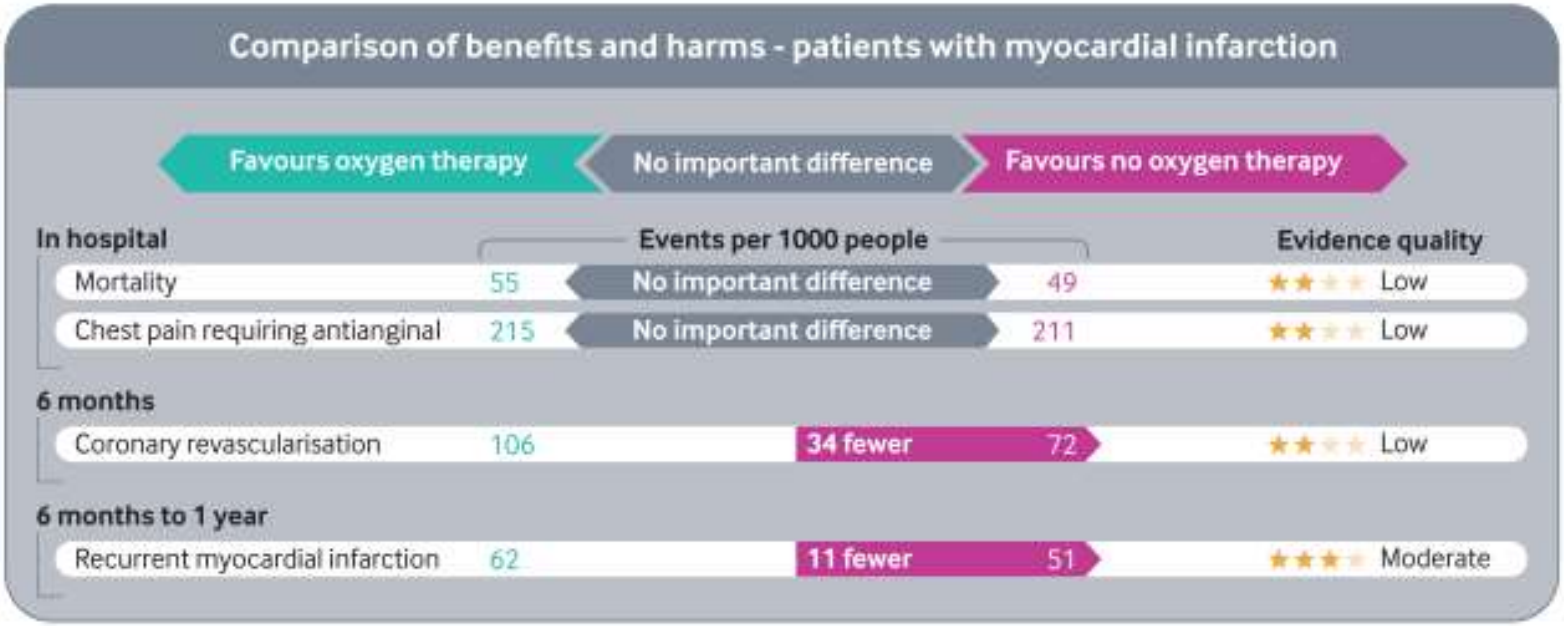
No provision of supplemental oxygen

Oxygen therapy		No oxygen therapy	
Strong	Weak	Weak	Strong

We suggest not providing oxygen therapy

Recommendation 2 - lower limit (90-92%)





Recommendation 2 - lower limit (90-92%)

Key practical issues

Oxygen therapy

- Sometimes causes one or more of: claustrophobia, nasal or throat dryness, hoarseness, irritation
- Oxygen delivery devices may hinder patients' freedom of movement, eating, drinking, and communication

No oxygen therapy

No practical issues

Ideal levels

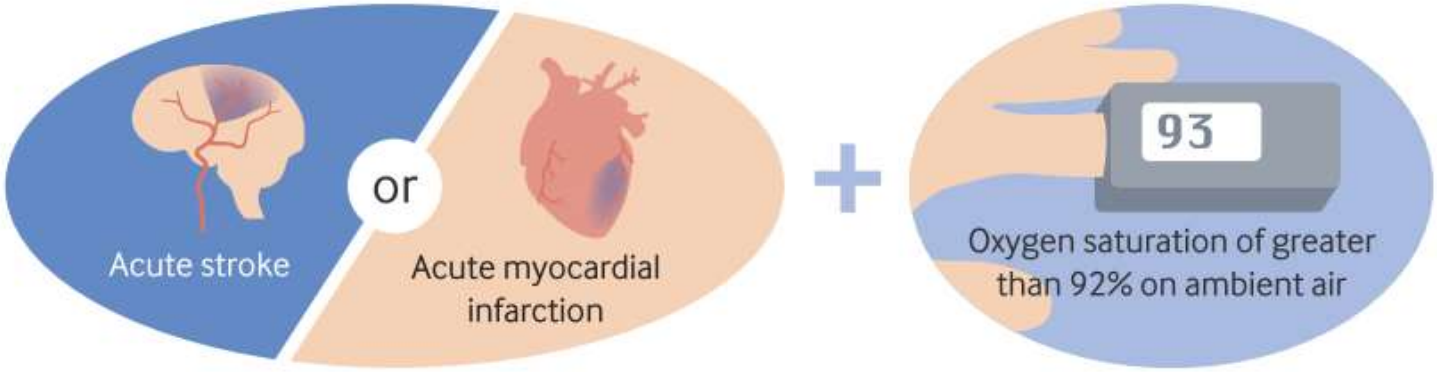
The ideal oxygen saturation at which to start oxygen therapy is uncertain, but is probably 90% or lower

Values and preferences

Wearing a mask or nasal prongs can be uncomfortable. However, aside from terminally ill patients, almost all patients are likely to accept this discomfort for even a small reduction in chance of death

Recommendation 3 - lower limit (>92%)

Applies to people with:



Oxygen therapy

Provision of supplemental oxygen

or

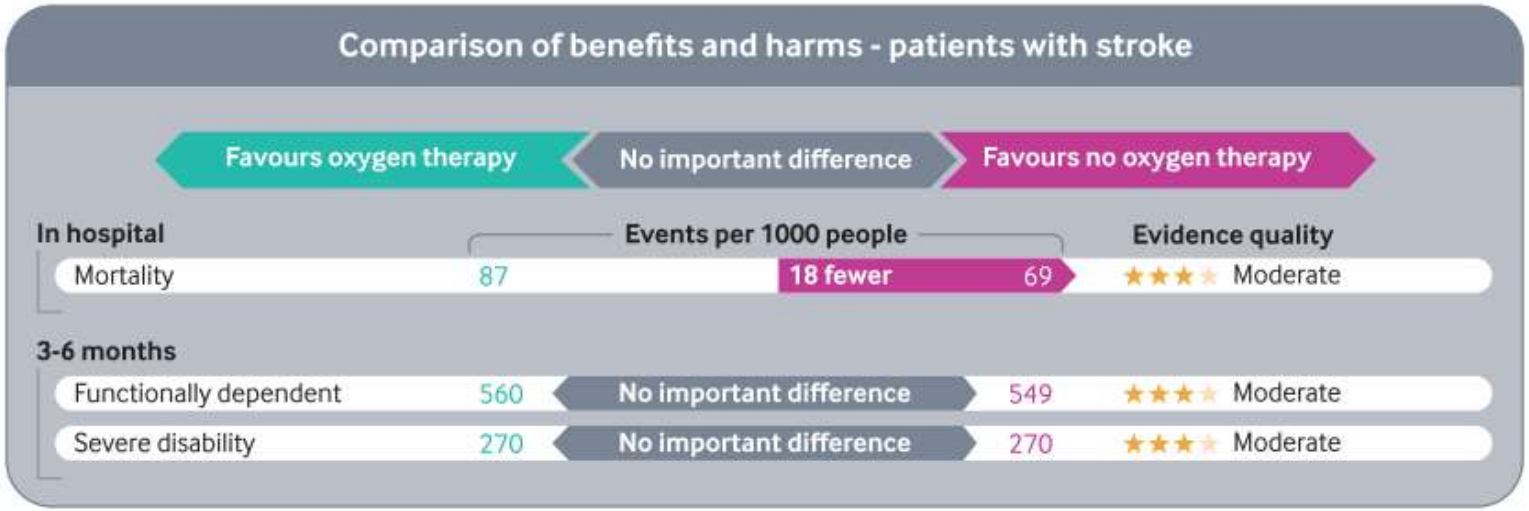
No oxygen therapy

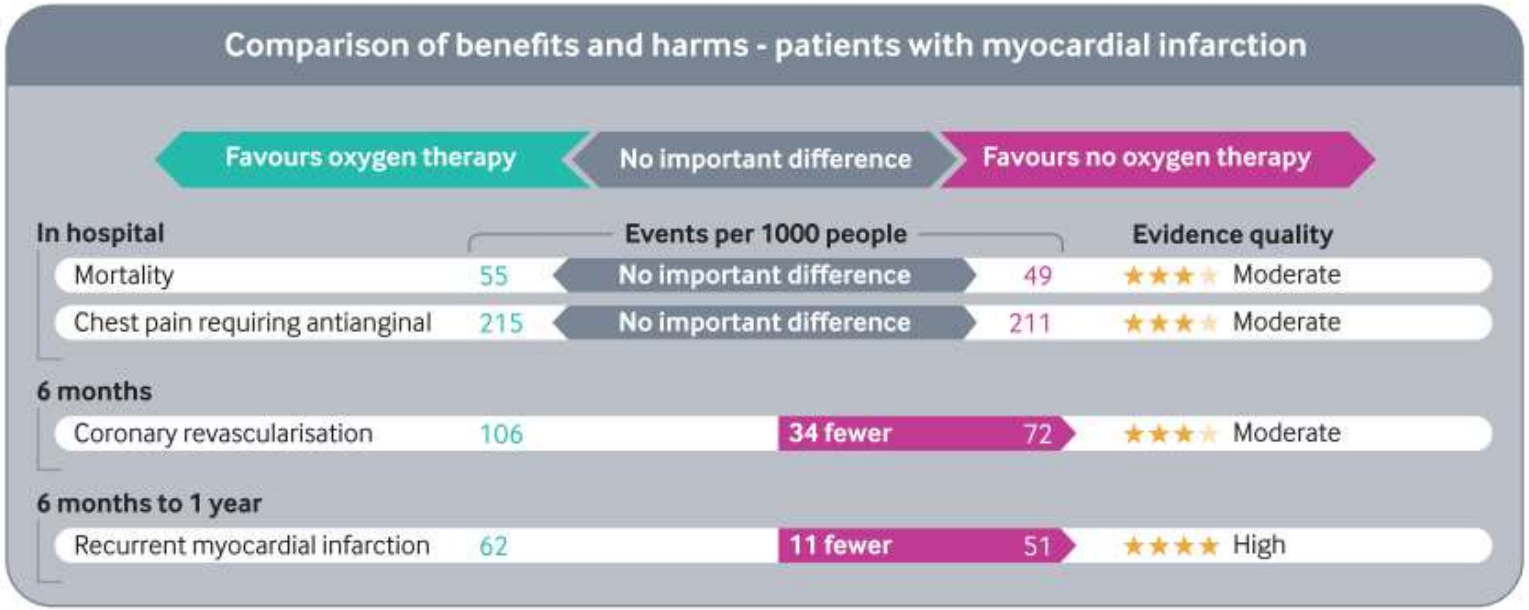
No provision of supplemental oxygen

Oxygen therapy		No oxygen therapy	
Strong	Weak	Weak	Strong

We recommend not providing oxygen therapy

Recommendation 3 - lower limit (>92%)





Recommendation 3 - lower limit (>92%)

Key practical issues

Oxygen therapy

- Sometimes causes one or more of: claustrophobia, nasal or throat dryness, hoarseness, irritation
- Oxygen delivery devices may hinder patients' freedom of movement, eating, drinking, and communication

No oxygen therapy

No practical issues

Ideal levels

The ideal oxygen saturation at which to start oxygen therapy is uncertain, but is likely below 93%

Values and preferences

Wearing a mask or nasal prongs can be uncomfortable. However, aside from terminally ill patients, almost all patients are likely to accept this discomfort for even a small reduction in chance of death

文獻評讀

(AGREE II臨床診療指引評讀工具)

1.有特別描述指引的整體目的

P6

of panel members). They decided on the scope of the recommendation and the outcomes most important to patients. The panel identified three key patient-important outcomes: mortality, hospital acquired infections, and length of hospitalisation. For two specific populations for which there was substantial randomised evidence available, the panel noted additional key outcomes: for patients with stroke, disability; and for patients with acute myocardial infarction, recurrent myocardial infarction, revascularisation, and chest pain.

完全不同意　　完全同意

1	2	3	4	5	6	7

2.有清楚述指引所涵蓋的健康問題

The panel asked;

- In acutely ill patients, when should oxygen therapy be started? (What is the lower limit of peripheral capillary oxygen saturation (SpO_2)?)
- In acutely ill patients receiving oxygen therapy, how much oxygen should be given? (What is the upper limit of SpO_2?)

The panel makes a strong recommendation for

p1

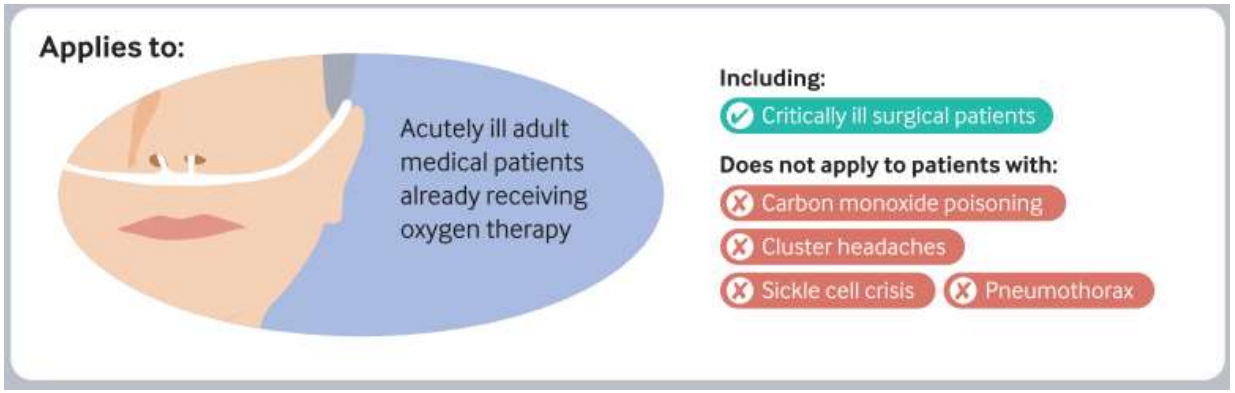
p6

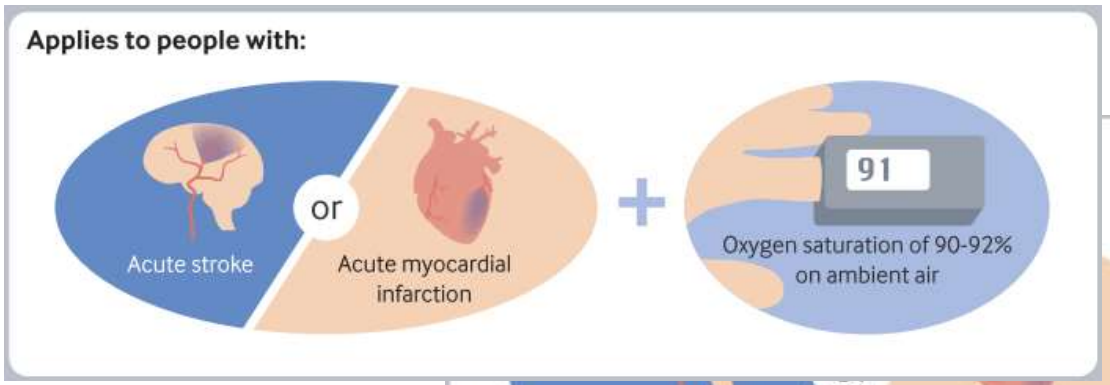
The panel considered several key practical issues: psychological comfort from oxygen, discomfort (such as nasal irritation), and feasibility (such as impact on nursing resources). The panel was interested in knowing whether the impacts of oxygen were different in different medical conditions or study populations.

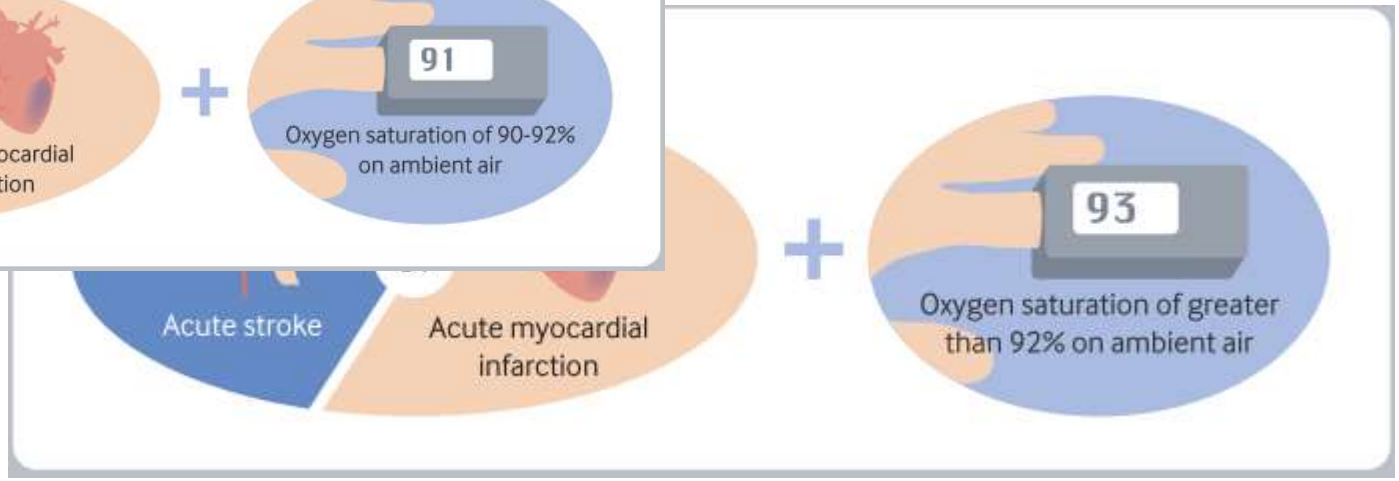
完全不同意 完全同意

1	2	3	4	5	6	7

3.清楚定義適用的族群(病人, 公眾等)







完全不同意 完全同意

1	2	3	4	5	6	7

4.指引發展團隊成員包含所有相關專業團體

Our international panel included methodologists, a respiratory therapist/technician, a nurse, patient partners who have been hospitalised for an acute medical condition, pulmonologists, intensivists, internists, an anaesthesiologist, a cardiologist, emergency physicians, and a surgeon (see appendix 1 on bmj.com for details of panel members). appendix 1 on bmj.com

P6

完全不同意 完全同意

1	2	3	4	5	6	7

5.已納入目標族群(病人、公眾等)看法和偏好

P3-P5大圖右下方都有 values and preferences

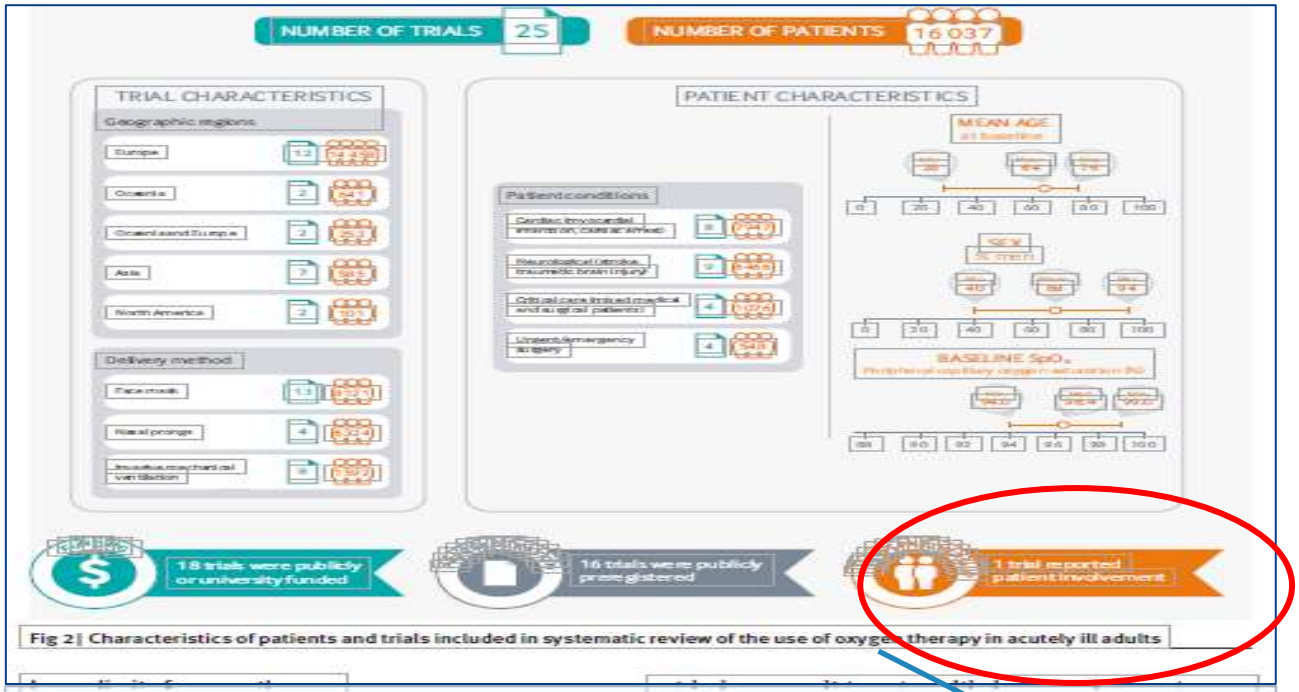


Fig 2| Characteristics of patients and trials included in systematic review of the use of oxygen therapy in acutely ill adults

P7 Fig2

p9

HOW PATIENTS WERE INVOLVED IN THE CREATION OF THIS ARTICLE

Three people with lived experience of acute medical conditions requiring hospitalisation were members of the panel. They identified and rated outcomes, and helped lead the discussion on values and preferences in a videoconference and email discussions before the full panel meetings. They noted that patients are often underinformed about the reason for and implications of supplemental oxygen therapy.

完全不同意

完全同意

1	2	3	4	5	6	7

6.清楚界定指引使用者

完 全 不 同 意　　完全同意

1	2	3	4	5	6	7

7.運用系統性的方法搜尋證據

The panel followed the BMJ Rapid Recommendations procedures for creating a trustworthy recommendation, including using the GRADE approach to critically appraise the evidence and create recommendations (appendix 3 on bmj.com)

appendix 3 on bmj.com

完全不同意　　完全同意

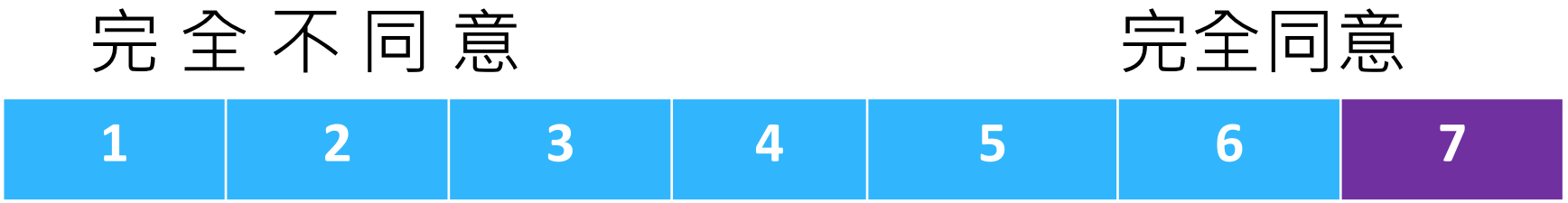
1	2	3	4	5	6	7

8. 清楚描述選擇證據的標準

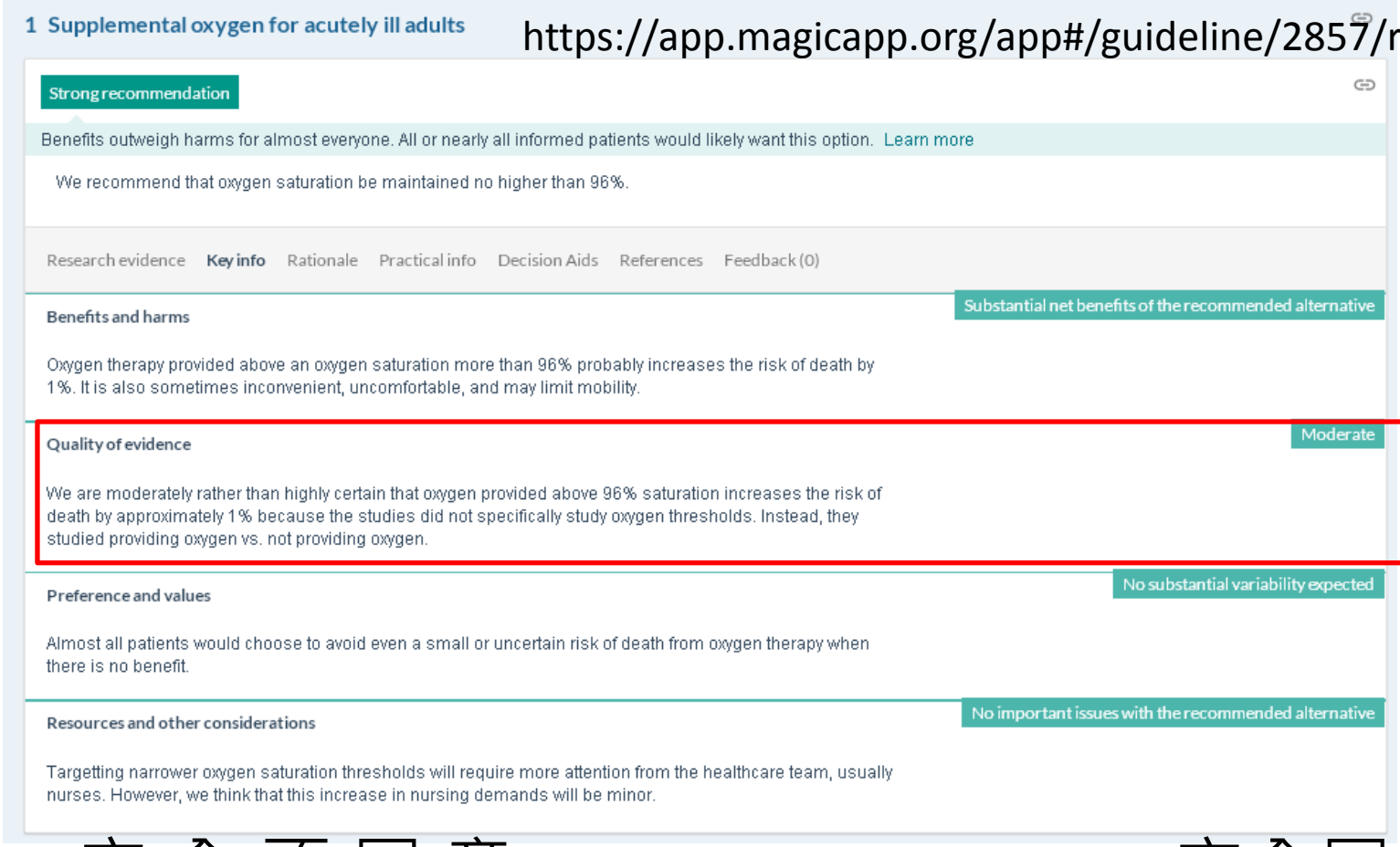
The panel considered the benefits, as well as any harms and burdens, of oxygen therapy, the certainty (quality) of the evidence for each outcome, typical and expected variations in patient values and preferences, acceptability, and feasibility.
Within the GRADE framework, recommendations can be either strong or weak (also known as conditional), and for or against a specific course of action.

appendix 3 on bmj.com

p6



9.清楚描述整體證據的強項及限制



完全不同意　　完全同意

1	2	3	4	5	6	7

10.清楚描述形成建議的方法

p6 HOW THIS RECOMMENDATION WAS CREATED

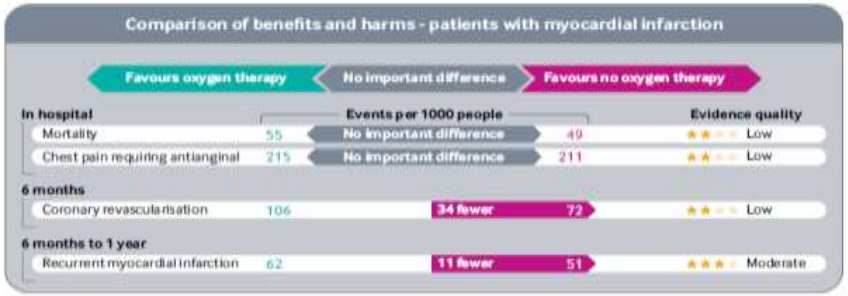
- international panel included methodologists, a respiratory herapist/technician, a nurse, patient partners who have been hospitalised for an acute medical condition, pulmonologists, intensivists, internists, an anaesthesiologist, a cardiologist, emergency physicians, and a surgeon
- They decided on the scope of the recommendation and the outcomes most important to patients. The panel identified three key patient-important outcomes: mortality, hospital acquired infections, and length of hospitalisation.
- The panel met to discuss the evidence and formulate a recommendation.
- The panel followed the BMJ Rapid Recommendations procedures for creating a trustworthy recommendation, including using the GRADE approach to critically appraise the evidence and create recommendations
- Within the GRADE framework, recommendations can be either strong or weak (also known as conditional), and for or against a specific course of action.

11.形成建議時, 有考慮到健康效益、副作用及風險

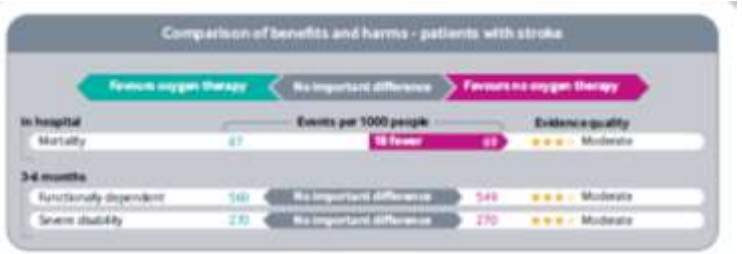
Recommendation 1 - upper limit

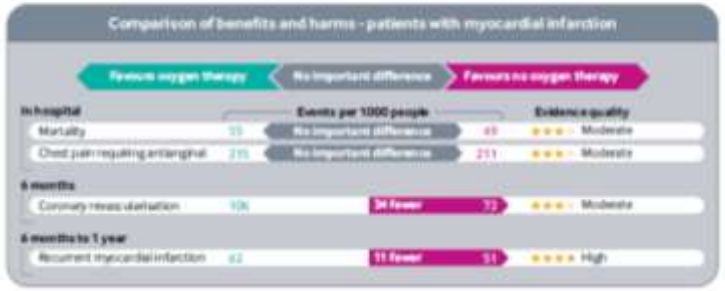
P3-5 圖

Recommendation 2 - lower limit (90-92%)



Recommendation 3 - lower limit (>92%)





完全不同意　　完全同意

1	2	3	4	5	6	7

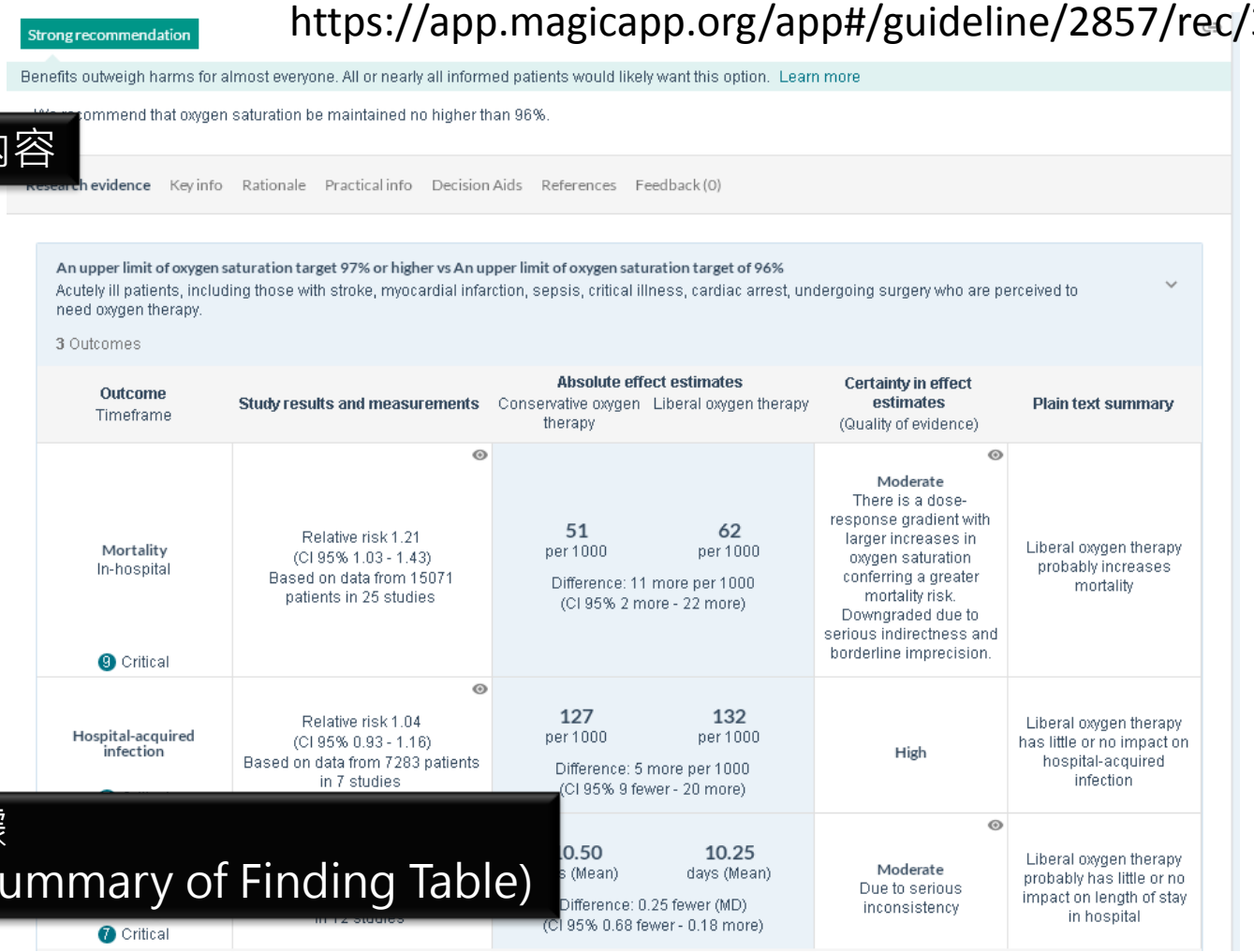
12.指引建議與其支持證據間有明確的關聯

https://app.magicapp.org/app#/guideline/2857/rec/37859

建議強度

臨床建議內容

整合的證據
(GRADE: Summary of Finding Table)



Strong recommendation

Benefits outweigh harms for almost everyone. All or nearly all informed patients would likely want this option. Learn more

...commend that oxygen saturation be maintained no higher than 96%.

Research evidence | Key info | Rationale | Practical info | Decision Aids | References | Feedback (0)

An upper limit of oxygen saturation target 97% or higher vs An upper limit of oxygen saturation target of 96%

Acutely ill patients, including those with stroke, myocardial infarction, sepsis, critical illness, cardiac arrest, undergoing surgery who are perceived to need oxygen therapy.

3 Outcomes

Outcome Timeframe	Study results and measurements	Absolute effect estimates Conservative oxygen therapy	Liberal oxygen therapy	Certainty in effect estimates (Quality of evidence)	Plain text summary
Mortality In-hospital 9 Critical	Relative risk 1.21 (CI 95% 1.03 - 1.43) Based on data from 15071 patients in 25 studies	51 per 1000	62 per 1000 Difference: 11 more per 1000 (CI 95% 2 more - 22 more)	Moderate There is a dose-response gradient with larger increases in oxygen saturation conferring a greater mortality risk. Downgraded due to serious indirectness and borderline imprecision.	Liberal oxygen therapy probably increases mortality
Hospital-acquired infection	Relative risk 1.04 (CI 95% 0.93 - 1.16) Based on data from 7283 patients in 7 studies	127 per 1000	132 per 1000 Difference: 5 more per 1000 (CI 95% 9 fewer - 20 more)	High	Liberal oxygen therapy has little or no impact on hospital-acquired infection
7 Critical		0.50 s (Mean)	10.25 days (Mean) Difference: 0.25 fewer (MD) (CI 95% 0.68 fewer - 0.18 more)	Moderate Due to serious inconsistency	Liberal oxygen therapy probably has little or no impact on length of stay in hospital

完全不同意

完全同意

1	2	3	4	5	6	7

13.指引公告前已經由其他外部專家審閱

7. External review

"External reviewers should comprise a full spectrum of relevant stakeholders...., authorship should be kept confidential....., all reviewer comments should be considered....a rationale for modifying or not should be recorded in writing.... a draft of the recommendation should be made available to general public for comment.."

appendix 3 p8-9

- At least two external peer-reviewers and one patient reviewer will review the article for The BMJ and provide open peer review.
- Each will have access to all the information in the package. They will be asked for general feedback as well as to make an overall judgement on whether they view the guidelines as trustworthy.
- A BMJ series adviser with methodological and/or statistical expertise will review the BMJ Rapid Recommendations publication and the systematic reviews.
- The Rapid Recommendations panel will be asked to read and respond to the peer review comments and make amendments where they judge reasonable
- The BMJ and Rapid Recommendations executive team may, on a case-by-case basis, choose to invite key organizations, agencies, or patient/public representatives to provide and submit public peer-review.

完全不同意						完全同意
1	2	3	4	5	6	7

14.提供指引更新的程序

8. Updating

"The date for publication, systematic review and proposed date for future review should be documented, the literature should be monitored regularly and the recommendation should be updated when warranted by new evidence"

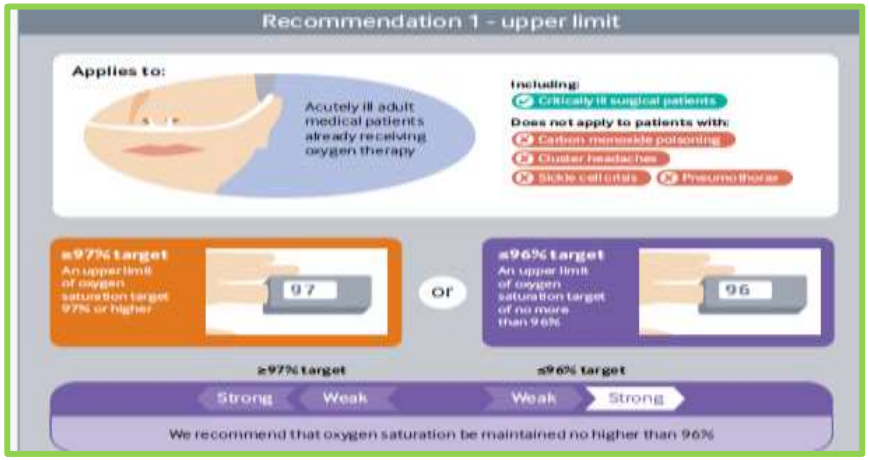
- The *Rapid Recommendations* panel will, through monitoring of new research evidence for published *BMJ* Rapid Recommendations, aim to provide updates of the recommendations in situations in which the evidence suggests a change in practice. These updates will be initially performed in MAGICapp and submitted to *The BMJ* for consideration of publication of a new Rapid Recommendation.

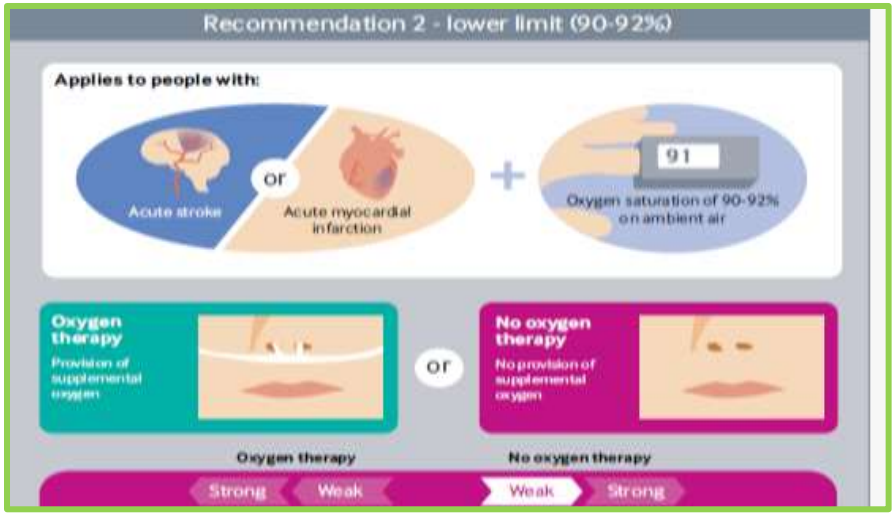
appendix 3 p9

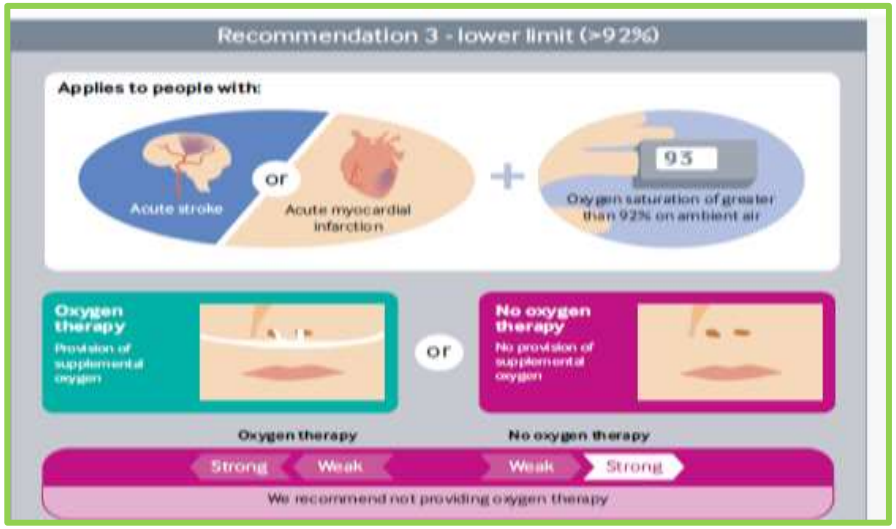
完全不同意　　完全同意

1	2	3	4	5	6	7

15.指引中的建議具體、明確



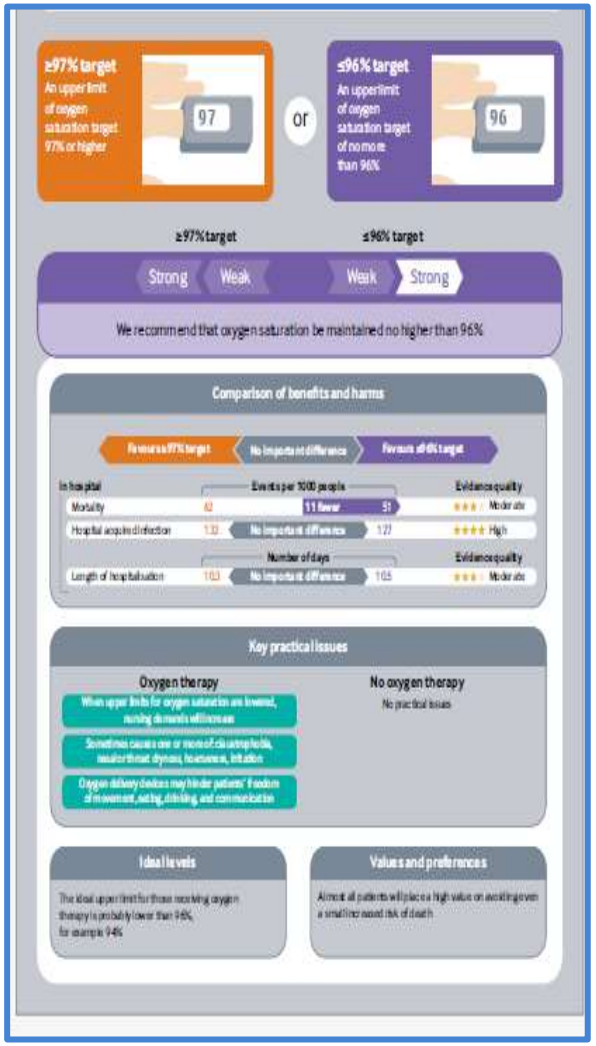


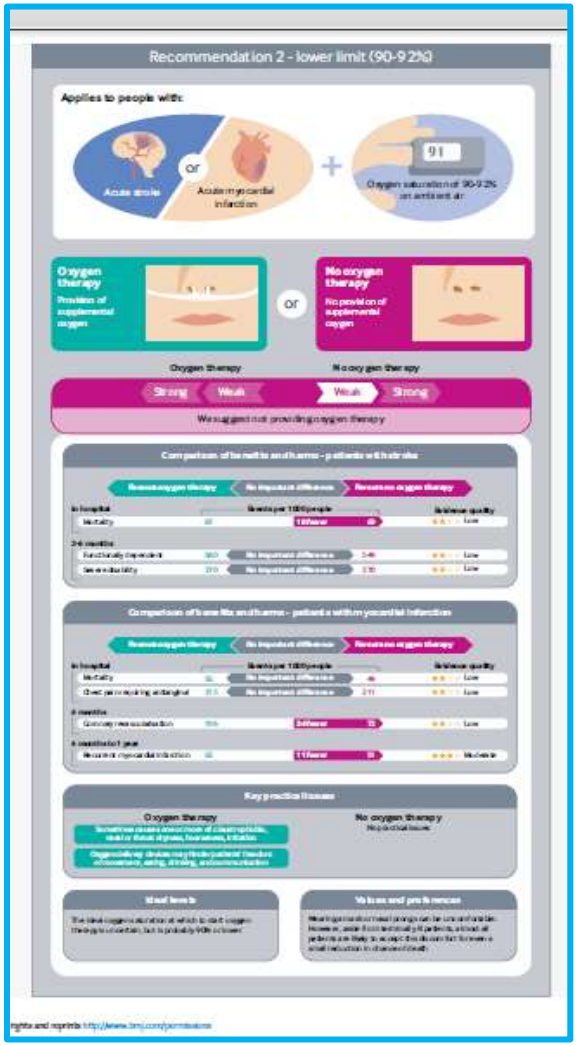


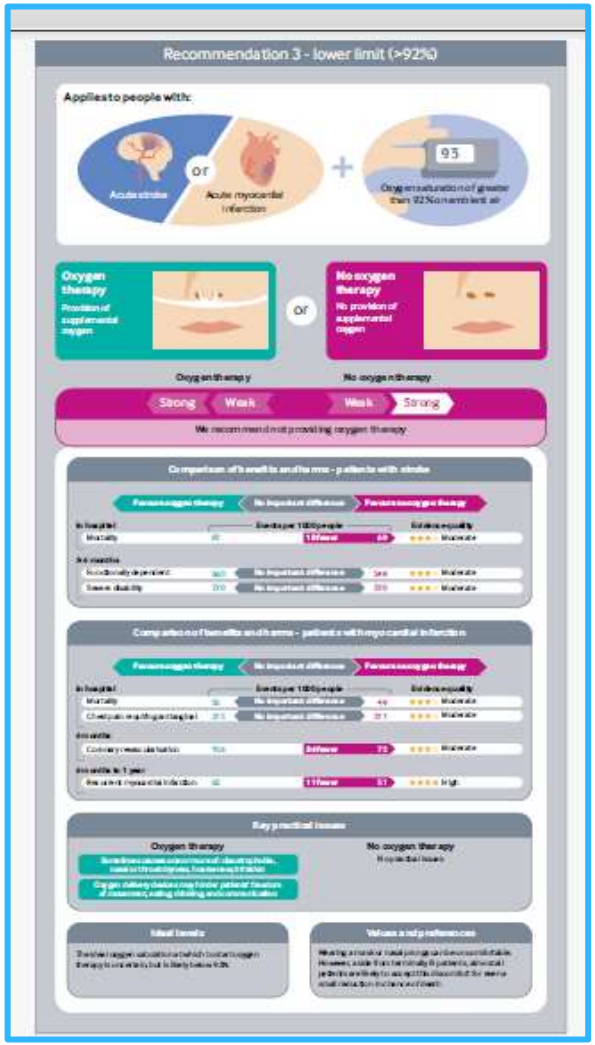
完全不同意　　完全同意

1	2	3	4	5	6	7

16.清楚呈現處理狀況或健康議題的不同選項







完全不同意

完全同意

1	2	3	4	5	6	7

17.主要建議清楚易辨

完 全 不 同 意　　完全同意

1	2	3	4	5	6	7

18.指引有描述在應用時會遇到助力或障礙

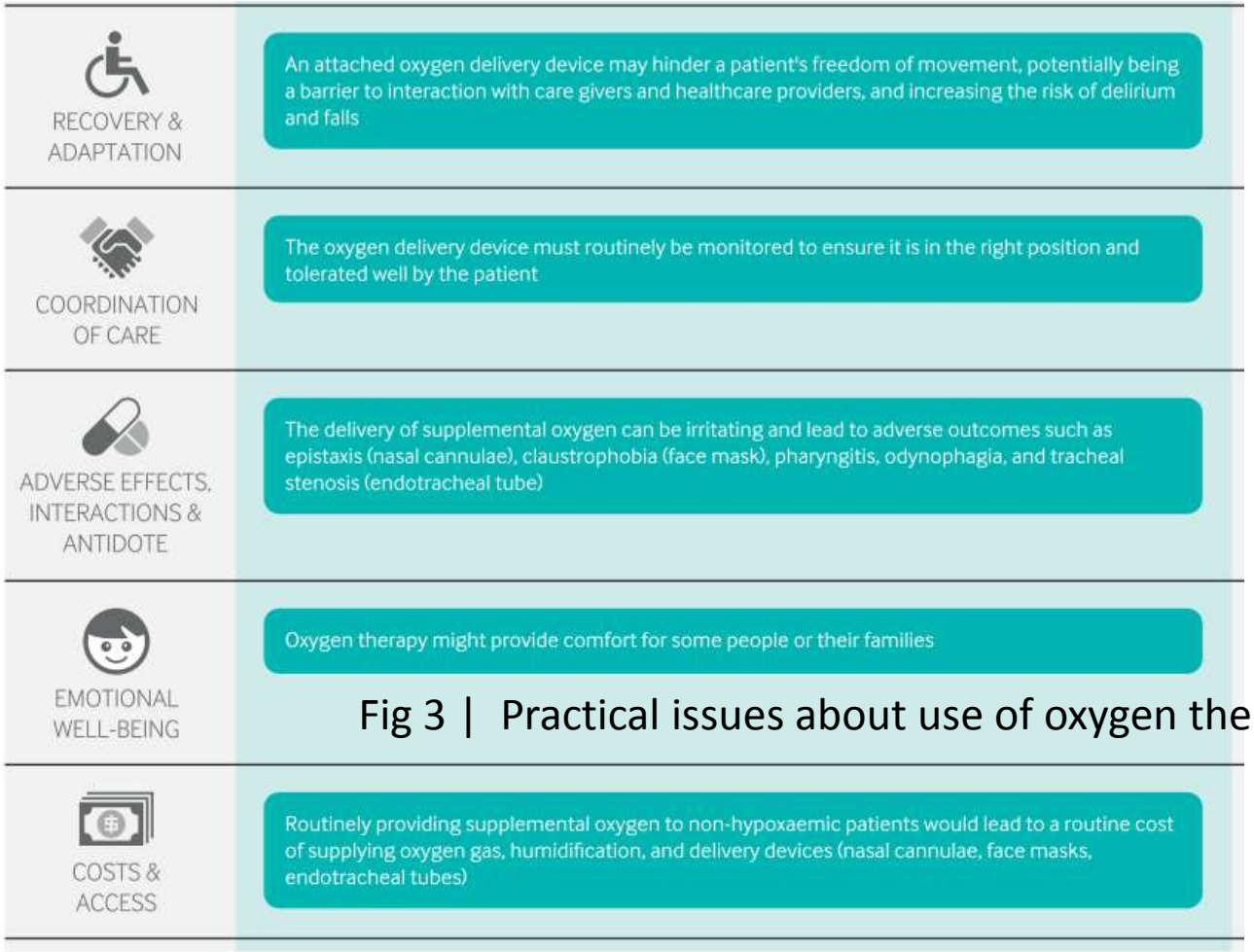


Fig 3 | Practical issues about use of oxygen therapy for patients

完全不同意　　完全同意

1	2	3	4	5	6	7

19.指引有提供如何實踐建議的說明和(或)配套工具

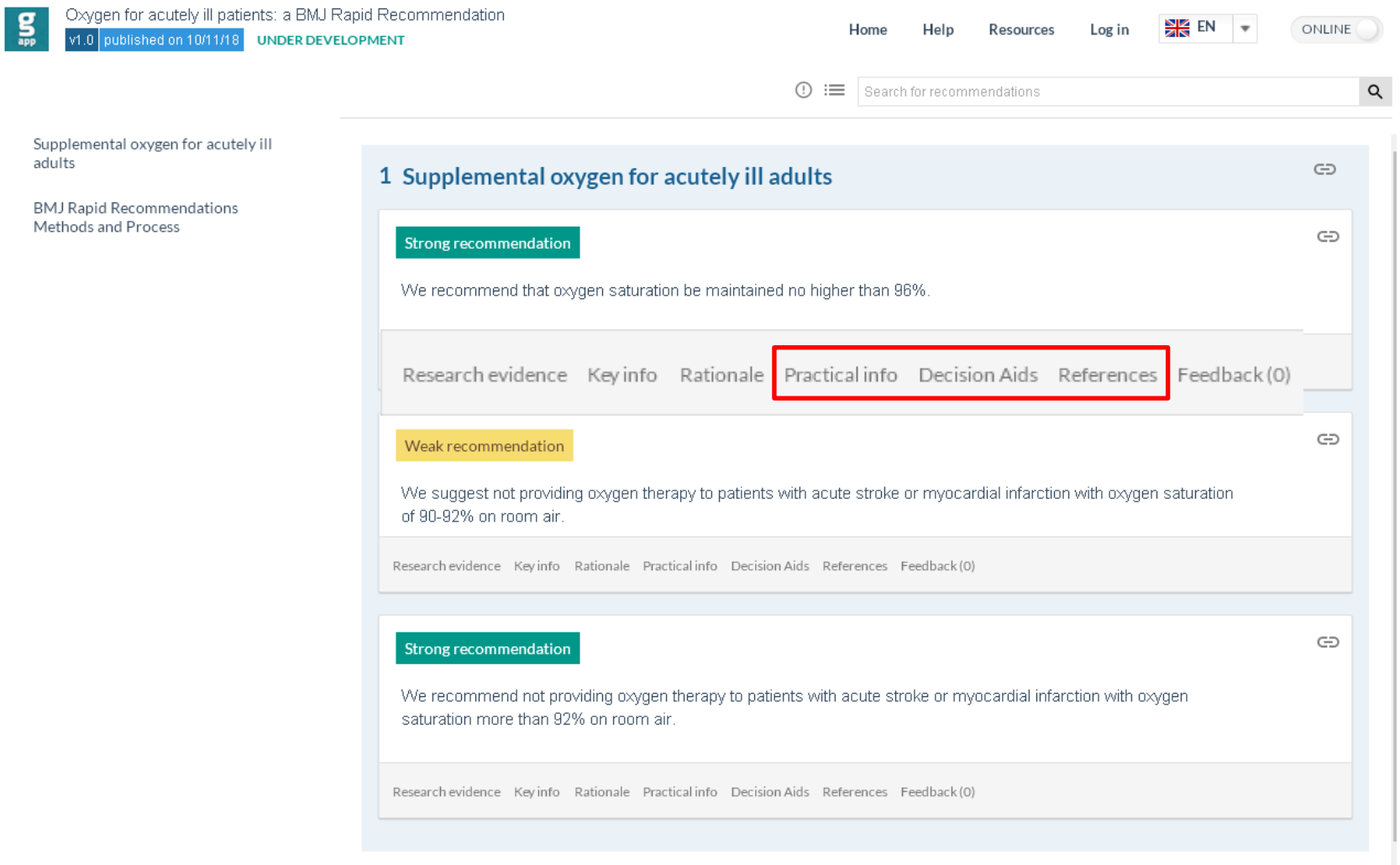
Disseminate the rapid recommendations through

a. publication of the research in *BMJ* journals
b. short summary of recommendations for clinicians published in *The BMJ*
c. press release and/or marketing to media outlets and relevant parties such as patient groups
d. Links to BMJ Group's *Best Practice* point of care resource
e. MAGICapp which provides recommendations and all underlying content in digitally structured multilayered formats for clinicians and others who wish to re-examine or consider national or local adaptation of the recommendations.

MAGIC app

ttps://app.magicapp.org/public/guideline/. jxQ7OL

19.指引有提供如何實踐建議的說明和(或)配套工具



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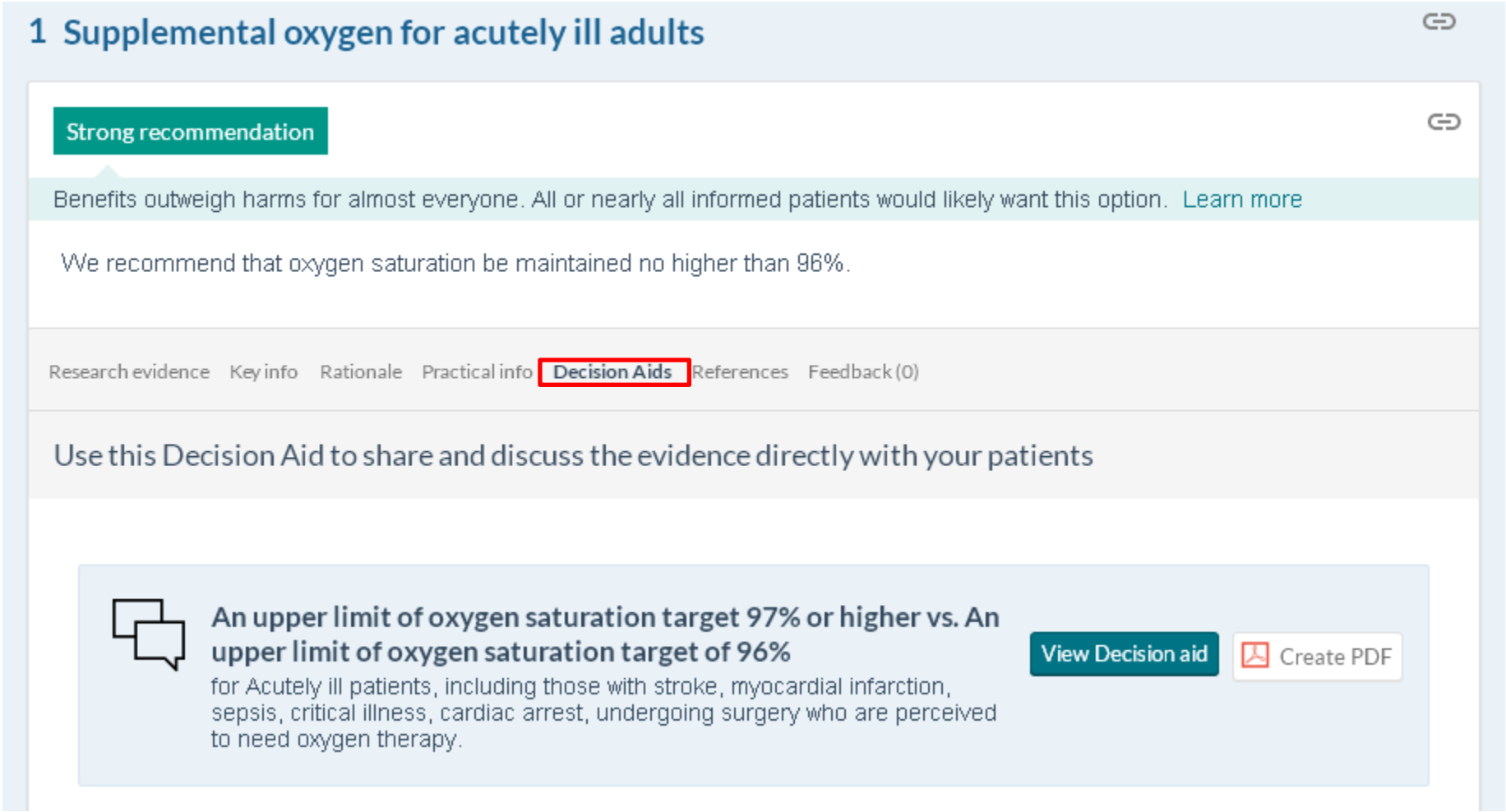

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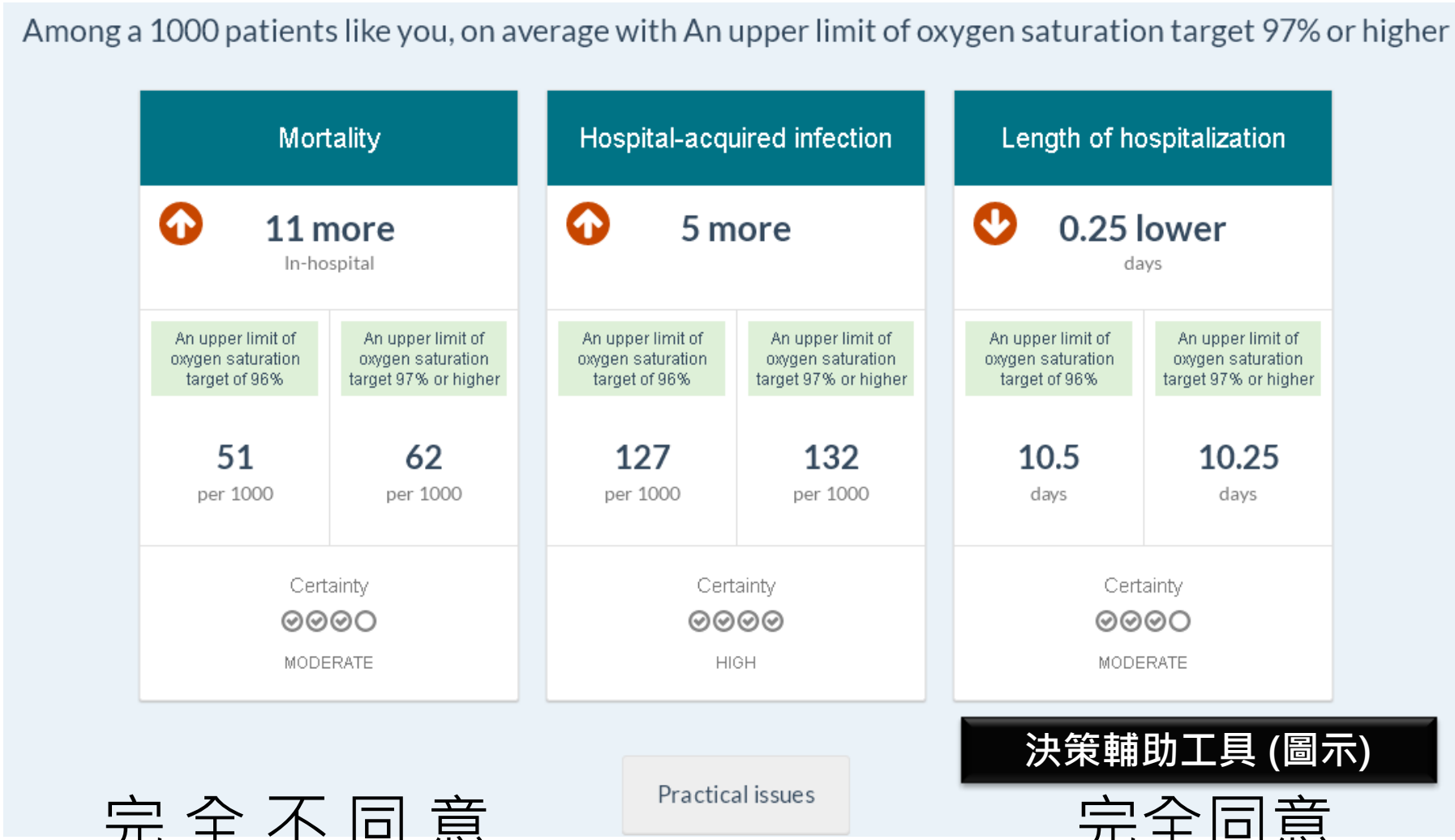


20.有考慮到應用建議時對資源的潛在影響

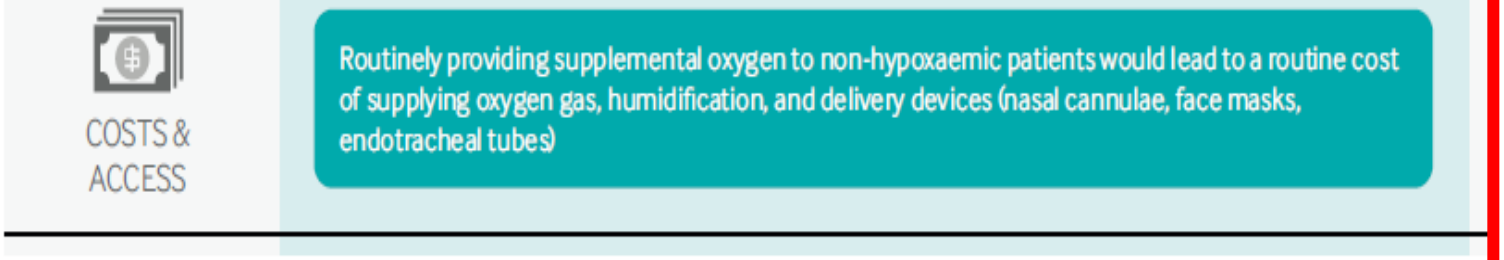


Fig 3| Practical issues about use of oxygen therapy for patients

Costs and resources

Patients are unlikely to view the modest cost of oxygen as excessive, particularly in settings where they do not directly pay for their care.

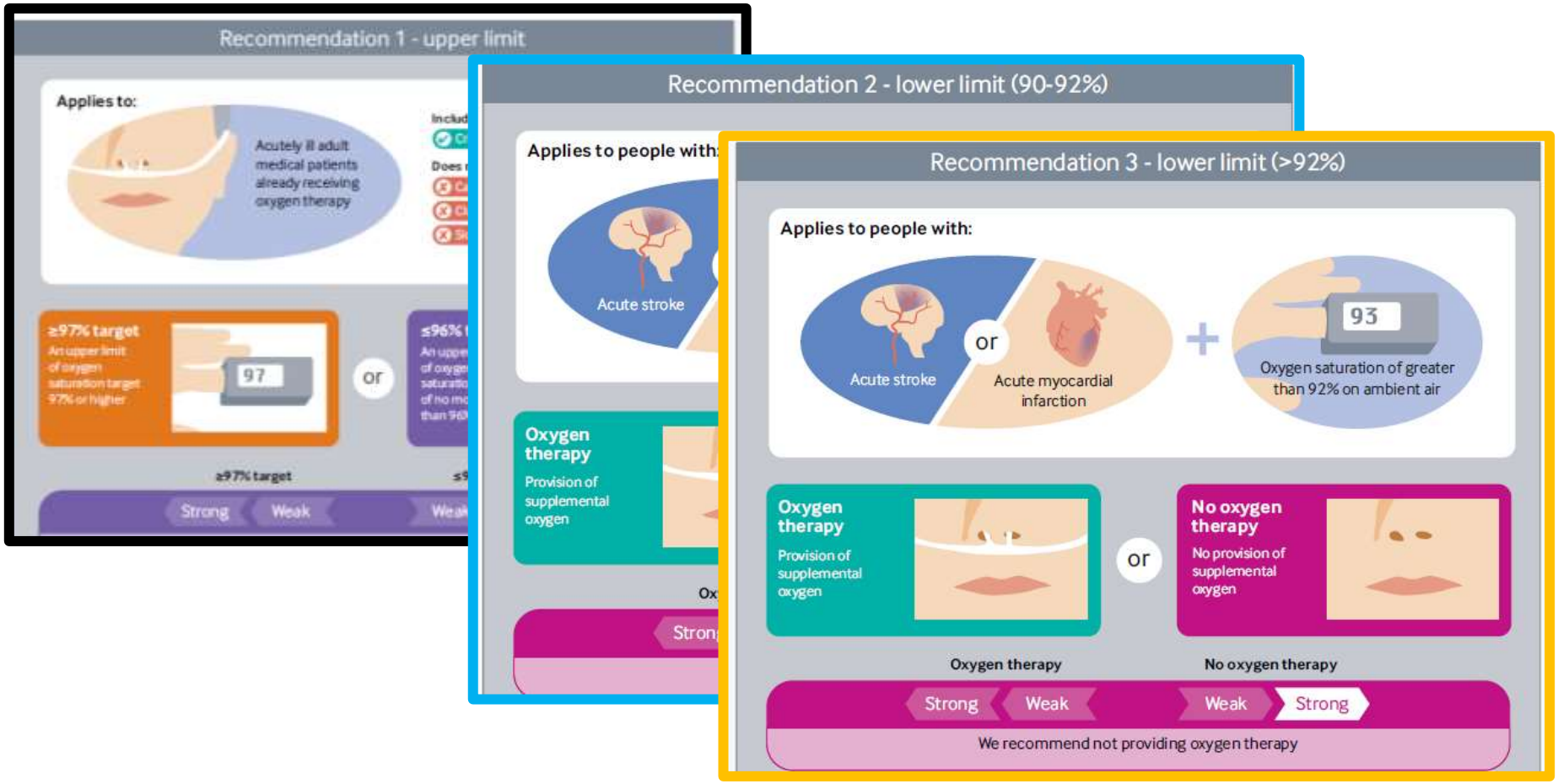
A target SpO_2 range (rather than a lower limit without an upper limit) will need closer monitoring by the healthcare team. Our recommendations do not consider healthcare payer considerations. We suggest a target SpO_2 range that is sufficiently wide that it does not require excessive attention (such as 90-94%). Some patients will have wider SpO_2 fluctuations and may therefore require a wider target range; these patients may also benefit from closer monitoring.

p9

完全不同意　　完全同意

1	2	3	4	5	6	7

21.指引呈現監測和(或)評估的標準



完全不同意　　完全同意

1	2	3	4	5	6	7

22.贊助者的見解沒有影響到指引的內容

Funding: This guideline was not funded.

完 全 不 同 意　　完全同意

1	2	3	4	5	6	7

23. 記錄和陳述指引發展團隊成員的利益競爭

P9右下方

Competing interests:

- All authors have completed the BMJ Rapid Recommendations interests disclosure form, and a detailed description of **all disclosures is reported in appendix 2 on bmj.com.**
- As with all BMJ Rapid Recommendations, the executive team and The BMJ judged that no panel member had any financial conflict of interest.
- Professional and academic interests are minimised as much as possible, while maintaining necessary expertise on the panel to make fully informed decisions.
- DK Chu, LH-Y Kim, and W Alhazzani co-authored the systematic review that formed the evidence base for this guideline. RAC Siemieniuk, T Agoritsas, PO Vandvik, L Lytvyn, and GH Guyatt are members of the GRADE Working Group

完全不同意						完全同意
1	2	3	4	5	6	7

AGREE II 整體總評

1.Rate the overall quality of the guideline
整體品質評分

1	2	3	4	5	6 √	7

最低可能的品質　　最高可能的品質

AGREE II 整體總評

2.I would recommend this guideline for use. 我是否建議採用本指引

1. 強烈建議血氧飽和度>96%時，停止給氧。否則可能會增加病人死亡風險，也沒有更多治療獲益。
2.對於心臟病發作或中風的病人，建議血氧飽和度90%~92%時無需啟動吸氧，並強烈建議血氧飽和度>93%時不要給氧。
3.對於大多數急症病人，國際小組認為90-94%的血氧飽和度是比較合理的治療目標；對於有高碳酸血癥呼吸衰竭風險的患者，合理治療目標區間為88-92%。

建議：35位
建議(有但書或需修改)：0位
不建議：0位

臺北市立萬芳醫院
-委託財團法人臺北醫學大學辦理-

THANKS