

REDEFINING SUCCESS IN THE TREATMENT OF PERIPROSTHETIC JOINT INFECTION:

A qualitative analysis guided by Artificial Intelligence

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Cross-model qualitative analysis · 10 AI models · same prompt · 2 independent reviewers · 43 sub-domains analysed

BACKGROUND

Defining treatment success after periprosthetic joint infection (PJI) is inherently multifactorial.

- Traditional definitions focus on infection eradication, wound healing, no further surgery for infection, and no chronic suppressive antibiotics.
- Recent literature shows that reported success rates change substantially according to the definition applied.

AIM

To identify the macro-domains and sub-domains most frequently reported by Artificial Intelligence (AI) models when defining successful treatment of PJI.

METHODS

INPUT

10 AI models - Same clinical question
Same prompt - Definition of PJI treatment success

OUTPUT

10 definitions - one output per model

REVIEW

2 reviewers for the 10 definitions
Independent qualitative coding

DOMAIN MAPPING

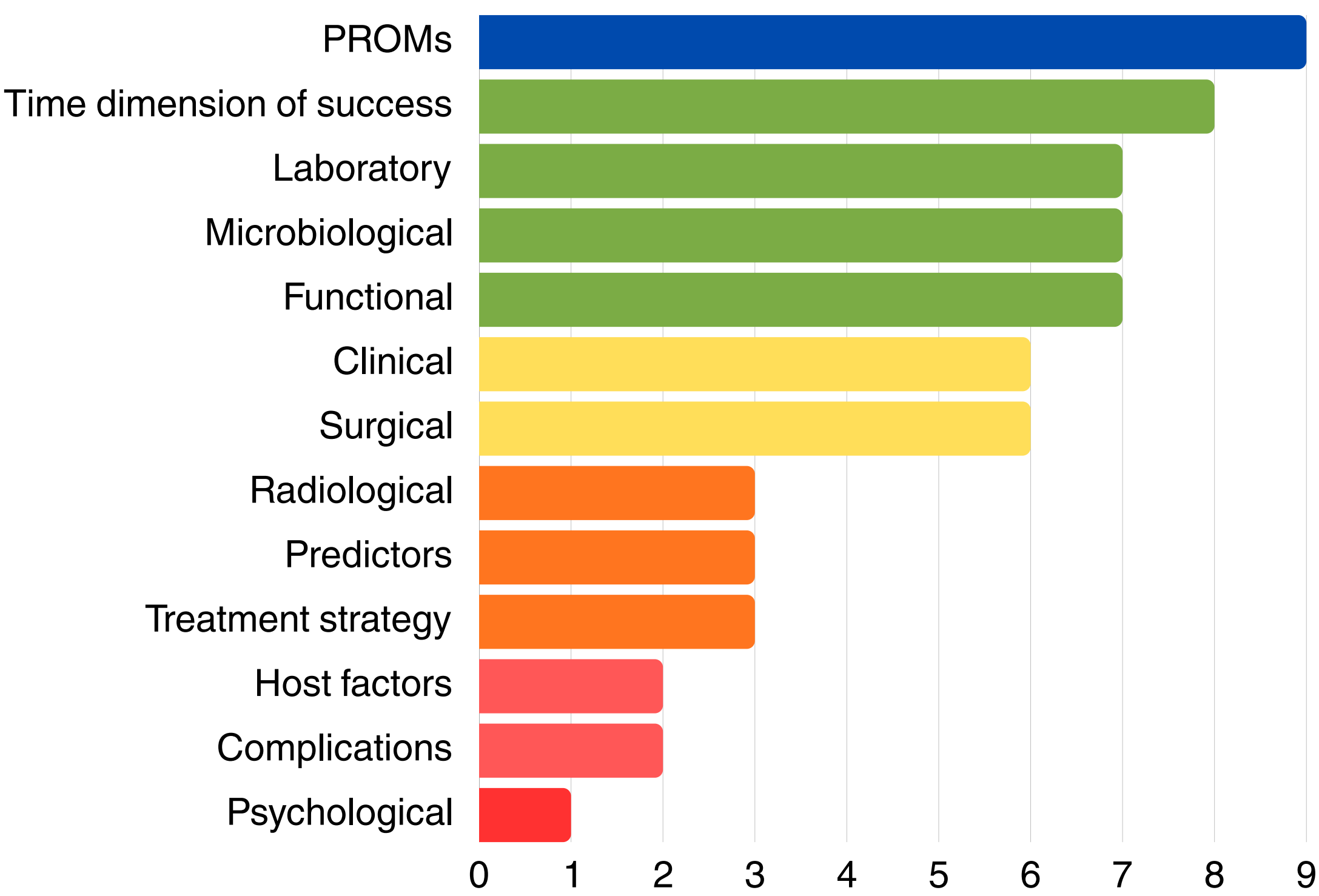
Identification of macro-domains + sub-domains

FREQUENCY ANALYSIS

Convergence · fragmentation · blind spots

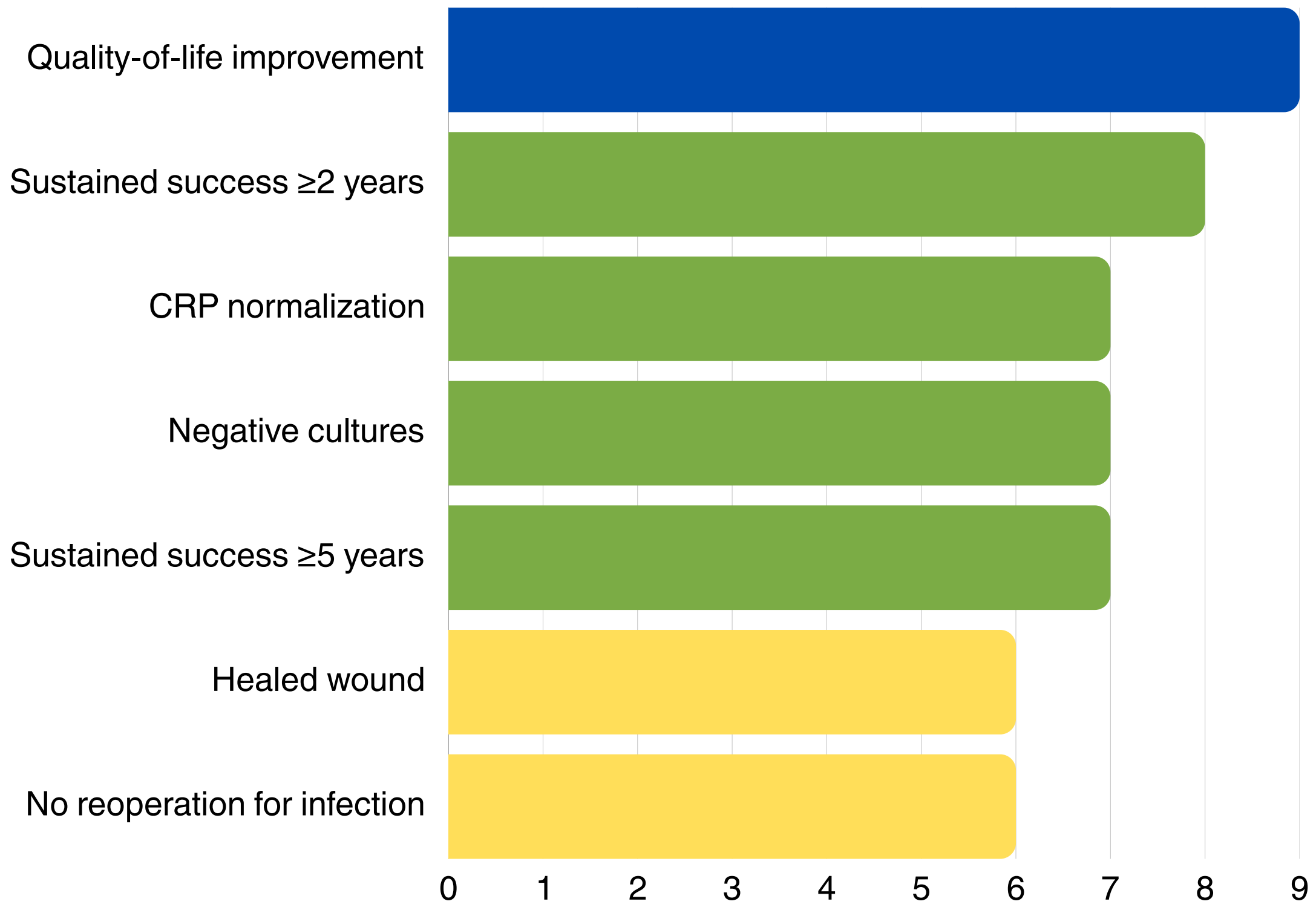
RESULTS: MACRO-DOMAINS

Frequency across the 10 AI-generated definitions



RESULTS: SUB-DOMAINS

Highest-consensus sub-domains (43 analysed)



OTHER RECURRENT ELEMENTS

Functional score improvement 6/10 · Implant retained 5/10 ·
Range-of-motion recovery 5/10 · Return to activities of daily living 5/10 · Pain control 4/10

THE BLIND SPOT

Psychological dimension per se was almost absent.

1/10
Psychological domain

1/10
Psychological well-being

This mismatch is particularly relevant when treatment success is interpreted as a broader recovery of health and quality of life.

THE THREE PILLARS OF SUCCESS IDENTIFIED BY AI



PATIENT
BENEFIT

PROMs



BIOLOGICAL
CONTROL

Laboratory and
microbiological
control



DURABILITY

Success
maintained
over time

KEY INTERPRETATION

The strongest convergence was not limited to infection eradication: **AI models repeatedly incorporated patient-reported benefit and the durability of the result.**

CONCLUSION

AI-generated definitions show a stable core centred on:

- PROMs
- Durability over time (2-to-5 years)
- Biological control

However, psychological dimension per se remains underrepresented.

AI captures the core of success, but not its full human complexity.

TAKE HOME MESSAGE

“Success in PJI treatment is not only infection eradication or avoidance of further surgery, but the balance between biological control, durability over time, and what the patients report they have regained in their life.”

SELECTED REFERENCES:

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