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Determining the Minimum Clinically Important Difference of Outcomes Following Lower Extremity Orthopedic Procedures

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Disclosures

- No relevant disclosures

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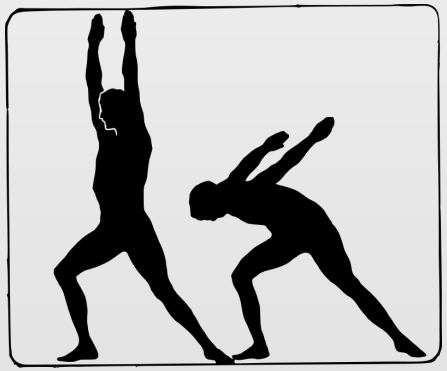
Background



- Patient-reported outcomes (PROs) offer providers a powerful tool to measure patient improvement and evaluate treatment techniques
- Minimum Clinically Important Difference (MCID) values are a practical benchmark to evaluate improvement following surgery
- General MCID values have been estimated for the foot and ankle population, but not for specific procedure categories.

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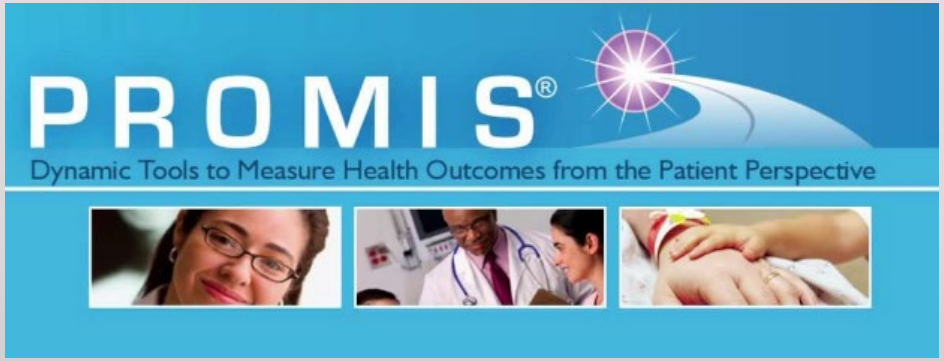
Goal

- Calculate procedure-specific MCID values for common lower-extremity injuries to provide physicians a benchmark to evaluate patient reported outcomes



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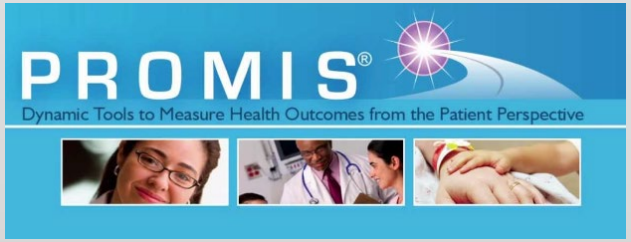
Methods – Outcomes collected

- Consecutive patients enrolled in the U-COSMOS* platform
- Patients undergoing lower extremity surgery included
- Dates: 2019 - 2023
- PROs Collected:
  - Foot and Ankle Single Assessment Numeric Evaluation (FA SANE)
  - PROMIS Physical Function CAT
  - PROMIS Pain Interference CAT



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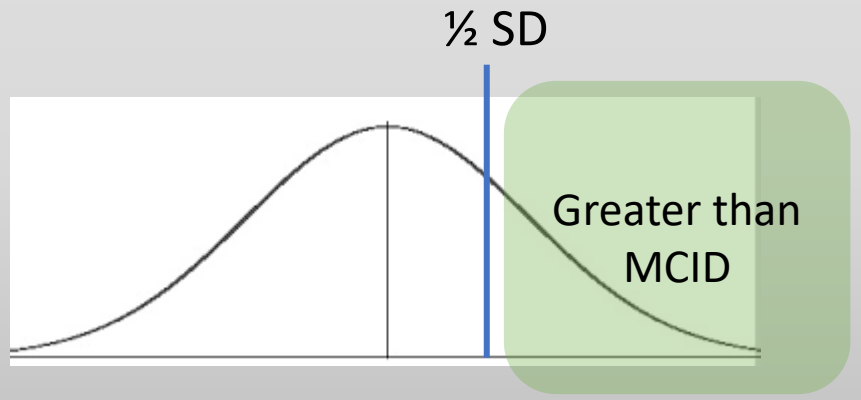
Two methods used to calculate MCID

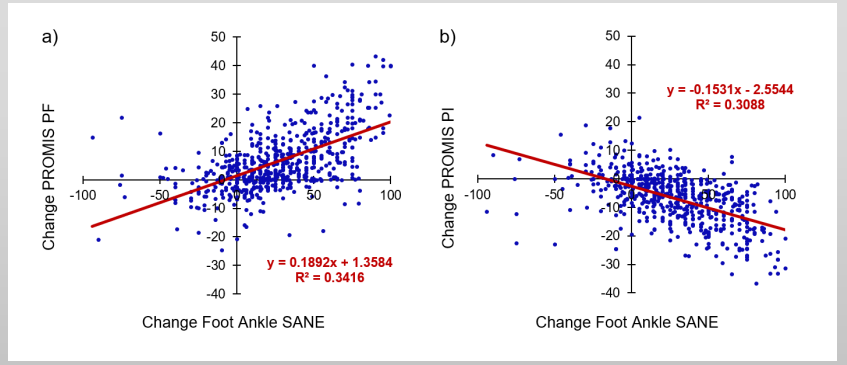
½ Standard Deviation (Distribution-based Method)

- Established method from the literature
- MCID set as ½ SD from baseline mean



Linear Regression w/ FA SANE (Anchor-based Method)

- Novel method to this study
- Anchored against FA SANE, which provides patient-perceived improvement as benchmark.
- Linear regression used to calculate slope, and ½ SD improvement in FA SANE (patient perception) used to calculate MCID



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Results

- N = 895
- All surgeries included
- Minimum 6-month follow-up
- Used longest follow-up available
- Average follow-up > 1 year (431 days)

Patient Demographics (N=895)	
Follow-up (days)	
Mean (SD)	431 (±170)
Age	
Mean (SD)	52.1 (±16.0)
Gender	
Female	540 (60.3%)
Male	354 (39.6%)
Race	
White	747 (83.5%)
Black or African American	21 (2.3%)
Asian	15 (1.7%)
American Indian or Alaska Native	4 (0.4%)
Other Race	42 (4.7%)
Missing	66 (7.4%)
Laterality	
Left	447 (49.9%)
Right	448 (50.1%)

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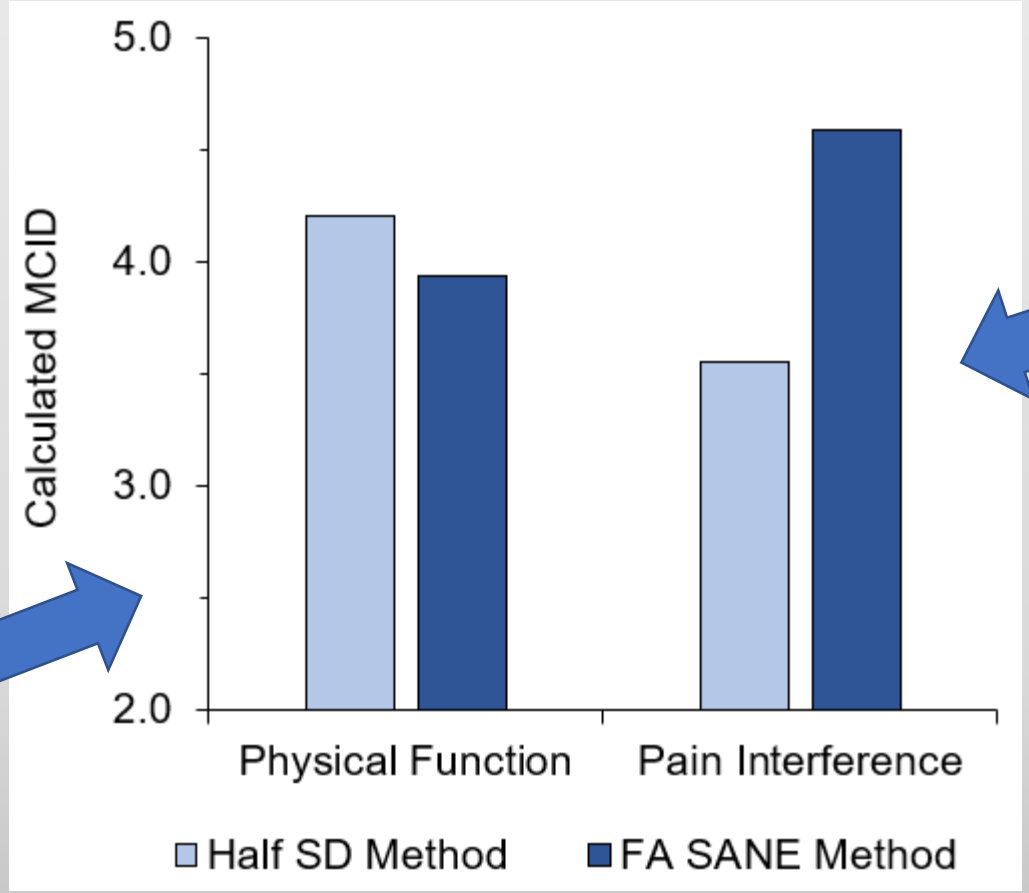
Results – Calculated MCID for all procedures

MCID value calculated for PF is consistent between methods



FA SANE method (anchored to patient perception) supports a larger reduction in pain needed to be clinically meaningful, compared to estimate using traditional distribution-based calculation

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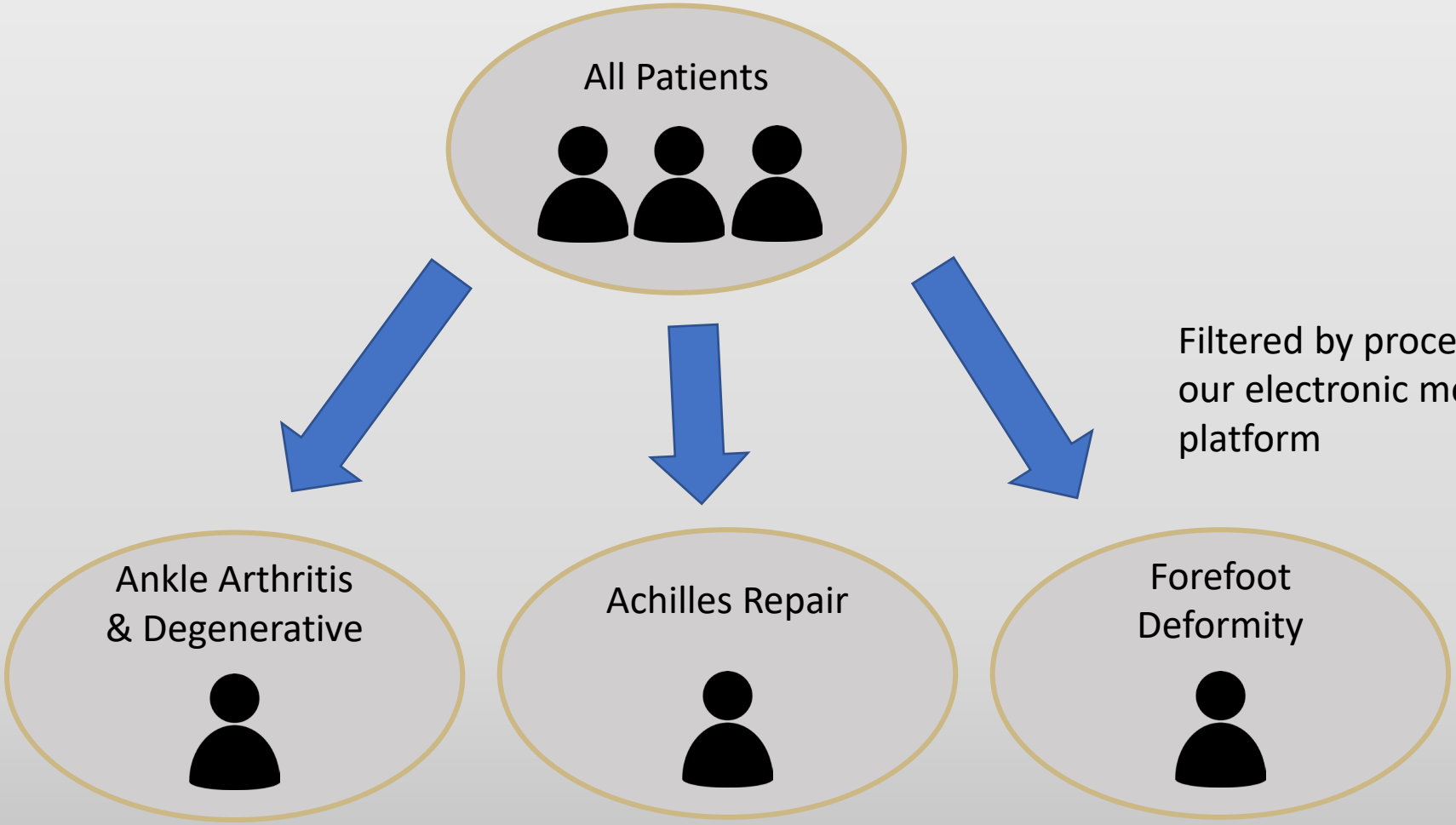
Dividing patients into procedure-based cohorts



Filtered by procedure code in our electronic medical record platform

Examples:

Results – Physical Function MCID for different procedure types

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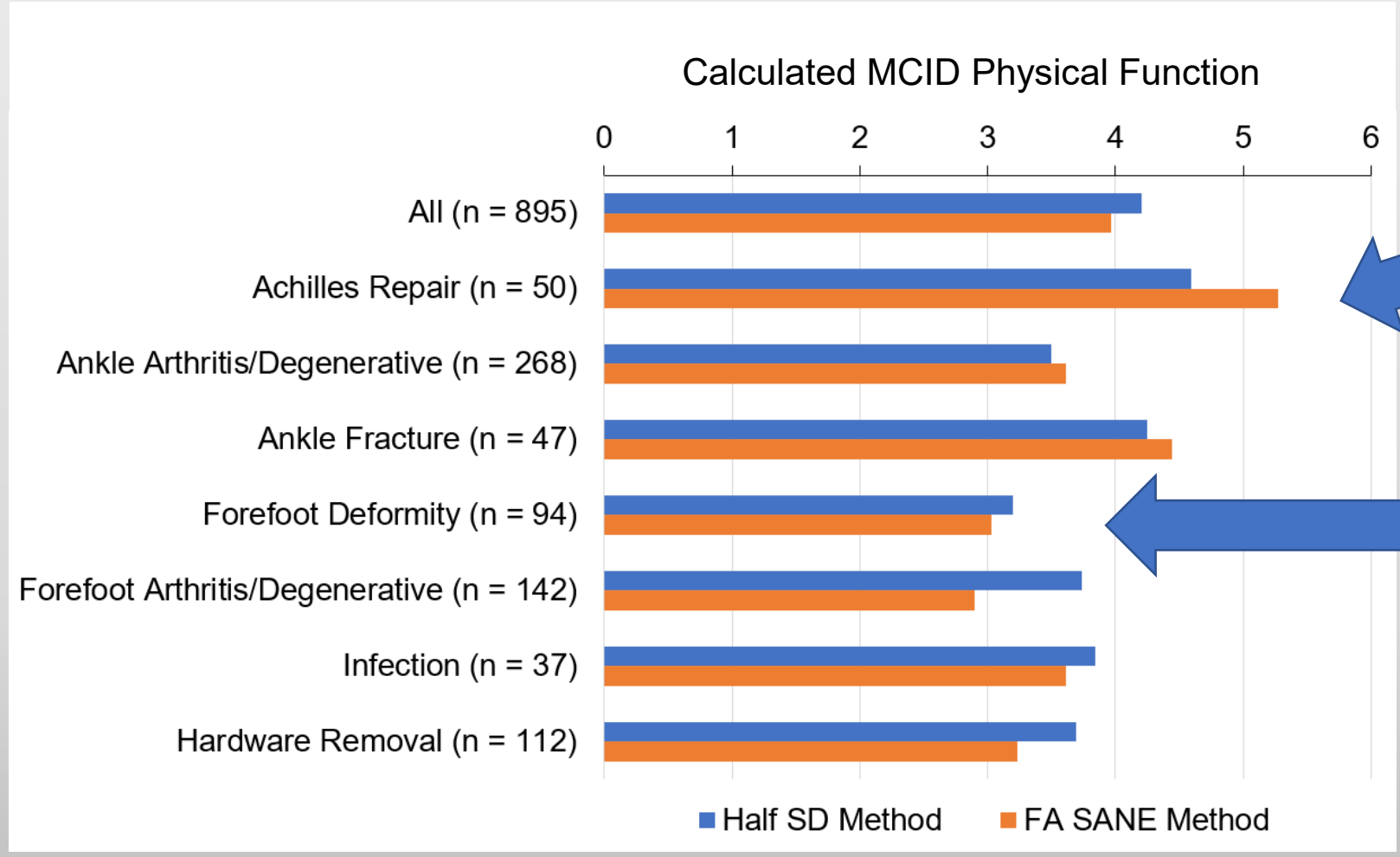

Higher change for Achilles repair needed (often athletic population and low preoperative baseline)

Lower change for forefoot deformity needed (often have high preoperative baseline prior to surgery)

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Results – Pain Interference MCID for different procedure types

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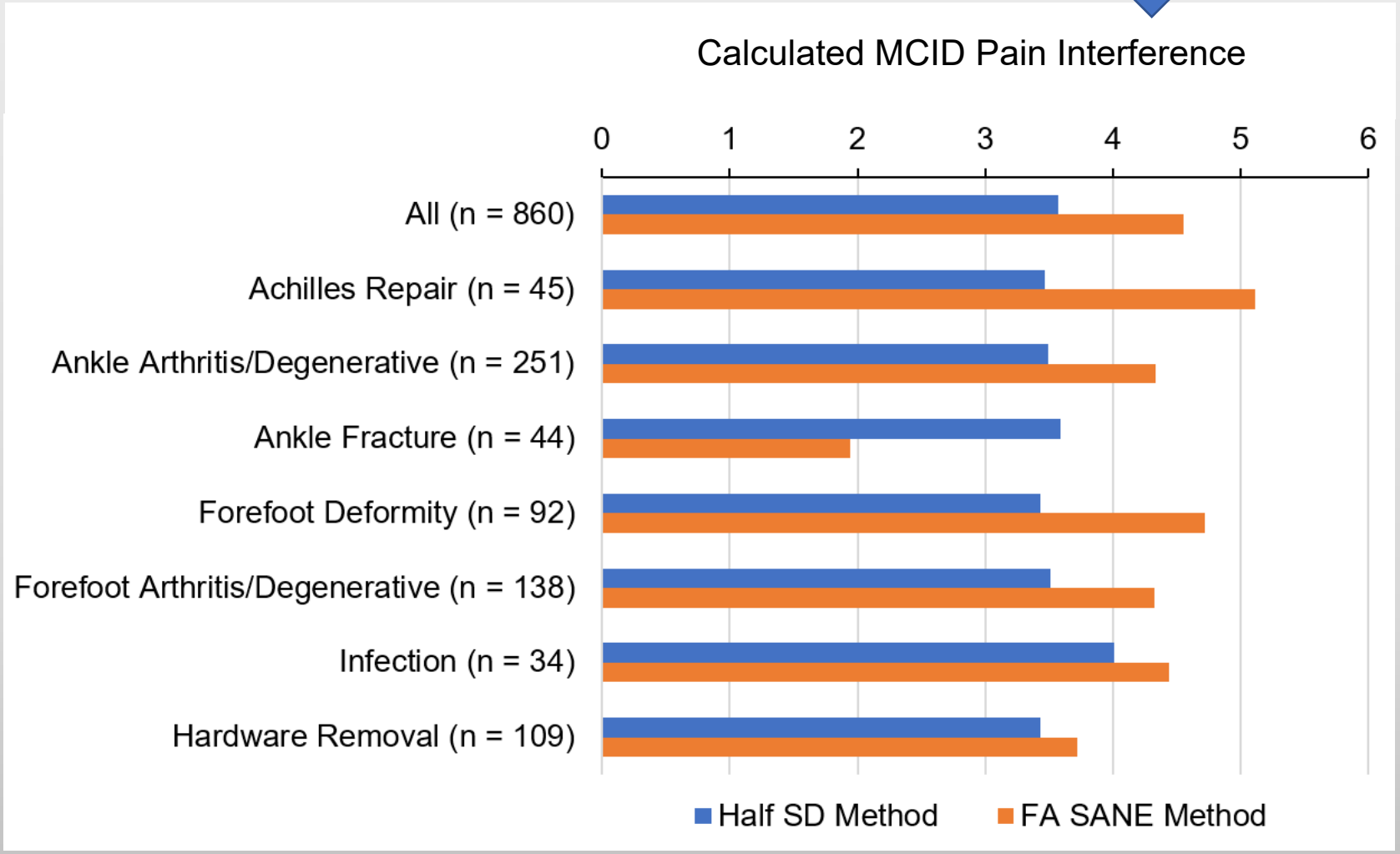

Distribution-based method provides extremely similar estimate for all populations, while anchor-based method shows variation

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Summary

- Changes in PROMIS physical function and pain interference are not uniform among lower extremity injuries following surgery.
- Sports or trauma-related injuries such as an Achilles rupture often result in a lower baseline and require a higher change in PRO to meet MCID
- Anchoring outcomes to FA SANE offers an objective way to calculate MCIDs that still incorporates the patient perspective

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References

1. Çelik D, Çoban Ö, Kılıçoğlu Ö. Minimal clinically important difference of commonly used hip-, knee-, foot-, and ankle-specific questionnaires: a systematic review. J Clin Epidemiol 2019;113:44-57. (In eng). DOI: 10.1016/j.jclinepi.2019.04.017.
2. Hung M, Baumhauer JF, Licari FW, Voss MW, Bounsanga J, Saltzman CL. PROMIS and FAAM Minimal Clinically Important Differences in Foot and Ankle Orthopedics. Foot Ankle Int 2019;40(1):65-73. (In eng). DOI: 10.1177/1071100718800304.
3. Norman GR, Stratford P, Regehr G. Methodological problems in the retrospective computation of responsiveness to change: the lesson of Cronbach. J Clin Epidemiol 1997;50(8):869-79. (In eng). DOI: 10.1016/s0895-4356(97)00097-8.
4. Karhade AV, Bono CM, Schwab JH, Tobert DG. Minimum Clinically Important Difference: A Metric That Matters in the Age of Patient-Reported Outcomes. J Bone Joint Surg Am 2021;103(24):2331-2337. (In eng). DOI: 10.2106/jbjs.21.00773.
5. Myhre L, Kellam P, Dekeyser G, et al. Minimal Clinically Important Differences of PROMIS PF in Ankle Fracture Patients. Foot Ankle Int 2022;43(7):968-972. (In eng). DOI: 10.1177/10711007221091815.
6. Terwee CB, Peipert JD, Chapman R, et al. Minimal important change (MIC): a conceptual clarification and systematic review of MIC estimates of PROMIS measures. Qual Life Res 2021;30(10):2729-2754. (In eng). DOI: 10.1007/s11136-021-02925-y.
7. Wright A, Hannon J, Hegedus EJ, Kavchak AE. Clinimetrics corner: a closer look at the minimal clinically important difference (MCID). J Man Manip Ther 2012;20(3):160-6. (In eng). DOI: 10.1179/2042618612y.0000000001.
8. Yost KJ, Eton DT. Combining distribution- and anchor-based approaches to determine minimally important differences: the FACIT experience. Eval Health Prof 2005;28(2):172-91. (In eng). DOI: 10.1177/0163278705275340.

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