SHOULDER PAVEMENT PRESERVATION

Spray-on Asphalt Rejuvenation

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December 11, 2024

BACKGROUND

Illinois Tollway shoulders – pavement preservation

Standard practice – microsufacing

Alternates? More economical and/or effective?

Spray-on asphalt rejuvenation – restore the crack resistance of the asphalt surface

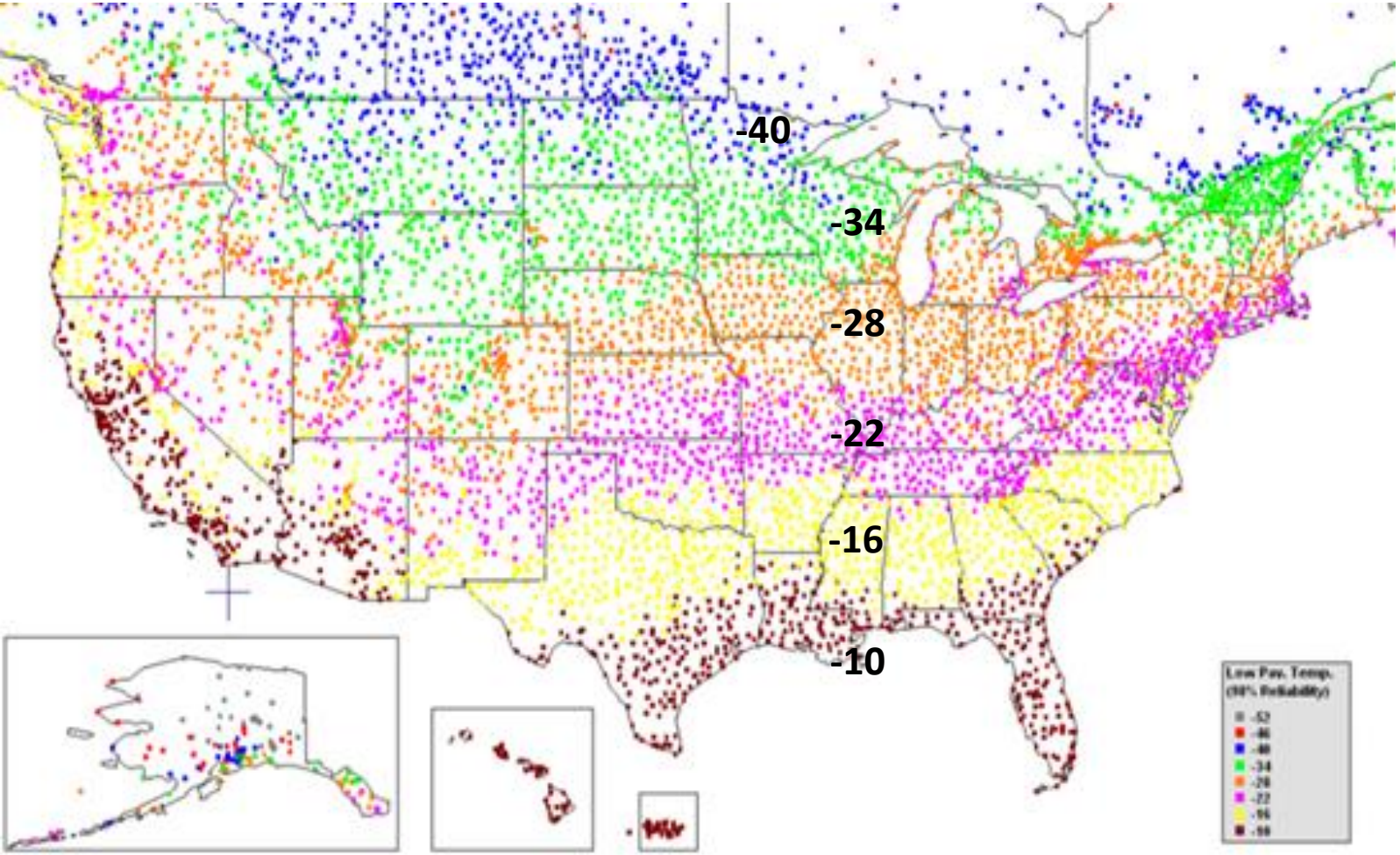
EVALUATION

Several manufacturers

In-place visual performance supports treatment

How to quantitively evaluate in the lab?

RECOVERED PERFORMANCE GRADING



98 percent reliability map of climate dependent low PG

- Superpave PG (example 64-22)
- Recovered binder testing (RAP and RAS)
- Testing on cores, before and after

TRIAL – JANE ADDAMS MEMORIAL TOLLWAY (I-90)

Evaluated several rejuvenators

Placed on shoulders in 2020 on 1-mile section of I-90 near Rockford

- Emulsified maltene-based sealer (petroleum oils and resins emulsified with water)
- Emulsified crack filler sealer (petroleum oils and asphalts emulsified with water
- Bio-based sealer and polymer binder (agriculture-based soy oil derivatives and other agricultural oils

FIELD PLACEMENT EVALUATION

Placed fall 2020, 60s degrees F.

- 1-mile sections on shoulder N70 SC
- Shoulders swept
- Uniform spray nozzles
- Yield verified; application rates tested

Maltene and bio-based sealer – rapid placement

Crack filler sealer - slower

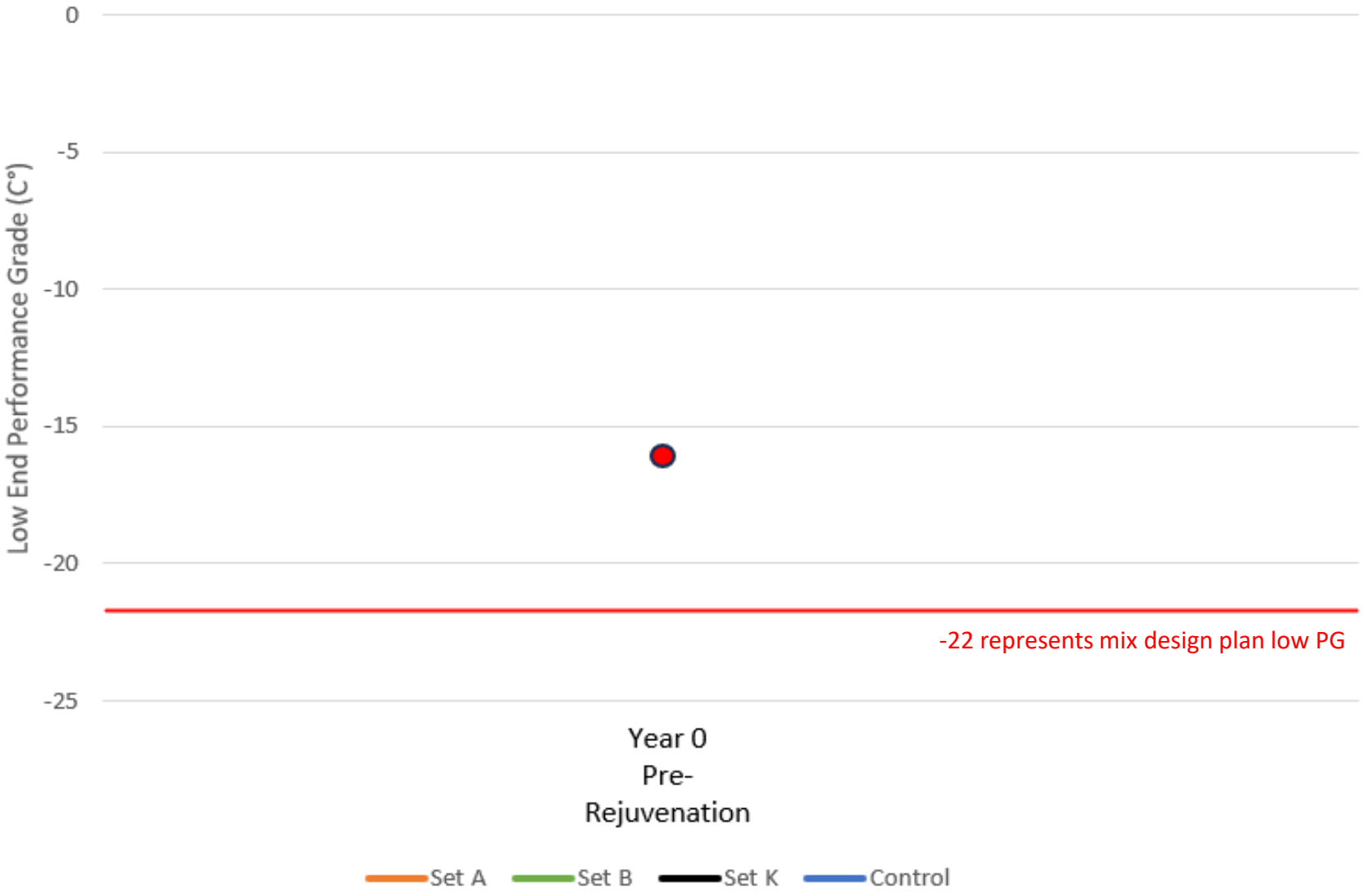
CORING AND TESTING

Coring for PG testing

- Most manufacturers claim 3/8-inch penetration
- Top 3/8 inch evaluated
- Eight cores per test
- Testing once per year per product, average of two tests
- Illinois Tollway Test Procedure 001 – Recovered Asphalt Binders

Cored and evaluated yearly

LOW-PERFORMANCE GRADE



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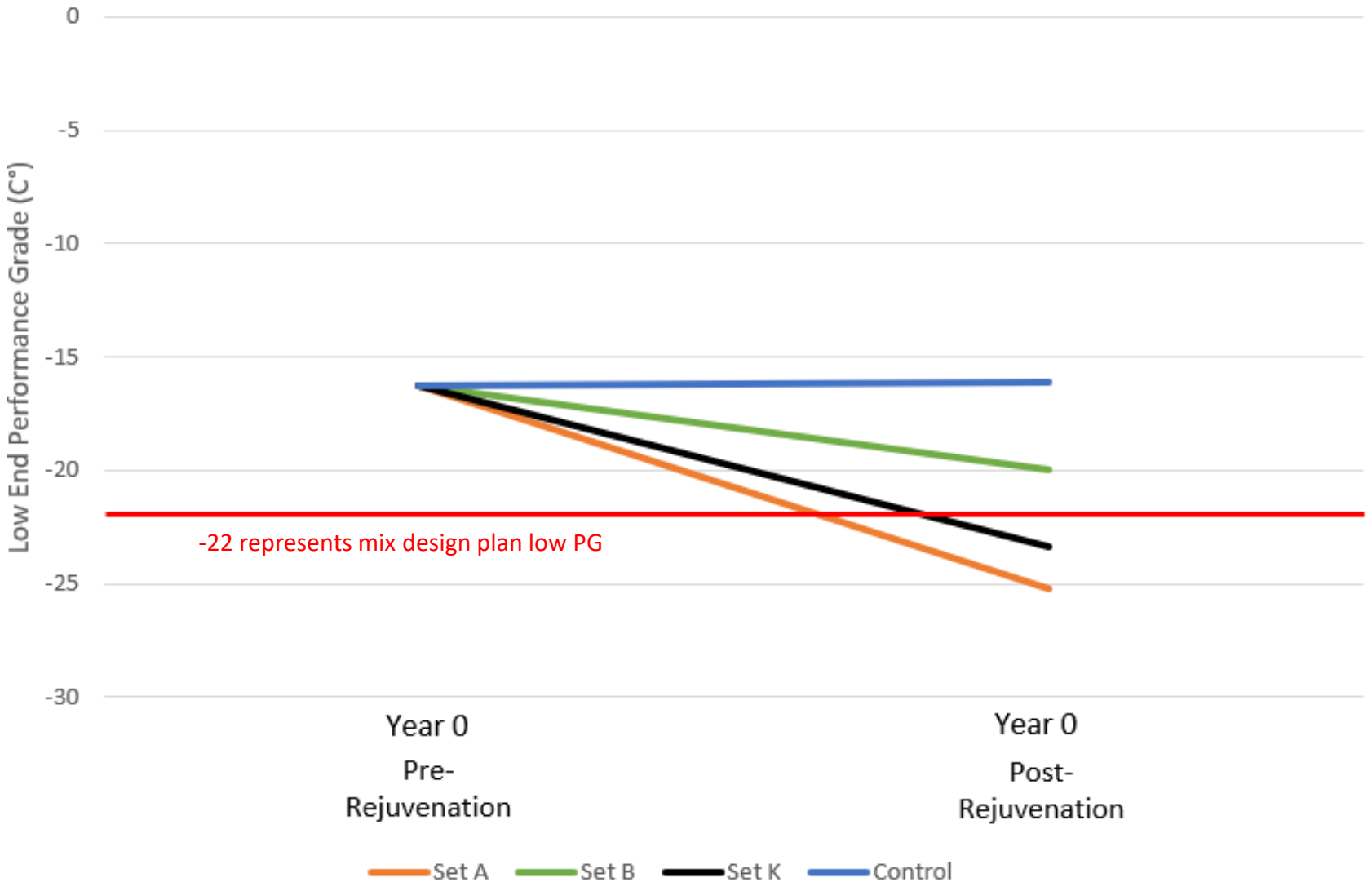

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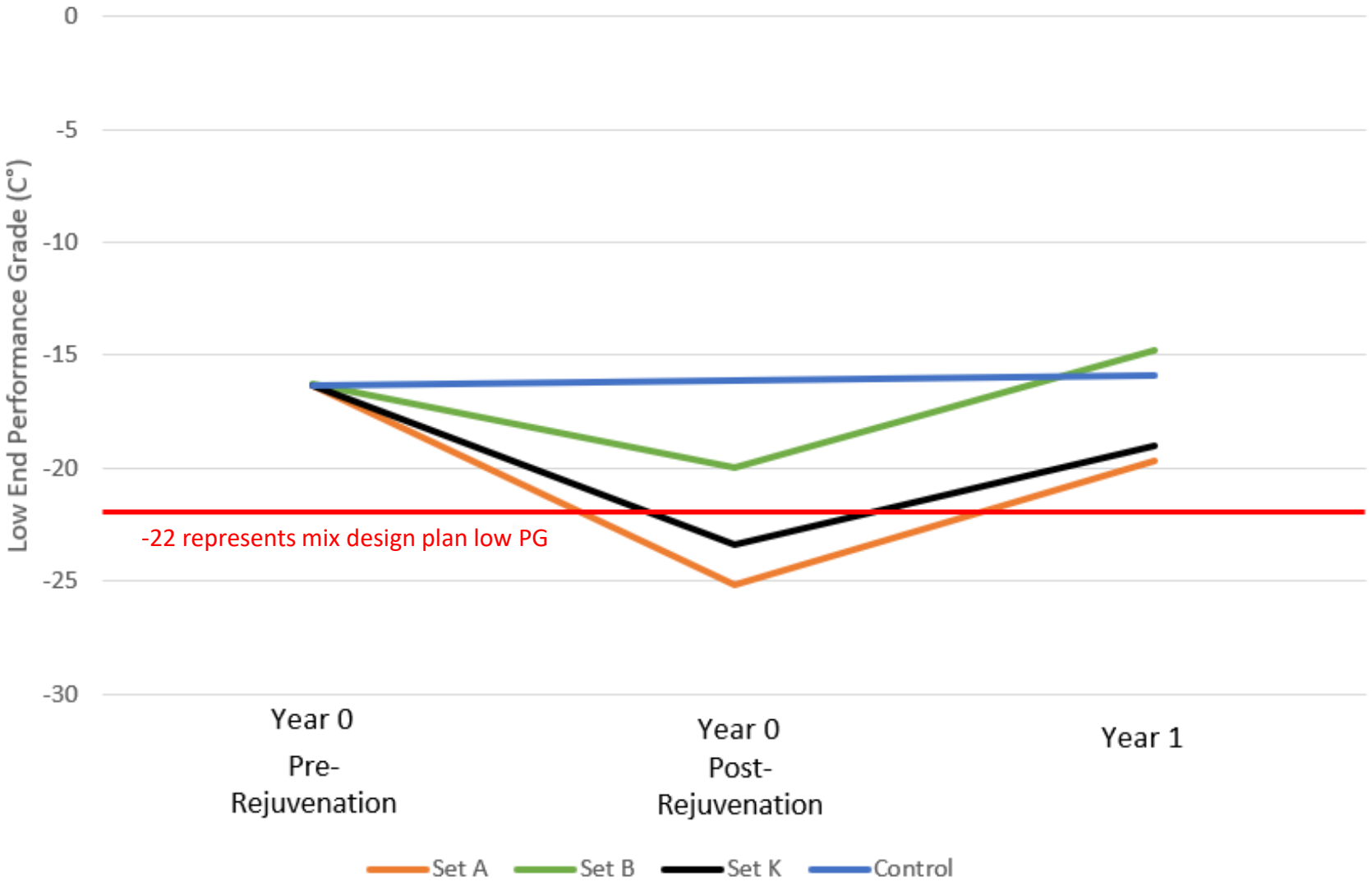

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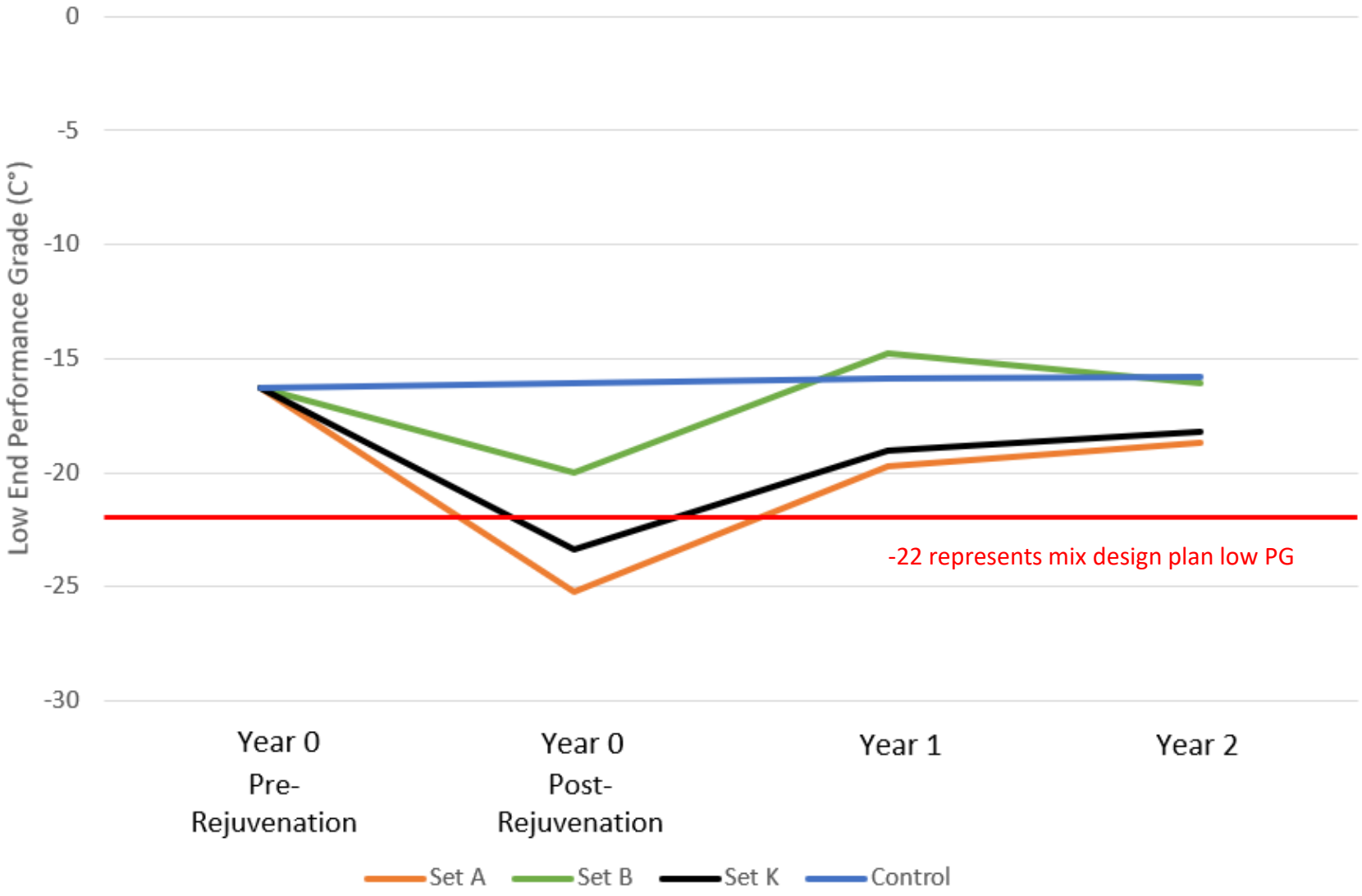

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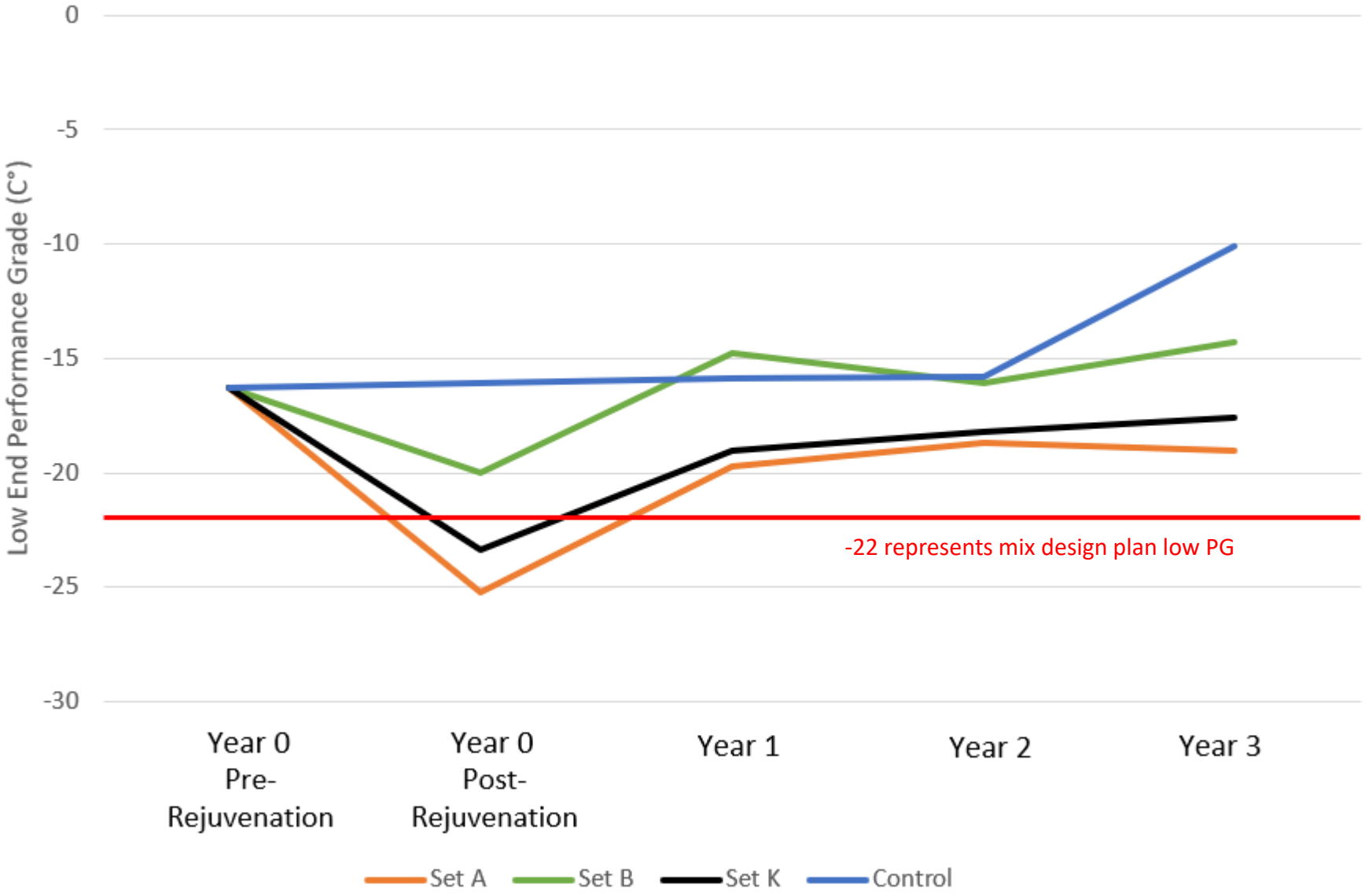

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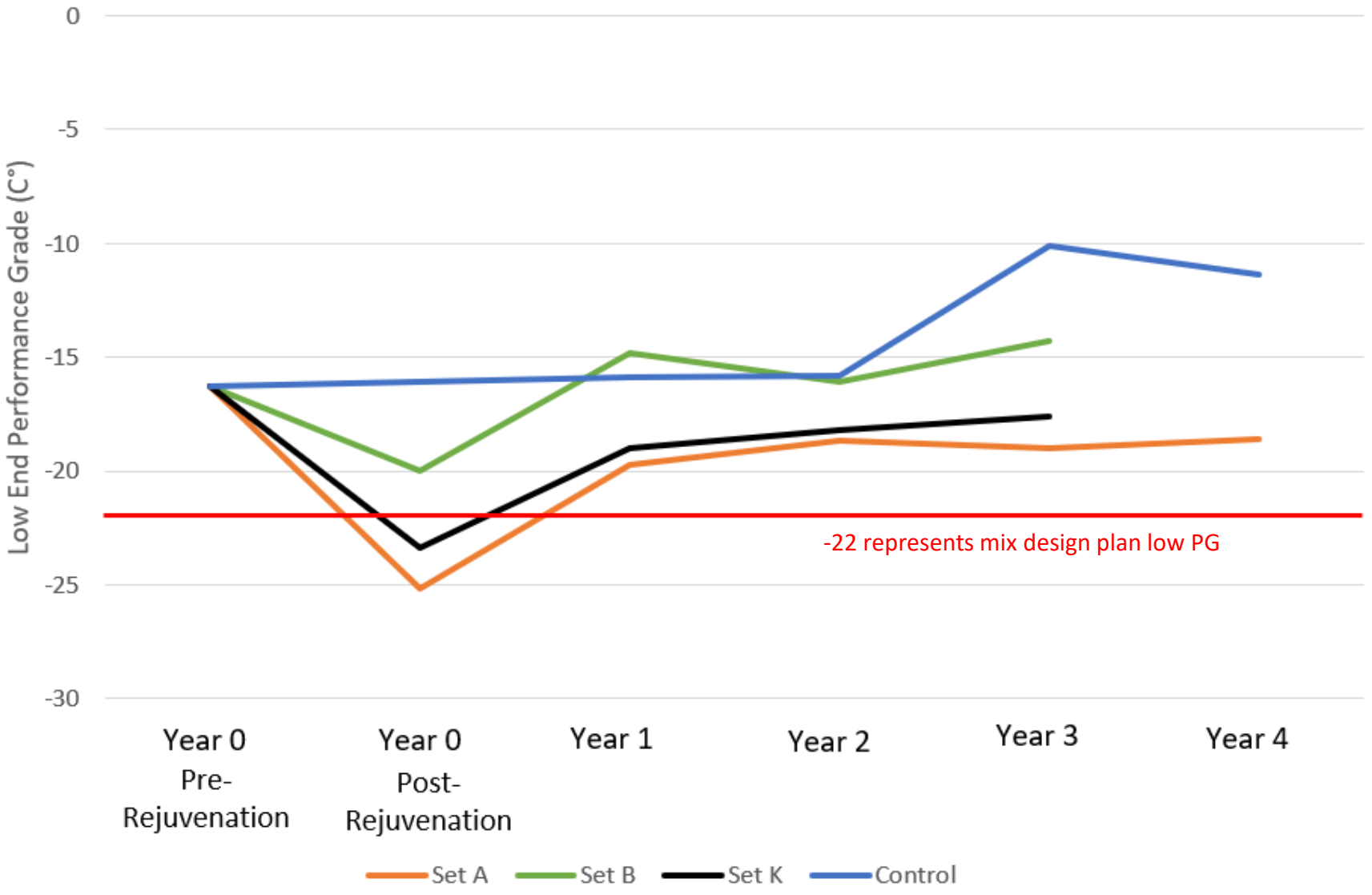

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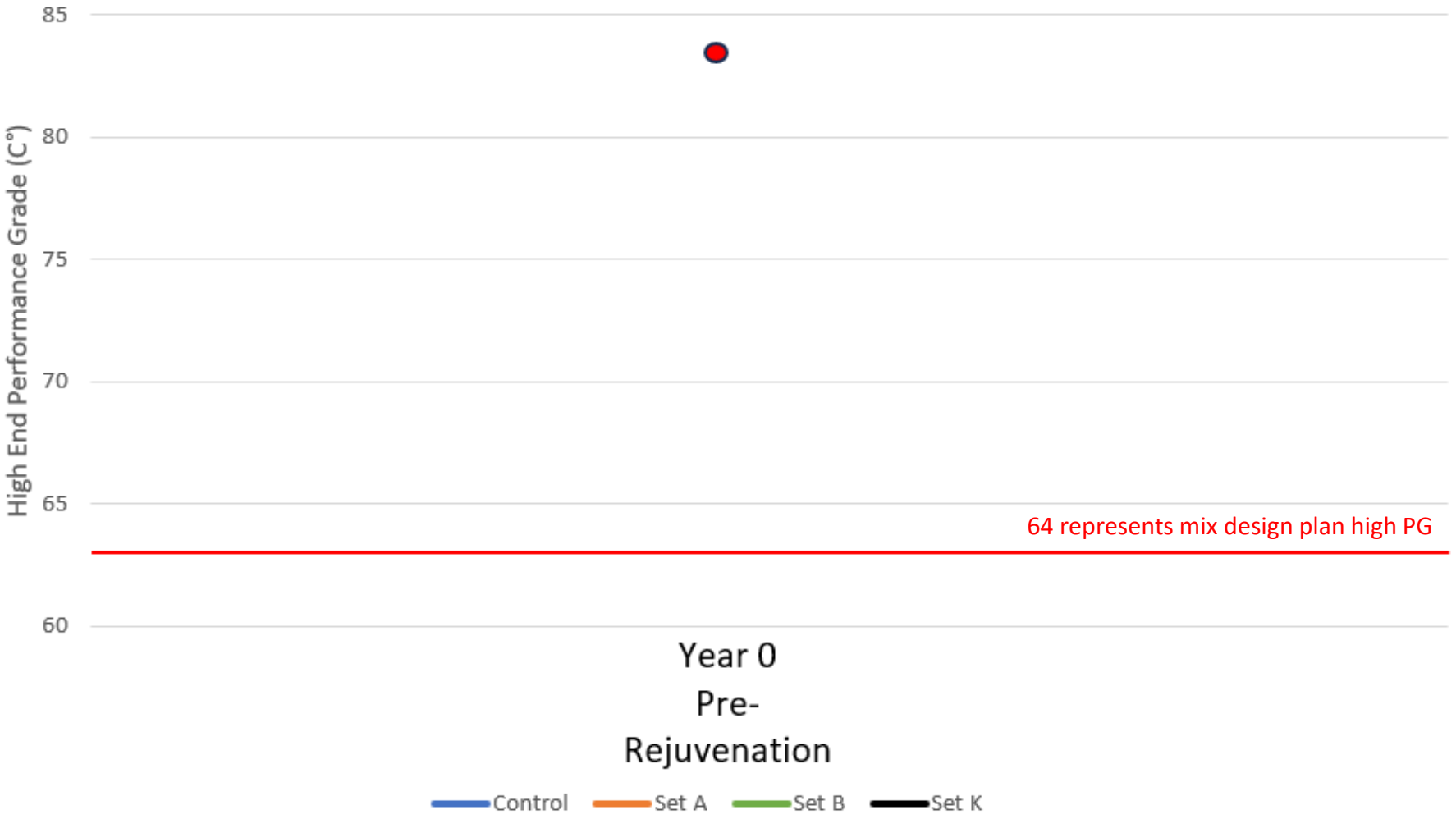

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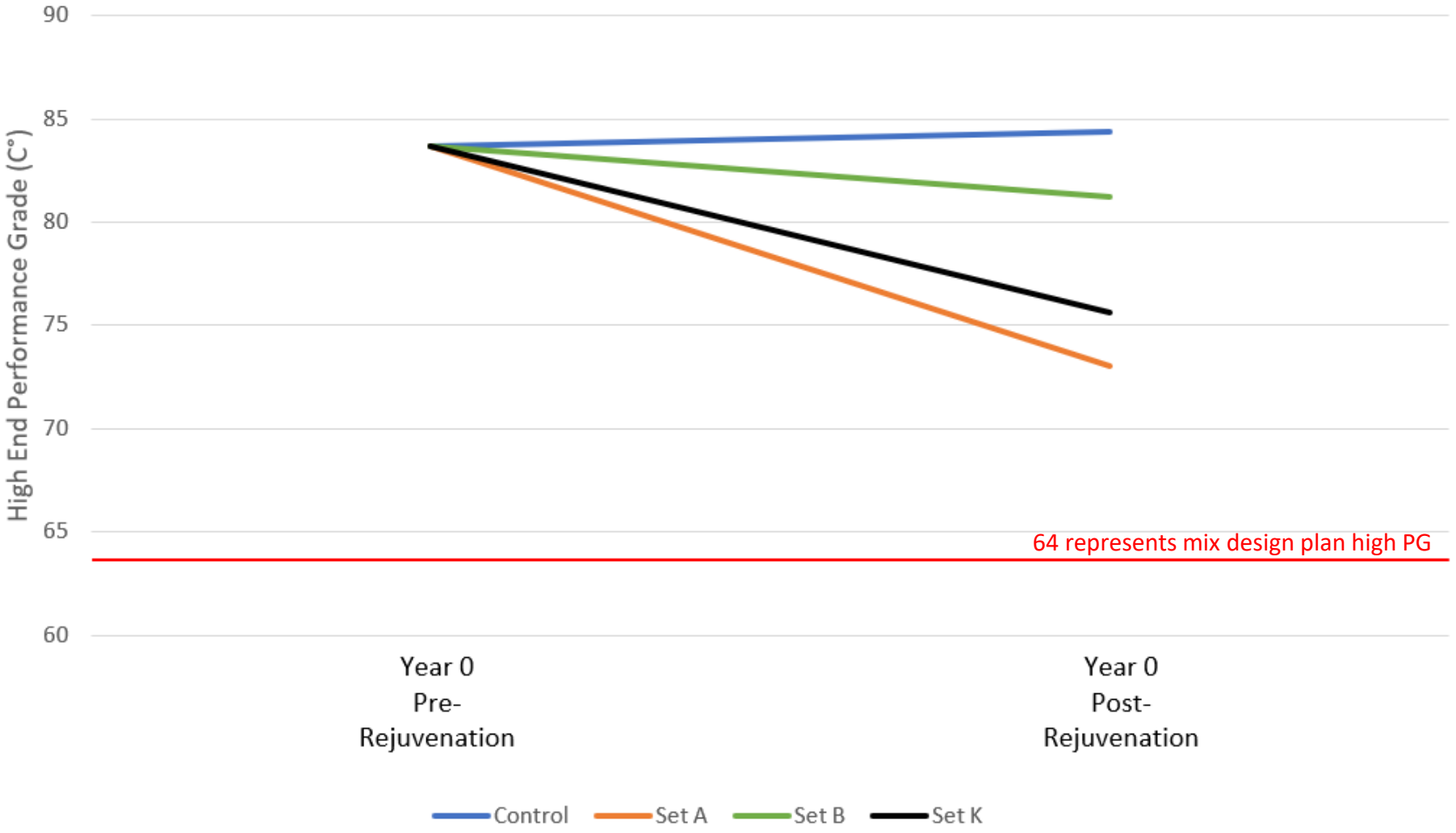

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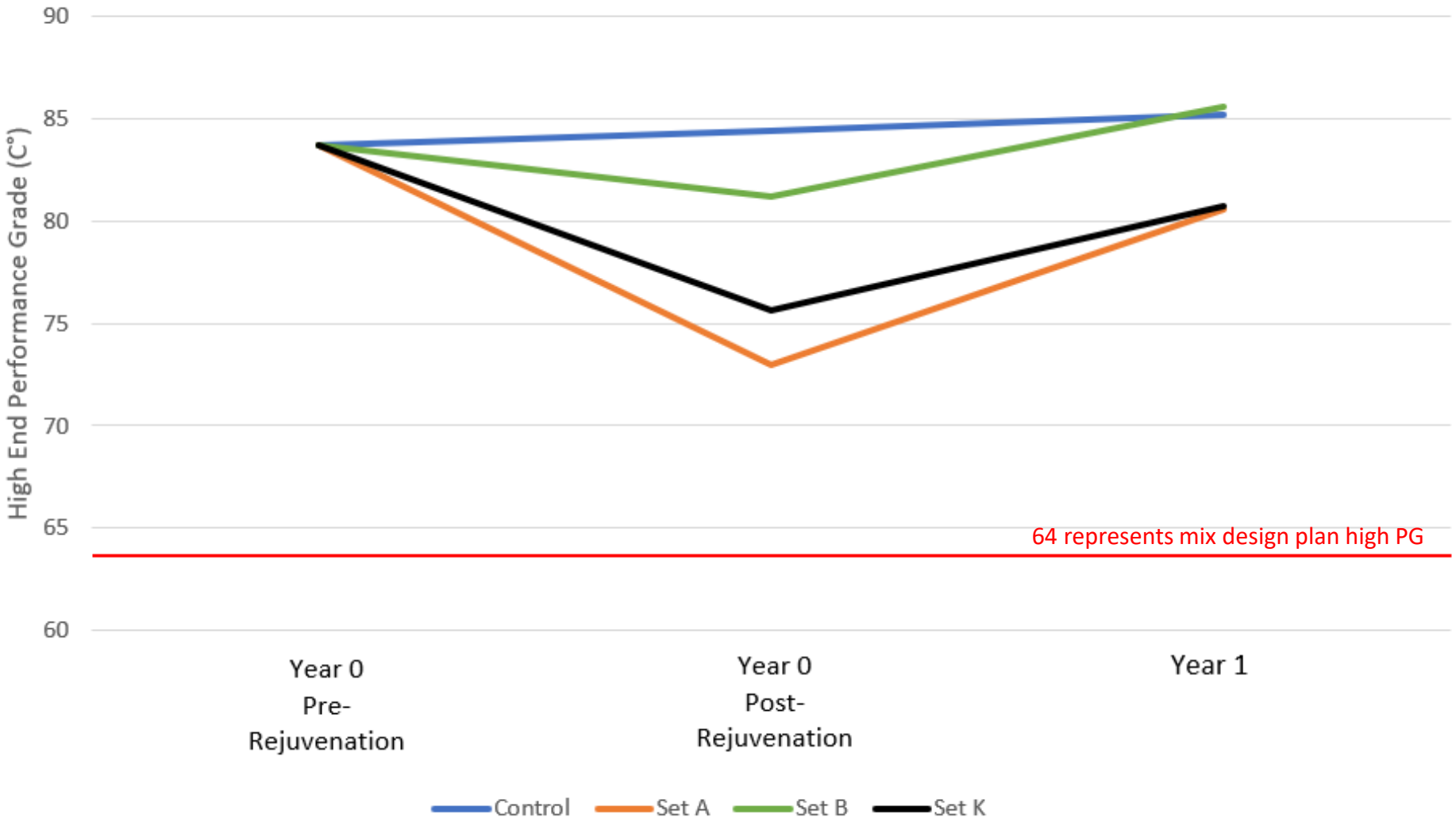

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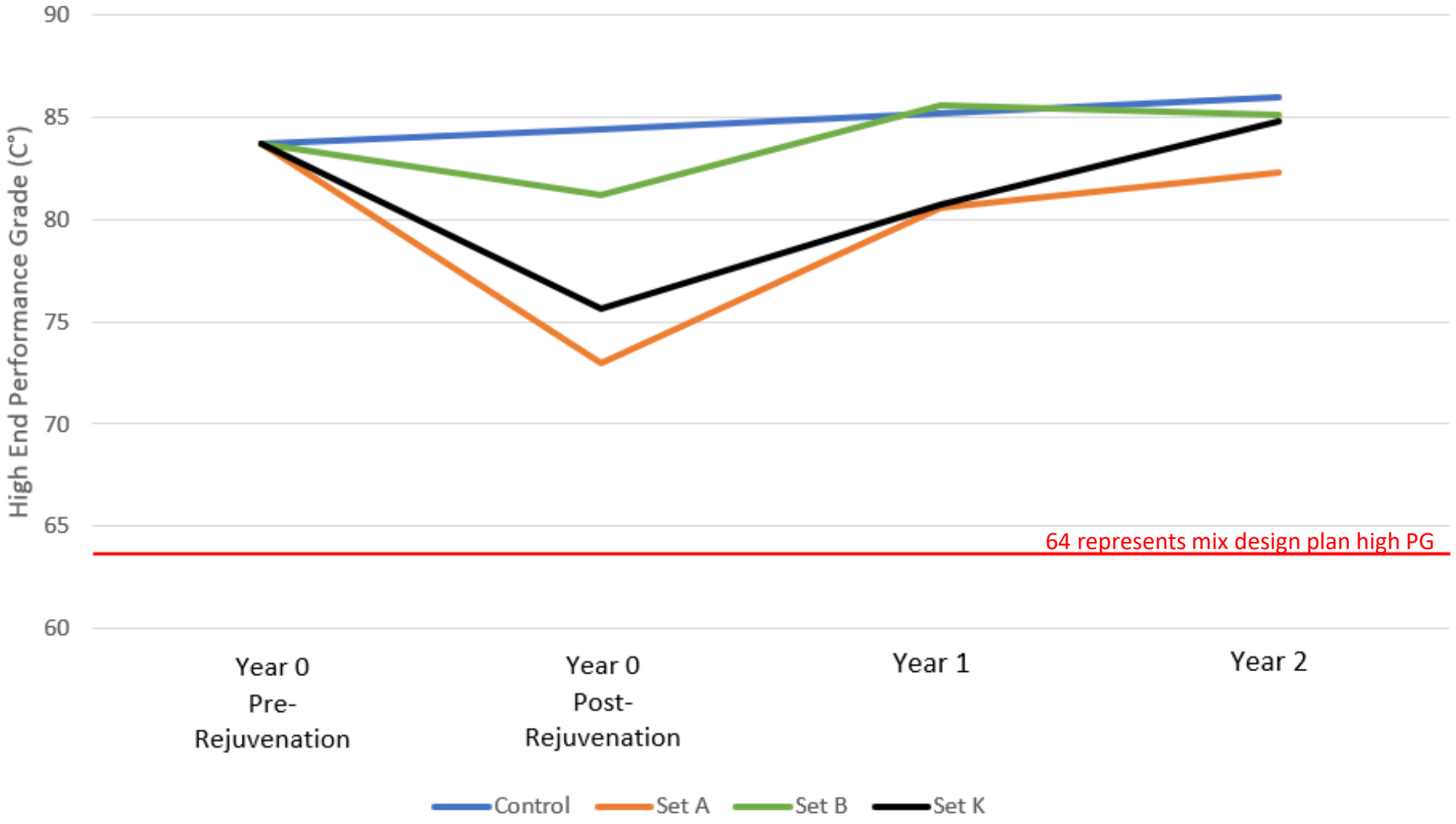

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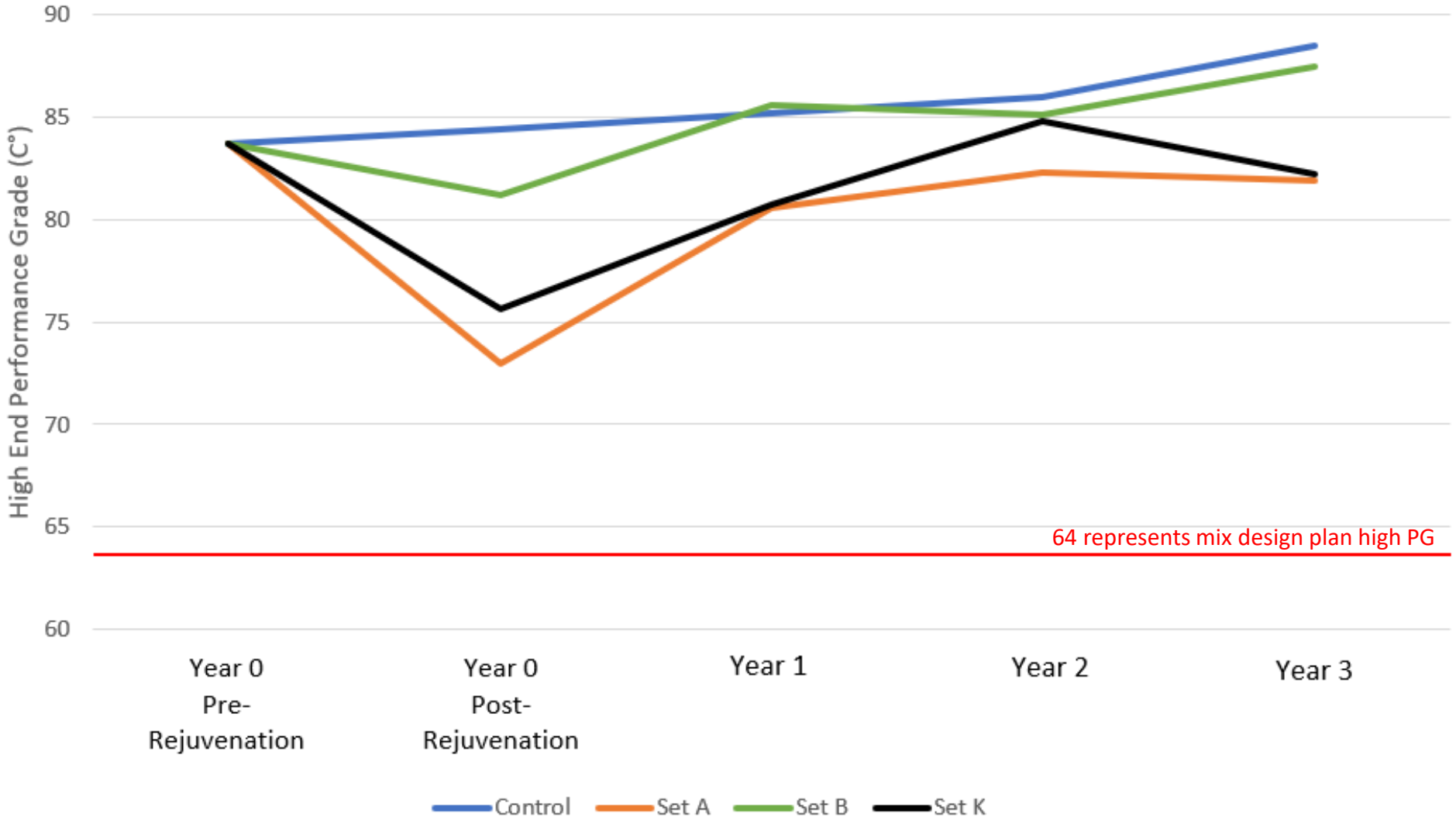

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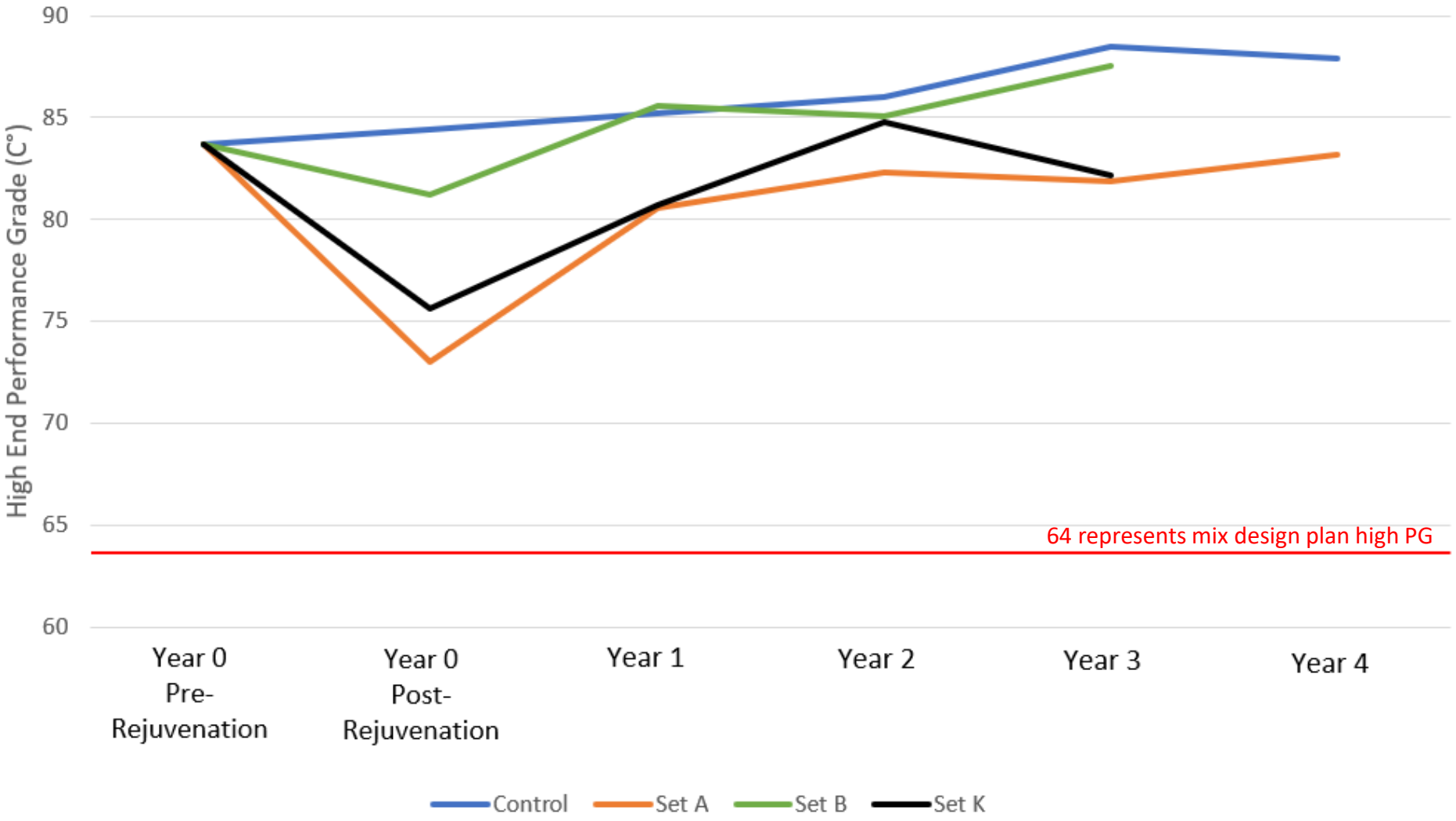

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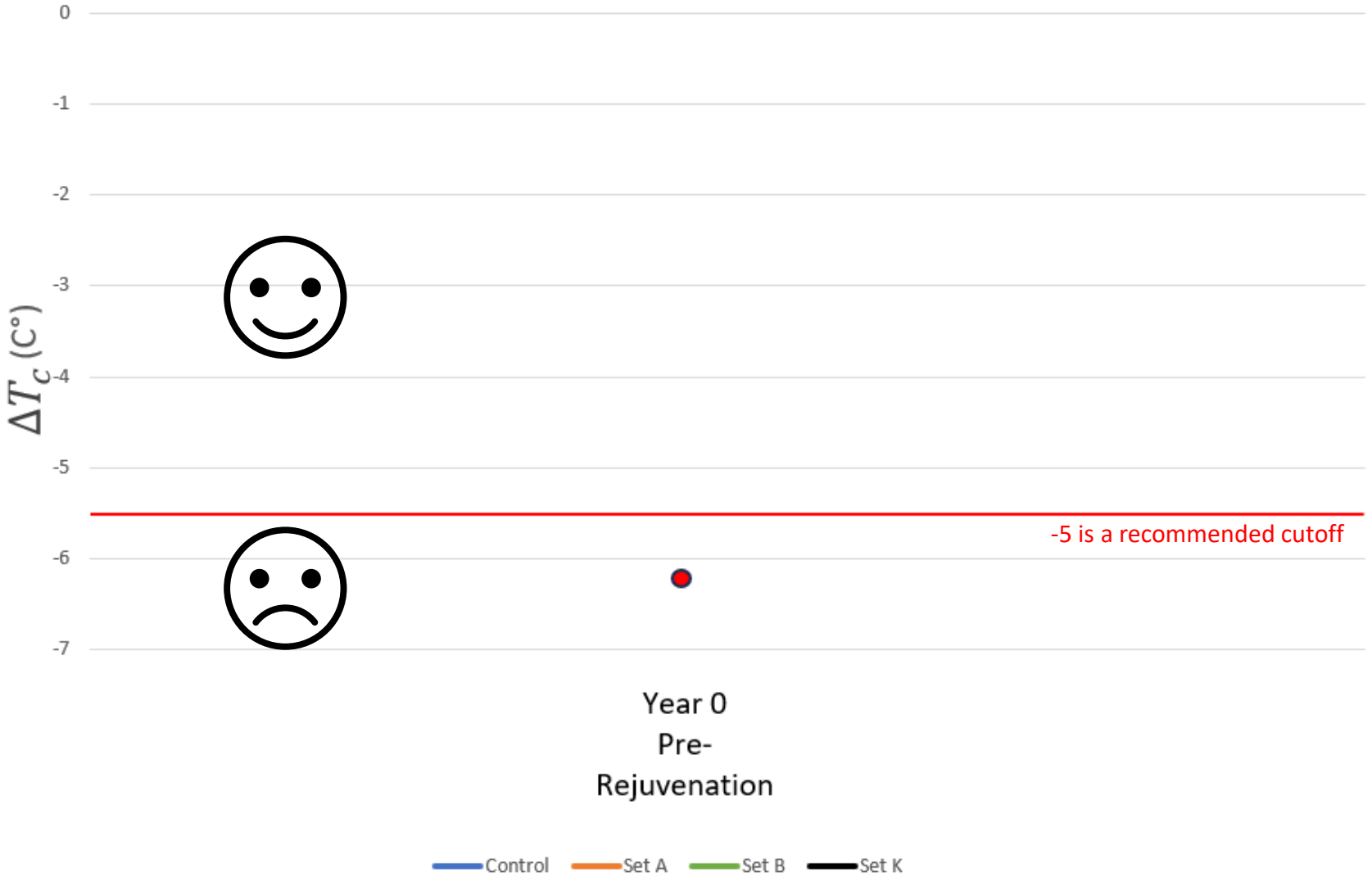

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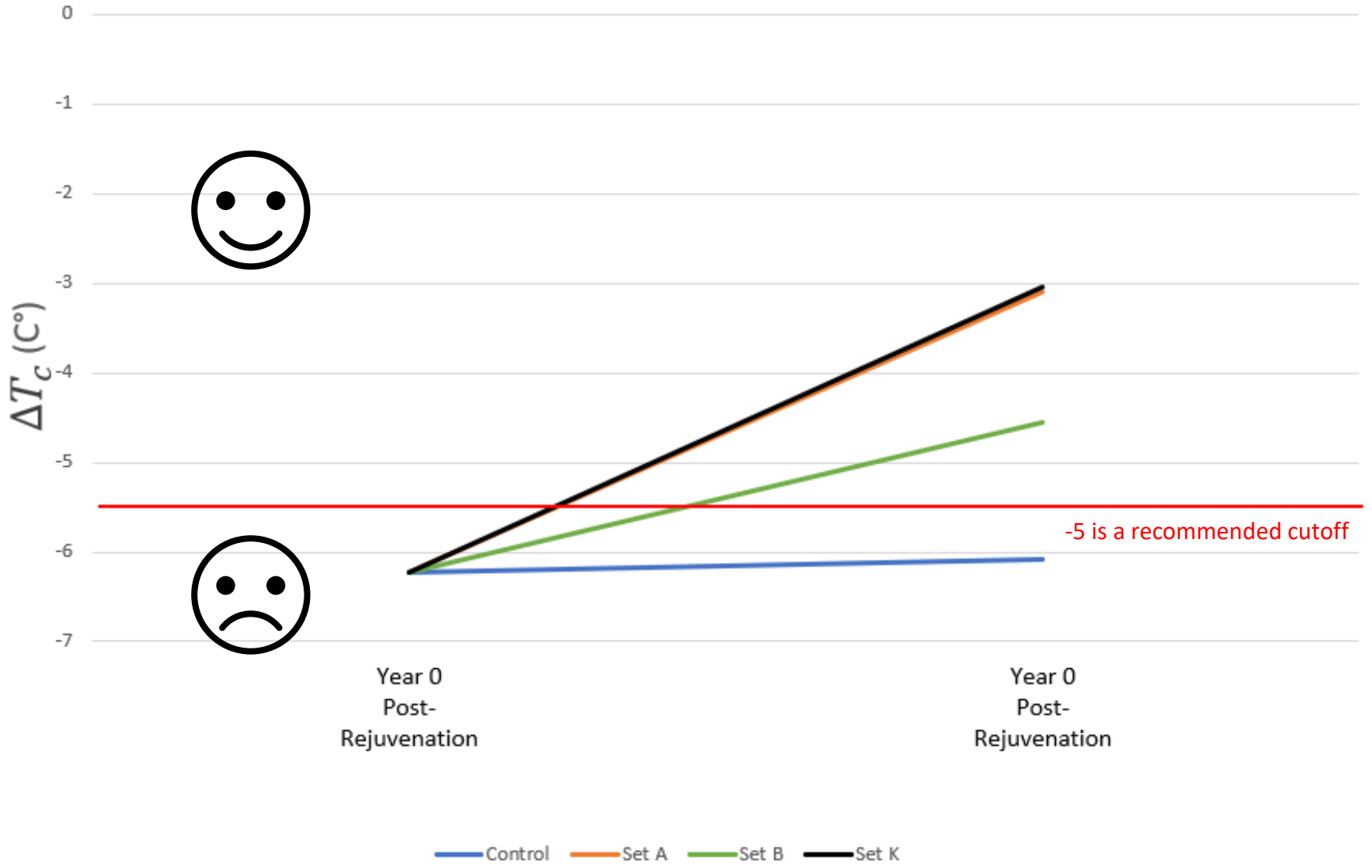

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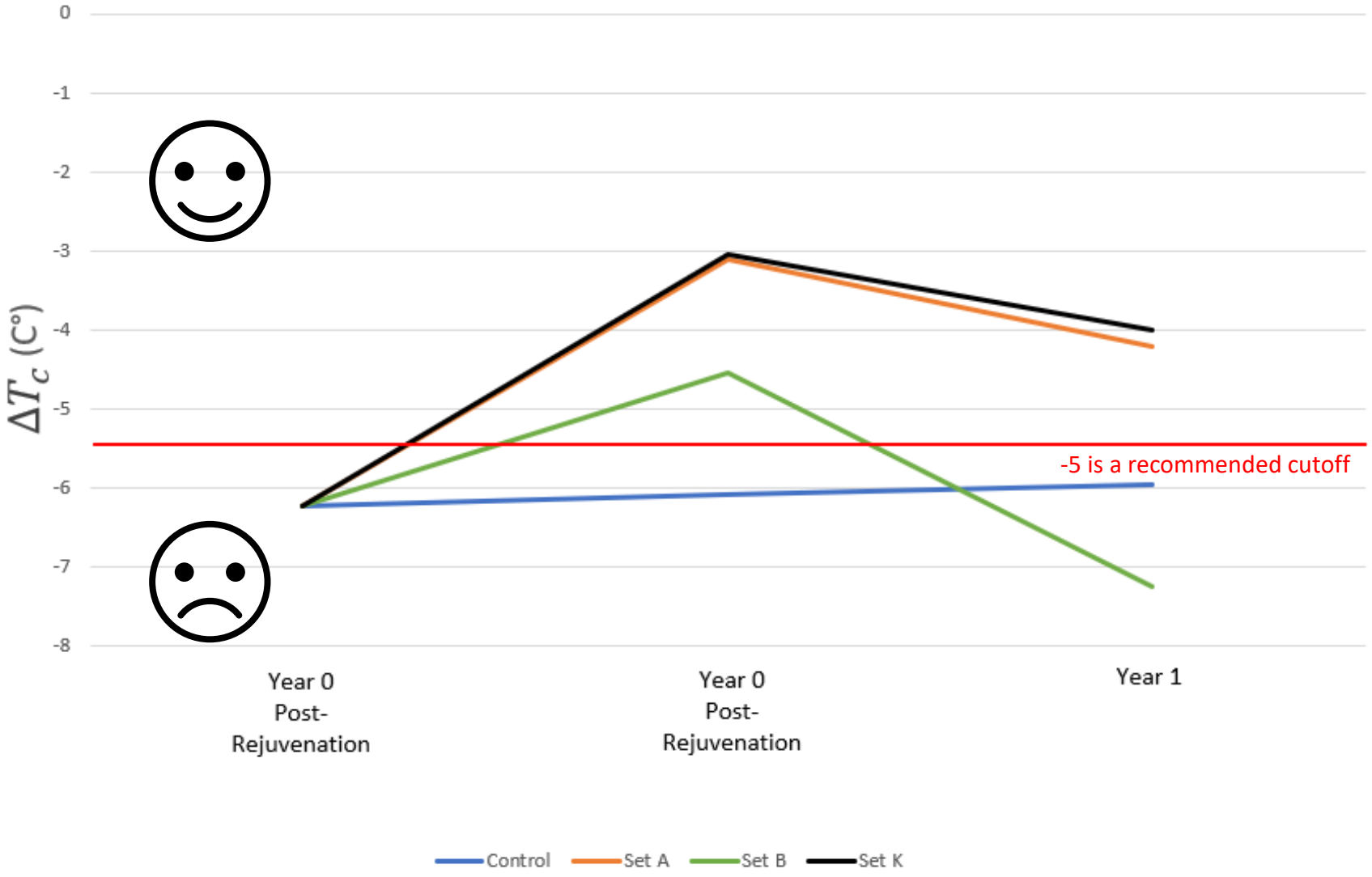

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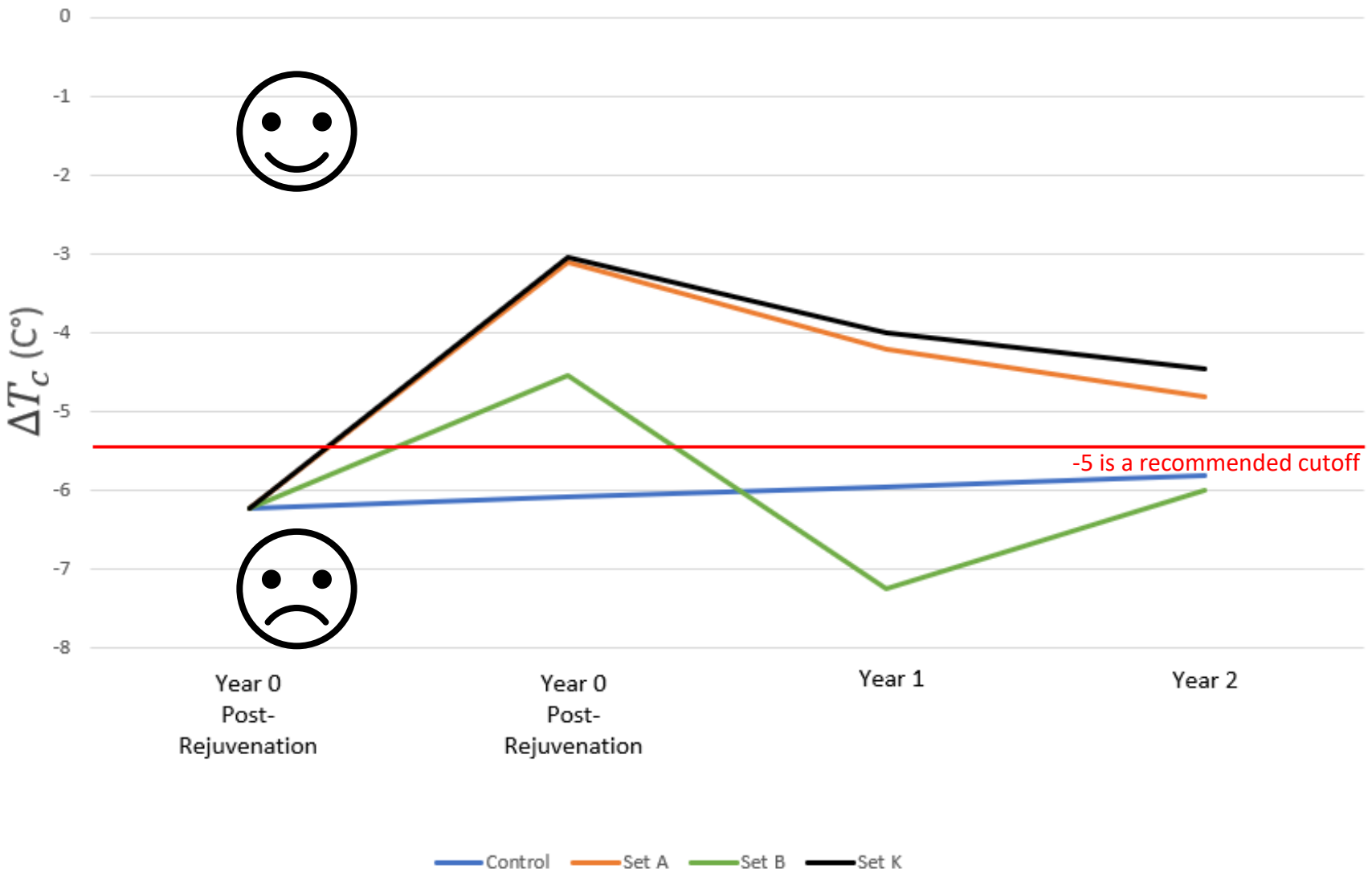

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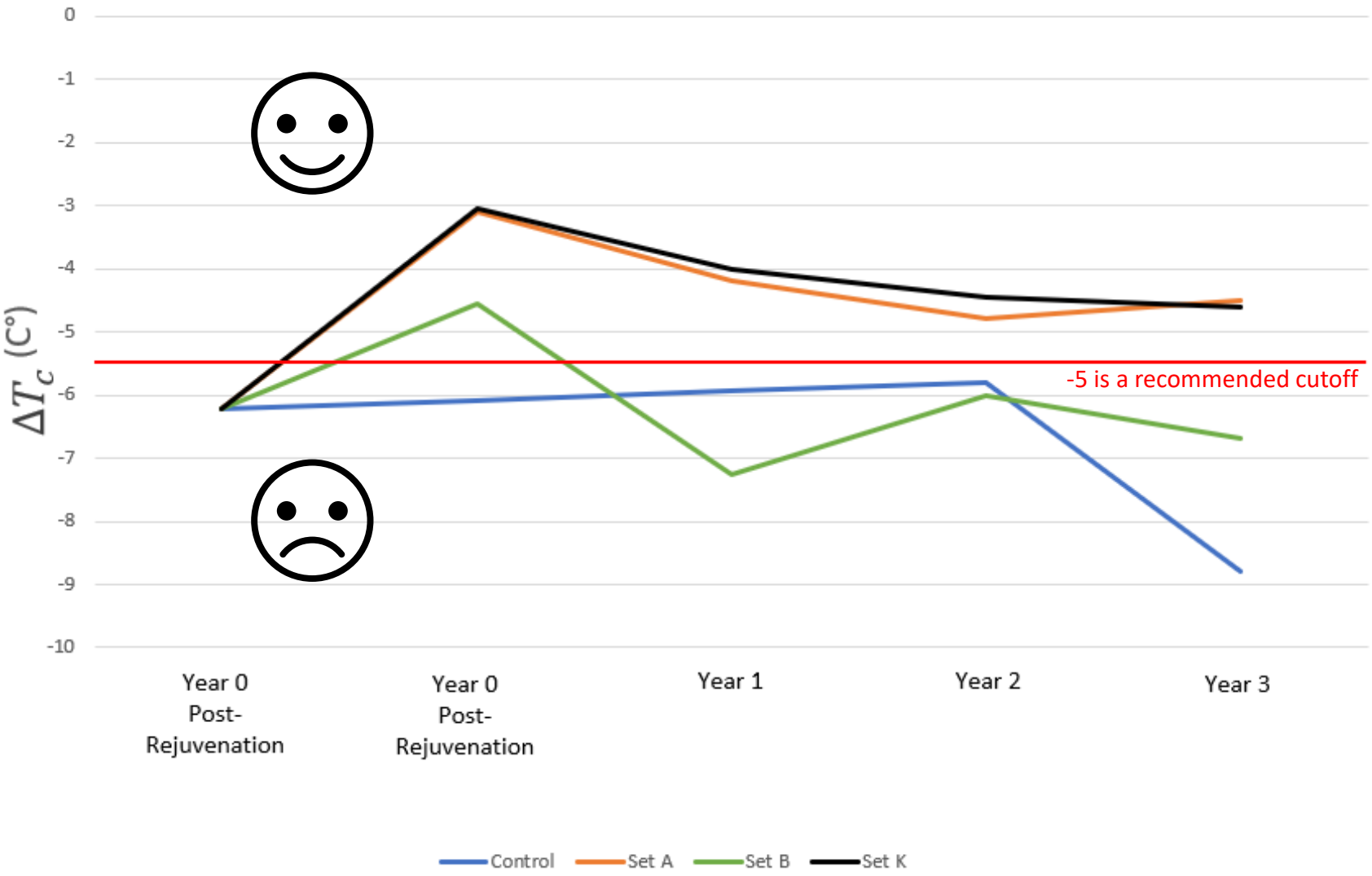

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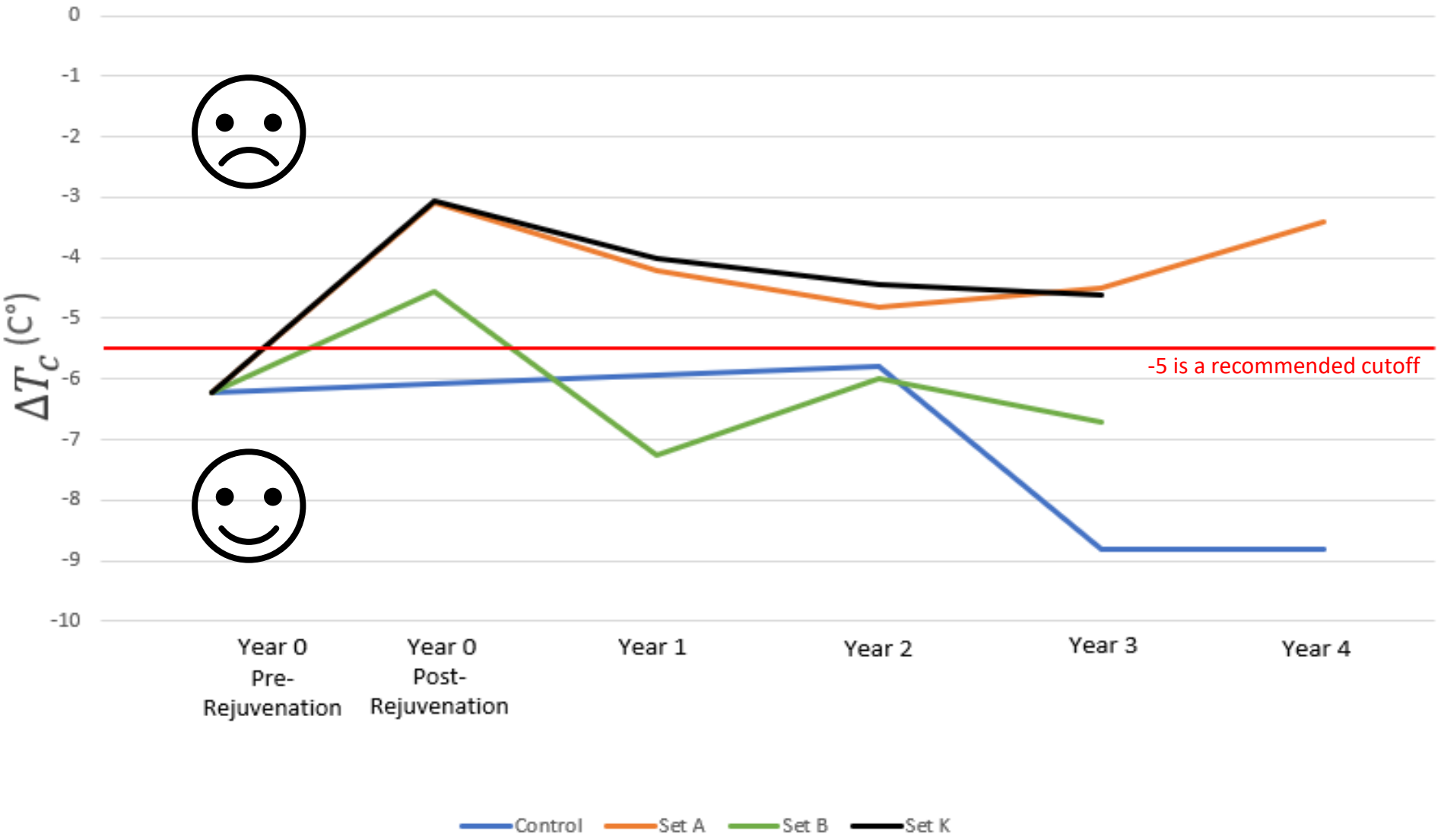

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DETERMINING APPROPRIATE PAVEMENTS FOR TREATMENT

Two tools

Visual examination and age review

- Newer pavements not yet showing distress
- Prevent cracks, not a fix for existing cracks

Coring and PG testing

- Determine existing PG
- Can rejuvenator return surface to desired PG?
- Example: Maltene-based showed 9-degree low PG softening, then a sustained 3+ degree softening

NEXT STEPS

The Illinois Tollway is moving forward with emulsified maltene-based rejuvenaation for shoulders

- Reagan Memorial Tollway (I-88) from Aurora to Rochelle

Life cycle

- Current estimate: Two placements, year 5 and year 10 on a 15-year surface life cycle
- Annual testing to confirm

Cost

- Maltene sealer approx. $1.13 - $1.15 square yard
- Microsurfacing approx. $3.39 - $3.48 square yard
  - Current Tollway life cycles for 15-year surface include one round of microsurfacing, compared with two rounds of rejuventation

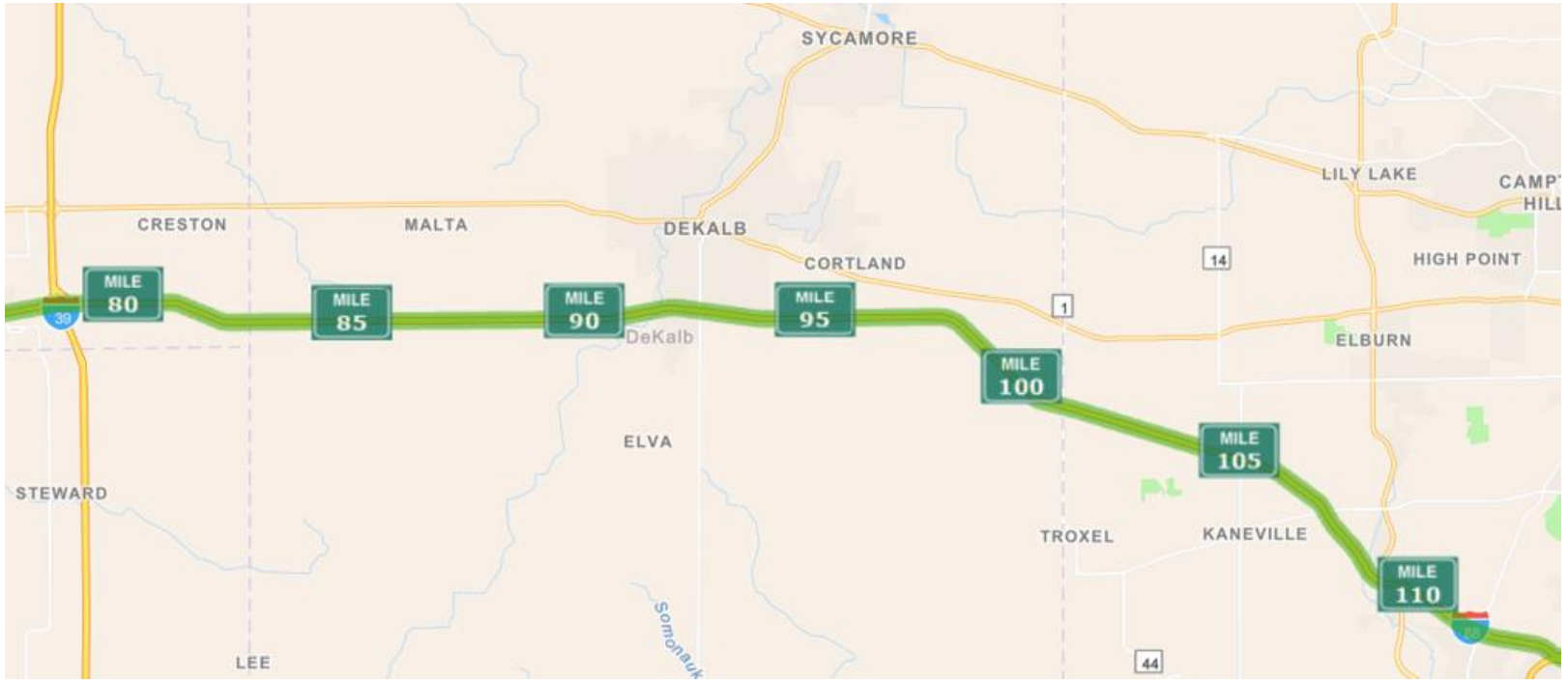
Illinois Tollway

I-88 PROJECT – AURORA TO ROCHELLE SHOULDERS

Emulsified maltene-based rejuvenation

MP 76.1 through MP 113.6 in Ogle, DeKalb and Kane counties, originally paved in 2018

Rejuvenator successfully placed on shoulders in fall 2024



I-88 PROJECT – NEW PRODUCT TRIALS

Two additional products evaluated in test sections at multiple rates

Coring/PG testing and visual evaluation planned

Demonstrate equivalent performance


THANK YOU