

Referral Geography, Case Complexity, and Definitive Surgical Strategy in a Regional Specialized Center for Periprosthetic Joint Infection in China



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TAKE-HOME

Broader referral geography marked greater prereferral burden, yet infection control remained comparable.

492

surgically treated PJI patients

1.3 → 12.0 mo

median symptom duration

61.6 → 90.0%

single-stage revision

84.8%

infection control

01 BACKGROUND & OBJECTIVE

Referral distance may reflect delays and accumulated treatment burden—not geography alone.

Evidence gap: how referral breadth relates to case complexity, definitive surgical strategy, and outcomes is poorly defined.

Objective: evaluate these associations in a regional specialized PJI center.

02 COHORT & REFERRAL STRATA

Retrospective cohort: 492 consecutive hip or knee PJI cases treated surgically, Jan 2017–Dec 2024.

Urumqi n=86 (17.5%) · Other Xinjiang n=326 (66.3%) · Outside Xinjiang n=80 (16.3%).

Dedicated multidisciplinary revision-infection service; treatment individualized to chronicity, fixation, soft tissue, and host status.

03 REFERRAL GEOGRAPHY

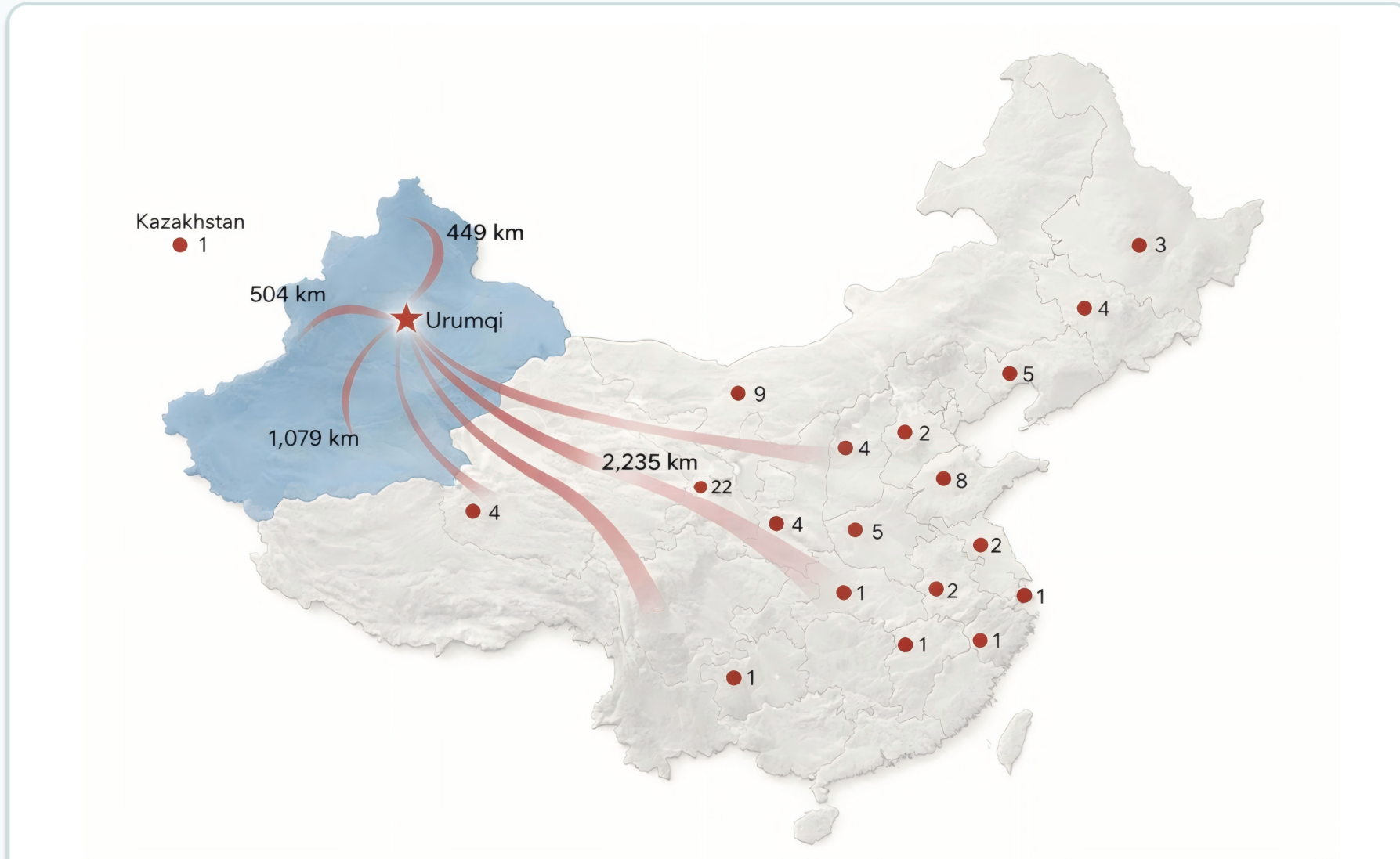


Figure 1. Referral network to Urumqi and observed travel distances.

04 ANALYTIC FRAMEWORK

Baseline complexity, microbiology, and surgical strategy compared across referral regions.

Infection features assessed across 0, 1, and ≥2 prior PJI surgeries using trend tests.

Outcome: MSIS tier-based infection control vs infection-related or other failure.

Mean follow-up: 3.95, 4.05, and 3.07 years across the three regions.

Two-sided p<.05 defined statistical significance.

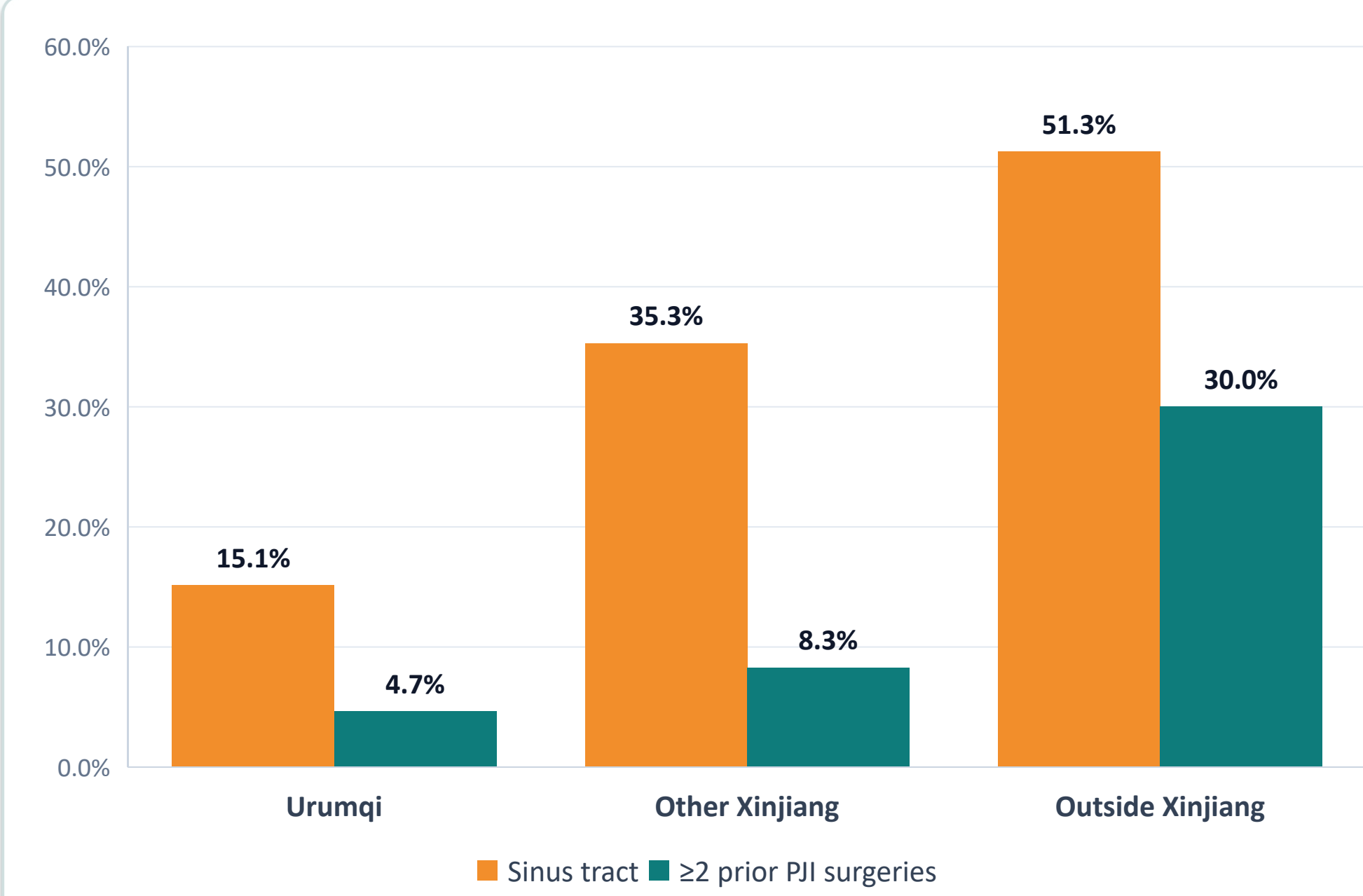
INTERPRETATION FRAME

Referral geography is a systems-level marker of the prereferral pathway.

Observational, single-center data; no non-specialized comparator.

Loss to follow-up did not differ across regions (p=.241).

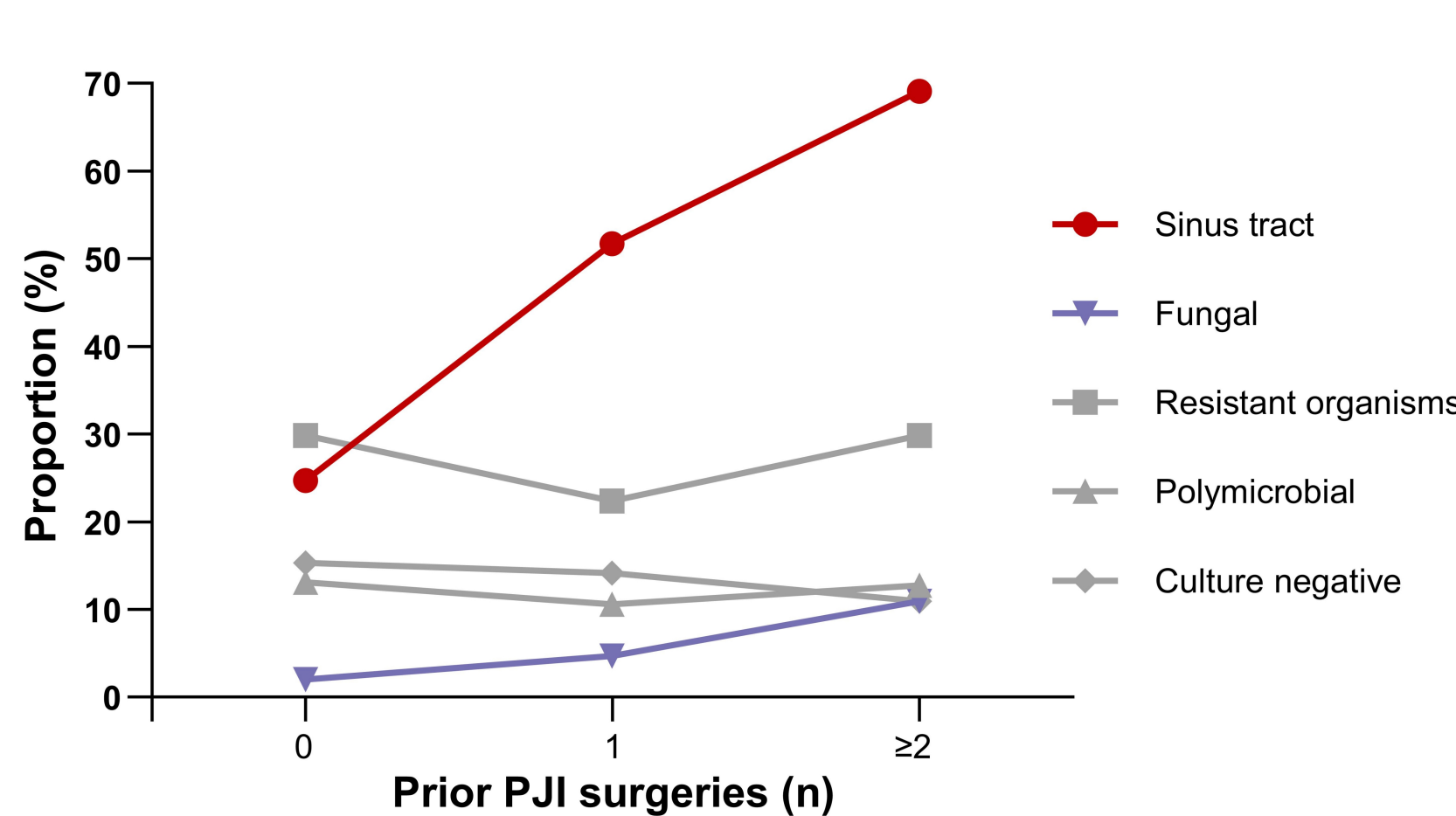
05 COMPLEXITY ROSE WITH REFERRAL BREADTH



Symptom duration: 1.3 → 4.0 → 12.0 months (p<.001)

Sinus tract and ≥2 prior PJI surgeries: both p<.001

06 REPEATED SURGERY, MORE COMPLEX INFECTION



Sinus tract: 24.7% with no prior PJI surgery → ~69.1% with ≥2 (p trend<.001)

Fungal infection also increased (p trend<.001); resistant, polymicrobial, and culture-negative profiles showed no significant trend.

07 GEOGRAPHY AS A CASE-MIX MARKER

SYSTEM-LEVEL INTERPRETATION

Delay + repeated procedures accumulated before specialist referral

Geography captured pathway burden—not a causal biological exposure.

OUTCOMES AT THE SPECIALIZED CENTER

417 / 492

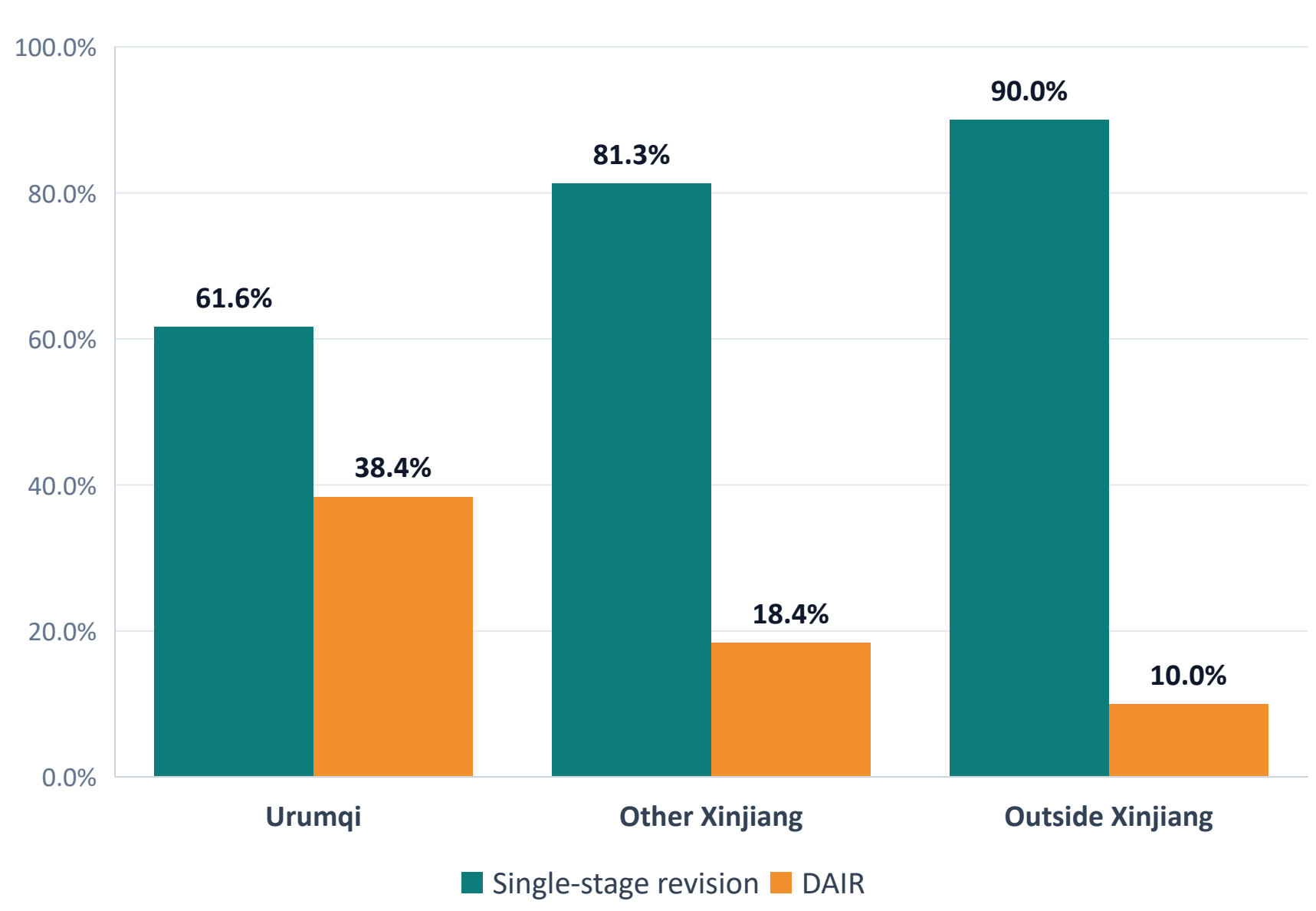
infection control
84.8%

p = .801

outcomes comparable
across regions

The center managed increasingly complex cases referred over wider geographies without an observed gradient in infection control. This is compatible with effective risk concentration, but cannot prove center superiority without a non-specialized comparator.

08 DEFINITIVE STRATEGY SHIFTED



Single-stage revision: 61.6% → 81.3% → 90.0% (p<.001)

DAIR: 38.4% → 18.4% → 10.0%

Only 1 two-stage revision (other Xinjiang).

09 OUTCOMES REMAINED COMPARABLE

Infection control: 82.6% · 85.0% · 86.3%

Overall: 417/492 (84.8%)
Regional outcome distribution p=.801

Infection-related failure: 8.9% overall; other failure: 6.3%.

CONCLUSION

Broader referral geography signaled accumulated prereferral burden and more advanced PJI—not worse specialized-center outcomes.

Complexity increased with travel breadth and prior surgery.

Definitive management shifted from DAIR toward single-stage revision.

Earlier referral pathways may limit the accumulation of delay, sinus tracts, and repeated procedures.

CLINICAL IMPLICATIONS & LIMITATIONS

Clinical: define earlier referral triggers after suspected or failed PJI treatment.

System: use geography and prior surgery count for case-mix adjustment and pathway planning.

Limitations: retrospective single-center design; geography is not causal; no non-specialized comparator.

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