

Digitally Enabled Mental Health Services, Complement or Crowd Out?

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Background

1 in every 5 US adults reports having mental health challenges with an alarming increase in suicidal attempts within marginalized communities.

Access to trained mental-health (MH) professionals improves outcomes and continuity. Unfortunately, over 150 million Americans live in designated mental health professional shortage areas. While the use of technologies can expand reach and capacity, research shows that:

- More technology ≠ better outcomes.
- MH providers differ in age, training, scope of practice, and digital literacy.
- No one-size-fits-all solution: population diversity means no single solution can meet all needs.
- COVID adoption reality: most MH professionals were forced to adopt technologies to deliver services, yet not all succeeded.

Objective: Identify the technology-provider fit by testing how digital services align with MH professionals service mix and their patient panel needs.

Data and Methods

Sources: 2017 to 2023 CMS QPP/Physician Compare, CMS Physician & Services PUF, County Health Rankings, CDC WONDER, USDA RUCA, and ACS/FCC.

Outcome: MIPS Score by provider by year

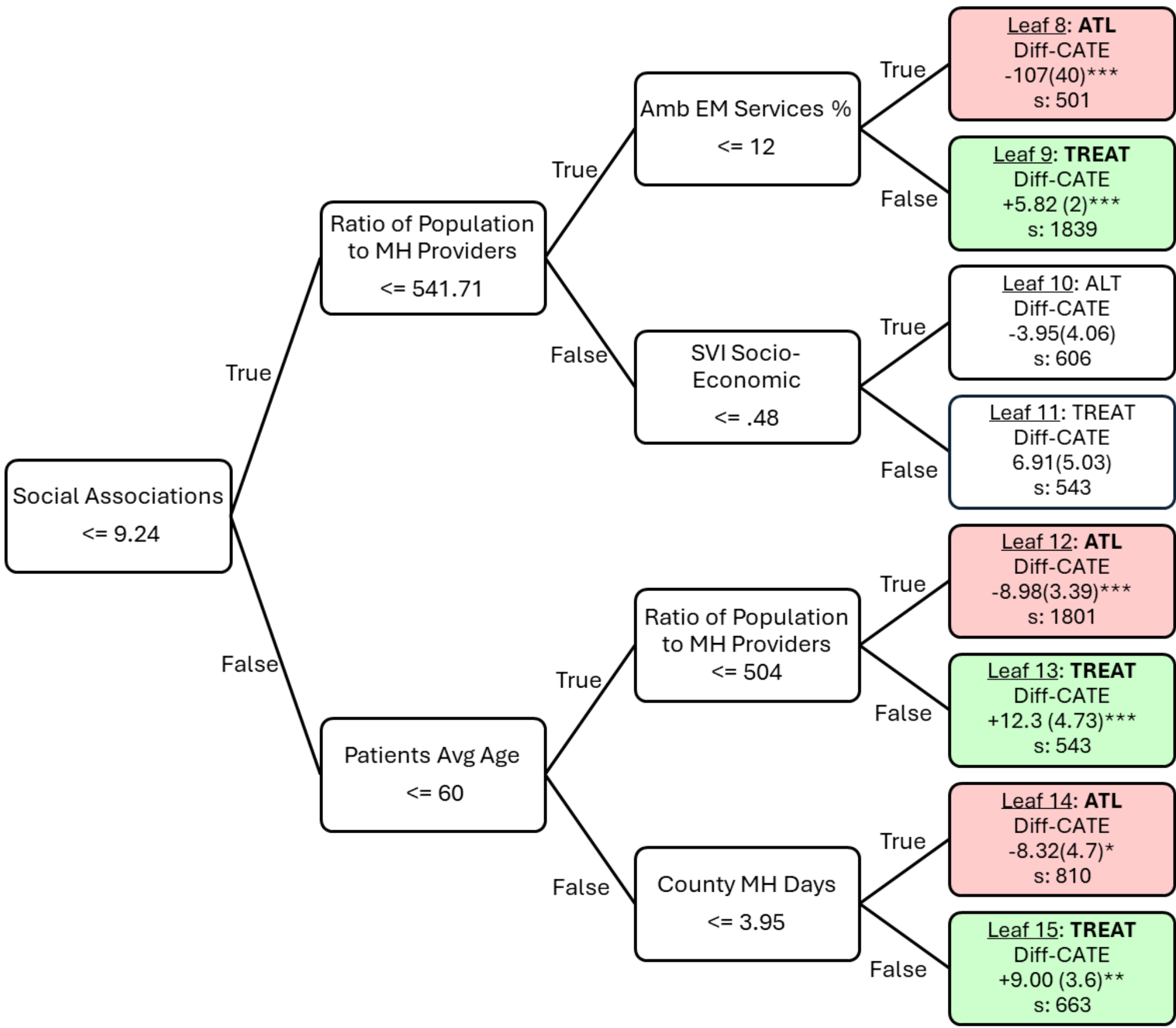
Treatment: Digital Services (online E/M, virtual check-ins, store-and-forward)

Covariates: Service mix, years in Medicare, graduation year, practice size, facility/hospital-based & non-patient-facing flags, beneficiary count, avg age, HCC risk, condition shares. MH provider ratio (people per MH provider), social associations, broadband, income, SVI, poor MH days, and suicide rates.

Design, estimation & targeting. Matched pre-COVID cohort; honest causal forest (GRF) with AIPW and cross-fitting; clustered/weighted. Heterogeneity validated via calibration test and BLP. Policy learning with an interpretable hybrid policy tree on double-robust scores to yield leaf profiles.

Robustness checks. Overlap checks & trimming; alternative treatment definitions (intensity thresholds); alternative outcomes; placebo/pre-trend tests and negative-outcome tests; leaf/policy stability via resampling; out-of-fold policy value using doubly robust scores; benchmark recommendations against treat all vs treat none.

Preliminary Findings



MH Provider Profiles						
	Leaf 8	Leaf 9	Leaf 12	Leaf 13	Leaf 14	Leaf 15
Variables Decision	ALT	TREAT	ALT	TREAT	ALT	TREAT
% of Patients with Anxiety	68.9 ± 9.1	64.4 ± 12.5	68.7 ± 10.0	68.0 ± 10.4	66.9 ± 11.0	68.3 ± 9.7
% of Patients with Depression	66.8 ± 9.9	65.1 ± 11.5	64.2 ± 11.7	65.6 ± 10.2	68.4 ± 9.0	69.7 ± 8.1
Social Associations per 10k	7.5 ± 1.5	7.3 ± 1.5	11.9 ± 2.8	13.0 ± 2.7	12.1 ± 3.4	12.3 ± 2.4
% of Ambulatory E&M Services	3.4 ± 4.3	63.0 ± 28.4	48.8 ± 37.0	56.6 ± 34.1	51.3 ± 33.3	47.6 ± 32.3
Avg Patient Age (yrs)	58.3 ± 10.2	61.5 ± 8.4	53.6 ± 4.4	54.5 ± 4.1	67.6 ± 5.6	66.9 ± 4.9
HCC Risk Score	1.79 ± 0.56	1.71 ± 0.59	1.50 ± 0.37	1.44 ± 0.28	1.82 ± 0.55	1.82 ± 0.50
Years Since Med School Grad	22.7 ± 13.0	25.0 ± 13.2	21.6 ± 12.1	24.9 ± 12.3	24.3 ± 12.5	25.3 ± 12.4
People per MH provider	354 ± 96	353 ± 98	300 ± 101	859 ± 525	410 ± 530	495 ± 415
County Poor Mental-health Days	3.7 ± 0.5	3.7 ± 0.5	3.8 ± 0.4	4.0 ± 0.5	3.6 ± 0.3	4.3 ± 0.3
SVI — Socioeconomic	0.39 ± 0.25	0.39 ± 0.24	0.35 ± 0.21	0.46 ± 0.24	0.28 ± 0.18	0.51 ± 0.19
SVI — Household	0.21 ± 0.21	0.21 ± 0.22	0.24 ± 0.23	0.48 ± 0.25	0.20 ± 0.22	0.42 ± 0.28
SVI — Minority	0.89 ± 0.13	0.89 ± 0.12	0.72 ± 0.21	0.58 ± 0.23	0.75 ± 0.21	0.67 ± 0.21
SVI — Housing & Transportation	0.73 ± 0.21	0.72 ± 0.21	0.72 ± 0.19	0.57 ± 0.23	0.65 ± 0.25	0.71 ± 0.17

Note: The Decision row reflects recommendations from the policy tree. TREAT = implement digital MH to complement provider's services. ALT = implement an alternative (e.g., usual in-person care/other modalities), as digital services do not align with provider services for this profile. For ease of interpretation, the table includes only leaves with significant policy effects. Values are mean ± SD within each leaf.

Implications

- **Fit over footprint.** Digital MH isn't a blanket upgrade. It creates value when it complements the right profile of a MH professional's service offerings and patient-panel needs.
- **Extends care where access is scarce and risks redundancy when there is a misfit.** Digital MH services expand reach and continuity in provider-scarce, higher-burden communities. However, in well-resourced outpatient settings, it can become a redundant add-on that crowds out effective in-person care.
- **Use by design, not by default.** Treat digital MH services as a structured add-on (protocolized check-ins, brief med management, post-visit follow-ups), not as a substitute for complex encounters.

Next Steps

- **Decompose ambulatory E&M by HCPCS.** Break out services into therapy types and complexity tiers. Then map each service type to its best-fit digital modality to refine targeting rules.
- **Theorize with Task–Technology Fit (TTF).** Use TTF to explain why digital works in some profiles but not others by aligning provider tasks + patient-panel needs + technology features + context. Convert findings into testable propositions and profile-based guidance.

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