Diabetes Management in Primary Care:

Evaluating the Impact of Lifestyle Redesign® Occupational Therapy on Patient Outcomes and Healthcare Utilization Costs

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Introduction

Primary Care Accessibility in the U.S.

- Disproportionately impacts underrepresented populations' health outcomes (Voura et al., 2024)
- Leading to costly and preventable emergency healthcare utilization (Dashputre et al., 2020)

Team-Based Care: A Collaborative Healthcare Strategy

Improves:

- Patient outcomes, medication adherence (Kravetz & Walsh, 2016)
- Provider productivity and satisfaction (Helfrich et al., 2014)
- Healthcare utilization and medical errors (Wagner et al., 2017; Shi et al., 2023)

Occupational Therapists

- Help patients achieve greater independence through meaningful daily activities (Dahl-Popolizio et al., 2023)

Lifestyle Redesign® Occupational Therapy Improves Diabetes Management

Prior Evaluation of Lifestyle Redesign® OT (LROT) in Safety-Net Primary Care

Clinically significant improvements in glycemic control

- Hemoglobin A1c (HbA1c) decreased by an average that exceeded the **clinically meaningful** threshold
    - Associated with higher attendance, suggesting a dose–response relationship

Significant Improvements in Habitual Diabetes Self-Management Behaviors

- Healthy diet behaviors
- Physical activity engagement
- Blood glucose monitoring habits
- Medication adherence

Significant Health and Function Improvements

- Physical, mental, social, and role functioning
    - Reductions in pain & diabetes distress
- Health perception & Quality of Life

(Pyatak et al., 2019; Pyatak et al., 2022)

Gaps in Literature

Preliminary Effectiveness → System-Level Impact

The impact of Lifestyle Redesign® Occupational Therapy's integration into Primary Care on system-level value.

Patient Outcomes → Healthcare Service Utilization & Costs

Methods

Primary Aim:

- Compare differences in clinical outcomes and healthcare utilization between LR-OT and Usual Care

Secondary Aim:

- Evaluate and predict cost benefit of LR-OT integration

Study Design & Setting

Hybrid Effectiveness Implementation Study

- Simple randomization:
    - LR-OT vs. no-contact control group (usual care)
- Approved by USC IRB
- Clinical Trial Registry #NCT03293914

Large Urban Safety - Net Public Health System

- Patient-Centered PC clinic with TBC culture
- Serves 14k t o16k patients annually
    - Patient majority on Medicare or Medicaid

Participants

Inclusion Criteria

- Type 2 diabetes
- HbA1c ≧ 9.0%
- 18-75 years of age
- English or Spanish Speaking
- Willing to make lifestyle changes
    - Per provider judgment

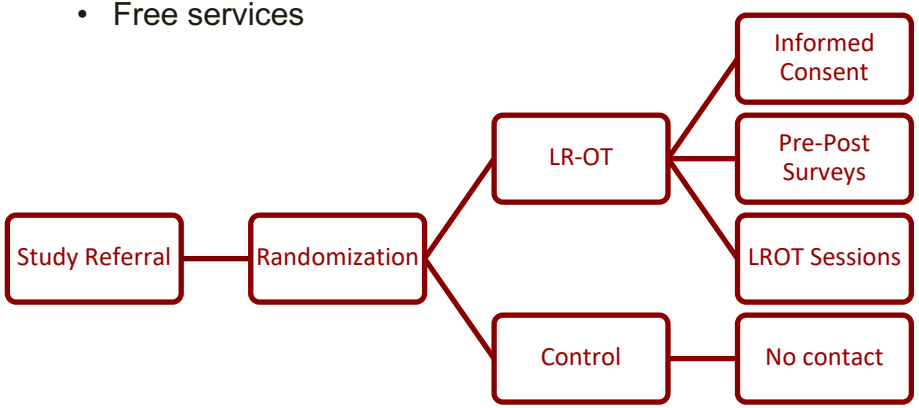
Exclusion Criteria

- Current, untreated substance use disorder
- Behavioral health disorders

LR-OT Intervention

8 1-hour sessions (every 2-3 weeks)

- Individual and onsite
- **Focus:** Collaborative goal setting, autonomy support, knowledge and skills relevant to diabetes, incorporating healthy lifestyle changes into daily routines
- Warm-hand-off referral
    - (personal introduction or direct connection)
- Free services



LR-OT Interventionist

Spanish Bilingual University Faculty Member

- Half time
- Advanced training in:
    - Diabetes education
    - Lifestyle Redesign®
    - Motivational interviewing
- Designated treatment room

TBC Collaboration

- EMR messaging, documentation, in-person discussions
- Visits typically scheduled in alignment with patients routine PC visits

Data Collection & Measures

Extracted from the Electronic Medical Record

- **Clinical outcomes:** Hemoglobin A1c (HbA1c), blood pressure (BP), cholesterol, and body mass index (BMI)
- **Healthcare Utilization:** PC clinic, specialty, emergency department (ED), hospital visits, and hospitalizations

Primary Aim Analyses: Clinical & Healthcare Utilization Outcomes

- **Clinical Outcomes:** Mixed-effects Regression (SAS, version 9.4, SAS, Cary NC)
- **Healthcare Utilization:** Wilcoxon Rank-Sum Tests (R Core Team, 2024)

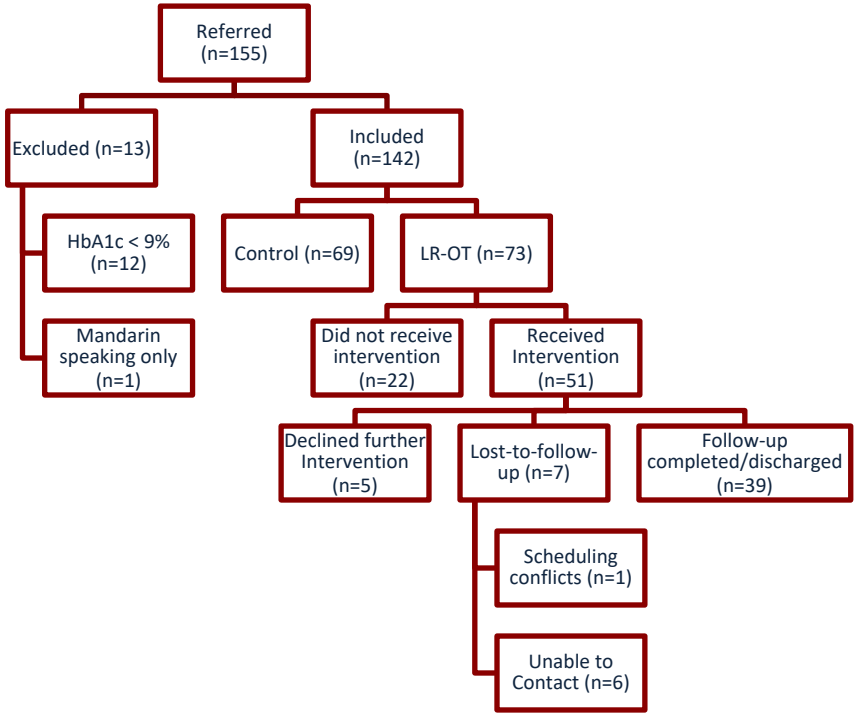
Secondary Aim Analyses: Cost–Benefit Analysis

Estimates: Salary (U.S. Bureau of Labor Statistics, 2020; 2024) and Employer Contribution (California Health Care Foundation, 2025)

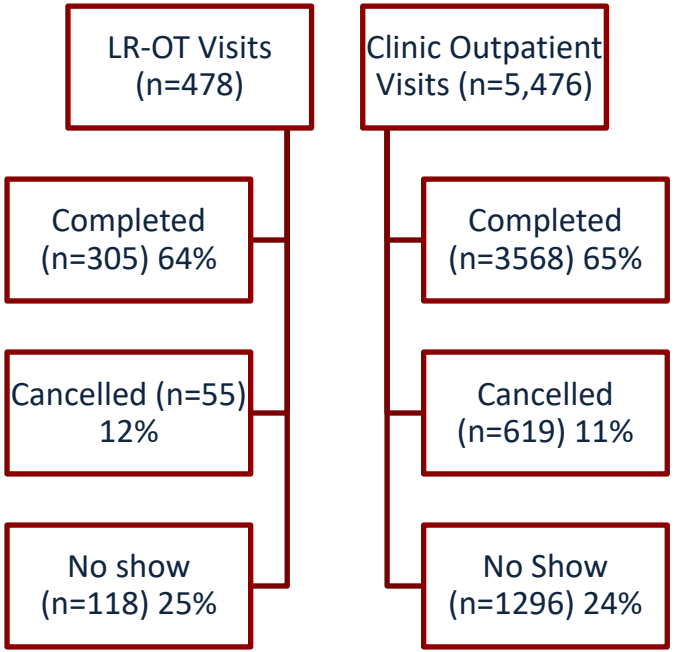
- **Cost:** Mean change per person * Sample Size * Utilization Costs
- **Cost Savings:** Control Group Costs - LR-OT Group Costs
- **Projected Savings:** Cost Savings - LR-OT (salary and benefits)

Results

Participant Flow



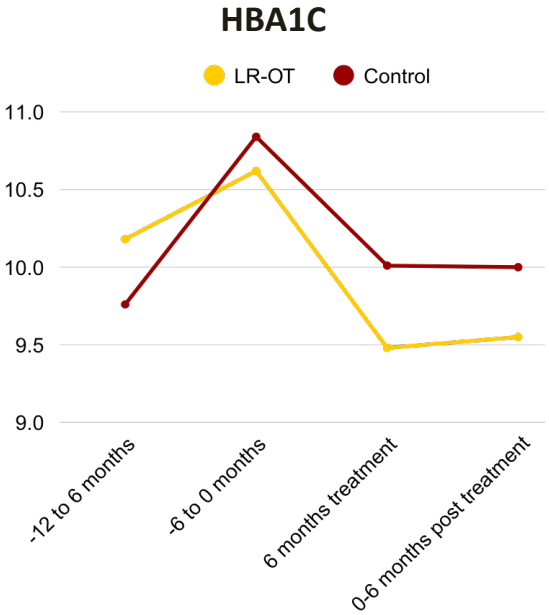
Visit Flow



Results: Primary Aim: Clinical Outcomes

Reversal of Worsening Glycemic Trajectory

- Non-significant change between groups



Before:
Both groups worsened

During:
LR-OT improved more than Usual Care

After:
Both groups stabilize relatively

Clinically Relevant Ranges:

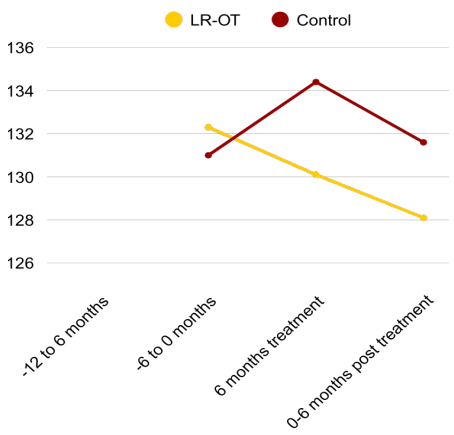
- Diabetes: > 6.5%
- Prediabetes: 5.7% - 6.4%

Results: Primary Aim: Clinical Outcomes

Better Sustained Cardiac Workload Improvement than Usual Care

- Non-significant change between groups

SYSTOLIC BLOOD PRESSURE



Clinically Relevant Ranges:

- Hypertension, Stage 1 (130-134)
- Elevated (128-129)

Shift Out of Stage 1 Hypertension

Before:

LR-OT worse
than Usual Care

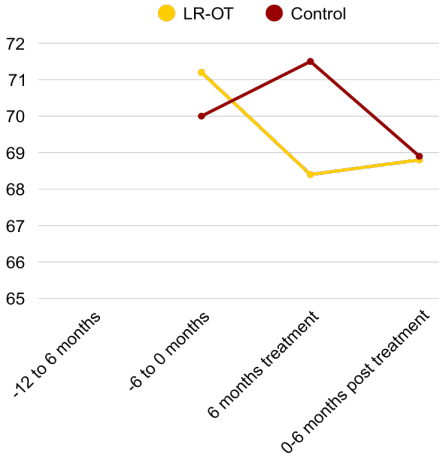
During:

LR-OT improves
Usual care worsens

After:

LR-OT improves:
Hypertension S1 → Elevated
Usual Care maintains
Hypertension S1

DIASTOLIC BLOOD PRESSURE



Clinically Relevant Range:

- Normal < 80

Stabilization in Normal Range

Before:

Both normal
LR-OT worse

During:

Both normal
LR-OT improves
Usual Care worsens

After:

Both stabilized

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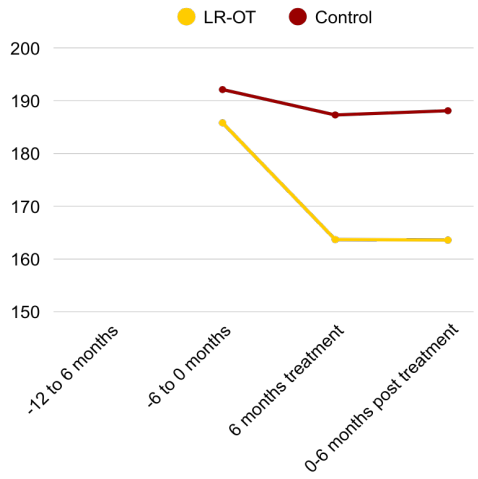
Results: Primary Aim: Clinical Outcomes

Meaningful Progress, Reduced Risk, and Positive Directional Change

- Non-significant change between groups

CHOLESTEROL



Clinically Relevant Ranges:

- ≥ 190 Very High Risk
- ≥ 160 High Risk

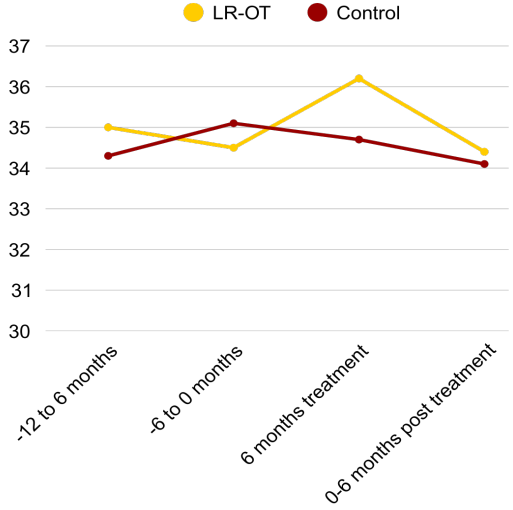
Sustained Reduction Toward Lower Cardiovascular Risk

Before:
LR-OT High Risk
Usual Care Very High Risk

During:
Both High
LR-OT improves
Usual Care relatively stabilized higher risk

After:
Both stabilized High Risk

BODY MASS INDEX



Clinically Relevant Ranges:

- Obese (Class I): 30 – 34.9
- Obese (Class II): 35 – 39.9

Transient Change Consistent With Body Recompositing

Before:
LR=OT lowering
Usual Care increasing

During:
LR-OT increases
Usual Care steady reduction

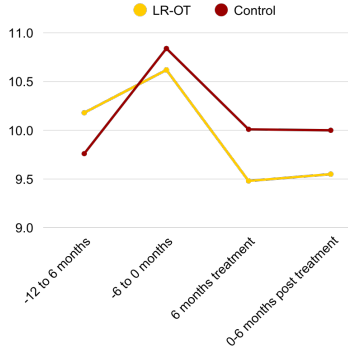
After:
Both trending decline

Results: Primary Aim: Clinical Outcomes

Meaningful Progress, Reduced Risk, and Positive Directional Change

- Non-significant change between groups; patterns consistent with lifestyle-driven change

HBA1C



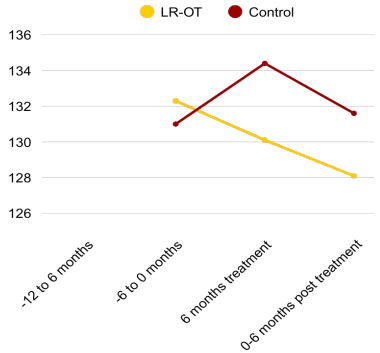
Reversal of Worsening Glycemic Trajectory

Before: Both groups worsened
During: LR-OT improved more than Control
After: Both groups stabilize

Clinically Relevant Ranges:

- Diabetes: > 6.5%
- Prediabetes: 5.7% - 6.4%

SYSTOLIC BLOOD PRESSURE



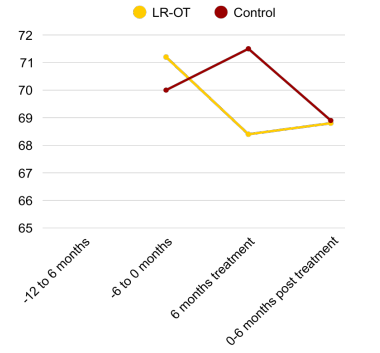
Shift Out of Stage 1 Hypertension

Before: LR-OT worse than control
During: LR-OT improves, Control worsens
After: LR-OT improves:
- Hypertension S1 → Elevated
Control maintains Hypertension S1

Clinically Relevant Ranges:

- Hypertension, Stage 1 (130-134)
- Elevated (128-129)

DIASTOLIC BLOOD PRESSURE



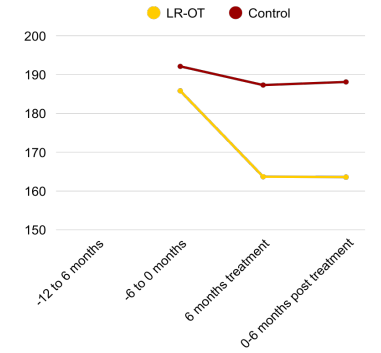
Stabilization in Normal Range

Before: Both normal, LR-OT worse
During: Both normal
LR-OT improves
Control worsens
After: Both stabilized

Clinically Relevant Range:

- Normal < 80

CHOLESTEROL



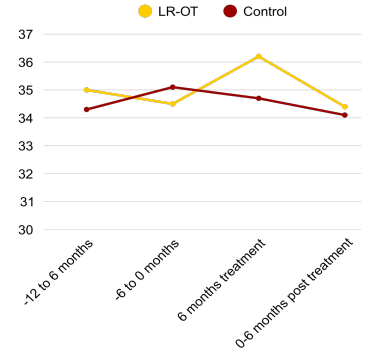
Sustained Reduction Toward Lower Cardiovascular Risk

Before: Both normal, Control worse
During: Both normal
LR-OT improves
Control stable higher risk
After: Both stabilized

Clinically Relevant Ranges:

- Normal < 200
- Closer to 200 = More risk

BODY MASS INDEX



Transient Change Consistent With Body Recompositing

Before: LR=OT worse
During: LR-OT increases
Control steady reduction
After: Both trending decline

Clinically Relevant Ranges:

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Primary Aim: Healthcare Utilization

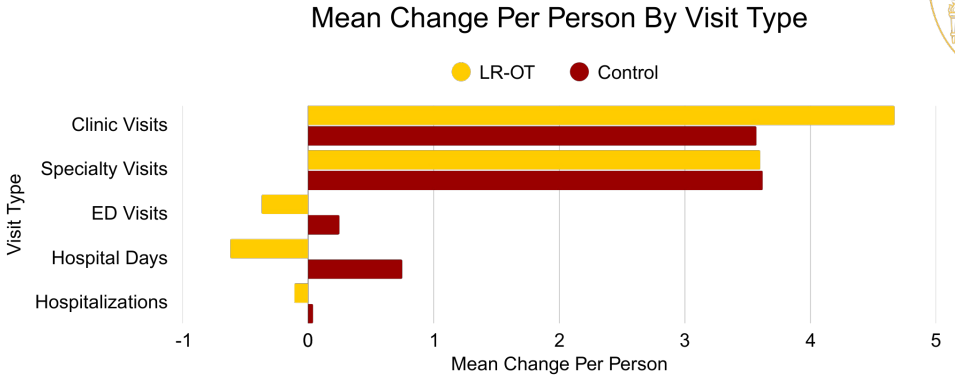
LR-OT supports a redistribution of care

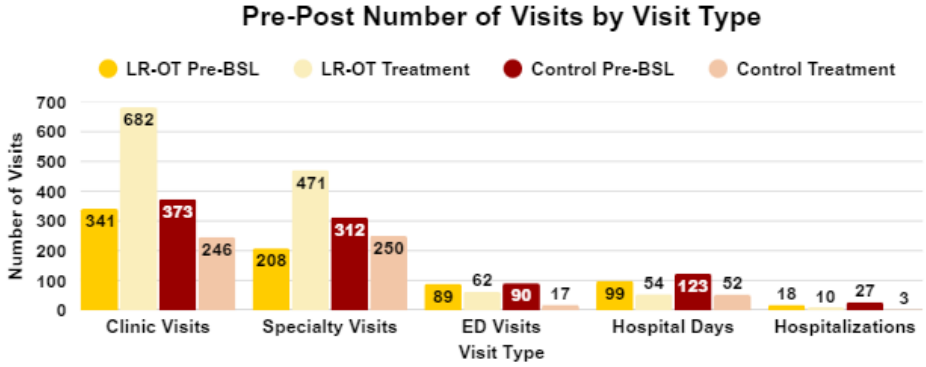
From crisis-driven utilization → toward planned primary care

- Significant decrease in ED visits and hospital days

Without increasing specialty or inpatient burden

- Non-significant increase in PC clinic visits
- Non-significant decrease in specialty visits and hospitalizations





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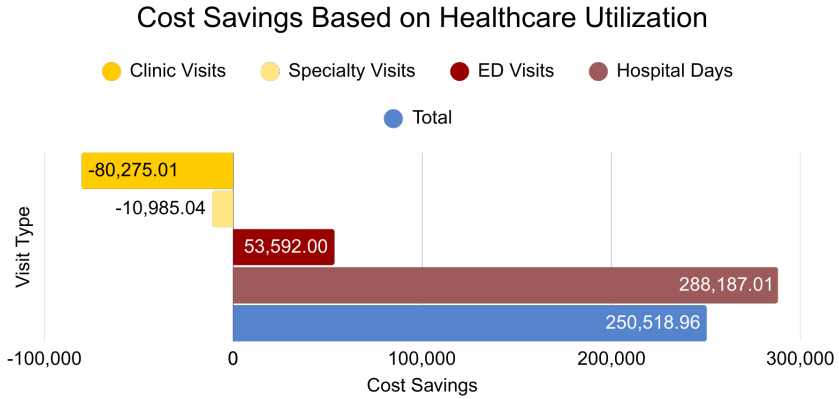
Secondary Aim: Cost Analysis



Cost Category	Actual Half-Time LR-OT	Projected Full-Time LR-OT
Annual Savings	**$250,518.96**	$501,037.92
Total Investment (Salary and Benefits)	$74,355.60	$148,711.20
Net Financial Benefit	$176,163.36	**$352,326.70**

- Half-time LR-OT role generated approximately $176,000 in net savings
- Projected full-time scaling yielding over $350,000 in net financial benefit

Salary estimates (U.S. Bureau of Labor Statistics, 2020)
Benefits estimates (California Health Care Foundation, 2025)

Discussion & Conclusion

Equivocal Evidence on Clinical Outcomes:

Although no significant improvements in clinical outcomes were observed, positive trends were noted, suggesting that integrating LR-OT into PC may favor patients' health.

- Interpreted with (Pytatak, et al., 2019)

Reduced ED Visits and Hospital Days:

Integrating LR-OT into PC increases the likelihood that patients can reduce their dependence on emergency services for diabetes management.

- Consistent with TBC practices (Nelson et al., 2014; Romaire et al., 2014; Bayliss et al., 2015)

Cost Savings and Fiscal Benefit:

Conservative cost analysis demonstrates that integrating LR-OT into PC without fee-for-service has a positive return on investment for healthcare systems.

- Without taking into consideration revenue from services
- Consistent with TBC cost effectiveness (Henry et al., 2018)

Strengths

Randomization & Pragmatic Design

Limitations

Small Sample Size & Sporadically Collected Data

- Reduced statistical power
- Demographic difference and intention to treat analysis not feasible

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