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Does blood pressure telemonitoring increase the number of diabetic patients at goal blood pressure?

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Disclosures

- No financial disclosures

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Hypertension (HTN) Problem

- HTN treatment is inadequate for most
- HTN treatment is more successful with:
  - Team-based support (nurse or pharmacist)
  - Facilitated relay of blood pressure data
  - Patient awareness and self-management
- Home vs. office-based blood pressure (BP)

	Home	Office
Diagnostic Accuracy (sens/spec)	86%/63%	75%/75%
Outcomes Correlation (CV & all-cause mortality)	Better	Good
Office Visits	Fewer	More
Overall Costs	Lower	Higher

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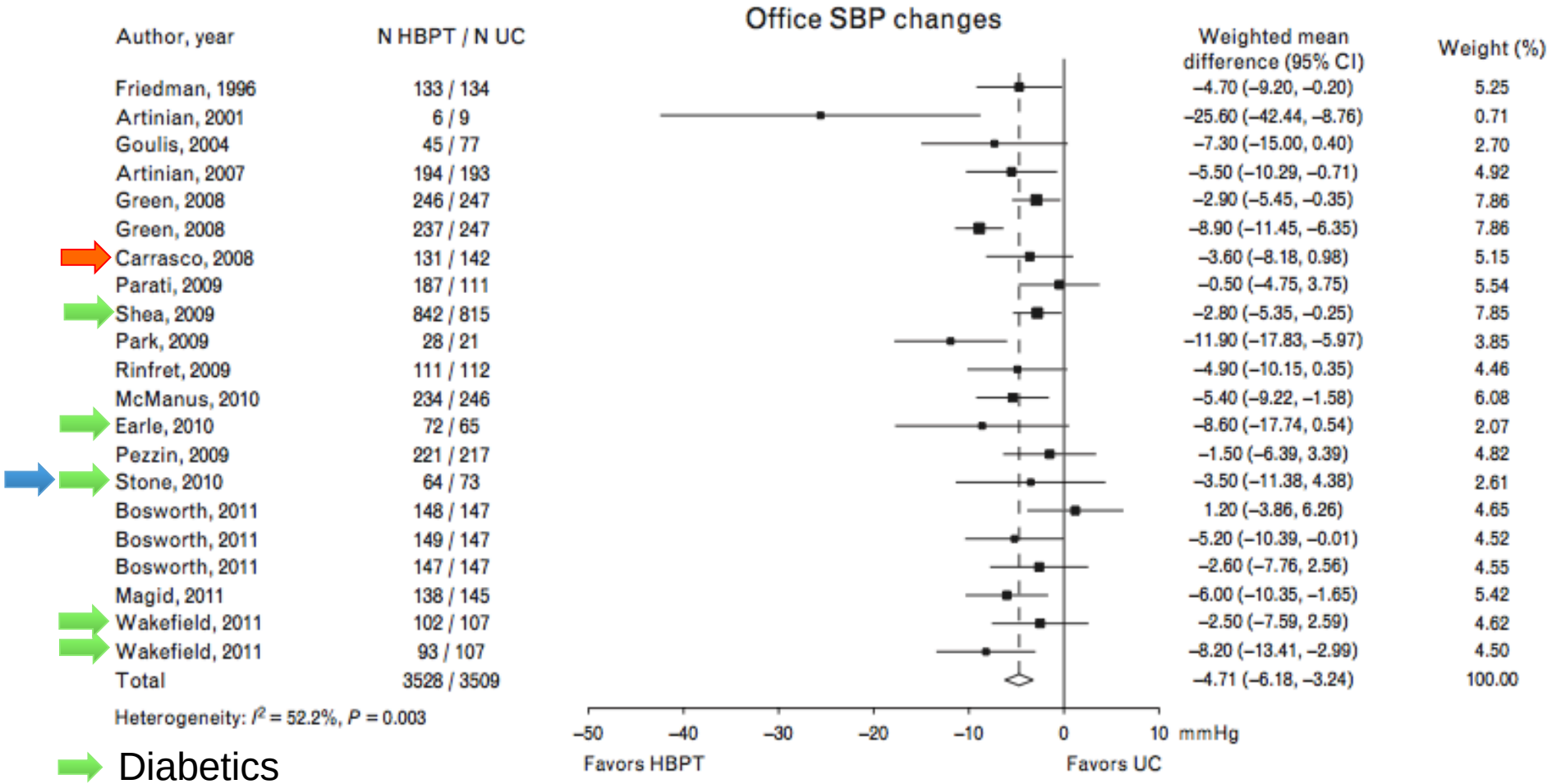
Telemonitoring vs. Usual Care 2013 Meta-analysis[1]



- Diabetics
- Home BP comparison group
- Care management

1. Omboni S. et al. Clinical usefulness and cost effectiveness of home blood pressure telemonitoring. J Hypertens. 2013.

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Clinical Question

- For diabetic patients in a primary care practice with nurse care management, does home BP telemonitoring (compared to home BP testing without telemonitoring) increase the number of patients at goal blood pressure?

Study Design

- Randomized trial
  - Intervention = **IdealLife** home BP **tele**monitor (n=25)
  - Control = **Omron** home BP monitor (n=25)
  - All patients:
    - Nurse care manager
    - Usual care
    - Not blinded to intervention
    - Academic primary care practice, Rochester, MN, USA

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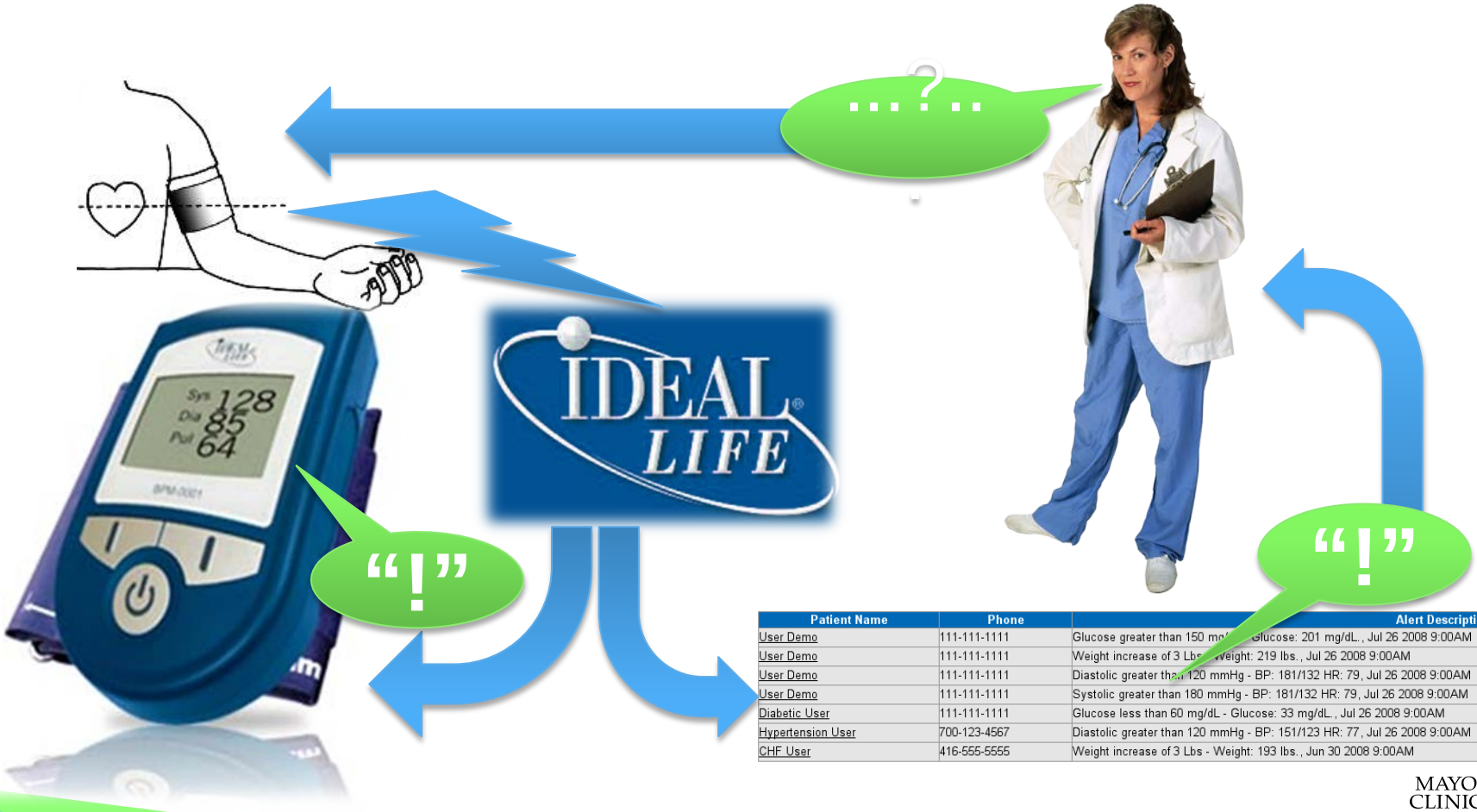
Intervention

- IdealLife home BP **tele**monitor



Patient Name	Phone	Alert Description
User Demo	111-111-1111	Glucose greater than 150 mg/dL - Glucose: 201 mg/dL., Jul 26 2008 9:00AM
User Demo	111-111-1111	Weight increase of 3 Lbs - Weight: 219 lbs., Jul 26 2008 9:00AM
User Demo	111-111-1111	Diastolic greater than 120 mmHg - BP: 181/132 HR: 79, Jul 26 2008 9:00AM
User Demo	111-111-1111	Systolic greater than 180 mmHg - BP: 181/132 HR: 79, Jul 26 2008 9:00AM
Diabetic User	111-111-1111	Glucose less than 60 mg/dL - Glucose: 33 mg/dL., Jul 26 2008 9:00AM
Hypertension User	700-123-4567	Diastolic greater than 120 mmHg - BP: 151/123 HR: 77, Jul 26 2008 9:00AM
CHF User	416-555-5555	Weight increase of 3 Lbs - Weight: 193 lbs., Jun 30 2008 9:00AM

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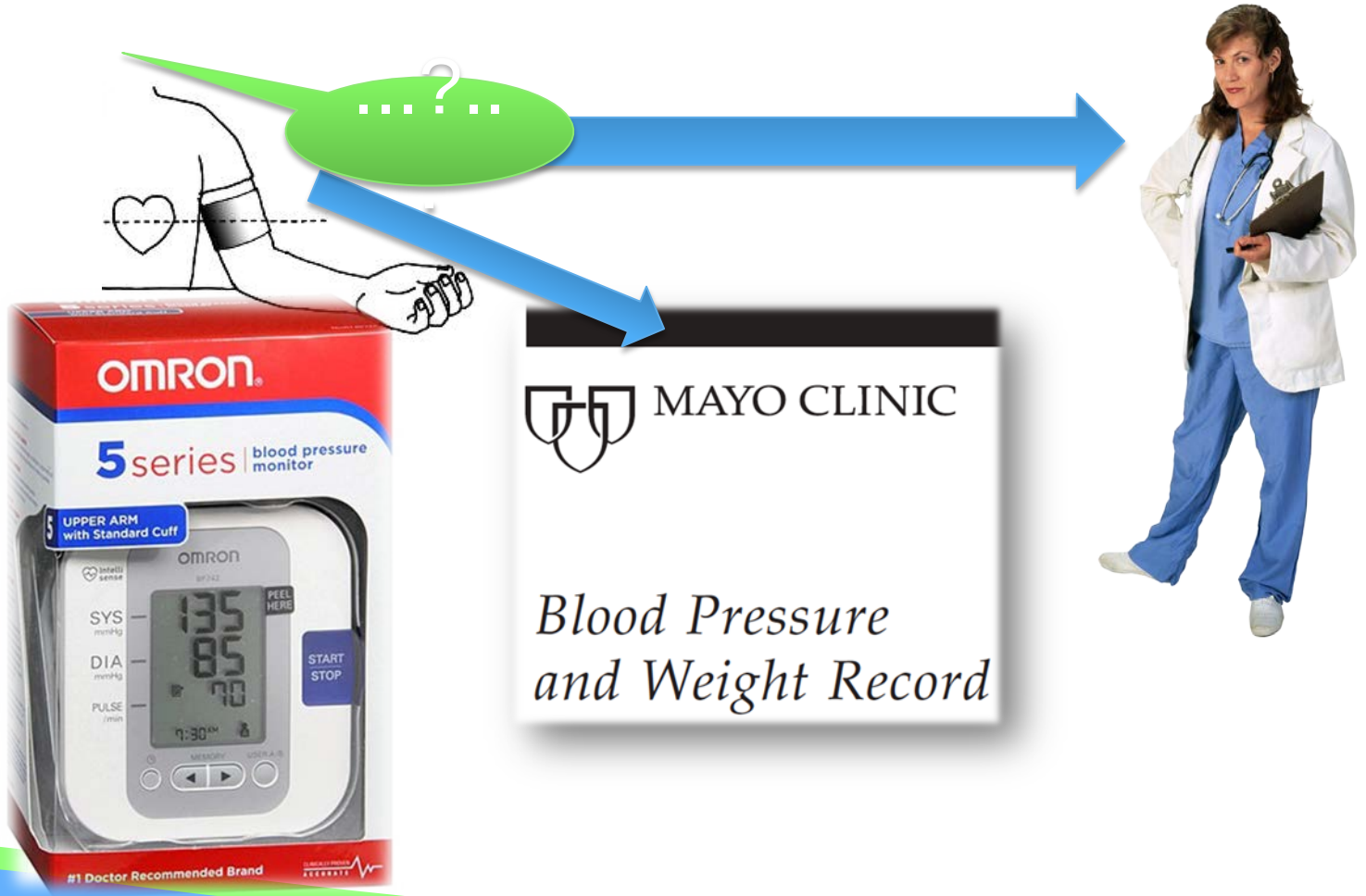
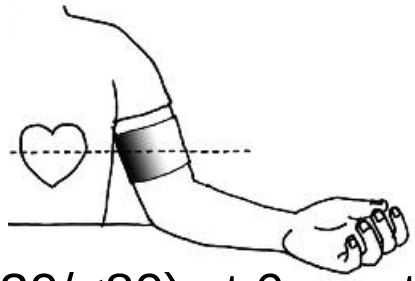
Control

- Omron home BP monitor



Methods

- Participants
  - Primary care patients with diabetes
  - Uncontrolled HTN (BP >140/90)



- Outcomes
  - 1º= proportion achieving goal BP (<130/<80) at 6 months
  - 2º= change in mean BP, number of interactions
  - BP assessments at baseline, 3 months, and 6 months
- Analysis
  - Intention-to-treat
  - Missing data = last value carried forward
  - Statistics
    - two sample test for proportions (1º outcome)
    - t-test (2º outcome)

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Demographics

	IdealLife count (percent)	**Omron** count (percent)	**p-value**
Age, mean (std dev)	63.24 (7.9)	62.36 (8.5)	0.35
Sex, male	10 (40)	12 (48)	0.57
Race, white	24 (96)	25 (100)	0.31
Number of BP meds, mean (std dev)	2 (0.91)	2.2 (1.73)	0.69
Years on BP meds, mean (std dev)	14.68 (8.45)	17.32 (12.63)	0.78
Years as diabetic, mean (std dev)	16 (12.31)	16.32 (8.67)	0.54

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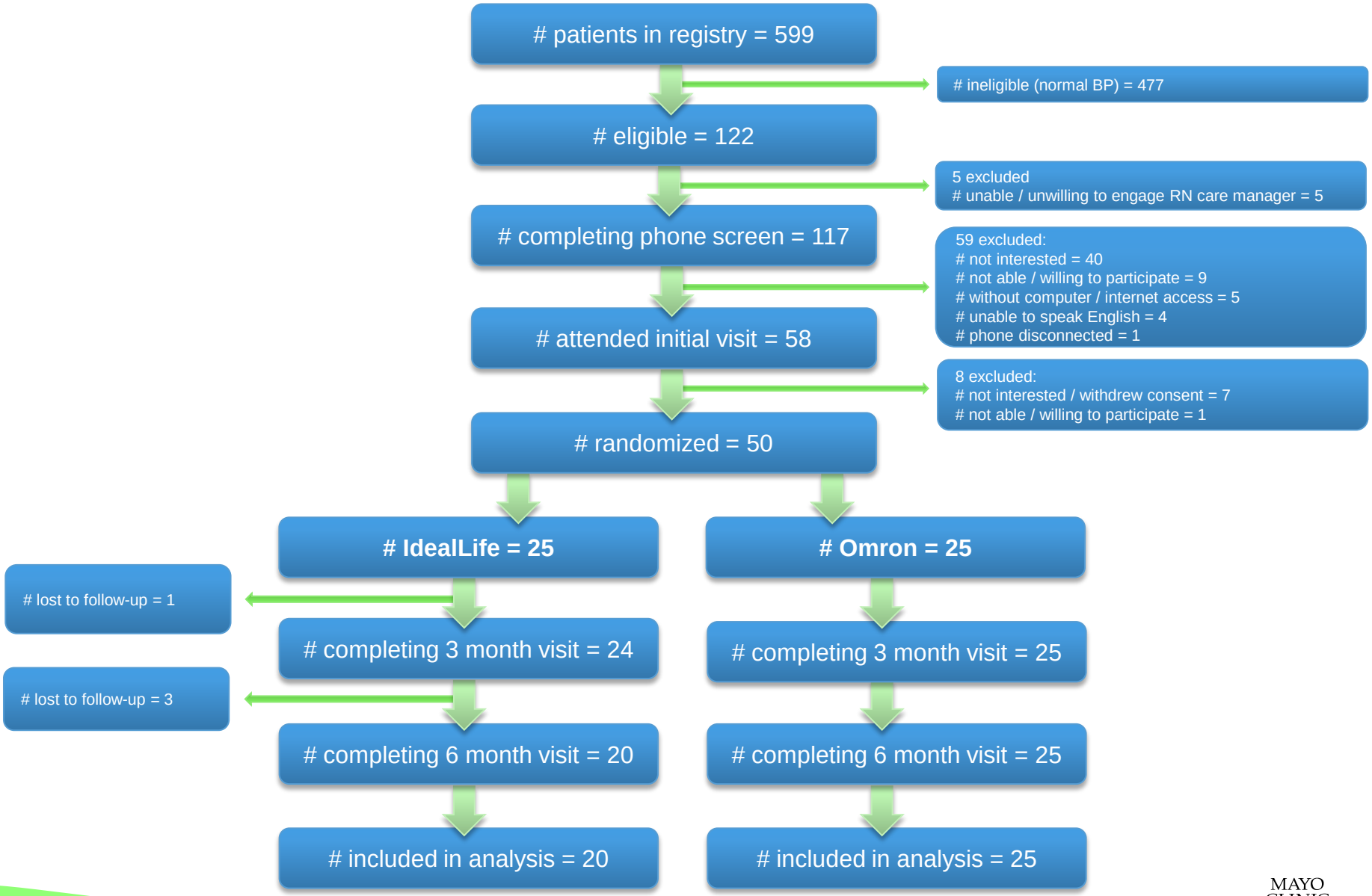
patients in registry = 599
ineligible (normal BP) = 477
eligible = 122
5 excluded
unable / unwilling to engage RN care manager = 5
completing phone screen = 117
59 excluded:
not interested = 40
not able / willing to participate = 9
without computer / internet access = 5
unable to speak English = 4
phone disconnected = 1
attended initial visit = 58
8 excluded:
not interested / withdrew consent = 7
not able / willing to participate = 1
randomized = 50
IdealLife = 25
Omron = 25
lost to follow-up = 1
completing 3 month visit = 24
completing 3 month visit = 25
lost to follow-up = 3
completing 6 month visit = 20
completing 6 month visit = 25
included in analysis = 20
included in analysis = 25

Primary Outcome: Proportion at goal BP (<130/<80)

	IdealLife	p-value	Omron	p-value
Achieving goal BP, baseline; count [%]	14 [56%]		11 [44%]	
Achieving goal BP, 6 months; count [%]	15 [60%]		16 [64%]	
Proportion at Goal BP, difference [95% CI]	0.04 [-0.2 to 0.3]	0.78	0.2 [-0.1 to 0.4]	0.16

- At 6 months (vs. baseline)
  - IdealLife = 4% more at goal BP (non-significant)
  - Omron = 20% more at goal BP (non-significant)

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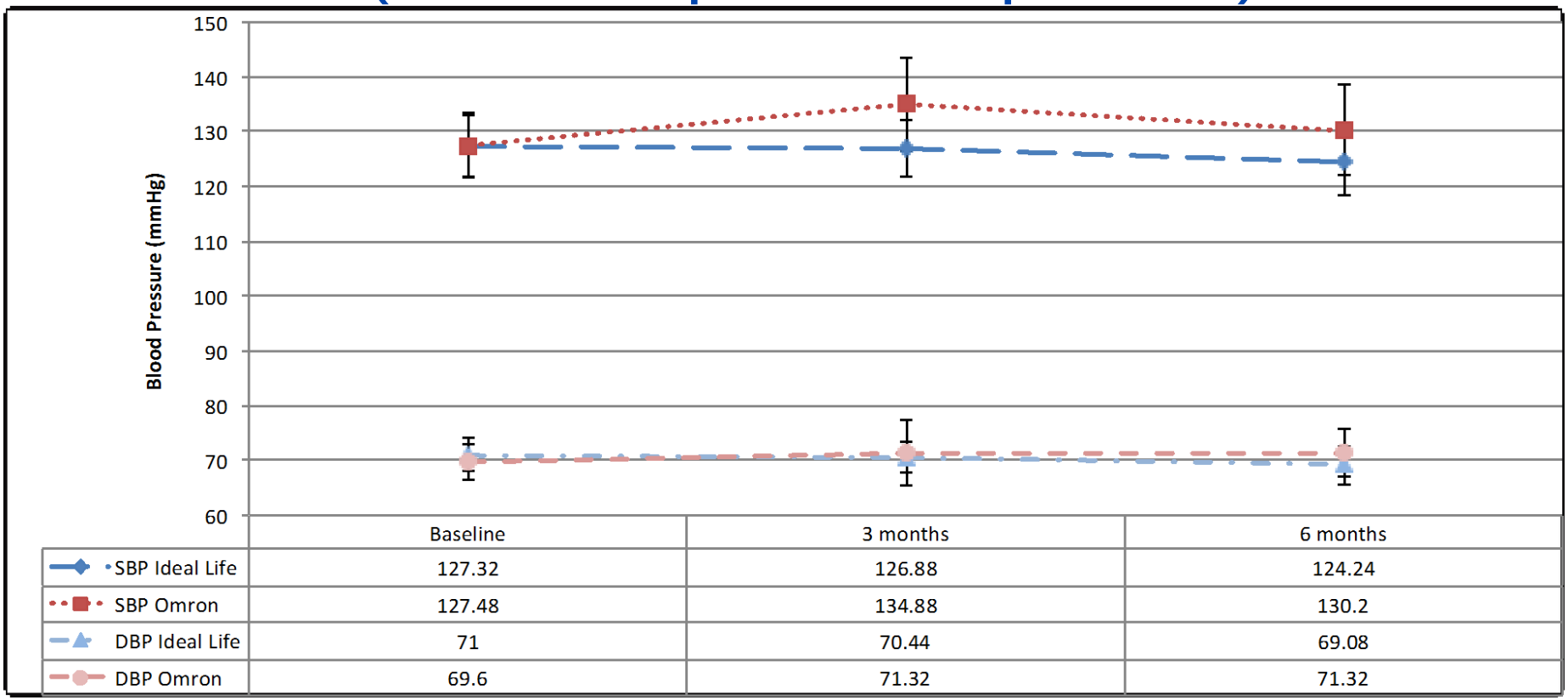
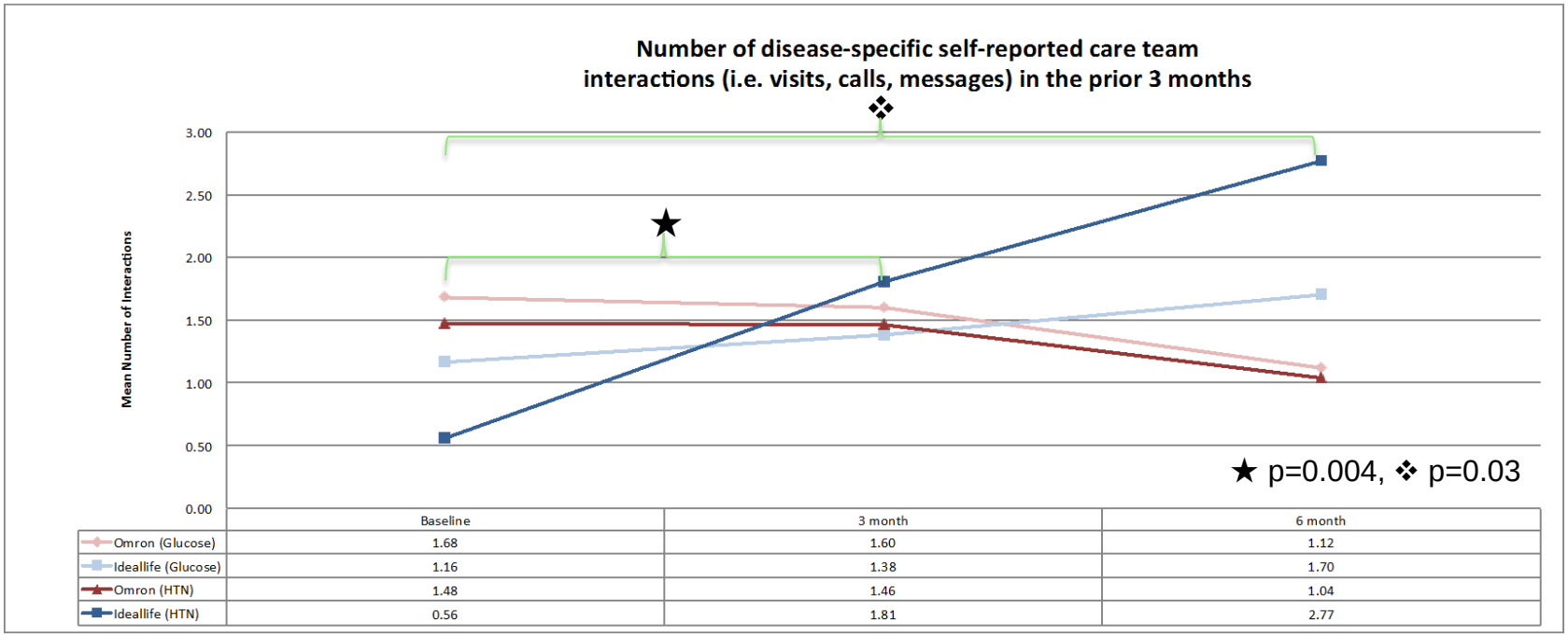
Systolic and Diastolic BP Change (matched pairs comparison)



	Baseline	3 months	6 months
SBP Ideal Life	127.32	126.88	124.24
SBP Omron	127.48	134.88	130.2
DBP Ideal Life	71	70.44	69.08
DBP Omron	69.6	71.32	71.32

	IdealLife (6 mo. vs baseline)	p-value	Omron (6 mo. vs baseline)	p-value
SBP difference [mean, 95% CI]	3.1 [-2.4 to 8.6]	0.25	-2.7 [-11.1 to 5.6]	0.22
DBP difference [mean, 95% CI]	1.9 [-1.4 to 5.2]	0.24	-1.7 [-5.7 to 2.3]	0.38

Care team interactions about BP increased with telemonitoring



	Baseline	3 month	6 month
Omron (Glucose)	1.68	1.60	1.12
Ideallife (Glucose)	1.16	1.38	1.70
Omron (HTN)	1.48	1.46	1.04
Ideallife (HTN)	0.56	1.81	2.77

- At 6 month visit (vs baseline) IdealLife patients reported an average of ~2.2 more care team interactions about blood pressure in the prior 3 months
- No differences in the Omron group
- No differences in interactions about glucose (control outcome)

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Study Limitations

- Limited power (due to dropouts)
  - 72% power to detect a 35% difference in proportion at goal
  - 72% power to detect a 10 mmHg difference in systolic BP
- BP control at baseline was better than predicted
- Single site academic medical center
- Race majority white
- RN care manager not universally available

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Summary

- RCT comparing home BP **tele**monitoring with home BP **self**-monitoring over 6 months
- Powered to detect moderate to large differences
- Outcomes
  - No difference in proportion of patients at goal BP
  - No difference in mean BP
  - Significantly more self-reported care team interactions about blood pressure in telemonitoring group

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Questions & Discussion

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