Right Knowledge. Right Place. Right Time.

ECHO: A Revolutionary Model for Expanding Access to Specialized Care in Underserved Settings

NAFC Symposium 2017

CommunityHealth, Community Health Care Clinic, Family Health Partnership, Will-Grundy Medical Clinic, Tri-City Health Partnership

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Objectives

1. Describe the ECHO model and its implementation in free and charitable clinics
2. Recognize the extensive resources the ECHO model offers to clinics in underserved settings
3. Discuss the impact of the model on education, provider knowledge, patient health outcomes and clinic-wide changes
4. Identify, locate and consider opportunities to participate in ECHO by collaborating with local ECHO hubs across the country


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Americares Core U.S. Programs

Safety Net Support & Access to Medicine

Emergency Programs

Clinical Services

Community Health Programs

Americares, Loyola University Chicago, ECHO-Chicago, and IAFCC Free and Charitable Clinics (FCC) Initiative

- Collaboration among **four** strategic partners
- Implemented in **five** FCCs in Illinois
- Designed exclusively for FCC providers
- Goal: Assess feasibility and effectiveness of ECHO model in FCC setting
- Funding provided by the GE Foundation

Characteristics of Participating Clinics

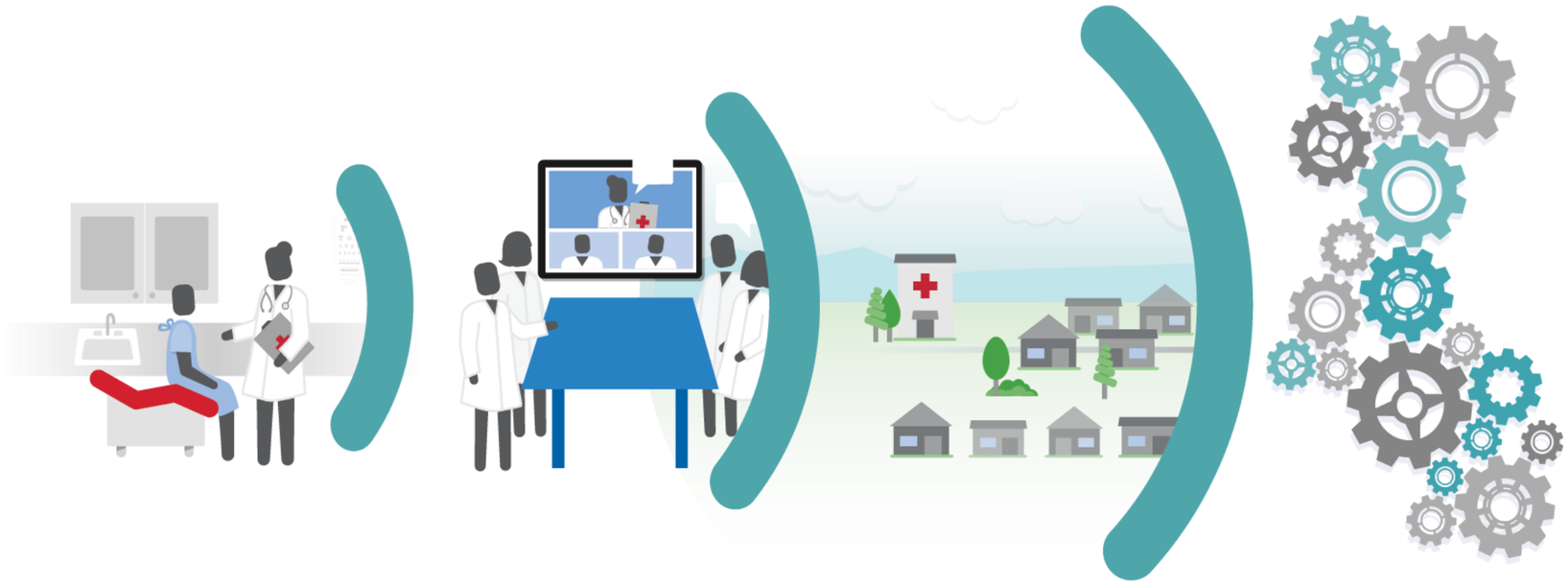
Clinic	Location	Annual Budget	# Patients	# Annual Visits	# (FTEs) Paid Providers	Volunteers	# HTN Patients	#/Type of ECHO Participants
Site E	Suburban	$571,000	~1,000	~6000	5 RNs (3)	33 MDs 1 DO 7 NPs 42 RNs	198	1 NP (paid) 1 RN (paid)
Site D	Suburban	$380,000	510	1,825	1 NP 1 RN	22 MDs 1 DO 24 RNs	67	1 NP (Clinic Dir) 1 MD (vol Med Dir)
Site C	Suburban	$1.2 million	2,054	7,500	2 NPs (1.5) 4 RNs (2.5)	28 MDs 1 DO 2 NPs 5 RNs	259	1 NP (paid) 2 RNs (paid) Note: 1 RN participated informally
Site B	Urban	$580,000	1,500	10,000	2 (1.6)	130 MDs 5 DOs 5 NPs 6 RNs	288	1 NP (paid) 1 NP (paid)
Site A	Urban	$3.0 million	10,500	23,000	1 NP 2 RNs	252 MDs 23 DOs 7 NPs 5 PAs 5 RNs	2,046	1 NP (Dir of Nursing) 1 RN 1 MD (vol Med Dir)

ECHO-Chicago Mission

The mission of ECHO-Chicago is to establish a robust community-based knowledge network that reduces the serious health disparities affecting children and adults in underserved communities.

ECHO: How it Works

The Extension for Community Health Outcomes (ECHO) uses *case-based, iterative, telehealth* delivered via high-grade videoconference technology to bring advanced training and support to community-based primary care providers



PATIENT
- Right Care
- Right Place
- Right Time

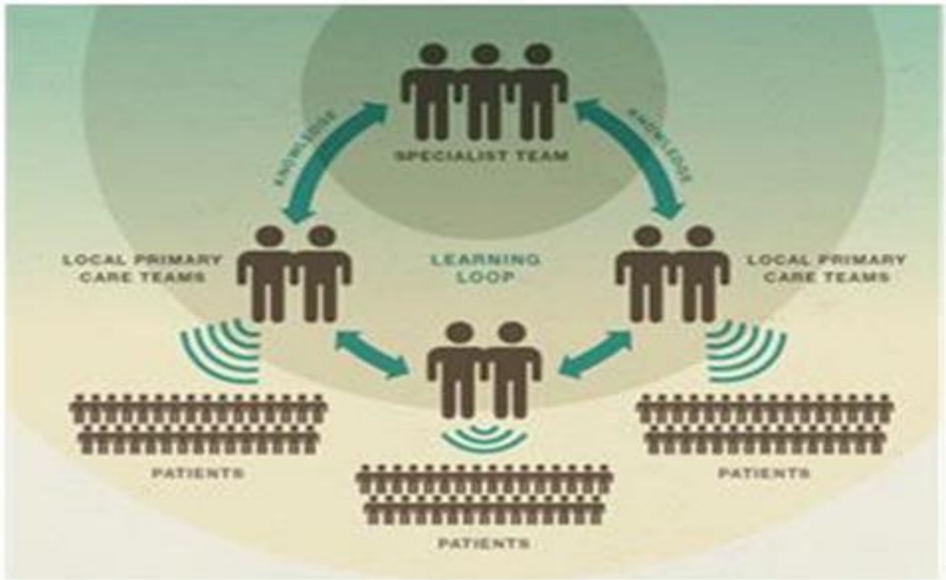
PROVIDER
- Acquire New Knowledge
- Treat More Patients
- Build Community of Practice

COMMUNITY
- Reduce Disparities
- Retain Providers
- Keep Patients Local

SYSTEM
- Increase Access
- Improve Quality
- Reduce Cost

Image courtesy of ECHO Institute

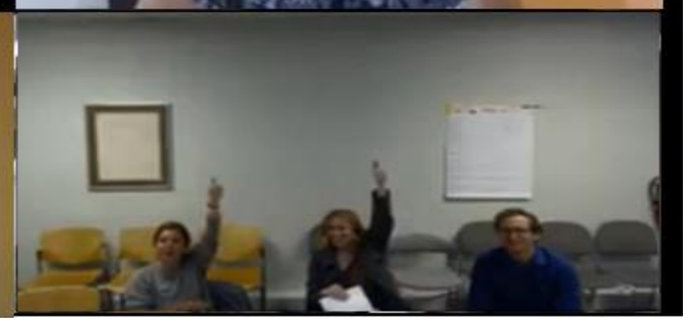
Best Practices + Knowledge Transfer + Technology = Force Multiplier



RWJF 2011

THE UNIVERSITY OF CHICAGO MEDICINE & BIOLOGICAL SCIENCES

ECHO CHICAGO



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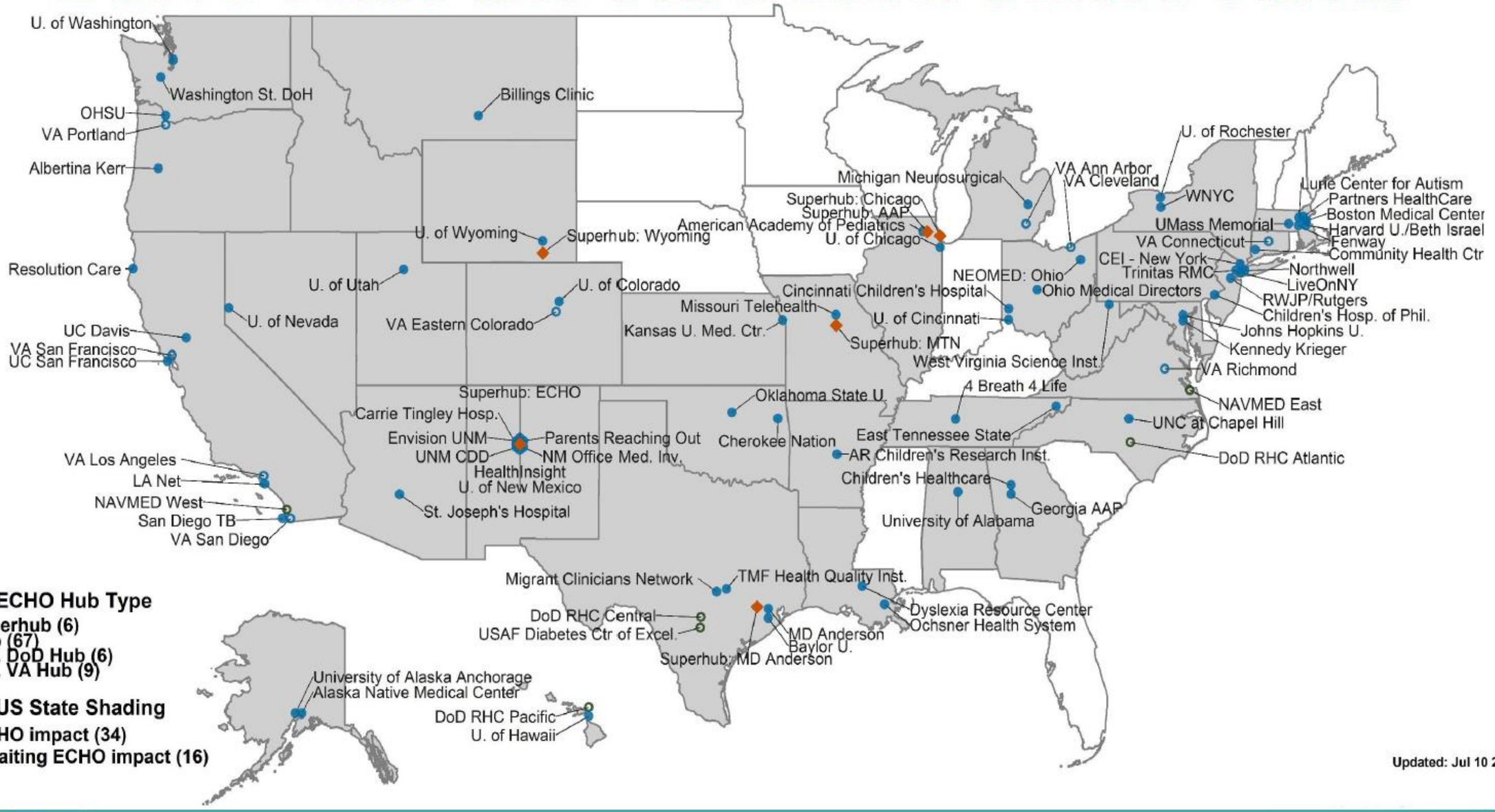
ECHO CHICAGO

ILLINOIS ASSOCIATION OF FREE & CHARITABLE CLINICS
IAFCC

ECHO-Chicago Disease Areas

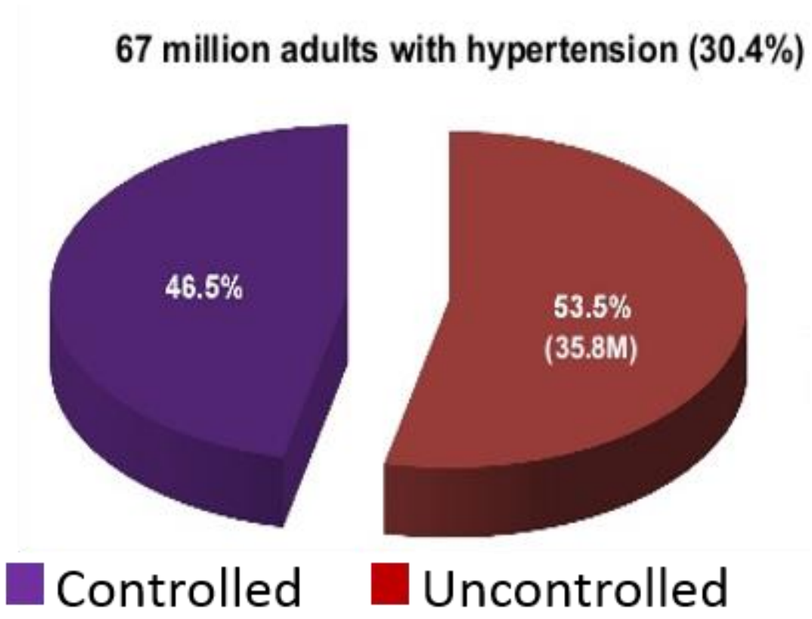
Oct 2010	Resistant hypertension
Dec 2011	Pediatric ADHD
Jan 2012	Risk based approach to women's health
Mar 2013	Pediatric obesity & comorbidities
Apr 2014	Hepatitis C
Feb 2015	Child & youth epilepsy (not active)
Feb 2016	Geriatrics
Jun 2016	Behavioral health integration (system change)
Sep 2016	Complex pediatric asthma
Jan 2017	Hepatitis C case management
Feb 2017	Behavioral health (clinic management)

ECHO Hubs and Superhubs: United States



Focus: Resistant Hypertension

- Disease area selected through collaborative discussion with FCC partners
- Leverage existing ECHO-Chicago infrastructure, experience and disease specific resources
- **Mixed method approach**
  - Quantitative analysis of patient and provider outcomes
    - BP control
    - Medication management
  - Qualitative/descriptive analysis of provider practices and clinic processes



CDC. MMWR 2012;61(35):203-9.

FCCs and ECHO

Several key factors impact how ECHO works in the FCC setting

- No federal funding for medications, supplies, lab tests
- Volunteer providers with variable experience delivering primary care to the FCC patient population

This creates both challenges and opportunities

Photo credit: IAFCC

- Challenges
  - Identify the right clinic and provider partners
  - Support continuity of care consistent with FCC model
  - Disseminate knowledge among FCC staff/volunteers
- Opportunities
  - Engage clinic leadership
  - Engage pharmacy/pharmacist
  - Expand models for disseminating knowledge

ECHO-Chicago FCC Project

- Aim 1: Determine the **feasibility** of implementing the ECHO-Chicago intervention in free and charitable clinics
- Aim 2: Compare the **effectiveness** of the ECHO-Chicago intervention with conventional care in free and charitable clinics

Preliminary Findings

ECHO-Chicago FCC Project

- Aim 1: Determine the **feasibility** of implementing the ECHO-Chicago intervention in free and charitable clinics
- Aim 2: Compare the **effectiveness** of the ECHO-Chicago intervention with conventional care in free and charitable clinics

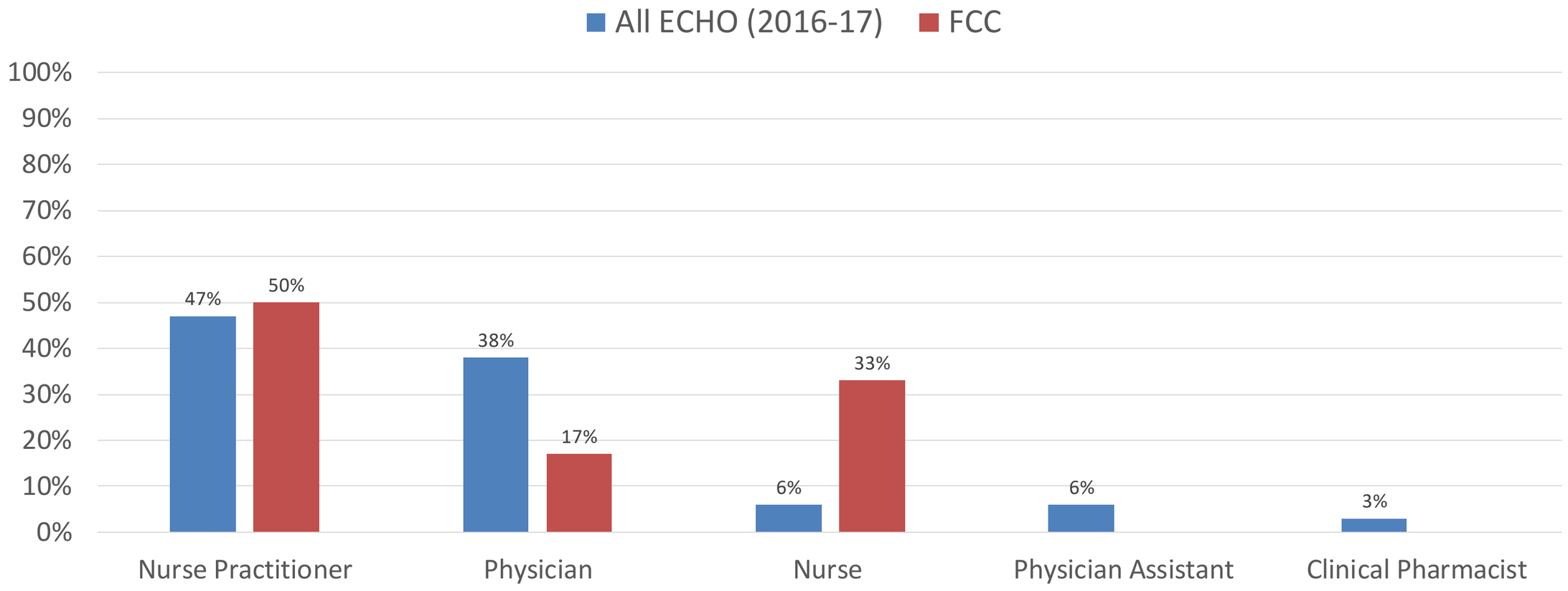
Study Timeline

Study period 10/1/2015 and 5/10/2017 (586 day/ 1.6 year period)
Total visits occurring in this time period: **4,849**

Pre intervention period	Post intervention period
10/1/2015 – 2/21/2016	2/22/2016 – 5/10/2017
143 days	443 days
1,225 visits	3,623 visits
25% of total visits	75% of total visits

Is ECHO *Feasible* in FCCs?

ECHO-Chicago HTN FCC Participants



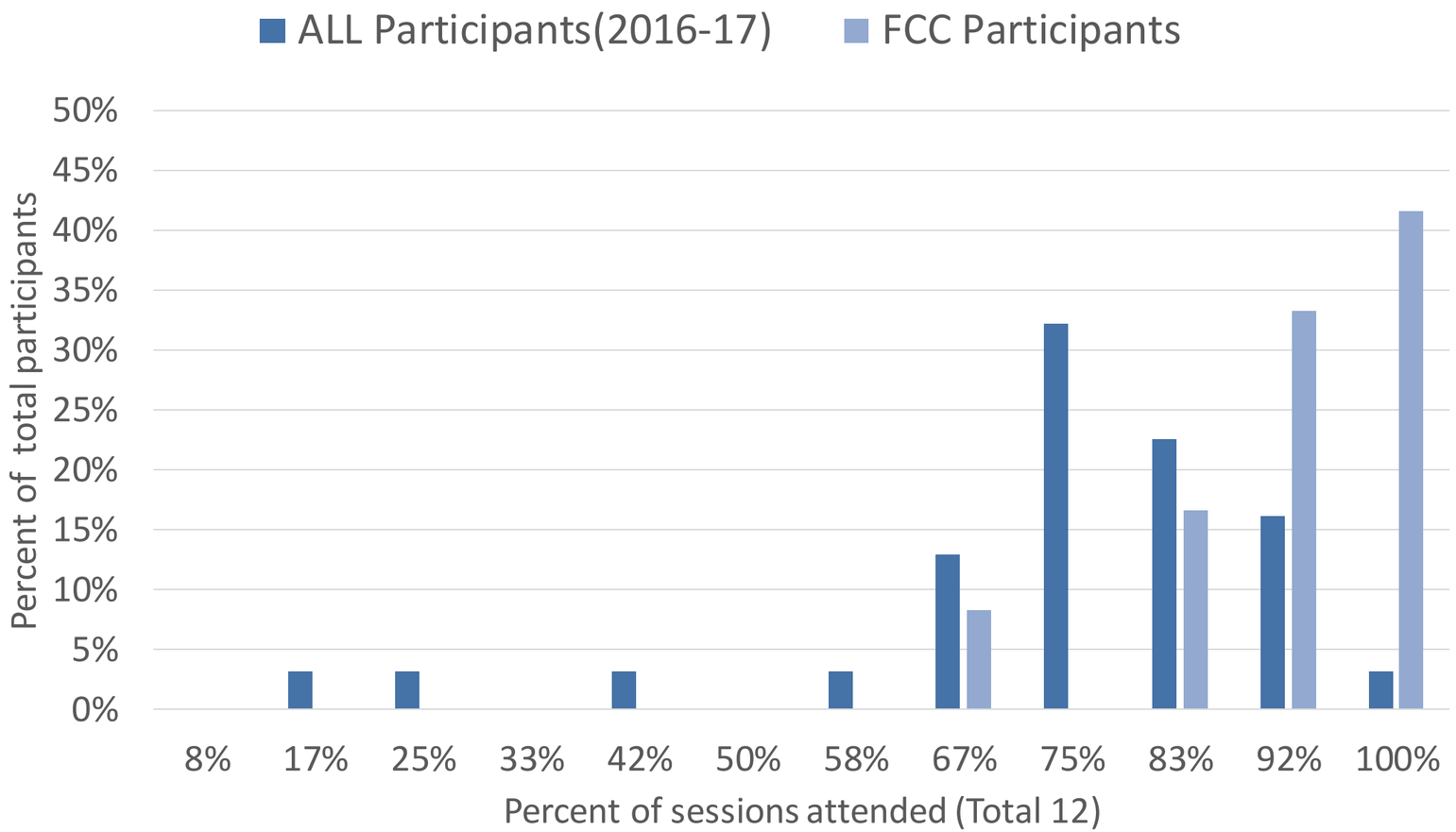
n=6 n=2 n=4* n=0 n=0

Total number of participating providers/clinicians = 12

*1 RN participated informally

ECHO-Chicago HTN FCC Rates of Participation

	Total # of participants	Mean Attendance (# of sessions)
All ECHO HTN Participants (2016-17)	276	9
FCC ECHO HTN Participants	12	11



Is ECHO *Effective* in FCCs?

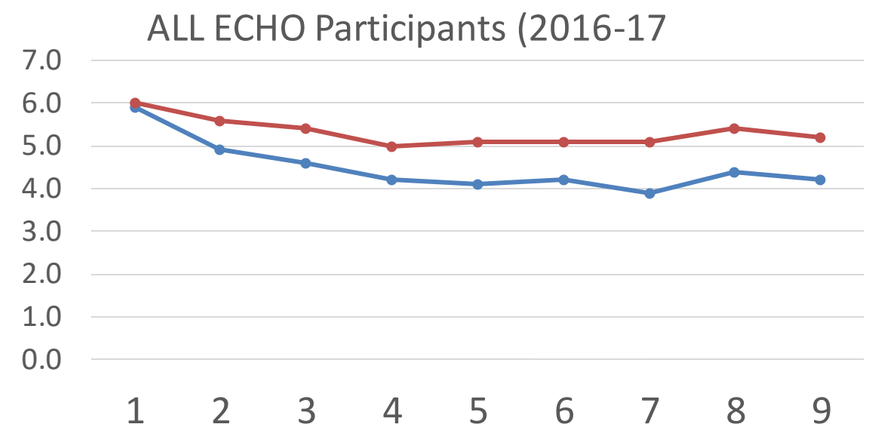
- Provider Level:
  - Self Efficacy
  - Knowledge
  - Number of blood pressure readings taken
  - Adherence to guideline-concordant care
- Patient Level:
  - Reduction in systolic blood pressure
  - Improvement in blood pressure control
- Clinic Level:
  - Changes in policies and procedures affecting management of hypertensive patients
  - Dissemination of knowledge

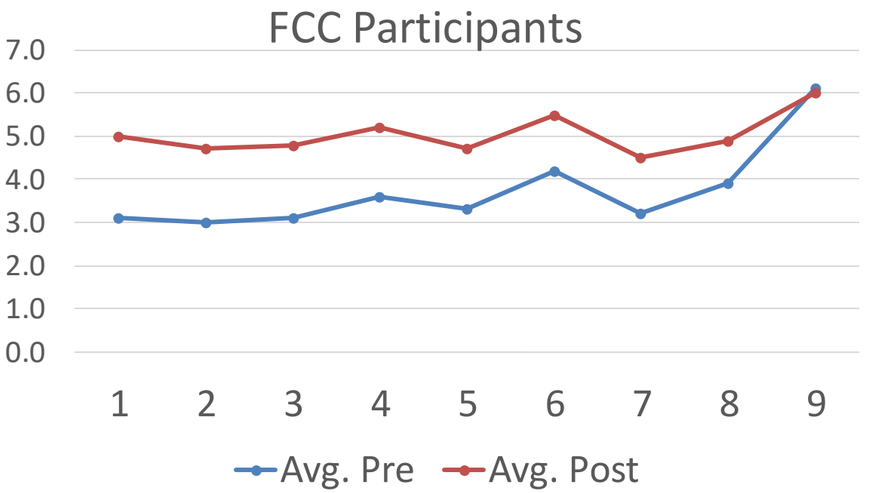
PROVIDER LEVEL

Self-Efficacy

7 point rating scale

1. Ability to identify patients with resistant hypertension\
2. Ability to assess the importance of kidney disease in patients with hypertension
3. Ability to measure blood pressure accurately
4. Ability to manage side effects of hypertension medications
5. Ability to work collaboratively with patients to effectively manage resistant hypertension
6. Ability to assess and manage comorbidities in patients with resistant hypertension
7. Overall ability to treat patients with resistant hypertension
8. Ability to select the most appropriate medication(s) for patients with resistant hypertension
9. Ability to educate clinic staff about patients with resistant hypertension





Improving Provider Self-Efficacy

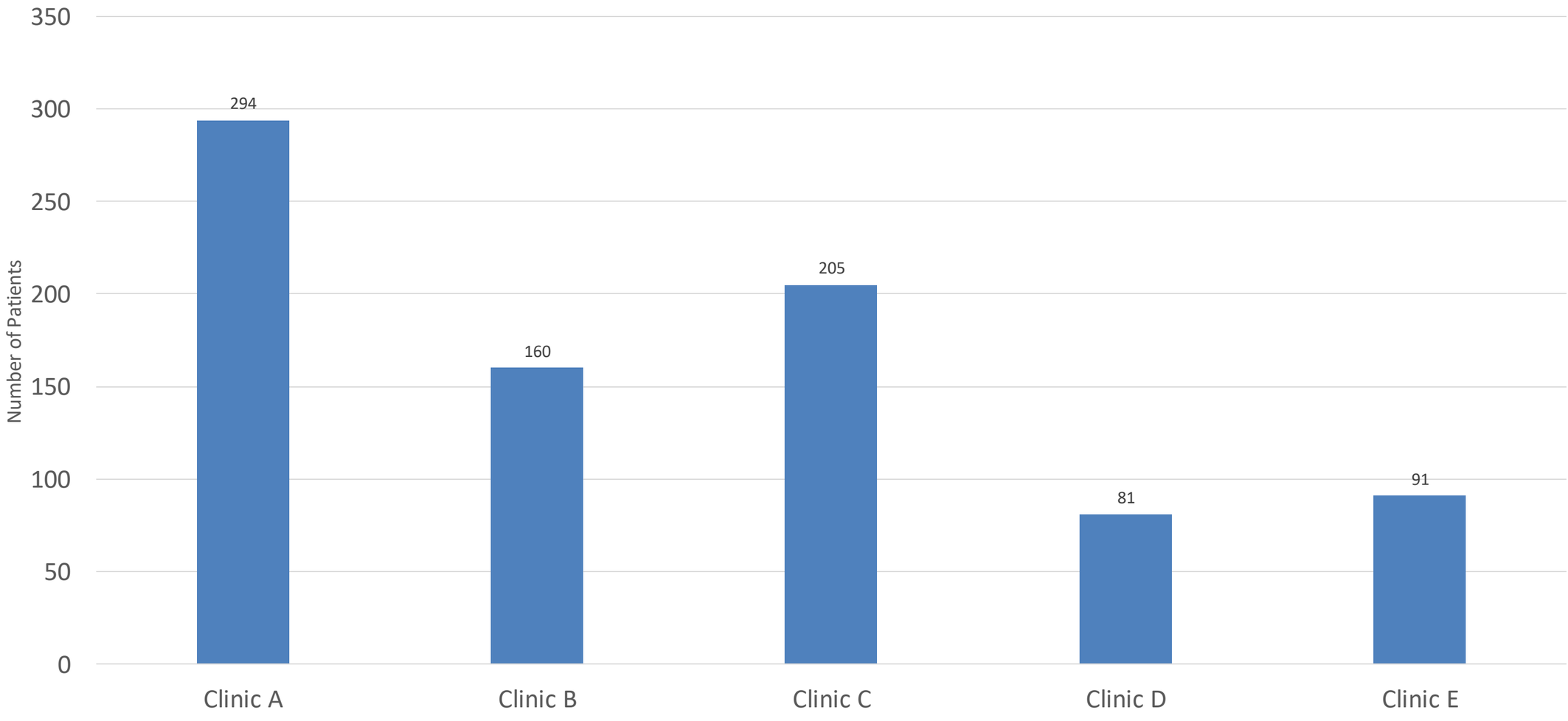
ECHO-trained providers emerged as HTN experts at 80% of participating clinics

“Our provider has become the expert and a champion for the program in our medical advisory committee and at our board meetings.”

“My "new" NP grew so quickly because of the ECHO program. Her learning curve was greatly accelerated. Also, for myself and pharm tech we are much more knowledgeable in the full range of HTN meds and dosing and what are reasonable doses.“

PATIENT LEVEL

Number of HTN Patients by Clinic



Patient Characteristics by Clinic

Characteristic	Overall	Clinic A	Clinic B	Clinic C	Clinic D	Clinic E
Age (mean)	55	56	53	54	53	54
% Female	55	63	48	58	36	54
Race/Eth						
% White	35	29	36	37	73	10
% Hispanic	56	67	40	54	21	84
% Black	4	7	16	0	1	4
% Other	5	2	8	9	5	2
% Non-English	64	86	37	51	24	73

Note: Differences across clinics are statistically significant at p<.0001

Patient Characteristics by Clinic

# of comorbidities	Overall %	Clinic A %	Clinic B %	Clinic C %	Clinic D %	Clinic E %
0	49	35	53	63	57	45
1	40	52	34	32	33	35
2	9	11	9	4	7	14
3	2	1	6	1	2	6

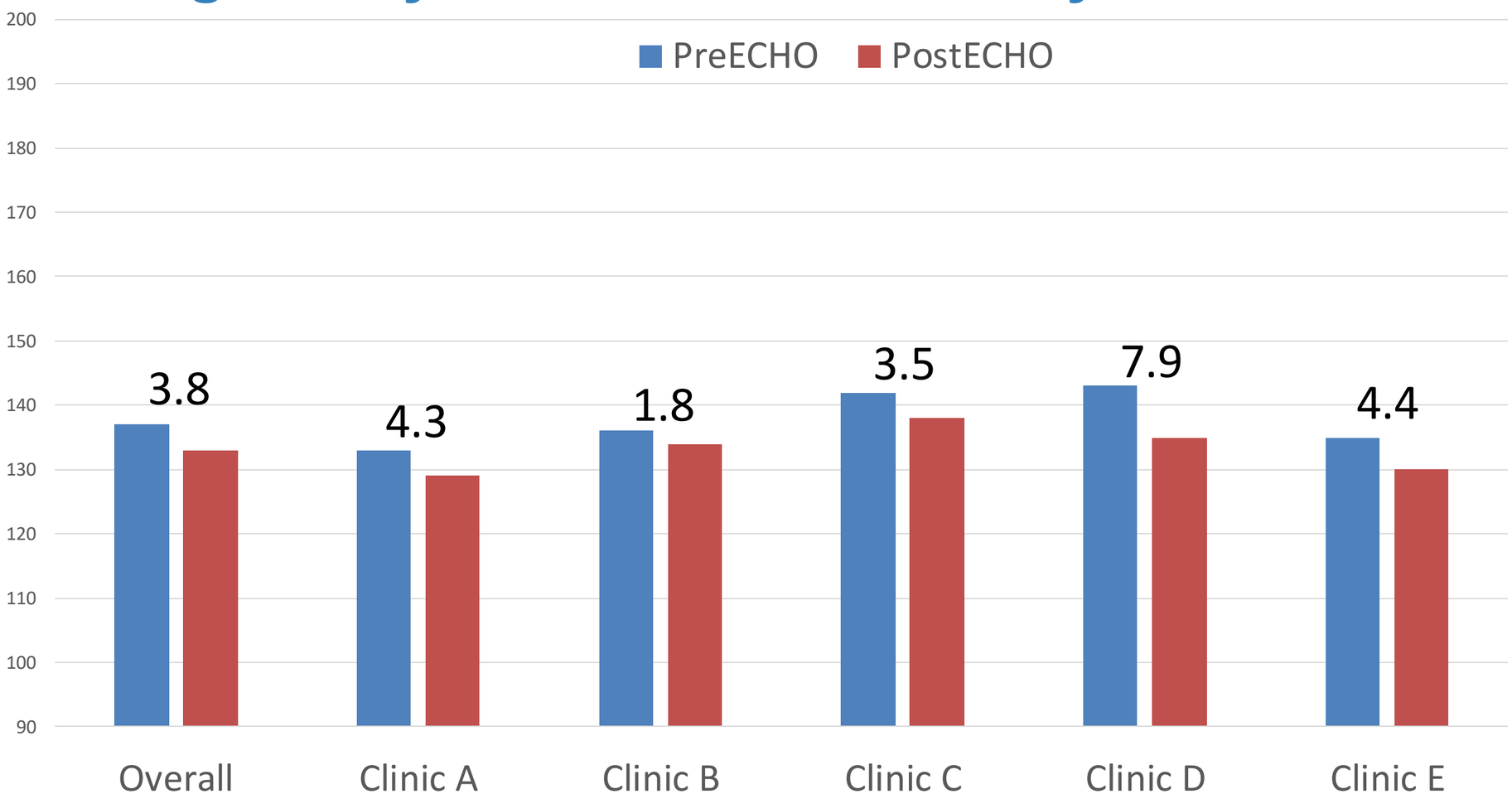
Notes: Maximum # of comorbidities = 19
Differences across clinics are statistically significant at p<.0001

Top Comorbidities by Clinic

Comorbidities	Overall %	Clinic A %	Clinic B %	Clinic C %	Clinic D %	Clinic E %
Diabetes	34	45	19	27	27	50
Diabetes w/ complications	8	10	8	5	11	6
Renal disease	5	7	0	4	9	5

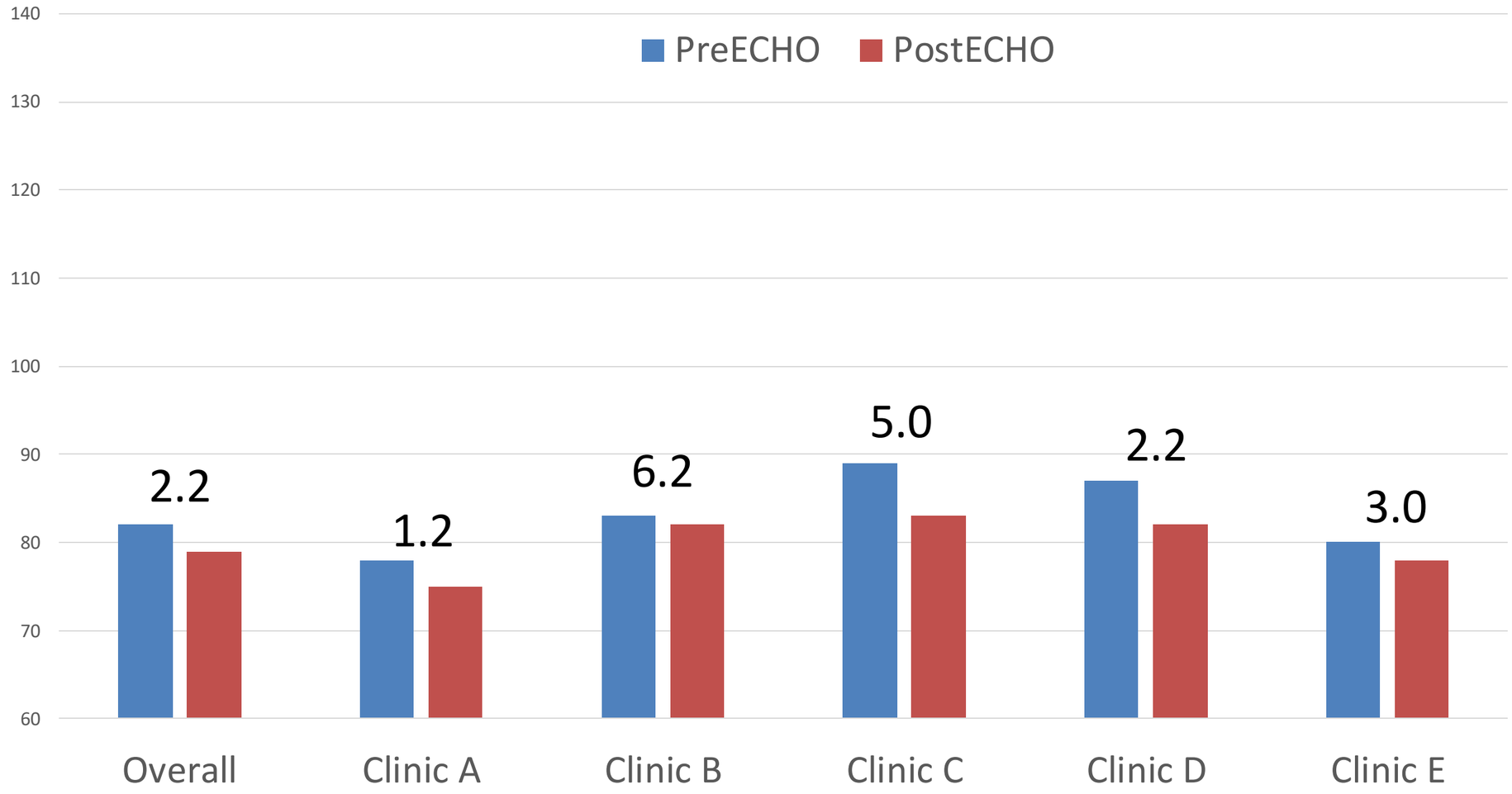
Notes: Maximum # of comorbidities = 19
Differences across clinics are statistically significant at p<.0001

Changes in Systolic Blood Pressure by Clinic



"PreECHO" value is the first visit during the pre period and "PostECHO" is the last visit.

Changes in Diastolic Blood Pressure by Clinic



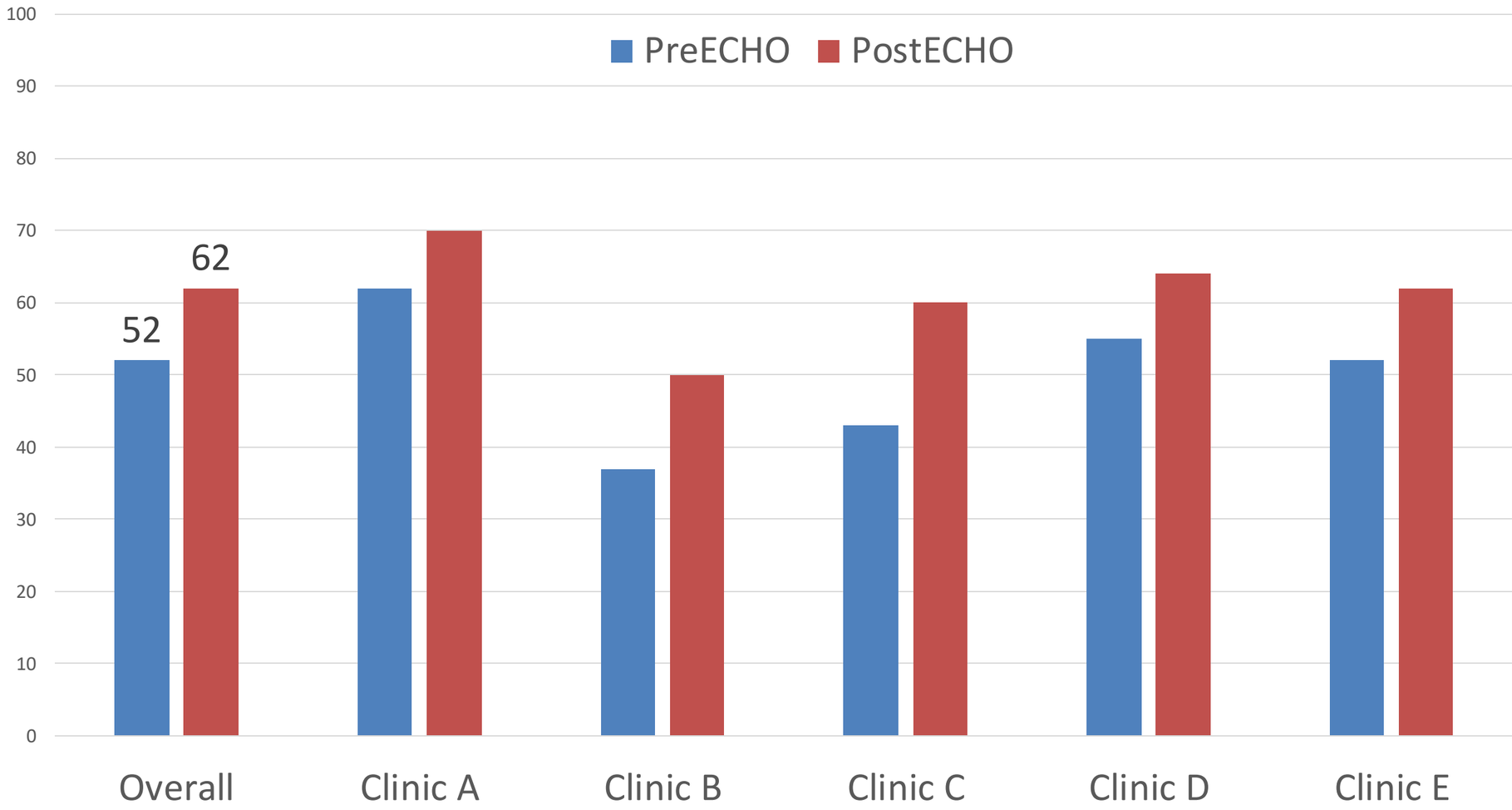
"PreECHO" value is the first visit during the pre period and "PostECHO" is the last visit.

Adjusted Differences in Systolic Blood Pressure

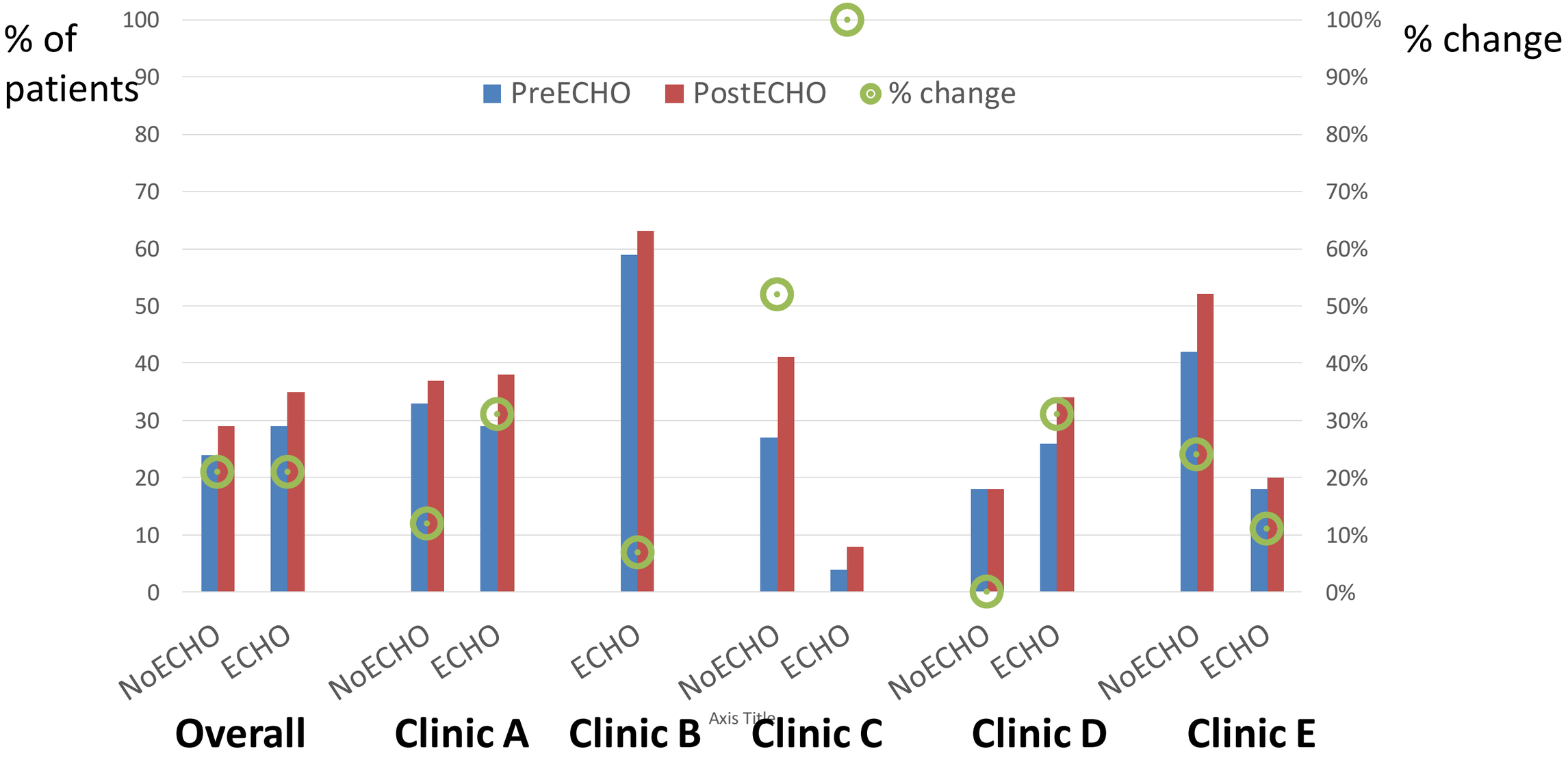
Variable	Coef	SE	p-value
Change in systolic blood pressure	-3.99	2.17	.033

Note: Adjusted differences are derived from a regression-based difference-in-difference model that includes clinic sites, age, race, language spoken, and number of comorbidities. Standard errors are robust.

% of Patients with Controlled Blood Pressure



% of Patients with Controlled Blood Pressure by Provider Type

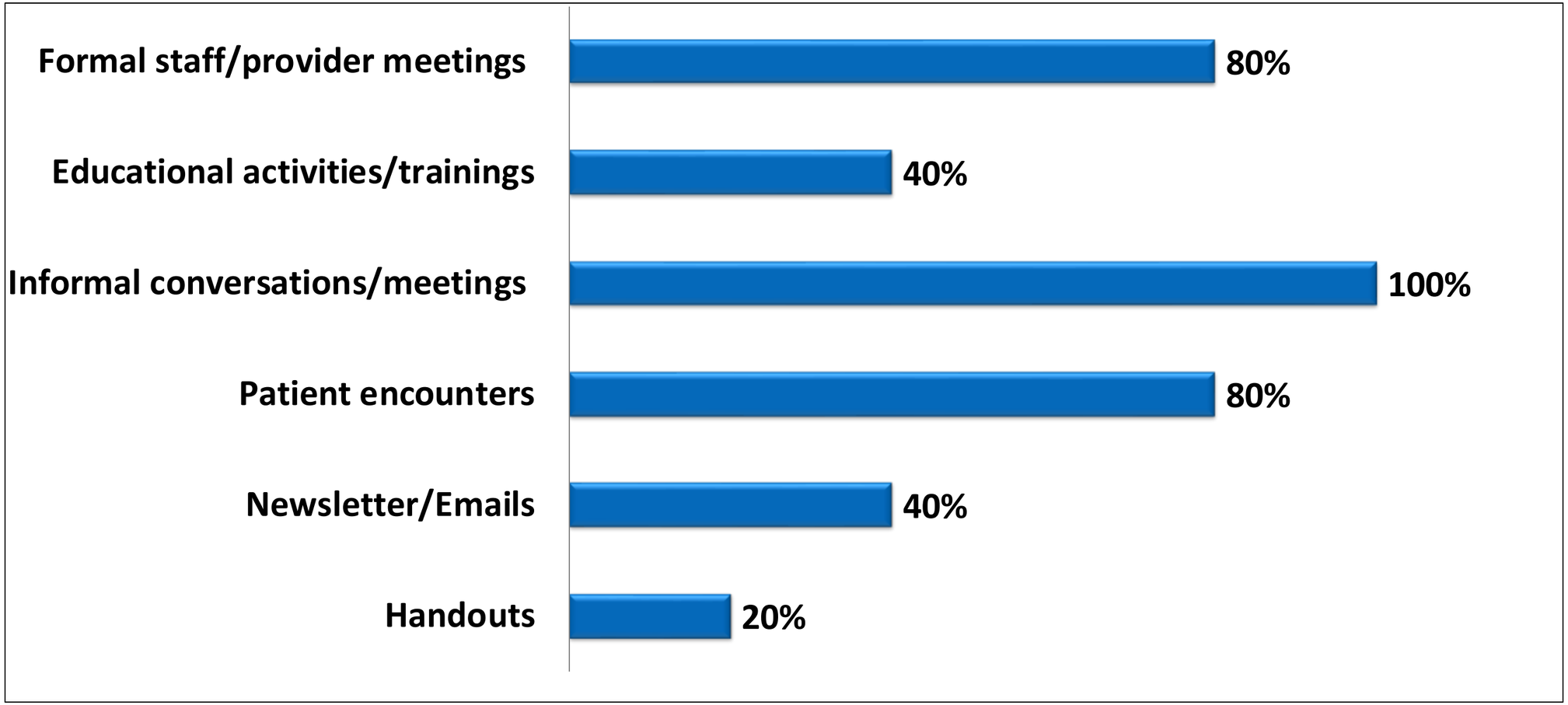


CLINIC LEVEL

Changing Clinic Processes

Clinic	Implemented Patient Registry (100%)	Changed How BP was Taken (60%)	Identified new sources HTN Meds (40%)	Increased Frequency of Visits (80%)	Implemented Improved Patient Education Resources (80%)	ECHO Trained Providers Promoted/Seen as Experts (80%)
SITE A	X			X	X	X
SITE B	X	X	X	X	X	X
SITE C	X	X		X	X	
SITE D	X					X
SITE E	X	X	X	X	X	X

Disseminating Knowledge



Conclusion

- Pilot points to the potential for ECHO to expand capacity at clinics delivering care to the most vulnerable patient population in the U.S.
  - Improved provider self-efficacy
  - Identified areas for improved clinic processes
  - Implemented ECHO in FCCs with minimal modifications
  - Important to be mindful of distinctive characteristics of FCCs
    - Engage clinic leadership
    - Availability of medications
    - Support for dissemination of ECHO knowledge
- Clinically meaningful improvements in systolic blood pressure among ECHO-trained providers
- Improvements in levels of blood pressure control clinic-wide

Participating Clinics

Community Health Care Clinic

Clinic Demographics

- Location: Normal, IL
- Size: 1,300 unduplicated patients; 10,000 square feet of space
- Patients:
  - Unique characteristics: Just moved in to a new building!
  - Hypertension: High prevalence of HTN

Age Range	Male/Female	Race	Geographic Area
19-64	45%/55%	White – 18%	McLean County
		Black – 9%	
		Hispanic – 68%	
		Other – 5%	

Patient Success

- FH is a long standing patient (2008) of the clinic (52 y.o Hispanic female). Many years of poorly controlled HTN, with minimal response to medication adjustments. Patient is compliant with meds. No other comorbidities.
- Ace + diuretic (lisinopril/HCTZ) for several years with GRADUALLY increased dosages. Minimal success with dosage increases.
  - Presented with decreased KCL on labs in December, 2015, added potassium 20 QD at that time. (Lisinopril 40, HCTZ 25) Added amlodipine 2.5 in January, 2016
  - KCL continued to decrease, HCTZ stopped in March, 2016. No change in BP with the addition of 2.5 of amlodipine. BP recheck on 2/11/16 was 166/104, amlodipine increased to 10mg daily.
  - Appt. 2/18/16. Hypokalemia resolved with stopping HCTZ, but BP was 152/92 on Lisin 40 and amlodipine 10. Added Spironolactone 12.5 QD.
  - Appt. 3/23/16, with BP of 150/98. Drilled MUCH farther down on salt intake, which showed she is/was salt abuser. Spironolactone increased to 25 qd.
  - Appt. 4/21/16, with BP of 134/94. Patient stated has improved salt intake, continues med compliance. BP readings remain consistent at the time of this writing.

Patient Success

Challenges and Results

- Much improvement in BP readings, the most progress that has been made with this patient since she started with the clinic.
- Faster increases in dosages, as well as salt education.
- The most major change with this patient was the salt investigation. Due to the ECHO project, there was no need to refer her out for specialist consultation on her NP.

Impact of ECHO on Clinic

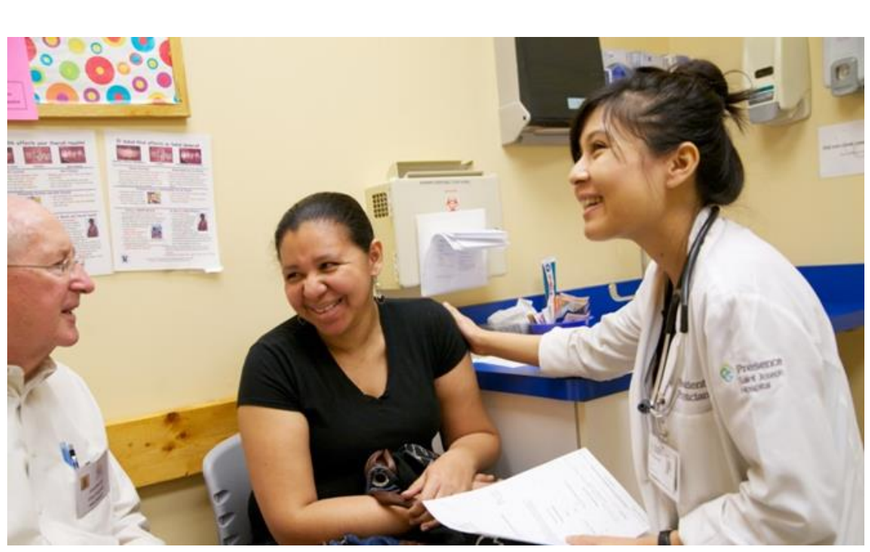
- Improvements/changes in medication formulary based on recommendations from Dr. Bakris (chlorthalidone, endapimide)
- Much more emphasis on salt intake, more aggressive dosing, better understanding of significance of renal function changes
- The opportunity to provide better patient outcomes!
- Better overall understanding of the whole picture to addressing HTN (diet, meds, compliance)
- Information was shared with key staff during our Wednesday afternoon staffing sessions with our NPs, medical director, dispensary coordinator, ED, and Operations Manager
- Providers immediately started increased education on salt intake and counseling on how to make changes in diet
- Analyzed our internal dispensary inventory and made the necessary changes to supply based on the recommendations of Dr. Bakris

CommunityHealth

- About 9,000 patients
- About 16,000 provider visits per year
- Over 1000 volunteers, including over 300 providers
- Services provided include:
  - Primary Care
  - Specialty Care
  - Lab Work
  - Medications
  - Dental Care
  - Health Education
  - Social Services/Mental Health

SERVING THE UNINSURED

communityhealth



Patient Success

- 74yo Hispanic woman with diabetes, HTN, hyperlipidemia, hypothyroidism, anemia, and a history of hospitalization for hyponatremia.
- Had been on lisinopril 40mg QD and ToprolXL 100mg QD. Lisinopril was stopped in hospital due to hyponatremia in Dec 2015.
- At 12/16/15 visit BP was 132/64 on ToprolXL only.
- At 3/16/16 visit BP was 170/70 on ToprolXL only. Toprol was d/c'd and amlodipine 5mg QD started. Low sodium diet was discussed.
- At 3/26/16 BP check, BP is 174/90 and amlodipine is increased to 10mg.
- 3/28/16 case presented to ECHO: addition of very low dose furosemide recommended if BP still not controlled.
- At 4/27/16 visit, BP is 150/70 and furosemide 10mg QD is added.
- 5/2/16 case presentation to ECHO: d/c of furosemide, reduction of amlodipine, and addition of carvedilol recommended.
- 5/23/16 visit, BP is 136/60 and sodium level is stable, so no changes made.
- 7/20/16 visit, BP is 160/70 and carvedilol 3.125mg BID is added. (Perhaps should have stopped furosemide and started higher dose of carvedilol.)
- 10/12/16 visit, BP is 140/60 and sodium and potassium are stable.

Patient Success

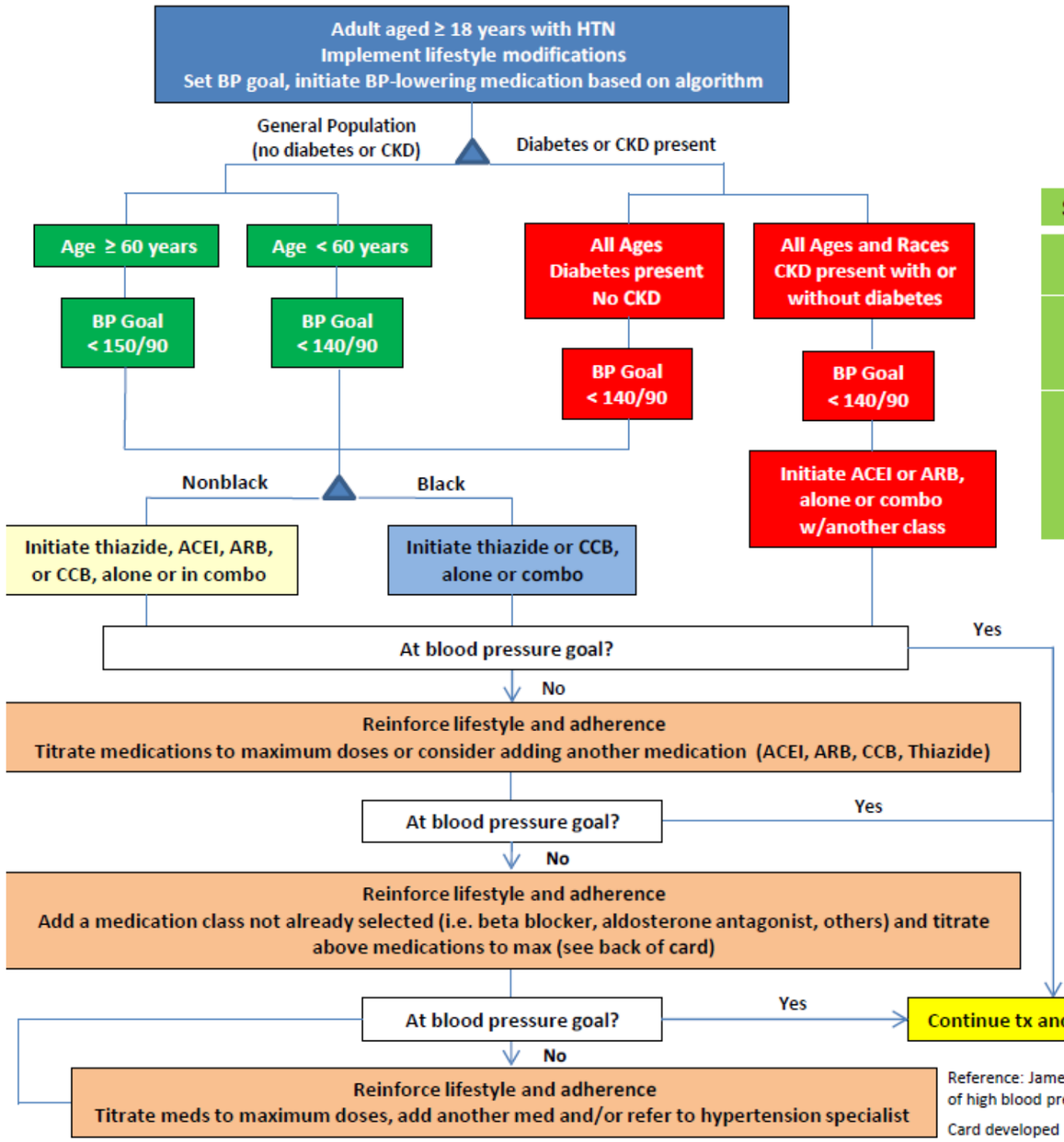
Challenges and Results

- BP improvement from 170/70 to 140/60 with stable electrolytes in an elderly woman.
- Improvements based on optimized medications and low sodium counseling
- Improved knowledge of role of salt and role for each medication class contributed to success
- Consider d/c of furosemide and increase of carvedilol next visit?
- If possible, more “real time” consultations would be helpful for patient cases as often the patient visits and patient case presentations don’t align

Impact of ECHO on Clinic

- Increased focus on blood pressure control clinic-wide (leader board and huddles)
- Development of updated hypertension treatment guidelines specific to clinic formulary with leadership from multiple key providers
- Development of HTN Care Group
- Identification of a low literacy sodium handout
- Improvements in BP control from Q1 to Q3 clinic-wide:
  - BP <140/90 in DM: 66% in Q1 to 72% in Q3
  - BP < 140/90 in 18-59yo pts w HTN: 43% in Q1 to 49% in Q3
  - BP < 150/90 in pts 60+ w/o DM or CKD: 59% in Q1 to 73% in Q3

JNC 8 Hypertension Guideline Algorithm



Initial Drugs of Choice for Hypertension
- Thiazide diuretic
- ACE inhibitor (ACEI)
- Angiotensin receptor blocker (ARB)
- Calcium channel blocker (CCB)

Strategy	Description
A	Start one drug, titrate to maximum dose, and then add a second drug.
B	Start one drug, then add a second drug before achieving max dose of first
C	Begin 2 drugs at same time, as separate pills or combination pill. **Initial combination therapy is recommended if BP is greater than 20/10mm Hg above goal**

Lifestyle changes:
- Smoking Cessation
- Control blood glucose and lipids
- Diet
  - ✓Eat healthy (i.e., DASH diet)
  - ✓Moderate alcohol consumption
  - ✓Reduce sodium intake to no more than 2,400 mg/day
- Physical activity
  - ✓Moderate-to-vigorous activity 3-4 days a week averaging 40 min per session.

Reference: James PA, Ortiz E, et al. 2014 evidence-based guideline for the management of high blood pressure in adults: (JNC8). JAMA. 2014 Feb 5;311(5):507-20

Card developed by Cole Glenn, Pharm.D. & James L Taylor, Pharm.D.

Hypertension Treatment at CommunityHealth

Compelling Indications	
Indication	**Treatment Choice**
Heart Failure	ACEI/ARB + BB + diuretic + spironolactone
Post –MI/Clinical CAD	ACEI/ARB AND BB
CAD	ACEI, BB, diuretic, CCB
Diabetes	ACEI/ARB, CCB, diuretic
CKD	ACEI/ARB
Recurrent stroke prevention	ACEI, diuretic

Beta-1 Selective Beta-blockers – possibly safer in patients with COPD, asthma, diabetes, and peripheral vascular disease:
• metoprolol succinate 50-100mg daily (outside script)

Drug Class	Agents of Choice	Comments
Thiazide Diuretics	Chlorthalidone 12.5-25 mg daily, HCTZ 12.5-50 mg daily	Monitor for hypokalemia Most SE are metabolic in nature Most effective when combined w/ ACEI Stronger clinical evidence w/chlorthalidone
Other diuretics	*K+ sparing* – spironolactone 25-50mg daily, triamterene/HCTZ 37.5/25mg daily furosemide 20-80mg twice daily	Spironolactone - gynecomastia and hyperkalemia Loop diuretics may be needed when GFR <40mL/min
ACEI/ARB	*ACEI:* Lisinopril 10-40mg daily *ARB*: Losartan 50-100mg daily	SE: Cough (ACEI only), angioedema (more with ACEI), hyperkalemia Losartan lowers uric acid levels
Beta-Blockers	carvedilol 6.25-25mg twice daily, propranolol 40-120mg twice daily. for Beta-1-Selective – outside script is needed (i.e. metoprolol succinate 50-100mg daily)	Not first line agents – reserve for post-MI/CHF Cause fatigue and decreased heart rate Adversely affect glucose; mask hypoglycemic awareness
Calcium channel blockers	*Dihydropyridines*: amlodipine 5-10mg, nifedipine ER 30-90mg *Non-dihydropyridines*: verapamil ER 240-480mg daily	Cause edema; dihydropyridines may be safely combined w/ B-blocker Non-dihydropyridines reduce heart rate and proteinuria
Centrally-acting Agents	clonidine 0.1-0.2mg twice daily	Clonidine weekly patch formulation available via outside script for resistant hypertension
Vasodilators	terazosin 1-5mg daily	Alpha-blockers may cause orthostatic hypotension, caution in CHF, ECHO recommended

FAMILY HEALTH PARTNERSHIP CLINIC

Patient Success

- Hispanic female, 56, first visit July 2014 to establish care. Hx breast CA on tamoxifen.
- Lives in Harvard, 25 miles from clinic.
- Took 1 ½ year and 9 provider visits to control her BP. Saw 4 providers. Got BP under control after Sara Brubacher applied knowledge from ECHO to change RX.

Date	CC/Exam	BP	BP Rx	RX change	Provider
7/15/14	56 Hispanic F establish care. CC leg pain wakes her up at night. Hx breast CA 2012 Only Rx is tamoxifen	**165/90; 136/82** P: 77/Wt 224#/BMI 38	NONE	levothyroxine 25mcg, lovastatin 20 mg after labs drawn today	JM (MD)
3/30/15	Always thirsty, leg pain continues at night; mild bilat. ankle edema on exam. More labs today.	**159/86**	NONE	Losartan 50mg QD	MS (NP)
8/27/15	Discuss FPG 117; leg cramp/burning	**140/100**	losartan 50 mg QD	gabapentin 300 TID	KW (NP)
11/3/15	Legs still hurt at night, gabapentin not helping	**176/92; 148/84**	losartan 50 mg QD	NONE	KW (NP)
	ECHO program January - March				

Date	CC/exam	BP	BP RX	RX change	Provider
3/17/16	Htn F/U	156/92, 148/92 on recheck	losartan 50 mg QD; HCTZ 12.5 QD	HCTZ 25mg QD; Losartan 100mg QD; spironolactone 25 mg QD	SB (NP)
3/31/16	Htn F/U; bought cuff for home, BPs 140/100 at home	144/86	losartan 100 mg QD; HCTZ 25 mg QD; spironolactone 25mg QD	metformin 500 mg QD	SB (NP)
4/28/16	Htn F/U; home SBP 130-150, DBP 80-100	134/84	losartan 100 mg QD; HCTZ 25 mg QD; spironolactone 25mg QD	Stop losartan. Start amlodipine 10/benazepril 40. Continue HCTZ 25 QD and spironolactone 25mg QD	SB (NP)
6/8/16	Diabetes F/U	125/75	amlodipine 10, benazepril 40, HCTZ 25, spironolactone 25	metformin 500 mg BID	ER (NP)

What did we learn?

Took nearly 2 years to control this patient's blood pressure

- 50 mile round trip for each appointment
- 12+ appointments over 2-year time frame
- "Wait and see" attitude by some providers
- Incremental medication changes too conservative to achieve results
- Providers' reliance on their own formulary often doesn't include calcium channel blockers or the use of 2 diuretics

Impact of ECHO on Clinic

- Compiled clinical pearls handout based on ECHO learning and distributed to all providers
- RNs educated on correct BP measurement technique
- 16-week CareMessage texting program geared toward hypertensive patients
- Goals: chronic disease registry; lunch and learn case presentations

Questions and Discussion

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