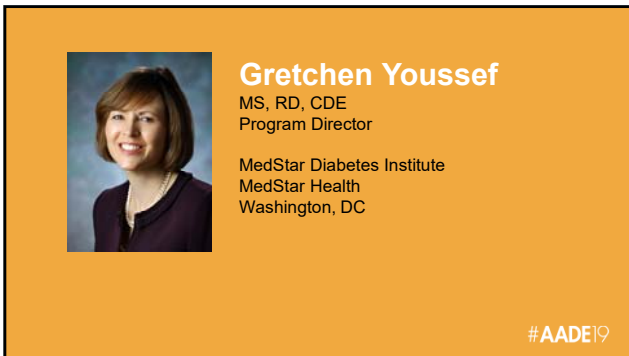
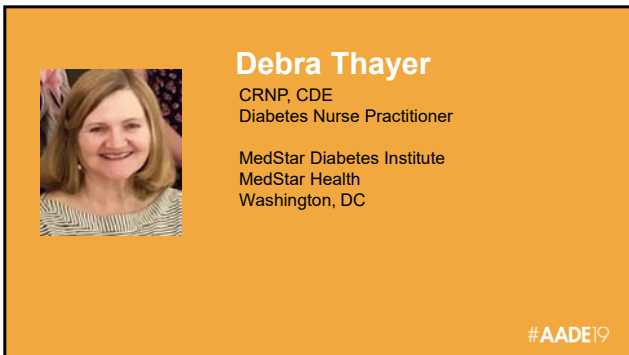



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Carine Nassar
MS, RD, CDE
Program Director

MedStar Diabetes Institute
MedStar Health
Washington, DC

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Learning Objectives

- Describe the Diabetes Boot Camp Intervention
- Identify key elements for successful patient outcomes
- Discuss the changing role of the diabetes educator

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Disclosure to Participants

- Notice of Requirements For Successful Completion
 - Please refer to learning goals and objectives
 - Learners must attend the full activity and complete the evaluation in order to claim continuing education credit/hours
- Conflict of Interest (COI) and Financial Relationship Disclosures:
 - Carine Nassar, MS, RD, CDE – No COI/Financial Relationship to disclose
 - Gretchen Yousef, MS, RD, CDE – No COI/Financial Relationship to disclose
 - Debra Thayer, CRNP, CDE – No COI/Financial Relationship to disclose
- Non-Endorsement of Products:
 - Accredited status does not imply endorsement by AADE, ANCC, ACPE or CDR of any commercial products displayed in conjunction with this educational activity
- Off-Label Use:
 - Participants will be notified by speakers to any product used for a purpose other than for which it was approved by the Food and Drug Administration.

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MedStar Diabetes Boot Camp Conception & Background

- Championed by the Chief Medical Officer
- 18 month period to gather input from system stakeholders including patients
- Integrated into the MedStar Health strategic plan and part of Population Health as of March 2019




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Challenges of Diabetes Care Management

1. Reaching A1C goals

- <53% of US adults w/ DM have A1C<7% (NHANES 2013)
- >15% have an A1C> 9%
https://www.cdc.gov/diabetes/pubs/press/2013/03/13diabetes_statistics_report.pdf



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Challenges of Diabetes Care Management

2. Access to DSMES

First year after diagnosis
Less than 7% of those with private insurance (1) Only 5% of Medicare beneficiaries (2)

Only 1.7% of Medicare beneficiaries with diabetes had a Medicare claim for DSMES in 2012 (3).



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1. Li R, Shrestha. MMWR Morb Mortal Wkly Rep. 2014;63:1045-1049
2. Strawnbridge. Health Educ Behav 2015;42:530-538
3. http://www.healthindicators.gov/Indicators/Diabetesmanagement-benefit-use-diabetic-older-adultspercent_1263/Profile/ClassicData

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Challenges of Diabetes Care Management

3. Therapeutic Inertia

- Failure to initiate/intensify therapy despite suboptimal glucose control
 - Multifactorial etiologies including patient/MD factors
 - Impacts adversely on overall “glycemic burden”
- Lack of timely advancement of the DM medication regimen is common.
 - Outpatients in the US spend an average of 3-5 years with an A1C over 8% before being started on insulin
 - Median time to Rx intensification in pts. failing metformin is 14 months

Lin et al. Endocrine Practice 2016 #AADE19

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Challenges of Diabetes Care Management

4: Medication Adherence

= 14 Rx

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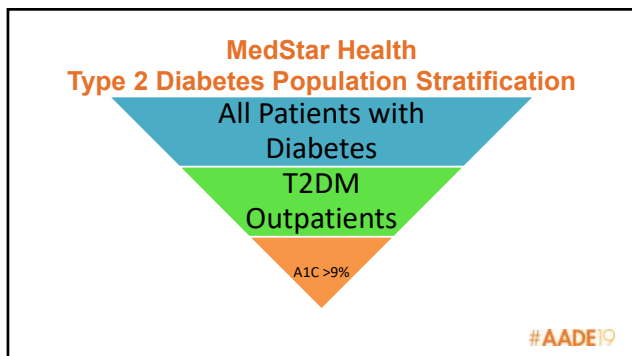
Challenges of Diabetes Care Management

5. Provider Time for Patient Encounters

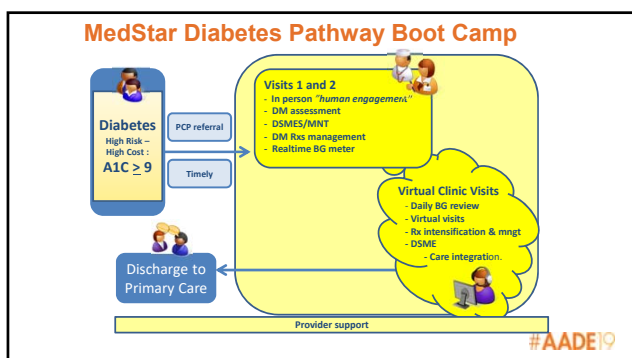
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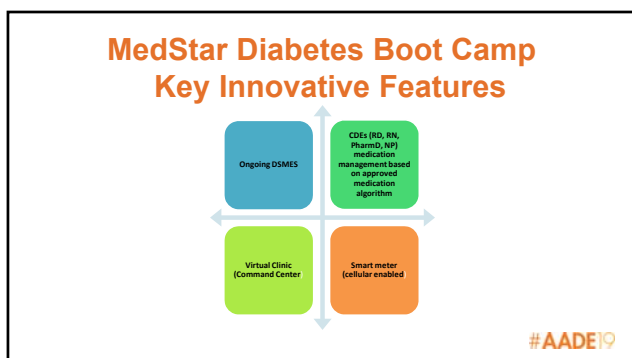
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MedStar Diabetes Boot Camp

Inclusion Criteria

- Adults with T2DM
- A1C \geq 9.0%
- PCP/Endo willing to have patient enter the program
- Patient is able and willing to participate in the program
- Active and established patient in the MedStar System

Exclusion Criteria

- Active medical issues which would preclude patient concentrating on diabetes management
- High dose steroids
- Pregnant or planning pregnancy
- Patient and/or custodial caregiver unwilling and/or unable to participate in program-related activities

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Visit One with CDE



- Deliver the MedStar KNOW Diabetes Knowledge Test on Tonic for Health Platform
- Delivery of video education content based on knowledge test

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Visit One


- Comprehensive Assessment with Focus on:
 - Barriers to medication adherence
 - Taking diabetes medications including insulin administration and medication storage
 - Eating patterns and access to food
 - SMBG
 - Self care behaviors including exercise



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Visit One
Telcare Real Time Blood Glucose Monitoring System



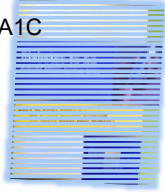
- Register and Train Patient on use of meter
- No additional charge for cell service
- No uploading of BG values required
- BGs go to HCP dashboard

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Visit One - DSMES
Diabetes to Go: Know the Basics About your Diabetes Before You Go Home

- Know Your Diabetes Numbers: Sugar and A1C
- Know when your Blood Sugar is Low
- Know when your Blood Sugar is High
- When to call your Doctor or go to the ED
- Basic Meal Planning
- Checking your Blood Sugar
- Know your Diabetes Medications



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Visit Two in 1-2 Weeks


| Date | AM | | | | | | | | | | | PM | | | | | | | | | | | | |
|------------|----|---|---|---|---|---|---|---|---|---|----|----|----|---|---|---|---|---|---|---|---|---|----|----|
| | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 10/12/2019 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10/13/2019 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10/16/2019 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10/20/2019 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10/27/2019 | | | | | | | | | | | | | | | | | | | | | | | | |
| 10/30/2019 | | | | | | | | | | | | | | | | | | | | | | | | |

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Visit Two with CDE

- Review use of BG meter and BG patterns
- Food intake/ meal planning
- Medication barriers and adherence
- Medication management
- DSMES Plan
- Warm Hand-off to the Virtual Clinic




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Weeks 3-12 MedStar Virtual Control Center Managed by Nurse Practitioners

- Contacts patient via phone, text, email minimum once a week
- Review BG Patterns
- Medication Adherence Strategies
- Medication titrations
- DSMES



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Boot Camp Medication Algorithm

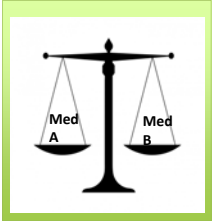
- Developed by MedStar Endos & CDEs with input from PCPs
- NP/CDE use PCP ordered DM medication management algorithm
- NP or Boot Camp MDs review and sign off on rx or medication titration
- Hard stops for NPs/ CDEs

| Pre-existing Diabetes on Oral Anti-hyperglycemic Agents | | | | |
|---|--|--|--|--|
| Flowchart | One Agent | Two Agents | Three or more agents | |
| 166-176 | On metformin | On sulfonylurea | Other oral agent | 2-3 oral agents |
| 266-300 | 1. 1500 mg po bid Add metformin to max 2550 mg po bid 2. Add DPP-4i 3. Add TZD 4. Add SGLT2i 5. Add GLP-1 RA | 1. Add metformin to max 2550 mg po bid 2. Add DPP-4i 3. Add TZD 4. Add SGLT2i 5. Add GLP-1 RA | 1. Add metformin to max 2550 mg po bid 2. Add DPP-4i 3. Add TZD 4. Add SGLT2i 5. Add GLP-1 RA | 1. Add metformin to max 2550 mg po bid 2. Add DPP-4i 3. Add TZD 4. Add SGLT2i 5. Add GLP-1 RA |
| 301-400 | 1. Consider dose of insulin (over 100 units) 2. Add basal insulin (0.1-0.2 units/kg/day) 3. Add prandial insulin (0.5-1.0 units/kg/day) 4. Add basal insulin (0.1-0.2 units/kg/day) 5. Add prandial insulin (0.5-1.0 units/kg/day) 6. Add basal insulin (0.1-0.2 units/kg/day) 7. Add prandial insulin (0.5-1.0 units/kg/day) 8. Add basal insulin (0.1-0.2 units/kg/day) 9. Add prandial insulin (0.5-1.0 units/kg/day) | 1. Consider dose of insulin (over 100 units) 2. Add basal insulin (0.1-0.2 units/kg/day) 3. Add prandial insulin (0.5-1.0 units/kg/day) 4. Add basal insulin (0.1-0.2 units/kg/day) 5. Add prandial insulin (0.5-1.0 units/kg/day) 6. Add basal insulin (0.1-0.2 units/kg/day) 7. Add prandial insulin (0.5-1.0 units/kg/day) 8. Add basal insulin (0.1-0.2 units/kg/day) 9. Add prandial insulin (0.5-1.0 units/kg/day) | 1. Consider dose of insulin (over 100 units) 2. Add basal insulin (0.1-0.2 units/kg/day) 3. Add prandial insulin (0.5-1.0 units/kg/day) 4. Add basal insulin (0.1-0.2 units/kg/day) 5. Add prandial insulin (0.5-1.0 units/kg/day) 6. Add basal insulin (0.1-0.2 units/kg/day) 7. Add prandial insulin (0.5-1.0 units/kg/day) 8. Add basal insulin (0.1-0.2 units/kg/day) 9. Add prandial insulin (0.5-1.0 units/kg/day) | 1. Consider dose of insulin (over 100 units) 2. Add basal insulin (0.1-0.2 units/kg/day) 3. Add prandial insulin (0.5-1.0 units/kg/day) 4. Add basal insulin (0.1-0.2 units/kg/day) 5. Add prandial insulin (0.5-1.0 units/kg/day) 6. Add basal insulin (0.1-0.2 units/kg/day) 7. Add prandial insulin (0.5-1.0 units/kg/day) 8. Add basal insulin (0.1-0.2 units/kg/day) 9. Add prandial insulin (0.5-1.0 units/kg/day) |

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**Diabetes Medication
Shared Decision Making**



- Insurance coverage & cost
- Reduction in A1C
- Frequency
- Risk of hypoglycemia
- Weight change
- Main side effects

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Monitoring of Telcare Dashboard

- Patient informed that Telcare dashboard is NOT monitored 24/7
- Should contact PCP or go to ED when unable to contact Virtual Clinic
- Reviewed week days 8 AM – 4 PM
- Allows for teachable moments, problem solving and targeted education

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Week 12



- Patient “ graduates” and returns to PCP or Endo
- Recommendations sent to referring provider which may include follow-up with CDE and Endo (NP or physician).
- Follow on dashboard for extreme highs and lows for another 3 months
- Sustaining strategies being implemented to support continued successful self-management

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Outcomes, Program Spread and Sustainability

Carine Nassar, MS, RD, CDE
Program Director, MedStar Diabetes Institute

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Boot Camp Combined Phase 1 & 2 Results

- A total of 366 patients have completed the boot camp with end of intervention A1C available as of February 2018
- Completed patients were matched with chart controls using a propensity score matching procedure at a 1:1 ratio for age, sex, race/ethnicity, insurance group, and baseline A1C. Matched controls received standard diabetes care through their PCPs

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Boot Camp Combined Phase 1 & 2 Demographics

| N=732 | Cases N=366 N(%) | Controls N=366 N(%) | p-val |
|---------------|------------------------|---------------------------|-------|
| Age, mean(SD) | 56.7 (10.6) | 55.4 (12.6) | 0.08 |
| Female | 225 (62) | 233 (64) | 0.52 |
| White | 49 (13) | 53 (15) | 0.67 |
| AA | 296 (81) | 284 (78) | 0.27 |
| Hispanic | 5 (1) | 3 (1) | 0.48 |
| Insurance | | | 0.37 |
| Commercial | 6 (2) | 5 (1) | |
| Medicaid | 154 (42) | 152 (42) | |
| Medicare | 64 (18) | 59 (16) | |
| Private | 134 (37) | 128 (35) | |
| Self-Pay | 8 (2) | 18 (5) | |

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Three Months A1C Data

| Variable | Cases N=366 | Controls N=366 | Case Effect Mean Difference | 95% CI | P |
|-------------------------|----------------|-------------------|--------------------------------|-------------|--------|
| Baseline A1c (%) | 11.2 (1.7) | 11.3 (1.6) | 0.14 | | 0.13 |
| 90 Day A1c (%) | 8.1 (1.5) | 9.9 (1.0) | -1.8 | | <0.001 |
| Change in A1c (%) | -3.06 (1.98) | -1.44 (2.11) | -1.6 | | <0.001 |
| Percentage A1c Lowering | -26.3 (14.6) | -12.0 (17.5) | -14.3 | | <0.001 |
| N reaching A1c < 8% | 197 (54) | 61 (17) | OR=5.5 | [3.8, 8.2] | <0.001 |
| N reaching A1c < 7% | 96 (26) | 18 (5) | OR=7.0 | [3.9, 12.5] | <0.001 |

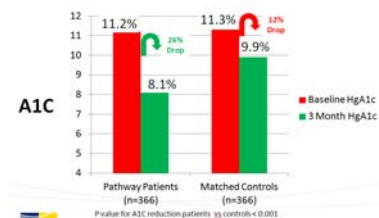
*Odds Ratio

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A1C Results



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Utilization of Acute Care Services

- In addition to A1C, number of ED visits and hospitalizations also collected for 3 months pre and post baseline to assess impact of Boot camp on acute care utilization if any
- Data obtained for both boot camp cases and controls
- Evaluated and analyzed raw data and risk ratios

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Risk for Acute Care Utilization at Baseline

- Boot Camp patients had a 53% higher risk of having had an acute care utilization encounter (ED and/or hospitalization) in the 90 days prior to baseline as compared to controls
- Boot Camp patients had a 300% higher risk of having had an inpatient hospital stay in the 90 days prior to baseline
- Data confirms that high risk patients are being referred to the Boot Camp

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Pre and Post Hospitalization data: Cases vs. Controls

| Metric | | Cases | Controls |
|--------|-----------|---------|----------|
| 30 day | Pre- | 19 | 7 |
| | Post- | 4 | 8 |
| | Reduction | - 79% | + 14.0% |
| 90 day | Pre- | 39 | 12 |
| | Post- | 9 | 19 |
| | Reduction | - 76.9% | + 58.3% |

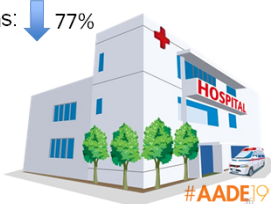
* P value = 0.036 for cases vs control post-intervention



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Risk for Acute Care Utilization at 90 Days: Boot Camp Patients

- Overall risk for acute care utilization: ↓ 51%
- Risk for inpatient admissions: ↓ 77%
- Risk for ED visits: ↓ 38%
- p < 0.001



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Risk for Acute Care Utilization at 90 days: Matched Controls

- Overall risk for acute care utilization: small decrease, NSS
- Risk for inpatient admissions: increased, NSS
- Risk for ED visits: ↓ 34%
- $p < 0.03$

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Cost Analysis and Return on Investment

- Based on analysis of 732 patient cohort and actual hospitalization cost data, a patient with diabetes participating in the Boot Camp is projected to save \$3,086.40 annually in averted hospitalization costs
- Full cost analysis and return on investment modeling in progress based on: cost of Boot Camp per patient, insurance reimbursement for in person visits, cost of new medications, hospitalizations averted, etc.

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Patient and Provider Satisfaction

- Patients and providers were queried about their satisfaction with the pilot program during pathway 1 (N=98):
 - 94% of participants reported being very satisfied with the intervention, with 98% very satisfied with their progress. Participants also reported high satisfaction with the structure of the program.
- Among 33 providers referring patients, 10 (30%) completed a satisfaction survey. All reported being very satisfied with the structure and quality of care and requested that the boot camp become an established program in the healthcare system.

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Overall Impact of the Diabetes Pathway Boot Camp

- Significantly greater A1C lowering than standard of care over 90 days: -3.06 vs. -1.44 %
- Significant reduction in ER and inpatient admissions as compared to baseline; and significant reductions in inpatient admissions as compared to standard of care.
- High satisfaction from patients and referring providers
- Mandate from healthcare system to spread to additional sites

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Diabetes Pathway Boot Camp Program Spread

Pilot boot camp program (N= 98): offered at 3 hospital based hubs to patients of system providers with clinics located at those hubs.



Phase 2: Expanded program (N=268): offered at 5 hospital based hubs + 1 clinic to patients of all system providers via 1 click order in EMR.



Phase 3 (current): offered at 7 hospital based hubs +1 clinic , additional locations being identified. Patients have to have a system provider and EMR.

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Challenges to Program Spread

- Educator availability at the various sites under consideration.
- Physician or NP oversight at each location.
- Extensive training required for site staff prior to conducting visits 1 and 2 without central program staff present.
- Availability of office space.
- Reimbursement model for visits 1 and 2 vary by location and state
- Need for reimbursement for Virtual Center calls

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Program Spread Strategies

- RD, CDE hired to act as “roving” educator for high referring primary care practices to provide 2 initial in-person visits.
- Virtual control center capacity increased with more NP coverage to provide additional educator oversight.
- Reimbursement for virtual visits by NPs utilizing remote monitoring codes is being explored.

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Sustainability of Improved Glycemic Outcomes

- What happens to the pathway patients once they complete the boot camp? Are their improved glycemic outcomes sustained?
- If no one is watching... do patients maintain newly acquired self-care behaviors?



"Say you fall down and nobody is around to hear it. With the Emergency Alert System..."

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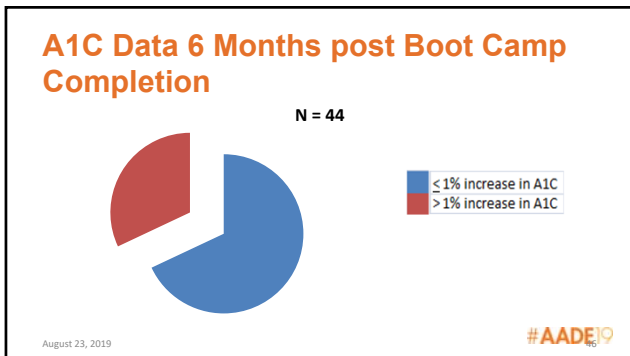
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What Happened to A1C Results Post Pathway v 1.0, n=98

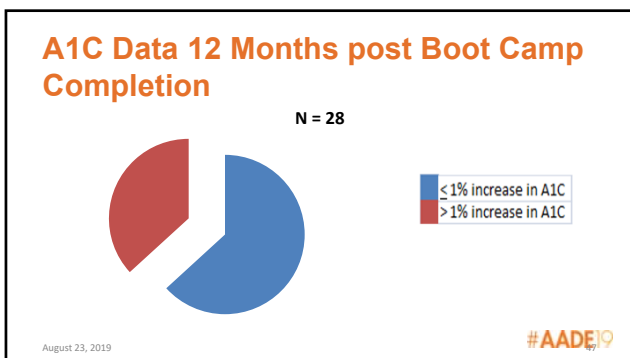
- Reviewed A1C data at 6 months and 12 months post Boot camp completion
- Many A1Cs not available for long term follow up: patient did not return for clinic visits, insurance and provider changes, etc
- Small data set



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What does long term A1C data tell us?

Two conclusions drawn from A1C drift data despite limited data:

- The Diabetes Pathway Boot Camp intervention has a long term impact.
- One year after completion,
 - 80% of patients with follow up A1C had lower A1Cs then prior to the pathway; and
 - 57% had an A1C that was still at least 2 points lower than baseline.
- Some of the gains are lost over time for a subset of patients
- Long term sustaining strategies are needed to ensure more patients maintain their gains.

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Sustaining Strategies Status

- 3 strategies being tested at different hubs
- Long term A1C data continues to be a challenge to obtain
- Patient focus groups and Provider feedback: preference for pathway staff to provide long term follow up to ensure sustainability of glycemic improvements and continuity of care.
- Under consideration: monthly follow-up call by VCC NPs

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Conclusions

- The technology enabled MedStar Diabetes Boot Camp has proven to be effective in reducing A1C and acute care utilization as compared to standard of care.
- Patients and providers have expressed high satisfaction with the program.
- System spread is an incremental process that requires careful site selection with identification of local providers and champions
- Diabetes educators play a lead role in population health .

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