An Integrative Approach to Addressing Diabetes

Integrating Clinical Pharmacy with Diabetes Management

PRIMARY CARE DEVELOPMENT CORPORATION

CoE Center of Excellence for Integrated Health Solutions
Funded by Substance Abuse and Mental Health Services Administration
Operated by the National Council for Behavioral Health

About PCDC

Primary Care Development Corporation (PCDC) is a national nonprofit organization and a community development financial institution catalyzing excellence in primary care through strategic community investment, capacity building, and policy initiatives to achieve health equity.

Disclaimer

The views, opinions, and content expressed in this presentation do not necessarily reflect the views, opinions, or policies of the Center for Mental Health Services (CMHS), the Substance Abuse and Mental Health Services Administration (SAMHSA), or the U.S. Department of Health and Human Services (HHS).

SAMHSA
Substance Abuse and Mental Health Services Administration

www.samhsa.gov

Today's Moderator

Andrew Philip, PhD
Senior Director of Clinical & Population Health
Primary Care Development Corporation
New York, NY

Poll

What's life like where you are viewing?

1. I'm in a clinic setting
2. I'm in a nonclinical office setting
3. I'm at home and otherwise normal
4. I'm at home, and helping care for children and others
5. Other

An Integrative Approach to Addressing Diabetes

1. Behavioral Treatment
2. Evidence-based Prescribing Practices
3. Nutrition, Food Insecurity and Health Promotion
4. Integrating Clinical Pharmacy
5. Expanding Quality Improvement
6. Operational and Clinical Pathways
7. Persons with Lived Experience

Moving Beyond 101: An Advanced Application of Integrated Care

An Integrative Approach to Addressing Diabetes

- Improve screening and management and partner with patients to better address diabetes
  - Maximize the value of interprofessional teams
  - Enhance what you have (even if it's just you!)
  - Build efficient processes and procedures

(Image courtesy C. Aguilar)

Today's Presenter:
Donna M. Lisi, PharmD, BCPS, BCPP, BCGP, BCACP

- Clinical Pharmacist at Hackensack Meridian Health in Post-Acute Care
- BS Pharmacy and Doctor of Pharmacy (PharmD) from St. John's University
- Completed a NIA-sponsored Geriatric Pharmacy fellowship at Montefiore Medical Center
- Board-certifications as a Pharmacotherapy Specialist, Geriatric Pharmacist, Psychiatric Pharmacist and Ambulatory Care Pharmacist
- Held faculty appointments educating pharmacy students and other allied health/medical disciplines
- Medical Writer/Consultant/Public Health Advocate

Agenda

Part I:

- **Why** include a Clinical Pharmacist as part of the team in the management of patients with Diabetes?
- What **Outcomes Data** are available supporting the Clinical Pharmacist's role in the management of patients with Prediabetes and Diabetes, especially in Primary Care?
- What role does the Clinical Pharmacist have in managing **Diabetes-related Complications and Comorbidities**?

Agenda

Part II:

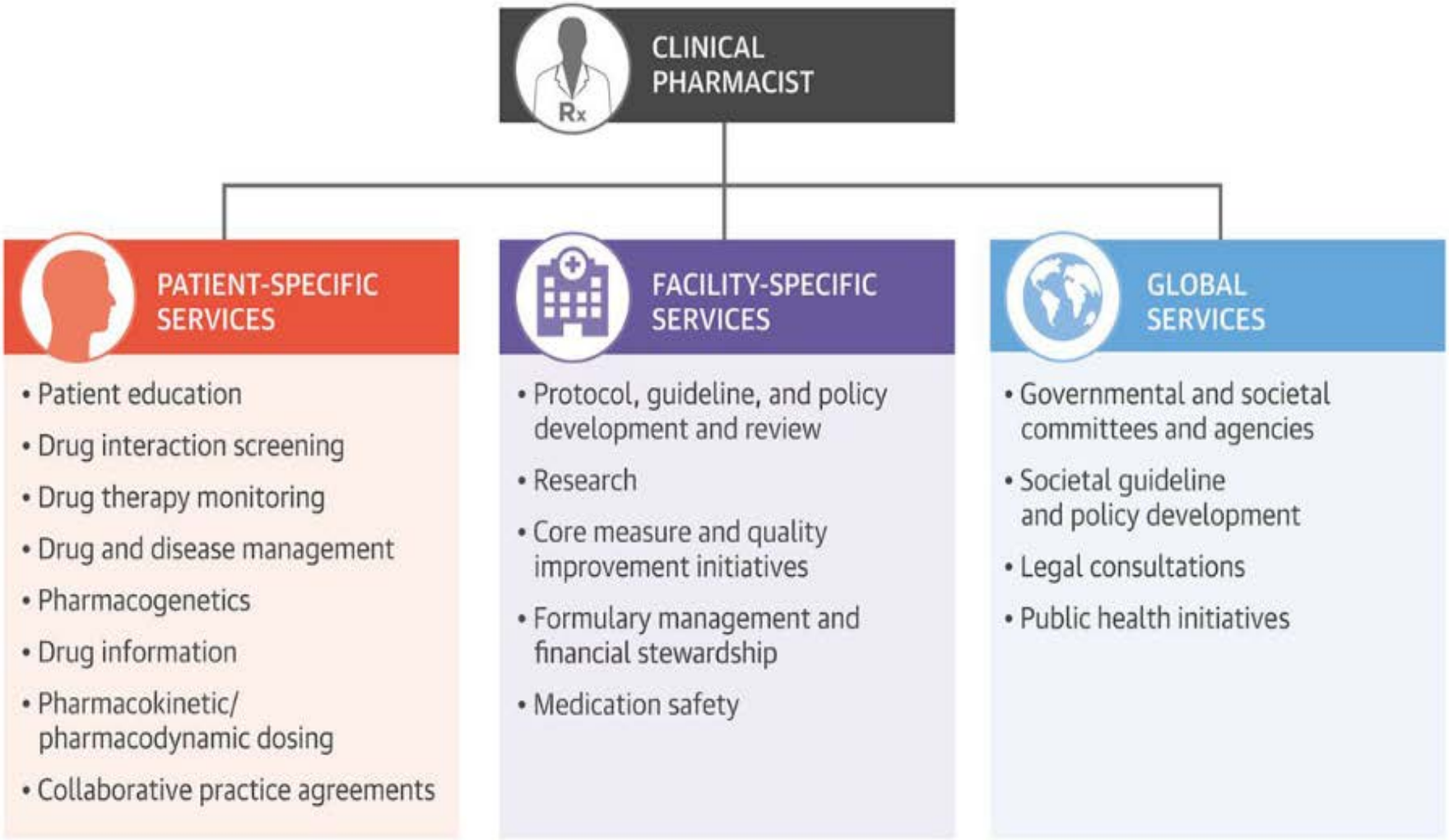
- What **“Principles of Diabetes Pharmacotherapy (Clinical Pearls)”** can be incorporated into practice without the benefit of a Clinical Pharmacist?
  - Shifting practices in Diabetes Pharmacotherapy
  - Taking a “Population-Health-based” approach

Part I: Why Include a Clinical Pharmacist on the Team?

https://www.acc.org/membership/sections-and-councils/cardiovascular-team-section/section-updates/2015/12/01/11/29/summarizing-the-role-of-the-clinical-pharmacist-in-cardiovascular-disease-care

Pharmacist Specialized Training

- Highly trained health care professionals
  - 6-year Doctor of Pharmacy programs or BS Pharmacy +/- 2-year thesis Doctor of Pharmacy program
- Post-graduate Year 1 (general) and Year 2 (specialized) residency programs
- Post-graduate Fellowship programs
- Board-certification by the Board of Pharmaceutical Specialties
- Additional certifications such as CDE, MTM-DM
- Mandatory state requirements for Continuing Education



Dunn, S.P. et al. J Am Coll Cardiol. 2015; 66(19):2129-39.

Source: *JACC*

Role of the Pharmacist in DM Management

- Patient identification
- Patient assessment
- Patient education
- Patient referral
- Monitoring diabetes care

Am J Health-Syst Pharm—Vol 59 Dec 1, 2002 Suppl 9: S18-21.

ASHP Statement on the Pharmacist's Role in Primary Care

- Patient assessment for medication-related factors
- Order labs needed to monitor medications
- Interpret data related to medications
- Initiate or modify medication therapy care plans
- Patient education and counseling
- Document patient's care
- Identify barriers to adherence
- Participate in multidisciplinary review
- Communicate with payers to resolve issues
- Communicate with prescribers and team members

https://www.ashp.org/-/media/assets/policy-guidelines/docs/statements/pharmacists-role-primary-care.ashx

The Proof is in the Pudding? Yes!

- **Asheville Project (2003)**
  - Longitudinal study conducted in Asheville, NC to assess the clinical, economic and humanistic outcomes of pharmaceutical care delivered by community pharmacists to patients with DM
  - 12 community pharmacies
  - Patients who were employees, dependents or retirees from 2 self-insured employers
  - Pharmacists worked with 85 patients over 7-9 months providing patient education on self-monitoring blood glucose, performing clinical assessment and monitoring, and providing follow-up and referral
  - Followed for up to 5 years

Cranor CW et al. J Am Pharm Assoc. 2003;43:173-84.

The Proof is in the Pudding? Yes!

- At each of 3 planned follow-ups over 5 years:
  - Mean A1c improved in 58-82% of patients
  - % of patients achieving A1c < 7% (goal) at each follow-up added 24%, 27% and 18% more patients at each of 3 F/Us
  - LDL-C improved in 50-67% patients
  - HDL-C increased (beneficial) in 53-75% of patients
  - Total mean direct medical costs decreased by $1200-1872 per patient/year compared to baseline
  - Days of sick time decreased from 1997-2001 in one employer group with an estimated increase in productivity estimated at $18,000 annually

Cranor CW et al. J Am Pharm Assoc. 2003;43:173-84.

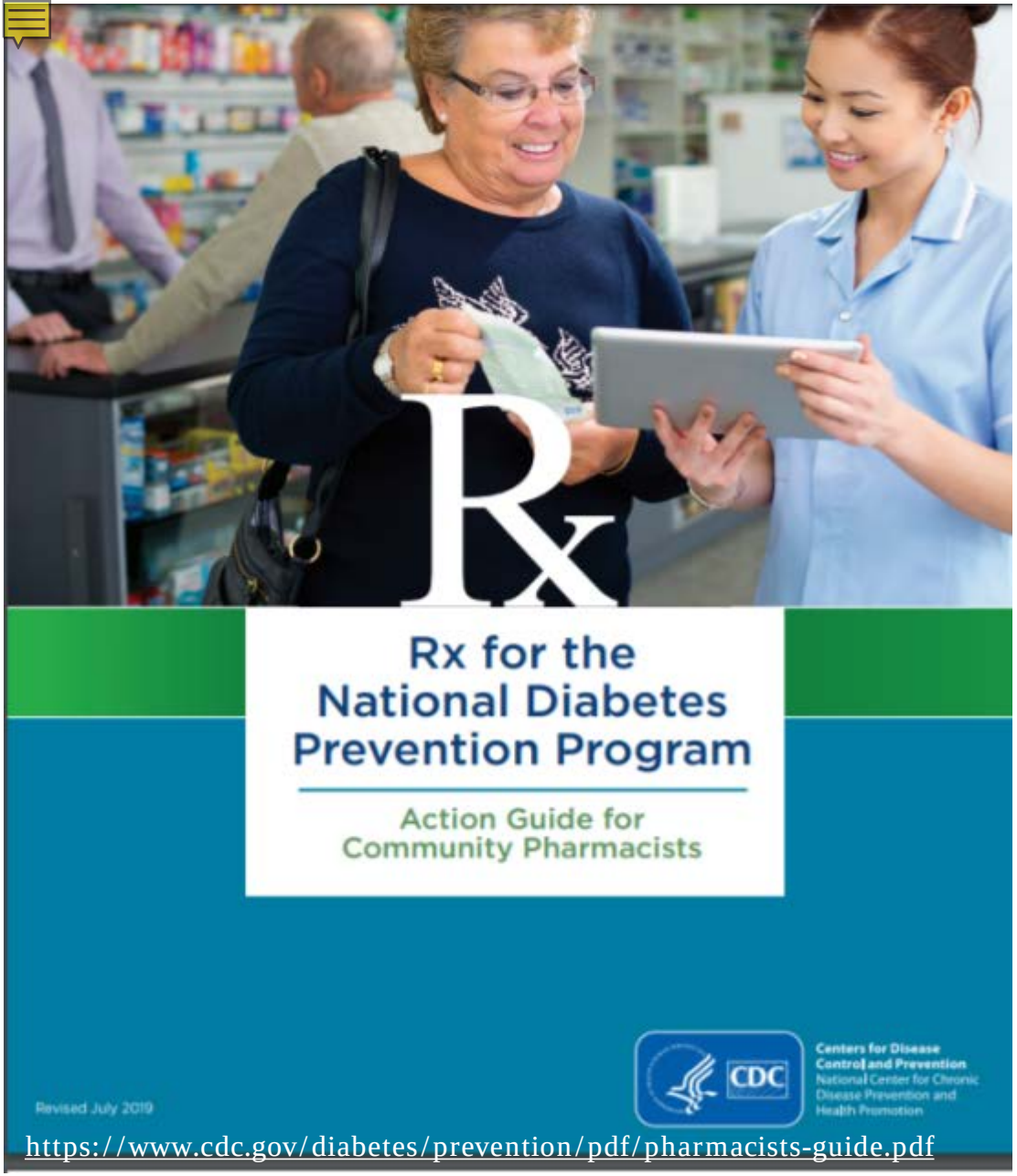
The Proof is in the Pudding? Yes!

- Effect of adding pharmacists to primary care teams on blood pressure control in patients with Type 2 ***Diabetes. Diabetes Care. 2011;34:20-6***.
- Adding pharmacists to primary care teams reduces predicted long-term risk of cardiovascular events in Type 2 diabetic patients without established cardiovascular disease: results from a randomized trial. ***Diabet Med. 2012;29: 1433-9.***
- Adding pharmacists to primary care teams increases guideline-concordant antiplatelet use in patients with Type 2 diabetes: results from a randomized trial. ***Ann Pharmacother. 2013;47: 43-8.***
- Enhancing diabetes care by adding a pharmacist to the primary care team. ***Am J Health-syst Pharm. 2013;70: 877-86.***

The Proof is in the Pudding? Yes!

- Cost-effectiveness analysis of adding pharmacists to primary care teams to reduce cardiovascular risk in patients with Type 2 diabetes: results from a randomized controlled trial. ***Diabet Med. 2015;32;899-906.***
- Pharmacists on primary care teams: effect on hypertensive medication management in patients with type 2 diabetes. ***J Am Pharm Assoc. 2015;55: 265-8.***
- Impact on diabetes care by pharmacists as part of health care team in ambulatory settings: a systematic review and meta-analysis. ***Ann Pharmacother. 2017; 51:890-907.***

- ***The Bottom Line: Pharmacist involvement in the management of DM improves patient care.***



https://www.cdc.gov/diabetes/prevention/pdf/pharmacists-guide.pdf

The purpose of this guide is to help pharmacists prevent new cases of type 2 diabetes among patients at high risk by helping to expand the reach of the National DPP.

Focus:

- Raise awareness of prediabetes and the National DPP among their patients at risk.
- Screen and test for prediabetes and refer people with prediabetes to a CDC-recognized lifestyle change program participating in the National DPP.
- Deliver the National DPP lifestyle change program.

Evidence-Based Care means Inclusion of Clinical Pharmacists

- Team-based cardiovascular care, including the use of clinical pharmacists, can efficiently deliver high-quality care.
- Clinical pharmacist roles have a substantial effect in a wide variety of roles in inpatient and ambulatory settings.
- Areas of impact include: optimization of drug use, avoidance of adverse drug events, and transitional care activities (medication reconciliation and patient education.).

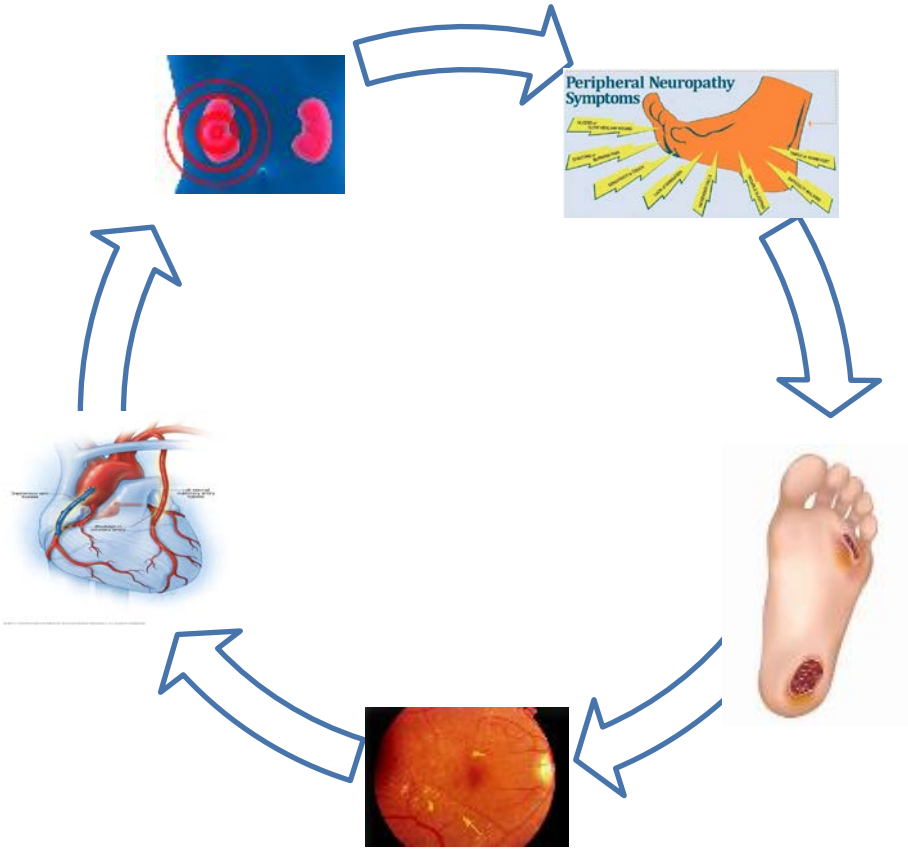
This Joint Council Perspectives paper from the Cardiovascular Team and Prevention Councils of the American College of Cardiology

"Multidisciplinary organizations, including the American College of Cardiology, should support efforts to overcome these barriers, allowing pharmacists to deliver high-quality patient care to the full extent of their education and training."
(J Am Coll Cardiol 2015;66:2129–39)

Managing the Complications of DM

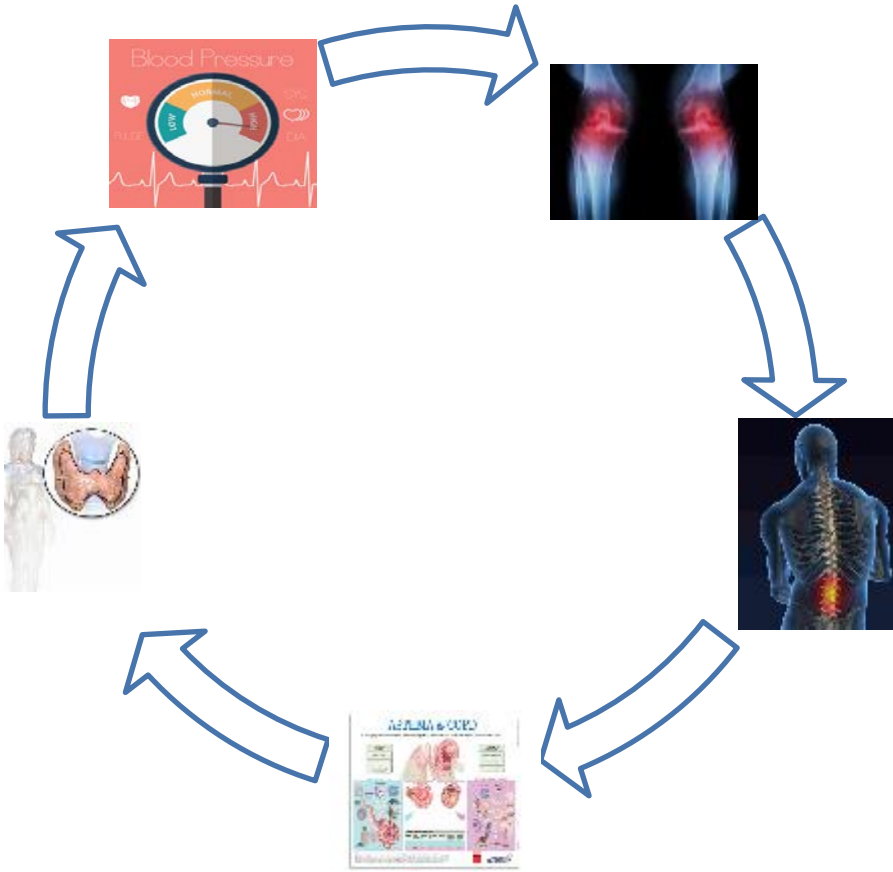
Pharmacists can work with the team to help:

- Manage CV risk – CAD, HTN – ACEIs/ARBs
- Renally adjust doses
- Assist with drug selection for neuropathic pain
- Encourage good foot hygiene and send reminders for podiatrist visits
- Encourage visits to ophthalmologists
- Recommend eye exams to detect retinopathy early

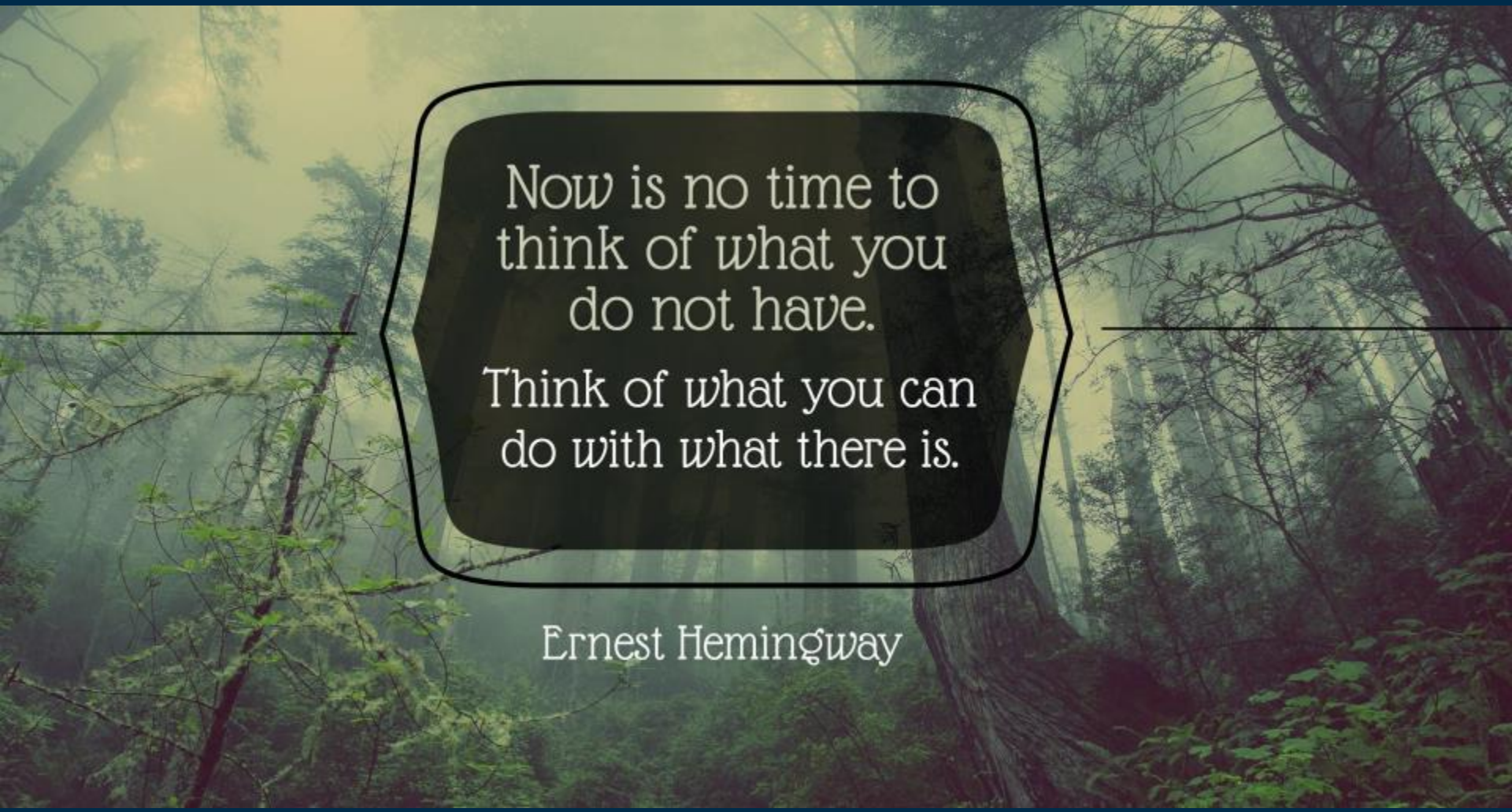


Managing the Comorbidities of DM

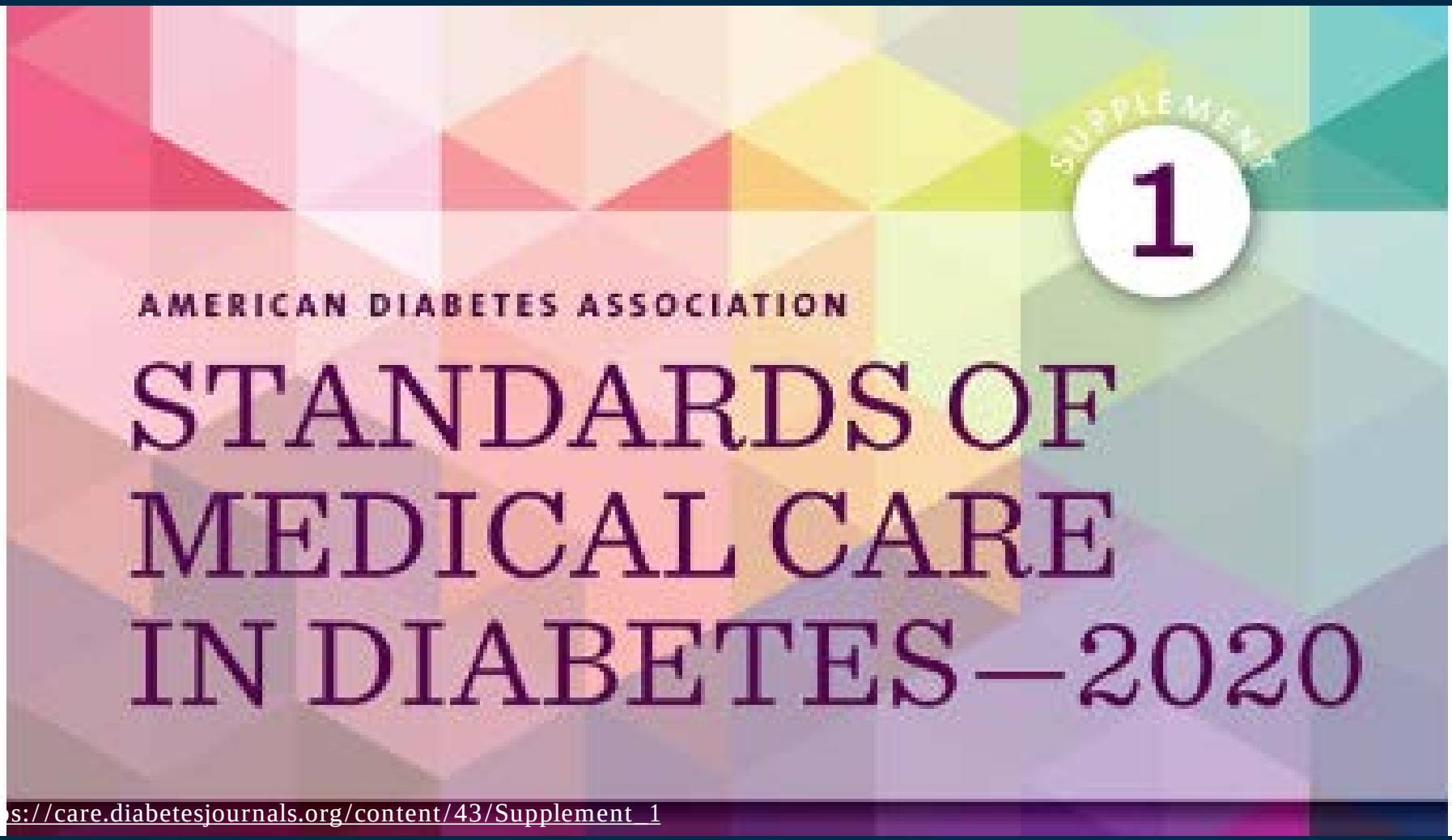
- As a fully integrated part of the team, the pharmacist can assist in managing underlying comorbidities that can lead to complications in diabetes
- Heart disease
- Hypertension
- Osteoarthritis
- Chronic low back pain
- Asthma
- COPD
- Thyroid problems



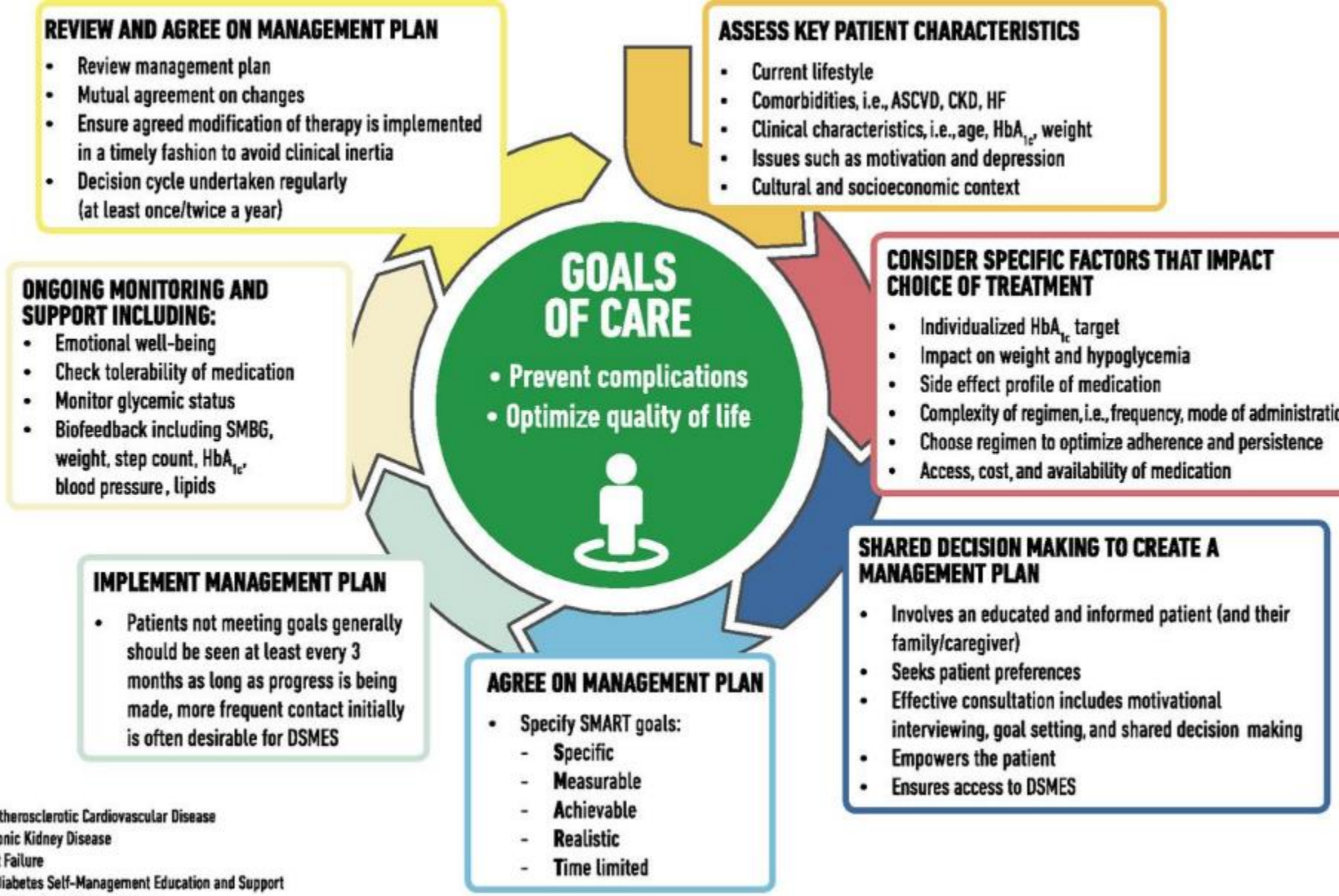
Part II: “Clinical Pearls” from a Clinical Pharmacist



Great Place to Start



https://care.diabetesjournals.org/content/43/Supplement_1



ASCVD = Atherosclerotic Cardiovascular Disease
CKD = Chronic Kidney Disease
HF = Heart Failure
DSMES = Diabetes Self-Management Education and Support
SMBG = Self-Monitored Blood Glucose

https://care.diabetesjournals.org/content/42/Supplement_1/S34

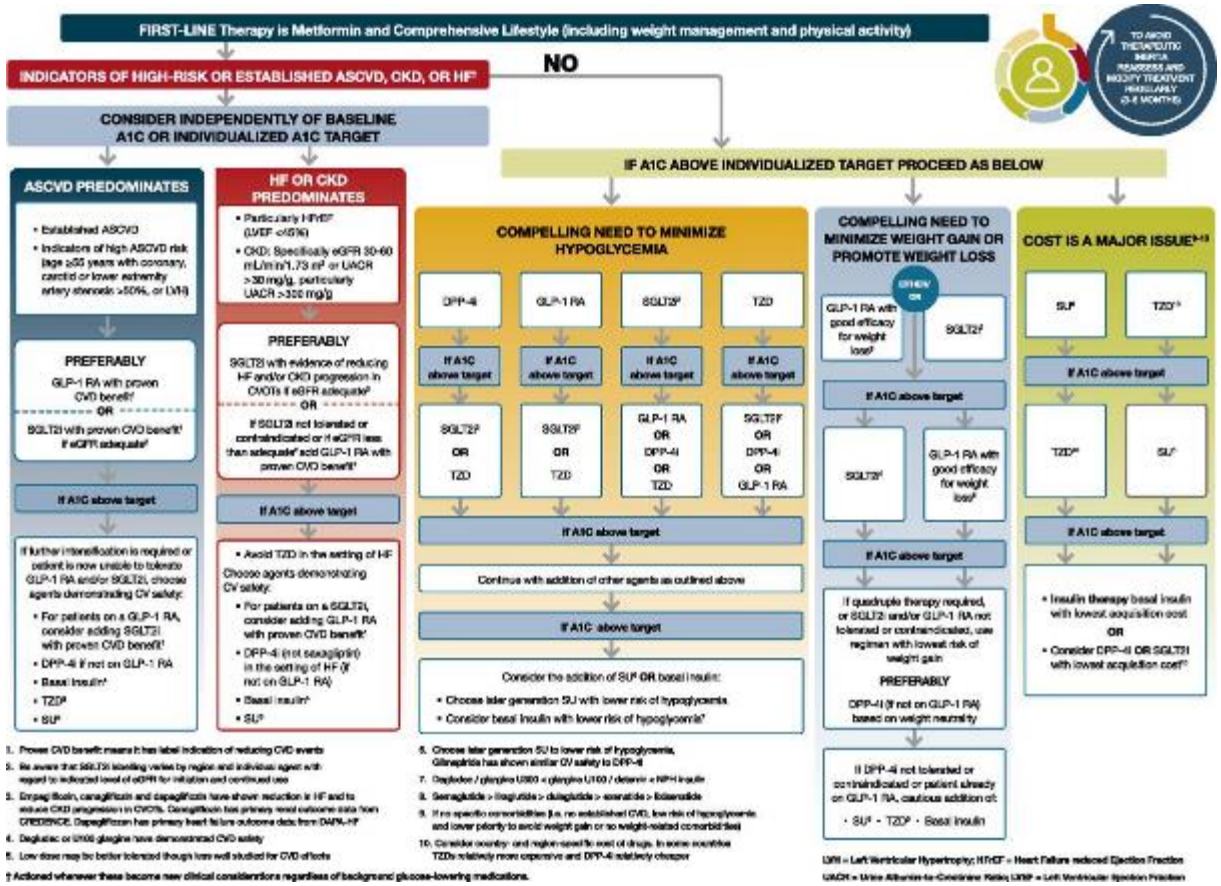
Applying Critical Resources

- Pharmacists can help the team weigh issues of efficacy and benefit versus risk, route of administration, and an assessment of physiological parameters, such as renal function that factor into medication selection decisions

	Efficacy	Hypoglycemia	Weight change	CV effects		Cost	Oral/SQ	Renal effects		Additional considerations
				ASCVD	HF			Progression of DKD	Dosing/use considerations*	
Metformin	High	No	Neutral (potential for modest loss)	Potential benefit	Neutral	Low	Oral	Neutral	• Contraindicated with eGFR <30 mL/min/1.73 m²	• Gastrointestinal side effects common (diarrhea, nausea) • Potential for B12 deficiency
SGLT-2 inhibitors	Intermediate	No	Loss	Benefit: empagliflozin†, canagliflozin	Benefit: empagliflozin†, canagliflozin, dapagliflozin‡	High	Oral	Benefit: canagliflozin§, empagliflozin, dapagliflozin	• Renal dose adjustment required (canagliflozin, dapagliflozin, empagliflozin, ertugliflozin)	• **FDA Black Box:** Risk of amputation (**canagliflozin**) • Risk of bone fractures (canagliflozin) • DKA risk (all agents, rare in T2DM) • Genitourinary infections • Risk of volume depletion, hypotension • ↑LDL cholesterol • Risk of Fournier's gangrene
GLP-1 RAs	High	No	Loss	Neutral: lixisenatide Benefit: See label indication of reducing CVD events	Neutral	High	SQ; oral (semaglutide)	Benefit: liraglutide	• Renal dose adjustment required (exenatide, lixisenatide) • Caution when initiating or increasing dose due to potential risk of acute kidney injury	• **FDA Black Box:** Risk of thyroid C-cell tumors (**liraglutide, albiglutide, dulaglutide, exenatide extended release**) • Gastrointestinal side effects common (nausea, vomiting, diarrhea) • Injection site reactions • ?Acute pancreatitis risk
DPP-4 inhibitors	Intermediate	No	Neutral	Neutral	Potential risk: saxagliptin	High	Oral	Neutral	• Renal dose adjustment required (sitagliptin, saxagliptin, alogliptin); can be used in renal impairment • No dose adjustment required for linagliptin	• Potential risk of acute pancreatitis • Joint pain
Thiazolidinediones	High	No	Gain	Potential benefit: pioglitazone	Increased risk	Low	Oral	Neutral	• No dose adjustment required • Generally not recommended in renal impairment due to potential for fluid retention	• **FDA Black Box:** Congestive heart failure (**pioglitazone, rosiglitazone**) • Fluid retention (edema; heart failure) • Benefit in NASH • Risk of bone fractures • Bladder cancer (pioglitazone) • ↑LDL cholesterol (rosiglitazone)
Sulfonylureas (2nd generation)	High	Yes	Gain	Neutral	Neutral	Low	Oral	Neutral	• Glyburide: not recommended • Glipizide and glimepiride: initiate conservatively to avoid hypoglycemia	• FDA Special Warning on increased risk of cardiovascular mortality based on studies of an older sulfonylurea (tolbutamide)
Insulin — Human insulin	Highest	Yes	Gain	Neutral	Neutral	Low	SQ; inhaled	Neutral	• Lower insulin doses required with a decrease in eGFR; titrate per clinical response	• Injection site reactions • Higher risk of hypoglycemia with human insulin (NPH or premixed formulations) vs. analogs
Insulin — Analogs						High	SQ			

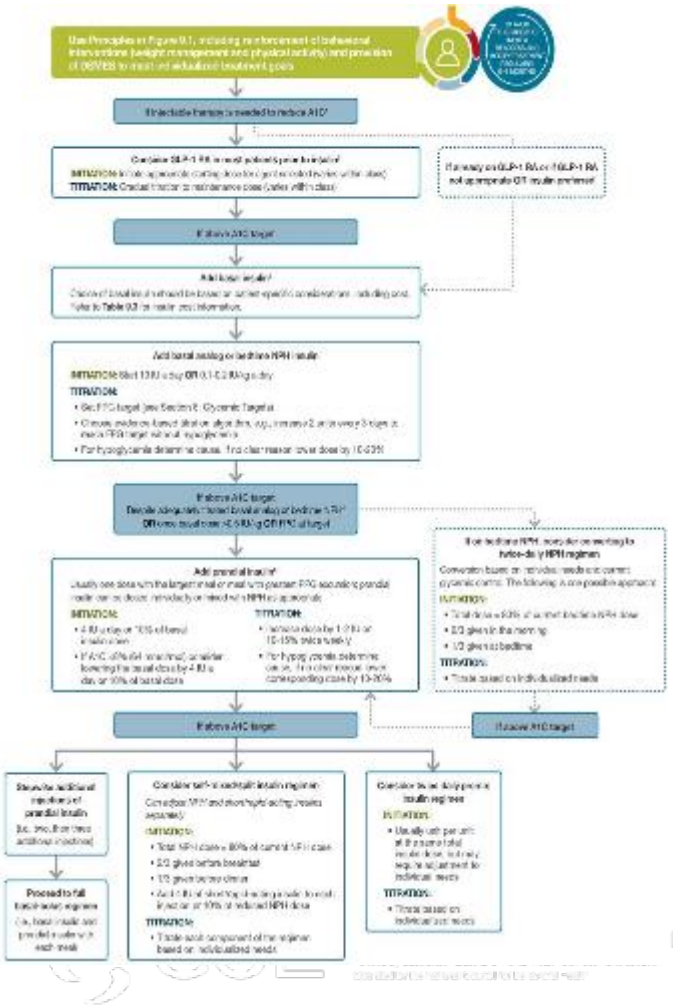
Applying Critical Resources

- The pharmacist can work with the team to apply this algorithm for medication management in DM specifically focusing on comorbidities, risk for hypoglycemia, weight management and cost



Applying Critical Resources

- Resources such as this workflow allow for clear guidance when providing care to clients with insulin dependence
- Pharmacists are a key part of this workflow, and support the entire care team with the decision making that it covers
- Allows more members of the care team to better understand prescribing practices and decision making
- Links to resources will be sent in post webinar email!



Treat Based on the TOTAL Picture

Population Health Approach

Social Determinants of Health

Economic Stability	Neighborhood and Physical Environment	Education	Food	Community and Social Context	Health Care System
Employment	Housing	Literacy	Hunger	Social Integration	Health Coverage
Income	Transportation	Language	Access to Healthy Options	Support Systems	Provider Availability
Expenses	Safety	Early Childhood Education		Community Engagement	Provide Linguistic and Cultural Competency
Debt	Parks	Vocational Training		Discrimination	
Medical Bills	Playgrounds	Higher Education		Stress	Quality of Care
Support	Walkability				
	Zip Code/ Geography				

Health Outcomes

Mortality, Morbidity, Life Expectancy, Health Care Expenditures, Health Status, Functional Limitations

https://www.kff.org/disparities-policy/issue-brief/disparities-in-health-and-health-care-five-key-questions-and-answers/

KFF HENRY J KAISER FAMILY FOUNDATION

Clinical Pharmacist's Role in Managing SDH in DM

Economic Stability	Neighborhood and Physical Environment	Education	Food	Community and Social Context	Health Care System
Insurance Coverage Status Selection of Medications, Glucose Meters, Stripes, and Supplies considering Cost	Pharmacy Delivery Services Safe Communities and Senior-Friendly Communities to Promote Physical Fitness Caring for the Homeless Person with DM Racial Differences in Drug Response	Health Literacy/ ESL Prediabetes Prevention Educating about Diabetes Management and Management of its Complications and Comorbidities	Interdisciplinary Diet and Nutrition Education Timing of Medications around Meals Preventing Food-Drug Interactions Use of Natural Products Medication Management Around Periods of Fasting (Medical or Religious)	The "Most Accessible Person of the Health Care Team" Community Engagement in Diabetes Prevention Programs Community Education and Outcome Smoking Cessation Psychosocial Support	Medication Reconciliation Continuity of Care Pharmacist-Led Diabetes Clinics Conduct Medication Use Reviews using EHRs Consultant Pharmacist Drug Regimen Reviews in LTC User-friendly Devices

Economic Stability

Research Letter

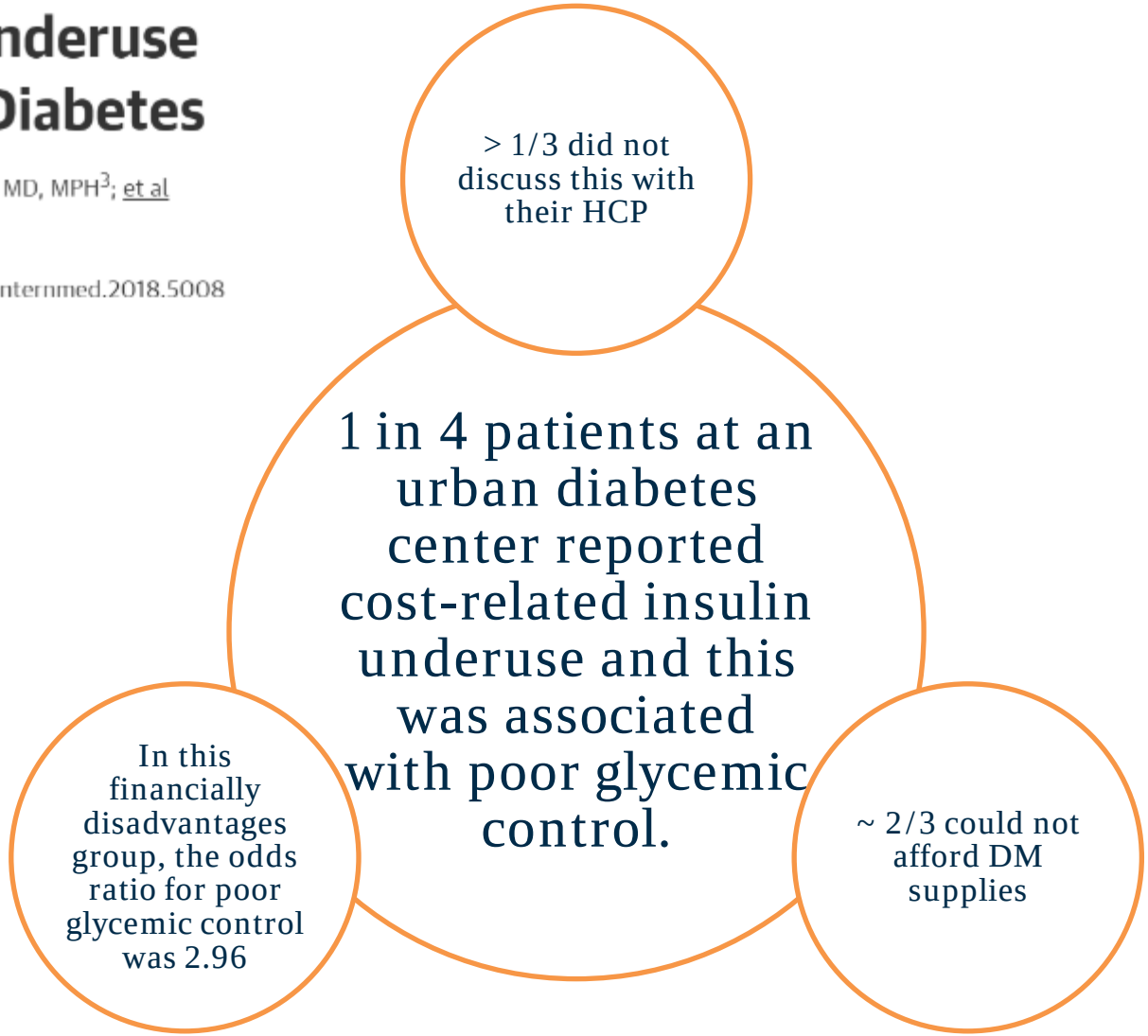
January 2019

Cost-Related Insulin Underuse Among Patients With Diabetes

Darby Herkert, BS[1]; Pavithra Vijayakumar, BA[2]; Jing Luo, MD, MPH[3]; et al

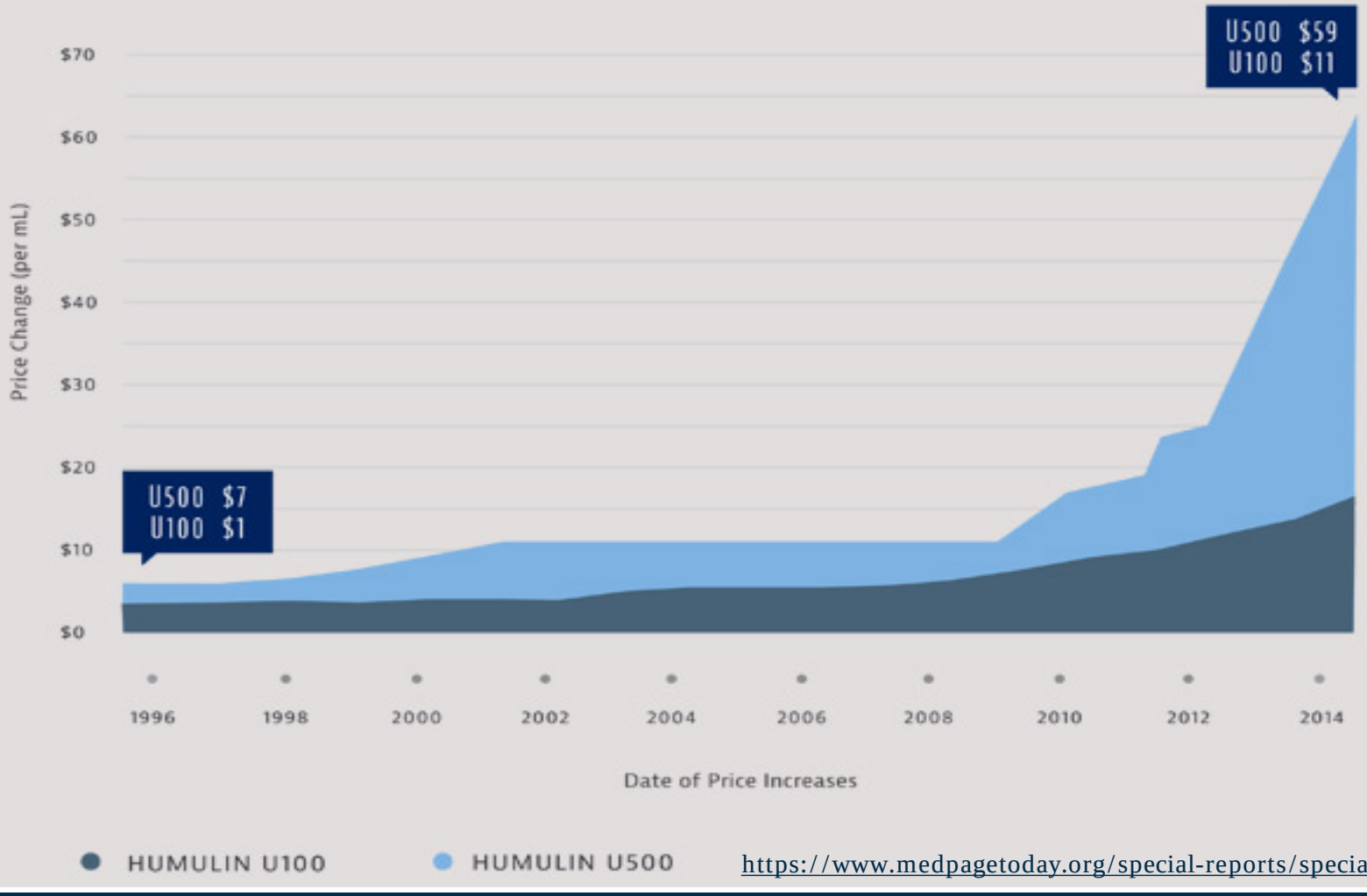
» Author Affiliations | Article Information

JAMA Intern Med. 2019;179(1):112-114. doi:10.1001/jamainternmed.2018.5008



PRICE OF INSULIN : U500 vs U100

Based on average $USD wholesale prices.



https://www.medpagetoday.org/special-reports/specialreports/47603

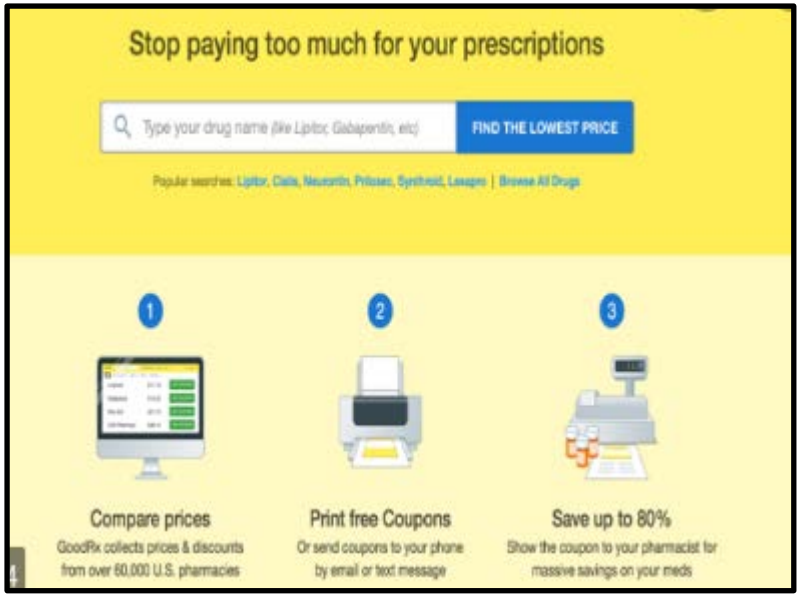
http://main.diabetes.org/dorg/PDFs/2018-insulin-affordability-survey.pdf

Executive Summary

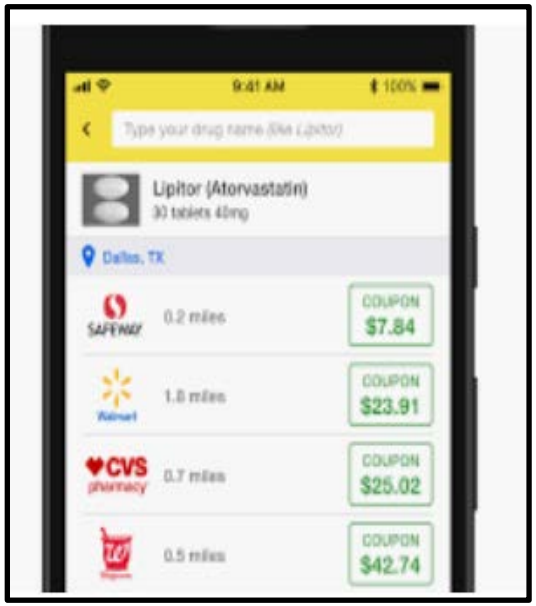
- Roughly a quarter (27%) of respondents indicate insulin cost has affected their past year purchase or use of insulin – more so in the case of dependent child insulin users (34%).
- Affected users – all segments – respond in a number of ways, including:
  - Regularly taking less than prescribed (26% of those impacted by cost)
  - Changing to less expensive types/brands with doctor (23%)
  - Missing doses weekly (23%) or monthly (20%)
  - Choosing between insulin and other health-related purchases, e.g. other medications (36%), fruits/vegetables (34%), doctor visits (32%), and health insurance (26%)
  - Made choices between insulin and transportation (32%), utilities (30%), housing (27%), and non-essential purchases like vacations (41%) and entertainment (43%).

GoodRx

www/goodrx.com



Website



Mobile App

https://insulinhelp.org/

www.needymeds.org

About NeedyMeds

Video

Back

NeedyMeds is a 501(c)(3) national non-profit that connects people to programs that will help them afford their medications and other healthcare costs.

Mission Statement: NeedyMeds educates and empowers those seeking affordable healthcare.

Vision Statement: Our vision is affordable healthcare for all.

How we do it: NeedyMeds, a national non-profit, achieves its mission by providing information on healthcare programs, offering direct assistance and facilitating programs.

Glucose Meter and Strips Programs

NeedyMeds offers information on several programs that provide diabetes kits which contain free or discounted glucose meters, testing strips and lancets. NeedyMeds is not endorsing any one product nor guaranteeing its quality or accuracy.

When contacting these programs, make sure to mention that you heard about them through NeedyMeds.

- KnowCopay EasyMax NG*
  844-521-5042
  Offers free glucose meter and supplies at a discounted price.
  No eligibility requirements.
- Rx Outreach*
  888-796-1234
  Offers glucose meters and supplies at a discount price.
  Must be at 300% or less of federal poverty level.
- Abbott Freestyle Meter
  Offers free glucose meter and supplies at a discounted price.
- DirecTest No Coding Glucose Monitoring Kits
  855-837-8365
  Offers glucose meter and supplies at a discount price if meet eligibility guidelines and have health insurance.
- LifeScan OneTouch Meter
  800-227-8862
  Offers glucose meter and supplies at a discounted price if have insurance and meet income guidelines.

https://www.needymeds.org/diabetes_kits

www.rxassist.org

RxAssist
Patient Assistance Program Center

The Web's most current and comprehensive directory of Patient Assistance Programs

Patient assistance programs are run by pharmaceutical companies to provide free medications to people who cannot afford to buy their medicine. RxAssist offers a comprehensive database of these patient assistance programs, as well as practical tools, news, and articles so that health care professionals and patients can find the information they need. All in one place.

Health Care Professionals

Helping You Help Your Patients

Help your patients obtain free or low-cost medications and learn more about safety net programs for the uninsured.

Learn More

Patients

Information about free medications

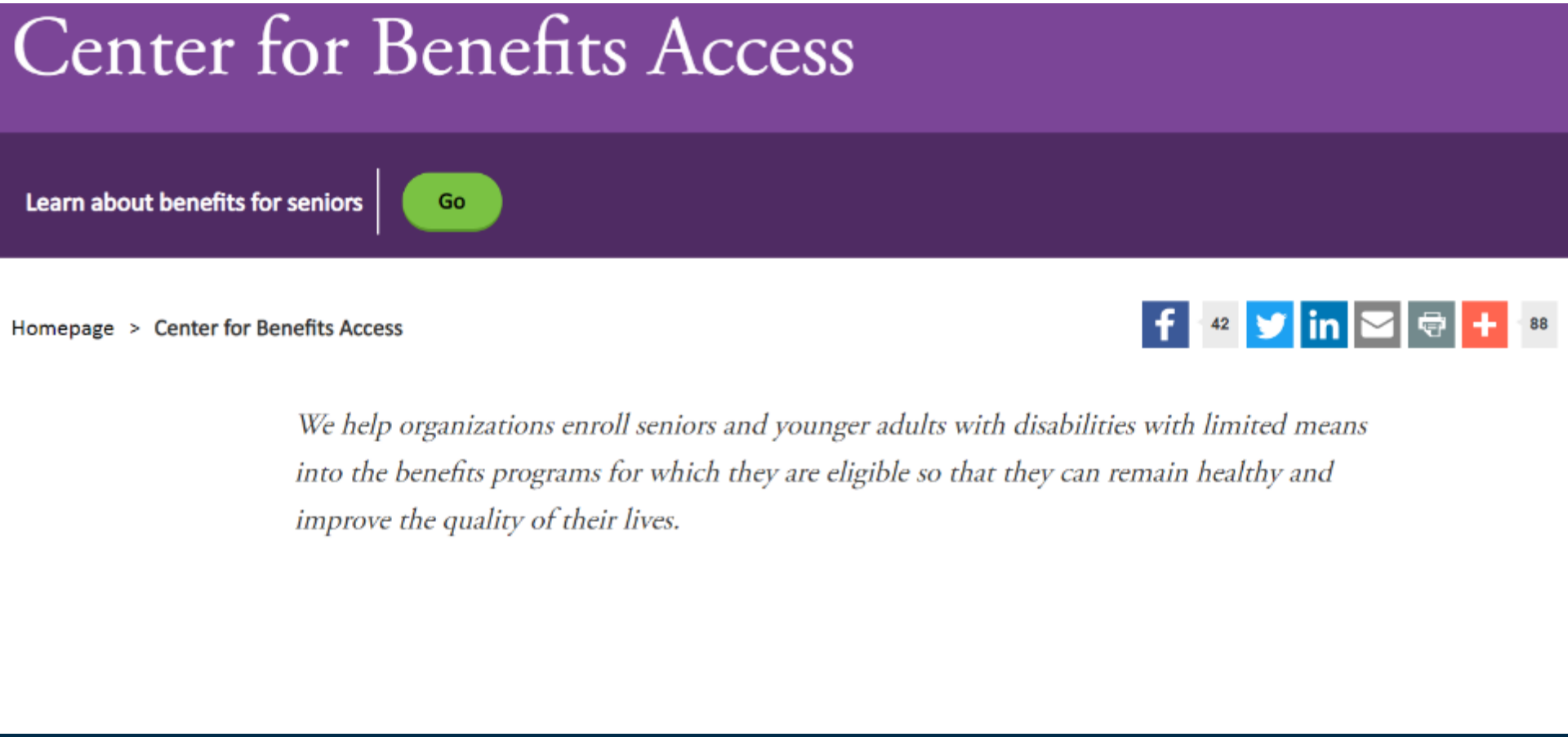
Find information about free and low cost medicine programs and other ways to manage your medication costs.

Learn More

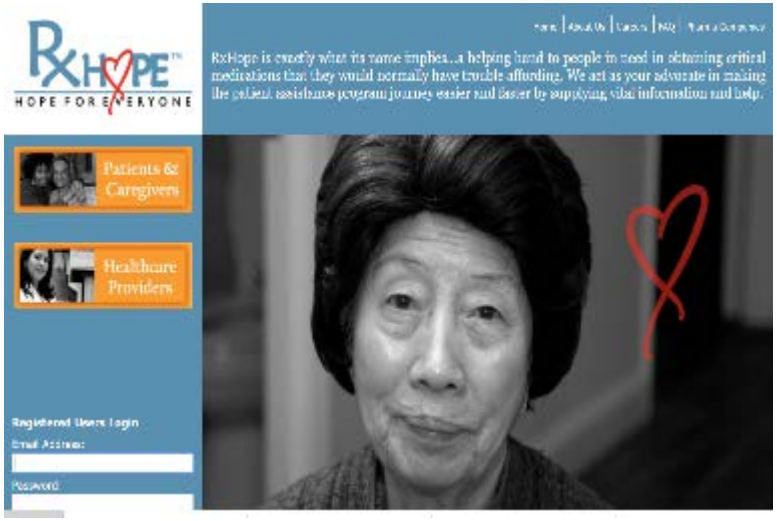
Welcome

Please visit either the Patient Center or the Provider Center to access the database and other resources.

www.ncoa.org/nationalcenterforbenefits/

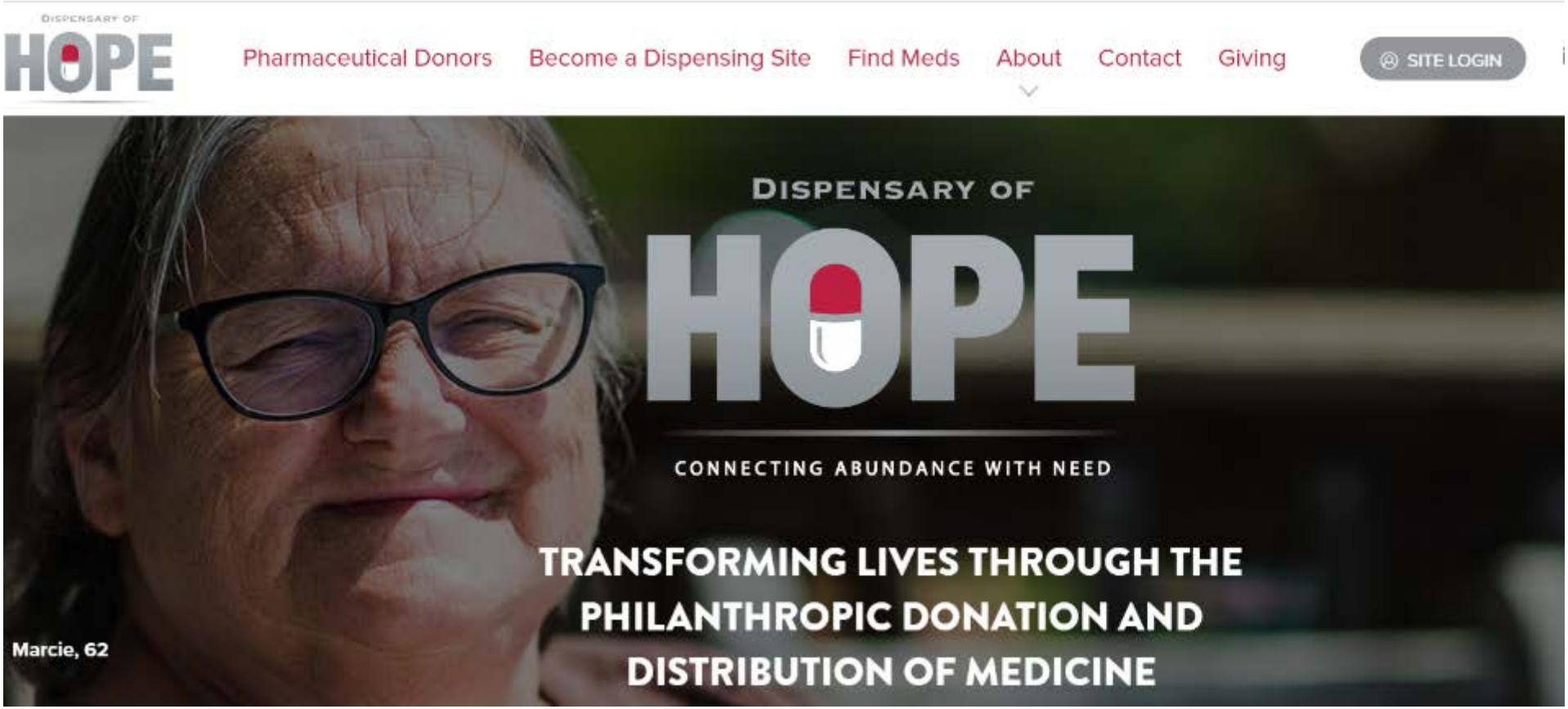


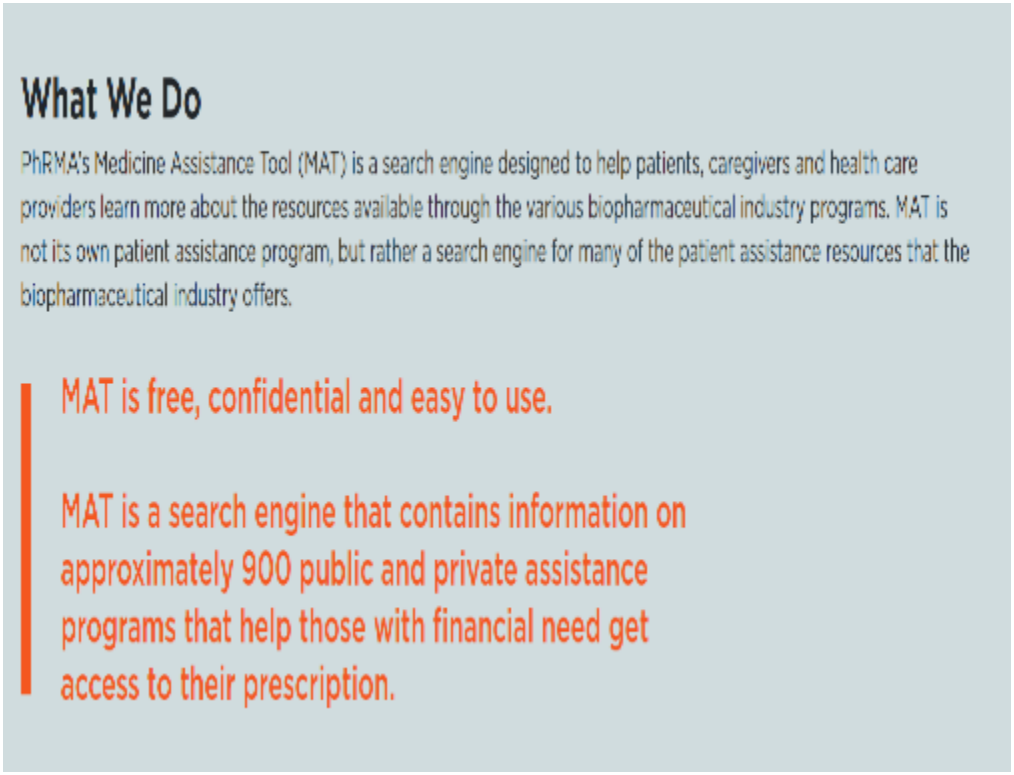
www.rxhope.com



www.rxreach.org

www.dispensaryofhope.org





https://medicineassistancetool.org

Inside Rx

Inside Rx is a subsidiary of Express Scripts, Inc.

- The Inside Rx card is a free discount drug card
- Can provide deep discounts on certain brand-name diabetes medications including insulin and drugs that treat co-existing conditions such as high cholesterol and blood pressure.
- Also can get pet medications

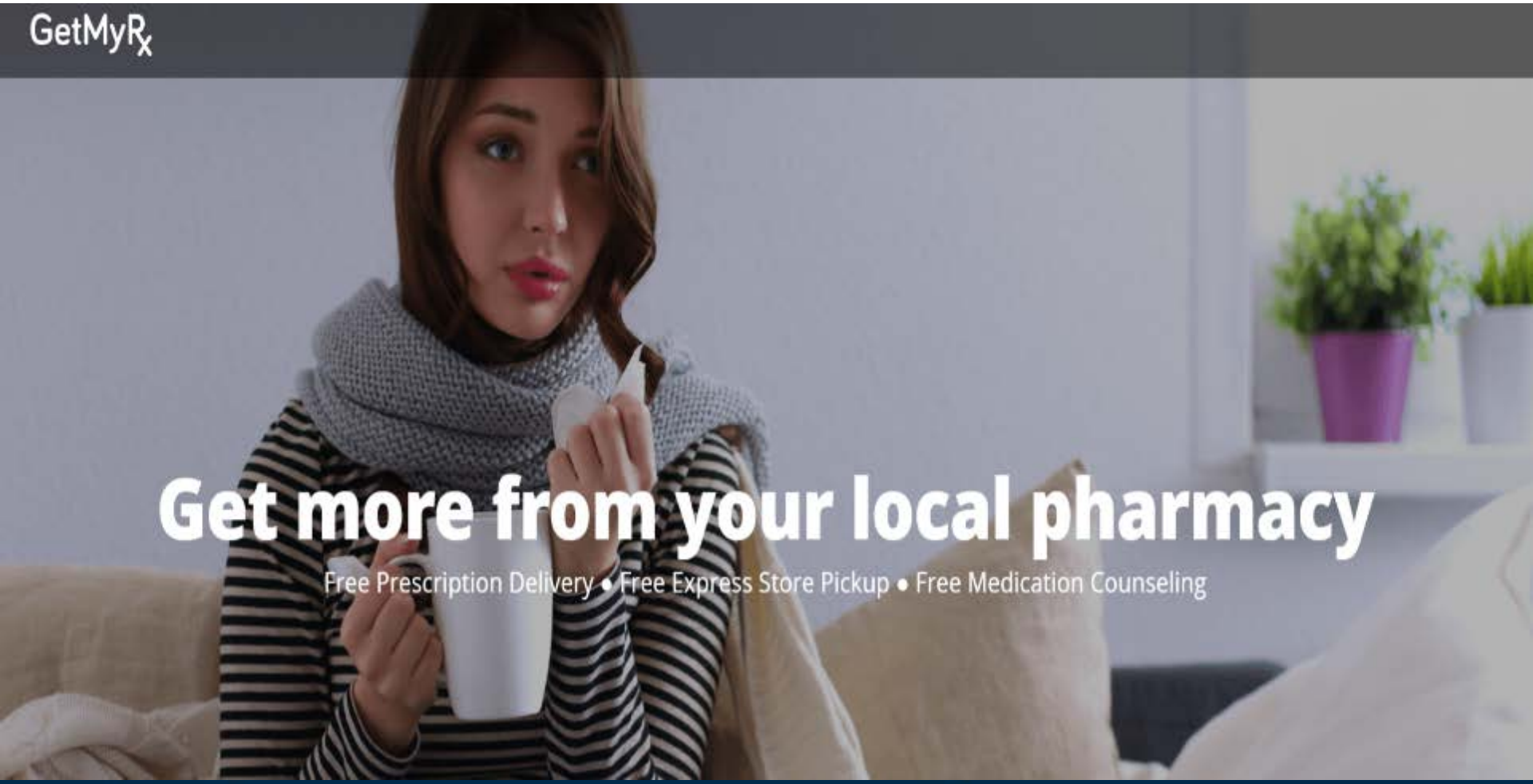
www.insiderx.com

Neighborhood and Physical Environment

Pharmacy Delivery Service

- Major pharmacy chains and many local independents offer delivery service

www.getmyrx.com



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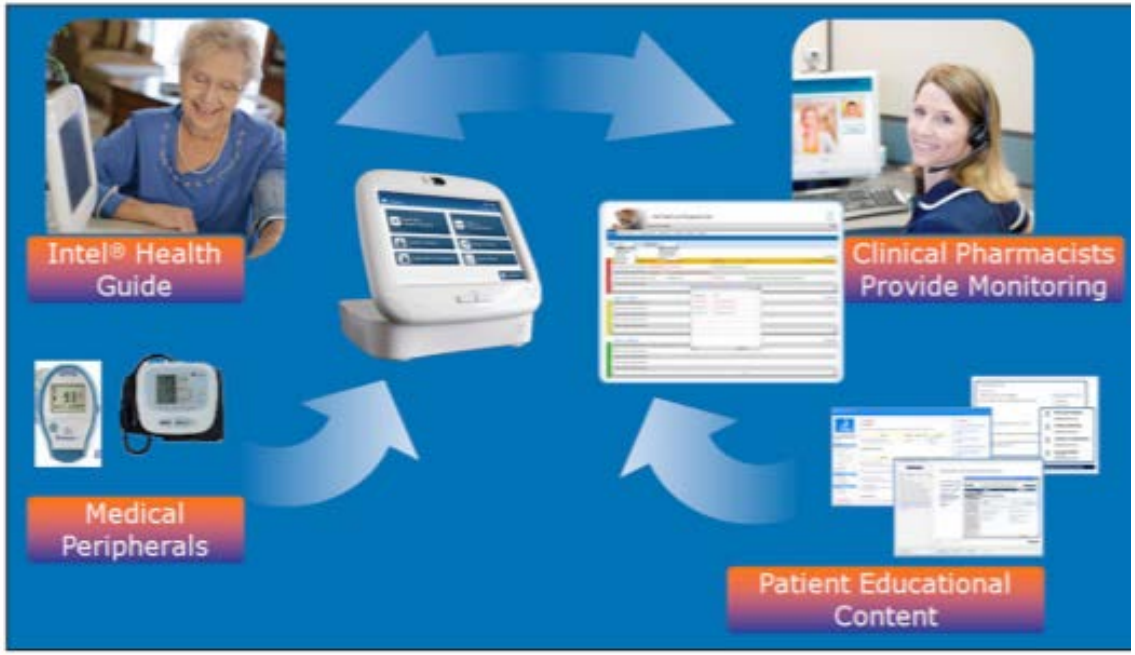
Telepharmacy

- Pre-post study that evaluated the impact of electronic visits (e-visits) on patients with either uncontrolled diabetes (A1c > 9%) or on warfarin who were enrolled in a patient-centered medical home program in NC
- 36 patients were followed over 2 years
- Utilized MyChart
- Patients encouraged to attend initial Pharmacotherapy clinic to assess literacy
- 66% of DM visits involved e-visits only
- A1c decreased 3.4% points at 5.7 months with significant improvements in statin use, aspirin use and BP control
- For those on warfarin, the % of extreme (<1.5 or >5.0) INRs significantly decreased

Pharmacotherapy. 2016;36:348-56.

Telepharmacy

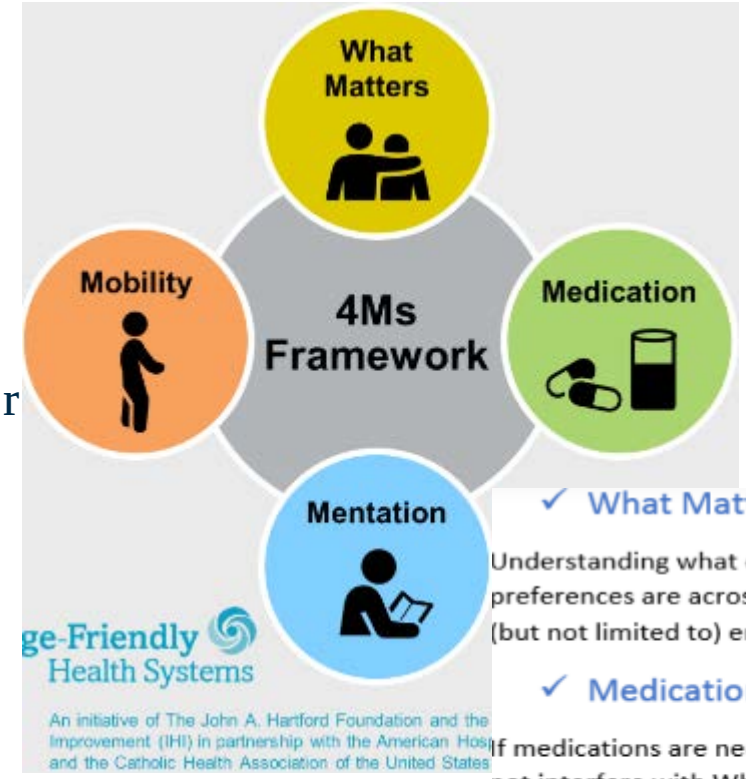
- Clinical Pharmacy Telephone Diabetes Management Program
- Observational study in 3 primary care clinics
- Mean HbA1c level decreased by 1.3%
- Mean blood glucose decreased significantly over 16 weeks



https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3208888/pdf/dst-05-1238.pdf

4M's for an Age-Friendly Society

- Pharmacists can be Board-certified in Geriatrics
- Pharmacists conduct MTM or Medication Therapy Management for Medicare
- Part D beneficiaries
- 21.4% of those aged >65 years have DM and another 5.3% is undiagnosed (NDSR 2020)



✓ What Matters:

Understanding what each patient's health goals and care preferences are across settings to know and align care, including (but not limited to) end-of-life

✓ Medication:

If medications are necessary, using age-friendly medications that do not interfere with What Matters, Mentation, or Mobility

✓ Mentation:

Preventing, identifying, treating, and managing dementia, depression, and delirium across care settings

✓ Mobility:

Ensuring that older adults move safely every day to maintain function and do What Matters to them

https://www.johnahartford.org/blog/view/discovering-the-4ms-a-framework-for-creating-age-friendly-health-systems/

Homeless with Diabetes

- According to the ADA, the prevalence of DM in homeless population is ~ 8%
- Food insecurity, lack of insurance
- Secure place and storage for diabetes medications and supplies
- Work with Social Workers to address these concerns
- Dispensary of Hope, free clinics and vet centers

https://invisiblepeople.tv/how-homeless-people-become-homeless/

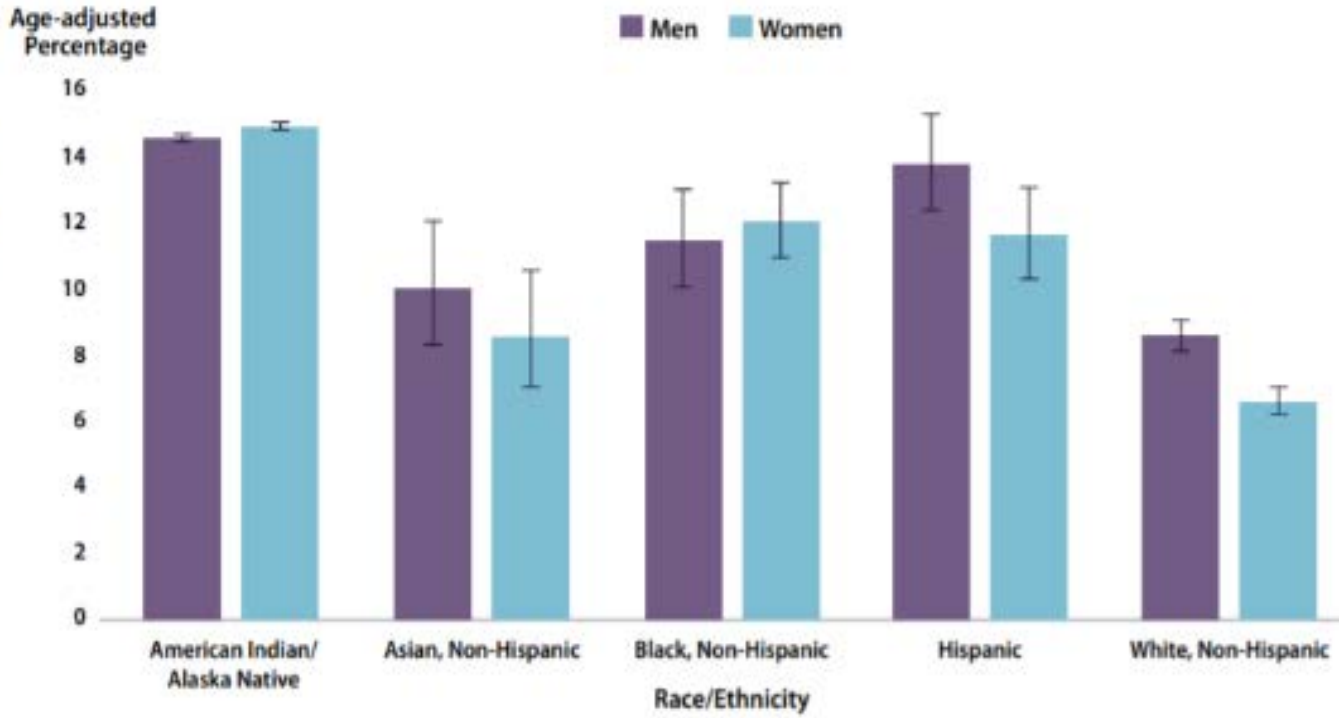
Racial Differences in DM Prevalence

- Health care team needs to assess the role of race in drug selection
- Prevalence of diagnosed diabetes was highest among American Indians/Alaska Natives (14.7%), people of Hispanic origin (12.5%), and non-Hispanic blacks (11.7%), followed by non-Hispanic Asians (9.2%) and non-Hispanic whites (7.5%)

Figure 2. Age-adjusted estimated prevalence of diagnosed diabetes by race/ethnicity group and sex for adults aged 18 years or older, United States, 2017–2018

Note: Error bars represent upper and lower bounds of the 95% confidence interval.

Data sources: 2017–2018 National Health Interview Survey; 2017 Indian Health Service National Data Warehouse (for American Indian/ Alaska Native group only).

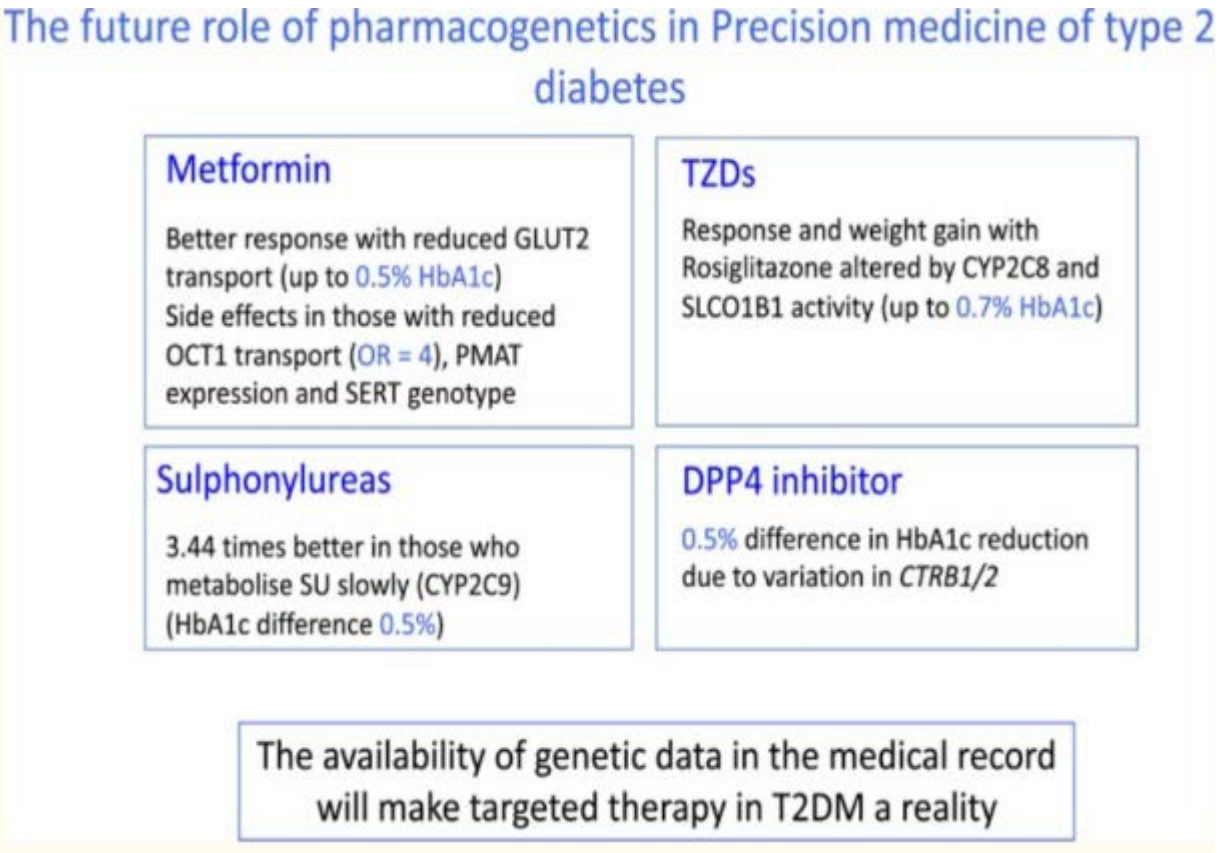


https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf

http://www.diabetesincontrol.com/ethnicity-plays-a-role-in-diabetes-drug-selection/

Role of RACE

- **Pharmacogenomics**
- Differences in DM drug disposition based on race and ethnicity
- Science is young but learning more each day



Clin Pharm Ther. 2019;106(2): 329-37.

Education

patients with low

HEALTH LITERACY...

Are more likely to visit an **EMERGENCY ROOM**

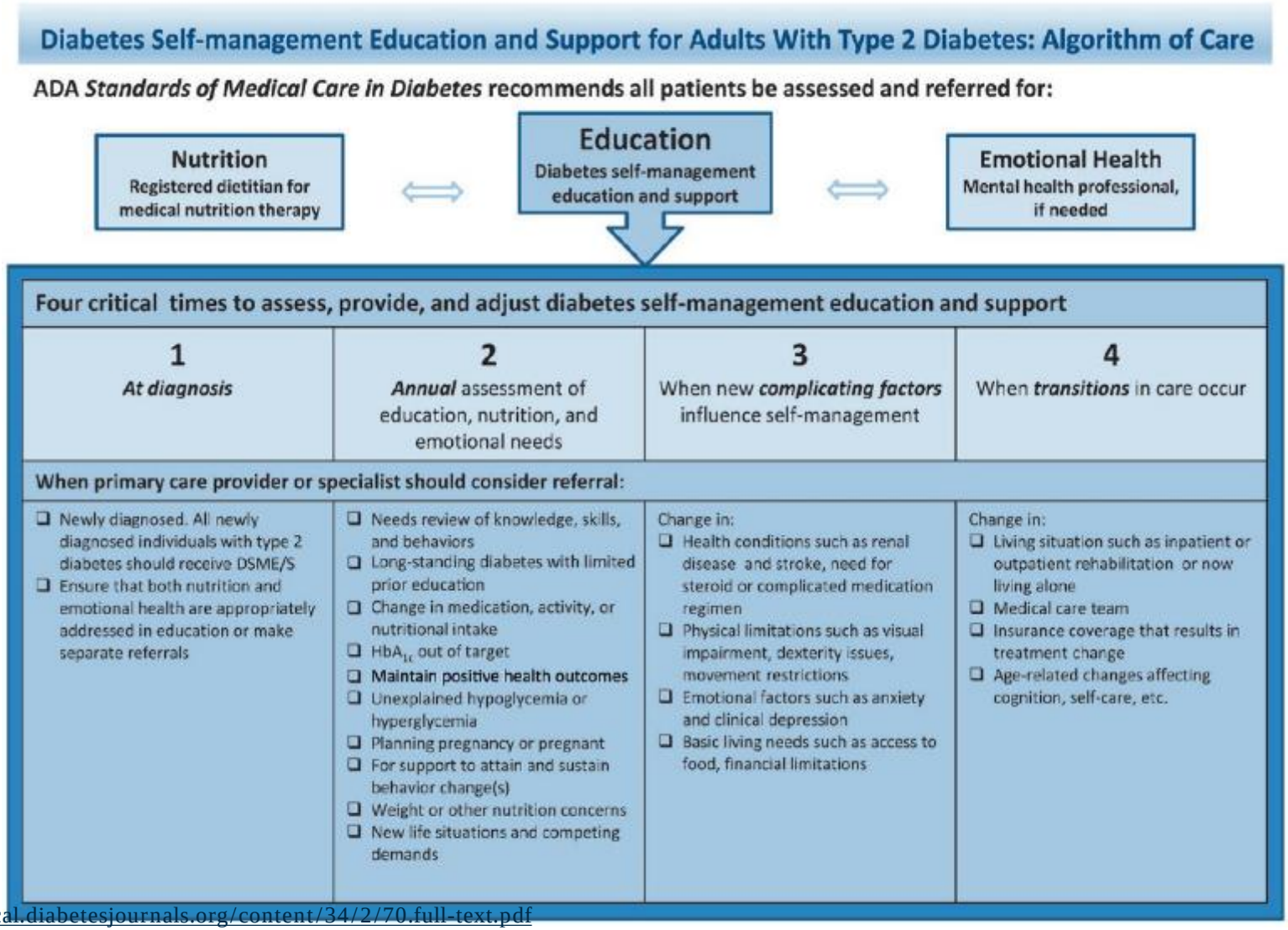
Have more **HOSPITAL STAYS**

Are less likely to follow **TREATMENT PLANS**

Have higher **MORTALITY RATES**

www.cdc.gov/phpr

Diabetes Self Management (DSM) Programs



https://clinical.diabetesjournals.org/content/34/2/70.full-text.pdf

Health Literacy

- The Pharmacist can help the health care team assess the patient's ability to:
  - Calculate medication dosing intervals and correction scales for insulin
  - Interpret medication instructions and food labels
  - Determining insulin-to- carbohydrate ratios
  - Deciphering charts (such as for growth and body mass index)
  - Weigh the risks and benefits needed to make informed decisions related to healthcare, such as appropriate A1C target ranges based on comorbidities and age

Diab Educator. 2004:30: 263-73

↑ Education = ↓ A1c

Follow this guide to organize information for the pill card.

Medicine	Important Information, in Simple Terms	Incorporating This Information into a Pill Card	Possible Graphics Used
Simvastatin 20mg	• Take 1 pill at night • For cholesterol	• Picture of one pill at night/bedtime (shown by moon)	• Night/bedtime
Furosemide 20mg	• Take 2 pills in the morning and 2 pills in the evening • For fluid	• Picture of two pills in the morning (shown by rising sun) and two pills in the evening (shown by setting sun)	• Morning • Evening
Insulin	• Inject 24 units before breakfast and 12 units before dinner • For diabetes (sugar)	• Picture of syringe in the morning (shown by rising sun) and evening (shown by setting sun). • Picture of bag of sugar	• Syringe • Sugar • Morning • Evening

Source: AHRQ Publication No. 08-M016. www.ahrq.gov/patients-consumers/diagnosis-treatment/treatments/pillcard/pillcard.pdf. 2008.

https://journals.lww.com/nursing/Fulltext/2017/01000/Improving_health_literacy_in_patients_with.9.aspx

Prediabetes

- An estimated 88 million adults aged 18 years or older had prediabetes in 2018.
- Yearly monitoring
- Assess vaccination status
- Diabetes Prevention Program

https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf;
https://www.cdc.gov/vaccines/hcp/adults/downloads/fs-diabetes-vaccines.pdf

Multidisciplinary and Multi-Pronged Approach

Risk factors targeted DM-related Complications

- Smoking: educate about smoking cessation
- Overweight/Obesity: choose weight neutral or weight loss antidiabetic agents, diet, exercise
- Physical inactivity: promote exercise
- Hemoglobin AIC: develop patient-specific goals depending on life-expectancy and patient's priorities
- High blood pressure: follow guidelines
- High cholesterol: follow guidelines

https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf

Food

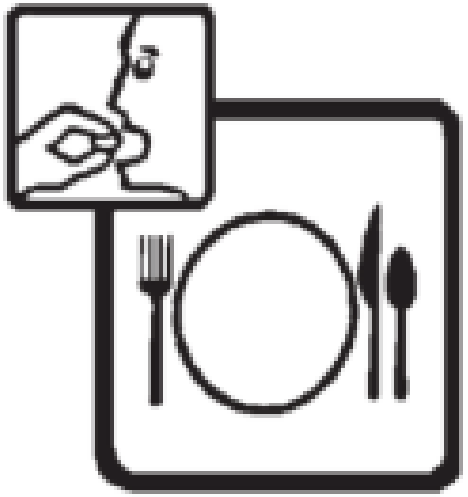
Food as Medicine

- Assist in the team approach to encourage healthy lifestyle, including eating habits
- Information available on CDC website on counting carbs and using the plate method to help with meal planning

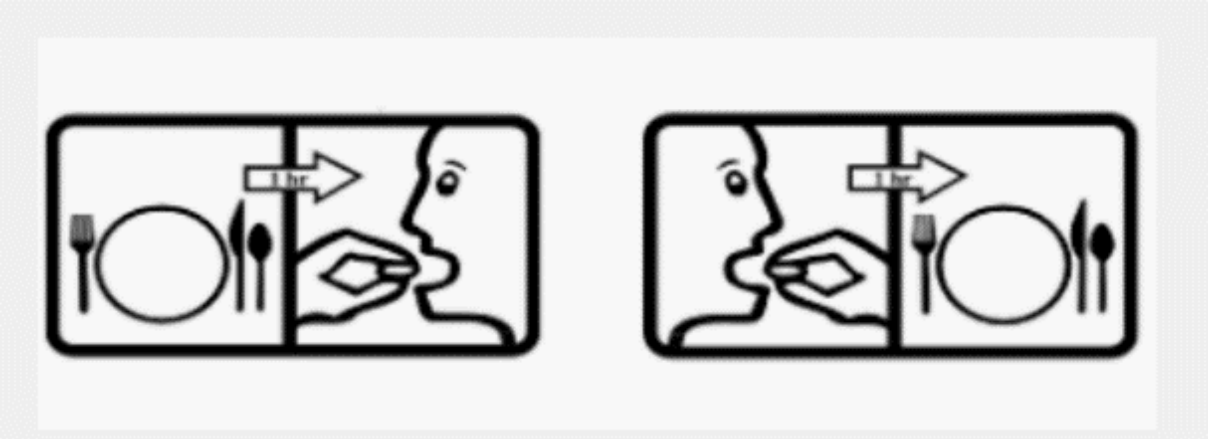
The importance of the pharmacist's expanding role on the diabetes team: reinforcing nutritional guidelines for improved glycemic control. Pharm Pract Manag Q. 1997 Oct;17(3):32-44

https://www.cdc.gov/diabetes/managing/eat-well/meal-plan-method.html

Timing of Medications



- Sulfonylureas: before meals
- Acarbose: with the first bite
- Metformin: with meals
- Repaglinide (Prandin®): before meals
- Nateglinide (Starlix®): before meals
- Adjusting medications for fasting states



BMJ Open Diabetes Research and Care. 2015;3: e000108, doi:10.1136/bmjdrc-2015-000108

To optimize insulin therapy, it is important to know how it should be administered with regards to meals

Table 1. Insulin Options to Manage Type 1 Diabetes

Insulin type	How it is delivered	Expiration date	Onset	Peak	Duration
Rapid Acting					
Admelog	Pens and vials	28 days	15-30 min	30 min-2 ½ hrs	4-5 hours
Afrezza inhaled powder	4, 8 and 12 unit Cartridges	3 days	3-7 min	12-15 min	1 ½-3 hours
Apidra	Vials and pens	28 days	10-20 min	30 min-1 ½ hrs	2-4 hours
Fiasp	Vials and pens	28 days	15-20 min	1 ½- 2 hours	5 hours
Humalog, U-100 and U-200	Vials, pens and cartridges refills	28 days	10-20 min	30 min-1/12 hrs	3-5 hours
Novolog	Vials, pens and cartridges refills	28 days	10-20 min	1-3 hours	3-5 hours
Short Acting **					
Regular	Vials and pens (varies by brand)	31-42 days	15-30 min	2 ½-5 hours	4-12 hrs
U-500 (5x the concentration)	Vials and pens	28 days	30 min	4-8 hours	18-24 hrs
Intermediate Acting **					
NPH (created in 1946)	Vials and pens (varies by brand)	31-42 days	1-2 hours	4-12 hours	14-24 hrs
Long Acting					
Basaglar	Vials and pens	28 days	3-4 hours	No peak +	11-24 hrs
Lantus	Vials and pens	28 days	3-4 hours	No peak +	11-24 hrs
Levemir	Vials and pens	42 days	3-4 hours	No peak +	6-23 hrs
Toujeo, U-300	Pen only	42 days	6 hours	No peak	24-36 hrs
Tresiba, U-100 and U-200	Pen only	56 days	1 hour	9 hours	36-42 hrs
Combination					
NPH/Regular 70/30	Vials and pens	31-42 day vial 10 day pen	30 min	50 min-2 hrs 6-10 hrs	18-24 hrs
Rapid acting 70/30	Vials and pens	28 day vial 14 d pen	15-30 min	1-4 hours	18-24 hrs
Rapid acting 75/25	Vials and pens	28 d vial 10 d pen	15-30 min	1-6 ½ hours	12-24 hrs
Rapid acting 50/50	Vials and pens	28 d vial 10 d pen	15-30 min		

** Both short- and intermediate-acting insulin can be purchased without a prescription at most pharmacies. This is a good option in an emergency; be sure to ask your healthcare provider what option is best. + May affect blood glucose the most ~8-10 hours after being taken.

https://www.endocrineweb.com/conditions/type-1-diabetes/type-1-diabetes-treatments

Timing of Insulins and Meals

Short-acting (regular) insulin	•Regular (Humulin R, Novolin R)	Onset	When to Take Insulin with Regards to Meals
Rapid-acting insulin	•Insulin glulisine (Apidra®) •Insulin lispro (Humalog®) •Insulin aspart (NovoLog®)	About 15 minutes	**Apidra®**: take within 15 minutes before or 20 minutes after starting a meal **Humalog®**: within 15 minutes of eating or right after meal **Novalog®**: eat within 5-10 minutes of taking dose
Fast-acting insulin	•Faster-acting insulin aspart (Fiasp®)	About 3 minutes	Take at beginning of the meal or within 20 minutes after starting a meal.
Short-acting (regular) insulin	•Regular (Humulin R®, Novolin R®)	About 30 minutes	**Humulin N®**: covers meals eaten within 30 minutes **Novolin R®**: wait 30 minutes after insulin to eat a meal

Food-Drug Interactions

- Pharmacists can educate patients and work with dieticians to avoid FDIs
- Grapefruit juice: repagalinide, saxagliptin (no dosage adjustment)
- B12 deficiency: metformin
- Alcohol: cause hypoglycemia or hyperglycemia, flushing reaction if on sulfonylureas

Natural Products

- Patients with DM are 1.6 times more likely to use alternatives to traditional medicine compared to those without DM
- Pharmacists can help shift through the 'hype'
  - Chromium: can interfere with thyroid meds
  - Zinc: can interact with fluroquinolones

JAPhA. 2014;5 (Supplement 4): e304-e321 Hannon. Nutrition and Diabetes. 2020:10:14-

Community and Social Context

Resources available at https://www.mhanational.org/mental-health-month

https://www.diabeteseducator.org/practice/practice-tools/diabetes-management-tools/mental-health-and-diabetes

Effect of Psychotropics on DM

- Important areas for consideration:
  - Metabolic Profile:
    - -- Weight Gain
    - -- Lipids
  - Adherence Issues

Drug-induced hyperglycaemia and diabetes: pharmacogenomics perspectives. Arch Pharm Res. 2018 Jul;41(7):725-736. doi: 10.1007/s12272-018-1039-x. Epub 2018 Jun 1

https://www.uspharmacist.com/article/diabetes-and-the-psychiatric-patient

Effect of Psychotropics on DM

Table 1. Psychotropic Medications Associated With WG

Class	Medication	Potential WG/Year (lb.)
Antipsychotics, atypical	Clozapine, olanzapine	>15
	Quetiapine, risperidone	6-10
	Paliperidone	1-5
	Aripiprazole, ziprasidone	0
Antipsychotics, conventional	Thioridazine	6-10
	Fluphenazine, haloperidol, perphenazine	1-5
	Molindone	0-5
Antidepressants, SSRIs	Paroxetine	1-5
	Fluoxetine	0-5
	Citalopram, escitalopram, fluvoxamine, sertraline	0
Antidepressants, TCAs	Amitriptyline, doxepin, imipramine	6-10
	Desipramine, nortriptyline, protriptyline	1-5
Antidepressants, SNRIs	Duloxetine, venlafaxine	0
Antidepressants, MAOIs	Phenelzine, tranylcypromine	6-10
	Selegiline	0
Antidepressants, miscellaneous	Mirtazapine	6-10
	Bupropion	0-5
	Nefazodone, trazodone	0
Mood stabilizers	Lithium, valproate	11-15
	Gabapentin	6-10
	Carbamazepine	1-5
	Topiramate	0-5
	Lamotrigine, oxcarbazepine	0
Stimulants	Amphetamine, atomoxetine, methylphenidate	0-5
	Modafinil	0
Sedative-hypnotics	Benzodiazepines, buspirone, diphenhydramine, hydroxyzine, zolpidem	0

MAOI: monoamine oxidase inhibitor; SNRI: serotonin–norepinephrine reuptake inhibitor; SSRI: selective serotonin reuptake inhibitor; TCA: tricyclic antidepressant; WG: weight gain. Source: Reference 30.

- Assess the patient's risk for weight gain that can lead to metabolic complications in DM for psychotropics such as:
  - Antipsychotics
  - Antidepressants
  - Mood stabilizers
  - Stimulants

BAP Guidelines on Wt Gain, Metabolic Disturbances and CV Risk Associated with Psychosis and AP Drug Treatment. J Psychopharmacol. 2016;30:717-48.

Effect of Psychotropics on DM

Table 2. Preventing and Treating Antipsychotic-Associated AEs on Glucose–Insulin Homeostasis and LM

Direct AEs	
GC or LA concerns in pts with pre-existing DM or HLD	Choose CA or AA with no or few known effects on glucose–insulin homeostasis, LM
GC or LA in pts starting/already on clozapine, olanzapine, or structurally related agents	Monitor weight, fasting BG, and fasting serum insulin and lipid concentrations before initiation and at regular intervals
GC or LA in pts who develop HI and/or HLD while on clozapine, olanzapine, or structurally related agents	Switch to agent with no/few known metabolic AEs; if cannot switch, use lowest dose possible, monitor closely, and start appropriate therapy if needed (e.g., lipid-lowering drugs)
GC or LA in pts who develop DM while on clozapine, olanzapine, or structurally related agents	Switch to agent with little/no propensity to affect BG; if cannot switch, use lowest dose possible, monitor closely, and start appropriate therapy if needed (e.g., oral hypoglycemics, insulin)
DKA or coma: for prevention of serious diabetic state during antipsychotic therapy	Recognize and treat signs of DM; monitor closely for drowsiness, dehydration, overbreathing, acetone on breath, or HoTN
Indirect AEs	
Excessive WG: pts already on/starting antipsychotic with high or intermediate likelihood of WG or pts already overweight/obese	Monitor weight, switch to agent less likely to cause WG, decrease dose, adjust diet, have pt undergo WR or physical training
Smokers	Encourage pt to stop smoking, increase physical activity
Sedation as AE	Recognize and manage antipsychotic-related daytime sedation to minimize negative effect on physical activity
Older pts, pts with FH of DM/established DM or pts with high genetic susceptibility to type 2 DM	Monitor closely for development of IR and overt DM

AA: atypical antipsychotic; AE: adverse effect; BG: blood glucose; CA: conventional antipsychotic; DM: diabetes mellitus; DKA: diabetic ketoacidosis; FH: family history; GC: glycemic control; HI: hyperinsulinemia; HLD: hyperlipidemia; HoTN: hypotension; IR: insulin resistance; LA: lipid abnormality; LM: lipid metabolism; pt: patient; WG: weight gain; WR: weight reduction.
Source: Reference 41.

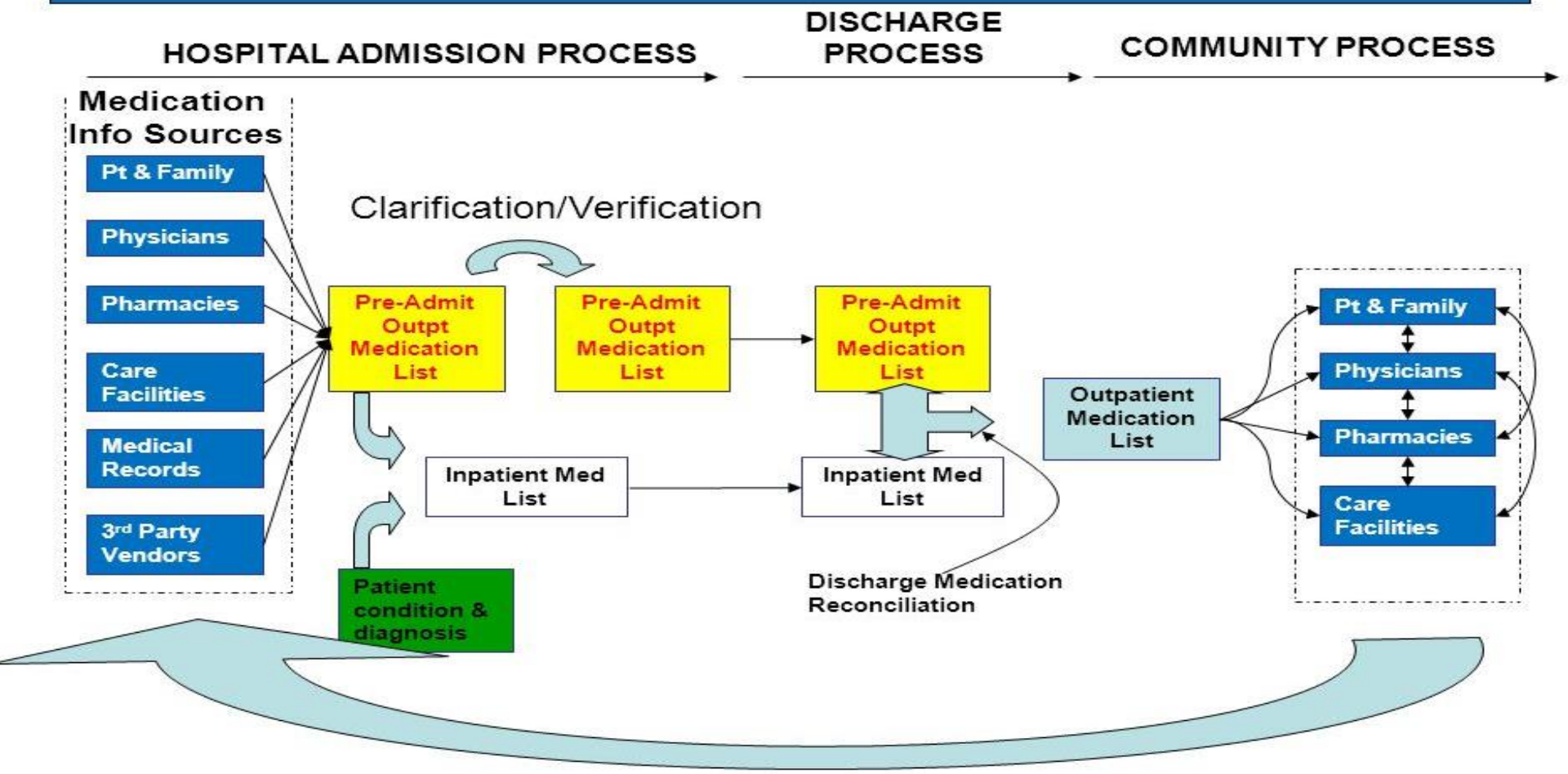
https://www.uspharmacist.com/article/diabetes-and-the-psychiatric-patient

Proactive Screening

- Assist in referrals for depression evaluation
  - Pharmacist screening for depression among patients with diabetes in an urban primary care setting. ***J Am Pharm Assoc. 2008;48: 518-21.***
  - Depression and diabetes: establishing the pharmacist's role in detecting comorbidity in pregnant women. ***J Am Pharm Assoc. 2010;50: 195-9.***
- Assist in monitoring metabolic effects of psychotropics
  - Development and pharmacist-mediated use of tools for monitoring atypical antipsychotic-induced side effects related to blood glucose levels. ***Pharmacoepidemiol Drug Saf. 2018;27: 1379-84.***

Health Care Systems

Medication Reconciliation: Not So Simple!



https://slideplayer.com/slide/1608483/

Continuity of Care

- Ineffective transitions of care- pitfalls to avoid:
  - Communication breakdown
  - Patient education breakdown
  - Accountability breakdown
- Pharmacists can help the team navigate TOC and avoid these pitfalls

https://www.jointcommission.org/-/media/deprecated-unorganized/imported-assets/tjc/system-folders/topics-library/hot_topics_transitions_of_carepdf.pdf?db=web&hash=CEFB254D5EC36E4FFE30ABB20A5550E0

Pharmacist-Led DM Clinics

- Costs and effectiveness of pharmacist-led group medical visits for type 2-diabetes: a multi-center randomized controlled trial. ***PLOS One. 4/18/18***
- Evaluation of a pharmacist-managed diabetes program in a primary care setting within an integrated health care system. ***J Manag Care Spec Pharm. 2018;24:114-22.***
- Economic evaluations of pharmacist-managed services in people with diabetes mellitus: a systematic review. ***Diab Med. 2016;33: 421-7.***
- Development and clinical outcomes of pharmacist-managed diabetes care clinics. ***Am J Health-Syst Pharm. 2006;63: 1325-31.***
- Implementation of a pharmacist-led multidisciplinary diabetes management team. ***Am J Health-Syst Pharm. 2012;69: 1240-5.***

- ***The Bottom Line: Pharmacist involvement in the management of DM improves patient care.***

Drug Use Reviews Using EHR

- An audit of prescribing for type 2 diabetes in primary care: optimizing the role of the community pharmacist in the primary healthcare team. ***Prim Health Care Res Develop. 2013;14: 315-9.***
- Retrospective review of exceptions for angiotensin-converting enzyme inhibitor or angiotensin II receptor blocker recommendations for a diabetic Medicare population. ***J Manag Care Spec Pharm. 2019;25: 358-65.***
- Influence of pharmacist intervention on prescribing of angiotensin-converting enzyme inhibitors, angiotensin II-receptor blockers, and aspirin for diabetic patients. ***Am J Health-Syst Pharm. 2010. 67: 290-4.***

Drug Regimen Review

- Thorough evaluation of the medication regimen of a resident, with the goal of promoting positive outcomes and minimizing adverse consequences and potential risks associated with medication.
- Includes review of the medical record in order to prevent, identify, report, and resolve medication-related problems, medication errors, or other irregularities
- Involves collaborating with other members of the IDT, including the resident, their family, and/or resident representative
- Clinical Pharmacist can interface with Consultant Pharmacist and IDT as well as Post-Acute Care follow-up

CMS
CENTERS FOR MEDICARE & MEDICAID SERVICES

State Operations Manual
Appendix PP - Guidance to Surveyors for Long Term Care Facilities
Table of Contents

(Rev. 173, 11-22-17)

https://www.cms.gov/Regulations-and-Guidance/Guidance/Manuals/downloads/som107ap_pp_guidelines_ltcf.pdf

Deprescribing Too Much of a Good Thing

Organization	Medication-Recommendation
AMDA (American Medical Directors Association)/ The Society for Post-Acute Long term Care Medicine	Don't use sliding scale insulin (SSI) for long-term diabetes management for individuals residing in the nursing home.
American Geriatrics Society	Avoid using medications other than metformin to achieve hemoglobin A1c<7.5% in most older adults; moderate control is generally better.
American Society of Nephrology	Avoid nonsteroidal anti-inflammatory drugs (NSAIDS) in individuals with hypertension or heart failure or CKD of all causes, including diabetes.

Choosing Wisely®
An initiative of the ABIM Foundation

https://www.choosingwisely.org/

Age & Disability-Friendly DM Devices

- With so many different medication administration options, the Pharmacist can work with the team and the patient to find the one that the patient is most comfortable with and which is covered by insurance.

- Digital Health

https://www.diabeteseducator.org/docs/default-source/legacy-docs/_resources/pdf/research/aade_meded.pdf?sfvrsn=2

Consult Pharm. 2016;31(5): 240-50.
http://main.diabetes.org/dforg/pdfs/2018/2018-cg-injection-aids.pdf

SUMMING IT ALL UP

- **The Clinical Pharmacist is an "Essential Part" of the Diabetes Management Team**
  - **Drug Therapy based on Comorbidities, Complications, Concomitant Medications, Pharmacogenomics, Cost, Social Determinant of Health factor**
- **Principles of rational Diabetes Pharmacotherapy should be incorporated in all patients' drug regimens in order to optimize treatment**

Questions?


THANK YOU

Contact US

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