

Standards and Challenges of Diabetes Self-Management

Sara Sedaghat, MD

Deputy of diabetes academy and advocacy

Tara Sedaghat, Psychologist

Senior Diabetes Educator



International
Diabetes
Federation
Member



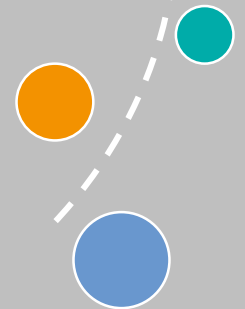
Gabric Diabetes Education Association
Renovating Diabetes Education

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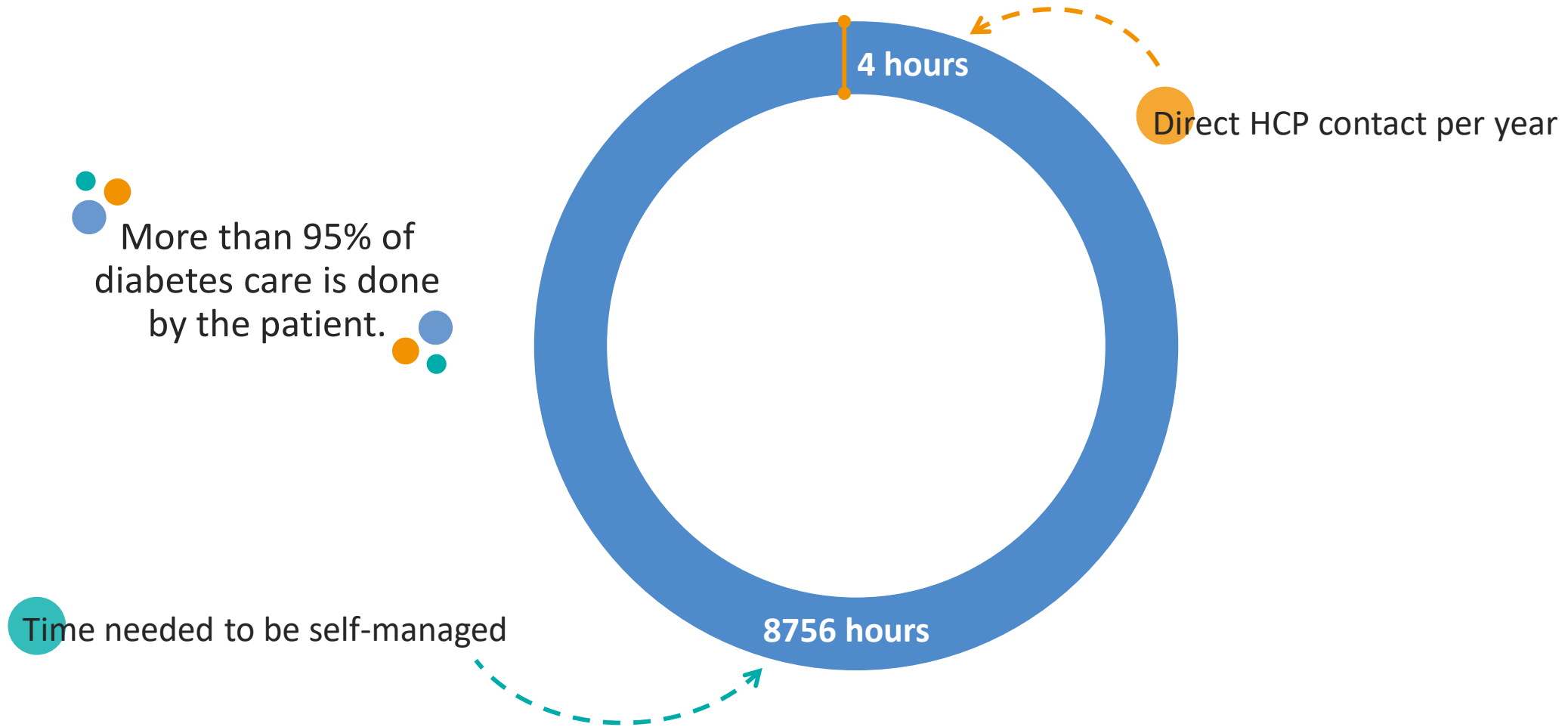
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Presentation Outline

- Standards of Diabetes Self-Management and Support:
 - History of Diabetes Self-management
 - Patient-centered DSME
 - Gabric Diabetes School
- The Role of Blood Glucose Monitoring in Diabetes management:
 - Glucose Monitoring in DM
 - Guideline Review
 - National Iranian Consensus
- Techniques and Challenges of Insulin Injection:
 - Psychological Challenges of Injections
 - Storage of Insulin
 - Needle Length
 - Insulin Injection Technique
 - Injectable Therapies



Each patient has a doctor inside them!



More time is needed!

TABLE 1. CDE Estimation of Time Needed for Self-Care Activities for an Adult With Established Type 2 Diabetes on Oral Medications and Performing SMBG Twice Daily

ADA-Recommended Task	Time Needed \pm SD (minutes)
SMBG	11 \pm 26
Recordkeeping (e.g., fasting serum glucose and blood pressure)	9 \pm 13
Taking medications	8 \pm 9
Foot care	7 \pm 5
Oral care	18 \pm 21
Problem-solving	20 \pm 21
Obtaining supplies	21 \pm 19
Meal planning	21 \pm 18
Shopping for food	23 \pm 24
Preparing meals	54 \pm 32
Exercise	32 \pm 17
Stress management	16 \pm 19
Support/support groups	13 \pm 19
Scheduling medical appointments	9 \pm 13

TABLE 2. CDE Estimation of Time Needed for Self-Care Activities for a Child (and Family) With Established Type 1 Diabetes on Basal-Bolus Insulin Therapy (Four Shots/Day) and Performing SMBG Four Times Daily

ADA-Recommended Task	Time Needed \pm SD (minutes)
SMBG	17 \pm 12
Recordkeeping (e.g., fasting serum glucose and blood pressure)	16 \pm 18
Insulin drawing and administering	16 \pm 12
	4 \pm 4
	7 \pm 5
	18 \pm 21
	20 \pm 21
	21 \pm 19
Preparing meals	60 \pm 265
Exercise/extracurricular activities	53 \pm 31
Meal planning for school	13 \pm 11
Medications for school	11 \pm 11
Parental visits to school for problems (hypoglycemia/hyperglycemia)	15 \pm 21
Support/support groups	14 \pm 21
Obtaining supplies	11 \pm 16
Scheduling medical appointments	9 \pm 15

The total estimated time needed daily for recommended diabetes self-care: ~4 hours for adults and >5 hours for children

Extra decisions, Extra burden!



T1DM: 180 extra
decisions every day, on
average



Key clinical Benefits of DSMES

2020 DSMES
CONSENSUS REPORT

Diabetes Care Volume 43, July 2020



Diabetes Self-management Education and Support in Adults With Type 2 Diabetes: A Consensus Report of the American Diabetes Association, the Association of Diabetes Care & Education Specialists, the Academy of Nutrition and Dietetics, the American Academy of Family Physicians, the American Academy of PAs, the American Association of Nurse Practitioners, and the American Pharmacists Association

Diabetes Care 2020;43:1636–1649 | <https://doi.org/10.2337/dci20-0023>

Diabetes is a complex and challenging disease that requires daily self-management decisions made by the person with diabetes. Diabetes self-management education and support (DSMES) addresses the comprehensive blend of clinical, educational, psychosocial, and behavioral aspects of care needed for daily self-management and provides the foundation to help all people with diabetes navigate their daily self-care with confidence and improved outcomes (1,2).

The prevalence of diagnosed diabetes is projected to increase in the U.S. from 22.3 million (9.1% of the total population) in 2014, to 39.7 million (13%) in 2030, and to 60.6 million (17%) in 2080 (3). Approximately 90–95% of those with diabetes have type 2 diabetes (4). Diabetes is an expensive disease, and the medical costs of health care alone for a person with diabetes are 2.3 times more than for a person without diabetes (5). Confounding the diabetes epidemic and high costs, therapeutic targets are not being met (6). There is a lack of improvement in reaching clinical target goals since 2005 despite advancements in medication and technology treatment modalities. Indeed, between 2010 and 2016 improved outcomes stalled or reversed (6).

The goals of this Consensus Report are to improve clinical care and education services, to improve the health of individuals and populations, and to reduce diabetes-associated per capita health care costs (1,7). This article is specifically directed toward health care providers (physicians, nurse practitioners, physician assistants [PAs]), referred to herein as providers, as it outlines the benefits of DSMES, defines four critical times to provide and modify DSMES (see Fig. 1), proposes how to locate DSMES-related resources, and discusses potential solutions to access and utilization barriers. This report provides guidance to others as well; health systems and organizations can use this report to anticipate and address the needs of persons with diabetes and create

Margaret A. Powers,¹ Joan K. Bardley,² Marjorie Cypress,³ Martha M. Funnell,⁴ Dixie Harms,⁵ Amy Hess-Fischl,⁶ Beulette Hooks,⁷ Diana Isaacs,⁸ Ellen D. Mandel,⁹ Melinda D. Maryniuk,¹⁰ Anna Norton,¹¹ Joanne Rinke,¹² Linda M. Siminerio,¹³ and Sacha Uelmen¹⁴

¹HealthPartners, Bloomington, MN

²MedStar Health Research Institute, MedStar Diabetes Institute, and MedStar Health System Nursing, Hartsville, MD

³Independent consultant, Albuquerque, NM

⁴University of Michigan Medical School, Ann Arbor, MI

⁵MercyOne Olive Internal Medicine, Olive, IA

⁶Section of Adult and Pediatric Endocrinology, Diabetes, and Metabolism, University of Chicago, Chicago, IL

⁷Martin Army Community Hospital, Fort Benning, GA

⁸Cleveland Clinic Diabetes Center, Cleveland, OH

⁹Johnson & Wales University, Providence, RI

¹⁰Maryniuk & Associates, Boston, MA

¹¹Diabetes Sisters, Chicago, IL

¹²Association of Diabetes Care & Education Specialists, Chicago, IL

¹³University of Pittsburgh, Pittsburgh, PA

Corresponding author: Margaret A. Powers, margaret.powers@parknicollet.com

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Additional resources are available at <http://www.diabeteseducator.org/consensusreport>.

This article is featured in a podcast available at <https://www.diabetesjournals.org/contents/diabetes-care-update-podcasts>.

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- Average A1C reduction of 0.45–0.57% when compared with usual care for people with T2D treated with a variety of modalities (lifestyle alone, oral and injected medication)
- Reduction in the onset and/or worsening of diabetes-related complications
- Reduction of all-cause mortality

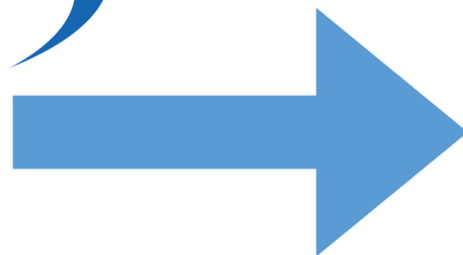


Patient-centered DSME



ADCES7 SELF-CARE BEHAVIORS™

- PROBLEM SOLVING**
- REDUCING RISKS**
- MONITORING**
- TAKING MEDICATION**
- HEALTHY EATING**
- HEALTHY COPING**
- BEING ACTIVE**



Case



65 y/o women

Diabetes duration: 5 years

Dyslipidemia: 15 years

PMHx:

Grade I fatty liver

Diabetic retinopathy: PDR

Rising HbA1c through
last 6 months

FBS: 200 mg/dL

HbA1c: 8.8%

Total Chol: 220 mg/dL

TG: 400 mg/dL

LDL: 100 mg/dL

HDL: 40 mg/dL

Cr: 1.1 mg/dL (eGFR: 54.5 mL/min/1.73m²)

AST: 34 U/L

ALT: 30 U/L



Laboratory Analysis



Daily Medications:

- Glargine U300
- Empa/Met 5/500 mg BID
- Atorvastatin 20 mg Daily
- Aspirin 80 mg Daily
- Losartan 50 mg
- Amlodipine 5 mg



P/E:

Office BP: 150/90 mm/Hg

BMI: 26 kg/m²

Lower Extremity: ++ non pitting edema

case



65 y/o women

Diabetes duration: 5 years T2DM

Dyslipidemia: 15 years

PMHx:

Grade I fatty liver

Diabetic retinopathy: PDR

FBS: 200 mg/dL

HbA_{1c}: 8.8%

Total Chol: 220 mg/dL

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HDL: 40 mg/dL

Cr: 1.1 mg/dL (eGFR: 54.5 mL/min/1.73m²)

AST: 34 U/L

ALT: 30 U/L

Laboratory Analysis



Last 6
mon

- HbA_{1c}: 8%
- Glargine U300 up-titration

Last 3
mon

- HbA_{1c}: 8.5%
- Adding Empa/Met 5/500 mg BID

Current
visit

- HbA_{1c}: 8.8%
- Recommendation?

checkpoint

این شوخی نیست . منظورم این است که اگر به زودی این کار را نکنید دچار مشکل بزرگی می شوید.

شما باید هرچه زودتر به فکر خودتون باشید و پیگیری جدی داشته باشید! تا خودتون نخواهید اوضاع همینه!

ای وان سی شما خوب نیست و باید با رعایت تغذیه و مصرف منظم انسولین موضوع شرایط را خوب کنید.

حقیقتاً تقصیر شما نیست و اشکالی نداره!

نگران عوارض نباش، اتفاقی نمی افتد.



Ineffective communication



Core Communication Skills



Asking

- develop an understanding of patients' problems and perspectives by using open-ended questions

Listening

- understand patients' experiences, feelings, and meanings correctly by using reflection

Informing

- conveying knowledge about a condition or medical treatment or even share the results

Effective asking

Effective asking

- What special problems have you experienced in relation to diabetes management?
- What is the hardest part of managing diabetes for you?
- What is your opinion about.... (negative behavior and negative result)?
- What is your most important concern about this situation?

Answers heard from the individual

- The food that is recommended for me to eat is small, that's why I am always hungry and I eat a lot also recently my wife passed away and I don't cook anymore because I am alone.
- I am worried that retinopathy will progress and surgery will be needed.
- I inject insulin, but I think my injection is not correct because sometimes it hurts a lot.
- I don't take the glucose test regularly because the cost of the test strip and the needle is high.

Accurate
Empathy



Affirmations



Reflecting

Listening and empathy

Listening by Reflecting

- From what I understand...
- So you feel that
- It sounds like... Have I understood what you mean?
- what I hear you saying
- You want
- On the one hand you feel that and on the other hand
- you mean that
- You feel because you think

Affirm Patients' Strengths and Past Efforts

- What challenges of diabetes management were you able to solve?
- Which part of diabetes management is easier for you?
- What strengths of yours can solve this challenge?
- Do you have a similar experience in the past?

Accurate
Empathy



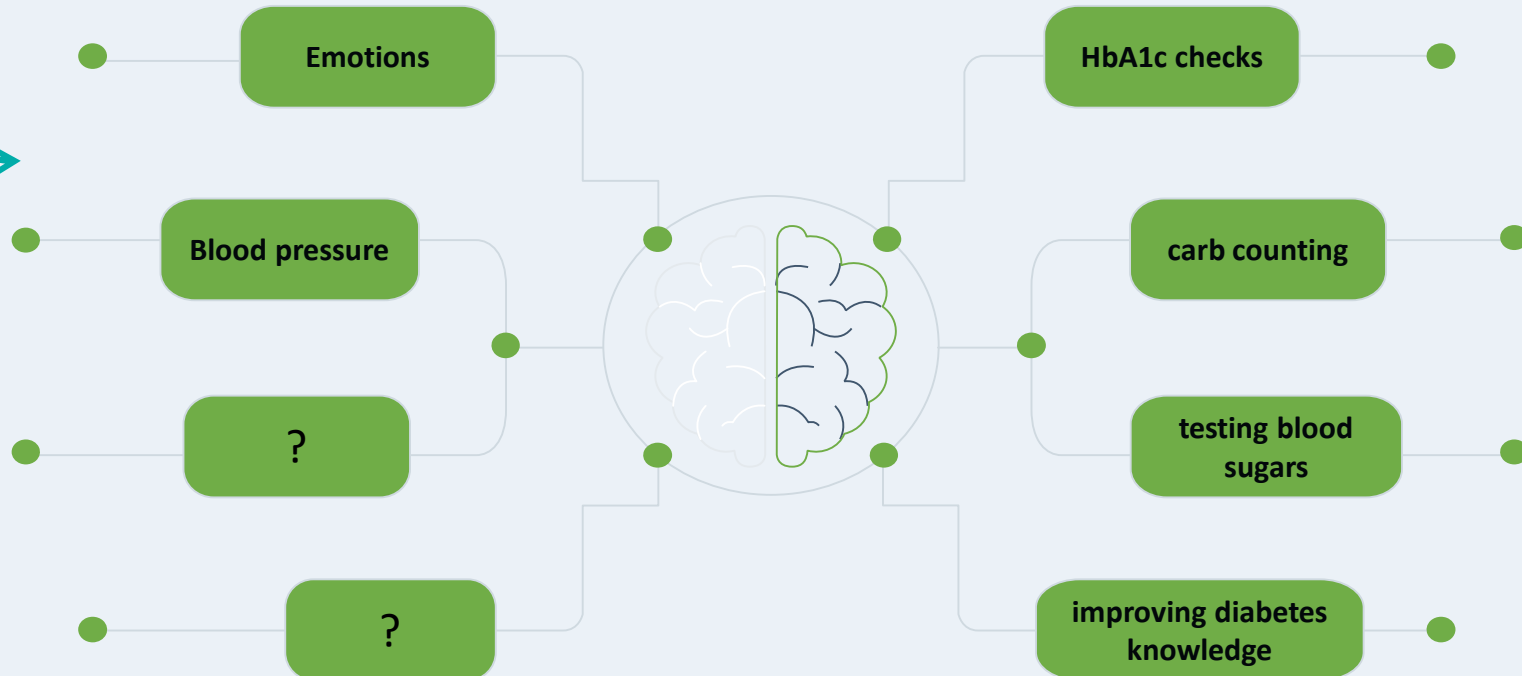
Affirmations



Reflecting

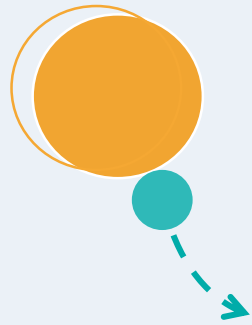
Informing

conveying knowledge about a condition or medical treatment or even share the results



use clear simple language and allow for joint exploration and discussions

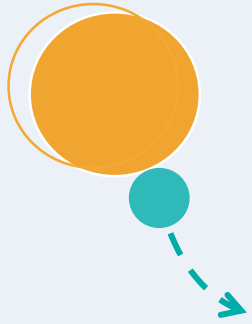
Agreed actions



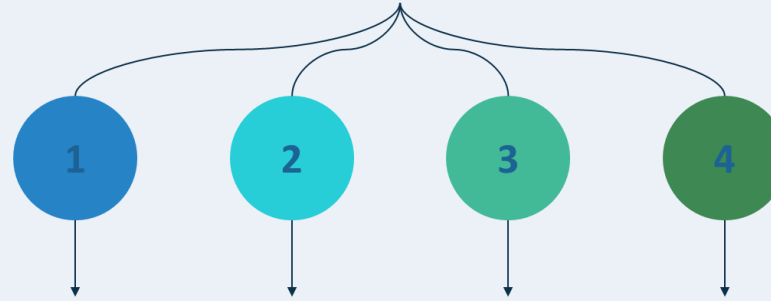
Work together

- **What's the most important area of your diabetes to start working on?**
- **What part of your diabetes would it be easiest to try changing?**
- **Have you got any ideas about how to improve the way you're feeling?**
- **What would you like to change by the end of the year?**

Agreed actions



GOALS



Work together

- **if you agree a goal ask them if they see any barriers to achieving this!**
- **Ask them to write their goal down.**

Effective communication

در این چند وقت چه مشکل خاصی در رابطه با مدیریت دیابت را تجربه کردی؟ نظرت راجع به نتیجه ای وان سی که افزایش یافته چیست؟

اینطور که متوجه شدم توجه به از دست دادن همسرتون شرایط سختی را تجربه میکنید و باعث شده انرژی مراقبت از خودتون نداشته باشید و در عین حال مشکلاتی را راجع به تزریق انسولین و رعایت تغذیه دارید و نگران پیشرفت عوارض هستید.

اگر موافق باشی میتونیم در مورد تکنیک ها تزریق انسولین و روش ها که به بهبود تغذیه تون میشه صحبت کنیم.

Asking

Listening

Informing



Communication Is The Key!

**Reviewing
Injection Tech**



**Resistance and concerns
for complications and
lifestyle modifications**

**Social Determinant of
Health**

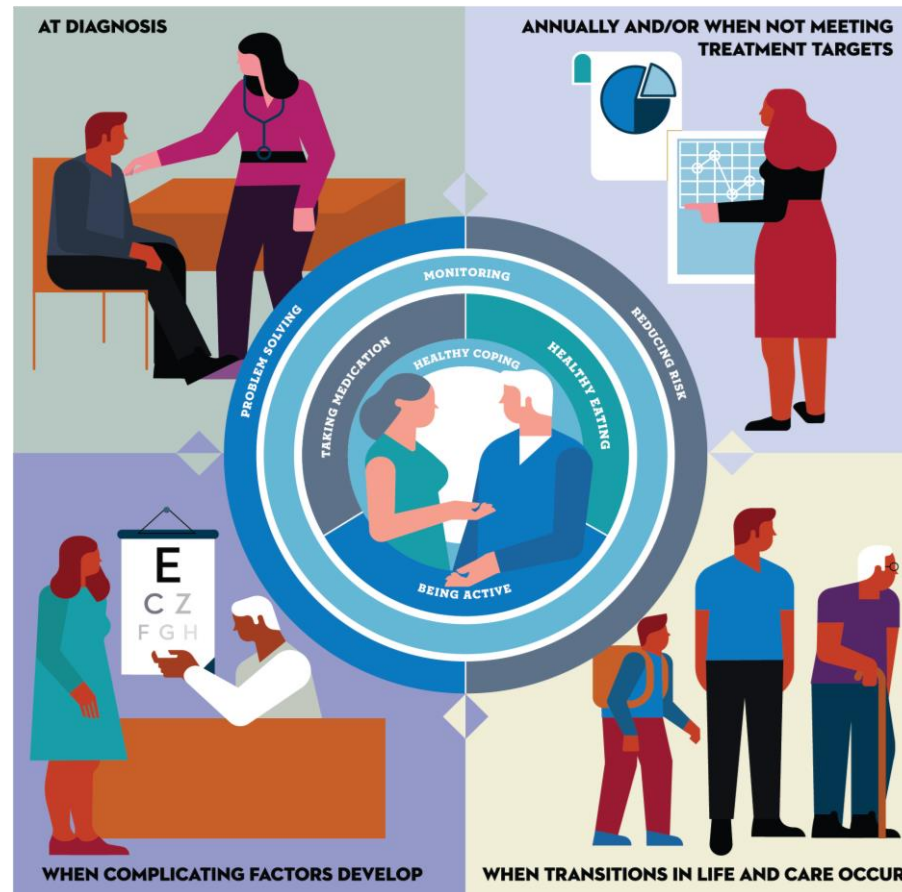
Patient Communication Toolbox

What's inside our toolbox ?

- Communication skills
- Your knowledge
- DSMES referral



Four Critical Times to Provide and Modify DSMES



DSMES Consensus Report Recommendations

DSMES Improves Health Outcomes, Quality of Life, and Is Cost Effective, and People With Diabetes Deserve the Right to DSMES Services. Therefore, It Is Recommended That:

Providers:

1. Discuss with all persons with diabetes the benefits and value of initial and ongoing DSMES.
2. Initiate referral to and facilitate participation in DSMES at the 4 critical times: (1) at diagnosis, (2) annually and/or when not meeting treatment targets, (3) when complicating factors develop, and (4) when transitions in life and care occur.
3. Ensure coordination of the medical nutrition therapy plan with the overall management strategy, including the DSMES plan, medications, and physical activity on an ongoing basis.
4. Identify and address barriers affecting participation with DSMES services following referral.

Health policy, payers, health systems, providers, and health care teams:

5. Expand awareness, access, and utilization of innovative and nontraditional DSMES services.
6. Identify and address barriers influencing providers' referrals to DSMES services.
7. Facilitate reimbursement processes and other means of financial support in consideration of cost savings related to the benefits of DSMES services.

Summary of DSMES Benefits to Discuss with People with Diabetes

- Provides critical education and support for implementing treatment plan
- Reduces hypoglycemia
- Addresses weight maintenance or loss
- Enhances self-efficacy and empowerment
- Increases healthy coping
- Decreases diabetes-related distress
- Promotes lifestyle behaviors including healthful meal planning and engagement in regular physical activity
- Improves quality of life
- Reduces all-cause mortality
- Reduces emergency department visits, hospital admission, and hospital readmission
- Lowers A1C

No negative side effects

Medicare / most insurers covers costs

If DSMES were a pill, would you prescribe it?



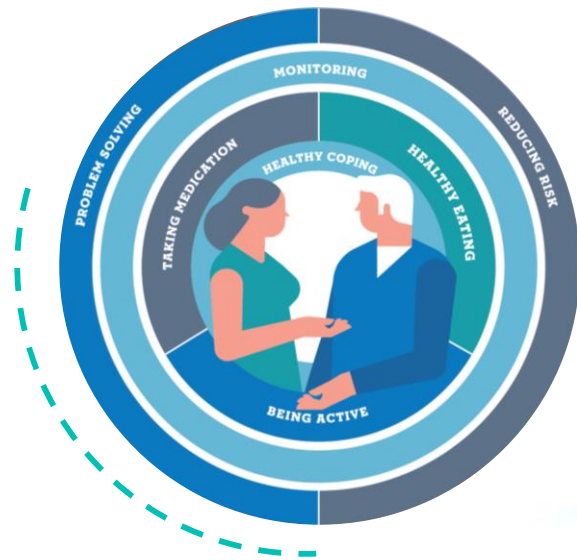
Comparing the benefits of DSMES/MNT vs metformin therapy

CRITERIA	Benefits rating	
	DSMES/MNT	METFORMIN
Efficacy	High	High
Hypoglycemia risk	Low	Low
Weight	Neutral/Loss	Neutral/Loss
Side effects	None	Gastrointestinal
Cost	Low/Savings	Low
Psychosocial benefits*	High	N/A

N/A, not applicable. *Psychosocial benefits include *improvements to* quality of life, self-efficacy, empowerment, healthy coping, knowledge, self-care behaviors, meal planning, healthier food choices, more activity, use of glucose monitoring, lower blood pressure and lipids and *reductions in* problems in managing diabetes, diabetes distress, and the risk of long-term complications (and prevention of acute complications).



Low Utilization of DSME despite its proven benefits is a Global Challenge!



Li, Shrestha et al. 2014

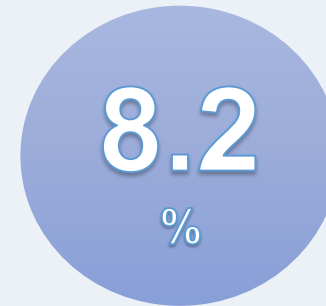
Low Utilization of DSMES



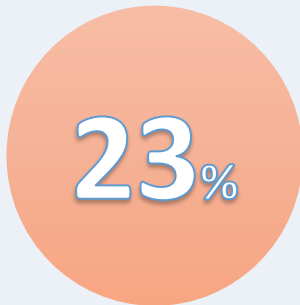
Of **MEDICARE** beneficiaries with newly diagnosed diabetes used DSMT services¹



Of individuals with newly diagnosed T2D with **PRIVATE HEALTH** insurance received DSMES within 12 months of diagnosis²



UK: of patients with T2DM attended DSME.



Iran:

Phase 2 analysis from nationwide diabetes report of National Program for Prevention and Control of Diabetes (NPPCD-2018)

The prevalence of patients who received education for nutrition therapy or diabetes self-management was 16.3% and 23.3% respectively.

Li R, et al. Morbidity Mortality Weekly Report, 2014
Strawbridge LM, et al. Health Educator, 2015
Li, Shrestha et al. 2014
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Gabric Diabetes School: What we have learned



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Eastern Mediterranean Health Journal | Past issues | Volume 24, 2018 | Volume 24, issue 1 | GABRIC Diabetes School: an innovative education centre for people with diabetes

Report

EMHJ – Vol. 24 No. 1 – 2018

GABRIC Diabetes School: an innovative education centre for people with diabetes

Alireza Esteghamati¹, Farhad Hosseinpanah², Seyed Adel Jahed³, Hadi Harati³, Mohammad Taghi Cheraghchi Bashi Astaneh³, Hormoz Kaykhanzadeh³ and Sara Sedaghat³

¹Endocrinology and Metabolism Research Center, Vali-Asr Hospital School of Medicine, Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran ²Obesity research center, Research institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Islamic Republic of Iran ³Gabric Diabetes Education Association, Tehran, Islamic Republic of Iran (Correspondence to: Sara Sedaghat: s.sedaghat@gabric.ir).

Abstract

Diabetes prevalence and deaths attributable to diabetes continue to rise across globally. Diabetes Self-Management Education and Support (DSME/S) is a critical resource designed to help people with diabetes (PWD) successfully self-manage their disease; however, its utilization is too low. In the Islamic Republic of Iran, there are currently limited structured educational programmes and no national standards for DSME/S protocol. In response to this, the GABRIC Diabetes Education Association (GDEA) has been developed as a school for diabetics, which has a comprehensive DSME/S programme for PWD with 18 distinct courses on 5 levels for 8 target groups. In addition, GABRIC has developed a database registry with more than 100 000 members throughout the country, of whom 95% are diabetic with a proportion of 82% Type 2 diabetes and 13% Type 1 diabetes. The success of the GABRIC school model results is yet to be investigated through study trials, and offers a fruitful line of research.

Keywords: Diabetes, diabetic, education, self-management, noncommunicable diseases

Citation: Esteghamati A, Hosseinpanah F, Adel Jahed S, Harati H, Astaneh MTCB, Kaykhanzadeh H, et al. GABRIC diabetes school: an innovative education centre for diabetics. East Mediterr Health J. 2018;24(1):99–103. <https://doi.org/10.26719/2018.24.1.99>

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<http://www.emro.who.int/emhj-volume-24-2018/volume-24-issue-1/gabric-diabetes-school-an-innovative-education-centre-for-people-with-diabetes.html>

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GABRIC Diabetes School: an innovative education centre for people with diabetes



Report

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Alireza Esteghamati¹, Farhad Hosseinpanah², Seyed Adel Jahed³, Hadi Harati³, Mohammad Taghi Cheraghchi Bashi Astaneh³, Hormoz Kaykhanzadeh³ and Sara Sedaghat³

¹Endocrinology and Metabolism Research Center, Vali-Asr Hospital School of Medicine, Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran ²Obesity research center, Research institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Islamic Republic of Iran ³Gabric Diabetes Education Association, Tehran, Islamic Republic of Iran (Correspondence to: Sara Sedaghat: s.sedaghat@gabric.ir).

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"Gabric Diabetes School" An innovative peer education, hand in hand with support in the Middle East



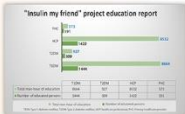
Alireza Esteghamati, M.D., Farhad Hossainpanah, M.D., Seyyed Adel Jahed, M.D., Hadi Harati, M.D., Mohammadaghi Cheraghchi Bashi, M.D., DPH, Hormoz Kaykhanzadeh, MBA, Sara Sedaghat, M.D.

The History Behind Gabric

- Gabric, Diabetes Education Association (GDEA) is a non-governmental organization (NGO) founded in 2006 in Tehran/Iran. GDEA's mission is to improve the lives of people with diabetes and to promote primary, secondary and tertiary diabetes prevention via education, raising awareness, and building motivation.
- Most of the staff are well-controlled youth with type 1 diabetes who provide peer support and motivation for others with diabetes. The idea of a comprehensive educational association was developed by a group of well-known endocrinologists as well as young "well controlled" people with type 1 diabetes.
- Diabetes self-management education and support (DSME/S) provides the foundation to help people with diabetes to navigate these decisions and activities and has been shown to improve health outcomes. As a comprehensive diabetes education institution, Gabric provides DSME and DSMS basically through group classes and peer support.

National Diabetes Education Campaigns

Trying to address primarily children with diabetes and health care professionals in deprived areas and provinces, Gabric specifically designed and started the program "Insulin My Friend" six years ago as a national educational campaign, and expanded the program to cover people with type 2 diabetes and primary health care providers as well.



Keepo: your diabetic friend

Specifically designed to fulfill the educational needs of children with diabetes, Keepo has type 1 diabetes and has arrived from an imaginary planet (Sugarland) and is here to learn self-management skills to better control diabetes. The free of charge "Keepo adventures" course, addressing children aged 7 to 12, comes along with counselling sessions for parents, to help facilitate the psychological challenges of dealing with their new family life.



Education is Individualized

Gabric's diabetes education model is essentially a self-management education program categorized into 20 distinct topics, addressing eight different target groups. Education is delivered through an innovative Diabetes School model including consecutive elementary, intermediate, advanced and complementary levels. A distinct special level is also defined which includes four national programs as well as practical courses for training health care professionals (HCPs).

Achievements

In over 10 years of activity, Gabric has registered more than 100,000 members throughout the country, 95% of whom have diabetes based on self-disclosure (Female: Male ratio: 1/1) and 70% of reside in the capital. Our data registration reports T2DM, T1DM, a specific type of diabetes population to be around 58%, 18, & 5% respectively. A total man-hour of education equal to 340,000 has been delivered up to April 2017.



Along with the growing evidence for the role of peers in providing ongoing support, Gabric has utilized unique features including peer-support oriented Diabetes Self Management Support (DSMS) as well as using well trained peers specialized in providing empathy and motivational interviews as innovative means to recruit people with diabetes to participate in DSME courses and promote motivation to control diabetes.

Experience is the best homework

The 4-stage experiential learning model, integrated in the training process, requires the people to actively involve the visitation and it up to the educator to facilitate the learning process.



Presenting GDEA during World Health Day 2016, Hormoz Kaykhanzadeh - WHO Ambassador - Geneva

Peer Support: passing from DSME to DSMS

To effectively manage diabetes for life, programs are needed to support self-management skills and behavioral changes. Diabetes DSMS is the implementation of active peer support, follow-up phone calls and Gabric's unique support session aim to facilitate behavior change through motivational interviewing in long-term concepts that make up for a comprehensive DSMS program.



Mr. H. KAYKHANZADEH
Diabetes Education Specialist

Gabric's outstanding educational model was selected as the best practice of diabetes education in the Middle East and North Africa (MENA) region in 2010 by MENA Diabetes Leadership Forum. In 2016, after 10 years of ongoing development and pioneering in the field of diabetes education, GDEA was invited to attend WHO's World Health Day event in Geneva as a "World Leader in Diabetes" to present its unique structure to the world.

Conclusion

Gabric diabetes school model that implements structured and patient-centered DSME/S has been thriving to research, study and deliver diabetes education at an international standard level. Distinctive educational characteristics like as collective education, experiential learning model, patient-specific education path and active follow up support has helped Gabric DSME/S achieve national and international credit in accordance with Iran ministry of health and WHO policies.

References

- 1. American Diabetes Association. Standards of medical care in diabetes - 2017.
- 2. National Diabetes Education Program. National Diabetes Education Program. 2016.
- 3. American Diabetes Association. National Diabetes Education Program. 2016.
- 4. American Diabetes Association. National Diabetes Education Program. 2016.
- 5. American Diabetes Association. National Diabetes Education Program. 2016.



"Telehealth facilitates national access to DSME/S" peer support integrated tele-education for people with T1DM (PSITE-1) project

Alireza Esteghamati, M.D., Farhad Hossainpanah, M.D., Seyyed Adel Jahed, M.D., Hadi Harati, M.D., M.Taqi Cheraghchi Bashi, M.D., DPH, Hormoz Keykhanzadeh, MBA, Sara Sedaghat, M.D., Sima Abbasi M.S., Maryam Azizam M.S.

Background

Diabetes is a chronic disease that requires the affected person to make a multitude of daily self-management decisions and perform complex care activities. Diabetes self-management education (DSME), is the process of facilitating the knowledge, skill, and ability necessary for diabetes self-care. Diabetes self-management support (DSMS) refers to the support that is required for implementing and sustaining coping skills and behaviors needed to self-manage on an ongoing basis.⁽¹⁾ DSME improves hemoglobin A1c by as much as 1% and has been shown to be cost-effective by reducing hospital admissions.^(2,3) Studies have found that DSME is associated with improved diabetes knowledge and self-care behaviors (4), lower A1C (5-6), lower self-reported weight (6, 11), improved quality of life (6, 8), reduced all-cause mortality risk (10), healthy coping (11), and reduced health care costs (12-14). Despite this fact, there are limited educational programs in the Islamic Republic of Iran for PWD and no national standard DSME protocol has been implemented in the country (15) and access to structured DSME is limited to capital.

Addressing Low Utilization of DSMEs

Despite the fact that DSMEs is such a critical resource to help PWD successfully self-manage their disease, its utilization is too low (13, 17). As there are limited DSMEs programs available in Iran (15), so it seems limited access to DSMEs can be a reason for its utilization. Based on a systematic review by Morgan et al, logistical and financial reasons are among the reasons why patients referred to diabetes education programs choose not to attend. So it is crucial to provide new and innovative methods of delivering diabetes education which address the needs of PWD whilst maximizing quality and efficiency (17). As technology has been integrated into our daily life, we can use it as a way to deliver DSMEs for PWD in remote areas. Systematic review by Verhoeven et al. showed both teleconsultation and videoconferencing are practical, cost-effective and viable ways of delivering a worthwhile health care service to PWD (18). GDEA has recently been started a program to make DSMEs available all over the country, named peer support integrated tele-education for people with T1DM (PSITE-1).

Results and Conclusion

In the first year, we implemented PSITE-1 courses in 5 centers in 5 different provinces. In the second and third years, we added 6 and 10 more centers in different cities, respectively. During 107 courses, 2198 people with T1DM and 1373 family members have received DSMEs through PSITE-1 project. In the era of technology, we believe technology would help us expand DSMEs access across country. PSITE-1 model has been implemented for 2 years. Now we think a well-designed research is necessary to find out whether PSITE-1 is effective in providing clinical, psychological, behavioral & care coordination outcomes including cost reduction in short term & long term.



Introducing PSITE-1

Peer support integrated tele-education for people with T1DM (PSITE-1) is a project started in 2017 to expand DSMEs across the country in Iran. It aims to provide intensive group based diabetes education via videoconferencing and a messenger application to provide peer support for all participant in a group. All children and adult aged 30 and younger with an established T1DM diagnosis were recruited and registered by their physician. The course was offered to the patients regardless of age, time from diagnosis or level of glycemic control. No literacy or numeracy requirements were specified to attend PSITE-1 program. Since using technology is still challenging in our country and many people are not familiar with videoconferencing, we identified a role as the local diabetes education instructor. He/she is a nurse in hospital or secretary in a clinic who works with local pediatric endocrinologists. All participants will be informed and registered by a local diabetes education instructor. GDEA will contact them regarding class schedule. During one week, they will attend three sessions every other day. Each session will be 2 hours long, making it an accumulative hours of group videoconferencing. Each session has unique and specific topics to be covered. (Table 1) as well as homeworks and class activities to engage people with topics. Sessions were delivered by a senior diabetes educator and trained in GDEA. Patients would gather on the regional center and the diabetes educator at GDEA will have real time contact with group through skype videoconferencing.

Session 1	Session 2	Session 3
Diabetes 101/2 Introduction of the T1DM, Facts and Misconceptions Prevalence, Etiology and Risk Factors Diabetes symptoms and diagnosis Diabetes complications Lifestyle modification	Introduction to self-management Diabetes self-management and self-care behaviors Diabetes self-management support Diabetes self-management support	Diabetes complications Diabetes complications Diabetes complications Diabetes complications Diabetes complications

We have utilized "empathy" by peers as a motivating factor for PWD to become active members of their diabetes care team. Every individual with diabetes would be contacted with a well-controlled peer who has been trained to provide empathy and lead peer support through an empathic communication, interactive motivational interview, and convince the PWD to get involved in the DSMEs program (20).



References

1. American Diabetes Association. Standards of medical care in diabetes - 2017.
2. National Diabetes Education Program. National Diabetes Education Program. 2016.
3. American Diabetes Association. National Diabetes Education Program. 2016.
4. American Diabetes Association. National Diabetes Education Program. 2016.
5. American Diabetes Association. National Diabetes Education Program. 2016.
6. American Diabetes Association. National Diabetes Education Program. 2016.
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8. American Diabetes Association. National Diabetes Education Program. 2016.
9. American Diabetes Association. National Diabetes Education Program. 2016.
10. American Diabetes Association. National Diabetes Education Program. 2016.
11. American Diabetes Association. National Diabetes Education Program. 2016.
12. American Diabetes Association. National Diabetes Education Program. 2016.
13. American Diabetes Association. National Diabetes Education Program. 2016.
14. American Diabetes Association. National Diabetes Education Program. 2016.
15. American Diabetes Association. National Diabetes Education Program. 2016.
16. American Diabetes Association. National Diabetes Education Program. 2016.
17. American Diabetes Association. National Diabetes Education Program. 2016.
18. American Diabetes Association. National Diabetes Education Program. 2016.
19. American Diabetes Association. National Diabetes Education Program. 2016.
20. American Diabetes Association. National Diabetes Education Program. 2016.



Tailored Diabetes Education

Patients with T1DM

Patients with T2DM (Insulin)

Patients with T2DM (Oral agents)

Children with T1DM

Parents of children with T1DM

Healthcare professionals

General/at risk population

Women with GDM

Individualized Education Path

برنامه‌های آنلاین ویژه کودکان در سراسر کشور



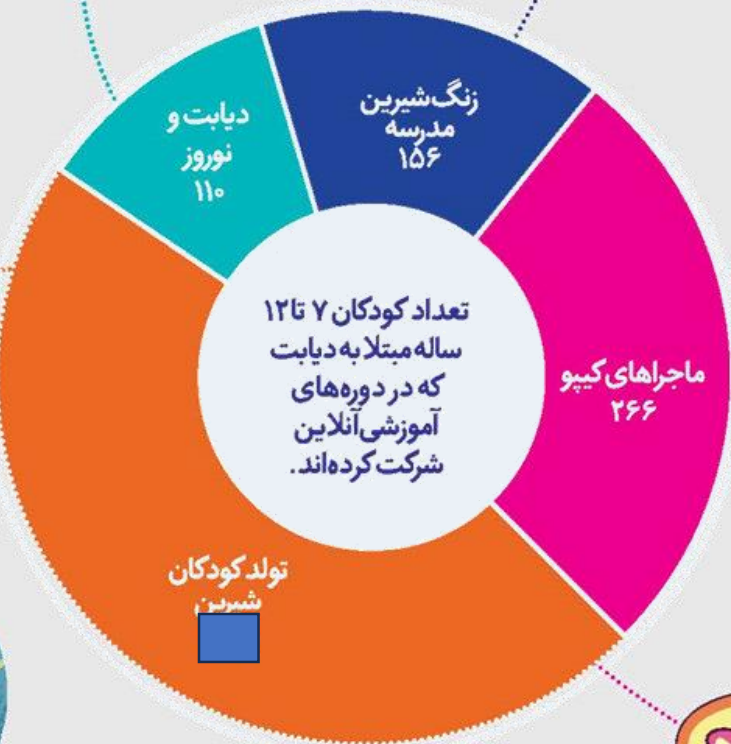
این دوره به طور خاص برای توانمندسازی کودکان در زمینه مدیریت قند خون در تعطیلات نوروز طراحی شده است.

در این کارگاه آموزشی جذاب مهارت‌های مهمی مانند جرات‌ورزی، دوست‌یابی و حل مسئله رایاد می‌گیرند تا بتوانند در محیط مدرسه دیابت خود را به خوبی مدیریت نمایند.



در این دوره دو جلسه‌ای به زبانی قابل درک برای کودکان آموزش اصول مدیریت دیابت با کمک شخصیت "کیپو" ارائه می‌شود.

کیپو موجودی است، فضایی که در سیاره قندی‌ها زندگی می‌کند، سرزمینی که ساکنین آن مبتلا به دیابت نوع یک هستند. انسولین تزریق می‌کنند. کیپو به عنوان قهرمان داستان، تصمیم می‌گیرد برای یافتن راهکارهای مدیریت دیابت، به زمین و انجمن دیابت گابریک سفر کند! کودکان مبتلا به دیابت با ماجراهای کیپو در این مسیر همراه می‌شوند و با مفاهیم مدیریت قند خون آشنایی شوند.



در این دوره کودکان با مهارت‌های کنترل قند خون در مهمانی و جشن آشنایی شوند.

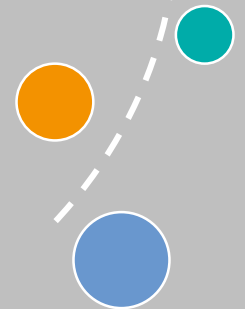


Gabric Diabetes Association

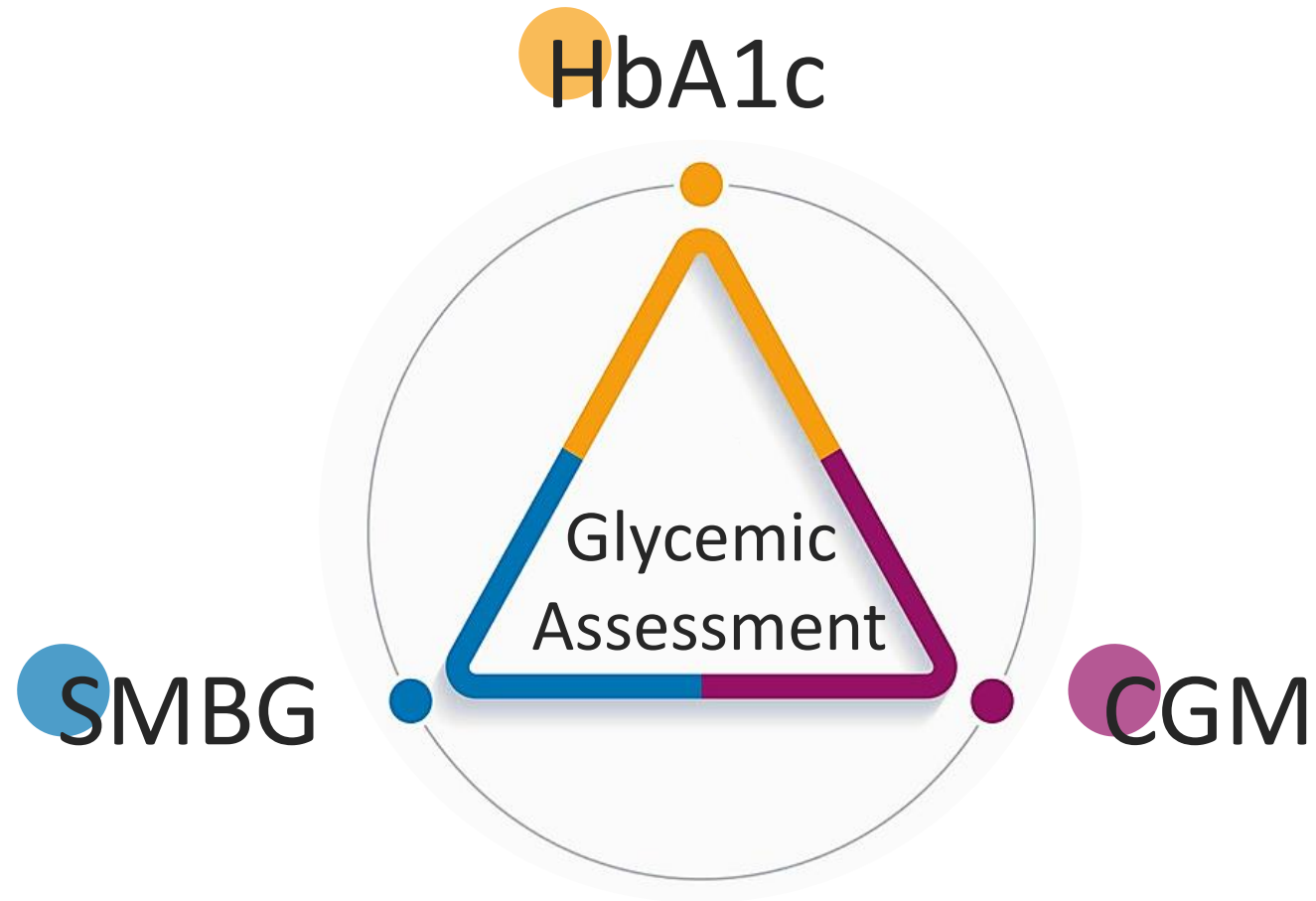


Presentation Outline

- Standards of Diabetes Self-Management and Support:
 - History of Diabetes Self-management
 - Patient-centered DSME
 - Gabric Diabetes School
- The Role of Blood Glucose Monitoring in Diabetes management:
 - Glucose Monitoring in DM
 - Guideline Review
 - National Iranian Consensus
- Techniques and Challenges of Insulin Injection:
 - Psychological Challenges of Injections
 - Storage of Insulin
 - Needle Length
 - Insulin Injection Technique
 - Injectable Therapies

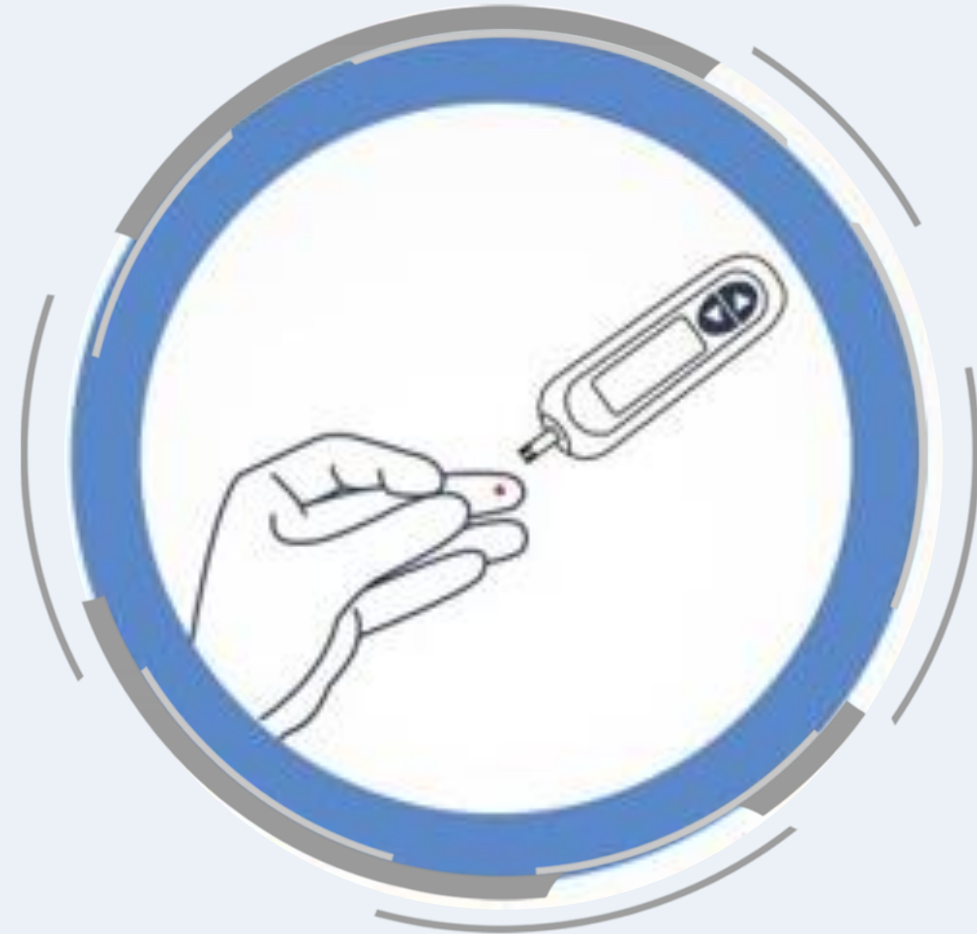


Glycemic Control Assessment

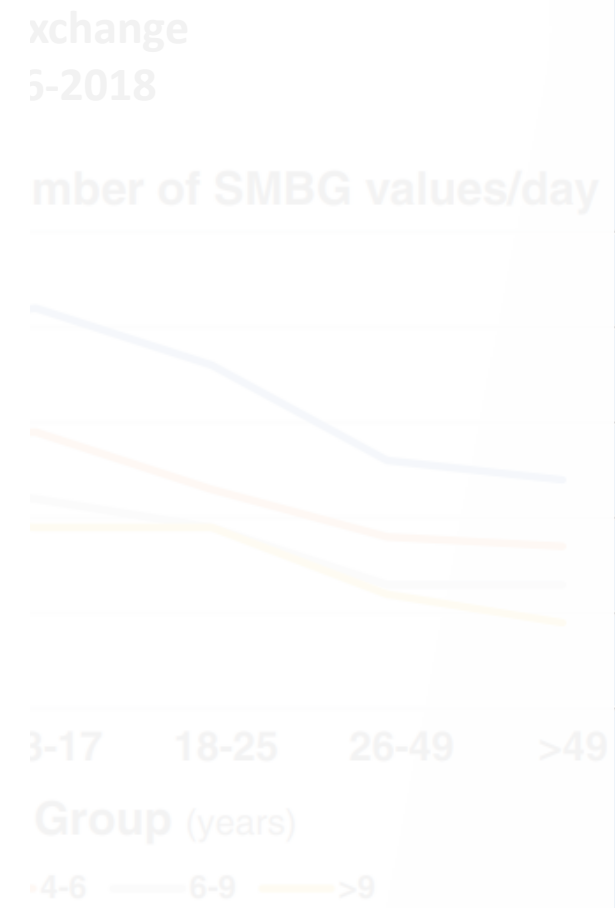
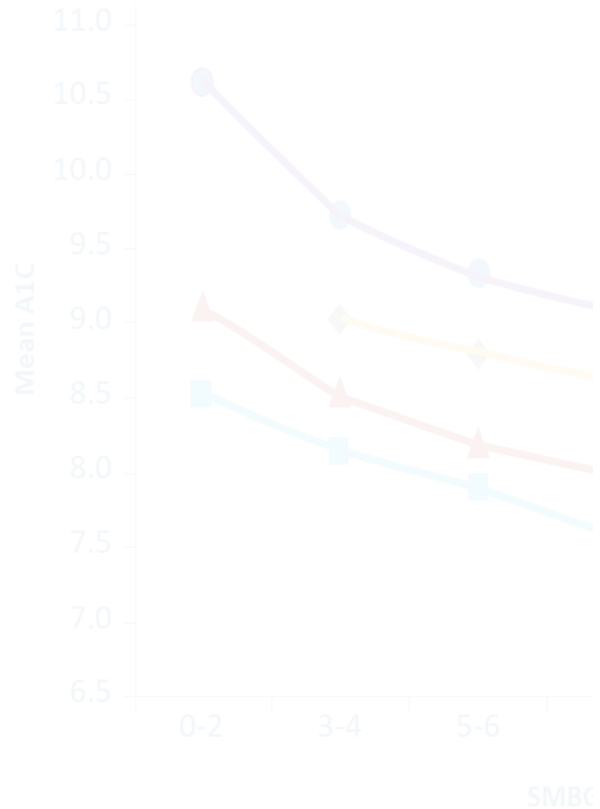
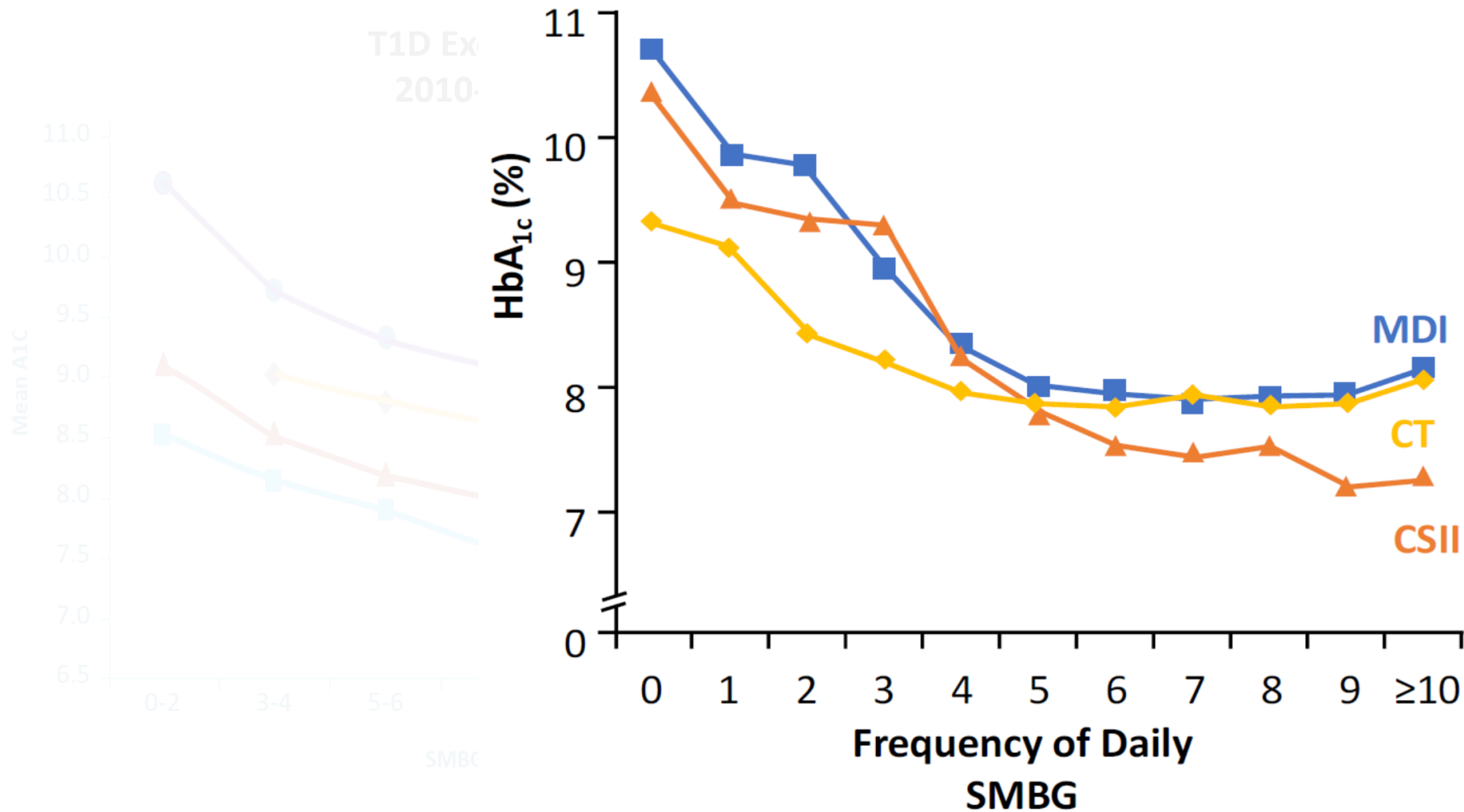


Self Monitoring of Blood Glucose (SMBG)

- SMBG as an integral part of patient self-management:
- SMBG needs to be practiced evidence based.
- SMBG barriers and limitations needs to be addressed.



T1DM: Greater SMBG Frequency and Lower HbA1C



Ziegler R, et al. *Pediatr Diabetes*. 2011;12(1):11-7.

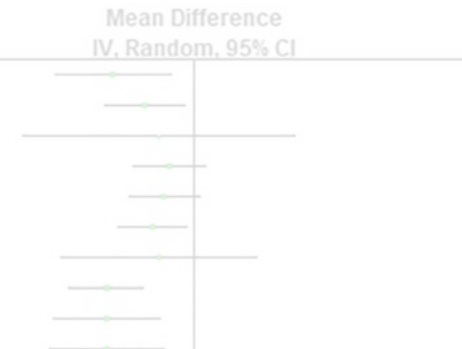
Miller KM, et al. *Diabetes Care*. 2013;36:2009-14.

Foster NC, et al. *Diabetes technology & therapeutics*. 2019 Feb 1;21(2):66-72.



The Efficacy and Frequency of Self-monitoring of Blood Glucose in Non-insulin-Treated T2D Patients: a Systematic Review and Meta-analysis

Study or Subgroup	SMBG		no SMBG		Mean Difference			Year
	Mean	SD	Total	Mean	SD	Total	Weight	
Schwedes 2002	-1	1.08	113	-0.54	1.41	110	5.3%	2002
Guerci 2003	-0.88	1.54	345	-0.6	1.54	344	6.5%	2003
Davidson 2005	-0.8	1.6	43	-0.6	2.1	45	2.0%	2005
Farmer 2007	-0.14	0.82	150	0	1.02	152	6.8%	2007
Farmer 2007	-0.17	0.73	151	0	1.02	152	6.9%	2007
Barnett 2008	-1.15	1.14	311	-0.91	1.29	299	7.0%	2008
O'Kane 2008	-1.9	1.84	96	-1.7	1.99	88	3.1%	2008
Durán 2010	-0.5	0.519	62	0	0.854	99	6.7%	2010
Franciosi 2011	-1.2	0.557	46	-0.7	0.529	16	5.6%	2011
Lu 2011	-1.5	0.4	35	-1	0.9	35	5.3%	2011
Harashima 2013	-0.195	0.479						
Kempf 2013	-0.5	0.954						
Malanda 2016	-0.1	0.9						
Lee 2017	-1.946	1.608						
Sodipo 2017	-1.5	2.358						
Young 2017	-0.075	1.07						
Parsons 2019	-1.11	1.45						
Lee 2020	-0.33	0.224						
Total (95% CI)								



Better HbA1c reduction (Mean Difference: -0.35%)
was seen with SMBG 8-11 times weekly

Heterogeneity: $\tau^2 = 0.05$; $\chi^2 = 88.45$, $df = 17$ ($P < 0.00001$); $I^2 = 81\%$
 Test for overall effect: $Z = 4.70$ ($P < 0.00001$)



Study or Subgroup	Structured SMBG		SMBG		Mean Difference			Year
	Mean	SD	Total	Mean	SD	Total	Weight	
Scherbaum 2008	-0.3	1.25	102	-0.1	1	100	25.0%	2008
Polonsky 2011	-1.2	1.44	256	-0.9	1.51	227	34.9%	2011
Bosi 2013	-0.39	2.51	501	-0.27	1.74	523	34.5%	2013
Kan 2017	-1.91	1.9	60	-1.35	1.82	60	5.5%	2017
Total (95% CI)			919			910	100.0%	

Heterogeneity: $\chi^2 = 1.91$, $df = 3$ ($P = 0.59$); $I^2 = 0\%$
 Test for overall effect: $Z = 2.85$ ($P = 0.004$)



International Guidelines and Consensus Review



**DIABETES
CANADA**
CLINICAL PRACTICE GUIDELINES

NICE National Institute for
Health and Care Excellence

**American
Diabetes
Association**



بیانه مشترک

انجمن اطلاع رسانی دیابت گابریک و انجمن دیابت ایران
در مورد فودپایشی قند خون در ایران

نسخه اول - آبان ۱۳۹۹

انجمن دیابت ایران



جمهوری اسلامی ایران
وزارت بهداشت، درمان و آموزش پزشکی
سازمان بهداشت
پژوهش‌های ای‌ترناب



International
Diabetes
Federation
Member



First National Iranian Consensus on SMBG

انجمن دیابت ایران



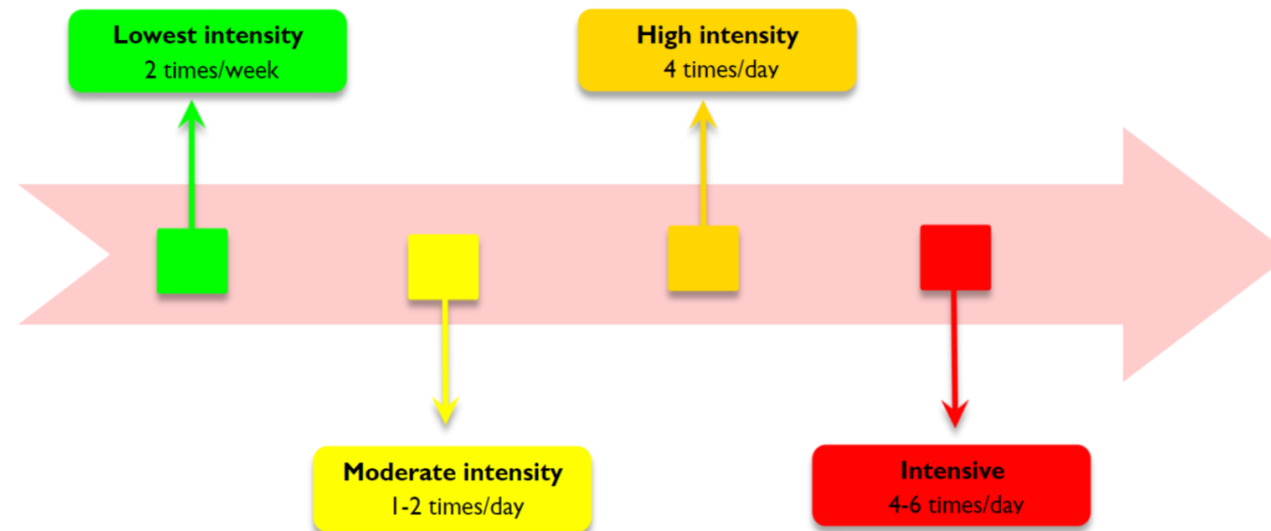
SMBG Protocol Categories

We recommend 4 SMBG protocols, including:

- Lowest intensity: 2 times per week
- Moderate intensity: 1-2 times per day
- High intensity: 4 times per day
- Intensive: 4-6 times per day

Tailored target groups, based on

- Glycemic control
- Type of diabetes
- Therapeutic regimen

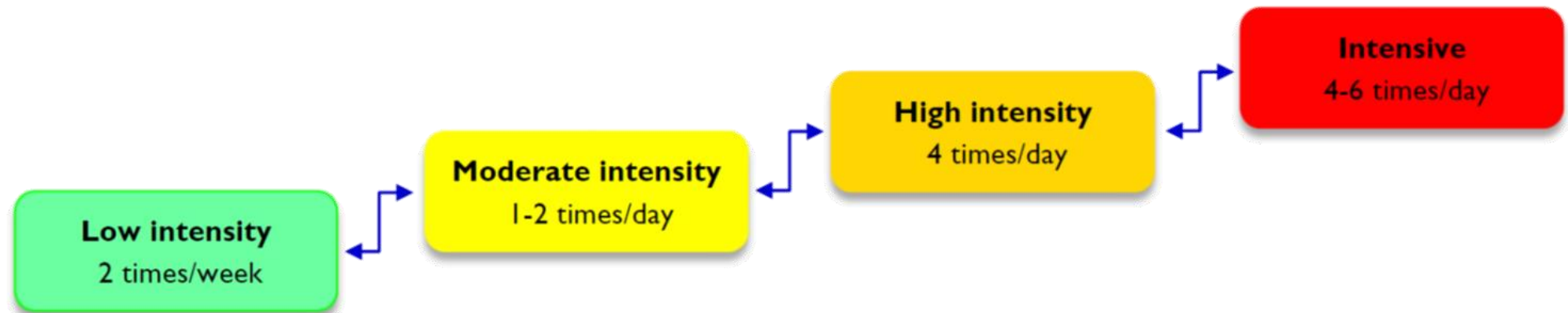


Intensification process

Intensification is needed if the person with diabetes is:

- Newly diagnosed
- Not meeting glycemic target
- Sick days or hospitalized patients
- History of DKA or Severe hypoglycemia during last month

De-intensification based on HCP consultation and re-assessment.



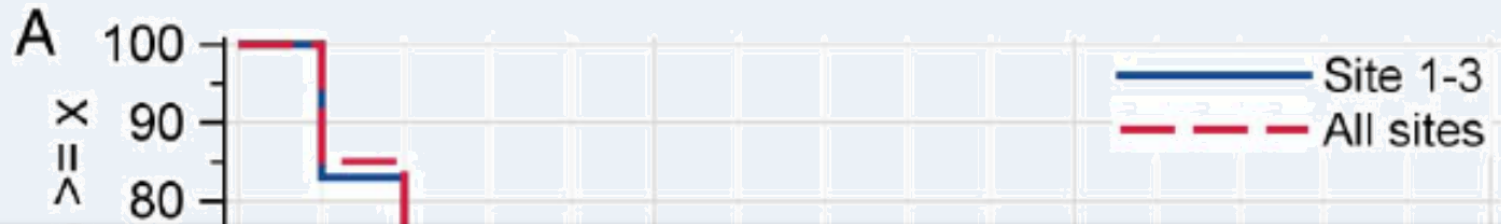
<i>Status</i>		<i>Table Number</i>
T₁DM	HbA _{1c} in Target	1-3
	HbA _{1c} Not in Target	1-4
	Children ≤ 5 years old	1-4
	Pregnant	1-4
T₂DM	HbA _{1c} in Target, on OAD with no hypoglycemia risk	1-1
	HbA _{1c} Not in Target, on OAD with no hypoglycemia risk	1-2
	HbA _{1c} in Target, on OAD with hypoglycemia risk	1-2
	HbA _{1c} in Target on insulin, not MDI, ± OAD	1-2
	HbA _{1c} Not in Target, on OAD with hypoglycemia risk	1-3
	HbA _{1c} Not in Target, on insulin, not MDI ± OAD	1-3
	HbA _{1c} in Target, on MDI ± OAD	1-3
	HbA _{1c} Not in Target, on MDI ± OAD	1-4
	Pregnant, on insulin	1-4
GDM	HbA _{1c} in Target, only on LSM/metformin	1-2
	HbA _{1c} Not in Target, only on LSM/metformin	1-3
	On Insulin	1-4

Standard Care:
Available and
Affordable
Standard SMBG
Practice

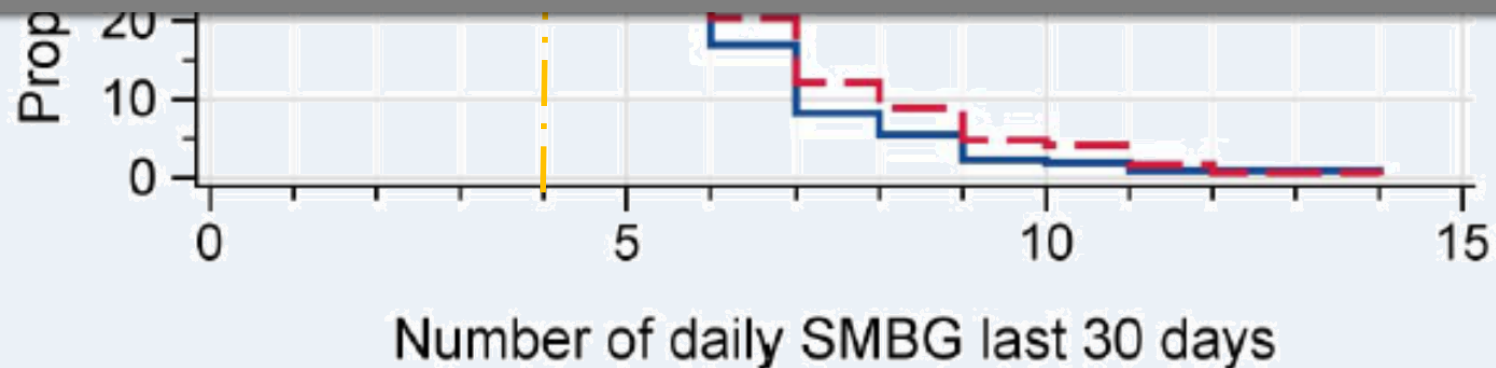
Limited Care:
 Unavailable and
 Unaffordable
 Standard SMBG
 Practice

<i>Status</i>		<i>Table Number</i>
T₁DM	HbA _{1c} in Target	2-2
	HbA _{1c} Not in Target	2-3
	Children ≤ 5 years old	2-3
	Pregnant	2-3
[Publish Date] T₂DM	HbA _{1c} in Target, on OAD with hypoglycemia risk	2-1
	HbA _{1c} in Target on insulin, not MDI ± OAD	2-1
	<i>If possible: T₂DM on OAD with no hypoglycemia risk</i>	2-1
	HbA _{1c} Not in Target, on OAD with no hypoglycemia risk	2-1
	HbA _{1c} Not in Target, on OAD with hypoglycemia risk	2-2
	HbA _{1c} Not in Target, on insulin, not MDI ± OAD	2-2
	HbA _{1c} in Target, on MDI ± OAD	2-2
	HbA _{1c} Not in Target, on MDI ± OAD	2-3
	Pregnant, on insulin	2-3
GDM	HbA _{1c} in Target, only on LSM/metformin	2-1
	HbA _{1c} Not in Target, only on LSM/metformin	2-3
	On Insulin	2-3

Adherence to SMBG

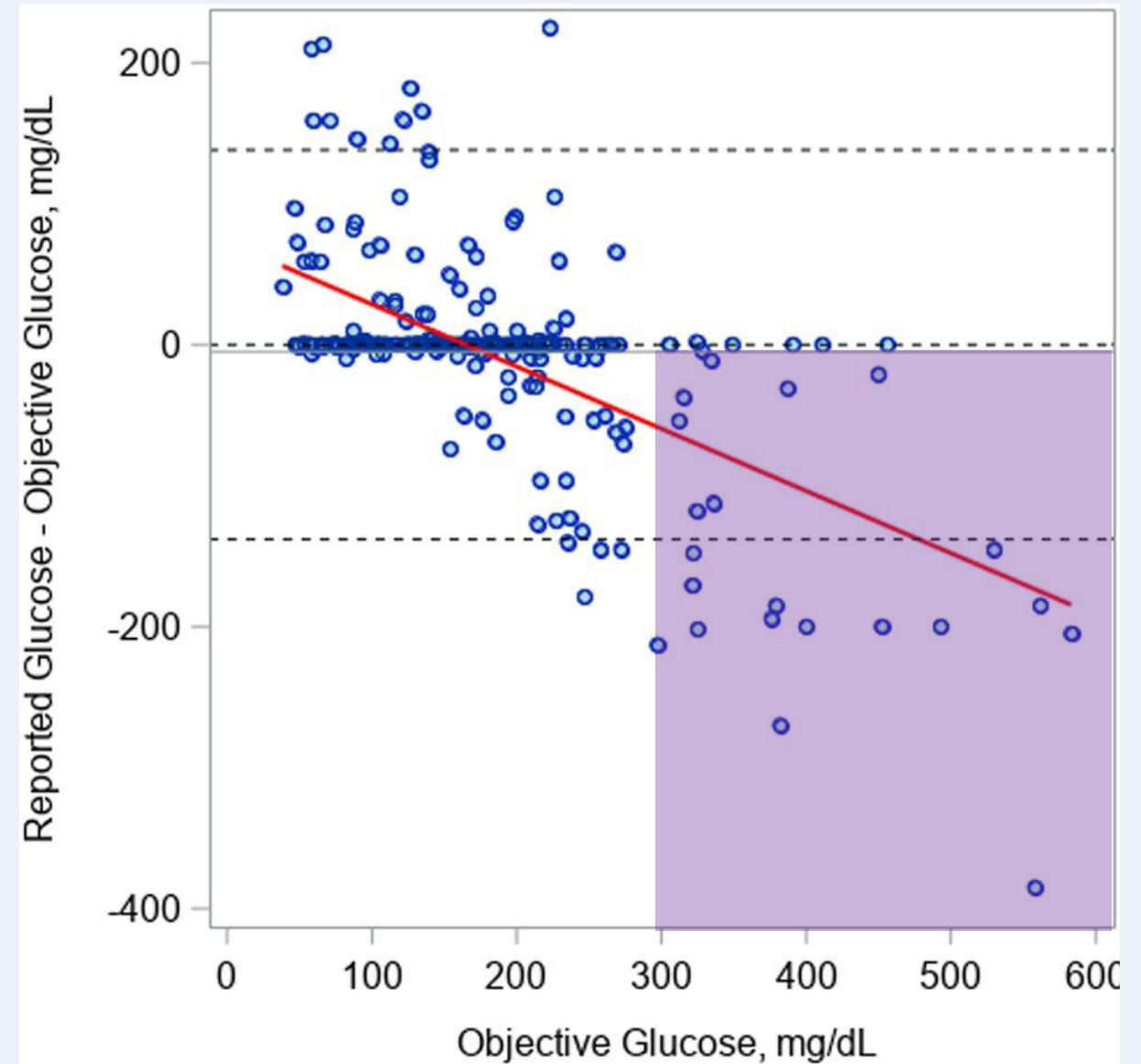


SMBG \geq 4 per day:
Almost 44% of persons with T1DM in Sweden



Inaccurate SMBG Reporting: The Hidden Truth

Almost 60% of self-reported SMBG values in youth with T1DM were inaccurate.



Inaccurate SMBG Reporting in Pregnancy: The Hidden Truth

GDM
N= 91

23% of individuals had significant inaccuracy.

Pregnancy and Diabetes
N= 85

% of inaccurate SMBG values:

GDM: 22%

Preexisting T1DM: 37%

Preexisting T2DM:9%

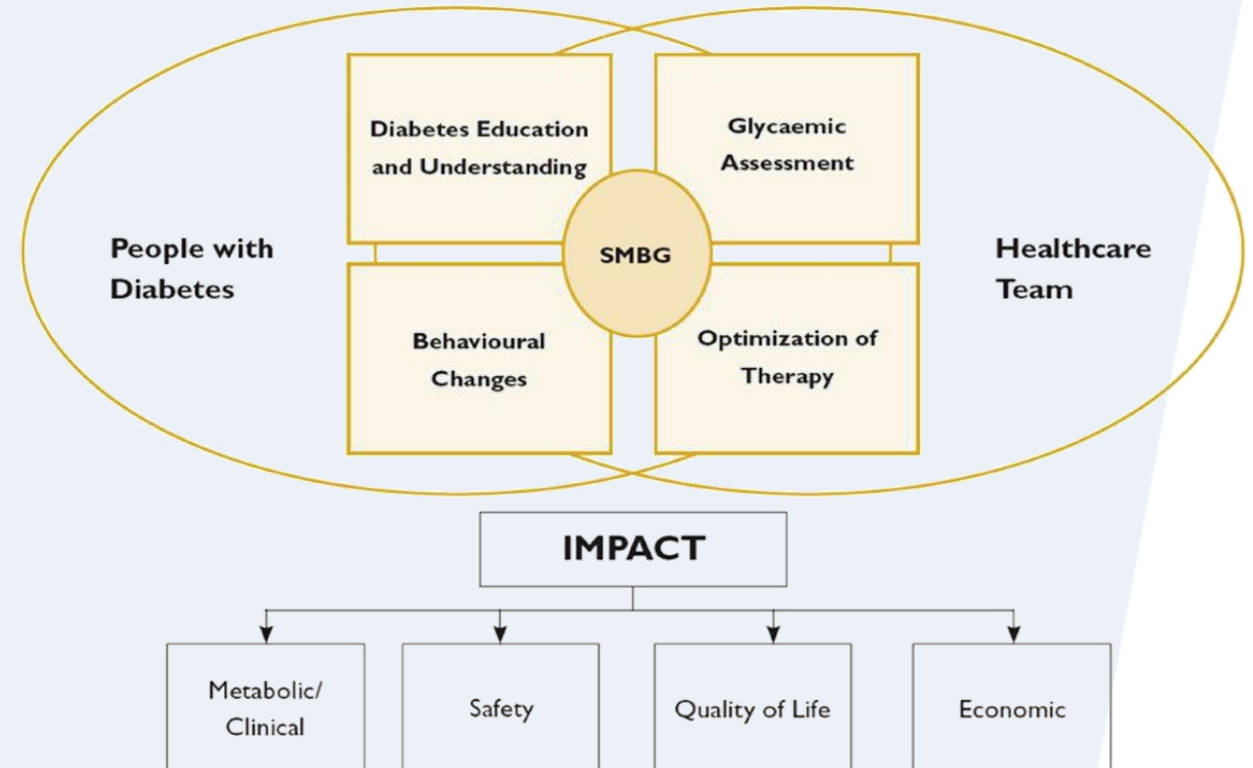
SMBG is a Tool, Not an Intervention

Kaiser Permanente Northern California (KPNC)
Registry
T2DM on Non insulin Therapy
N=7320

15% unused by patient or provider

48% used by **either** patient or provider

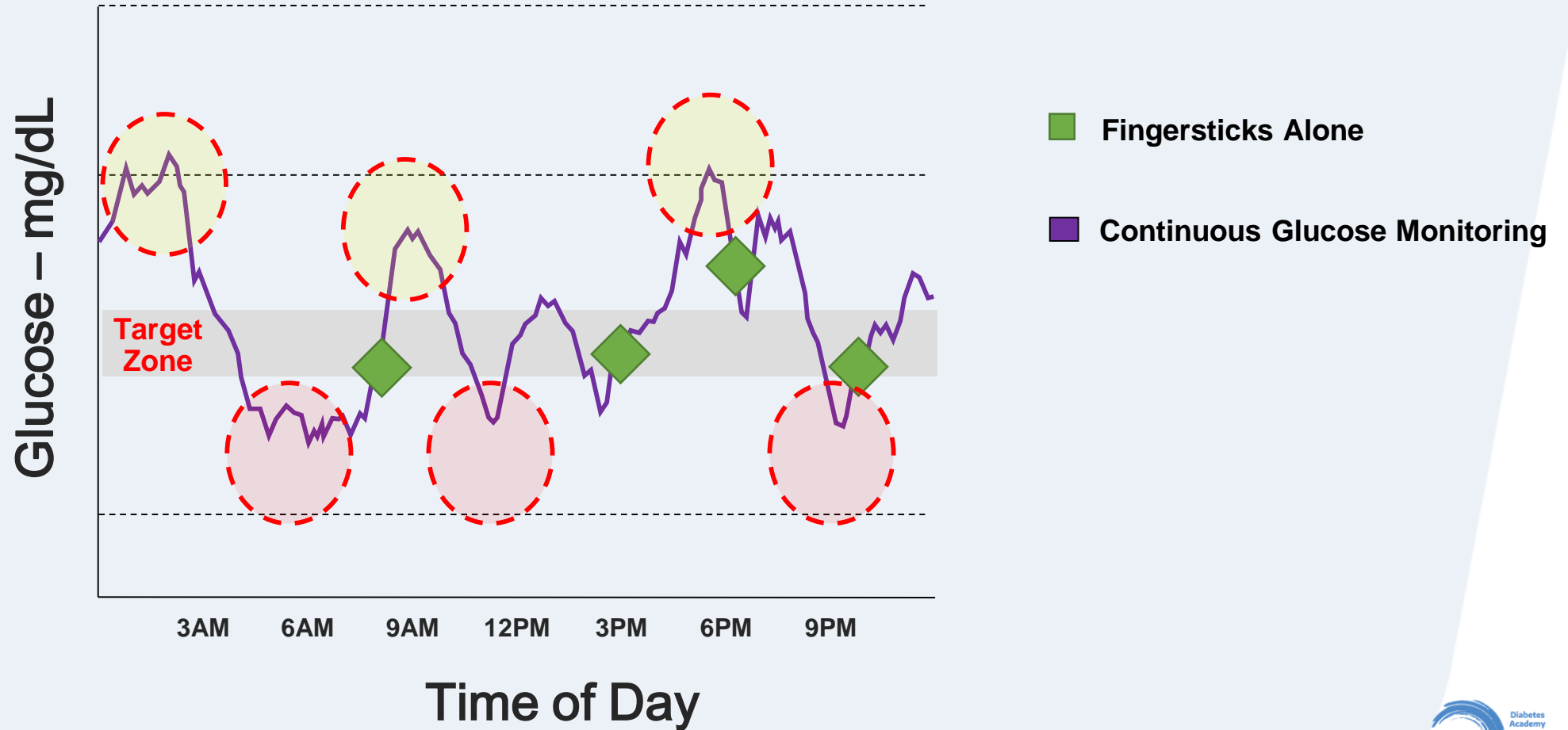
37% used **by both** patient and provider



Continuous Glucose Monitoring



CGM reveals insights beyond SMBG



Components of CGMs

A. Sensor



B. Transmitter



C. Receiver



Sensor + Transmitter

Receiver



Key Players



1999:
Medtronic MiniMed

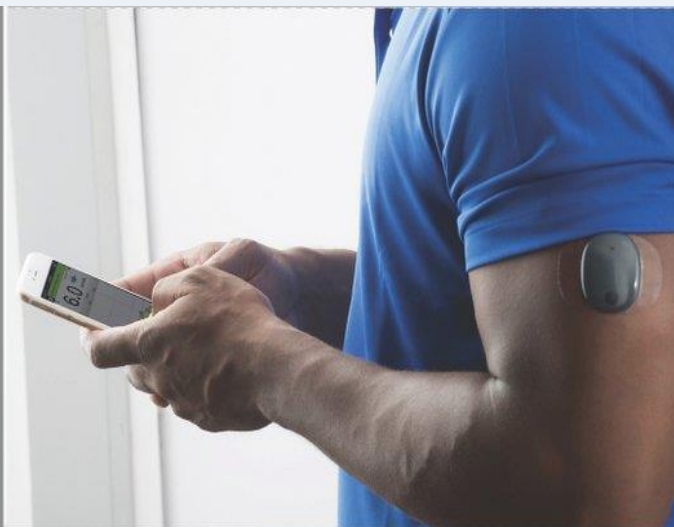
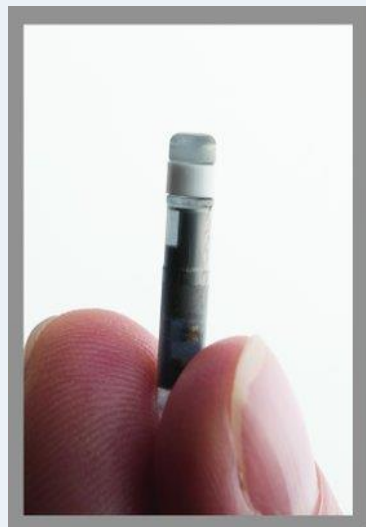


2006:
Dexcom STS



2008:
Freestyle Navigator





Most popular CGMs

FreeStyle *Libre* 



Dexcom

Freestyle libre

FreeStyle *Libre*



Size: 30*5 mm

FreeStyle *Libre 2*

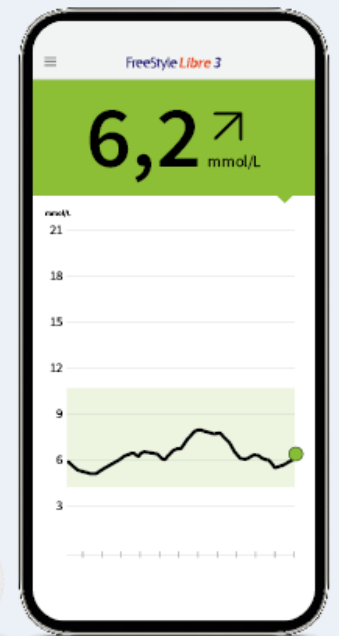
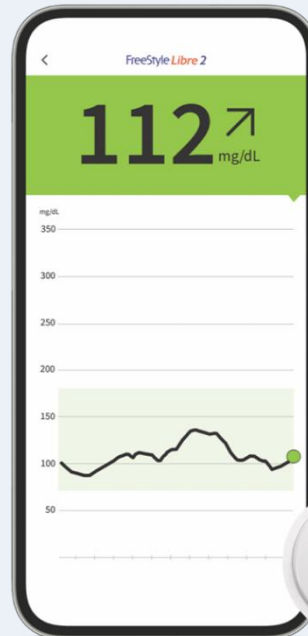


Size: 30*5 mm

FreeStyle *Libre 3*



Size: 21*2.9 mm



Standardized CGM Metrics

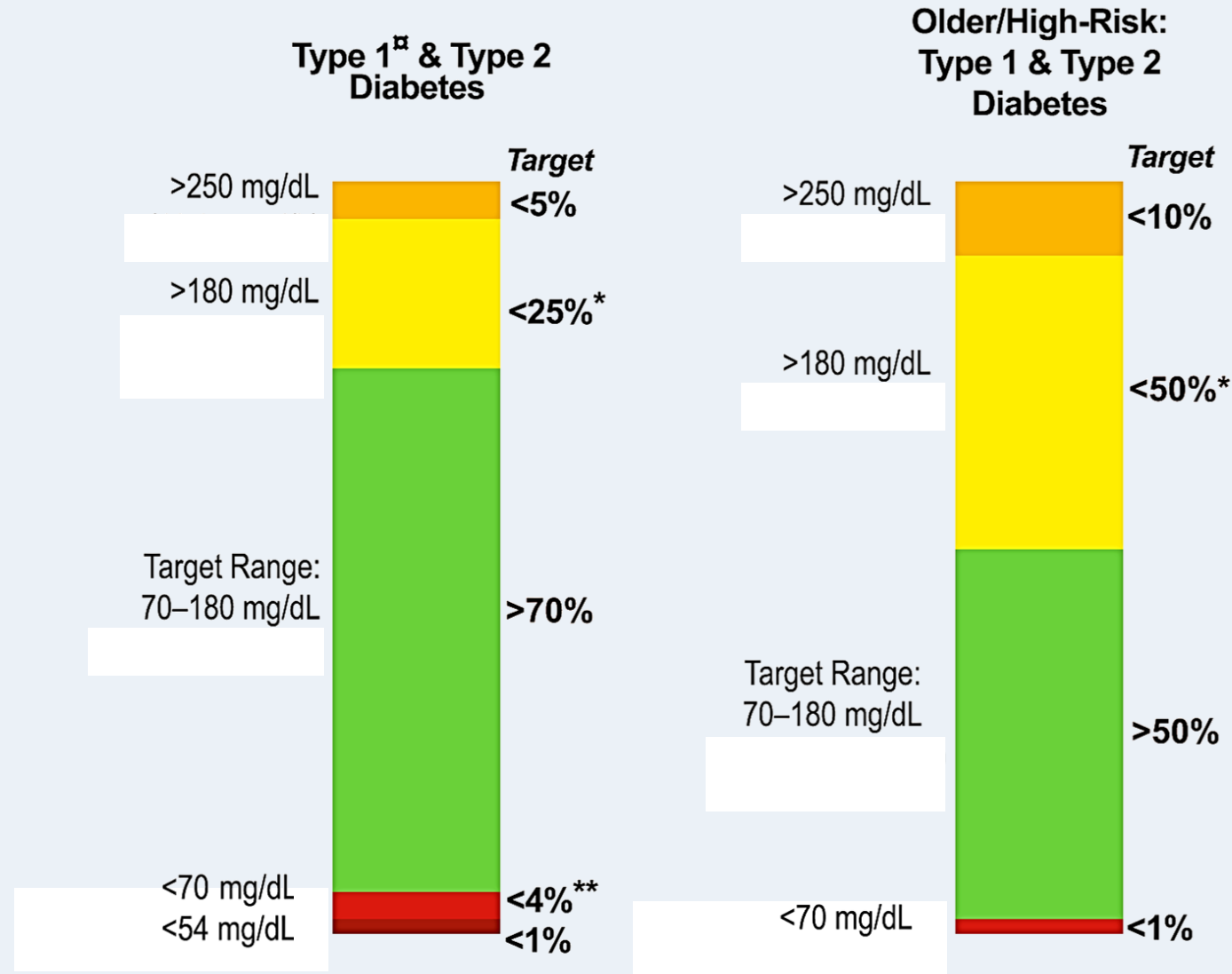
Table 6.2—Standardized CGM metrics for clinical care in nonpregnant individuals with type 1 or type 2 diabetes

Metric	Interpretation	Goals
1. Number of days CGM device is worn		14-day wear for pattern management
2. Percentage of time CGM device is active		70% of data from 14 days
3. Mean glucose	Simple average of glucose values	*
4. Glucose management indicator	Calculated value approximating A1C (not always equivalent)	*
5. Glycemic variability (%CV) target	Spread of glucose values	≤36%†
6. TAR: % of readings and time >250 mg/dL (>13.9 mmol/L)	Level 2 hyperglycemia	<5% (most adults); <10% (older adults)
7. TAR: % of readings and time 181–250 mg/dL (10.1–13.9 mmol/L)	Level 1 hyperglycemia	<25% (most adults); <50% (older adults)‡
8. TIR: % of readings and time 70–180 mg/dL (3.9–10.0 mmol/L)	In range	>70% (most adults); >50% (older adults)
9. TBR: % of readings and time 54–69 mg/dL (3.0–3.8 mmol/L)	Level 1 hypoglycemia	<4% (most adults); <1% (older adults)§
10. TBR: % of readings and time <54 mg/dL (<3.0 mmol/L)	Level 2 hypoglycemia	<1%

CGM, continuous glucose monitoring; CV, coefficient of variation; TAR, time above range; TBR, time below range; TIR, time in range. *Goals for these values are not standardized. †Some studies suggest that lower %CV targets (<33%) provide additional protection against hypoglycemia for those receiving insulin or sulfonylureas. ‡Goals are for level 1 and level 2 hyperglycemia combined. §Goals are for level 1 and level 2 hypoglycemia combined. Adapted from Battelino et al. (32).

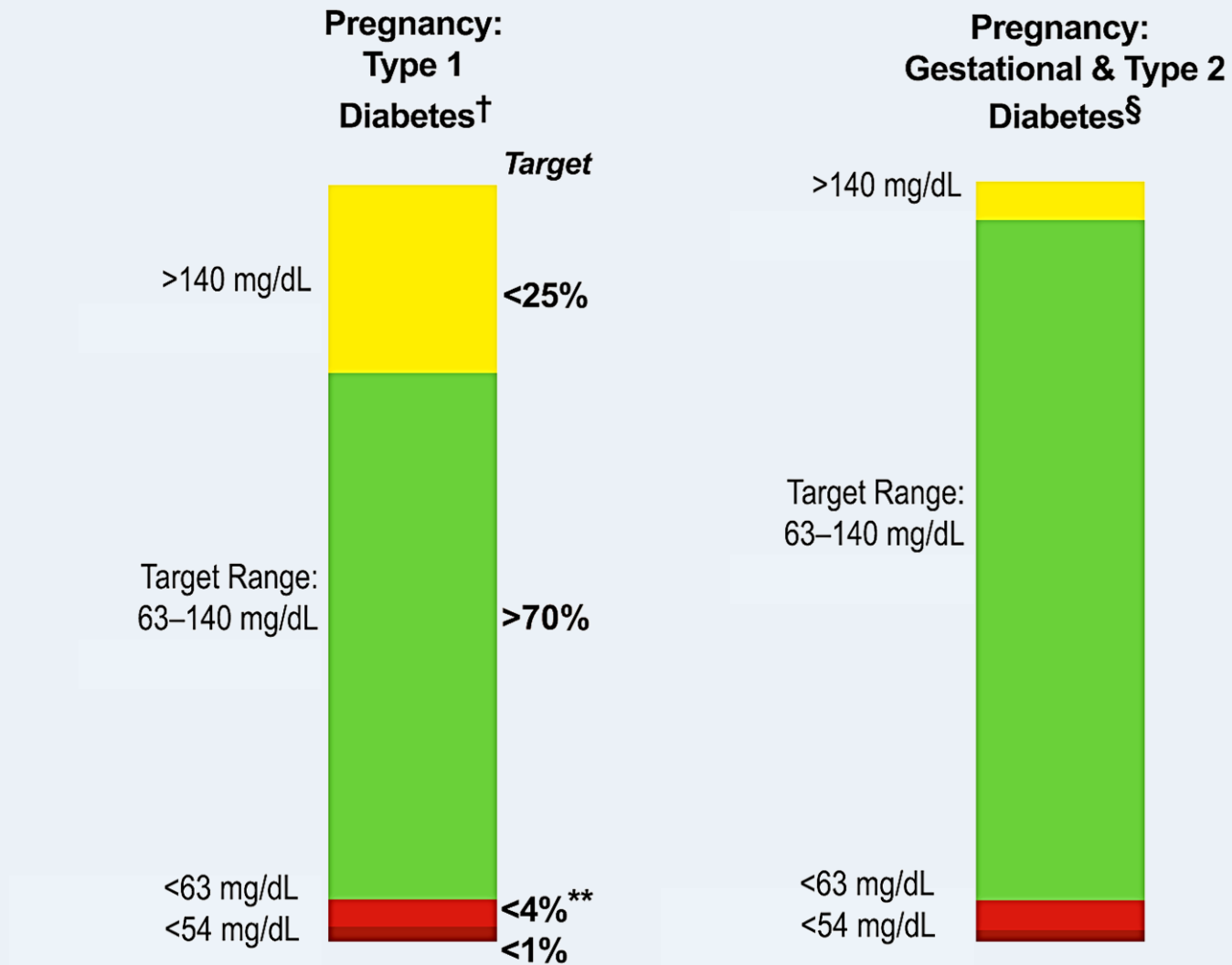


CGM-based targets for different diabetes populations



Clinical targets for continuous glucose monitoring data interpretation: recommendations from the international consensus on time in range. Diabetes Care. 2019;42(8):1593-603.

CGM-based targets for Pregnancy



Clinical targets for continuous glucose monitoring data interpretation: recommendations from the international consensus on time in range. Diabetes Care. 2019;42(8):1593-603.

Why PWD Stop Using CGM!

- Poor accuracy due to lag times
- Insurance reimbursement or cost
- False alarms and alarm fatigue
- Having a device attached to the body and discomfort
- Adverse skin reactions

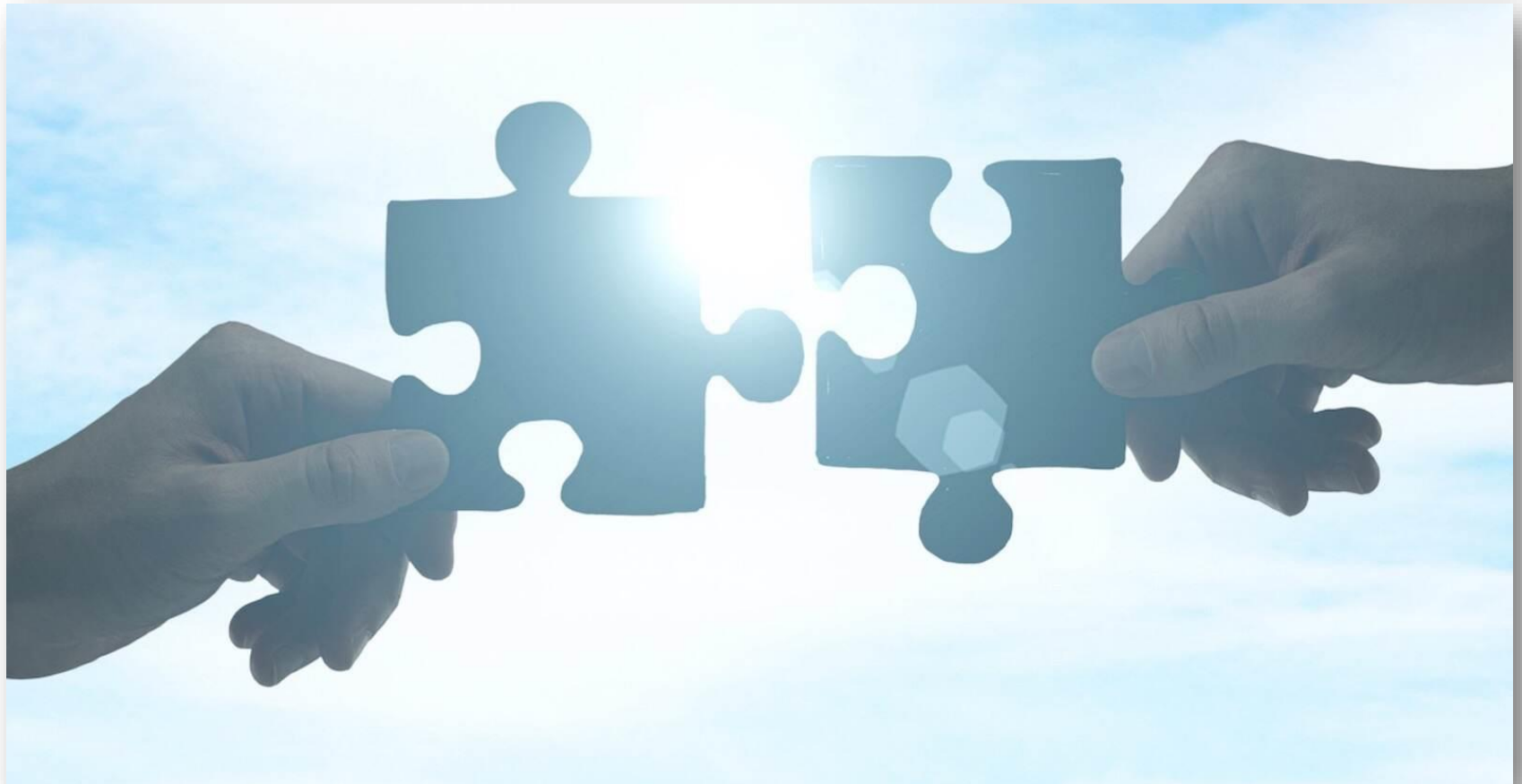
Individualization

- One size dose NOT fit all!



Education

- Teach to Monitor with Meaning



Communication

- SMBG as a Tool to shared decisions!

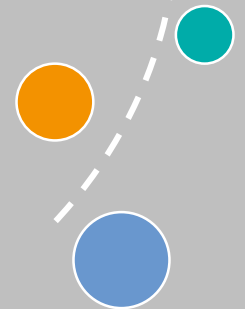


The Road To Cost Effective SMBG



Presentation Outline

- Standards of Diabetes Self-Management and Support:
 - History of Diabetes Self-management
 - Patient-centered DSME
 - Gabric Diabetes School
- The Role of Blood Glucose Monitoring in Diabetes management:
 - Glucose Monitoring in DM
 - Guideline Review
 - National Iranian Consensus
- Techniques and Challenges of Insulin Injection:
 - Psychological Challenges of Injections
 - Storage of Insulin
 - Needle Length
 - Insulin Injection Technique
 - Injectable Therapies



Case 1

- A 4 year old boy, Newly diagnosed with type 1 diabetes mellitus
- Emaciated at diagnosis with a height of 105cm (75th percentile)
- Weight of 14.5 kg (10-25th percentile).
- On MDI:
 - Basal: Glargine U-100
 - Prandial: Aspart before meals
- Review of potential injection sites indicates that there is minimal subcutaneous tissue at the abdomen, arms and thighs.



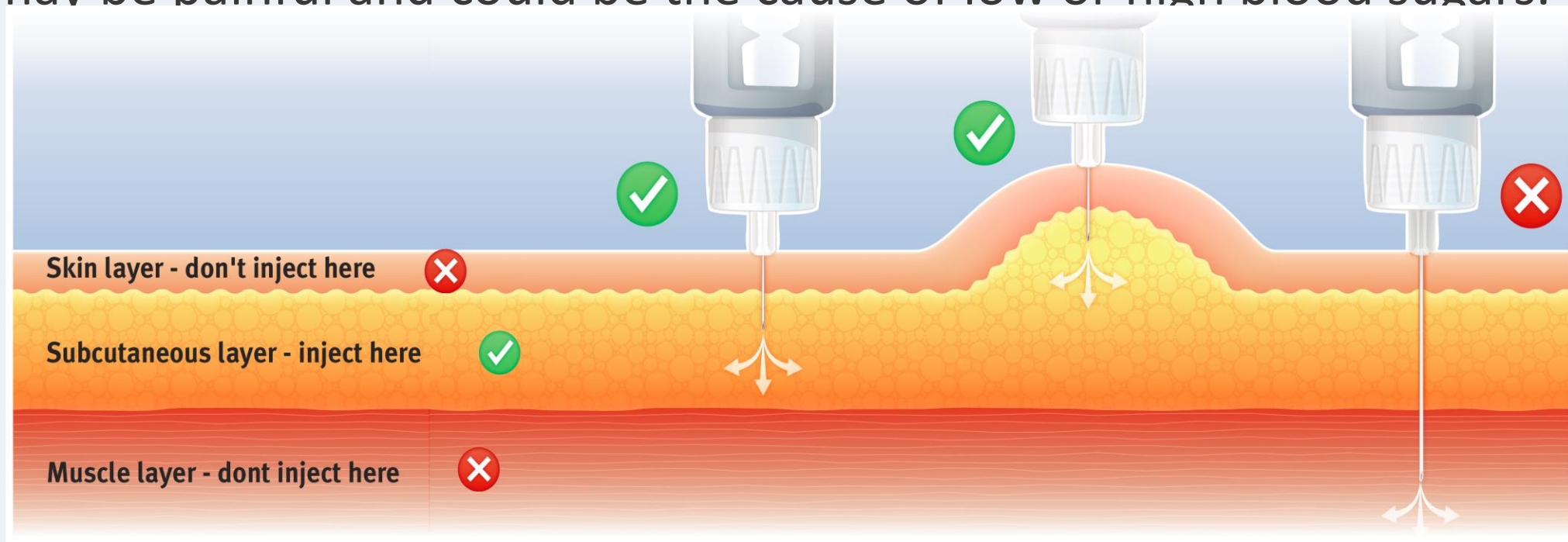
Storage of Insulin

- Unopened insulin vials and cartridges should be stored at refrigeration temperature (2 to 8 °C).
- once insulin is opened for use, it should not be used past the recommended time (usually 28 days but could be up to 56 days).
- Insulin should never be frozen or exposed to extreme heat (greater than 30 °C).
- Do not store insulin in direct sunlight.
- Insulin administered at room temperature may reduce irritation, burning or pain, and facilitates the re-suspension of cloudy insulin.

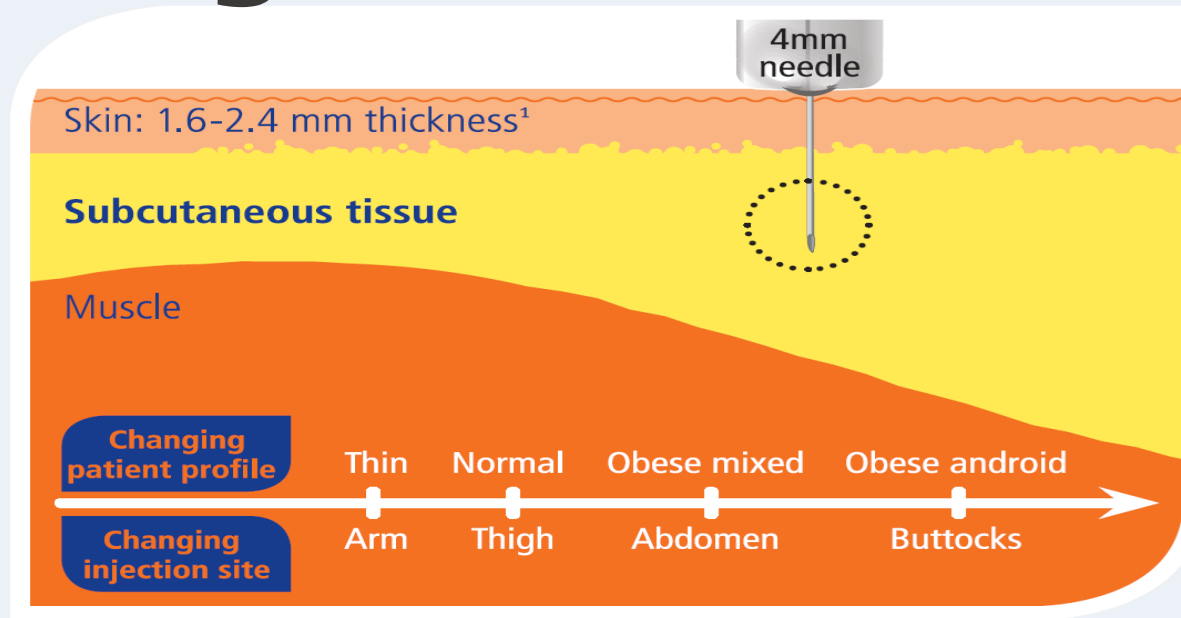


Needle Length

- Insulin is best absorbed in the subcutaneous layer.
- Insulin injected into the muscle will not be absorbed properly. It may be painful and could be the cause of low or high blood sugars.



Needle Length

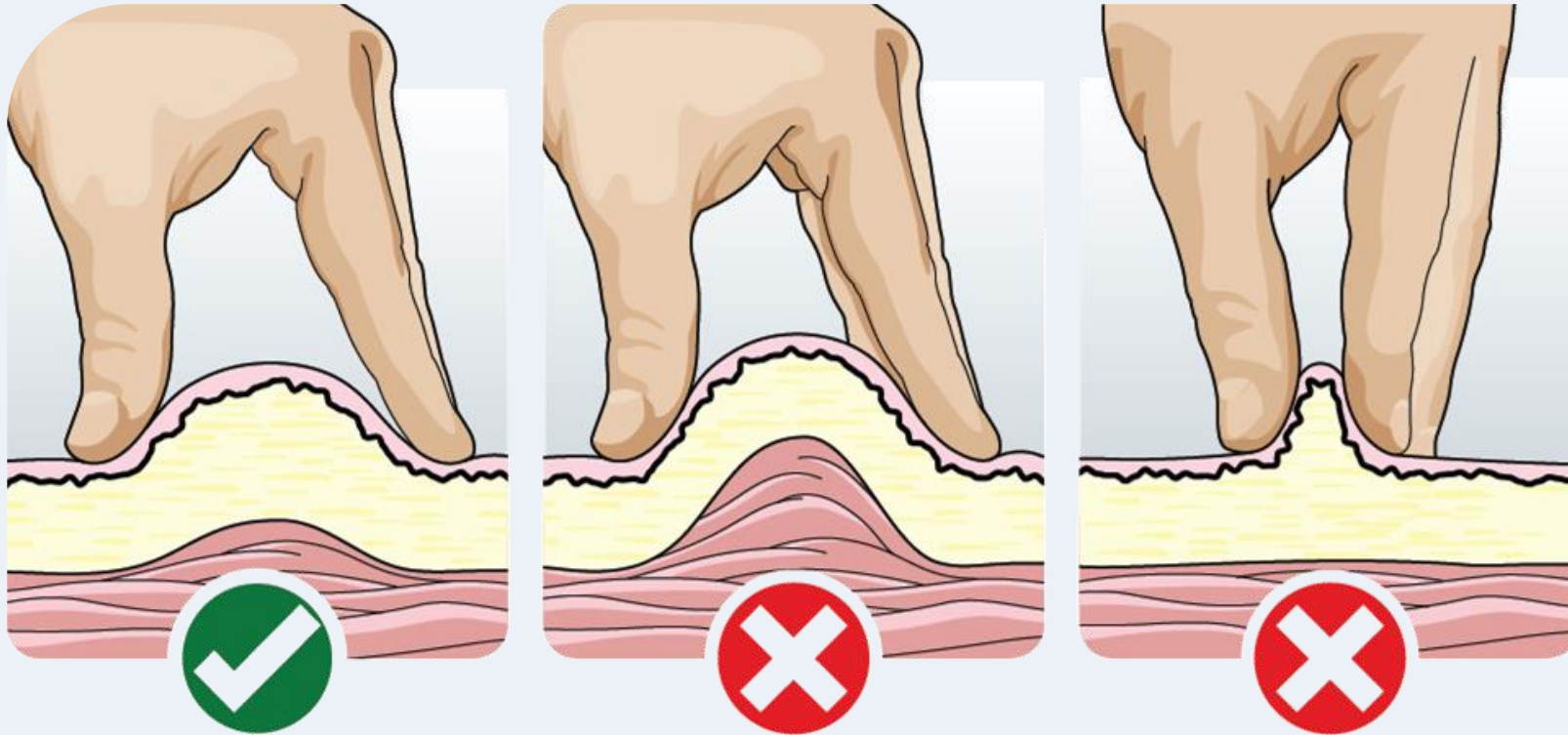


4 mm pen needle is considered the safest pen needle for adults and children regardless of age, sex, ethnicity, or BMI.

4-mm pen needles provide equivalent A1C control to 8-mm and 12-mm pen needles in people with obesity who are taking large doses of insulin.

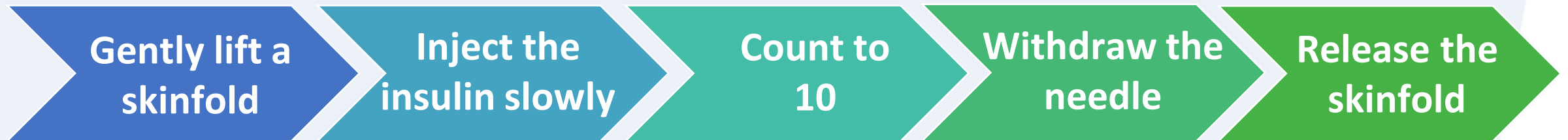
Skin Pinch

- A skin lift may be warranted to prevent an IM injection in a slim limb or abdomen, even when a shorter needle is used.



Lifting Skin Fold

- The optimal sequence when injecting into a skinfold:



4mm

5mm

6mm
(pen or syringe)

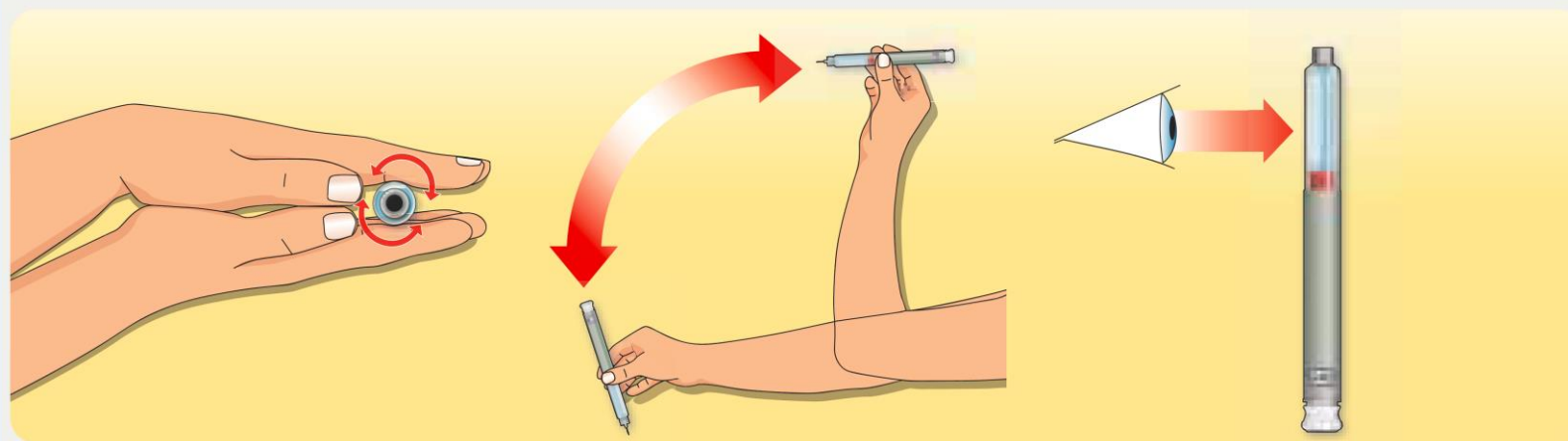
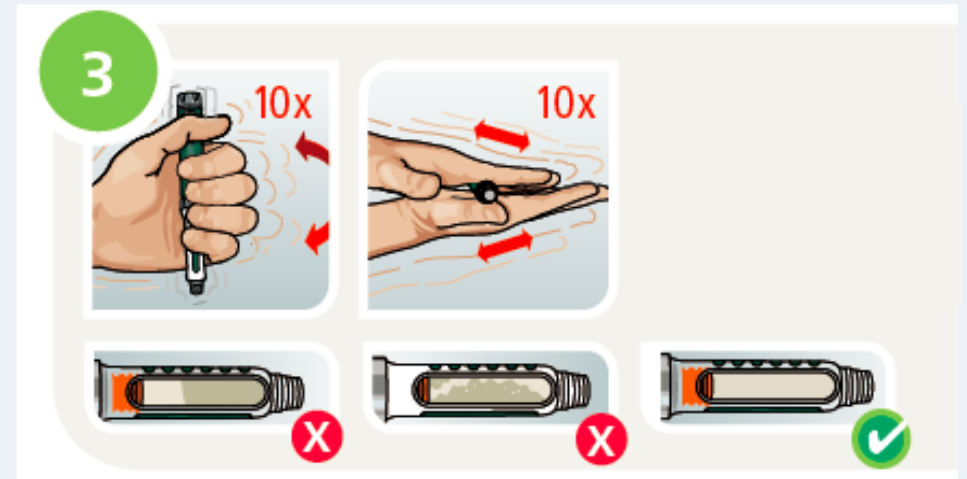
8mm Preferable to use shorter pen needles and syringes

8mm
(pen or syringe)

12.7mm Not Recommended

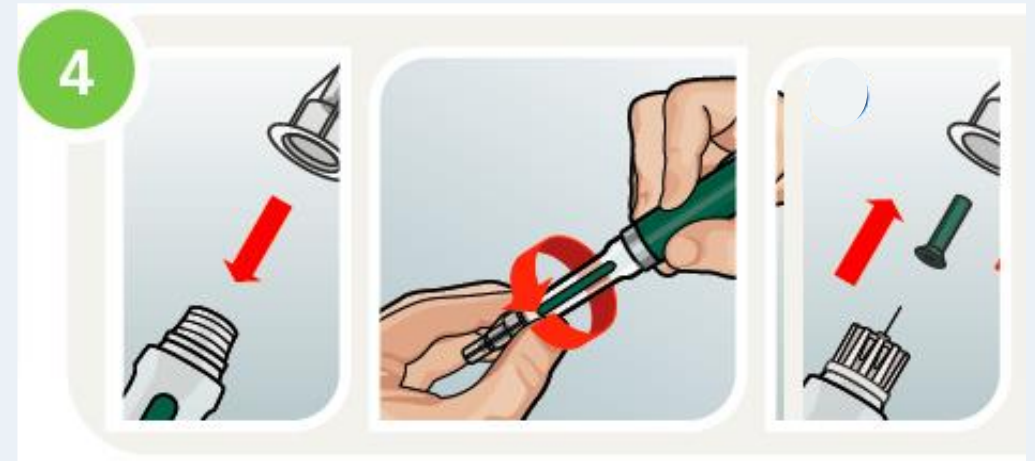
Insulin Injection Technique

- Mix cloudy insulins:
- roll 10 times, then tip 10 times to see milky white consistency.



Insulin Injection Technique

- Attach the pen needle.
- Ensure that the pen needle(PN) is International Organization for Standardization (ISO) certified compatible with the insulin pen.
- Position the PN along the axis of the pen before screwing or snapping it on.
- Pierce straight through the septum of the cartridge.



Insulin Injection Technique

- Prime your pen.
- Prime pen upwards with 2 or 3 units as per pen instructions.
- Repeat if needed until drops come out.
- GLP-1 pens only need to be primed the 1st time you use them.



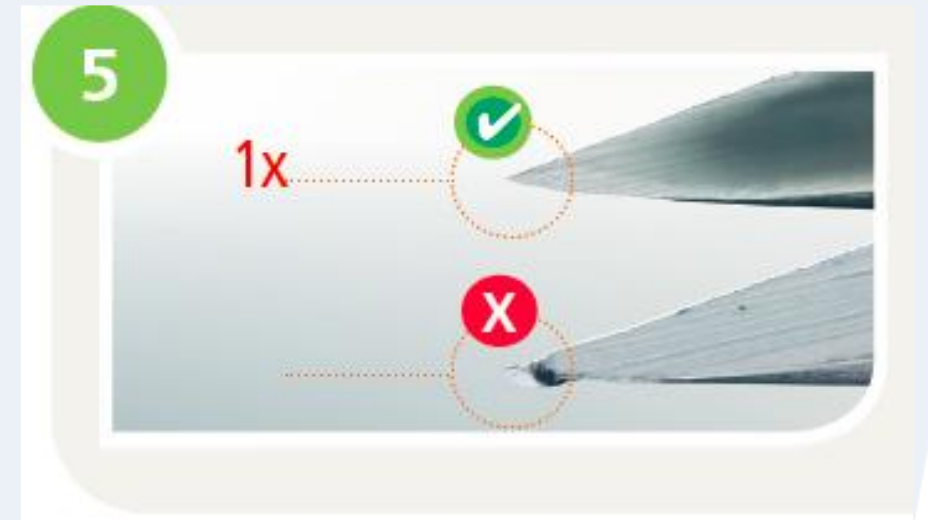
Pen Priming Importance in Correct Dose Delivery

- Greater than 50 μl of air: the accuracy in clinical use might suffer.
- Accumulate 200 μl of air in cartridge, the pen might deliver only 37 % of the dialed dose and a full 2/3 of the dose would be wasted.
- Air buffers the flow rate of the insulin and slows it.
- The greater amount of the air, the slower the flow rate.

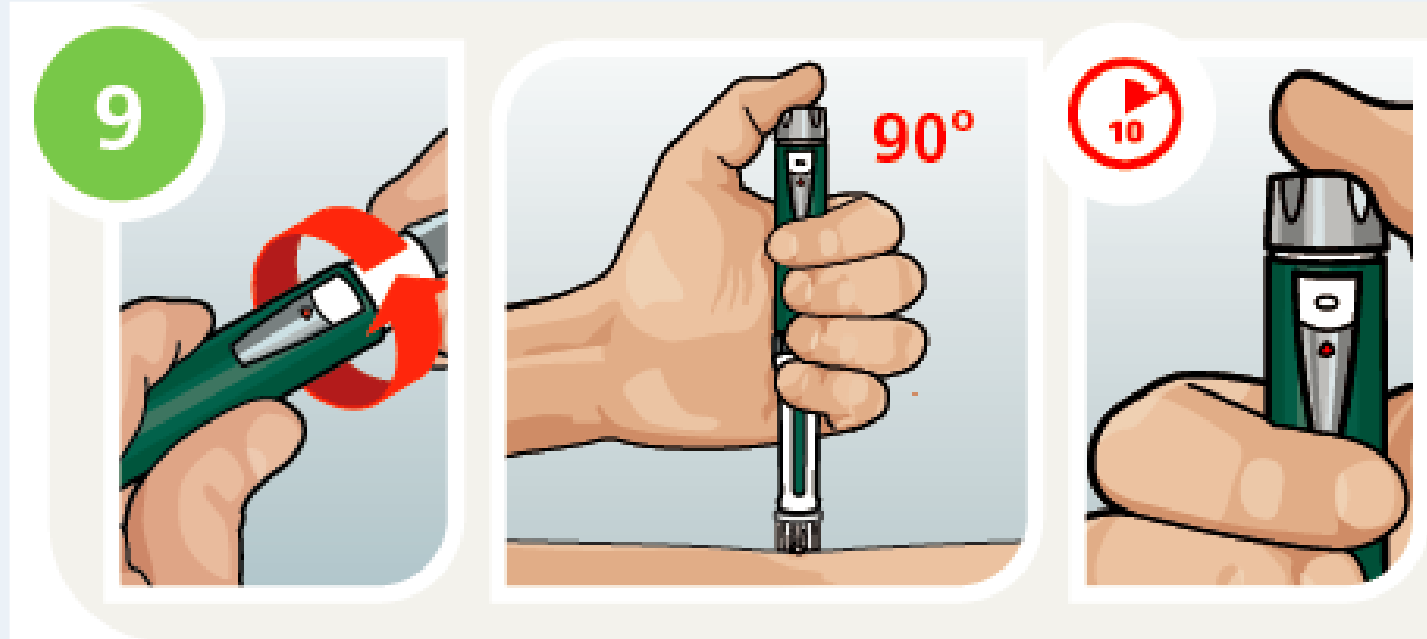


Insulin Injection Technique

- Use pen needles and syringes only once.
- Syringe or pen needles should only be used once.
- Reusing insulin needles is not optimal injection practice and patients should be discouraged from doing so.



Insulin Injection Technique



- Dial dose, Insert, push completely and count to 10.
- Always push the button vertically (along the axis of the pen)

Case 2

- 52 year old female
- Type 2 diabetes
- for 12 years
- Injecting 30/70 biphasic mix insulin for the past 7 years.
 - Injecting 50 units before breakfast and 30 units before evening meal.
- Using an 8mm pen needle.



Current Challenges

- HbA1c has been drifting up over the last 18 months from 7.8% to her most recent value of 8.4%
- Unexplained glycaemic variability
- Occasional episodes of unexplained hypoglycaemia.



Patient Injection Technique Review

- Uses her abdomen and occasionally will use thighs but finds injections there “burn”
- Using an 8mm pen needle
- Rotates by moving from left to right on her abdomen, similar location either side, examination indicates evidence of lipohypertrophy
- Injects at a 90° angle, no lifted skin fold

Lipohypertrophy (LH)

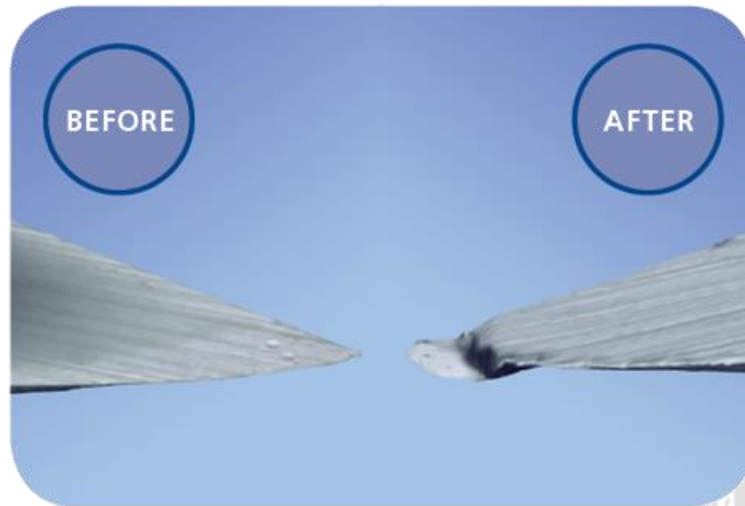
- The most common cutaneous complication of insulin therapy
- Change in the SC tissue
- A raised or mound-like, convex pattern with no change in skin color or hair distribution
- A harder, and more rubbery or less bouncy tissue.



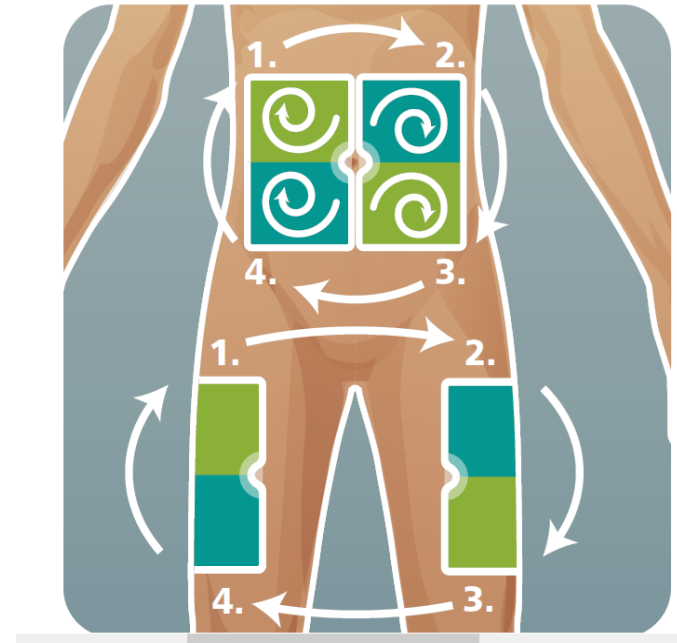
Lipohypertrophy: the Silent Enemy in Diabetes

- Higher HbA1C values
- Unexpected hypoglycemia
- Glycemic variability
- Frequent DKA
- Increased total daily dose of insulin
- Increased cost due to Excessive insulin and Hospitalization

Most important factors associated with LH



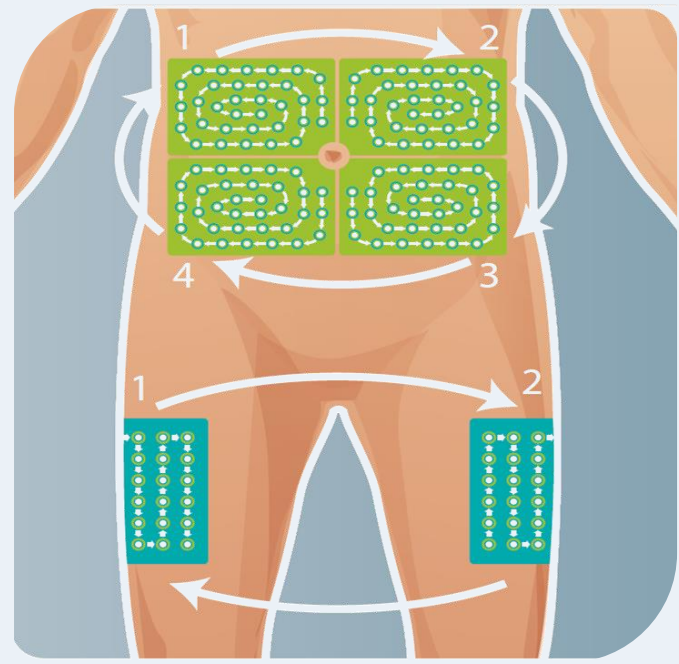
Pen needle reuse



Incorrect rotation

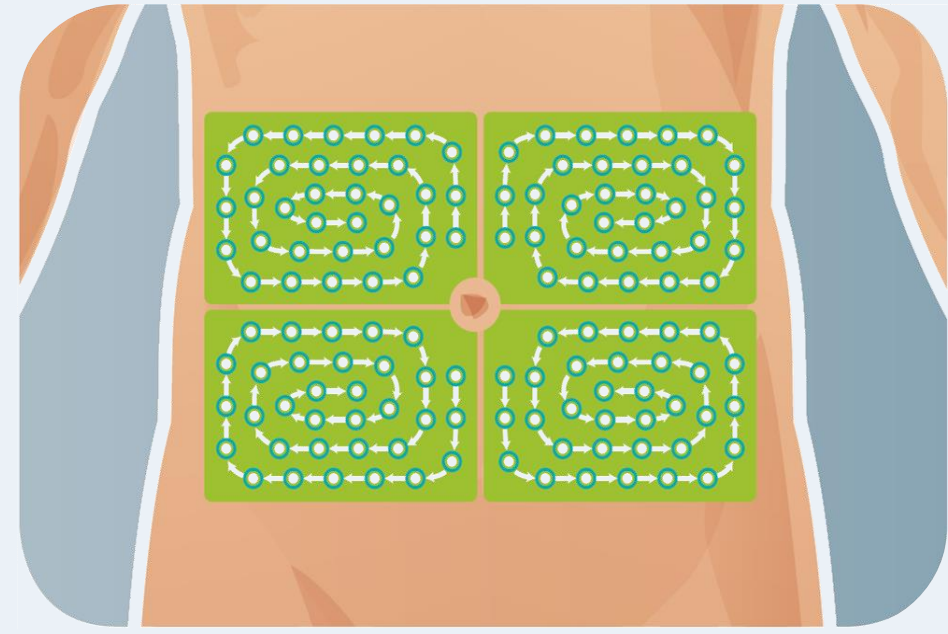
Structured Rotation Plan

Rotate the site you use

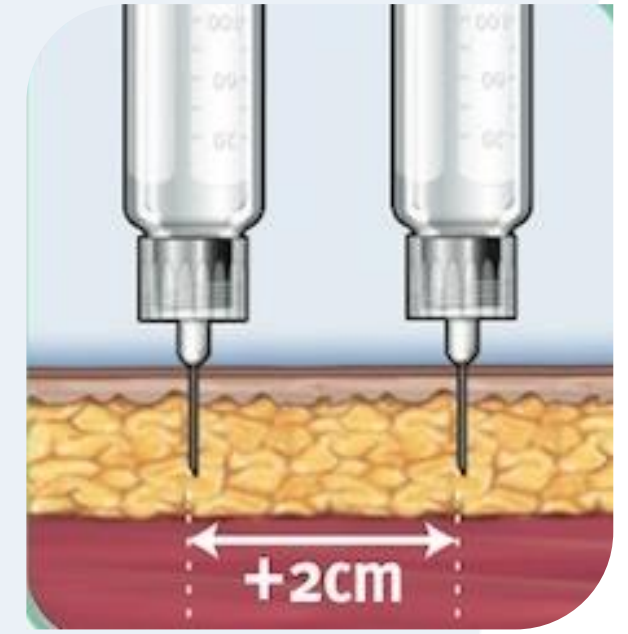


Use 1 zone per week and move clockwise

Rotate within the site you use



Injections within any quadrant should be spaced at least 1-2cm from each other



LH Examination

- Frequency:
 - At least once a year on all persons injecting insulin.
- Patients with LH lesions:
 - More frequently
- Educate patient for monthly self-examination and to report any change to the HCP.
- Technique:
 - Visual Inspection
 - Palpation
- Documentation and monitoring



LH Management

1- Skip LH lesions

By avoiding injections into lipohypertrophic sites over a 3- to 6-month period, these lesions may decrease by up to 50% in diameter or in some instances resolve completely.

LH Management

2-Decrease insulin dose based on patient BG report

- In order to reduce the risk of hypoglycemia when changing from a lipohypertrophic injection site to a healthy site, patients should be cautioned to reduce their insulin dose initially and monitor their blood glucose levels more frequently.

LH Management

3. Increased glucose monitoring
4. Site rotation education
5. Record LH lesion sites
6. LH lesion site examination



Insulin Injection Technique

- A syringe should NEVER be used to remove insulin from a pen with concentrated insulin, as the scale on insulin syringes is made for U-100 insulin only.
- The use of current insulin syringes with concentrated insulin (U-200, U-300 or U-500) could result in an overdose.



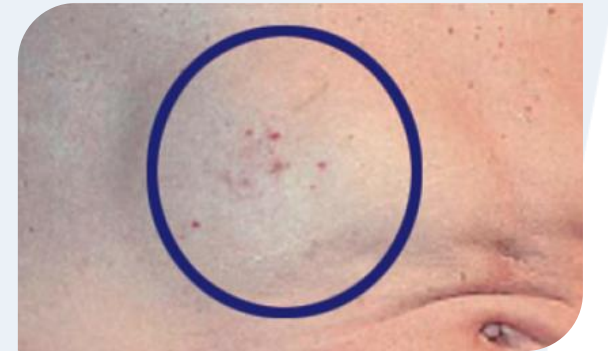
Bleeding and Bruising

- Blood and/or bruising may indicate that a minor capillary has been penetrated
- Bruising and bleeding do not impede medication absorption and does not appear to be associated with choice of injection site.
- Use a thinner gauge pen needle
- Switch to a shorter needle



Bleeding and Bruising

- Avoid indenting the skin & excessive force
- Place the needle into the skin, while maintaining visibility of the needle hub.
- Injection technique review
- Coagulopathy/ drug history



Insulin Leakage

Leakage at cartridge pen and pen needle connection:

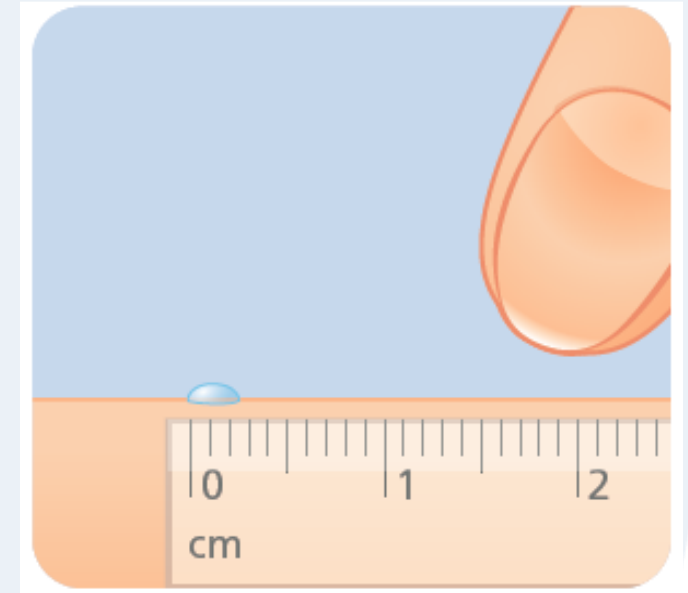
- ISO-Certified pen needle compatible with insulin pens
- Position the PN along the axis of the pen before screwing or snapping it on
- Pierce straight through the septum of the cartridge



Insulin Leakage

Skin leakage:

- A small amount of skin leakage (little pearl of liquid at injection site) can be ignored.
- Use needles with thin-wall or extra thin-wall technology
- Count to 10 after the plunger is fully depressed (More/ less seconds in higher/ lower dose)
- Frequent skin leakage: a direct observation of their self-injection is important to detect possible technique-related issues



Factors That Affect Insulin Absorption

Inadvertent intramuscular (IM) injections may **increase pain** and/or **adversely affect blood glucose control**.



Injecting into areas of lipohypertrophy can result in a significant **delay in insulin absorption** and cause **fluctuating blood glucose results**.



Factors That Affect Insulin Absorption

Exercise, increased skin temperature and massaging at the injection site can **increase the absorption rate of insulin** and potentially result in hypoglycemia.



Some factors can speed up the absorption of your insulin and affect your blood glucose control.



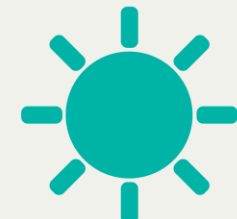
Massage



Exercise



Hot baths



Hot weather

Thank you for your attention...

