Special Considerations for the Special Population

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Diabetes in Older Adults

The definition of elderly or older varies.

- (IDF) : those above 70 years of age
- (ADA) : all aged over 65 years
- (WHO) : 60 years or more of age
- This is a concept that reflects ***an age continuum starting sometime around age 70 and is characterized by a slow, progressive impairment in function that continues until the end of life.***

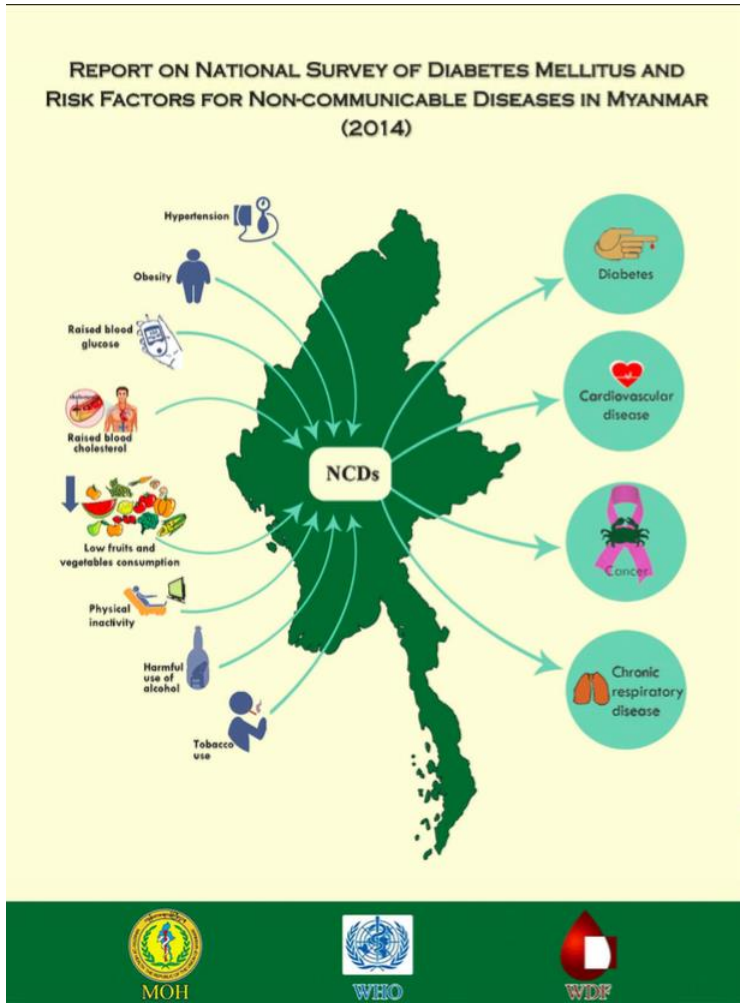
THE GLOBAL NEW LIGHT OF MYANMAR

Formulating health care services for better health of ageing population in rural area of Myanmar

Posted by Global New Light of Myanmar | Date: **October 14, 2018** | in: Articles, Opinion

- Myanmar is facing the emerging issue of increasing number of ageing population.
- Myanmar Elderly People Law (2016) has defined **those 60 years and above as elderly people.**
- Myanmar's 2014 Census:
  - **4.5 millions of ageing population**
  - **8.7% of total population**
  - **40 % are male and 60% are female.**
  - **70% of them is residing in rural area and 30% in urban area**
  - **By 2050, the proportion is expected to reach nearly 20 % of the total population.**

- **~ 25% of people over the age of 65 years have diabetes and**
- **50% of older adults have prediabetes (USA).**



Report on National Survey of Diabetes Mellitus and Risk Factors for Non communicable Diseases in Myanmar in 2014

Ministry of Health
November 2015

This survey was done among a nationally representative sample of 8757 adults aged 25 to 64 years from 52 townships of Myanmar in 2014. The survey covered 4 major behavioural risk factors (tobacco use, harmful use of alcohol, insufficient physical activity and low consumption of fruit and vegetable consumption) and 4 major biological risk factors (obesity, hypertension, raised blood glucose and abnormal lipid levels). This

Prevalence of DM in Myanmar : 10.5%

Prevalence of DM in Elderly in Myanmar: ?

Older individuals with diabetes have higher rates of

- Premature death
- Functional disability
- Accelerated muscle loss
- Coexisting illnesses (hypertension, CAD , and CVA)

- According to the **Myanamar hospital statistics report (2014 – 2016)**, the leading causes of morbidity and mortality of ageing population are NCDs such as Hypertension, Diabetes, IHD and CVA
- Therefore, the health care services should be formulated according to the needs of ageing population.

Special Considerations in the Management of Diabetes in Older Adults

- Older adults with diabetes differ from their younger-adult counterparts in terms of glycemic goals and management of other cardiovascular risk factors.
- It is crucial for providers to be aware of these differences to allow for proper assessment and to develop pharmacotherapeutic strategies that are adapted to unique challenges.

“All Older Adults Are Not the Same”

- There is extensive variability within this population.
- The unique physiological constitution, biomedical needs, and psychosocial challenges of the elderly call for an **individualized approach to their management.**
- Older adults with diabetes require some **unique considerations for developing treatment goals and management strategies.**

A person's living situation and degree of available social support can affect both glycemic goals and the ways in which diabetes is managed.

Diabetes management can differ across the spectrum according to where elderly patients live (i.e., whether they are community dwelling or a nursing home).

Functional status

Definition: Functional impairment is defined as difficulty performing, or requiring the assistance of another person to perform, one or more of the following Activities of Daily Living (ADL):

Activities of Daily Living (ADLs)*	**Instrumental Activities of Daily Living (IADLs)****
Bathing	*Administering own medication*
Dressing	*Grocery shopping*
Toileting	*Preparing meals*
Transfers	Using the telephone
Grooming	Driving and transportation
Feeding	Handling own finances
	Housekeeping
	Laundry

Note: italicized items are most important

*ADLs are the essential elements of self-care. Inability to independently perform even one activity may indicate a need for supportive services.

**IADLs are associated with independent living in the community and provide a basis for considering the type of services necessary in maintaining independence.

Some elderly people with diabetes are high functioning and medically stable, can perform self-care, and may or may not need caregivers.
There are many people with type 2 diabetes who are over the age of 70 who are otherwise well and not frail and have at least a decade of healthy life expectancy.
These people should be treated to targets.

However, for others who are unable to follow instructions and manage their own medication regimen, diabetes management can be tricky and dangerous.

Older adults with diabetes also are at greater risk for “geriatric syndromes”

- Cognitive impairment
- Polypharmacy
- Depression
- physical disability
- Injurious falls and fractures
- Persistent pain
- It is important to recognize these conditions because they can interfere with patients’ ability to perform diabetes self-care.

Cognitive Impairment

- Older adults with diabetes are at
  - higher risk of cognitive decline.
  - higher incidences of all-cause dementia, Alzheimer disease, and vascular dementia

  - Poor glycemic control is associated with a decline in cognitive function, and longer duration of diabetes is associated with worsening cognitive function.

- The presentation of cognitive impairment ranges from subtle executive dysfunction to memory loss and overt dementia.
- Cognitive dysfunction makes it difficult for patients to perform **complex self-care tasks**, such as glucose monitoring and adjusting insulin doses.
- It also hinders their ability to appropriately **maintain the timing and content of diet.**

- Simple assessment tools, such as the
- Mini-Mental State Examination
- Montreal Cognitive Assessment
- which may help to identify patients requiring neuropsychological evaluation, particularly those in whom dementia is suspected (i.e., experiencing memory loss and decline in their basic and IADL).

Cognitive impairment: Mini-Cog Test

- Consisting of two parts: 3-item recall plus clock draw test (CDT).
- Instruct the patient to listen carefully as you name 3 unrelated objects and then to repeat the object names.
- Instruct the patient to draw the face of a clock, either on a blank sheet of paper, or on a sheet with the clock circle already drawn on the page. After the patient puts the numbers on the clock face, ask him or her to draw the hands of the clock to read a specific time, such as 11:20. These instructions can be repeated, but no additional instructions should be given. Give that patient as much time as needed to complete the task. The CDT serves as the recall distractor.
- Ask the patient to repeat the 3 previously presented object names.

Mini-Cog™

Instructions for Administration & Scoring

ID: _____ Date: _____

Step 1: Three Word Registration

Look directly at person and say, "Please listen carefully. I am going to say three words that I want you to repeat back to me now and try to remember. The words are [select a list of words from the versions below]. Please say them for me now." If the person is unable to repeat the words after three attempts, move on to Step 2 (clock drawing).

The following and other word lists have been used in one or more clinical studies.[1-3] For repeated administrations, use of an alternative word list is recommended.

Version 1	Version 2	Version 3	Version 4	Version 5	Version 6
Banana	Leader	Village	River	Captain	Daughter
Sunrise	Season	Kitchen	Nation	Garden	Heaven
Chair	Table	Baby	Finger	Picture	Mountain

Step 2: Clock Drawing

Say: "Next, I want you to draw a clock for me. First, put in all of the numbers where they go." When that is completed say: "Now, set the hands to 10 past 11."

Use preprinted circle (see next page) for this exercise. Repeat instructions as needed as this is not a memory test. Move to Step 3 if the clock is not complete within three minutes.

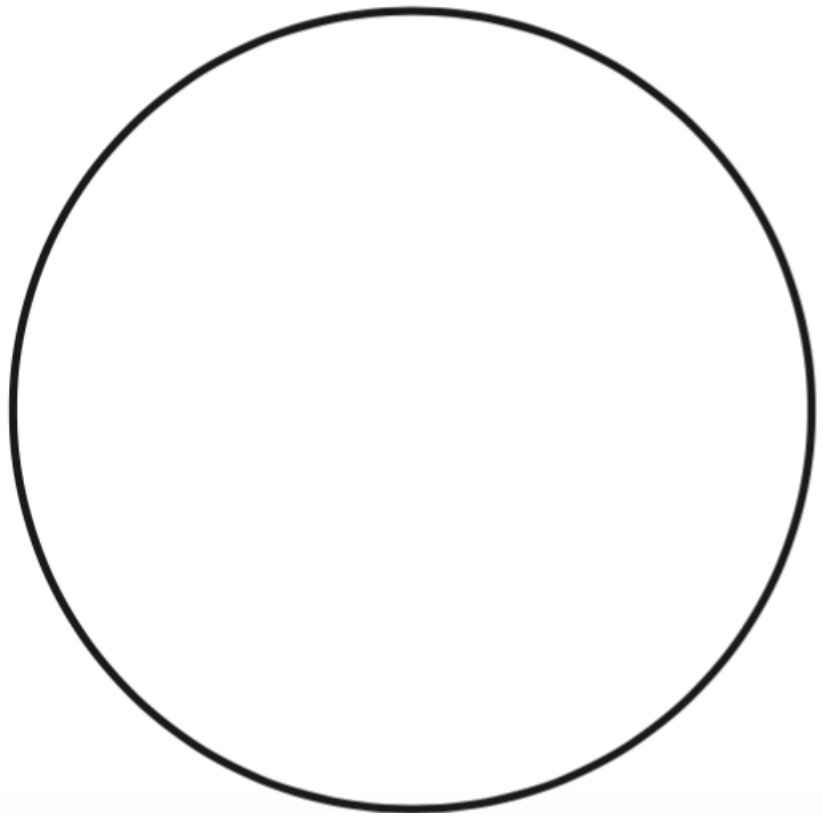
Step 3: Three Word Recall

Ask the person to recall the three words you stated in Step 1. Say: "What were the three words I asked you to remember?" Record the word list version number and the person's answers below.

Word List Version: _____ Person's Answers: _____ _____ _____

Clock Drawing

ID: _____ Date: _____



Scoring

Word Recall: _____ (0-3 points)	1 point for each word spontaneously recalled without cueing.
Clock Draw: _____ (0 or 2 points)	Normal clock = 2 points. A normal clock has all numbers placed in the correct sequence and approximately correct position (e.g., 12, 3, 6 and 9 are in anchor positions) with no missing or duplicate numbers. Hands are pointing to the 11 and 2 (11:10). Hand length is not scored. Inability or refusal to draw a clock (abnormal) = 0 points.
Total Score: _____ (0-5 points)	Total score = Word Recall score + Clock Draw score. A cut point of <3 on the Mini-Cog™ has been validated for dementia screening, but many individuals with clinically meaningful cognitive impairment will score higher. When greater sensitivity is desired, a cut point of <4 is recommended as it may indicate a need for further evaluation of cognitive status.

Scoring

- Give 1 point for each recalled word after the CDT distractor.
  - Score 0–3.
- The CDT is considered normal if all numbers are present in the correct sequence and position, and the hands readably display the requested time.
- A score of 0 indicates dementia (regardless of CDT results).
- A score of 1 or 2 with an abnormal CDT indicates dementia
- A score of 1 or 2 with a normal CDT indicates absence of dementia
- A score of 3 indicates absence of dementia (regardless of CDT results).

- Annual screening for cognitive impairment is indicated for adults 65 years of age or older for early detection of mild cognitive impairment or dementia.
- Screening for cognitive impairment should additionally be considered in the presence of a **significant decline in clinical status**, inclusive of increased difficulty with self-care activities, such as
- **errors in calculating insulin dose**
- **difficulty counting carbohydrates**
- **skipping meals**
- **skipping insulin doses**
- **difficulty recognizing, preventing, or treating hypoglycemia**.

- People who screen positive for cognitive impairment should receive diagnostic assessment as appropriate, including referral to a behavioral health provider for formal cognitive/neuropsychological evaluation.
- When clinicians are managing patients with cognitive dysfunction, it is critical to simplify drug regimens (**with lesser frequency, flexible timing, and easy method of administration)**and to involve caregivers in all aspects of care.

Geriatric Depression Scale: Short Form

Choose the best answer for how you have felt over the past week:

1. Are you basically satisfied with your life? YES / **NO**

2. Have you dropped many of your activities and interests? **YES** / NO

3. Do you feel that your life is empty? **YES** / NO

4. Do you often get bored? **YES** / NO

5. Are you in good spirits most of the time? YES / **NO**

6. Are you afraid that something bad is going to happen to you? **YES** / NO

7. Do you feel happy most of the time? YES / **NO**

8. Do you often feel helpless? **YES** / NO

9. Do you prefer to stay at home, rather than going out and doing new things? **YES** / NO

10. Do you feel you have more problems with memory than most? **YES** / NO

11. Do you think it is wonderful to be alive now? YES / **NO**

12. Do you feel pretty worthless the way you are now? **YES** / NO

13. Do you feel full of energy? YES / **NO**

14. Do you feel that your situation is hopeless? **YES** / NO

15. Do you think that most people are better off than you are? **YES** / NO

Answers in **bold** indicate depression. Score 1 point for each bolded answer.

A score > 5 points is suggestive of depression.
A score ≥ 10 points is almost always indicative of depression.
A score > 5 points should warrant a follow-up comprehensive assessment.

Polypharmacy

- Polypharmacy heightened risk of **adverse effects, drug–drug interactions, iatrogenic complications** and **cost**
- These can be minimized by following the "**law of therapeutic parsimony".**
- This law states that **minimum drug preparations and doses should be used, as long as they are able to achieve optimal outcomes**.

TABLE 4. Common Geriatric Syndromes Associated With Diabetes

Condition	Strategies for Optimizing Care
Cognitive dysfunction	• Avoid tight glucose control or complex diabetes medication regimens an treatment programs • Educate caregivers, if available • Avoid diabetes treatments with high risks of hypoglycemia • Recommend alarms and pill boxes for medication reminders
Depression	• Identify, assess, and treat the depression
Physical disabilities (e.g., hearing loss, visual impairment, and gait abnormalities)	• Recommend assistive devices (e.g., hearing aids, glasses, canes, and walkers) • Recommend a safe exercise program based on current physical capacity
Polypharmacy and medication noncompliance	• Ask patients to bring all medication bottles or list of medications and dosages with them to appointments, including over-the-counter medications • Review patients' medications at each visit • Discontinue any medications that do not have benefit

how the presence of geriatric syndromes can interfere with patients' ability to perform self-care tasks and offers strategies for optimizing care in such situations.

Risk of Hypoglycemia and Poor Outcomes

- Hypoglycemia is one of the major limiting factors when trying to achieve recommended levels of glycemic control at any age.
- The elderly are especially prone to this complication.
- Hypoglycemia unawareness is also common in older adults.
- Glucagon and epinephrine response to hypoglycemia (the endocrine defense mechanism to correct low blood glucose) are blunted in the elderly.

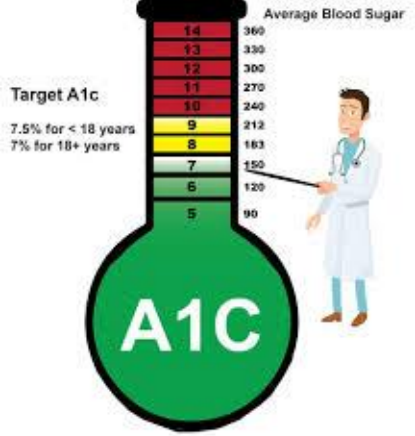
Risk of Hypoglycemia and Poor Outcomes

- Hypoglycemia also has the potential to **precipitate or trigger cardiovascular events, worsen cognitive function, and lead to poor outcomes**.
- It may also increase in **falls and fractures, fear of falling, confusion, delirium, and symptoms such as fatigue and dizziness.**

Risk of Hypoglycemia and Poor Outcomes

- When choosing medications for elderly patients,
- **Avoiding medications with a high risk of hypoglycemia is a reasonable first step.**
- **Regimens and drugs with a low risk of hypoglycemia must be preferred in this age group.**
- Hypoglycemia awareness training (training individuals with diabetes to recognize, limit, manage, and prevent low blood glucose) is an integral part of diabetes care for the elderly.

Role of A1C in the Care of Older Adults



- A1C remains the gold standard test to assess long-term glycemic control in the management of diabetes.
- However several factors commonly seen in older adults can falsely raise or lower A1C.
- Normal aging is associated with a progressive increase in A1C

Role of A1C in the Care of Older Adults

- A1C is dependent on the length of time the RBCs circulate in the blood.
- increase RBC circulation time can falsely elevate A1C levels by increasing the exposure time to glucose and protein glycation.
- decrease RBC circulation time can falsely lower A1C levels.

TABLE 5. Conditions That Can Falsely Increase or Decrease A1C

Condition	Possible Mechanism	False Change in A1C
Age	Increased insulin resistance	↑
Race (African American or Hispanic)	Unknown	↑
Iron deficiency anemia	Decreased RBC turnover, longer glycation exposure	↑
Hemolytic anemia, sickle cell anemia, or thalassemia	Increased RBC turnover	↓
Anemia of chronic diseases	Unknown	↑ or ↓
Recent transfusion	Increased RBC turnover	↓
Polycythemia	Longer RBC life span	↑
Hemoglobinopathies	Interference from hemoglobin variants	↓
Hemodialysis	Shorter RBC life span	↓
Erythropoietin therapy	Increased young RBCs/shorter RBC life span	↓
Metabolic acidosis/uremia	Carbamylation of hemoglobin	↑

- Elderly patients have a high prevalence of these conditions and for whom A1C-derived average glucose values may not correlate with average glucose as measured by continuous glucose monitoring.
- There can be a significant discordance between glucose-based and A1C-based diagnosis of diabetes in this age group.

- A1C reflects mean glucose over a 90-day period.
- It is a **poor marker of glucose variability or risk of hypoglycemia**.
- Thus, **simply liberalizing A1C goals** in this population **does not eliminate the risk of hypoglycemia.**
- It is important to avoid dependence on A1C as a sole parameter for glycemic goals in frail elderly with multiple comorbidities that may affect A1C measurement.
- **The best current option is to use finger-stick blood glucose testing results to guide therapy when A1C is deemed unreliable.**

Glycemic Goal-setting

Factors to be considered

- **Patients' overall health**
- **Comorbidities**
- **Cognitive and physical status**
- **Hypoglycemia risk**
- **Life expectancy**

ADA

- glycemic goals are stratified based on patient characteristics and health status.
- major consideration is given to
- **coexisting severe medical conditions**
- **presence of cognitive dysfunction**
- **ability to perform day-to-day activities.**

- **“Functional status”** is a key factor in determining the target A1C .
- As functional independence is lost and/or life expectancy shortens, the benefit of lower glycemic targets is diminished and the risk of hypoglycemia increases.
- Therefore, **functional status and life expectancy**, rather than age itself, that helps determine glycemic targets.

Coexisting chronic illnesses: conditions serious enough to require medications or lifestyle management

1. congestive heart failure
2. Hypertension
3. myocardial infarction
4. stroke.
5. stage 3 or worse chronic kidney disease
6. incontinence

1. Cancer
2. Depression
3. Emphysema
4. Falls
5. Arthritis

“Multiple” means at least three, but many patients may have five or more

End-stage Chronic Illness

- stage 3–4 congestive heart failure
- oxygen-dependent lung disease
- chronic kidney disease requiring dialysis
- uncontrolled metastatic cancer

- The presence of a single end –stage chronic illness may cause significant symptoms or impairment of functional status and significantly reduce life expectancy.

TABLE 3. A Framework for Treatment Goals for Diabetes in Older Adults From the ADA

Patient Category and Associated Characteristics	Suggested A1C Goal (%)	Suggested Average Fasting Glucose Target Range (mg/dL)	Suggested Average Bedtime Glucose Target Range (mg/dL)	Rationale
Healthy • Few comorbidities • Functionally and cognitively intact	<7.5	90–130	90–150	• Significant life expectancy • Goal is to prevent future macrovascular and microvascular complications
Complex/intermediate • Multiple chronic comorbidities *or* • Two or more IADL impairments *or* • Mild to moderate cognitive impairment	<8	90–150	100–180	• Intermediate life expectancy • High treatment burden • At risk for hypoglycemia and falls
Very complex/poor health • Residency in a long-term care facility *or* • End-stage chronic illnesses *or* • Two or more IADL impairments *or* • Moderate to severe cognitive impairment	<8.5	100–180	110–200	• Limited life expectancy • Benefit uncertain • High risk of hypoglycemia and falls

2013 IDF global guideline “Managing Older People with Type II Diabetes”

- **three major categories**
- **For functionally independent older adults**
  - A1C goal of 7–7.5%
- **for functionally dependent, frail patients or patients with dementia**,
  - an A1C goal of 7–8% is recommended.
- **For end-of-life care**,
  - avoiding a specific A1C goal and focusing instead on avoiding symptomatic hyperglycemia.

2018, the American College of Physicians

- "Clinicians should treat patients with type 2 diabetes **to minimize symptoms** related to hyperglycemia and **avoid targeting an HbA1c** level in
  - patients with a **life expectancy <10 years** due to advanced age (**80 years or older**)
  - residence in a **nursing home**
  - chronic conditions (such as **dementia, cancer, ESRD , or severe COPD or CHF**)
- because the harms outweigh the benefits in this population."

Aim of Management

- to achieve comfort, optimal quality of life, resolution of symptoms, and avoid acute complications. Thus, numerical targets are not as important as symptomatic well-being. HbA1c targets can be relaxed .
- Another challenge in this population is a higher frequency of acute illnesses and frequent changes in overall health, which can affect glucose control and lead to decline in cognitive functioning and physical status. In such cases, readjust treatment goals .

Best Approach to Pharmacotherapy in Older Adults

Lifestyle modification is important as the starting point for all patients with diabetes, including older adults.

Nutrition

- Although very restrictive diets are not recommended for older adults, counseling to **avoid large carbohydrate loads at any one meal** can reduce glucose excursions without unnecessary dietary restriction.

- Alteration in taste,
- Reduced appetite due to drugs
- Difficulty in chewing
- Gastric irritation
- Gastrointestinal dysmotility (diarrhea, constipation, or frequent change in bowel habits)
- Malabsorption
- may compromise nutritional status.

- Diabetes in the aging population is associated with reduced muscle strength, poor muscle quality, and accelerated loss of muscle mass, resulting in “**sarcopenia”**.
- Frailty is characterized by **decline in physical performance and an increased risk of poor health outcome**s due to physiologic vulnerability to clinical, functional, or psychosocial stressors.

- Inadequate nutritional intake, particularly inadequate protein intake, can increase the risk of sarcopenia and frailty in older adults.
- Management of frailty in diabetes includes optimal nutrition with adequate protein intake combined with an exercise program that includes aerobic and resistance training.
-

Hydration

- Dysfunctional thirst mechanisms may act as an obstacle to adequate fluid intake, thus leading to dehydration.
- A rule of thumb to optimal fluid intake is
- 10 ml/kg for the first 10 kg body weight
- 50 ml/kg for the next 10 kg
- 15 ml/kg for further weight.

Physical Activity and Mobility

- In the elderly, maintenance of mobility along with regular physical activity is an integral part of nursing care.
- Such exercises help prevent and reduce the risk of sarcopenia, or muscle loss. This, in turn, helps prevent falls and fractures as well.
- Flexibility exercises and yoga, along with mobility exercises, should be integrated into diabetes care and encouraged.
- Those at risk of osteoporosis should avoid high impact exercises.
- Low impact exercises, in which at least one foot is on the ground at all times, may be practiced.

Exercise

- It is important to consider patients' physical abilities when developing an exercise plan.
- For example, older adults who are **not very active and at risk of falls** should be encouraged to walk for
- **5–10 minutes**,
- **two to three times per day**,
- **inside the house**.
- The exercise program can be increased gradually as tolerated.

Pharmacological Interventions

- Follow the same hierarchy of choosing a glucose-lowering therapy as recommended for younger adults.
- In general, elderly persons respond to lower doses and do not require aggressive glucose-lowering therapy.
- It is important to match complexity of the treatment regimen to the self-management ability of an older patient.

METFORMIN

Benefits in Older Adults	Cautions in Older Adults	Caveats and Additional Considerations
• Safe to use if no contraindications • Low risk of hypoglycemia • Low cost	• May cause gastrointestinal disturbances • May cause weight loss in frail older adults • Associated with vitamin B12 deficiency	Considered “first-line” treatment unless contraindicated Extended-release formulation may decrease gastrointestinal disturbances

SULPHONYLUREA

Benefits in Older Adults	Cautions in Older Adults	Caveats and Additional Considerations
• Low cost	•Hypoglycemia risk • Drug interactions with some common geriatric drugs (such as warfarin and allopurinol)	• Consider short-acting agents (i.e., glipizide) to reduce risk of hypoglycemia • Avoid glyburide because of higher risk of hypoglycemia

Meglitinides

Benefits in Older Adults	Cautions in Older Adults	Caveats and Additional Considerations
• Can skip doses if meals are skipped • Useful to take before one large meal to control postprandial hyperglycemia	• Multiple doses before each meal increase pill burden •High cost	• May be useful in older adults with variable eating habits

Dipeptidyl peptidase 4 inhibitors

Benefits in Older Adults	Cautions in Older Adults	Caveats and Additional Considerations
• Low risk of hypoglycemia	• Nausea, vomiting, stomach discomfort, and diarrhea • High cost	• Well tolerated in frail elderly because of once-daily pill formulation

Few side effects and minimal hypoglycemia, but their costs may be a barrier.
DPP-4 inhibitors do not increase major adverse cardiovascular outcomes

Thiazolidinediones

Benefits in Older Adults	Cautions in Older Adults	Caveats and Additional Considerations
• Low risk of hypoglycemia • Can be used in impaired renal function • Well tolerated and effective in reversing insulin resistance	• Edema and congestive heart failure • Increased bone loss and fracture risk • Concerns about bladder cancer	• Many contraindications in elderly (e.g., congestive heart failure, edema, and high risk of falls and fractures) • In those with limited life expectancy, less concerns for bladder cancer

if used at all, should be used **very cautiously** in those with, or at risk for, CHF and those at risk for falls or fractures.

Sodium–glucose cotransporter 2 inhibitors

Benefits in Older Adults	Cautions in Older Adults	Caveats and Additional Considerations
Low risk of hypoglycemia • Benefits for patients with ASCVD or CHF • Benefits to decrease progression of renal disease	• Increased risk for genital yeast infections and UTI , dehydration, weight loss, hyperkalemia, and elevated LDL • May increase risk of euglycemic DKA	• Limited safety profile in older adults (long-term experience in this population is limited)

Insulin

Benefits in Older Adults	Cautions in Older Adults	Caveats and Additional Considerations
• Once-daily basal insulin is effective with low complexity	High risk of hypoglycemia	•Avoid complex regimen • Using basal insulin doses in the morning to control fasting blood glucose and noninsulin agents to control postprandial hyperglycemia is a good strategy in older adults • Avoid a long-term sliding-scale insulin regimen

Insulin therapy

- The indications for insulin are similar in adults of all age groups.
- Insulin can be used safely in older adults as long as the complexity of the regimen is not overwhelming.
- Use of basal insulin + noninsulin agents is well tolerated .
- In patients who are not on any basal insulin, it should be added once daily in the morning.
- For patients who are already on basal insulin, the timing of injections should be moved to morning if they have been getting their basal insulin at bedtime.

Insulin therapy

- Basal insulin is tolerated better when given in the morning because postprandial glucose contributes more than fasting glucose to overall hyperglycemia in older patient.
- Dosing basal insulin in the morning allows the use of higher doses titrated to fasting glucose levels and lowers the risk of early-morning hypoglycemia.

Insulin therapy

- Once-daily regimens should be preferred over twice-daily regimens.
- For patients on premixed insulin, 70% of the dose should be managed as basal insulin and 30% as mealtime insulin.
- The dose of basal insulin should be increased by 2–3 units every 5–7 days until fasting glucose is in the individualized target range.
- **For most older adults, 90–150 mg/dL is a reasonable fasting glucose target range**.
- Mealtime insulin should be discontinued while adding noninsulin agents.

Insulin therapy

- The use of insulin therapy requires that patients or their caregivers have good visual and motor skills and cognitive ability.
- Insulin is usually self-administered, but elderly persons with visual, tactile, or motor impairment may need support in insulin injection as well as for glucose monitoring and dose titration.

Insulin therapy

- Pen devices should be preferred over syringes and vials for insulin delivery.
- Modern insulin delivery devices are available which can be used easily by visually and functionally challenged older adults.
- Examples include pens with large-sized numbers, audible clicks on dose dialing, and low-pressure requirement for administration.

- **“Tight glycemic control”** in older adults with multiple medical conditions is considered **overtreatment** and is associated with an increased risk of hypoglycemia; unfortunately, overtreatment is common in clinical practice.

Deintensification /deprescribing of regimens in patients taking **noninsulin** glucose-lowering medications

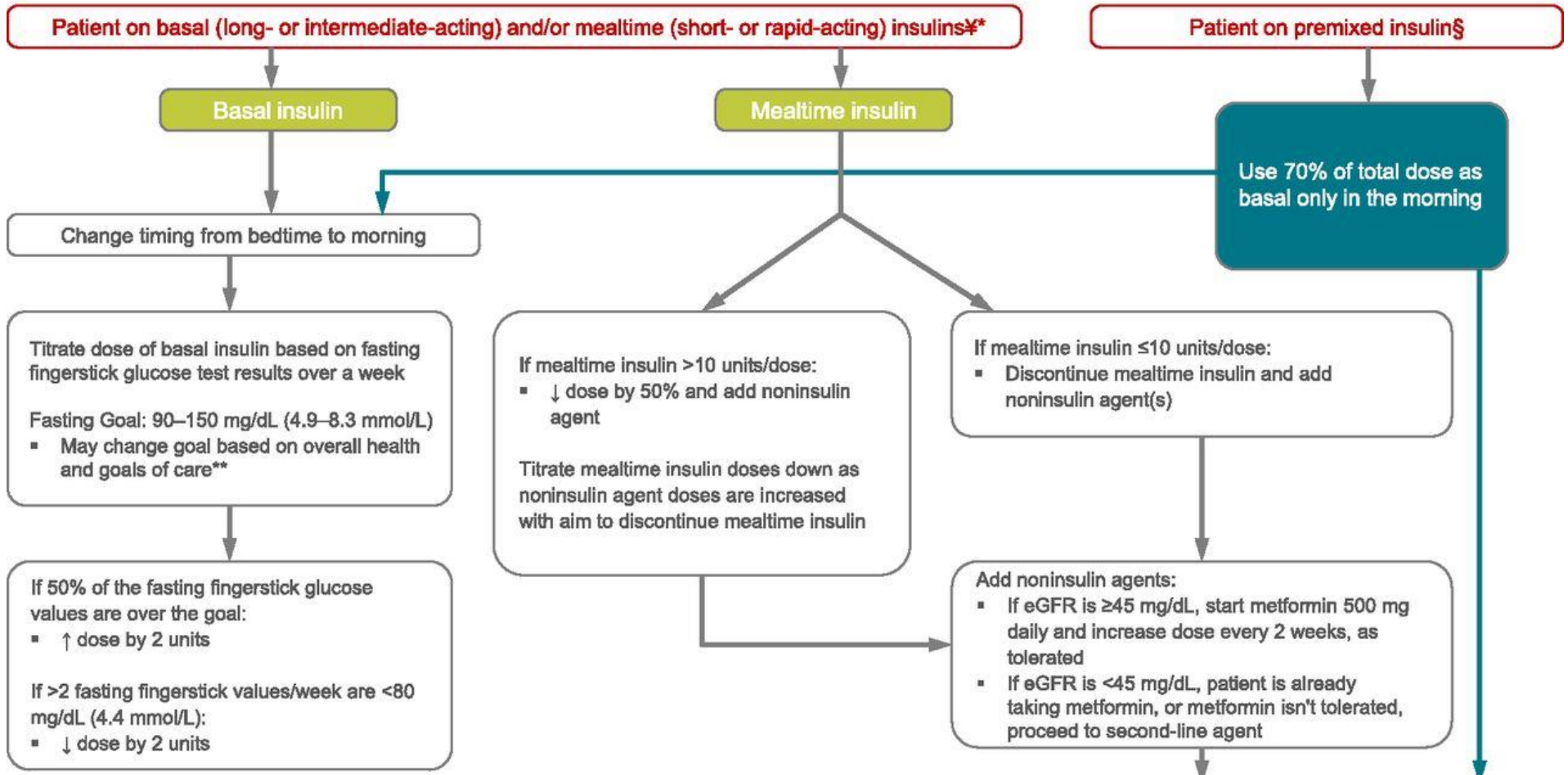
- decreasing the dose or frequency of administration of a treatment
- or
- discontinuing a treatment altogether.

- **Simplification of the insulin regimen** in patients with insulin regimen with complexity beyond their self-management abilities
- lowering the dose of insulin may not be adequate.
- Simplify the regime to match an individual’s self-management abilities

Treatment regimen simplification

- changing strategy to decrease the complexity of a medication regimen,
- e.g., fewer administration times,
- fewer fingerstick readings
- decreasing the need for calculations (such as sliding scale insulin calculations or insulin-carbohydrate ratio calculations).
- It can reduce hypoglycemia and disease-related distress without worsening glycemic control.

Simplification of Complex Insulin Therapy



Additional Tips

- Do not use short-acting insulin at bedtime
- While adjusting mealtime insulin, may use simplified sliding scale, for example:
  - Premeal glucose >250 mg/dL (13.9 mmol/L), give 2 units of short- or rapid-acting insulin
  - Premeal glucose >350 mg/dL (19.4 mmol/L), give 4 units of short- or rapid-acting insulin
- Stop sliding scale when not needed daily

- Management of associated metabolic dysfunction is part of comprehensive care. This includes a focus on blood pressure, weight, and lipid levels. Blood pressure control is important, but systolic blood pressure targets can be relaxed to 150/90 mmHg in persons with limited life expectancy and multiple comorbidities.
- The emphasis is on maintenance of a symptom-free life and avoidance of iatrogenic postural hypotension.

Blood Pressure	Healthy: <140/80 mmHg Complex/Intermediate: <140/80mmHg Very Complex/Poor Health: <150/90mmHg	Functionally independent with life expectancy >10 years: <130/80 mmHg Functionally dependent, orthostasis or limited life expectancy: individualize BP targets	Functionally independent: <140/90 mmHg Functionally dependent: <140/90 mmHg Sub-level frail: <150/90 mmHg Sub-level dementia: <140/90mmHg End of life: strict BP control may not be necessary
LDL-C	<1.8mmol/L	<2.0 mmol/L or >50% reduction from baseline	<2.0mmol/L and adjusted based on CV risk

Treatment in Nursing Homes

- Management of diabetes in the long-term care (LTC) setting (i.e., nursing homes) is unique.
- Staff of LTC facilities should receive appropriate diabetes education to improve the management of older adults with diabetes.
- Training should include diabetes detection.

Nutritional Considerations

- An older adult residing in an LTC facility may have **irregular and unpredictable meal consumption, undernutrition, anorexia**, and **impaired swallowing** and contribute to unintentional weight loss and undernutrition.
- Diets tailored to a patient's culture, preferences, and personal goals may increase quality of life, satisfaction with meals, and nutrition status.

Hypoglycemia

- Older adults with diabetes in LTC are especially vulnerable to hypoglycemia.
- LTC facilities should develop their own policies and procedures for prevention and management of hypoglycemia.
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Alert Strategy

- 1. Call provider **immediately:**
  - in case of low blood glucose **levels (≤70 mg/dL).**
- 2. Call **as soon as possible**:
- a) glucose values between 70 and 100 mg/dL (regimen may need to be adjusted)
- b) glucose values > 250 mg/dL within a 24-h period
- c) glucose values > 300 mg/dL over 2 consecutive days
- d) when any reading is too high for the glucometer
- e) the patient is sick, with vomiting, symptomatic hyperglycemia, or poor oral intake.

END-OF-LIFE CARE

- The older adult with diabetes at the end of life receiving palliative medicine or hospice care is a unique situation.
- Overall, palliative medicine promotes comfort, symptom control and prevention (pain, hypoglycemia, hyperglycemia, and dehydration), and preservation of dignity and quality of life in patients with limited life expectancy.

- The goals of treatment **change from number-based targets to symptomatic well-being and preservation of dignity/quality of life.**
- Through a process of **shared decision-making**, including the person with diabetes, family, nursing and medical team, one may reduce the intensity of therapy and monitoring.

- A patient has the right to refuse testing and treatment, whereas providers may consider withdrawing treatment and limiting diagnostic testing, including a reduction in the frequency of fingerstick testing.

Diabetes Management in Those with Advanced Disease

- **A stable patient**:
- continue with the patient's previous regimen, with a focus on the prevention of hypoglycemia and the management of hyperglycemia using blood glucose testing, keeping levels below the renal threshold of glucose.
- There is very little role for A1C monitoring and lowering.

Diabetes Management in Those with Advanced Disease

- **A patient with organ failure**:
- preventing hypoglycemia is of greater significance.
- Dehydration must be prevented and treated.
- Anti-diabetic agents that may cause hypoglycemia should be downtitrated.
- The main goal is to avoid hypoglycemia, allowing for glucose values in the upper level of the desired target range.

Diabetes Management in Those with Advanced Disease

- **A dying patient**:
- the discontinuation of all medications may be a reasonable approach, as patients are unlikely to have any oral intake.

Summary

- Diabetes management in older adults requires careful assessement of clincial, functional, and psychosocial factors.
- Before developing glycemic goals and a treatment strategy, each patient’s overall health, coexisiting medical conditions, personal preferences, coping capacity, and factors affecting quality of life should be considered.