Partners Guidelines for the Treatment of Type 2 Diabetes
In the Non-Pregnant Adult

2012

This document contains the following:

• Criteria for Diagnosis
• Screening for Diabetes in Asymptomatic Individuals
• Treatment Goals
• Diabetes Self-Management Education
• Self-Monitoring of Blood Glucose
• Surgical Treatment of Type 2 Diabetes
• Recommended Frequency of Diabetes Care Components
• Diabetes Care Redesign
• Recommendations for the Management of Hyperglycemia:
  o Step 1: At the Time of Diagnosis, Initiation and Titration of Metformin
  o Step 2: Addition of a Second Glucose-lowering Agent
  o Step 3: Initiation of Basal Insulin
  o Step 4A: Basal Insulin Adjustment, Self-Titration Protocol
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  o Listing of Diabetes Self-management Education Programs

Disclaimer: These guidelines were established after careful review of current evidence and sound clinical practice and are endorsed by the Partners Diabetes Council. The recommendations serve to assist clinicians in the treatment of diabetes and do not seek to supersede the judgment of healthcare providers. Modifications may be appropriate in a given setting; particular relevant influences may include a given individual’s abilities, co-morbidities, overall health and anticipated lifespan. The responsibility for individual patient care decisions rests solely with healthcare providers.
Introduction

These guidelines represent the third writing of Partners’ care guidelines for type 2 diabetes in the non-pregnant adult; the prior most recent update was prepared in 2009. While only three years have passed since that revision much of what follows has been updated. Our altered recommendations reflect changes in medical literature and the evolving roles and responsibilities in diabetes and medical care delivery generally, promoted in part by Partners’ work to support diabetes care (Diabetes Care Redesign) and the Patient Centered Medical Home.

Major revisions in these guidelines include the following:

- Criteria for screening
- Revised BP targets
- Revised targets and medications for lipid management
- Increased emphasis on diet and exercise related content
- Recommended altered roles for Diabetes Self-Management Education services
- Specific recommendations for self-measurement of blood glucose (when and how often)
- A section is added regarding bariatric surgery
- A description of interventions to promote quality and value at Partners (Diabetes Care Redesign)
- Practical tools to support insulin initiation and dose titration (e.g. dose titration algorithms/handouts)

Many readers will find the insulin initiation and titration tools to be of practical value in daily clinical practice. To make these tools readily accessible, physicians may choose to print patient handouts and protocols to allow for ready access in their offices/clinics. Some providers may choose to cut and paste algorithms to become EMR templates for easy access, entry into patient charts and easy modification based on personal preference and individual patient requirements. You can access this material in a format that can be copied and/or edited via the following link: http://www.pchinet.com => click on Medical References => Diabetes Guidelines.

A new position paper by the ADA/EASD was issued in 2012. It reviews and updates the characteristics of currently available and approved diabetes medications. The new position paper provides a very similar, albeit updated, review of diabetes medications as the 2009 consensus algorithm, but notes that it has purposely adopted a non-prescriptive approach. Since one of the overarching goals of the Partners redesign initiative is to provide high quality, cost-effective treatment for diabetes, the Partners Diabetes Care Redesign group will continue to follow the 2009 algorithm which pays more attention to the relative costs of therapy, balanced against achieving metabolic targets, safety and patient tolerance-acceptability, than the 2012 position paper.
This document was prepared under the auspices of the Partners Diabetes Council and the Partners Diabetes Care Redesign Team. We would in particular like to acknowledge the work performed by Margo Hudson, M.D. (BWH) and Rita McCarthy, R.N., C.D.E. (BWH) in directing the writing of insulin titration protocols. We also appreciate additional expert assistance provided by Mason Freeman, M.D. (MGH), Sheila Partridge, M.D. (NWH), Edward Ryan, M.D. (MGH) and Randall Zusman, M.D. (MGH).

Alan Cole, M.D.
Elizabeth Savaria-Porter, R.N., C.D.E.
Partners Healthcare System
July, 2012

References:

Diagnosing Diabetes/Increased Diabetes Risk (Pre-diabetes) in the Non-Pregnant Adult

Diagnostic Criteria for Diabetes
- A1c ≥6.5%*, or
- Fasting plasma glucose (FPG) ≥126 mg/dl**, or
- ≥200 mg/dl random plasma glucose in a patient with classic symptoms of hyperglycemia, or
- 2-hour plasma glucose ≥200 mg/dl during an oral glucose tolerance test (OGTT)^

Test should be repeated to confirm diagnosis, unless symptoms of unequivocal hyperglycemia are present.

*A1c obtained by lab using a method that is NGSP certified and standardized to DCCT assay.
**Fasting is defined as no caloric intake for at least 8-hours.
^OGTT should be performed as described by WHO and should use a glucose load of the equivalent of 75 g anhydrous glucose dissolved in water. The OGTT is not generally recommended or required for the purpose of diagnosis outside of pregnancy.

Diagnostic Criteria for Increased Diabetes Risk (Pre-diabetes)
- A1c 5.7-6.4%, or
- FPG 100-125 mg/dl, or
- 2-hour plasma glucose 140-199 mg/dl during an OGTT

The individual who demonstrates increased diabetes risk based on modest hyperglycemia should undertake appropriate preventive interventions including dietary modification with weight loss when appropriate along with a program of regular exercise. The additional use of metformin, particularly among individuals under age 60, those with an elevated BMI (≥25 kg/m2) or with additional risk-related concerns (e.g. metabolic syndrome or vascular disease) should be considered.

Associated Complications and Conditions
In addition to the commonly recognized long-term microvascular and macrovascular complications of diabetes, i.e. retinopathy, nephropathy, and neuropathy, as well as several-fold increase in incidence of vascular disease, diabetes may increase the risk of the following:

- Fatty liver disease with progression to cirrhosis
- Obstructive sleep apnea
- Hearing impairment
- Cataracts
- Cognitive impairment
- Low testosterone in men
- Skin disorders
- Fractures
- Certain cancers including that of the liver, pancreas, endometrium, colon/rectum, breast, and bladder
Screening for Diabetes in Asymptomatic Individuals

Screening for diabetes is recommended in asymptomatic adults. Initiation and frequency of routine screening is based on age as well as the presence of risk factors.

Screening is recommended in adults not known to have diabetes who are:

- Overweight or obese (BMI ≥25 kg/m²) and who have one or more additional risk factors for diabetes. Those risk factors include:
  - Physical inactivity
  - First-degree relatives with diabetes
  - High-risk race/ethnicity (African-American, Latino, Native American, Asian American, Pacific Islander)
  - Women who delivered a baby weighing >9 pounds or who are known to have had gestational diabetes mellitus
  - Hypertension (BP ≥140/90 mmHg or on therapy for HTN)
  - HDL cholesterol level <35 mg/dl and/or triglyceride level >250 mg/dl
  - Polycystic Ovarian Syndrome (PCOS)
  - A1c >5.7%
  - Other clinical conditions associated with insulin resistance (obesity, acanthosis nigricans)
  - History of cardiovascular disease
- Age 45 and older without risk factors

Frequency of Screening:
If studies are normal, recheck at three year intervals.

Note: Performance of OGGT is not generally recommended or required for the purpose of diagnosis outside of pregnancy.

Treatment Goals for Type 2 Diabetes in Non-Pregnant Adult

A. A1c ≤7%
Treatment targets which balance risk and benefit should be considered when determining individual glycemic targets. Less stringent A1c goals, e.g. an HbA1c target of 8% or at times higher, may be appropriate in those at particular risk of hypoglycemia, those with limited life expectancy, multiple co-morbidities, cardiovascular disease, or those for whom diabetes care may be challenging.

B. Blood Pressure ≤140/90 mmHg
Lower blood pressure target (e.g. 130/80 mmHg) may be preferred if diabetic nephropathy or microalbuminuria is present or if a lower target is reasonably achievable without medication-induced adverse effects.
C. Cholesterol (Lipids)
  LDL Goals
  • LDL <100 mg/dl in patients >40 years or in patients 30-40 years of age with additional risk factor for vascular disease
  • LDL <70 mg/dl in patients with co-existing vascular disease (when reaching that goal is practical)

Other Considerations
  Triglyceride elevations will often decline in parallel with improvement in glycemic control, limitation of dietary carbohydrates and/or alcohol ingestion. Pharmacological therapy is recommended when the fasting triglyceride levels remain >500 mg/dl despite initial efforts to manage with improved glycemic control or diet.

D. Diet
  Even when weight loss is not desired, attention to diet is a necessary component of a successful diabetes treatment plan. Calorie content should be specific to the individual. Carbohydrate choices should be complex over simple carbohydrates and distributed fairly evenly over the course of the day rather than concentrated within a single large meal; doing so allows one with declining islet cell function to respond to ingested carbohydrates more effectively. Referral to a dietician is often of value.

E. Exercise
  Regular exercise is another highly effective component of a successful diabetes treatment plan. Current exercise recommendations endorse at least
  • 150 minutes per week of moderate intensity aerobic activity (i.e. brisk walking) with exercise performed at least three days each week
  • 20 minute sessions at least two times per week of strength training directed toward multiple muscle groups

Regular exercise has been shown to improve blood glucose control, contribute to weight loss, reduce cardiovascular risk and promote well-being. Within the diabetes population, there are some conditions (e.g. peripheral vascular disease, more severe peripheral neuropathy or unstable proliferative retinopathy) that will at times place restrictions on exercise choices. The American Diabetes Association no longer recommends routine exercise tolerance testing in screening asymptomatic individuals prior to the start of an exercise program; providers should use clinical judgment based on individual circumstances. Consider use of exercise prescriptions.
Diabetes Self-Management Education (DSME)

Diabetes management is performed by patients in their home environment, sometimes with assistance and support from their social support system. As a result, it’s particularly important that patients with diabetes engage in DSME beginning at around the time of diagnosis.

DSME should include individualized lifestyle recommendations, education related to the character and complications of the disorder, risk reduction, monitoring, prescribed pharmacological interventions, acute and long-term complications as well as behavior change management and goal setting strategies. Diabetes education often requires reinforcement and revision as the character of one’s diabetes-related circumstances change. As a result, the relationship between individuals with diabetes and diabetes educators should be an ongoing one.

Diabetes education may be provided in group or in individual settings, the choice for a given individual will be guided by one’s needs and often by insurance coverage requirements. Insurance reimbursement for multiple individual sessions is usually restricted to selected situations as group sessions have been shown under many or most circumstances to be preferred when judged by outcomes and patient satisfaction. Diabetes education programs should be able to provide guidance for the appropriate education setting upon request.

Diabetes education services can act as partners in the provision of diabetes care; that role will undoubtedly increase as care transitions toward the Patient Centered Medical Home. Diabetes educators will increasingly partner with physicians in titrating insulin doses and performing additional clinical functions as medical home models develop.

A full listing of DSME programs available within Partners Healthcare service areas is attached.

Self-Monitoring of Blood Glucose (SMBG)

While the HbA1c serves as the most trusted measure for assessment of glycemic control, SMBG provides certain benefits that the HbA1c does not offer. As an example, SMBG is necessary to demonstrate hypoglycemia.

The HbA1c is an index of blood glucose over the prior 3 months while SMBG provides immediate and early feedback to patients and their providers. Examples of effective use of SMBG include time of insulin dose titration, dosing of prandial insulin that may vary as determined by a pre-meal glucose measure, and monitoring of the effect of exercise among insulin treated individuals. The functional value of SMBG among non-insulin
users is often less clear. The frequency and desirability of recommended BG monitoring should be individualized based at least in part on hypoglycemia risk. Frequency of testing may need to increase at times of medication changes, illness, dietary changes, alterations in exercise, change in work or sleep schedule, travel, and periods of increased stress.

**Suggested Frequency/ Schedule for Home Blood Glucose Monitoring**

<table>
<thead>
<tr>
<th>Diabetes Treatment</th>
<th>SMBG Schedule</th>
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</thead>
<tbody>
<tr>
<td>Diet, metformin, and/or other agents that do not promote hypoglycemia risk</td>
<td>Limited, if any, monitoring may be required, e.g. once or twice per week.</td>
</tr>
<tr>
<td>Sulfonylureas (SU)</td>
<td>Closer monitoring is required when SU is initiated or adjusted e.g. 2-3 times per week or more. Often frequency can be decreased once patterns are established.</td>
</tr>
<tr>
<td>Basal insulin</td>
<td>4-5 times per week. Fasting glucose is used to determine nighttime insulin dose. For patients on insulin and for others as well, it may be useful to monitor at differing times per day, e.g. related to meals and/or exercise.</td>
</tr>
<tr>
<td>Multiple daily insulin injections(MDI)</td>
<td>Pre-meals and/or bedtime. Times/frequency determined by one’s treatment regimen.</td>
</tr>
</tbody>
</table>

SMBG data can be shared with providers in a number of ways, from simple handwritten log books to software that can organize data into easy to interpret formats. Such software, exclusive to each brand of meter, is available to patients and providers. Providers can often access the software without charge.

When used properly, home blood glucose meters offer an accuracy of +/- 10% as compared with laboratory blood glucose results of +/- 1-2%. Patients should be aware that while the imprecision of SMBG can lead to uncertainties, the rapid availability it offers provides unequaled value in properly defined circumstances. Instruction in SMBG may have value in ensuring that technique is proper and equipment is up-to-date and properly used.
A diabetes treatment program incorporates dietary modification with weight loss often serving as the primary treatment target. Bariatric surgery may at times be the preferred treatment option toward effective weight loss and, in turn, toward effective management of the metabolic parameters of type 2 diabetes, e.g. glycemic control, management of lipids, blood pressure and cardiovascular risk. Less measurable benefits occur as a result of bariatric surgery as well. Roux-en-Y gastric bypass (RYGB), laparoscopic sleeve gastrectomy, adjustable gastric banding and biliopancreatic diversion with duodenal switch (BPD/DS) are among the surgical procedures that are currently offered. In terms of weight loss and metabolic changes, BPD/DS and RYGB, followed by sleeve gastrectomy are most effective. The lap adjustable gastric banding (“lap band”) affords less weight loss and less resultant effect on diabetes related parameters but does not alter the physiology or have the same metabolic component as the other bariatric surgeries. Commonly, particularly following RYGB, improved blood glucose control occurs soon after surgery, prior to the occurrence of meaningful weight loss and not accounted for by low caloric intake alone. The surgical interventions’ mechanisms are multifactorial and complex and, depending on the procedure performed, include alterations in anatomy, hormonal signaling, and factors that are not well defined.

The International Diabetes Federation (IDF), in a 2011 position statement, proposes the following indications for bariatric surgery in the setting of type 2 diabetes:

- Surgery should be an accepted option in people who have type 2 diabetes and a BMI of 35 or more
- Surgery should also be considered as an alternate treatment option in persons with a BMI of 30-35 when diabetes cannot be controlled by optimal medical regimen, especially in the presence of other major cardiovascular disease risk factors
- In Asian and some other ethnicities of increased risk, BMI action points may be lowered by 2.5 kg/m²

Two recent randomized controlled clinical trials published in the NEJM show that surgery appears superior to medical therapy when comparing diabetes care outcomes over one and two year intervals. Given that medical therapy of diabetes may promote weight gain, notably the use of insulin and sulfonylureas, bariatric surgery should be considered a viable option even early in the course of care in the appropriate population.

Criteria for insurance coverage for bariatric surgery may differ from the recommendations outlined by the IDF. Insurers will often base bariatric surgery approvals on 1991 NIH guidelines. These earlier guidelines recommend bariatric surgery
when a BMI is ≥35 with one major comorbidity or ≥40 without a major comorbidity. The lap band is the only surgical intervention covered by many insurers for individuals with a BMI ≥30 despite its lesser success in achieving desired weight loss and diabetes treatment targets.

References:
<table>
<thead>
<tr>
<th>Care Component</th>
<th>Frequency</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI (weight)</td>
<td>At every visit</td>
<td>Provide weight management counseling and support regularly when BMI &gt;25kg/m2.</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>At every visit</td>
<td>Reassess 1-4 weeks after treatment change. If self-monitoring BP, review results at diabetes care visits.</td>
</tr>
<tr>
<td>Foot Exam</td>
<td>Annually</td>
<td>Foot exam includes vibration perception or 10-g monofilament pressure sensation check for neuropathy along with circulation and inspection. Consider Ankle Brachial Index (ABI) since many patients with peripheral artery disease are asymptomatic.</td>
</tr>
<tr>
<td>Blood Glucose Logs</td>
<td>At every diabetes care visit</td>
<td>Review home results.</td>
</tr>
<tr>
<td>A1c</td>
<td>Every 3 months</td>
<td>When target not achieved or when there is a change in treatment plan. Also when insulin is in use.</td>
</tr>
<tr>
<td></td>
<td>Every 6 months</td>
<td>When target is achieved and clinical/therapeutic conditions remain unchanged.</td>
</tr>
<tr>
<td>Urine Microalbumin/Creat</td>
<td>Annually</td>
<td>Annually unless microalbuminuria documented. Optimal time to check is early in the day. Exercise, infection, fever, CHF, marked hyperglycemia and marked HTN may falsely elevate. Elevation should be confirmed with a repeat measure. Continued monitoring once microalbuminuria is established is performed by some providers to titrate doses of ACEI/ARB.</td>
</tr>
<tr>
<td>Serum Creatinine and eGFR</td>
<td>Annually</td>
<td></td>
</tr>
<tr>
<td>Lipid Profile</td>
<td>Annually</td>
<td>Repeat lipid profile within 3 months of medication change.</td>
</tr>
<tr>
<td>Dilated Eye Exam</td>
<td>Annually</td>
<td>Initial dilated eye exam should occur around the time of diagnosis, generally after control is achieved. Subsequent frequency may be decreased at the discretion of the eye care professional.</td>
</tr>
<tr>
<td>Smoking Cessation Education</td>
<td>At every visit</td>
<td>Unless non-use is assured.</td>
</tr>
<tr>
<td>Influenza Vaccine</td>
<td>Annually</td>
<td></td>
</tr>
<tr>
<td>Hepatitis B Vaccine</td>
<td>See comments</td>
<td>Recommend if &lt;age 60, discretionary if ≥age 60.</td>
</tr>
<tr>
<td>Pneumococcal Vaccine</td>
<td>See comments</td>
<td>Once before age 65, with follow-up immunization after age 65 with at least a five-year interval between doses.</td>
</tr>
<tr>
<td>Assess Aspirin (ASA) Therapy Indication (81 mg)</td>
<td>As needed</td>
<td>Secondary prevention for individuals with diabetes and a history of CVD. Primary prevention is generally appropriate men &gt;age 50 and women &gt;age 60 who have at least one additional risk factor.</td>
</tr>
<tr>
<td>Depression screening</td>
<td>As needed</td>
<td>Depression may be present in upwards of 20% of the diabetes population.</td>
</tr>
<tr>
<td>Assessment of self-management behaviors and skills, knowledge deficits related to diabetes care</td>
<td>Annually</td>
<td>Refer to DSME and MNT at time of diagnosis, change in treatment plan or knowledge deficit.</td>
</tr>
</tbody>
</table>
Diabetes Care Redesign

Partners’ Care Redesign initiative seeks to provide increased value for patients, families and the entire medical enterprise by improving outcomes and/or efficiencies by lowering unnecessary or excessive costs. Recommendations have been developed through the collaborative efforts of providers and staff that touch a number of selected conditions, diabetes being one. Due to the enduring nature of diabetes care, our focus has been to address the character of care over an extended interval. Patient input has been solicited during the planning phase of the care redesign process. A review of the medical literature, practice patterns and costs led to the following recommendations for the treatment of type 2 diabetes in the non-pregnant adult:

- Use of generic oral medications are preferred over brand name alternatives in most settings
- Avoid most oral agents in the setting of insulin use
- Encourage and support use of insulin when clinically indicated

The management of hyperglycemia in this population, along with other components of diabetes care, is reflected in the treatment recommendations outlined in this document.

Use of Generic Oral Agents Are Preferred in Most Settings

Metformin and sulfonylureas (SUs) will lower HbA1c by an estimated 1 - 1.5% in most settings. Metformin is inexpensive, well tolerated and will not promote weight gain unlike most alternatives. Likewise, SUs are inexpensive and lower HbA1c with a comparable glucose-lowering effect to that of metformin. SUs may promote hypoglycemia, however, particularly among the elderly. The risk of hypoglycemia may be limited with proper choice of agent (glipizide and glimepiride are preferred), timing, dose and education.

Newer alternatives are available at notably higher cost and/or may promote a greater incidence of adverse effects than the older alternatives. Januvia® (sitagliptin) and other DPP-IV inhibitors offer lower efficacy than metformin and SUs, i.e. will lower HbA1c by an estimated 0.6 - 0.8%. Thiazolidiones (TZDs), such as Actos® (pioglitazone) will lower glucose comparably to metformin and SUs, but may promote significant weight gain, fluid retention, osteoporosis and as recently reported, a higher incidence of bladder cancer. Injectable GLP-1 receptor agonists, such as Byetta® (exenatide), Bydureon® (extended release exenatide), and Victoza® (liraglutide) will lower HbA1c by up to 1%. Use of these agents is commonly encouraged for their potential weight loss benefit, although the average weight loss is only 4 - 6 pounds after 30 weeks of use. There is a relatively high incidence of GI intolerance with use of GLP-1 receptor agonists.

Under most circumstances, metformin, SUs and insulin are preferred for the purpose of glucose control.
Avoid Most Oral Agents with Insulin Use
Use of metformin along with insulin administration in the setting of type 2 diabetes can limit insulin dose requirements and may in turn limit weight gain, a commonly cited result of insulin use. Other oral agents, including SUs, have limited or no complimentary effect when insulin is in use and may only add to cost/co-pays for affected patients.

Encourage and Support Use of Insulin
Insulin is the only agent that has the potential to lower HbA1c by >2%. Having said that, there are obvious obstacles to insulin initiation. Obstacles include:

- Psychological insulin resistance (among patients and providers)
- Clinical inertia
- The resources required to successfully teach, initiate and titrate insulin
- Provider access to and awareness of recommendations and tools to support providers and patients

Interventions to support the implement Diabetes Care Redesign recommendations include the following:

- Creation of LMR decision support to encourage
  - Use of generic medications when appropriate
  - Proper use of oral agents when insulin is prescribed
  - Insulin initiation (development of order sets and protocols)
- Development of tools for provider and patient use to support initiation and titration of insulin (see attached protocols which users can use as EMR templates)
- Development of metrics to measure progress toward Diabetes Care Redesign recommendations
- Support local medical directors in providing education within their communities
Management of Hyperglycemia: Step 1- At the Time of Diagnosis, Initiation, and Titration of Metformin

- This guideline may also apply in setting of previously recognized diabetes with step selection determined by currently administered therapy and most recent A1c.
- Therapeutic lifestyle changes (dietary modification, regular exercise and smoking cessation) are necessary components of the treatment plan and require ongoing evaluation and reinforcement.

Consider insulin if catabolic symptoms are present*. Refer to Steps 3 & 4A or 4B.

Diagnosis of type 2 diabetes •

- Obtain A1c if not obtained in prior 12 weeks
- Initiate self-management education and therapeutic lifestyle changes
- Measure serum creatinine (& eGFR)
- Introduce metformin 500 mg daily with a meal if serum creatinine* /eGFR permits
- After one week, increase metformin to 500 mg BID with breakfast and dinner

*Metformin is not recommended when serum creatinine is >1.4 mg/dl in women, >1.5 mg/dl in men, among patients >80 years and those in whom serum creatinine may be spuriously low (e.g. nutritional deficiency, low muscle mass) look for eGFR >60 ml/min.
- Many experts believe use of metformin is safe when eGFR >30-45 ml/min.
- Metformin can rarely promote lactic acidosis in setting of chronic renal failure.

May try extended-release metformin if GI symptoms with rapid-release.

Dose with meal.
Maximum total daily dose (TDD): 2000 mg/day

After four weeks on metformin 500 mg BID, if well-tolerated, increase dose to 850-1000 mg with breakfast and dinner
- Metformin is available in 850 and 1000 mg tablets
- Maximum daily dose is 850 mg, three times/day with meals

A1c <7%
Continue current regimen
Obtain A1c every 3-6 months

Obtain A1c in 3 months

A1c ≥7%
Refer to Step 2

^Supplemental Information
Recommend increased frequency of patient contact to as much as weekly (visit, telephone call, email, fax, etc.) when treatment is altered or glucose unstable

Catabolic state can be defined as the presence of two or more of the following: unexplained weight loss, random glucose levels consistently >300 mg/dl, and/or ketonuria in the absence of calorie restriction.
Management of Hyperglycemia: Step 2
Addition of a Second Glucose-lowering Agent

- This guideline may also apply in setting of previously recognized diabetes with step selection determined by currently administered therapy and most recent A1c.
- Therapeutic lifestyle changes (dietary modification, regular exercise and smoking cessation) are necessary components of the treatment plan and require ongoing evaluation and reinforcement.
- Consider initiation of self-blood glucose monitoring at this stage as a way to make informed treatment adjustments.

**Sulfonylureas (SUs)**
Recommend avoidance of glyburide due to greater associated risk of hypoglycemia when compared with other SUs.

**A1c 7-9%**
- Add a second glucose-lowering agent. Sulfonylurea (SU) is preferred.
  - Pre-prandial blood glucose (BG) >150 mg/dl. If using glipizide, increase dose to 2.5 mg twice a day before breakfast & dinner. May progressively increase every 1-2-weeks to a maximum of 20 mg BID as required, or glimepiride progressively increase to a maximum of 8 mg daily with breakfast.
  - Starting dose for SU as second-line treatment:
    - glipizide 2.5 mg or
    - glimepiride 1 mg daily before breakfast.
  - Repeat A1c in 3 months.

**A1c <7%**
- Continue current regimen. Repeat A1c every 3-6 months.

**A1c ≥7%**
- Add:
  - Basal insulin (preferred and more cost-effective than three glucose lowering agents) see Step 3 and Step 4A or 4B, or
  - A third glucose-lowering agent (see Additional Agents).
- Repeat A1c in 3 months.

**A1c ≥7%**
- If three non-insulin glucose-lowering agents are prescribed.

**A1c >9%**
- Add basal insulin See Step 3 and Step 4A or 4B.

**Additional Agents**
- DPP-IV inhibitors (Do not use with GLP-1):
  - linagliptin, saxagliptin, sitagliptin
- Thiazolidone:
  - pioglitazone
- Meglitinides (Do not use with sulfonylureas):
  - repaglinide, nateglinide
- GLP-1 agonists (Do not use with DPP-IV inhibitors):
  - exenatide, liraglutide, extended-release exenatide
- alpha-glucosidase inhibitors:
  - acarbose, miglitol

- The use of metformin, SUs and insulin are generally recommended for glycemic management in most settings.
- When desire for weight loss or avoidance of hypoglycemia is a consideration, use of alternative glucose-lowering agent may be appropriate.
- Medications listed in this document as additional agents are considered to be second-tier due to lower relative effectiveness directed toward glycemic control, higher cost and associated adverse effects.
Management of Hyperglycemia: Step 3
Initiation of Basal Insulin

- A usual fasting glucose target should be 90-130 mg/dl and an A1c target should be 6.5-7.0%
- Targets should be relaxed for individuals who are compromised based on their state of health (comorbidities, anticipated lifespan) or hypoglycemia risk (ability level, motivation, etc.)
- Teaching should be provided that addresses blood glucose checking and schedule, insulin use (injection preparation and technique, site rotation, care of insulin and disposal of sharps, insulin action) as well as glucose management in the setting of insulin use (integration of food and exercise, recognition and approved response to hypoglycemia)
- Teaching is generally performed by non-physician providers (e.g. certified diabetes educators) or alternatively properly selected teaching materials
Management of Hyperglycemia: Step 4A
Basal Insulin Adjustment, Self-Titration Protocol

- Therapeutic lifestyle changes (dietary modification and exercise) as well as ongoing self-monitoring blood glucose (SMBG) are components of the insulin treatment plan
- Prescribing Provider designates Insulin Adjustment Provider
- Recommend intervals between patient and insulin adjustment provider contact should not exceed two weeks during active phase of titration
- Provide each patient with self-administration verbal guidance and written instructions (Insulin Adjustment Guide 1, 2 or 3)

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<thead>
<tr>
<th>Titration Directions</th>
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<tbody>
<tr>
<td>1. Patient obtains daily fasting blood glucose</td>
</tr>
<tr>
<td>2. If fasting levels are above goal range for 2 consecutive days, basal insulin dose is increased by 2 units</td>
</tr>
<tr>
<td>3. Insulin dose is increased by 2 units whenever 2 consecutive fasting blood glucose readings are above goal range until a dose of 40 units has been reached or a fasting blood glucose has been achieved.</td>
</tr>
<tr>
<td>4. If a patient reaches a total daily dose (TDD) of 40 units and fasting blood glucose levels have not reached goal, patient may increase titration of insulin dose to 4 units every 2 days after confirming dose adjustment with insulin adjustment provider.</td>
</tr>
<tr>
<td>5. When fasting blood glucose target is reached, do not increase insulin dose. Continue to monitor blood glucose levels and continue with routine contact with insulin adjustment provider.</td>
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</tbody>
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<table>
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<tr>
<th>Patient to contact Insulin Adjustment Provider for the Following:</th>
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</thead>
<tbody>
<tr>
<td>• Per Insulin Adjustment Provider-Patient Agreement</td>
</tr>
<tr>
<td>• If dose has exceeded 1 unit/kg or _____ units (determined by Prescribing Provider)</td>
</tr>
<tr>
<td>• If patient experiences any fasting glucose level below goal, contact insulin adjustment provider on next business day</td>
</tr>
<tr>
<td>• If patient experiences any glucose below 80 mg/dl or symptomatic hypoglycemia, contact insulin adjustment provider within 24-hours for further instruction and decrease basal insulin dose by 10% until further instruction received</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Titration Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assess A1c three months after insulin initiation/active titration period</td>
</tr>
<tr>
<td>2. If patient has achieved fasting blood glucose target, but A1c is not at goal and/or non-fasting glucose levels remain elevated, consider pre-meal or biphasic insulin (Step 5), or referral to endocrinologist.</td>
</tr>
<tr>
<td>3. Other circumstances in which referral to endocrinologist may be indicated:</td>
</tr>
<tr>
<td>• Algorithm does not appear to be appropriate for patient</td>
</tr>
<tr>
<td>• Patient has exceeded 1 unit/kg/day dose of basal insulin without adequate control of fasting blood glucose</td>
</tr>
<tr>
<td>• Patient has recurring hypoglycemia</td>
</tr>
<tr>
<td>• Patient is not engaged in titration process</td>
</tr>
</tbody>
</table>

Once blood glucose control achieved, continue to monitor A1c every 3 months
Management of Hyperglycemia: Step 4B
Basal Insulin Adjustment, Provider Led Protocol

- Therapeutic lifestyle changes (dietary modification and exercise) as well as ongoing self-monitoring blood glucose (SMBG) are components of the insulin treatment plan
- Prescribing Provider prescribes appropriate insulin dose titration protocol: Standard or Fragile
- Prescribing Provider designates Insulin Adjustment Provider
- Weekly contact between patient and Insulin Adjustment Provider are recommended during active titration process
- Provide each patient with written information that supports verbal instruction (Insulin Adjustment Guide – Provider Led)

- Patient records fasting blood glucose (FBG) every day for weekly evaluation
- Blood glucose records reviewed by insulin adjustment provider, with patient input at weekly interval, basal insulin dose adjustment (Refer to appropriate titration table)

Basal Insulin Dose Titration Table: Standard Patient
If average FBG for past seven days is
- >180 mg/dl, increase dose by 6 units or 20%, whichever is greater
- 141-180 mg/dl, increase dose by 4 units or 10%, whichever is greater
- 121-140 mg/dl, increase dose by 2 units or 10%, whichever is greater
- 91-120 mg/dl, No change in dose
- <90 mg/dl decrease dose by 4 units or 10%
If any hypoglycemia
If average fasting glucose is
- 60-70 mg/dl, reduce by 10% of dose
- <60 mg/dl, reduce by 20% of dose

Basal Insulin Dose Titration Table: Fragile Patient
If average FBG for past seven days is
- >180 mg/dl, increase dose by 4 units
- 141-180 mg/dl, increase dose by 2 units
- 121-140 mg/dl, No change in dose
- 91-120 mg/dl, decrease dose by 4 units
- <90 mg/dl decrease dose by 4 units or 10%
If any hypoglycemia
If average fasting glucose is
- 60-70 mg/dl, reduce by 15% of dose
- <60 mg/dl, reduce by 25% of dose

Titration Evaluation
1. When target is reached, may decrease frequency of patient-provider contacts to every 2-4 weeks
2. Check A1c three months after insulin initiation
3. If patient has achieved fasting blood glucose target, but A1c is not at goal and/or non-fasting glucose levels remain elevated, consider pre-meal or biphasic insulin (Step 5), or referral to endocrinologist.
4. Other circumstances in which referral to endocrinologist may be indicated:
   - Algorithm does not appear to be appropriate for patient
   - Patient has exceeded 1 unit/kg/day dose of basal insulin without adequate control of fasting glucose
   - Patient has recurring hypoglycemia
   - Patient is not engaged in titration process

Once blood glucose control is achieved, continue to monitor A1c every 3 months.
Management of Hyperglycemia: Step 5
Insulin Titration Beyond Basal Insulin

If A1c target not achieved despite successful addition of basal insulin, defined as achievement of fasting glucose target, a second injection and type of insulin is indicated. Addition of second injection and type of insulin will require more frequent blood glucose checks.

Check blood glucose (BG) pre-meals and HS for a few days. Depending on results, add second injection from the most appropriate option outlined below. Starting dose: 4 units.

- If pre-lunch BG >140 mg/dl, add rapid-acting insulin pre-breakfast
- If pre-dinner BG >140 mg/dl, add pre-breakfast NPH or pre-mixed insulin (75/25 or 70/30), or rapid-acting insulin at lunch
- If pre-bedtime BG >160 mg/dl, add rapid-acting insulin at dinner

Adjust dose every 3-7 days by 2 units until BG is within range:
- 90-130 mg/dl, or
- 100-140 mg/dl

Repeat A1c in 3 months

A1c <7%
Continue current treatment

A1c >7%
Reconsider insulin schedule, diet and activity pattern, abilities and compliance along with pre-meal BG results. When necessary check 1-2 hour post-prandial BG. Consider referral to endocrinologist or diabetes educator

Check A1c every 3 months
Blood Pressure (BP) Management

Therapeutic lifestyle changes (salt restriction, exercise, weight loss, smoking cessation, alcohol intake) as well as presence of sleep apnea should be considered.

Lower blood pressure target (e.g. ≤130/80 mmHg) may be preferred if diabetic nephropathy or microalbuminuria is present or if a lower target is reasonably achievable without medication-induced adverse effects.

BP ≥140/90 mmHg

- Recheck in 1-3 weeks
  - If BP remains ≥140/90 mmHg, initiate antihypertensive agent

Initiate ACE Inhibitor (ACEI)
- lisinopril 10 mg daily, or
- fosinopril 10 mg daily
  (Initial lisinopril dose 5 mg daily if creatinine >1.5 mg/dl or age ≥65)

- Increase dose as required every 2-4 weeks if BP remains ≤130/80 mmHg
- Check creatinine and potassium within 4 weeks of each dose change

Maximum daily dose
- lisinopril 40 mg
- fosinopril 40 mg
- losartan 100 mg
- irbesartan 300 mg

If BP remains ≥130/80 mmHg add a second antihypertensive agent:
- amlodipine 2.5-5 mg daily, may titrate to 10 mg daily, or
- diuretic (hydrochlorothiazide, chlorthalidone, or indapamide)

If BP remains ≥130/80 mmHg, add third agent

If BP remains ≤130/80 mmHg consider addition a fourth antihypertensive agent:
- Beta-blocker: with caution regarding hypoglycemia unawareness, or
- Alpha blocker: with caution regarding orthostatic hypotension, or
  - Consider referral to specialist

Substitute with losartan 50 mg daily, or irbesartan 150 mg daily if ACEI no tolerated

Administration of one or more BP meds at HS may have added value

Aliskiren should be considered if patient is unable to tolerate ACEI or ARB

Beta-blockers should be considered earlier in treatment in setting of concomitant coronary artery disease.
Lipid Management

- LDL level to <100 mg/dl (<70 mg/dl with co-existing or cardiovascular disease [CVD] when reaching that goal is practical)
- Treatment target in setting of diabetes is more aggressive than in the population-at-large and may not be achievable in all individuals
- Treatment of hyperlipidemia includes therapeutic lifestyle changes (weight management, regular exercise, smoking cessation, etc.)
- Treatment of hypothyroidism when present can lower cholesterol level
- Refer to page 6 for guidance related to management of triglycerides

**Initial Management**

- LDL < 100 mg/dl
  - Absence of CVD and Age < 40 + No other CVD risk factor or < Age 40 with no more than 1 additional CVD risk factor
  - Follow with lipid profile annually

- LDL > 100 mg/dl
  - Obtain baseline LFTs, then initiate low dose statin:
    - Atorvastatin 10 mg q HS
    - Lovastatin 20 mg q HS, or
    - Pravastatin 20 mg q HS, or if necessary
    - Simvastatin 20 mg q HS
  - If LDL is markedly elevated, initiate therapy with a higher statin dose
  - Follow with lipid profile in 6-12 weeks

**LDL Target**

- LDL target achieved
  - Continue current therapy
  - Follow with lipid profile annually
  - LDL < 100 mg/dl

- LDL target not achieved
  - LDL > 100 mg/dl
  - If statins not tolerated: Consider reverting to lower dose if statin dose was on high end of therapeutic range or alternatively ezetimibe
  - Follow with lipid profile in 6-12 weeks

**Supplemental Information**

- Initial statin dose decreases LDL by 30-39%, every doubling of subsequent doses decreases LDL level by an estimated 6%
- Common side effects of statins are myalgias, CPK elevation, or muscle weakness. These effects are often dose-related rather than statin specific. When adverse effects occur may consider withholding administered statin until resolution, then restart alternative statin at low dose.

- If LDL is markedly elevated, initiate therapy with a higher statin dose
- Follow with lipid profile in 6-12 weeks
- LDL target achieved
  - Continue current therapy
  - Follow with lipid profile annually
- LDL target not achieved
  - Refer to specialist

- Follow with lipid profile in 6-12 weeks
- LDL target achieved
  - Continue current therapy
  - Follow with lipid profile annually
- LDL target not achieved
  - Refer to specialist
Basal Insulin Initiation Template for Physicians
Partners Healthcare System

Criteria:
  a. Patient with type 2 diabetes on 2 oral diabetes medications and HbA1c >8% or
  b. Patient felt to be appropriate for insulin initiation for any other reason and
  c. Patient performs self-monitoring of glucose with a glucose meter

Determine targets:
  A1C target:
  a. 6.5-7%
  b. 7.1-8%
  c. Other (specify) __________

Fasting Glucose Targets:
  a. 90-130 mg/dl for most patients
  b. 100-140 mg/dl for older patients and those with significant co-morbidities
  c. Other (specify) __________

Prescribing Instructions
1. Choose titration approach and who will be primarily responsible for titration: based on assessment of ability and interest of patient to self-titrate
   a. Patient self-titration under guidance of ______________________ (specify provider)
   b. Provider-led titration: Usual patient
   c. Provider-led titration: Fragile patient (e.g. > age 80, creatinine > 2.0 mg/dl, moderate to severe hepatic insufficiency)

2. Choose oral regimen
   a. Continue metformin and discontinue all other non-insulin glucose lowering medications
   b. Continue metformin and sulfonylurea, discontinue all other non-insulin glucose lowering medications and plan to taper or stop sulfonylurea as glucose control is achieved
   c. Other (specify) __________________

3. Choose basal insulin
   a. NPH (less expensive, some potential for nocturnal hypoglycemia)
   b. Glargine (Lantus, longer duration of action, more expensive)
   c. Other (specify) __________________

4. Choose an insulin delivery method and prescribe
   a. Vials/Syringes
      • Vials (contain 1000 units per vial)
        1. Instructions: “increase by 2 units every 2 days to a max of 40 units then as directed”
      • Syringes (#100 per box)
        1. 0.50 cc with 31 gauge needle
2. 1.0 cc with 31 gauge needle for anticipated dose > 50 units
3. Instructions: “for use with insulin vials”

b. Pen/Needles
   • Pen (contain 300 units each and are packaged 5 to a box, may be restricted by some insurers)
     1. Lantus Solostar
     2. Humulin N pen
     3. Instructions: “increase by 2 units every 2 days to a max of 40 units then as directed”
   • Needles ( #100 needles per box)
     1. 31 gauge short pen needles
     2. Instructions: “for use with insulin pens”

5. Choose an insulin starting dose
   a. Recommend starting 10 units sc qhs
   b. If weight >80 kg and glucose levels >200 start at 20 units sc qhs

6. Choose a maximum dose before considering referral to endocrinologist
   a. 80 units (maximum for single injection with glargine pen)
   b. 1 unit/kg/day

7. Blood Glucose Testing Supplies (Must match brand of test strips and lancets to meter)
   a. Blood glucose meter
   b. Test Strips
   c. Lancets
   d. Include a diagnosis code on all prescriptions for glucose testing supplies
      • 250.00 (type 2)
      • 250.02 (type 2 uncontrolled)

Insulin Management Plan
1. Pre-insulin initiation patient education (Consider referral to CDE)
   a. Review home blood glucose monitoring:
      i. Meter is functional
      ii. Patient demonstrates ability to use meter
      iii. Patient has adequate supplies
      iv. Patient verbalizes target blood glucose range
      v. Patient verbalizes when to check glucose:
         • Check fasting blood glucose daily
         • Check pre-largest meal blood glucose (e.g. daily, 3x/week)
         • Other ___________
   b. Patient verbalizes knowledge of symptoms of hypoglycemia
   c. Patient verbalizes hypoglycemia treatment options (15 gm CHO, e.g. 3 glucose tabs, 
      ½ cup juice, 1cup low fat milk) and importance of carrying carbohydrate source at all times
   d. Discuss insulin
      i. Action of insulin and relationship to meals
ii. Demonstrate injection with appropriate device and confirm competence with insulin delivery system

2. **Patient titration algorithm** – give patient one of the insulin titration guides that follows. Patient Insulin Adjustment Guide 1 and 2 are found on page 26 and 27 – 8. (Guide No. 2 is for lower-literacy situations). The higher dose algorithm on page 29 (Guide 3) is intended for patients on 40 or more units as a starting dose.
   a. Patient obtains fasting glucose daily
   b. If fasting glucose levels are above goal range for 2 consecutive days, basal insulin dose is increased by 2 units
   c. Dose is increased by 2 units whenever 2 consecutive fasting blood glucose readings are above goal range until a dose of 40 units has been reached or fasting blood glucose has been achieved
   d. If patient reaches a total daily dose of 40 units and fasting glucose levels have not reached goal, patient may increase titration to 4 units every 2 days after confirming dose adjustment with provider
   e. For any blood sugar below 80 mg/dl patient should decrease insulin dose by 4 units or ______ and contact provider for further instructions

3. **Provider–led titration algorithm** – is available when close supervision is preferred. The Provider-led insulin titration guide for patients is available on page 30.
   a. Patient records fasting glucose every day for weekly evaluation
   b. Adjust basal insulin dose according to dose titration table

<table>
<thead>
<tr>
<th>Average Fasting Blood Glucose level for the past 7 mornings</th>
<th>Usual Patient</th>
<th>Fragile Patient</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 180 mg/dl</td>
<td>6 Units or 20%, whichever is greater</td>
<td>4 units</td>
</tr>
<tr>
<td>141 – 180 mg/dl</td>
<td>4 Units or 10%, whichever is greater</td>
<td>2 units</td>
</tr>
<tr>
<td>121 – 140 mg/dl</td>
<td>2 Units or 10%, whichever is greater</td>
<td>No change</td>
</tr>
<tr>
<td>91 – 120 mg/dl</td>
<td>0 Units</td>
<td>Decrease dose by 4 units</td>
</tr>
<tr>
<td>&lt; 90 mg/dl</td>
<td>Decrease dose by 4 units</td>
<td>Decrease dose by 4 units or 10%, whichever is greater</td>
</tr>
</tbody>
</table>

**Any Hypoglycemia**

- Dose Reduction
  - Fasting glucose 60-70 mg/dl: Reduce by 10% of dose
  - Fasting glucose less than 60 mg/dl: Reduce by 20% of dose
  - Reduce by 15% of dose
  - Reduce by 25% of dose
4. Patient will contact identified provider for the following (for both provider titration and for patient self-titration):
   a. Patients will report blood glucose readings and self-titrated insulin dose to provider as determined mutually by patient and provider (not to exceed 2 week intervals during initial titration)
   b. Maximum dose achieved by either protocol should not exceed pre-determined amount of 1 unit/kg or 80 units without contacting provider
   c. If patient experiences any glucose below 80 mg/dl or any symptomatic hypoglycemia, patient should decrease dose by 4 units and contact provider within 24 hours

5. Evaluation of titration
   a. Consider referral to an endocrinologist for the following after discussion with referring provider:
      i. Insulin titration provider does not feel algorithm is appropriate for patient for any reason
      ii. Patient has exceeded 1 unit/kg/day or 80 units of basal insulin without adequate control of fasting glucose
      iii. Patient has frequent episodes of hypoglycemia
      iv. Patient is not engaged in the titration process
      v. Patient has achieved fasting blood sugar goal, but A1C is not at goal and/or non-fasting glucose levels remain elevated (consider pre-meal or bi-phasic insulin – Refer to Step 5)
   b. When target is reached, do not increase insulin dose further. Decrease frequency of patient-provider contact to every 2-4 weeks
   c. HbA1c is checked at 3 months after insulin initiation
      i. If A1C is at predetermined goal without significant hypoglycemia, and stable insulin dose has been achieved, patient may return to PCP for ongoing care
      ii. If patient is not at goal and not at maximum insulin dose, patient will continue with titration for another 3 months
Insulin Adjustment Guide 1

Name __________________________  Insulin Adjustment Provider ________________________

Preferred Contact Method with adjustment provider (check one)
___ Patient Gateway
___ Phone _______________________

Date __________________________  ___ Other __________________________

Your fasting (before breakfast) blood sugar TARGET RANGE is _________

Starting Dose
• Please start taking (Lantus/NPH) _____ units at 10 PM or at ______. It is important that you take your insulin at about the same time every day
• Check your blood sugar every morning before breakfast (fasting)

Adjusting Insulin
• Look over your fasting blood sugar readings from the last 2 days
• If both readings are above your target range (as noted above), increase your dose by 2 or _____ units
• Take the new dose for the next two nights
• If your fasting blood sugar is above your target for 2 mornings in a row, increase the number of units of insulin you are taking by 2 or _____ units until your fasting blood sugar is in your target range
• If you have required no insulin dose adjustment for 2 weeks, a scheduled visit or message to your provider is advised
• Contact your insulin adjustment provider if you have reached an insulin dose of 40 units or _____ units and your target has not yet been met

Low Blood Sugar
• If you feel symptoms of low blood sugar such as sweating and shaking, test your blood sugar right away
• If your blood sugar is below 80 mg/dl and you have having low blood sugar symptoms:
  1. Treat with 15 grams of a simple carbohydrate:
     ½ cup (4 ounces) of fruit juice or 1 cup (8 ounces) skim or 1% milk or 3 packets regular sugar, or 3 – 4 commercially available glucose tablets
  2. Wait 15 minutes and check your blood sugar again
  3. If it is still low (below 80 mg/dl), treat again with 15 grams of simple carbohydrates
  4. Stop increasing your insulin dose and call the office on that same day for instructions
  5. If unable to reach your provider that day, decrease your next insulin dose by 4 or _____ units until you receive further instructions
Insulin Adjustment Guide 2

Name ________________________________________
Date: _________________________________________
Insulin Adjustment Provider ______________________
Preferred contact method with Insulin Adjustment Provider (check one)
___ Patient Gateway
___ Phone ________________________________
___ Other ____________________________________

Your fasting (before breakfast) blood sugar TARGET RANGE is __________

- Your starting dose of _______ insulin is _______ units
- Take your insulin at _________________
- Take your insulin at about the same time every day
- For any questions, contact your Insulin Adjustment Provider ___________
- You will increase your insulin dose by ______ units at a time as explained below
- Do not increase dose above _____ units a day without contacting your Insulin Adjustment Provider

Your glucose result

Day 1
---------
If both of your blood sugars are are greater than _____,
add _____ units to your daily insulin dose.

Day 2
---------
If either of your blood sugars is less than _____, continue with same dose of insulin.
Your daily dose of insulin for the next two days is ____ units.

Day 3
---------
If both of your blood sugars are greater than _____,
add _____ units to your daily insulin dose.

Day 4
---------
If either of your blood sugars is less than _____, continue with same dose of insulin.
Your daily dose of insulin for the next two days is ____ units.

Day 5
---------
If both of your blood sugars are greater than _____,
add _____ units to your daily insulin dose.

Day 6
---------
If either of your blood sugars is less than _____, continue with same dose of insulin.
Your daily dose of insulin for the next two days is ____ units.

Day 7 and beyond: continue with similar pattern and record daily doses in log book.
**Low Blood Sugar**

- If you feel symptoms of low blood sugar such as sweating and shaking, **test your blood sugar right away**
- If your blood sugar is below 80 mg/dl and you have having low blood sugar symptoms:
  - Treat with 15 grams of a simple carbohydrate, such as one of the following:
    - 1/2 cup (4 ounces) of fruit juice
    - 1 cup (8 ounces) of skim or 1% milk
    - 3 - 4 commercially available glucose tablets
    - 3 small packets of regular sugar
  - Wait 15 minutes and check your blood sugar again
    - If it is still low (less than 80 mg/dl), treat again with 15 grams of simple carbohydrates
  - Stop increasing your insulin dose and call the office on the same day for instructions
  - If unable to reach your provider that day, decrease your next insulin dose by 4 or ___ units until you receive further instructions
Insulin Adjustment Guide 3 – High Dose

Name __________________________ Insulin Adjustment Provider __________________________
Preferred Contact Method with adjustment provider (check one)
___ Patient Gateway
___ Phone _______________________
Date _________________________ ___ Other _______________________

Your fasting (before breakfast) blood sugar TARGET RANGE is __________

Starting Dose
• Please start taking (Lantus/NPH) _____ units at 10 PM or at ______. It is important that you take your insulin at about the same time every day
• Check your blood sugar every morning before breakfast (fasting)

Adjusting Insulin
• Check your blood sugar every morning before breakfast (fasting)
• Look over your fasting blood sugar readings from the last 2 days
• If both readings are above your target range (as noted above), increase your dose by 4 or _____ units
• Take the new dose for the next two nights
• Every 2 nights, increase the number of units you are taking by 4 or _____ units until your fasting blood sugar is in your target range
• If you have required no insulin dose adjustment for 2 weeks, a scheduled visit or message to your provider is advised
• Contact your insulin adjustment provider if you have reached an insulin dose of 80 or _____ units and your target has not yet been met

Low Blood Sugar
• If you feel symptoms of low blood sugar such as sweating and shaking, test your blood sugar right away
• If your blood sugar is below 80 mg/dl and you have having low blood sugar symptoms:
  o Treat with 15 grams of a simple carbohydrate, such as one of the following:
    ▪ ½ cup (4 ounces) of fruit juice
    ▪ 1 cup (8 ounces) skim or 1% milk
    ▪ 3 – 4 commercially available glucose tablets
    ▪ 3 small packets of regular sugar
  o Wait 15 minutes and check your blood sugar again
  o If it is still low (below 80 mg/dl), treat again with 15 grams of simple carbohydrates
• Stop increasing your insulin dose and call the office on that same day for instructions
• If unable to reach your provider that day, decrease your next insulin dose by 8 or _____ units until you receive further instructions
Insulin Adjustment Guide – Provider-led

Name ________________________
Date  ____________________________
Insulin Adjustment Provider _______________
How to reach me (check one)
___ Patient Gateway
___ Phone _________________________
___ Other _________________________

Insulin information
• Your starting dose of ________ insulin is _________ units
• Take your insulin at ____________
• It is important to take your insulin at about the same time every day
• For any questions, contact your Insulin Adjustment Provider

Blood sugar information
• Your fasting (before breakfast) blood sugar target range is _________
• Check your blood sugar before breakfast every morning
• Write your blood sugar results in your log book every day
• Report those results every week on ________ to your Insulin Adjustment Provider
• If you have a blood sugar below your target range, call your Insulin Adjustment Provider the next business day

Low Blood Sugar
• If you feel symptoms of low blood sugar such as sweating and shaking, test your blood sugar right away
• If your blood sugar is below 80 mg/dl and you have having low blood sugar symptoms
  o Treat with 15 grams of a simple carbohydrate, such as one of the following:
    ▪ 3-4 commercially available glucose tablets
    ▪ ½ cup (4 ounces) fruit juice
    ▪ 1 cup (8 ounces) skim or 1% milk
    ▪ 3 packets of regular sugar
  o Wait 15 minutes and check your blood sugar again
  o If it is still low (less than 80 mg/dl), treat with another 15 grams of simple carbohydrate
If you cannot to reach your provider that day, decrease your next insulin dose by 4 or _____ units until you receive further instructions.
## Diabetes Self-Management Education Programs

**July 2012**

*Referral is required for participation*

<table>
<thead>
<tr>
<th>RSO</th>
<th>Diabetes Education Program</th>
<th>Accredited by</th>
<th>Program Telephone Number</th>
<th>Point of Contact Information</th>
</tr>
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<td>ADA</td>
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<td></td>
<td>850 Boylston Street</td>
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<td>BWPO</td>
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<td>ADA</td>
<td>617-665-1552</td>
<td>Ann Lindsay, RN, CDE</td>
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<td></td>
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<td><a href="mailto:alindsay@challiance.org">alindsay@challiance.org</a></td>
</tr>
<tr>
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<td></td>
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<tr>
<td>CHA</td>
<td>Somerville Hospital</td>
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<td>617-591-4350</td>
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<tr>
<td></td>
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<td>CRMA</td>
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<td>508-848-2190</td>
<td>Sandra Krafsig, RN, MS, CDE</td>
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| PMG     | Jordan Hospital Diabetes Education Center  
36 Cordage Park Circle  
Suite 314  
Plymouth, MA 02360  
[www.jordanhospital.org](http://www.jordanhospital.org) (Classes & Support Groups) | ADA           | 508-830-2446             | Kay Grosberg, RN, BSN, MA, CDE kgrosberg@jordanhospital.org |
| PrimaCARE | Southcoast Health System  
Durfee Union Building  
283 Pleasant Street  
Fall River, MA 02720 | ADA           | 508-324-3260             | Geraldine Santos, RN, MSN, CDE santosg@southcoast.org |
| PrimaCARE | Southcoast Health System  
Dartmouth Place  
49 State Road, Mashpee Building  
Dartmouth, MA 02747 | ADA           | 508-910-3434-097 | Geraldine Santos, RN, MSN, CDE santosg@southcoast.org |
| PrimaCARE | Southcoast Health System  
Tobey Hospital  
43 High Street  
Wareham, MA 02571 | ADA           | 508-295-0880             | Geraldine Santos, RN, MSN, CDE santosg@southcoast.org |
| TCMA    | Milford Regional Hospital  
14 Prospect Street  
Milford, MA 01757  
[www.milfordregional.org](http://www.milfordregional.org) | ADA           | P: 508 422-2396  
F: 508 634-4382 | Jo Fleming, RN, CDE jfleming@milreg.org |