This care process model (CPM) was created by the Diabetes Prevention and Management Work Group and the Primary Care Clinical Program at Intermountain Healthcare. It summarizes current medical literature and, where clear evidence is lacking, provides expert advice on diagnosing prediabetes and preventing diabetes. In addition, this CPM outlines a systematic process for sharing accountability between clinicians, dietitians, patients, operational and clinic staff, and the Primary Care Clinical Program.

Why Focus ON DIABETES PREVENTION?

- **Prediabetes is common and underdiagnosed.** In 2010, approximately one in three U.S. adults, an estimated 86 million people, had prediabetes. During 2005 – 2014, fewer than 14% of those with prediabetes were aware of their condition, regardless of education level, income, insurance coverage, or healthcare use.\(^{\text{CDC}}\)

- **Up to ⅓ of people with prediabetes will progress to diabetes in three to five years.** This will increase their risk of cardiovascular disease, stroke, high blood pressure, blindness, kidney, nerve disease, and amputation.\(^{\text{ADA}}\)

  In addition, prediabetes itself is associated with early onset of neuropathy, retinopathy, microalbuminuria, and greater cardiovascular risk, suggesting that many patients with prediabetes may be already suffering adverse effects of abnormal glucose regulation.\(^{\text{TAB}}\)

- **Progression to diabetes can be prevented or delayed.** In a U.S. Diabetes Prevention Program (DPP) study, patients in the intensive lifestyle intervention (ILI) arm of the trial had a 58% reduction in the rate of conversion to type 2 diabetes over three years, and a 34% reduction at 10 years. Risk of reduction was even more pronounced among individuals age 60 and older (71% for a three-year reduction).\(^{\text{ADA,KNH}}\)

- **Diabetes prevention is cost effective.** The 10-year follow-up study of the DPP concluded that investment in lifestyle and metformin interventions for diabetes prevention in high-risk adults is highly cost effective.\(^{\text{HER}}\) With the same results (34% reduction in progression to diabetes), Intermountain would realize a significant cost savings.

- **Diabetes prevention is a shared responsibility for promoting population health.** Intermountain has the data collection and reporting, clinical decision support, and team coordination to identify and engage all patients with prediabetes in our system across all population groups.

What’s new in this update?

Intermountain’s intensive lifestyle intervention (ILI) program (The Weigh to Health\(^{\text{TM}}\)) will be recognized by the Centers for Disease Control and Prevention as a diabetes prevention program.
ALGORITHM: PREDIABETES PATIENT ENGAGEMENT AND TREATMENT

SCREEN patients (a)

Primary Care Clinical Program (PCCP):
PROVIDE list of patients who have laboratory findings consistent with prediabetes to primary care providers each month

Clinic: ADD prediabetes to patient’s problem list as appropriate

Care team: INVITE patient to participate in Diabetes Prevention Program (DPP) (b)

Patient AGREES to register?

no

CONSIDER metformin therapy (in addition to lifestyle intervention) for patients with BMI ≥ 35 kg/m², age < 60, or with prior gestational diabetes (c)

USUAL CARE: Clinic to CONTACT patient to schedule follow-up visit in 3 to 6 months (page 3)

yes

Patient CHOOSES pathway

Usual care AND....

<table>
<thead>
<tr>
<th>Role</th>
<th>Prediabetes 101 class (d) (page 3)</th>
<th>Medical nutrition therapy (MNT) (page 3)</th>
<th>Weigh to Health® program (page 3)</th>
<th>Online diabetes prevention program (page 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinic</td>
<td>REFER to Prediabetes 101 class</td>
<td>REFER to MNT</td>
<td>REFER to Weigh to Health® program</td>
<td>• PROVIDE patient with a link to the CDC national diabetes prevention program page</td>
</tr>
<tr>
<td>Clinical nutrition</td>
<td>• CONFIRM insurance coverage</td>
<td>• CONFIRM insurance coverage</td>
<td>• CONFIRM insurance coverage</td>
<td>• DOCUMENT in patient chart</td>
</tr>
<tr>
<td></td>
<td>• SCHEDULE patient for first in-patient appointment</td>
<td>• SCHEDULE patient for first in-patient appointment</td>
<td>• SCHEDULE patient for first in-patient appointment</td>
<td>• SCHEDULE patient for first in-patient appointment</td>
</tr>
<tr>
<td>Patient</td>
<td>ATTEND a 2-hour prediabetes class in person (if in rural region, via TeleHealth)</td>
<td>ATTEND one-on-one nutrition counseling</td>
<td>ATTEND classes (16 face-to-face visits over 6 months plus monthly visits for 6 months)</td>
<td>PARTICIPATE in online, asynchronous program</td>
</tr>
<tr>
<td>Dietitian</td>
<td>DOCUMENT participation and progress in iCentra</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Patient: CHOOSE additional pathways as recommended or desired

Clinic: MONITOR all patients’ HbA1c and/or FPG at least yearly. See page 5.
(a) Screen patients

- SCREEN all patients age 40 to 70 years with BMI ≥ 25 kg/m² (≥ 23 kg/m² if of Asian descent) and one or more risk factors using HbA1c and/or FPG; if tests are normal, repeat testing at three-year intervals.
- CONSIDER screening adults 18 to 39 years with a BMI ≥ 25 kg/m² plus one additional risk factor (e.g., high risk ethnicity, high blood pressure, hyperlipidemia, history of polycystic ovary syndrome, history of gestational diabetes or baby > 9 lbs, sedentary lifestyle, first-degree relative with type 2 diabetes.)
- IDENTIFY patients with HbA1c 5.7 % to 6.4 % OR two FPG results of 100 to 125 mg/dl in the previous three years.\textsuperscript{[40]}  

Note: Prediabetes should not be viewed as a clinical entity in its own right but as a risk factor for diabetes and cardiovascular disease.\textsuperscript{[40]}

(b) Care team invites patient to participate in program

Invite patient in person or by personal phone call from a member of the care team or whoever has an established relationship with patient.

- Introduce risk: For example, “We have a program in place to identify patients who may be at increased risk for diabetes. Your lab results show that you may be at increased risk.”
- Invite patient to participate in the diabetes prevention program. The patient can select which of the four pathways that works best for their personal needs.

Note: Care teams can leverage iCentra to identify patients who would benefit from participation in the DPP. There are several advisories available to provide guidance.

(c) Metformin therapy

- The ADA currently recommends metformin only for those at highest risk of developing diabetes (age < 60, BMI ≥ 35, or history of gestational diabetes). Metformin is especially recommended for patients who demonstrate progression to diabetes (HbA1c ≥ 6 %) despite lifestyle interventions.
- Follow-up required. Patients treated with metformin should be monitored twice a year with FPG and HbA1c testing.\textsuperscript{[40]}
- For more information on metformin therapy, refer to the Intermountain Adult Diabetes Mellitus CPM.

Medication class — Biguanide

(SelectHealth commercial formulary status)

<table>
<thead>
<tr>
<th>Generic</th>
<th>Brand</th>
<th>Usual dosing</th>
<th>2017 AWP cost for 30-day supply* (MAC cost for generics)</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
</table>
| metformin (Tier 1) | | 500 mg twice daily (once a day to start) to 1000 mg twice daily (max) | Generic: (Tier 1)  
500 mg twice daily: $6  
850 mg twice daily: $7  
1000 mg twice daily: $7  
Brand name: (Tier 3)  
500 mg twice daily: $68  
850 mg twice daily: $102  
1000 mg twice daily: $126 | Extensive experience  
No hypoglycemia  
↓ weight (preferred for obese patients — most type 2 diabetics)  
Favorable lipid effects  
Maximum plasma glucose effects at 3 to 4 weeks  
↓ insulin resistance  
Consensus first-line agent  
Very cost effective | GI distress (nausea/diarrhea)  
B12 deficiency — suggest periodic testing  
Chronic heart failure (CHF) patients should be stable  
Risk of acidosis: STOP with acute illness, dehydration, or IV contrast dyes  
Multiple contraindications: Do not use for patients with chronic liver disease, alcoholism, or chronic kidney disease (eGFR < 30) |
| metformin ER (Tier 1) | | 500 mg to 1500 mg once daily at dinner | Generic:  
500 mg twice daily: $9  
750 mg twice daily: $17  
2000 mg (4 X 500 mg): $27  
Brand name:  
500 mg twice daily: $35  
750 mg twice daily: $52 | |

\textsuperscript{*}AWP = Average Wholesale Pricing; MAC = Maximum Allowable Cost. Many patients may benefit from manufacturers’ discounts or patient assistance programs.  
Tier: Tier 1: generic; Tier 2: preferred brand; Tier 3: non-preferred brand

(d) Prediabetes 101 class

- The two-hour prediabetes class, Prediabetes 101 — What is it, and what can I do about it?, is taught by registered dietitian nutritionists (RDNs) and offered at no cost to participants.
- The class transfers responsibility for prediabetes education, self-management training, and follow up to RDNs.
- To find out where and when this class is offered, visit the Diabetes Prevention Program page.

- Topics covered in the class include:  
  - What is prediabetes — and what is diabetes?  
  - Why is diabetes such a big concern?  
  - What is your risk of getting diabetes?  
  - What can you do to prevent diabetes?  
  - What are you ready to do? (Patient will be encouraged to set one small lifestyle goal.)  
  - What’s your next step? (Patient can choose to continue with The Weigh to Health\textsuperscript{®} intensive lifestyle intervention (preferred), MNT, or the online DPP.)
# ROLES AND RESPONSIBILITIES

Diabetes prevention requires a coordination of roles to ensure a systematic process for:

- Proactive identification of patients with suspected or confirmed prediabetes
- Team coordination and support
- Patient education, engagement, and self-management training
- Documentation and reporting
- Patient visit and follow up

Each staff member has an important role in establishing this process. The table below recommends responsibilities for each staff member to ensure the program’s success.

**TABLE 1: OVERVIEW OF ROLES AND RESPONSIBILITIES**

<table>
<thead>
<tr>
<th>Role</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operations Officer (OO), Assistant Operations Officer (AOO), Regional Clinic Manager (RCM)</strong> Direct report: Primary Care Practice Manager</td>
<td>• <strong>DETERMINE</strong> operational process for classes in region.</td>
</tr>
<tr>
<td></td>
<td>• <strong>ADVOCATE</strong> for the need for prediabetes implementation in region.</td>
</tr>
<tr>
<td><strong>Primary Care Practice Manager</strong></td>
<td>• <strong>DEFINE</strong> owner/contact for each step of prediabetes prevention program process in their clinic (i.e., understand the process and importance of implementation).</td>
</tr>
<tr>
<td>Direct reports: Primary Care Provider (PCP), Care Manager (CM), Health Advocate (HA), Medical Assistant (MA), Care Guide (CG), Patient Service Representative (PSR)</td>
<td>• <strong>TRACK</strong> and <strong>ASSESS</strong> compliance and effectiveness of the DPP within their clinic (e.g., referral process and quality outcomes).</td>
</tr>
<tr>
<td><strong>Primary Care Provider (PCP)</strong></td>
<td>• <strong>REVIEW</strong> prediabetes report and <strong>REFER</strong> to diabetes prevention program.</td>
</tr>
<tr>
<td></td>
<td>• <strong>FOLLOW</strong> guidelines for screening and diagnosing patients with prediabetes.</td>
</tr>
<tr>
<td></td>
<td>• <strong>PREPARE</strong> patient for readiness to change.</td>
</tr>
<tr>
<td></td>
<td>• <strong>MONITOR</strong> patient’s improvement, and <strong>SCHEDULE</strong> follow-up appointments.</td>
</tr>
<tr>
<td><strong>Care Manager</strong></td>
<td><strong>INVITE</strong> patient to participate in DPP class if a relationship is established with the patient.</td>
</tr>
<tr>
<td><strong>Medical Assistant (MA)</strong></td>
<td>• <strong>ADD</strong> prediabetes to patient’s problem list in iCentra.</td>
</tr>
<tr>
<td></td>
<td>• <strong>ORDER/REFER</strong> to DPP in iCentra upon direction from provider.</td>
</tr>
<tr>
<td><strong>Patient Services Representative (PSR)</strong></td>
<td><strong>ORDER/REFER</strong> to DPP in iCentra upon direction from provider.</td>
</tr>
<tr>
<td><strong>Diabetes Clinic Manager</strong></td>
<td>• <strong>COLLABORATE</strong> with OO/AOO/RCM on creating DPP classes for patients.</td>
</tr>
<tr>
<td>Direct reports: OD/AOD/RCM</td>
<td>• <strong>ARRANGE</strong> schedule to provide DPP training for instructors.</td>
</tr>
<tr>
<td></td>
<td>• <strong>COMMUNICATE</strong> with clinic managers, if necessary, to schedule rooms/availability of instructors.</td>
</tr>
<tr>
<td><strong>Diabetes clinic Patient Service Representative</strong></td>
<td>• <strong>MONITOR</strong> DPP referrals daily.</td>
</tr>
<tr>
<td></td>
<td>• <strong>CALL</strong> patients to schedule for DPP activities.</td>
</tr>
<tr>
<td></td>
<td>• <strong>CHECK</strong> patients in for classes, if applicable.</td>
</tr>
<tr>
<td><strong>Registered Dietitian Nutritionist (RDN) or Certified Diabetes Educator (CDE)</strong></td>
<td>• <strong>FOLLOW</strong> curriculum for teaching two-hour prediabetes class.</td>
</tr>
<tr>
<td></td>
<td>• <strong>EDUCATE</strong> patients about prediabetes using standardized slide set.</td>
</tr>
<tr>
<td></td>
<td>• <strong>ENSURE</strong> patients fill out forms according to prediabetes flow process.</td>
</tr>
<tr>
<td></td>
<td>• <strong>ENCOURAGE</strong> selection of The Weigh to Health® intensive lifestyle intervention.</td>
</tr>
<tr>
<td></td>
<td>• <strong>REPORT</strong> patient’s attendance (whether or not attended), lifestyle goals, and next step selection to PCP.</td>
</tr>
<tr>
<td></td>
<td>• <strong>DOCUMENT</strong> participation in DPP class on 101 Ad Hoc Form including next steps.</td>
</tr>
</tbody>
</table>
ONGOING FOLLOW UP AND SUPPORT

ADA recommendations for usual care
The ADA recommends the following ongoing support for all patients with prediabetes:

• Counsel all patients to increase physical activity. Most should aim for 30 minutes of moderately intense exercise (such as a brisk walk) most days of the week, for a minimum of 150 minutes (2.5 hours) total physical activity per week.

• For overweight or obese patients, advise weight loss of 7% to 10% of body weight. For a 250-pound person, this means a weight loss of 17 to 25 pounds.

• Consider metformin therapy for some patients, as outlined in box (c) on page 3.

• Follow up at least annually with HbA1c and/or FPG testing. For patients taking metformin, follow up every six months.

• Screen and treat to reduce cardiovascular risk factors, including high blood pressure, dyslipidemia, and tobacco use.

• Manage sleep and stress issues. Intermountain’s Lifestyle and Weight Management CPM provides guidance in this area.

• Refer to an effective ongoing support program targeting lifestyle change. All three support programs below target lifestyle change.

The Weigh to Health® program
Outcome studies of the Diabetes Prevention Program (DPP) showed that a 16-week intensive lifestyle intervention reduced incidence of type 2 diabetes by 58% at two years. The Weigh to Health® curriculum has received pending recognition from the CDC’s Diabetes Prevention Recognition Program. Beginning in 2018, it will include:

• Group classes facilitated by registered dietitian nutritionists (RDNs) with guest instructors, such as exercise specialists, behavior specialists, and chefs.

• Twenty-two sessions over a 12-month period, including:
  – An orientation class, focusing on goal setting.
  – Four 60-minute 1:1 sessions with an RDN trained in weight management.
  – Eighteen 90-minute group sessions. Topics include physical activity, behavior change, meal planning, emotional eating, label reading, body image, intuitive eating, stress management, healthy cooking, and eating out.

NOTE: Medicare will begin reimbursing for recognized programs beginning in 2018. Check with the patient’s insurance providers to determine coverage.

Medical nutrition therapy (MNT)
• One-on-one nutrition counseling with an RDN. Patients will learn nutrition strategies to prevent diabetes and develop a personalized eating plan.

• Some insurance providers, including SelectHealth, cover up to five visits per calendar year for diet-related issues, including prediabetes. No referral is necessary.

Continued on page 6...
Online Diabetes Prevention Program

Several online diabetes prevention programs exist. Insurance coverage for online programs varies. Patients interested in participating in online programs should check with their insurance provider and/or employer regarding benefit availability, coverage or reimbursement.

- Online programs allow for asynchronous learning at the convenience of the participant.
- Programs include 16 core classes delivered over 16 weeks, followed by monthly lessons for an additional 6 months.
- Most programs include an online coach, social support, digital Bluetooth scale, and physical activity trackers.

Available programs can be accessed through the CDC Diabetes Prevention Program website.

**EDUCATION RESOURCES**

Intermountain education materials are designed to support clinician efforts to educate and engage patients and families. They complement and reinforce prediabetes team interventions by providing a means for patients to reflect and learn in another mode and at their own pace. To access these materials:

- **As the iCentra EMR system is implemented**, search for Intermountain items in the patient education module.
- **Log in to Intermountainphysician.org**, and search for the patient education library under A–Z. Then, search the item number and title in the appropriate area.
- **Use Intermountain’s Online Library and Print Store** for one-stop access and ordering for all Intermountain-approved education such as fact sheets, booklets, and trackers.

**Fact sheets**
- Pre-diabetes: Act Now to Protect Your Health
- Diabetes Medicines: Metformin

**Lifestyle materials**
- Live Well, Sleep Well
- Live Well, Snack Wisely
- 1-Week Habit Tracker
- 6-Week Habit Tracker
EVALUATION

The goal of Intermountain Healthcare's Diabetes Prevention Program is to facilitate weight loss leading to prevention and/or delay of type 2 diabetes through a consistent clinical process, team-based care, and rigorous evaluation, including reports for the clinical teams. These processes are designed to increase patient activation and engagement while providing evidence-based support for lifestyle change and healthy living.

Using the RE-AIM evaluation framework, the purpose of evaluation is to measure whether the program is effective in achieving its goals, determine which factors are contributing to the program's success, and recommend program changes. Of the five dimensions in the RE-AIM framework:

- **Reach** is measured with data on patient eligibility, referral, and participation.
- **Effectiveness** is measured with data on attaining a 5% weight loss and incidence of type 2 diabetes.
- **Adoption** is measured with organizational diabetes prevention diffusion among providers/clinics.
- **Implementation** is measured with studying fidelity to the program.
- **Maintenance** is measured with measuring outcome sustainability over time.

To enable this evaluation, Intermountain tracks the following:

**Reach**
- Number of patients identified with prediabetes.
- Number of identified patients invited to participate in the DPP. Of those invited to the DPP:
  - The number of attendees
  - The number of participants in the Prediabetes 101 class, MNT, and/or The Weigh to Health® program

**Effectiveness**
- Percent weight loss (at 6 months and 12 months)
- Annual incidence of conversion to type 2 diabetes
- Percent of individuals who converted from prediabetes to diabetes in less than three years
- Change in weight, HbA1c, fasting blood glucose, blood pressure, BMI, lipids

**Adoption**
Number of providers and clinics enrolling participants into the DPP

**Implementation**
Number of sessions that participants attend in the Weigh to Health® program

**Maintenance**
Indicates measurement over time

Provider resources
To find this CPM and its reference list, clinicians can go to intermountain.net/clinicalprograms, and select Diabetes Prevention Program from the topic list on the left side of the screen.
This CPM presents a model of best care based on the best available scientific evidence at the time of publication. It is not a prescription for every physician or every patient, nor does it replace clinical judgment. All statements, protocols, and recommendations herein are viewed as transitory and iterative. Although physicians are encouraged to follow the CPM to help focus on and measure quality, deviations are a means for discovering improvements in patient care and expanding the knowledge base. Send feedback to Sharon Hamilton, Intermountain Healthcare, Primary Care Clinical Program, Sharon.Hamilton@imail.org.

REFERENCES

The following are the primary references used in this CPM:


