OBESITY & DIABETES IN BERMUDA

Framework
for a
National Plan of Action

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Senior Medical Officer, Department of Health, Bermuda
1. THE DISEASE CONTINUUM
or
THE NATURAL HISTORY OF DISEASE
OBESITY CONTINUUM

No/Low Risk → At Risk → Early Signs → Symptoms → Disease → Complicated Disease

Healthy weight
Healthy diet
Physical activity
No family history of obesity or genetics
No other risk factors (availability / affordability of healthy foods; water available for drinking)
OBESITY CONTINUUM

No/Low Risk → At Risk → Early Signs → Symptoms → Disease → Complicated Disease

**Healthy weight**
- Healthy diet
- Physical activity
- No family history of obesity or genetics
- No other risk factors (availability/affordability of healthy foods; water available for drinking)

**Unhealthy diet**
- **Physical inactivity**
- **Weight increase**
- Older age (>45 years)
- Pregnancy
- Genetics
- Family Lifestyle
- Biological / Medical conditions
- Socio-economic
- Lack of sleep
- Quitting smoking tobacco
OBESITY CONTINUUM

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Early Signs
Symptoms
Disease
Complicated Disease

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Overweight (BMI >25-29.9)

- Increased BMI
- Elevated blood sugar
- Increasing blood fats and cholesterol
- Reduced physical stamina and ability to exercise
- Cravings for unhealthy foods – high fat, high sugar, alcohol
OBESITY CONTINUUM

No/Low Risk

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At Risk

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Early Signs

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Symptoms

Obese (BMI 30+)
- High blood fats and cholesterol
- Risks of other diseases e.g. Heart disease, Diabetes, Hypertension, Kidney failure, Cancers etc
- Complicated course and treatment for common ailments

Disease

Complicated Disease
OBESITY CONTINUUM

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- Complicated course and treatment for common ailments

Complicated Disease

Complicated and/or morbid obesity with co-morbidities
- Gynaecological problems
- Erectile dysfunction
- Osteoarthritis
- Sleep apnea
- Hypertension
- High blood cholesterol
- Fatty Liver disease
- Heart disease
- Diabetes
- Kidney disease (CKD and renal failure)
- Stroke
- Cancer
DIABETES CONTINUUM

No/Low Risk

- Healthy weight
- Healthy diet
- Physical activity
- No family history of Diabetes
- Young age
- No other risk factors (e.g. ethnicity, personal and family medical history)

At Risk

- Overweight/obese **
- Unhealthy diet **
- Physical activity **
- Family history of Diabetes
- Older age (>45 yrs)
- Other risk factors (e.g. high-risk ethnicity, personal and family medical history of disease)

Early Signs

- Elevated blood glucose
  - prediabetes
  - Impaired fasting glycemia (IFG)
  - Impaired glucose tolerance (IGT)
  - detected by blood glucose screening tests

Symptoms

- Elevated blood glucose & HbA1c >6.5% - diabetes
  - Symptoms of diabetes present (polydipsia, polyuria, unexplained weight loss etc)
  - poor wound healing
  - Hyperglycemia

Disease

- Complicated diabetes with co-morbidities
  - Co-morbidities
  - Hypertension
  - High blood cholesterol
  - Heart disease
  - Stroke
  - Blindness (retinopathy)
  - Kidney disease (CKD and renal failure)
  - Large & small blood vessel disease
  - Erectile Dysfunction
  - Neuropathy
  - Lower limb amputations
<table>
<thead>
<tr>
<th>RISK FACTORS FOR OBESITY &amp; TYPE 2 DIABETES</th>
<th>BERMUDA Data</th>
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<tbody>
<tr>
<td>Ethnicity</td>
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<tr>
<td><strong>Early childhood nutrition</strong> *</td>
<td></td>
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<tr>
<td>Family history of diabetes</td>
<td>52.2%</td>
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<tr>
<td>Previous gestational diabetes</td>
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<tr>
<td>Older age (over 45 years)</td>
<td>44% (2014); 51% (2020 est)</td>
</tr>
<tr>
<td><strong>Unhealthy diet</strong></td>
<td>81.9% - inadequate fruit &amp; vege</td>
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<td></td>
<td>50% - 1 or more sugary drink/day</td>
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<tr>
<td><strong>Physical inactivity</strong></td>
<td>27.1%</td>
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<tr>
<td><strong>Overweight and obesity</strong></td>
<td>74.6% (M=79%, F=70%)</td>
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<tr>
<td><strong>Active smoking</strong></td>
<td>13.9%</td>
</tr>
</tbody>
</table>

97% of Bermudians have 1 or more risk factor for NCD

SOURCE: Risk factors: International Diabetes Foundation website  
Bermuda statistics: STEPS Survey 2014
## 2. PREVENTION OF DISEASE

<table>
<thead>
<tr>
<th>HEALTHY, NORMAL</th>
<th>AT-RISK</th>
<th>SIGNS: FIRST DEFECT/LESION</th>
<th>FIRST SYMPTOM</th>
<th>DISEASE, DISABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social &amp; Environmental Determinants</td>
<td>Risk &amp; Protective Factors</td>
<td>Pre-clinical Phase</td>
<td>Clinical Phase</td>
<td>Post-clinical Phase</td>
</tr>
</tbody>
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<tr>
<th>PRIMORDIAL PREVENTION</th>
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<th>TERTIARY PREVENTION</th>
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<tbody>
<tr>
<td>GENERAL POPULATION</td>
<td>SUSCEPTIBLE POPULATION</td>
<td>ASYMPTOMATIC POPULATION</td>
<td>SYMPTOMATIC OR DIAGNOSED POPULATION</td>
</tr>
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- **REDUCE RISKS**
  - Alter social structures and thereby underlying determinants
  - Alter exposures that lead to disease

- **REDUCE DISEASE INCIDENCE**
  - Detect and treat pathological process at an earlier stage when treatment can be more effective

- **REDUCE PREVALENCE & CONSEQUENCES**
  - Prevent relapses and further deterioration via follow-up care and rehabilitation
  - Reduce complications or disability

<table>
<thead>
<tr>
<th>HEALTH PROMOTION</th>
<th>RISK REDUCTION</th>
<th>CLINICAL PREVENTIVE SERVICES</th>
<th>SCREENING FOR DISEASE MARKERS</th>
<th>CLINICAL PREVENTIVE SERVICES</th>
<th>TREATMENT &amp; CARE</th>
<th>SECONDARY OR SPECIALIST CARE REHABILITATION</th>
</tr>
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<tbody>
<tr>
<td>Health promotion</td>
<td>Immunization</td>
<td>Risk Reduction</td>
<td>Screening for Risks</td>
<td>Clinical Preventive Services</td>
<td>Treatment &amp; Care</td>
<td>Secondary or specialty care Rehabilitation</td>
</tr>
</tbody>
</table>
3. INTERVENTION POINTS

Lifestyle Interventions

- No/Low Risk
- At Risk
- Early Signs
- Symptoms
- Disease

Preventive Services
Screening
Diagnosis, Treatment & Care
Case Management

HEALTH MAINTENANCE & PROMOTION
RISK FACTOR REDUCTION
SCREENING & EARLY IDENTIFICATION
CARE AND TREATMENT
QUALITY OF CARE
INTERVENTION POINTS, EXPECTED OUTCOMES & TARGETS

Lifestyle Interventions

1. SOCIAL DETERMINANTS / HEALTH MAINTENANCE & PROMOTION
   Increase the prevalence of health-promoting behaviours AND
   Reduce the prevalence of behavioural / other modifiable risk factors for obesity and diabetes

   TARGETS
   - Increase the proportion of adults/children who:
     - are at a healthy weight.
     - report consuming 5 or more servings of fruit and vegetables daily.
     - report participating in physical activity daily & meet the WHO guidelines.
     - consume only water instead of sugar-sweetened beverages (or consume zero sugar-sweetened beverages daily).
   - Increase the proportion of adult non-daily smokers of tobacco.
INTERVENTION POINTS, EXPECTED OUTCOMES & TARGETS

<table>
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<th>Lifestyle Interventions</th>
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No/Low Risk ➔ At Risk ➔ Early Signs ➔ Symptoms ➔ Disease ➔ Complicated Disease

**EXPECTED OUTCOMES**

2. **RISK FACTOR REDUCTION**

Increase prevention behaviours in persons at high-risk for diabetes and obesity *(i.e. persons who are overweight or obese, physically inactive, poor dietary habits, and with elevated blood glucose)*

**TARGETS**

Reduce the proportion of adults/children who:
- are overweight/obese.
- are physically inactive / lack vigorous physical activity.
- consume 3 or more sugar-sweetened beverages daily.

Increase the proportion of adults who during last year:
- being overweight or obese, lose 10% of their body weight
- having elevated blood glucose, reduce and maintain blood glucose levels

Reduce the prevalence of prediabetes.
### INTERVENTION POINTS, EXPECTED OUTCOMES & TARGETS

**Lifestyle Interventions**

- **No/Low Risk**
  - At Risk → Early Signs
    - Symptoms → Disease
      - Complicated Disease

### EXPECTED OUTCOMES

3. **SCREENING & EARLY IDENTIFICATION**

Early identification and appropriate management of:
- pre-diabetes & diabetes
- overweight & obesity

### TARGETS

Increase the proportion of persons who have been screened & diagnosed with pre-diabetes & diabetes and overweight & obesity and effectively managed; who report:
- increasing their levels of physical activity.
- trying to lose weight.
- reducing the amount of fat and calories in their diet.
- receiving lifestyle advice and prescribed adequate treatment.

Reduce the **incidence** of obesity and of diabetes *(i.e. number of new cases per 1,000 population aged 18-84 years).*
4. **CARE AND TREATMENT**

Among diagnosed persons:
- Improved glycemic control for diabetes
- Improved weight control for obesity

**EXPECTED OUTCOMES**

**TARGETS**

Among persons diagnosed with **diabetes**:
- reduce the proportion with an A1c value greater than 9%.
- increase the proportion with an A1c value less than 7%.
- increase the proportion who lost at least 5/7/10% of body weight.

Among persons diagnosed with **obesity**:
- increase the proportion who lost at least 10% of body weight.
INTERVENTION POINTS, EXPECTED OUTCOMES & TARGETS

Lifestyle Interventions

No/Low Risk → At Risk → Early Signs → Symptoms → Disease → Complicated Disease

EXPECTED OUTCOMES

TARGETS (from X% to Y% by YEAR)

5. QUALITY OF CARE
   Improved quality of care provided to persons diagnosed:
   • with diabetes
   • with obesity.
   
   Increase the proportion of persons diagnosed with diabetes who:
   - have blood glucose self-monitoring devices and perform self-monitoring at least once daily;
   - have an annual dental, foot, dilated eye and urinary microalbuminuria examination.
   
   Reduce, among persons diagnosed with diabetes:
   - the rate of lower extremity amputations.
   - the diabetes death rate.
   
   Increase the proportion of persons diagnosed with obesity who receive nutritional and specialist services referral for weight loss.
4. Life Course Approach

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A model that suggests that health outcomes for individuals, families, and communities depend on the interaction of various protective and risk factors throughout the life course. These factors are related to psychological, behavioral, biological and environmental influences, as well as access to health services.

The approach provides a more comprehensive vision of health and its determinants, and calls for the development of health service networks that are centred on people's needs at each stage of their lives and address the social determinants of health.
# Strategies & Activities - Life Course Approach

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1. SOCIAL DETERMINANTS APPROACH & HEALTH PROMOTION

2. RISK FACTOR IDENTIFICATION & RISK REDUCTION

3. SCREENING & EARLY DIAGNOSIS OF DISEASE

4. CARE & TREATMENT

5. QUALITY OF CARE
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3. **SCREENING & EARLY DIAGNOSIS OF DISEASE**

4. **CARE & TREATMENT**

5. **QUALITY OF CARE**
HALTING THE RISE IN OBESITY AND DIABETES

Life Stage: Pregnancy

INTERVENTION POINTS

1. Social Determinants/Health Promotion
   - Health education – antenatal and parenting classes
   - Health promotion – preconception care, weight management, diet, and physical activity, lifestyle interventions
   - Risk avoidance regarding risky lifestyles and behaviours: avoidance of risks
   - Promotion of breastfeeding
   - Access to quality, comprehensive prenatal care

2. Primary Prevention/Risk Reduction
   - Risk factor screening and identification
   - Risk reduction regarding risky lifestyles and behaviours: avoidance of risks
   - Preconception care and counselling
   - Health education – antenatal diet, physical activity.

3. Screening & Early Detection
   - Routine antenatal care guidelines and referral pathways
   - Screening guidelines for blood glucose in preconception and antenatal care

4. Care and Treatment
   - Protocols for management of pregestational diabetes in pregnancy
   - Protocols for management of overweight and obesity in pregnancy
   - Statutory reporting of diabetes diagnoses for National Register

PRECONCEPTION CARE ENCOUNTERS

Preconception care – a set of interventions to identify and modify biomedical, behavioral, and psychosocial risks to a woman’s health or pregnancy outcome through prevention and management. Preconception care should be considered as a continuum of care throughout a woman’s reproductive life, any form of contact with a health care worker to prepare for a healthy pregnancy.

- Measure Blood Pressure, Calculate BMI
- Provide specific information
- Counselling on lifestyle choices and risks behaviours; encourage diet, nutrition, and physical activity
- Written Referral to Nutrition service, as indicated

Gestational Weight Gain (GWG) Guidelines* (Institute of Medicine)

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<th>Pre-Pregnancy BMI</th>
<th>Recommended Weight Gain</th>
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<td>Underweight (BMI &lt;18.5)</td>
<td>25-35 lbs / 11.4-15.9 kg</td>
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<td>Normal Weight (BMI 18.5 – 24.9)</td>
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<td>15-35 lbs / 6.8-11.4 kg</td>
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<td>Obese (BMI &gt;=30)</td>
<td>11-20 lbs / 5.0-9.0 kg</td>
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* For the overweight or obese woman who is gaining less than the recommended amount but has an appropriately growing fetus, no evidence exists to encourage increased weight gain to conform to the current IOM guidelines. Women should improve maternal or fetal outcomes.

PREGNANT CLIENT ENCOUNTERS

First Pre-natal Visit (GA 8-12 Wks)

- Measure Height & Weight, Calculate BMI
- Recommended gestational weight gain based on BMI
- Effct History of Type 2 Diabetes, Gestational DM, large infant (>9 lbs/4 kg), 1st degree family member with DM
- Test for undiagnosed Type 2 DM: if BMI >30 or personal history of GDM, known impaired glucose metabolism at first visit
- Counsel regarding excessive weight gain, recommend diet and physical activity
- Apply Nutrition Screening tool

- Women with complex medical conditions (obesity, Diabetes) must be offered referral for assessment by a consultant obstetrician. Referral pathways should be available.
- Structured Maternal Records and Client Passport & Itinerary should be available, showing time-line of prenatal care and when to expect at each visit.
- Informed and educating women on appropriate weight gain before and in the beginning of pregnancy may contribute to better dietary compliance.
- Diet or exercise, or both, during pregnancy can reduce the risk of excessive GWG, particularly for high-risk women.
- Exercise appears to be an important part of controlling weight gain in pregnancy.

EVIDENCE

- Women with complex medical conditions (obesity, Diabetes) must be offered referral for assessment by a consultant obstetrician. Referral pathways should be available.
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MANAGEMENT OF DIABETES IN PREGNANCY

- Pre-existing Diabetes: preconception counselling; family planning/effective contraception; importance of glycemic control; risks of diabetic retinopathy; dilated eye exam prior or in 1st trimester, repeat every trimester and for 1 year post-partum.
- GDM – lifestyle change; medication if needed.
- General principles of management of DM in pregnancy: avoid teratogenic meds if unreliable contraception; self-monitoring of blood glucose; modified targets for control using HbA1c and BP (for co-morbid hypertensive)

KEY:
- BMI: Body Mass Index
- GWG: Gestational Weight Gain
- GDM: Gestational Diabetes Mellitus
- DM: Diabetes Mellitus

REFERENCES


11x6 to 714x528
## Strategies & Activities - Life Course Approach

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<td>2. RISK FACTOR IDENTIFICATION &amp; RISK REDUCTION</td>
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HEALTH PROMOTION Strategies

1. Building healthy public policies
2. Creating supportive environments
3. Strengthening community action
4. Developing personal skills
5. Re-orienting health services
6. Creating alliances (e.g. with the Media, non-health sector)
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2. **RISK FACTOR IDENTIFICATION & RISK REDUCTION**

3. **SCREENING & EARLY DIAGNOSIS OF DISEASE**

4. **CARE & TREATMENT**

5. **QUALITY OF CARE**
INTERVENTION POINTS

Lifestyle Interventions

No/Low Risk → At Risk → Early Signs → Symptoms → Disease → Complicated Disease

Preventive Services → Screening → Diagnosis, Treatment & Care → Case Management

HEALTH MAINTENANCE & PROMOTION

RISK FACTOR REDUCTION

SCREENING & EARLY IDENTIFICATION

CARE AND TREATMENT

QUALITY OF CARE
HALTING THE RISE IN OBESITY AND DIABETES
Life Stage: School-aged Child (5 - 18 yrs)

INTERVENTION POINTS

1. Social Determinants/Health Promotion
   - National policies on taxing sugar-sweetened beverages, food labelling, marketing of foods to children etc.
   - School Health & Family Life Education policy, health education curriculum and local policies.
   - Health Education - Prevention of aversion to risk factors for obesity & diabetes.
   - Parental and carer education on nutrition and physical activity in schools.
   - National policy for induction of quality physical education in schools.
   - Standards for nutrition and physical activity in schools.
   - Premier's Youth Council on Fitness (PYFC).
   - Public awareness and education on childhood obesity.

2. Primary Prevention/Risk Reduction
   - School health assessments and referral process.
   - Public awareness and education on childhood obesity.

3. Screening & Early Detection
   - Routine weight and blood glucose screening guidelines (0-18 yrs).
   - Implementation of weight and blood glucose guidelines for monitoring.
   - Comprehensive School- and community-based screening services (5-18 yrs).
   - Referral resources for family support and health education.
   - Statutory reporting for Diabetes Register.

4. Care and Treatment
   - Protocols for management of excessive weight gain, overweight and obesity.
   - Protocols for management of impaired glucose metabolism in children.
   - Referral resources for development of self-care skills, family support and health education.
   - Statutory reporting of diabetes diagnoses for National Register.

5. Quality of Care
   - Adherence to national guidelines for clinical management.
   - Clinical Care Quality Reporting system with monitoring and accountability mechanisms.

Defining Childhood Obesity (5-18 yrs)

<table>
<thead>
<tr>
<th>Weight Category</th>
<th>BMI-for-age</th>
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<tbody>
<tr>
<td>Underweight</td>
<td>&lt;5th percentile</td>
</tr>
<tr>
<td>Normal</td>
<td>5th to 85th</td>
</tr>
<tr>
<td>Overweight</td>
<td>&gt;85th</td>
</tr>
<tr>
<td>Obese</td>
<td>&gt;95th</td>
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**COMMENTS**
- For children and teens, BMI is age and sex-specific and is often referred to as BMI for age. A child's weight status is determined using an age- and sex-specific percentile for BMI rather than the BMI categories used for adults, because children's body composition varies by age and gender. BMI level (among children and teens) is expressed relatively to other children of the same age and sex.

**HEALTH PROMOTION**

**EVIDENCE**
- Activities included in beneficial programmes:
  - Curriculum on healthy eating, physical activity and body image integrated into regular curricula.
  - More sessions for physical activity and the development of fundamental movement skills throughout the school year.
  - Improved nutritional quality of foods made available to students.
  - Creating an environment and culture that support children eating nutritious foods and being active throughout each day.
  - Providing support for teachers and other staff to implement health promotion strategies and activities (e.g. professional development, capacity building activities).
  - Engaging with parents to support activities in the home setting to encourage children to be more active, eat more nutritious foods and spend less time in screen-based activities.

**QUALITY OF CARE**

**EVIDENCE**
- Adherence to clinical management guidelines.
- Adherence to other management recommendations:
  - Routine immunization according to age-related recommendations.
  - Annual influenza vaccination.
  - Pneumococcal vaccination with pneumococcal polysaccharide vaccine (PPSV23).
  - Referral to Behavioural and Mental Health professionals for psychosocial care.

**REFERENCES**
3. Langford, Rebecca; Boneil, Christopher P; Jones, Hayley; Poulou, Theodora; Murphy, Simon M; Waters, Elizabeth; Komor, Kelly A; Gibbs, Lisa F; Magnus, Daniel; Campbell, Fiona. The WHO Health Promoting School framework (2010). Health PROMOTE (2010).
## Strategies & Activities - Life Course Approach

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Pregnancy &amp; Birth (foetus in-utero)</th>
<th>Infancy, Toddler and Pre-School-aged</th>
<th>School-aged child</th>
<th>Young Adult of Reproductive Age</th>
<th>Older Adult</th>
<th>Seniors / Elderly</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRANSITION POINTS</td>
<td>Gestational period</td>
<td>0-&lt;5 years</td>
<td>5-18 years</td>
<td>18-44 years</td>
<td>45-64 years</td>
<td>65+ years</td>
</tr>
<tr>
<td>1. SOCIAL DETERMINANTS APPROACH &amp; HEALTH PROMOTION</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>2. RISK FACTOR IDENTIFICATION &amp; RISK REDUCTION</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3. SCREENING &amp; EARLY DIAGNOSIS OF DISEASE</td>
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<td></td>
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<tr>
<td>4. CARE &amp; TREATMENT</td>
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<tr>
<td>5. QUALITY OF CARE</td>
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</tbody>
</table>
INTERVENTION POINTS

Lifestyle Interventions

- Preventive Services
- Screening
- Diagnosis, Treatment & Care
- Case Management

- No/Low Risk
- At Risk
- Early Signs
- Symptoms
- Disease
- Complicated Disease

HEALTH MAINTENANCE & PROMOTION
RISK FACTOR REDUCTION
SCREENING & EARLY IDENTIFICATION
CARE AND TREATMENT
QUALITY OF CARE
HALTING THE RISE IN OBESITY AND DIABETES
Life Stage: Older Adult (45 - 64 years)

1. Social Determinants/Health Promotion
   - National food and nutrition policies (accessibility and affordability of healthy foods, vending machine, food labeling etc.)
   - National policies on provision of community spaces for physical activity
   - Health Education/Promotion on avoidance of risk factors for obesity & diabetes
   - Adult Preventive Health Services and guidelines
   - Social mobilization and media & informational campaigns
   - Public awareness and education on obesity

2. Screening & Early Detection
   - Adult Preventive Health Services protocols and standards
   - Work- and community-based weight and blood glucose screening guidelines (45-65 years)
   - Referral resources for behavioural intervention, family support and health education
   - Statistical reporting for diabetes registration

3. Screening & Early Detection
   - Adherence to national guidelines for clinical management
   - Clinical Care Quality Reporting system with monitoring and accountability mechanisms

Defining Adult Overweight and Obesity

<table>
<thead>
<tr>
<th>Weight Category</th>
<th>BMI</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt;18.5</td>
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</tr>
<tr>
<td>Normal</td>
<td>18.5 - 24.9</td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>25.0 - 29.9</td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>≥30</td>
<td></td>
</tr>
</tbody>
</table>

Waist circumference indicates higher risk of developing obesity-related conditions if:
- A male has a waist circumference of more than 40 inches
- A non-pregnant female has a waist circumference of more than 35 inches

EVIDENCE

Supportive Policies
- Policies - vending machine; food & menu labeling
- Total Worker Health (TWH) programmes integrating injury and illness prevention; workplace interventions.
- National comprehensive health promotion incl. campaigns & informational, behavioural/social and environmental/policy interventions and approaches.
- Conditional incentives for behavior change (diet and physical activity).
- Vouchers for fruit and vegetable purchases for low-income persons

EVIDENCE

- Food labeling empowers consumers in choosing healthier products; and interpretive labels, e.g. traffic-light labels, are more effective.
- Pricing and availability strategies are effective at improving the nutritional quality foods and beverages purchased from vending machines.
- Conditional incentives/rewards provided for physical activity behavior instead of attendance, had positive effects; however long-term effects of financial incentives are still unclear.
- Positive association between incentives and dietary behavior change in the short term; with longer incentives associated with better outcomes.
- Subsidizing healthy behavior, e.g. fruit and vegetable consumption in low-income households is preferable to taxation as a disincentive for unhealthy food choices.
- Proven effectiveness of TWH interventions for increasing rates of smoking cessation, increasing fruit and vegetable intake, and reducing sedentary behavior.

Primary Prevention
- Total Worker Health (TWH) programmes
- Measure height & weight, calculate BMI at all health care visits; waist circumference is a useful measure.
- Social media and app-based interventions to improve diet and physical activity.
- Lifestyle/Behaviour Change Interventions for diet and physical activity
- Behavioural Counseling Interventions (5-As: Assess, Advise, Agree, Assist, Arrange)

EVIDENCE

- Behaviour change interventions for diet and physical activity are modestly effective at short and long term.
- Multi-component social media interventions can lead to improved diet, physical activity behaviors. Use of mobile phone apps showed reductions in participants' body weight, BMI, waist circumference and body fat, based on frequency of programme use. Important features of effective apps were frequent self-recording of weight, personalisation of the intervention (counselling and individualised feedback), and a social support system which acts as a motivational tool.
- Lifestyle/behaviour change interventions for diet and physical activity, emphasizing motivational interviewing, and self-determination theory are associated with long-term effects.

SCREENING AND EARLY DETECTION

1. Obesity
   - All adults should be screened for obesity.
   - Adults with BMI of 30 or higher, should be offered referral to intensive multi-component behavioural interventions.

2. Diabetes
   - All asymptomatic adults: Screen for type 2 diabetes with an informal assessment of risk factors, or use a validated tool.
   - Blood glucose test in adult clients of any age considered if overweight or obese (BMI ≥25) and having one or more risk factors: (test using either fasting plasma glucose, 2-hr plasma glucose after 75g oral glucose tolerance test, or HbA1c).
   - All persons should be tested beginning at age 45 years. If normal, repeat at a minimum 5-year interval. Those with prediabetes should be tested yearly.

CARE AND TREATMENT

1. Obese management:
   - Behavioural interventions (minimum 12 weeks’ duration)
   - Combined pharmacological and behavioural intervention

2. Complete medical evaluation should be performed at the initial visit to confirm the diagnosis and classify diabetes.

3. Diabetes care and treatment should be provided by a team to improve lifestyle management.

4. Statutory reporting for Diabetes Register

QUALITY OF CARE

1. Routine vaccination according to age-related recommendations
   - Annual influenza
   - Pneumonia vaccine (pneumococcal polysaccharide PCV23 vaccine up to age 64 yrs). At 65 yrs of age, pneumococcal conjugate vaccine (PCV13) to be administered, as recommended.
   - Hepatitis B (to unvaccinated adults up to age 59 yrs).

2. Complete medical evaluation of diabetic:
   - Detect diabetes complications and potential comorbid conditions.
   - Review treatment plan and risk factor control in patients with established diabetes.
   - Begin patient engagement in the formulation of a care management plan.
   - Develop a plan for continuing care.

3. Health professionals’ treating obesity should utilize disciplines that offer expertise in dietary counseling, physical activity, and behavior change through direct, formal relationships or an indirect referral.

REFERENCES
“All-of-Society” Involvement

INTERVENTIONS ON THE CONTINUUM

Lifestyle Interventions

No/Low Risk → At Risk → Early Signs → Symptoms → Disease → Complicated Disease

Preventive Services → Screening → Diagnosis, Treatment & Care → Case Management

HEALTH MAINTENANCE & PROMOTION
RISK FACTOR REDUCTION
SCREENING & EARLY IDENTIFICATION
CARE AND TREATMENT
QUALITY OF CARE

Resource (human, material and money) intensive

Largest Impact on population health
The Beginning

Halting the rise in obesity and diabetes