

# Life Course Preventive Care for Women in Primary Healthcare - Healthy Lifestyle

## Do Not Smoke

Recommendations	Grades of Recommendations <sup>^</sup>
1. Educate all on harms of tobacco smoking, including cigarette, e-cigarette, waterpipe, and second-hand smoke <sup>1</sup>	B
2. Ask about tobacco use by all clients and/or family member(s) at every opportunity <sup>1</sup>	A
3. Advise all smokers to quit <sup>1</sup>	A

<sup>^</sup> Scottish Intercollegiate Guidelines Network (SIGN) classification

## Recommended Care Components

For Who?	Recommended Care Components <sup>a</sup>	By Whom? <sup>b</sup>	How Often?
<b>Empowerment</b>			
All	Educate all on harms of tobacco smoking, including cigarette, e-cigarette, waterpipe, and second-hand smoke <sup>1</sup>	Primary Healthcare Providers	Opportunistically
Smokers who are <b>planning for pregnancy, or are pregnant</b>	Provide messages of the significant maternal and perinatal risks associated with tobacco use <sup>2</sup> + Offer referral to a cessation service	Primary Healthcare Providers	Opportunistically and At each antenatal visit
<b>Assessment</b>			
All smokers	Assess ( <b>Table 1.</b> ): <b>(1) Smoking habit<sup>3</sup></b>  <b>(2) Readiness to quit<sup>3</sup></b>	Trained Healthcare Professionals	Opportunistically

For Who?	Recommended Care Components <sup>a</sup>	By Whom? <sup>b</sup>	How Often?
<b>Management</b>			
Non-pregnant smokers who are <b><u>Not Ready</u></b> to quit	Motivate to make a quit attempt by <b>(1) Brief Interventions<sup>1</sup></b> - <b>5R's intervention (Table 2.)</b> (Relevance, Risk, Rewards, Roadblocks, and Repetition)  OR <b>(2) Motivational Interviewing</b>	Trained Healthcare Professionals	At every visit
Smokers who are <b><u>Ready</u></b> to quit	Offer <b>counselling (Table 1.):</b>  + pharmacotherapy such as: - <b>Nicotine replacement therapy<sup>@</sup></b> ("NRT", including patch, gum and lozenge), or - <b>Varenicline<sup>^4</sup></b>  + Offer referral to a <b>cessation service</b>	Trained Healthcare Professionals  <sup>@</sup> Pharmacists  <sup>^</sup> Doctors	At every visit

5R = Relevance, Risk, Rewards, Roadblocks, and Repetition; NRT = Nicotine Replacement Therapy

<sup>a</sup> **Grade of recommendation according to colour code:**

Recommended (Strong)	Conditionally recommended	Practice points	Generally not recommended	Not recommended (Strong)
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<sup>b</sup>

<p><b>Primary Healthcare Providers</b> – All providers of health services in primary healthcare settings</p> <p><b>Primary Healthcare Professionals</b> – Includes doctors, dentists, chinese medicine practitioners, nurses, pharmacists, physiotherapist, occupational therapist, dietitians</p> <p><b>“Trained”</b> Healthcare Professionals – Additional post-qualification training required to deliver the respective care component(s)</p>
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## Collaborative Care

### Consider Referral to Smoking Cessation Services in the Community

#### Smoking Cessation Service

- ◆ Counselling and medications (“Mail to Quit” Programme included)
- ◆ Hospital Authority Smoking Cessation and Counselling Centres (Paid services)
- ◆ Smoking Cessation Outreach Programme in Workplace
- ◆ Free One-week Smoking Cessation Drugs (Nicotine Replacement Therapy "NRT") Trial Packs

#### Smoking Cessation Hotline

- ◆ Integrated Smoking Cessation Hotline 1833 183
- ◆ Youth Quitline 3400 3799 (<https://sctc.nursing.hku.hk/youth-quitline/https://www.polyuyqi.com>)

NRT = Nicotine Replacement Therapy

**Table 1. 5A's Model<sup>5</sup>**

The 5A's model (Ask, Advise, Assess, Assist, and Arrange) can be applied to assess smokers' readiness to quit, and assist smokers who are ready to quit.

<b>Ask</b>	<ul style="list-style-type: none"> <li>◆ Ask ALL patients at each consultation about their <b>smoking status</b>, daily consumption and years of smoking, and record the information accordingly</li> <li>◆ Include smoking status of the patient as one of the vital signs and record such information prominently</li> </ul>
<b>Advise</b>	<ul style="list-style-type: none"> <li>◆ Convince the patient to quit smoking with a clear, personalised and strong manner, e.g. "Quitting smoking is the most important thing you can do to protect your health", "Quitting smoking can delay the progression of COPD"</li> </ul>
<b>Assess</b>	<ul style="list-style-type: none"> <li>◆ Assess each patient's <b>desire and readiness to quit</b> <ol style="list-style-type: none"> <li>1. Would you like to quit smoking?</li> <li>2. Do you think you have a chance of quitting successfully?</li> </ol> </li> <li>◆ If answer to either question is YES, can move on to the next step "Assist"</li> <li>◆ If answer to both question is NO, or if patient is unsure if they want to quit smoking, can deliver <b>5R's intervention</b></li> </ul>
<b>Assist</b>	<ul style="list-style-type: none"> <li>◆ Work out with the patient on the smoking cessation <b>plan</b>, e.g. set a quit day and encourage the patient to tell family members, colleagues and friends to enlist their support and encouragement</li> <li>◆ Provide appropriate <b>techniques</b> on problem solving and give advice for successful quitting</li> <li>◆ Recommend the use of <b>pharmacotherapy</b> for smoking cessation and assist in making referral</li> <li>◆ Provide relevant smoking cessation <b>information</b> such as pamphlets or quit-line card</li> </ul>
<b>Arrange</b>	<ul style="list-style-type: none"> <li>◆ Work out with the patient on <b>follow-up</b> schedule and approaches such as interviews and telephone calls</li> <li>◆ Recognise the efforts of those who have successfully remained tobacco-free, and remind those who are still unable to kick the habit to regard occasional "slips" as an alert</li> <li>◆ If a relapse occurs, encourage the client to repeat quit attempt and review cause of relapse</li> </ul>

COPD = Chronic Obstructive Pulmonary Disease

**Table 2. 5R's Model<sup>5</sup>**

The 5R's intervention (Relevance, Risk, Rewards, Roadblocks, and Repetition) can be delivered to those who are not ready to quit tobacco.

<b>Relevance</b>	<ul style="list-style-type: none"><li>◆ Get the patient to understand <b>why</b> his/ her quitting is relevant to him/ her personally and to the people around</li></ul>
<b>Risk</b>	<ul style="list-style-type: none"><li>◆ Guide the patient to identify potential <b>negative consequences</b> of tobacco use that are relevant to him/ her</li></ul>
<b>Rewards</b>	<ul style="list-style-type: none"><li>◆ Get the patient to understand the personally relevant <b>benefits</b> brought about by smoking cessation</li></ul>
<b>Roadblocks</b>	<ul style="list-style-type: none"><li>◆ Guide the patient to assess various <b>barriers</b> to quitting, e.g. experience of withdrawal symptoms or fear of repeated failure, and provide counselling accordingly</li></ul>
<b>Repetition</b>	<ul style="list-style-type: none"><li>◆ Make good use of every contact opportunity by <b>repeating motivational intervention</b></li></ul>

## Further Readings

### *Harms of Tobacco Smoking*

- ◆ Tobacco smoke contains at least 69 recognised carcinogens, toxic substances such as tar and carbon monoxide, and the highly addictive stimulant nicotine, which can inflict damages on nearly every organ system, increase the risk of cardiovascular diseases and cancers, particularly lung cancer.<sup>6, 7</sup> Smoking during preconception period and pregnancy is associated with increased risks of infertility, ectopic pregnancy, miscarriage, preterm birth, and low birth weight (**S Table 1.1.**).<sup>8, 9</sup>
- ◆ E-cigarette vaporizes e-liquid that contains nicotine, flavorings and solvents, and can generate harmful substances (e.g. carcinogenic aldehydes and chromium) when heated. The amount of nicotine inhaled may exceed that of traditional cigarettes, and some marketed as nicotine-free have been found to actually contain nicotine.<sup>10</sup> Vaping can also result in specific complications such as lipoid pneumonia, subacute bronchiolitis, acute eosinophilic pneumonia, multiple reactive pulmonary nodules, hypersensitivity pneumonia, diffuse alveolar haemorrhage, and organising pneumonia.<sup>11</sup>
- ◆ Waterpipe tobacco (also known as *shisha*, *goza*, *narghile*, *ghalyoon*, or *hookah*) involves heating a tobacco product (with or without flavorings) by hot charcoal to emit smoke that the user inhales by puffing on a hose connected to a water container. During a typical 1-hour long waterpipe smoking session, large volume of smoke is produced, which contains high level of toxins, including nearly nine times the carbon monoxide and 1.7 times the nicotine found in a single cigarette, and poses serious health risks comparable to traditional cigarette smoking.<sup>12-15</sup>
- ◆ The inhalation of environmental tobacco smoke, refers as secondhand smoke, raises the likelihood of developing lung cancer, heart disease and respiratory symptoms among non-smokers.<sup>7</sup>
- ◆ Nicotine and other chemicals from cigarette and e-cigarette use can linger on the skin, clothing, and surfaces, exposing children and family members of smokers to the harmful effects of these substances, even when the person is not actively smoking or vaping in their presence.<sup>7</sup>

- ◆ Prolonged exposure to nicotine leads to dependence, marked by withdrawal symptoms such as irritability, anxiety, increased appetite, and cravings when not smoking.<sup>16</sup>

### ***Interventions for Smoking Cessation***

- ◆ Quitting smoking is beneficial at any age, yielding immediate and progressive health improvements. Substantial health improvements and reduced disease risk were observed among those who stop, regardless of when they quit.<sup>17</sup> Within 20 minutes, blood pressure and heart rate return to normal. After 10 years, the risk of dying from lung cancer is about half that of smokers, and by 15 years, the risk of coronary heart disease matches that of a non-smoker.<sup>18</sup>
- ◆ Structural interventions such as brief intervention and motivational interviewing provided by healthcare professionals have been shown to be effective in helping smokers to quit smoking.<sup>19</sup>
- ◆ A meta-analysis in 2022 concluded that varenicline alone was more effective for smoking cessation compared to placebo (OR 2.88, 95% CI 2.10-3.96) and counselling (OR 3.27, 95% CI 1.48-7.21).<sup>20</sup>
- ◆ A Cochrane review of 65 trials demonstrated that enhancing behavioural support for individuals already using smoking cessation medication could further improve their likelihood of quitting. Approximately 17% of participants with minimal or no support managed to quit, while around 20% in the groups that received additional support succeeded. Moreover, providing support through personal interactions, whether in person or via phone, proved beneficial.<sup>21</sup>

**S Table 1. Adverse Effects of Smoking on Women’s Health across Life Stages**

Life Stage(s)	Adverse Health Effects	Relative Risks (RR) (95%C.I)	Level of Evidence
All	<p><b>Cigarette:</b></p> <p><b>Cancer</b></p> <ul style="list-style-type: none"> <li>♦ Lung Cancer</li> <li>♦ Oral Cavity Cancer</li> <li>♦ Cervical Cancer@</li> <li>♦ Esophageal Cancer</li> <li>♦ Bladder Cancer</li> <li>♦ Breast Cancer@</li> <li>♦ Colon and Rectum Cancer</li> </ul> <p><b>Cardiovascular</b></p> <ul style="list-style-type: none"> <li>♦ Coronary heart disease</li> <li>♦ Stroke</li> </ul> <p><b>Respiratory</b></p> <ul style="list-style-type: none"> <li>♦ Chronic Obstructive Pulmonary Disease</li> </ul> <p><b>e-Cigarette:</b></p> <ul style="list-style-type: none"> <li>♦ Myocardial infarction</li> <li>♦ Periodontal disease</li> <li>♦ Cracked/broken teeth</li> </ul> <p><b>Waterpipe:</b></p> <ul style="list-style-type: none"> <li>♦ Lung Cancer</li> <li>♦ Esophageal Cancer</li> <li>♦ Head and neck cancer</li> <li>♦ Gastric cancer</li> </ul>	<p>5.11 (1.84 – 14.99)</p> <p>3.43 (2.37 – 4.94)</p> <p>2.37 (1.23 – 4.79)</p> <p>1.96 (1.20 – 3.32)</p> <p>1.90 (1.31 – 2.81)</p> <p>1.17 (1.04 – 1.31)</p> <p>1.19 (0.97 – 1.46)</p> <p>3.12 (2.15 – 4.52)</p> <p>2.09 (1.51 – 2.89)</p> <p>3.17 (1.60 – 6.55)</p> <p>OR = 1.33 (1.14 – 1.56)</p> <p>OR = 2.34 (1.52 – 3.59)</p> <p>aOR = 1.65 (1.19 – 2.27)</p> <p>OR = 4.58 (2.61 – 8.03)</p> <p>OR = 3.63 (1.39 – 9.44)</p> <p>OR = 0.55 (0.24 – 1.27)</p> <p>OR = 2.35 (1.11 – 5.01)</p>	<p>2++<sup>22, 23</sup></p> <p>2+<sup>24</sup></p> <p>2++<sup>25</sup></p> <p>2++<sup>25</sup></p> <p>2++<sup>26</sup></p>
Reproductive years	<ul style="list-style-type: none"> <li>♦ Infertility</li> </ul>	<p>1.85 (1.08 – 3.14)</p>	<p>2++<sup>27</sup></p>
Pregnancy	<ul style="list-style-type: none"> <li>♦ Low birth weight</li> <li>♦ Preterm birth</li> <li>♦ Small size for gestational age</li> <li>♦ Ectopic pregnancy</li> <li>♦ Miscarriage</li> </ul>	<p>1.89 (1.8 – 1.98)</p> <p>1.08 (1.02 – 1.15)</p> <p>2.15 (2.07 – 2.23)</p> <p>Pooled OR = 1.77 (1.31 – 2.22)</p> <p>Summary RR = 1.32 (1.21 – 1.44)</p>	<p>2++<sup>28</sup></p> <p>2++<sup>29</sup></p> <p>2+<sup>30</sup></p> <p>2++<sup>31</sup></p>
Menopause	<ul style="list-style-type: none"> <li>♦ Premature menopause</li> <li>♦ Early menopause</li> </ul>	<p>2.05 (1.73 – 2.44)</p> <p>1.80 (1.66 – 1.95)</p>	<p>2+<sup>32</sup></p>

@ Adverse Health Effects Specific for Women

RR = Relative Risk; OR= Odd Ratio; aOR = Adjusted Odd Ratio

\*\*\*The corresponding list of References is available on HKRF webpage\*\*\*

## Avoid Harmful Drinking

Recommendations	Grades of Recommendations <sup>^</sup>
1. Educate all on harmful health effect of alcohol consumption <sup>1</sup>	B
2. Assess alcohol consumption by the client at every opportunity <sup>2</sup>	A
3. Advise all drinkers against harmful drinking pattern <sup>2</sup>	A
4. Strongly advise the following groups not to drink: <sup>2</sup> <ul style="list-style-type: none"> <li>◆ Pregnant women</li> <li>◆ Persons feeling unwell</li> <li>◆ Persons with a prior history of alcohol or drug dependence or physical damage</li> <li>◆ Persons with prior or current serious mental illness</li> <li>◆ Persons operating a vehicle or machinery, or engaging in sports</li> </ul>	A
5. Suggest non-drinkers not to start drinking alcohol for the perceived health benefits of alcohol consumption <sup>3</sup>	B

<sup>^</sup>Scottish Intercollegiate Guidelines Network (SIGN) classification

## Recommended Care Components

For Who?	Recommended Care Components <sup>a</sup>	By Whom? <sup>b</sup>	How Often?
<b>Empowerment</b>			
All	Provide messages about the harmful health effect of alcohol consumption + advise not to drink <sup>2</sup>	Primary Healthcare Providers	Opportunistically
Drinkers who are planning for pregnancy, or are pregnant	Provide message about the effects of alcohol consumption on both maternal and fetal health + advise not to drink <sup>2</sup>	Primary Healthcare Providers	Opportunistically and At each antenatal visit
<b>Assessment</b>			
All, including pregnant women	Assess drinking habit using Alcohol Screening and Brief Intervention Guideline and <b>Alcohol Use Disorders Identification Test (AUDIT)</b> <sup>4</sup> Accessible at: <a href="https://www.change4health.gov.hk/filemanager/comm on/pdf/presentation material/dh audit 2017 alcohol guideline en.pdf">https://www.change4health.gov.hk/filemanager/comm on/pdf/presentation material/dh audit 2017 alcohol guideline en.pdf</a>	Trained Healthcare Professionals	Opportunistically
<b>Management</b>			
Drinkers drinking at <b>Lower Risk</b> (AUDIT scores of 1-7)	Advise: 1. Drinking less or abstinence 2. For regular women drinkers, limit alcoholic drinks to 1 unit a day	Trained Healthcare Professionals	Opportunistically
Drinkers drinking at <b>Increasing Risk</b> (AUDIT scores of 8-15)	Offer: 1. Simple advice to minimise alcohol-related harm <sup>2</sup> 2. Patient education materials <sup>2</sup>	Trained Healthcare Professionals	Opportunistically

For Who?	Recommended Care Components <sup>a</sup>	By Whom? <sup>b</sup>	How Often?
<b>Management</b>			
Drinkers with <b>Harmful Drinking</b> (AUDIT scores of 16-19)	Offer: <b>(1) Brief Intervention:</b> <sup>2, 5</sup> <ul style="list-style-type: none"> <li>◆ Present screening results</li> <li>◆ Identify risks and discuss consequences</li> <li>◆ Provide medical advice</li> <li>◆ Solicit patient commitment</li> <li>◆ Identify goal: reduced drinking or abstinence</li> <li>◆ Give advice and encouragement</li> </ul> <b>+ continued monitoring</b> to assist drinkers to drink less  OR <b>(2) Motivational Interviewing</b> or Motivational Enhancement Therapy (MET) <sup>6</sup>	Trained Healthcare Professionals	Opportunistically
Drinkers with <b>Probable Alcohol Dependence</b> (AUDIT scores of 20 or above)	Refer to cessation service or a specialist for diagnostic evaluation and possible treatment for alcohol dependence <sup>2</sup>	Trained Healthcare Professionals	Opportunistically
<b>Pregnant women with harmful drinking</b>	Refer to fetal medicine subspecialist to scan for fetal alcohol syndrome	Trained Healthcare Professionals	As early as possible once identified during pregnancy

AUDIT = Alcohol Use Disorders Identification Test; MET = Motivational Enhancement Therapy

<sup>a</sup> **Grade of recommendation according to colour code:**

Recommended (Strong)	Conditionally recommended	Practice points	Generally not recommended	Not recommended (Strong)
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<sup>b</sup> **Primary Healthcare Providers** – All providers of health services in primary healthcare settings  
**Primary Healthcare Professionals** – Includes doctors, dentists, chinese medicine practitioners, nurses, pharmacists, physiotherapist, occupational therapist, dietitians  
**“Trained”** Healthcare Professionals – Additional post-qualification training required to deliver the respective care component(s)

## Collaborative Care

### Specialist Referral Recommended

**Refer to Specialist:** Drinkers with **probable** alcohol dependence (i.e. AUDIT scores of 20 or above)

**Refer to Fetal Medicine Subspecialist:** Pregnant women with harmful drinking to scan for fetal alcohol syndrome

### Consider Referral to Multidisciplinary Services in the Community

#### Alcohol Cessation Services:

- ◆ **Pilot Alcohol Cessation Counselling Service** (subvented by the Department of Health) 戒酒輔導服務先導計劃 (由衛生署資助)  
[https://www.change4health.gov.hk/en/alcohol\\_aware/facts/affecting/help/counselling\\_service.html](https://www.change4health.gov.hk/en/alcohol_aware/facts/affecting/help/counselling_service.html)
- ◆ **Tung Wah Group of Hospitals Integrated Centre for Addiction Prevention and Treatment (ICAPT)** 東華三院「心瑜軒」預防及治療成癮問題綜合服務  
<http://icapt.tungwahcsd.org>
- ◆ **Tung Wah Group of Hospitals “Stay Sober Stay Free” Alcohol Abuse Prevention and Treatment Service** 東華三院「遠酒高飛」預防及治療酗酒服務  
<http://atp.tungwahcsd.org/>
- ◆ **Alcoholics Anonymous (AA)** <http://aa-hk.org>

AUDIT = Alcohol Use Disorders Identification Test

## Further Readings

### *Harms of Excessive Alcohol Consumption*

- ♦ Alcohol-related harm is expressed as a continuum; no level of alcohol consumption is completely safe.<sup>7</sup> Even small amounts can pose risks and cause harm. Those who consume alcohol are directly affected, but innocent bystanders can also suffer from alcohol-related violence or accidents, such as drunk driving. Additionally, social issues like workplace difficulties, family problems, and interpersonal violence have substantial costs for the entire community.<sup>7</sup>
- ♦ Acute effects of “excessive” alcohol intake include impaired judgment and coordination, significantly raising the risk of accidents, while higher consumption can lead to emotional changes and alcohol poisoning, potentially life-threatening. Clinical signs and symptoms of acute alcohol intoxication include mental confusion, difficulty to remain conscious, vomiting, seizures, slow breathing, irregular breathing, and slow heart rate.<sup>8</sup>
- ♦ Chronic heavy drinking is associated with serious health issues. According to the WHO Global status report, in 2019, 2.6 million deaths were attributable to alcohol consumption due to detrimental causes such as digestive diseases, cardiovascular diseases, cancer, and unintentional injuries.<sup>9</sup> Binge drinking also negatively affects mental health and social relationships.
- ♦ Alcohol has been classified as a Group 1 carcinogen by the International Agency for Research on Cancer of the World Health Organization, as the consumption of alcoholic beverages has been linked to cancers of oral cavity, pharynx (excluding nasopharynx), larynx, oesophagus, liver, colorectum, and female breasts in humans.<sup>10</sup>
- ♦ Specifically for women, alcohol consumption impacts fertility, and during pregnancy poses severe risks to both the mothers and the fetus. Fetal alcohol spectrum disorders (FASDs) refers to the range of physical and neurobehavioral conditions due to prenatal alcohol exposure, including fetal alcohol syndrome, alcohol-related neurodevelopmental disorder, and alcohol-related birth defects.<sup>11</sup> Complications also includes miscarriage, stillbirth, preterm delivery<sup>12</sup> and an ongoing series of developmental disorders after birth.<sup>11</sup>

- Exposure of infants to alcohol via breast milk has been associated with delayed cognitive development, increased infant agitation, and disrupted sleep patterns.<sup>13-15</sup>

### ***Interventions to Reduce Harmful Drinking***

- ♦ The Alcohol Use Disorders Identification Test (AUDIT) was considered the best screening instrument for the whole range of alcohol problems in primary care, as it provides an accurate measure of risk of hazardous and harmful alcohol use, as well as possible dependence across gender, age and cultures.<sup>2</sup>
- ♦ Screening, brief intervention, and referral to treatment (SBIRT) programmes have been consistently reported to be effective in both primary care and emergency department settings.<sup>1</sup> Brief interventions in primary care could reduce alcohol consumption in hazardous and harmful drinkers compared to minimal or no intervention (mean difference: -20 grams/week, 95% CI: -28 to -12), regardless of socioeconomic status.<sup>5</sup>
- ♦ It was estimated that the lifetime quality-adjusted life-year (QALY) gained from screening plus brief intervention was likely to be in the region of 4-19 per 1000 compared to no intervention.<sup>16</sup>

## Perform Sufficient Level of Physical Activity

Recommendations	Grades of Recommendations <sup>^</sup>
<p>1. Educate all on the benefits of physical activity, as well as the risks associated with sedentary behaviour and inactivity<sup>1</sup></p>	C
<p>2. Advise all clients aged 18 or above to perform sufficient level of physical activities:</p> <ul style="list-style-type: none"> <li>(i) At least 150 minutes to 300 minutes of moderate-intensity aerobic physical activity per week; OR</li> <li>(ii) 75 minutes to 150 minutes of vigorous-intensity aerobic physical activity per week; OR</li> <li>(iii) an equivalent combination of moderate- and vigorous-intensity physical activity achieving at least 600 MET-minutes throughout a week;</li> </ul> <p style="text-align: center;"><b>AND</b></p> <ul style="list-style-type: none"> <li>(iv) muscle strengthening activities of moderate or greater intensity that involve all major muscle groups on 2 or more days a week for additional health benefits<sup>2</sup></li> </ul>	A
<p>3. Advise pregnant women to perform sufficient level of physical activity, and educate on safety considerations according to stage of pregnancy</p>	B
<p>4. Advise post-menopause women to perform weight-bearing aerobic exercise and resistance training for bone health<sup>3</sup></p>	C

<sup>^</sup>Scottish Intercollegiate Guidelines Network (SIGN) classification

## Recommended Care Components

For Who?	Recommended Care Components <sup>a</sup>	By Whom? <sup>b</sup>	How Often?
<b>Empowerment</b>			
All	Educate on: <ul style="list-style-type: none"> <li>♦ Benefits of physical activity and risks associated with sedentary behaviour and inactivity<sup>1</sup></li> <li>♦ Physical activity recommendation according to age and life stages</li> </ul>	Primary Healthcare Providers	Opportunistically
Pregnant women	Educate on the benefits of sufficient level of physical activity on maternal and perinatal health, and safety considerations according to stage of pregnancy ( <b>Table 1.</b> ) <sup>2</sup>	Primary Healthcare Providers	Opportunistically
<b>Assessment</b>			
All	Assess current <b>physical activity level</b> (i.e. Type, Intensity, Duration, Frequency) <sup>*4</sup>	Primary Healthcare Professionals	Opportunistically
	Screen for <b>symptoms or signs</b> suggesting increased risk for engaging in physical activities ( <b>Table 2.</b> )		

For Who?	Recommended Care Components <sup>a</sup>	By Whom? <sup>b</sup>	How Often?
<b>Management</b>			
Women having any symptoms or signs suggesting <b>increased risk for engaging in physical activities</b>	Refer for further medical work up  OR  Provide work up	Trained Healthcare Professionals  Doctors	As soon as symptoms reported or signs detected
Women with <b>insufficient physical activity</b>	Assess <b>readiness to change</b> , and provide <b>brief intervention</b> according to stage of change <sup>5</sup> ( <b>Table 3.</b> )  Advise to perform sufficient level of physical activities according to individual preference and capacity: <ul style="list-style-type: none"> <li>♦ At least 150 minutes to 300 minutes of moderate-intensity aerobic physical activity per week;                OR                75 minutes to 150 minutes of vigorous-intensity aerobic physical activity per week;                OR                an equivalent combination of moderate- and vigorous-intensity physical activity achieving at least 600 MET-minutes throughout a week (<b>Table 4.</b>)                 AND</li> <li>♦ Muscle strengthening activities of moderate or greater intensity that involve all major muscle groups on 2 or more days a week for additional health benefits<sup>2</sup>aerobic exercise and resistance training for bone health<sup>6</sup></li> </ul> Follow up to ensure client is participating in physical activities safely and effectively <sup>7</sup>	Trained Healthcare Professionals	Opportunistically
Post Menopause women	Advise to do weight-bearing aerobic exercise and resistance training for bone health <sup>6</sup>	Trained Healthcare Professionals	Opportunistically

\*Consider to use standardised, validated assessment instrument to assess adequacy of physical activity level e.g. Global

Physical Activity Questionnaire (GPAQ)

MET = Metabolic Equivalent of Task

<sup>a</sup> **Grade of recommendation according to colour code:**

Recommended (Strong)	Conditionally recommended	Practice points	Generally not recommended	Not recommended (Strong)
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<sup>b</sup> **Primary Healthcare Providers** – All providers of health services in primary healthcare settings  
**Primary Healthcare Professionals** – Includes doctors, dentists, chinese medicine practitioners, nurses, pharmacists, physiotherapist, occupational therapist, dietitians  
**“Trained” Healthcare Professionals** – Additional post-qualification training required to deliver the respective care component(s)

**Table 1. Safety Considerations of Physical Activity for Pregnant Women<sup>2</sup>**

<b>Additional Safety Considerations</b>
Avoid activities in <b>supine position</b> after the first trimester of pregnancy
Avoid physical activity during <ul style="list-style-type: none"><li>◆ excessive heat</li><li>◆ high humidity</li></ul>
Avoid participating in activities which <ul style="list-style-type: none"><li>◆ involve physical contact</li><li>◆ pose a high risk of falling</li><li>◆ limit oxygenation</li></ul>

**Table 2. Symptoms and Signs Suggesting Increased Risk for Physical Activity that Require for Medical Work-up prior to Participation\*<sup>^</sup>**

<b>Clinical Features Suggesting High Risk for Physical Activity</b>
<ul style="list-style-type: none"><li>◆ Pain, discomfort in the chest, neck, jaw, arms or other areas that may be due to ischaemia</li><li>◆ Shortness of breath at rest or with mild exertion</li><li>◆ Dizziness or syncope</li><li>◆ Orthopnoea or paroxysmal nocturnal dyspnoea</li><li>◆ Ankle oedema</li><li>◆ Palpitations or tachycardia</li><li>◆ Intermittent claudication</li><li>◆ Known heart murmur</li><li>◆ Unusual fatigue or shortness of breath with usual activities</li></ul>

\* Adopted from the Pre-participation Health Screening and Risk Stratification<sup>8</sup>

<sup>^</sup> These signs or symptoms must be interpreted within the clinical context in which they appear because they are not all specific for significant cardiovascular, pulmonary, or metabolic disease

**Table 3. The Physical Activity Stage of Change and Suggested Next Step<sup>5</sup>**

Stages	Description	Next Step
<b>Pre-contemplation</b>	<ul style="list-style-type: none"> <li>◆ Not physically active now</li> <li>◆ Does not intend to become more physically active in the next 6 months</li> </ul>	Ask the patient if you can talk about physical activity in the future
<b>Contemplation</b>	<ul style="list-style-type: none"> <li>◆ Not physically active now</li> <li>◆ Intends to become more physically active in the next 6 months</li> </ul>	Discuss and help the patient make a plan and set a start date
<b>Preparation</b>	<ul style="list-style-type: none"> <li>◆ Physically active now</li> <li>◆ BUT not to the recommended level</li> </ul>	Help the patient make a plan and set a start date
<b>Action</b>	<ul style="list-style-type: none"> <li>◆ Engaging in sufficient level of physical activity to the recommended level for less than 6 months</li> </ul>	Ask if the patient is ready to start another healthy behaviour
<b>Maintenance</b>	<ul style="list-style-type: none"> <li>◆ Engaging in sufficient level of physical activity to the recommended level for the past 6 months</li> </ul>	

**Table 4. MET Equivalents of Common Aerobic Activities and Energy Expenditures**

<b>Light-intensity Physical Activity</b>			
		MET	Energy (Kcal)*
Walking	Slowly walking	2	60
Household Chore and Occupation	Sitting, using computer	1.5	45
	Standing performing light housework	2.5	75
Leisure and Sports	Arts & crafts, playing cards	1.5	45
	Playing most musical instrument	2.5	75
<b>Moderate-intensity Physical Activity</b>			
		MET	Energy (Kcal)*
Walking	Brisk Walking	4	120
Household Chore and Occupation	Sweeping floors or carpet	3.5	105
Leisure and Sports	Volleyball (Non-competitive)	4	120
	Table Tennis	4	120
	Golf (Walking pulling clubs)	4.3	129
	Badminton (Recreational)	4.5	135
	Tennis (Doubles)	5	150
	Cycling: light effort	5.9	180
	Swimming (leisurely)	5.9	180
<b>Vigorous-intensity Physical Activity</b>			
		MET	Energy (Kcal)*
Walking	Jogging	8	240
	Running	11	330
Household Chore and Occupation	Carrying heavy load as bricks	7.5	225
	Shovelling, digging ditches	8.5	255
Leisure and Sports	Tennis (Singles)	8	240
	Basketball	8	240
	Football (Casual)	7	210
	Football (Competitive)	10	300
	Cycling: moderate effort	8	240
	Swimming (Moderate)	8	240
	Swimming (Hard)	11	330

\*For a 60 kg woman performs the activity last for 30 minutes; MET = Metabolic Equivalent of Task

## Further Readings

- ♦ Physical inactivity poses detrimental effects on health. According to WHO, people who are insufficiently active have a 20% to 30% increased risk of death compared to those who are sufficiently active.<sup>9</sup> Sedentary lifestyle, defined as time spent sitting or lying with low energy expenditure while awake,<sup>2</sup> was strongly associated with disease risks including cardiovascular diseases, diabetes mellitus, hypertension, and cancer.<sup>2</sup>
- ♦ Regular physical activity of at least 150 to 300 minutes of moderate-intensity aerobic physical activity or at least 75 to 150 minutes of vigorous intensity aerobic physical activity per week<sup>2</sup> has been shown to help prevent chronic diseases such as diabetes mellitus and breast cancer in adults, and is related to a reduced risk of premature death.<sup>10</sup> Moreover, regular physical activity have been shown to reduce anxiety, depression, negative mood, and improve self-esteem and cognitive function, which also played a role on one's mental health and well-being.<sup>10, 11</sup>
- ♦ Of note, physical activity refers to any bodily movement produced by the contraction of skeletal muscles that increases energy expenditure above a basal level, and can be achieved through occupational, household, conditioning, sports, or other activities. Meanwhile, exercise refers to a subcategory of physical activities that is planned, structured, and repetitive, aiming to improve or maintain physical fitness. Adults who participate in any amount of physical activity would gain some health benefits.<sup>12</sup>
- ♦ Different types of physical activities work on different health-related components of physical fitness. Aerobic exercises require the use of large muscle groups which can be maintained continuously and rhythmically.<sup>12</sup> Activities such as running and swimming help improve body composition and cardiorespiratory fitness. Muscle-strengthening activities involve a moderate to high level of intensity that work the major muscle groups of the body, improving muscular fitness. Balance training such as Tai Chi strengthens balance control and reduces the chance of falling. Stretching activities can also improve flexibility and range of motion.<sup>13</sup>
- ♦ It must be cautioned that physical activities may pose risks to certain individuals with chronic conditions such as heart diseases and osteoporosis.<sup>3, 14</sup> Pre-participation health screen has been recommended.<sup>8, 15, 16</sup>

- ♦ Exercise prescription when tailored to client's preferences, abilities, and limitations, was demonstrated to result in moderate improvements in physical activity or fitness of clients over a period of 6 to 12 months. Among patients who received exercise prescription, 10% more experienced an increase in their physical activity levels compared to control group, and had a mean improvement in aerobic fitness of 5 to 10%.<sup>17</sup>

## Maintain a Healthy, and Balanced Diet

Recommendations	Grades of Recommendations <sup>^</sup>
<p>1. Educate all on the importance of a healthy balanced diet that primarily relies on a variety of food including whole grains, fruits and vegetables, low-fat or non-fat dairy products, legumes, fish, eggs and lean meat; adequate amount of fluid intake; and limit intake of saturated fat, trans-fat, salt and sugar</p> <p>2. Advise women on:</p> <p>(i) Nutrients which they may be at risk of deficiency (such as iron, iodine, folate and vitamin D)</p> <p>(ii) Diet and food choices to meet their need at different life stages:</p> <ul style="list-style-type: none"> <li>◆ Reproductive age: <ul style="list-style-type: none"> <li>■ Maintain adequate iron intake: consume iron rich foods, fruits and vegetables; and reduce coffee and tea during meals</li> </ul> </li> <li>◆ Planning for Pregnancy: <ul style="list-style-type: none"> <li>■ Folic acid supplement: 400 mcg daily</li> </ul> </li> <li>◆ Pregnancy: <ul style="list-style-type: none"> <li>■ Advice to take a prenatal multiple micronutrient supplement daily: <ul style="list-style-type: none"> <li>- Folic acid: 400 mcg but not exceed 1000 mcg</li> <li>- Vitamin D: 400 – 600 IU (10 – 15 mcg)</li> <li>- Iodine: at least 150 mcg</li> </ul> </li> </ul> </li> <li>◆ Breastfeeding: <ul style="list-style-type: none"> <li>■ Advice to take a micronutrient supplement daily. The supplement should contain: <ul style="list-style-type: none"> <li>- Iodine: at least 150 mcg</li> </ul> </li> </ul> </li> <li>◆ Post-menopause: <ul style="list-style-type: none"> <li>■ Calcium : 800 – 1300 mg/day for bone health</li> </ul> </li> </ul>	<p style="text-align: center;">C</p> <p style="text-align: center;">C</p>

<sup>^</sup>Scottish Intercollegiate Guidelines Network (SIGN) classification

## Recommended Care Components

For Who?	Recommended Care Components <sup>a</sup>	By Whom? <sup>b</sup>	How Often?
<b>Empowerment</b>			
All women	Educate on: <ul style="list-style-type: none"> <li>♦ <b>Composition of a healthy, balanced diet (Table 1.):</b> <ul style="list-style-type: none"> <li>- Vegetables and fruits (at least 2 servings of fruit and 3 servings of vegetables per day)</li> <li>- Meat, fish, eggs, dry beans and dairy products</li> <li>- Grain (cereal) foods, mostly wholegrain and/or varieties high in cereal fibre</li> <li>- Choosing a variety of foods and foods rich in nutrients, including calcium, iron, zinc, iodine, and vitamins</li> <li>- Provide adequate energy</li> <li>- Limit intake of saturated fat, trans fat added salt, added sugars and alcohol</li> </ul> </li> <li>♦ Practical tips for food <b>choices (Table 2.)</b></li> <li>♦ <b>Beneficial effects</b> of consuming a variety of food groups, and adverse effects of unhealthy diet</li> </ul>	Primary Healthcare Providers	Opportunistically
Women who are <b>planning a pregnancy</b>	Advise adequate intake of Folic acid*: 400 mcg daily	Primary Healthcare Providers	Opportunistically
<b>Pregnant and lactating women</b>	Provide advices on supplements to meeting the extra nutrients needs, in particularly iodine, folate supplement during 1 <sup>st</sup> trimester and increasing demand after the 1 <sup>st</sup> trimester ( <b>Table 3.</b> )  + Advise on food safety	Trained Healthcare Professionals	Opportunistically
	Advise not to take supplements containing large quantities of vitamin A		
Menopause women	Advise adequate intake of Calcium for bone health	Primary Healthcare Providers	Opportunistically

For Who?	Recommended Care Components <sup>a</sup>	By Whom? <sup>b</sup>	How Often?
<b>Management</b>			
Women whose <b>Body Mass Index (BMI) is &lt;18.5 kg/m<sup>2</sup> or ≥ 23 kg/m<sup>2</sup> and have co-morbidities</b>	Refer to individual dietetics intervention <sup>1</sup>	Trained Healthcare Professionals	Opportunistically

\* in form of supplement

BMI = Body Mass Index

<sup>a</sup> **Grade of recommendation according to colour code:**

Recommended (Strong)	Conditionally recommended	Practice points	Generally not recommended	Not recommended (Strong)
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<sup>b</sup> **Primary Healthcare Providers** – All providers of health services in primary healthcare settings  
**Primary Healthcare Professionals** – Includes doctors, dentists, chinese medicine practitioners, nurses, pharmacists, physiotherapist, occupational therapist, dietitians  
**“Trained” Healthcare Professionals** – Additional post-qualification training required to deliver the respective care component(s)

**Table 1. Functions and Daily Requirement of Essential Nutrients for Healthy Adult Women<sup>2-4</sup>**

Nutrient	Functions	Daily Requirement
<b>Energy (Calorie)*</b>	<ul style="list-style-type: none"> <li>Provides the body with fuel for various functions such as metabolism, physical activity, and organ function</li> </ul>	<ul style="list-style-type: none"> <li><b>2100 kcal/day</b> for healthy women aged 18-49</li> </ul>
<b>Protein</b>	<ul style="list-style-type: none"> <li>Essential for building and repairing tissues, supporting immune function, and serving as enzymes and hormones</li> </ul>	<ul style="list-style-type: none"> <li>Contributes 10%-15% of daily energy intake</li> </ul>
<b>Carbohydrate</b>	<ul style="list-style-type: none"> <li>Main source of energy for the body, particularly important for brain function and physical activity</li> </ul>	<ul style="list-style-type: none"> <li>Contributes 55%-75% of daily energy intake</li> </ul>
<b>Dietary fibre</b>	<ul style="list-style-type: none"> <li>Aids in digestion, helps maintain bowel health, and may reduce the risk of chronic diseases like heart disease</li> </ul>	<ul style="list-style-type: none"> <li>Not less than 25g per day</li> </ul>
<b>Total fat</b>	<ul style="list-style-type: none"> <li>Provides energy, supports cell growth, helps with vitamin absorption, and serves as a protective layer for organs</li> </ul>	<ul style="list-style-type: none"> <li>Contributes 15%-30% of daily energy intake for adults</li> </ul>
<b>Saturated fat</b>	<ul style="list-style-type: none"> <li>Consuming too much can raise cholesterol levels and increase the risk of heart disease</li> </ul>	<ul style="list-style-type: none"> <li>Contributes not more than 10% of daily energy intake</li> </ul>
<b>Trans fat</b>	<ul style="list-style-type: none"> <li>Raises bad cholesterol levels (LDL) and lowers good cholesterol levels (HDL), increasing the risk of heart disease</li> </ul>	<ul style="list-style-type: none"> <li>Contributes not more than 1% of daily energy intake</li> </ul>
<b>Sodium</b>	<ul style="list-style-type: none"> <li>Excessive sodium (salt) intake will increase the risk of developing hypertension, stroke and coronary heart disease</li> </ul>	<ul style="list-style-type: none"> <li>No more than 5 g of salt (slightly less than 1 tea spoon) a day.</li> </ul>
<b>Sugar</b>	<ul style="list-style-type: none"> <li>Excess intake of sugars can lead to weight gain and other health issues including tooth decay</li> </ul>	<ul style="list-style-type: none"> <li>No more than 50 g (about 10 teaspoons) of free sugars a day for a diet of 2000 kcal per day</li> </ul>
<b>Folic acid (folate)</b>	<ul style="list-style-type: none"> <li>Adequate intake prevents the foetus from being affected by neural tube defect (malformations of the brain and spinal cord), as well as prevents women from developing anaemia</li> </ul>	<ul style="list-style-type: none"> <li>400 mcg a day for women aged 18-64</li> </ul>
<b>Vitamin D</b>	<ul style="list-style-type: none"> <li>Helps calcium absorption, essential for bone health and development</li> </ul>	<ul style="list-style-type: none"> <li>10 mcg (400 IU) for women aged 18-64</li> </ul>
<b>Calcium</b>	<ul style="list-style-type: none"> <li>Building block for bones and teeth</li> </ul>	<ul style="list-style-type: none"> <li>1000 mg for women aged 18-64</li> </ul>
<b>Iron</b>	<ul style="list-style-type: none"> <li>Adequate intake ensures normal foetal growth and brain development, and prevents women from anaemia during pregnancy and after delivery</li> </ul>	<ul style="list-style-type: none"> <li>18 mg for women aged 18-49</li> <li>10 mg for women after menopause</li> </ul>
<b>Iodine</b>	<ul style="list-style-type: none"> <li>Necessary for the normal functions of the thyroid gland</li> <li>Essential for foetal growth and brain development. Iodine deficiency may cause serious health consequences for the baby</li> </ul>	<ul style="list-style-type: none"> <li>150 mcg for women aged 18-64</li> </ul>

LDL = Low-density Lipoprotein; HDL = High-density Lipoprotein

\*Assuming 55kg for women with a moderate activity level

**Table 2. Practical Tips in Choosing Foods in the Food Groups<sup>5</sup>**

Food Group	DOs	DON'Ts
<p>Eat the most</p> <p><b>Grains</b></p>	<ul style="list-style-type: none"> <li>✓ Select more foods made from grains like bread, cereal, rice, and pasta</li> <li>✓ Choose whole grain foods like whole wheat bread and oatmeal</li> <li>✓ Prefer whole grains over refined grain foods</li> </ul>	<ul style="list-style-type: none"> <li>✗ Avoid high-fat foods like fried rice, fried noodles, or instant noodles</li> </ul>
<p>Eat more</p> <p><b>Fruit and vegetables</b></p>	<ul style="list-style-type: none"> <li>✓ Include plenty of fruits and vegetables in your diet for fibre, antioxidants, vitamins, and minerals</li> <li>✓ Choose colourful options</li> <li>✓ Opt for whole fruits over fruit juices</li> </ul>	<ul style="list-style-type: none"> <li>✗ Avoid overcooking vegetables</li> </ul>
<p>Eat moderately</p> <p><b>Meat, fish, eggs, dry beans ,dairy products and alternatives</b></p>	<ul style="list-style-type: none"> <li>✓ Select low-fat meat, such as lean cut pork, loin, poultry without skin, fish, etc.</li> <li>✓ Include protein-rich foods like dry beans and tofu</li> <li>✓ Low-fat milk and skimmed milk are lower in saturated fat</li> </ul>	<ul style="list-style-type: none"> <li>✗ Limit intake of deep-fried tofu, and tofu sticks</li> <li>✗ Limit intake in processed meat, e.g. sausages, ham</li> </ul>
<p>Eat the least</p> <p><b>Fat, oil, sugar and salt</b></p>	<ul style="list-style-type: none"> <li>✓ Use fresh foods over canned or preserved options. Minimize added sugar and salt</li> <li>✓ Utilize natural seasonings for flavouring and use less oil in cooking methods</li> </ul>	<ul style="list-style-type: none"> <li>✗ Avoid foods high in fat and sodium</li> <li>✗ Reduce sugar intake</li> </ul>

**Table 3. Key Differences in Energy and Nutrient Requirements across Life Stages  
Key Points about Changes in Nutritional Needs during Pregnancy**

Life Stages	Energy# (kcal/d)	Folic acid (mcg)# <sup>4, 6</sup> (supplement form)	Vitamin D <sup>&amp;</sup> (IU)	Calcium (mg)# <sup>7</sup>	Iron (mg)# <sup>8</sup>	Iodine (mcg)# <sup>9-11</sup>	Remarks
Pregnancy: 1 <sup>st</sup> trimester (the first 13 weeks)	2100 [+0] <sup>12</sup>	At least 400 <sup>4, 6</sup>	400-600 <sup>13</sup>	800-1000	18	250*	Demand for folate, vitamin A and iodine increases
Pregnancy: 2 <sup>nd</sup> trimester (14 <sup>th</sup> to 27 <sup>th</sup> weeks)	2400 [+300] <sup>12</sup>	At least 400 <sup>4, 6</sup>	400-600 <sup>13</sup>	800-1000	25	250*	Apart from folate, vitamin A and iodine, there is a higher demand for iron, zinc and omega-3 fatty acids, and a mild increase in calcium requirement
Pregnancy: 3 <sup>rd</sup> trimester (28 <sup>th</sup> to 40 <sup>th</sup> weeks)	2550 [+450] <sup>12</sup>	At least 400 <sup>4, 6</sup>	400-600 <sup>13</sup>	800-1000	29	250*	
Lactating mothers	2600 [+500] <sup>12</sup>	At least 400 <sup>4, 6</sup>	400-600 <sup>13</sup>	800-1000	24	250*	Sufficient intake of protein, folate, iodine, zinc, vitamin A and DHA are required to ensure an adequate level of nutrients in the breastmilk
Menopause	(1950) <sup>14</sup>	(400) <sup>14</sup>	400-600 <sup>13</sup> (400) <sup>14</sup>	800-1300	10	150	

# Recommendations follow the Department of Health

<sup>^</sup> Recommendations follow the WHO: Vitamin and mineral requirements in human nutrition, 2nd edition 2004

<sup>&</sup> Recommendations follow the U.S. Department of Health and Human Services: Dietary Reference Intakes for Calcium and Vitamin D 2011

( ) Recommendations follow the Chinese Nutrition Society: Dietary Reference Intakes for China 2023, women aged 50 to 64

\* in form of iodine-containing supplements at least 150 mcg iodine per day

## Further Readings

- ◆ Dietary intake is essential for life and an important behavioural risk factor that can significantly impact health. Optimal nutrition is vital for the normal growth and both physical and cognitive development of infants and children. Nutrition plays an important role in maintaining healthy weight, enhancing quality of life and wellbeing, strengthening resistance to infections, and safeguarding against chronic diseases and premature death. Improving nutrition has the potential to improve individual and public health while reducing healthcare costs.<sup>15</sup>
- ◆ The relationships between dietary patterns and health outcomes have been widely examined. It is well supported that people consuming diets that are low in fat, saturated fat, trans-fatty acids and cholesterol and high in fruits, vegetables and whole grain products containing fibre have lower rates of morbidity and mortality from coronary heart disease.<sup>16</sup>

### ***Interventions to Promote Healthy, Balanced Diet***

- ◆ The Food Pyramid can serve as a valuable guide for planning a balanced and nutritious diet, with the exception of diets for infants. It is essential to ensure that all major food groups are adequately represented in one's daily dietary intake, which play crucial roles in supporting overall health and wellbeing.<sup>17</sup>
- ◆ Dietetic consultations follow a structured nutrition care process of nutrition assessment, nutrition diagnosis, nutrition intervention, and nutrition monitoring and evaluation, which aims at supporting individual clients to modify their dietary behaviours to improve health outcomes. Systematic review of RCTs demonstrated that dietetic consultations were effective for improving diet quality, diabetes outcomes (including blood glucose and HbA1c) and weight control (e.g. changes in weight and waist circumference).<sup>1</sup>

**\*\*\*The corresponding list of References is available on HKRF webpage\*\*\***