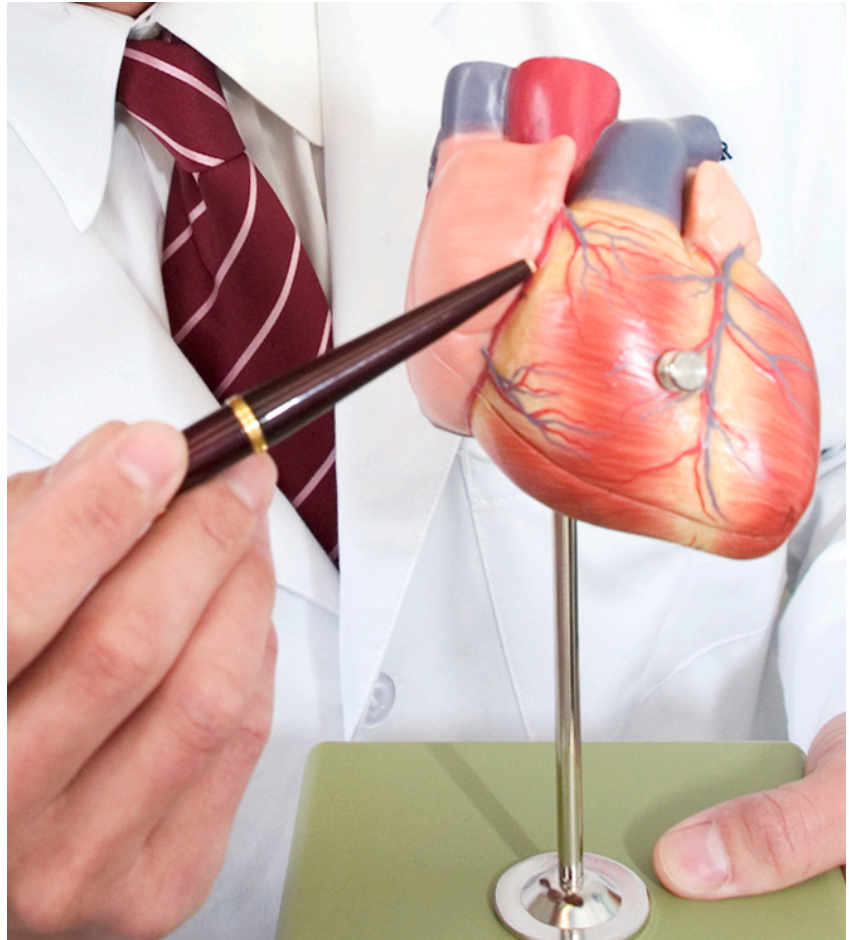




心脏病



本讲义为您解释心脏的疾病。它包括：

- 心脏的结构和功能
- 心脏病的种类
- 心脏病的风险因素
- 心脏测试的类型
- 有助于患者了解更多的其他资源

心脏病

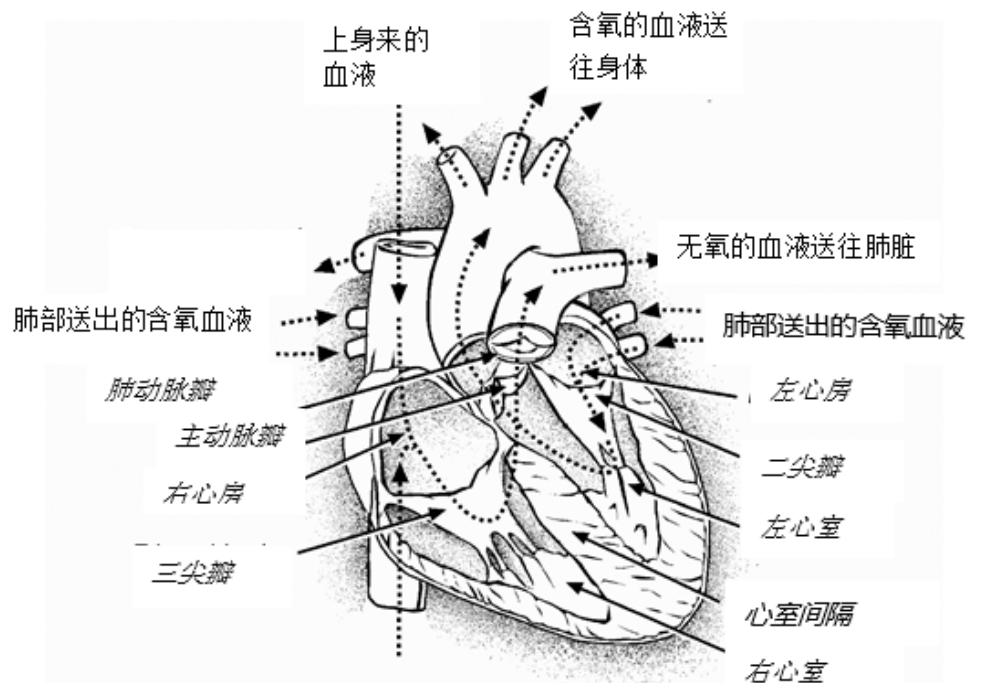
心脏是如何操作的

心脏是人体的主要器官之一。它位于胸部中间稍偏左。它受到**胸骨**（*sternum*）和肋骨的保护。

心脏是一肌肉组织。它把**含氧的血液**（充满氧气的血液）从肺部泵到身体的各个部位。它每分钟泵出约 5 夸脱的血液。

心脏有 4 个腔室：

- 上面的两个腔室是左心房和右心房。
- 下方的 2 个腔室是左心室和右心室。每个腔室大约有一个拳头大小。这些腔室之间有 4 个单向阀。



血液如何在心脏中流动

血液如何在心脏中流动

静脉将全身的血液带到右心房。血液从右心房流向右心室，然后被泵到肺部。

在肺部，将二氧化碳清除 (CO₂) 并被氧气取代。血液回到心脏进入左心房。从那里，血液流向左心室，然后被泵入主动脉。动脉将这些富含氧气的血液输送到身体的其他部位。

心脏如何跳动

心脏依靠 *电脉冲* 来维持跳动。心脏中的特殊细胞会发出电流，刺激心肌并使其收缩。稳定的电信号由心脏的“天然起搏器”——心房结 (SA) 产生。心房结 (SA) 位于右心房上部。

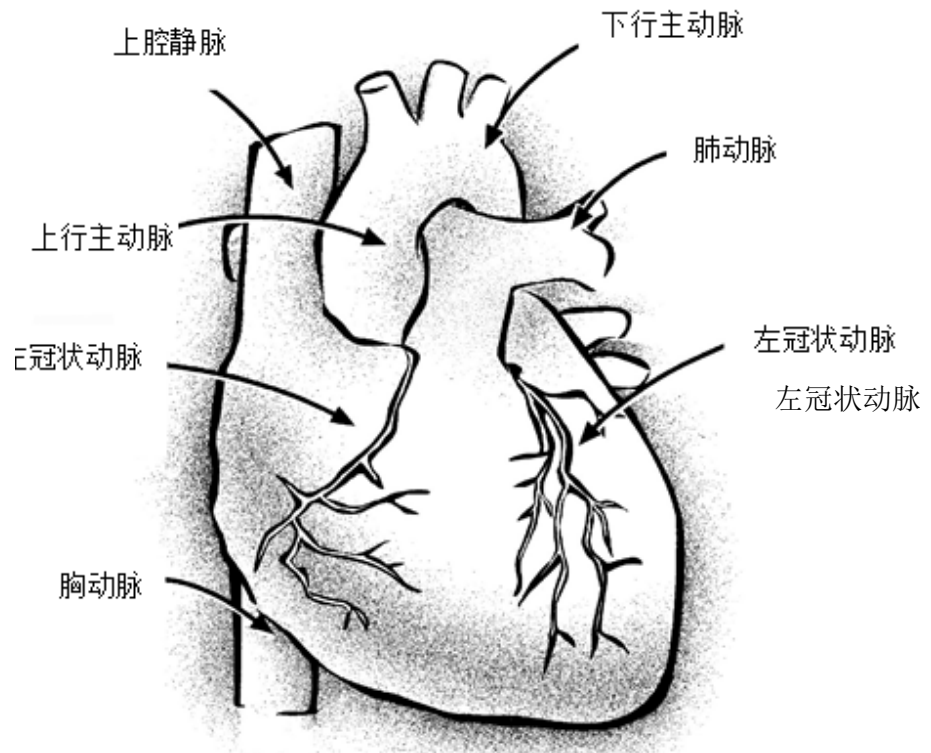
电信号通过心房传到心脏中部的一个区域，称为 *房室 (atrioventricular (AV) 结)*。然后，特殊的通路将信号从房室结传到两个心室的所有部位，使它们收缩。这一连串的事件被称为 *正常的窦性心律*，可以在心电图 (ECG) 中记录下来。

正常情况下，心脏每分钟跳动 60 至 80 次。每一次跳动所产生的血液涌动被称为 *脉搏*。有时，心脏的电气系统可能会出现問題，使电信号不能定期到达泵室，或导致信号延迟或不稳定。像这样的异常节律被称为“*心律失常 (arrhythmias)*”。

心脏如何得到滋养

心脏需要氧气和营养物质。它从 *冠状动脉* 的动脉系统中获得营养。它们有分支和分叉使整个心肌都能得到富含氧气的血液。

右冠状动脉 为心脏右侧供血。*左冠状动脉* 有 2 个主要分支——一个延伸到心脏的前面，另一个延伸到心脏的后面。当冠状动脉堵塞时，就会发生 *冠状动脉疾病*，从而引起 *心绞痛* 或心脏病发作。



心脏的动脉

冠状动脉疾病

冠状动脉疾病（CAD）也是指冠状动脉出现问题，限制了对心肌的供氧。冠状动脉疾病（CAD）也被称为**冠状动脉粥样硬化**（*coronary atherosclerosis*）或**缺血性心脏病**（*ischemic heart disease*）。这是一种缓慢进展的疾病（随着时间会变得更严重）。动脉的内层会变得增厚和不规则，形成胆固醇和钙的沉积。

这些沉积物被称为**斑块**（*plaque*）。斑块越来越厚，动脉就变狭窄。这个过程会导致正常血流的阻塞。

动脉壁的痉挛也可能导致血管变窄。痉挛或斑块导致的冠状动脉狭窄或阻塞可导致**缺血**（*ischemia*），即短期内减少了对部分心肌的富氧血液供应。

心绞痛

冠心病最常见的症状是**心绞痛**。一般心绞痛是在胸部感到一种压力或紧绷感。有时会在颈部、手臂、背部或下颚有这种感觉。它可以从轻微的疼痛到整个胸部的严重压迫感。

心绞痛可能会在下列情况发生：

- 锻炼时
- 暴露在寒冷的环境中时
- 吃完一顿大餐后
- 情绪紧张或疲劳

心绞痛发生时心率和血压会升高，因为部分冠状动脉阻塞使心肌无法获得所需的氧气。心绞痛通常只持续几分钟。通常通过休息或服用一种叫做 *硝酸甘油* 的药物来缓解。硝酸甘油能迅速扩张冠状动脉，增加心脏的血液供应。

- *稳定型* 心绞痛是由体力消耗或情绪压力带来的胸痛，但休息后会消失。
- *不稳定型* 心绞痛是指在休息时发生的胸痛，持续时间超过几分钟，或发作频率增加或不可预测。

心绞痛的治疗包括药物和手术，如球囊和激光血管成形术、动脉切除术、冠状动脉支架植入术和冠状动脉搭桥术（CABG）。

心脏病发作

当心脏的血液供应突然受阻时，就会发生心脏病发作。这将损害心肌。这也被称为 *急性冠状动脉综合征*。

*冠状动脉粥样硬化*与心脏病发作有关。动脉粥样硬化是一种胆固醇和其他脂肪物质开始沉积在动脉内壁的疾病。这就是所谓的 *斑块*。这种斑块会破裂，并形成血栓。血栓会阻止血液流动，从而导致心脏病发作。

当心脏病发作时，由于血液和氧气的供应停止或严重减少，部分心肌会死亡。这个区域周围的心肌也可能受伤。心脏的部分泵血能力会降低。心脏病发作时发生的损伤越大，心脏功能的损失就越大。

心脏受损部位愈合时，该区域会形成疤痕组织。愈合过程大约需要 4 至 6 周，但这将依据心脏损伤的程度及愈合的速度而定。有些人可能需要做血管成形术、冠状动脉支架或冠状动脉搭桥手术，以帮助恢复心脏某些区域的血流。

心脏病发作后住院期间的头几天活动会很受限制。此后，活动也会受到限制，直到心脏有时间愈合。心脏病发作后，大多数人在几周至几个月内就能恢复正常活动。

心脏病发作的征兆

心脏病发作时出现的症状可能包括：

- 胸口、下颚、肩膀、手臂或上腹部疼痛或压迫感
- 出汗
- 感到呼吸急促
- 恶心
- 感到头重脚轻

心脏病可以突然发作，也可能在任何时候发生。大多数人都有心脏病发作的一些或所有的症状，但有些人根本没有任何症状。症状可能严重或轻微，也可能时好时坏。

如您或您认识的人有任何或所有这些症状，请**立即**寻求帮助。大约有 30%的心脏病患者，因为他们迟迟没有打电话求救在到达医院之前就死亡了。

分秒必争。如何把握就医时间可能有生与死的区别。早期治疗可以增加心脏病发作的存活几率，并有助于防止对心脏的一些损伤

心脏病发作后的治疗方法

当心脏受损时，它更有可能出现异常的心律（*心律失常*）。这些心律失常中最严重的是*心室颤动*（VF），即心脏停止泵血。在您住院期间，我们将密切观察您的心律。如果发生室颤，我们可以给您“电击”以恢复正常心律。

有些治疗方法可以减轻心脏病发作时对心脏的永久性损伤。这些治疗包括：

- *溶栓疗法* (*Thrombolytic therapy*)，输注溶解血栓的药物，以恢复血流
- *经皮腔内冠状动脉血管成形术*（PTCA）或*球囊血管成形术*，以增加心脏受影响部位的血流量
- *冠状动脉支架* (*Coronary stents*)，植入后有助于保持冠状动脉的通畅。

这些治疗方法如在心脏病发作后的头 1 至 2 小时内使用效果最好。如果有任何可能与心脏病发作有关的症状，请立即就医。

心脏病风险因素

冠状动脉疾病（CAD）是一种缓慢进展的疾病。它会随着时间而恶化。

许多因素会增加患冠状动脉疾病(CAD)的风险。冠心病(CAD)的风险有一种是*可控的*，另一种是*不可控的*。

- **不可控的风险因素有：**

- 有冠心病（CAD）的家族史
- 身为男性

- **可控的风险因素有：**

- 抽烟
- 高血压
- 高血脂
- 糖尿
- 压力、“A”型性格
- 体重
- 久坐的生活方式

家族史/遗传

有些人在年轻时就患了冠状动脉疾病（CAD）。如家族有心脏病史，请尽力减少可能存在的其他可控制的风险因素，如吸烟或压力。鼓励其他家庭成员也这样做，以减少他们出现问题的风险。

身为男性

心脏病在男性中比女性更常见。但是，当女性到了更年期，荷尔蒙发生变化，她们的风险就会增加。很多人不知道心脏病是女性最常见的死亡原因。

抽烟。首要风险因素

吸烟会使心脏病发作的风险增加一倍。它还会增加患肺炎、肺气肿、肺癌和其他呼吸道疾病的风险。

戒烟是**能为自己的心脏和肺部做的最重要的一件事**。研究表明，接触二手烟也会使不吸烟者有患肺癌和其他呼吸道疾病的风险。

当您戒烟的时候，身体开始自我修复，除非是极端的损伤。心脏病风险在戒烟的那一天开始变小。3-5年内与不吸烟者的情况相似。

抽烟对心脏的一些伤害方式

- 降低心肌的含氧量
- 引起动脉狭窄和痉挛，导致血压和心率升高，这两种情况都会使心脏更加努力工作
- 增加血栓的机会
- 升高血液中不健康的胆固醇水平

戒烟的益处

- 降低患心脏病、肺病和癌症的风险。
- 更好的味觉和嗅觉
- 更有活力
- 房子和衣服不会有烟味
- 更清洁的牙齿和手
- 省钱

戒烟的小提示

- **决定永远戒烟：**“冷火鸡”（以毅力说戒就戒）的方法往往最有效。也可以使用慢一点的方法，只要不拖延。
- **设定一个戒烟日期并坚持下去：**将您的决定告诉您的家人和朋友，并寻求他们的支持。
- **把所有香烟、烟斗、雪茄、电子烟具产品、打火机和烟灰缸从家里和车上移走。**给您的汽车做“彻底清洁”有助于去除烟味。
- **在周围建立一个无烟环境：**远离通常会吸烟的地方或环境。
- **多喝水和果汁：**这有助于清除体内的尼古丁。
- **避免咖啡因：**如倾向于将吸烟与喝咖啡联系起来。
- **如怀念手上拿东西的感觉：**可以拿其他东西，如铅笔或回形针。
- **如怀念嘴里含着东西的感觉：**可以尝试牙签、硬纸片或其他东西。

- **缓解压力**；做深呼吸、运动或洗个热水澡。
- **省钱**；本来要花在烟草上的钱，给自己买点特别的东西。
- **不要自欺欺人地认为“只抽一根没关系”，因为这确实会造成损害的。**

要了解更多信息，或需要戒烟帮助，请访问这些网站：

- **美国癌症协会（American Cancer Society）**：
www.cancer.org/healthy/stay-away-from-tobacco/guide-quit-smoking.html
- **疾病控制和预防中心（Centers for Disease Control and Prevention）**：www.cdc.gov/tobacco/campaign/tips/quit-smoking/index.html

或者，向护士索取一份我们的讲义“戒烟或戒烟草的资源”（Resources to Quit Smoking or Using Tobacco）。

高血压

当血液被泵入动脉时，它会推挤动脉壁。这种对动脉壁的作用力称为**血压**。血压高（**高血压**）是冠状动脉疾病（CAD）的一个危险因素。您的血压由 2 个数字组成，如 120/80：

- 上面的数字是**收缩压**。它是心脏泵出新的血液后动脉中的压力。
- 下面的数字是**舒张压**。这是心脏在泵出下一轮血液前，处于舒张状态下，动脉中的压力。
- 血液在血管中流动越困难，这两个数字就越高。数字越高，心脏承受的压力就越大。

对于大多数成年人来说

- **健康的血压** 是低于 120/80。
- 如收缩压是 120 到 139，或者舒张压是 80 到 89，或者两者都是，就是**高血压前期**。
- **高血压** 是指收缩压 140 或更高，和/或舒张压 90 或更高，并长期保持在高的情况。

当收缩压或舒张压过高时，会增加心脏的工作负荷。这将增加患冠状动脉疾病（CAD）的风险。即使是轻微的高血压也会损害心脏。

高血压可能没有任何症状。一旦被诊断出来，就必须终身监测和治疗。

大约 90%的高血压没有已知的病因。有很多步骤可以控制高血压：

- 控制体重
- 戒烟
- 经常锻炼身体
- 低钠（低盐）饮食
- 管理生活中的压力
- 经常测量血压
- 如医生为开了药方，请按医嘱服用

胆固醇

胆固醇高的人患冠状动脉疾病(CAD)的风险更高。肝脏产生人体运作所需的所有胆固醇。当吃了高胆固醇的食物，身体就得到了超过所需的分量。当这种情况发生时，身体可能会在动脉壁内堆集脂肪物质称为斑块。渐渐地斑块会堵塞流向心脏的血液。

胆固醇的血液测试

需要测试血液才知道胆固醇的水平。为了获得准确的读数，在抽血前 12 小时内请勿吃或喝任何东西（水除外）。

血液测试会得到一个总胆固醇值。理想的总胆固醇值是低于 200。该测试还将显示 *低密度脂蛋白* (LDL) 和 *高密度脂蛋白* (HDL) 的胆固醇水平。

- *低密度脂蛋白胆固醇* (LDL) 即指“坏”胆固醇。我们认为低密度脂蛋白胆固醇 (LDL) 会增加脂肪堆积和血管壁内的胆固醇。理想情况下，对于患有冠状动脉疾病的人来说，低密度脂蛋白应该小于或等于 110。
- *高密度脂蛋白胆固醇* (HDL) 被称为“好”胆固醇。我们认为高密度脂蛋白胆固醇 (HDL) 可以清除血液和动脉壁上的脂肪和胆固醇，并带它们返回肝脏处理。血液中高密度脂蛋白水平较高的人通常是在锻炼、保持健康体重和不吸烟的人身上发现的。理想情况下，一个人的高密度脂蛋白水平应该大于或等于 40。

高胆固醇的治疗通常从营养咨询开始。减少总脂肪、饱和脂肪和胆固醇的摄入量有助于降低患心脏病的风险。

在改变饮食习惯后，每隔 1 至 3 个月检查一次胆固醇水平。如胆固醇水平仍然很高，医生可能会开出降低胆固醇的药物。

糖尿病

糖尿病是冠状动脉疾病（CAD）的危险因素。我们知道患有糖尿病多年，会损害大小血管。如糖尿病患者还有其他的风险因素，冠状动脉疾病（CAD）的风险就会高很多。

糖尿病患者可以通过吃低脂饮食、控制体重、戒烟来降低患心脏病的风险。

压力与“A型”性格的关系

我们的性格特征也可能是患冠状动脉疾病（CAD）的一个危险因素。如属“A型”性格您可能是：

- 竞争性
- 时间观念强
- 没耐心
- 侵略性
- 突兀
- 高度的积极性和成功
- 紧张
- 由于内疚，不愿放松
- 总是匆匆忙忙的

“A型”性格的人经常会感觉到很大的情绪压力和紧张。这使他们的身体产生一种叫做肾上腺素的激素。肾上腺素使心脏泵得更快、更用力，导致血管夹紧或缩小。紧张还可能导致高血压，并在压力期间提高血液中的胆固醇。

改变“A型”性格

了解身体的压力信号。可能肩部或颈部肌肉会有僵硬、紧绷的现象，紧张，胃泛酸，或者会发现自己生病的次数增多。当有这些信号时，可以使用放松或想象来帮助自己放松。

以下是一些帮助降低生活压力的技巧。

- 识别并尽量减少环境中给你带来压力的事物。
- 在生活中保持工作、娱乐和休息的平衡。
- 每周至少锻炼3次。
- 尝试默想或放松训练。

- 设定小而具体的目标。每次努力实现 1 个目标。
- 避免匆忙行事。采用悠闲的步伐。做个深呼吸。
- 每次只做一项活动。确保给自己留出一些时间。

要了解更多关于放松和减压的信息，请访问美国心脏协会网站的“压力管理”网页：www.heart.org/en/healthy-living/healthy-lifestyle/stress-management。

体重

超重会增加患冠状动脉疾病（CAD）的风险。它还会增加患高血压、糖尿病、高血脂和其他健康问题的风险。体重过重会使心脏工作得更辛苦，并可能导致骨骼和关节损伤。

保持理想的体重可以降低患冠状动脉疾病（CAD）的风险。控制体重的关键是节制饮食，吃各种健康的食物，锻炼身体，有意志力和自律性。

一些减肥的建议

- **慢慢地减掉体重。**长期成功取决于是否有新的、更好的饮食习惯。每周稳定地减掉 1 到 2 磅的体重是安全的，而且更有可能保持。
- **饮食要适量。**摄取各种健康的食物，包含身体所需的所有营养素。少吃脂肪和油腻的食物。少吃糖和甜食。避免饮酒。
- **避免急速减肥餐。**避免每天摄入少于 1000 卡路里的饮食方式。可与营养师合作，共同制定适合您的饮食计划。
- **缓慢地增加日常体育活动。**当准备好时，开始定期做有氧运动，如散步或游泳。长期的锻炼计划对减肥和保持健康的体重至关重要。在开始任何锻炼计划之前，请咨询您的医生，以确保它适合您。
- **不要用食物奖励自己。**随着体重下降，可以考虑买新的衣服、看电影、旅游或做其他自己喜欢但与食物无关的事。

久坐的生活方式

当一个人在工作或闲暇时间很少或没有运动时，我们说他们的生活方式是久坐的生活方式。这些人如还有其他的危险因素就更有可能遭受心绞痛和心脏病发作。

有规律的运动是指每周做 3 到 4 次，每次 20 到 30 分钟的活动。这种运动可以帮助减轻心脏的工作负担。当身体得到调节，心脏就会更好地操作。运动的其他益处包括：

- 血液循环更顺畅

- 更好的关节活动和肌肉张力
- 更多的体力和耐力
- 改善血液中的胆固醇水平
- 减肥
- 降低血压
- 能更好地处理压力
- 缓解紧张局势
- 更多的幸福感
- 减少压力和抑郁症

在开始运动计划之前，请与医生交谈。缓慢地增加您的运动量。

酒精与您的心脏

很多人都想知道有心脏病的人饮酒是否安全。酒精会对心脏产生不同的影响，这取决于具体的情况。如对饮酒有任何疑问，请与医生交谈。

大量饮酒

- 会增加高血压、中风、癌症和肝硬化的风险
- 也会损伤心肌，造成缺陷而导致心律失常（干扰正常、规律性的心跳）。

酒精会增加心率并略微降低心肌的收缩强度。这就是为什么喝酒后应该避免运动或其他剧烈活动的原因。

心脏测试

心导管检查（冠状动脉血管造影术 **Coronary Angiography**）

它的目的: 这项检查是检查冠状动脉为心肌供血的情况。将一根导管（细小的软管）插入腹股沟或手臂的动脉中，并使用透视镜（特殊的 X 光射线机）仔细引导至心脏。通过导管将造影剂（*contrast*）注入冠状动脉，并将图像记录在胶片上。这些图像就显示出动脉狭窄或阻塞的情况

需时: 1 到 3 小时 需要特殊说明以及您的书面同意。

在何处做: 心脏导管实验室

冠状动脉计算机断层血管造影（冠状动脉 CTA） Coronary Computed Tomography Angiogram (Coronary CTA)

它的目的： 这个程序可以在不进入心脏内部的情况下研究心脏微小血管的内部。*计算机断层扫描 (CT)*扫描仪只需 5 次心跳就能扫描整个心脏。放射科医生和技师将通过静脉注射给您一种无毒的*造影剂 (contrast)*。当造影剂到达心脏血管时，CT 扫描仪会在很短的时间内拍摄数千张照片。然后，这些图像组合在一起，如此，放射科医生即可评估动脉是否有阻塞。

需时： 30 分钟

在何处做： 放射科 (Radiology)

心电图 (ECG, EKG, 12 电极贴片) Electrocardiogram (ECG, EKG, 12 Lead)

它的目的： 心电图是记录心脏的电功能。在手腕和脚踝以及胸部的六个点上都贴电极贴片然后做记录，给医生提供了 12 个心脏电活动的视图。这样，医生就可以知道心脏是否出现了任何不规则、压力或损伤。

需时： 5 至 10 分钟，无需做特殊准备

在何处做： 在病床边，或心脏科诊所

超声心动图（超声、心脏超声） Echocardiogram (Echo, Cardiac Ultrasound)

它的目的： 此测试是使用声波来创建心脏图像。将一个小装置（传感器）放在您的胸部。声波在心脏结构上反折，并在胶片上记录图像。这些图像会显示心肌或瓣膜的问题，以及心脏周围是否有任何液体。

需时： 30 分钟至 1 小时

在何处做： 在病床边，或心脏科诊所

电生理学研究 (EP 研究, EPS) Electrophysiology Study (EP, Study, EPS)

它的目的： 此项测试更精确地提供了的有关心脏电功能信息。它是由受过专门训练的心脏病专家来执行测试的。我们将一根导管（细小的软管）插入腹股沟的动脉中，并使用透视镜（特殊的 X 光射线机）小心地引导到心脏。导管插入后，我们就可以测量您的心脏的电活动。

需时: 2 至 4 小时。在此程序前后需要给您特别说明，并需要签书面同意。

在何处做: 华大医疗中心-蒙特湖园区 UWMC – Montlake
2 楼电生理学程序室

心电监护仪（动态监护仪） Holter Monitor (Ambulatory Monitor)

它的目的: 此设备可以记录在一定时间内心脏的电活动。它可以在家或在医院佩戴。胸前贴电极贴片，电线连接到一个小型仪器，大小与一个小的便携式录音机差不多。可将这个仪器挂在肩上或皮带上。

需时: 我们会要求患者在监测期间记录日常活动、症状和所服用的药物。我们会将记录的心律与活动联系起来。

在何处做: 在心脏中心门诊部

核磁共振成像（MRI）心脏扫描 Magnetic Resonance Imaging (MRI) Heart Scan

它的目的: 这种扫描使用无线电波和强磁场代替 X 光射线，提供清晰详细的心脏图片。核磁共振检查通常由 2 至 6 组图片组成，每组持续 2 至 15 分钟。每组图片显示出心脏的横截面。

需时: 30 分钟至 1 小时

在何处做: 放射科

放射性核素心室造影（RNVG）、多门分析（MUGA）、心脏核医学检查 Radionuclide Ventriculogram (RNVG), Multi-gated Analysis (MUGA), Cardiac Nuclear Medicine Exam

它的目的: 此测试可以让我们了解心脏肌肉的泵送情况。我们会在静脉中注入极少量的放射性物质。一个特殊的摄像机会记录下放射性物质在心脏中的运动和每次心跳。

需时: 1 至 2 小时

在何处做: 核医部

肺功能测试 Pulmonary Function Test (PFT)

它的目的: 这个测试可以测量肺功能。患者需对着机器吸气和呼气几次。

需时: 30 至 45 分钟

在何处做: 肺功能测试室

遥测监测 Telemetry Monitoring

它的目的: 遥测是使用无线电信号将心脏电活动发送到护士站或病房的监视器上。放在患者胸前的电极贴片连接到一个小型电池供电的遥测盒（大小与小型手持收音机差不多）。可将把这个装置套在颈上的小袋里或衣服的口袋里。当患者慢慢增加活动量时，我们可以随时监测心律。

需时: 住院期间持续测试

在何处做: 病床边

负荷测试 (Stress Tests)

负荷测试有助于我们诊断冠状动脉疾病 (CAD) 或心绞痛。下面是一些我们最常使用的负荷测试类型：

运动耐力测试 (ETT, 跑步机) Exercise Tolerance Test (ETT, Treadmill)

它的目的: 此测试是检查心脏对活动的耐受性。它记录任何异常的心脏节律或运动时心脏缺乏血液的供应状况。将电极贴片贴在患者的胸前，并连接到跑步机心电图 (ECG) 计算机，它将记录心脏在运动时发出的电信号。当患者在跑步机上行走和/或跑步时，我们会记录心电图、血压和脉搏。

需时: 45 分钟至 1 小时

在何处做: 心脏中心

铊负荷测试、西斯塔米比负荷测试、宝山碱/腺苷、多巴胺负荷测试 Thallium Stress Test, Sestamibi Stress Tests, Persantine/Adenosine, Dobutamine Stress Test

它的目的: 这些测试是比较心脏在负荷和休息时流经心肌的血流量。*铊和*西斯塔米比压力测试需要在跑步机上行走和/或跑步。*宝山碱* 和 *多巴胺* 负荷测试是使用药物给心脏造成负荷，而不是通过实际的身体运动。这两种负荷测试都使用放射性扫描来检测是否有冠状动脉疾病 (CAD) 和程度。我们先注射极少量放射性物质，约半小时至 1 小时后做心脏的造影。我们先做休息状态的扫描，并在运动或药物引起的负荷后再次扫描。运动部分的测试也可先做。

需时： 全部扫描时间（拍照）大约需要半小时。整个测试可以在 1 到 2 天内完成，可能需要特别解说。

在何处做： 核医部

压力超声心动图检查（运动回声、多巴胺回声）**Stress Echocardiography Test (Exercise Echo, Dobutamine Echo)**

它的目的： 此测试是比较心脏在负荷及休息和下的操作情况。当流向心脏的血液减少时，心肌的运动就会发生变化。超声心动图可以让我们观察到这些变化（参见第 14 页的“超声心动图”）。此项检查以运动耐受性测试开始，可以是实际的体力运动，也可以是静脉注射药物（多巴胺）来刺激心肌。超声心动图检查技师会记录负荷测试前后的心脏图像。

需时： 1 个半小时

在何处做： 心脏科

有助于患者了解更多的其他资源

有很多书籍可以教您如何增加身体锻炼，减轻压力，管理体重，改善整体健康状况。您可以从图书馆借阅，或从书店或网上书店购买。可请您的医疗服务提供者推荐具体的书籍，以及有用的网站。

书籍

饮食/烹饪/减肥

有许多优秀的烹饪书和杂志关于烹饪清淡和吃得好。首先，可以试试美国心脏协会、Dean Ornish、Joseph Piscatella 和 Brenda Ponichtera 的书。

情绪/个人的顾虑

- **心灵的痊愈** (*The Healing Heart*) 作者 Norman Cousins
- **过渡：理解生活的变化** (*Transitions: Making Sense of Life's Changes*) 作者 William Bridges

锻炼

- **燃烧脂肪，健身：运动与您的心脏，美国心脏协会出版的体育活动指南。** (*Burning Fat, Getting Fit: Exercise and Your Heart, A Guide to Physical Activity by the American Heart Association*)
- **适合的健身：美国心脏协会出版** (*Fitting in Fitness by the American Heart Association*)

性活动

- **心脏病与亲密关系** (Heart Illness and Intimacy) 作者 Wayne Sotile
- **感性的心。心脏病发作或心脏手术后的性爱指南** (The Sensuous Heart: Guidelines for Sex After a Heart Attack or Heart Surgery) 作者 Suzanne Cambre

压力管理

- **别为小事烦恼** (Don't Sweat the Small Stuff) (系列中的任何一本) 作者 Richard Carlson
- **放松的过程** (The Relaxation Process) 作者 Herbert Benson
- **放松与压力过程** (The Relaxation and Stress Process) 作者 Martha Davis 等人。

网站

美国心脏协会 American Heart Association

www.americanheart.org

此网站提供了几十个其他备受尊敬的网站的链接，包括政府机构、大学和研究中心、科学组织和其他资源。

哈佛心脏寄语 Harvard Heart Letter

www.health.harvard.edu

此网站由华大临床医生推荐，提供有关心脏疾病、康复和心脏健康生活方式等多方面的详细信息。点击选项栏中的“心脏健康”。

您有疑问吗？

我们很重视您的提问。如有疑问或顾虑请致电您的医护提供者。

华大医疗中心的心脏科门诊
电话：206.598.4300

Heart Disease

How the Heart Works

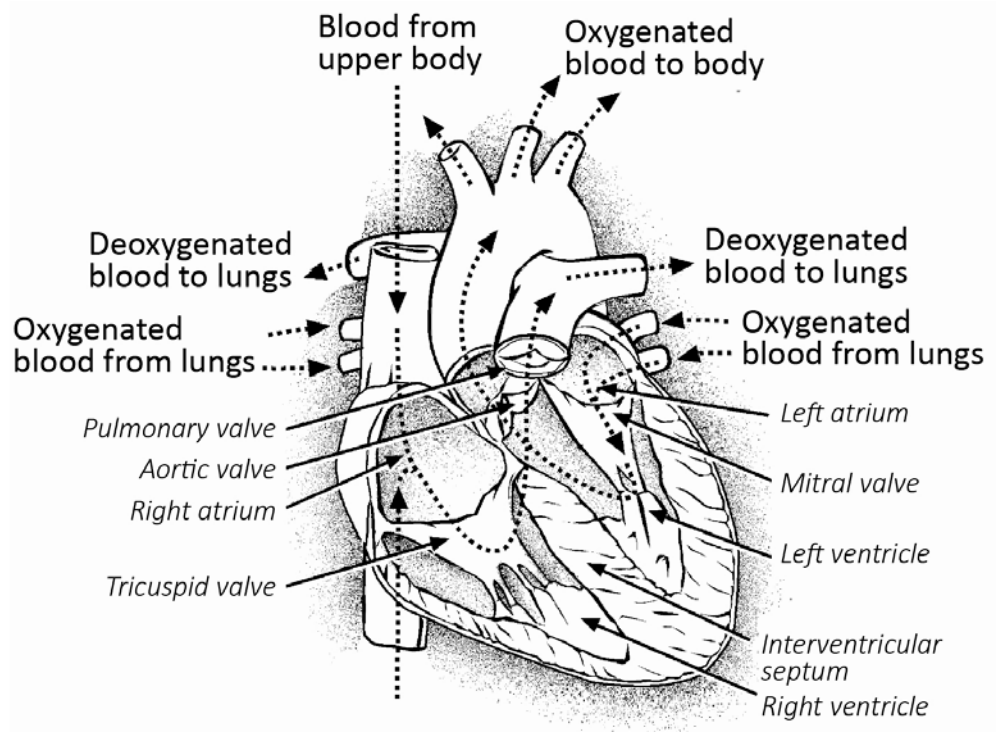
The heart is one of the main organs in the body. It lies in the chest, slightly to the left of center. It is protected by the *sternum* (breastbone) and rib cage.

The heart is a muscle. It pumps *oxygenated blood* (blood filled with oxygen) from the lungs to all parts of the body. Each minute, it pumps about 5 quarts of blood.

There are 4 chambers in the heart:

- The 2 chambers on top are the left and right *atria*.
- The 2 lower chambers are the left and right *ventricles*.

Each chamber is about the size of a fist. There are 4 one-way valves between these chambers that keep blood flowing the right way.



How blood flows through the heart

How Blood Flows in the Heart

Veins bring blood from all over the body to the right atrium. The blood flows from the right atrium to the right ventricle and is then pumped to the lungs.

In the lungs, carbon dioxide (CO₂) is removed and replaced with oxygen. The blood comes back to the heart into the left atrium. From there, it flows to the left ventricle and is pumped into the aorta. Arteries carry this oxygen-rich blood to the rest of the body.

How the Heart Beats

The heart relies on an *electrical impulse* to keep it beating. Special cells in the heart send out electrical currents that stimulate the heart muscle and cause it to contract. Steady electrical signals are produced by your heart's "natural pacemaker," the *sinoatrial (SA) node*. The SA node is in the upper right atrium.

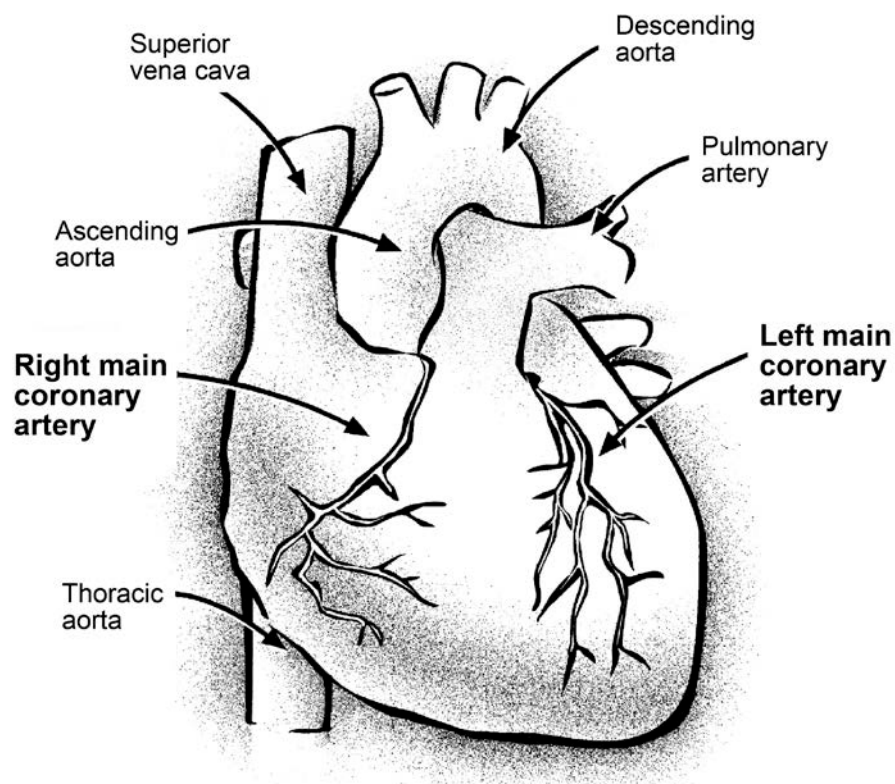
The electrical signal travels through the atria to an area in the middle of the heart called the *atrioventricular (AV) node*. Special pathways then carry the signal from the AV node to all parts of both ventricles, causing them to contract. This sequence of events is called *normal sinus rhythm*, and can be recorded during an electrocardiogram (ECG).

Normally, a heart beats 60 to 80 times per minute. The surge of blood with each beat is felt as a *pulse*. At times, the heart's electrical system may develop a problem that prevents the electrical signals from regularly reaching the pumping chambers or that causes the signals to be delayed or erratic. Abnormal rhythms such as these are referred to as "arrhythmias."

How the Heart Is Nourished

The heart needs oxygen and nutrients. It receives its nourishment from a system of arteries called the *coronary arteries*. They branch and divide so that the entire heart muscle is provided with oxygen-rich blood.

The *right coronary artery* supplies blood to the right side of the heart. The *left coronary artery* has 2 main branches – one extending to the front, the other to the back of the heart. *Coronary artery disease* occurs when the coronary arteries become blocked, which can cause *angina* or heart attacks.



The arteries of the heart

Coronary Artery Disease

Coronary artery disease (CAD) also refers to problems in the coronary arteries that restrict oxygen supply to the heart muscle. CAD is also called *coronary atherosclerosis* or *ischemic heart disease*. This is a slowly progressive disease (it gets worse over time). The inner layer of the artery becomes thickened and irregular, developing deposits of cholesterol and calcium.

These deposits are called *plaque*. As the plaque gets thicker, the artery narrows. This process causes blocks in the normal blood flow.

A spasm in the wall of the artery may also cause the blood vessel to narrow. Narrowing or blockage of a coronary artery from either a spasm or plaque can result in *ischemia*, a short-term decrease in the supply of oxygen-rich blood to a portion of the heart muscle.

Angina

The most common symptom of coronary artery disease is *angina pectoris*. Angina is pressure or tightness, often felt in the chest. At times, it is felt in the neck, arms, back, or jaw. It can vary from a mild ache to a severe crushing feeling throughout the chest.

Angina can occur:

- During exercise
- When exposed to cold
- After a heavy meal
- With emotional stress or fatigue

Angina occurs when heart rate and blood pressure increase because a partly blocked coronary artery keeps the heart muscle from getting the oxygen it needs. Angina usually lasts only a few minutes. It is often eased by resting, or by taking a medicine called *nitroglycerin*. Nitroglycerin quickly expands the coronary arteries and increases the blood supply to the heart.

- *Stable* angina is chest pain brought on by physical exertion or emotional stress, but goes away with rest.
- *Unstable* angina is chest pain that occurs at rest, lasts longer than a few minutes, or comes on with increasing or unpredictable frequency.

Treatment for angina includes medicines and procedures such as balloon and laser angioplasty, atherectomy, coronary stent placement, and coronary artery bypass graft (CABG) surgery.

Heart Attack

A heart attack occurs when blood supply to the heart is suddenly blocked. This damages the heart muscle. This is also known as *acute coronary syndrome*.

Coronary atherosclerosis is linked with heart attacks. Atherosclerosis is a disease in which deposits of cholesterol and other fatty substances begin to line the inner walls of arteries. This is called *plaque*. This plaque can burst and cause a blood clot to be formed. The clot stops blood flow and a heart attack occurs.

When you have a heart attack, part of your heart muscle dies because the supply of blood and oxygen is stopped or severely reduced. The heart muscle around this area may be injured as well. Some of your heart's ability to pump is reduced in a heart attack. The more damage occurs during a heart attack, the greater loss in heart function.

As the damaged part of your heart heals, scar tissue forms in the area. The healing process takes about 4 to 6 weeks, but it will depend on the extent of heart injury and how fast you heal. Some people may

need angioplasty, coronary stents, or coronary artery bypass graft surgery to help restore blood flow to certain areas of the heart.

While you are in the hospital after a heart attack, your activity will be restricted for the first few days. After that, activity is limited until your heart has had time to heal. After a heart attack, most people resume normal activities within a few weeks to months.

Signs of a Heart Attack

Symptoms that occur with a heart attack may include:

- Pain or pressure in the chest, jaw, shoulders, arms, or upper belly
- Sweating
- Feeling short of breath
- Nausea
- Feeling light-headed

Heart attacks can occur suddenly, and at any time. Most people have some or all the signs of a heart attack, but some do not have any signs at all. The symptoms may be severe or mild, or they may come and go.

If you or someone you know has any or all of these symptoms, get help **right away**. About 30% of people who have heart attacks die from them before they reach the hospital, because they delay calling for help.

Minutes count. They can mean the difference between life and death. Early treatment can increase the chances of surviving a heart attack and can help to prevent some of the damage to the heart.

Treatments After a Heart Attack

When your heart is damaged, it is more likely to have abnormal heart rhythms (*arrhythmias*). The most serious of these arrhythmias is *ventricular fibrillation* (VF), in which the heart stops pumping blood. While you are in the hospital, we will closely watch your heart rhythm. We can give you a “shock” to restore normal heart rhythm if VF occurs.

Some treatments can lessen the amount of permanent damage to the heart during a heart attack. These include:

- *Thrombolytic therapy*, an infusion of clot-dissolving medicines to restore blood flow
- *Percutaneous transluminal coronary angioplasty* (PTCA) or *balloon angioplasty* to increase blood flow to the affected part of the heart
- *Coronary stents*, implanted to help keep the coronary arteries open

These treatments work best if they are used in the first 1 to 2 hours after a heart attack. Seek medical attention right away if you have any symptoms that may be linked to a heart attack.

Cardiac Risk Factors

Coronary heart disease (CAD) is a slowly progressive disease. This means it gets worse over time.

Many factors can increase a person's risk of developing CAD. Risks for CAD are either *controllable* and *uncontrollable*.

- **You cannot control these risk factors:**

- Family history of CAD
- Male gender

- **You can control these risk factors:**

- Smoking
- High blood pressure
- Elevated blood cholesterol
- Diabetes
- Stress, being a "type A" person
- Weight
- Sedentary lifestyle

Family History/Heredit

Some people develop CAD when they are young adults. If heart disease runs in your family, do your best to reduce other risk factors you may have that can be controlled, such as smoking or stress. Encourage other family members to do the same, to lessen their risk of problems.

Male Gender

Heart disease is more common in men than women. But, when women reach menopause and their hormones change, their risk increases. Many people do not realize that heart disease is the most common cause of death in women.

Smoking: The Top Risk Factor

Smoking doubles a person's risk for having a heart attack. It also increases their risk of developing pneumonia, emphysema, lung cancer, and other respiratory diseases.

Quitting smoking is the **single most important thing you can do** for your heart and lungs. Studies show that exposure to 2nd-hand smoke also puts nonsmokers at risk for developing lung cancer and other respiratory illnesses.

When you stop smoking, your body starts to repair itself, unless the damage is extreme. Your risk for heart disease starts getting less on the day you quit smoking. It is similar to that of nonsmokers within 3 to 5 years.

Some ways smoking harms the heart:

- Reduces oxygen to the heart muscle
- Causes narrowing and spasm of the arteries, leading to higher blood pressure and heart rate, both of which make the heart work harder
- Increases chance of blood clots
- Leads to unhealthy blood cholesterol levels

Benefits of quitting smoking:

- Lower risk of developing heart disease, lung disease, and cancer
- Better sense of taste and smell
- Have more energy
- House and clothes won't smell of smoke
- Cleaner teeth and hands
- Save money

Tips to Quit Smoking

- **Decide to give up smoking forever.** A “cold turkey” method often works best. You can also use a slower approach, as long as you don't delay.
- **Set a quit date and stick to it.** Tell your family and friends about your decision and ask for their support.
- Remove all cigarettes, pipes, cigars, vape products, lighters, and ashtrays from your home and car. Getting your car “detailed” will help remove the smell of smoke.
- **Develop a nonsmoking environment around you.** Stay away from places or situations where you usually would smoke.
- **Drink a lot of water and fruit juice.** This helps remove the nicotine from your body.

- **Avoid caffeine** if you tend to link smoking with drinking coffee.
- **If you miss the feel of having something in your hand**, hold something else such as a pencil or paper clip.
- **If you miss having something in your mouth**, try toothpicks, hard candy, carrot sticks, apples, or gum.
- **Relieve stress** by taking deep breaths, exercising, or taking a warm bath.
- **Save the money** you would have spent on tobacco and treat yourself to something special.
- **Don't fool yourself by thinking "just one won't hurt," because it will.**

To learn more or if you need help to quit smoking, visit these websites:

- **American Cancer Society:** www.cancer.org/healthy/stay-away-from-tobacco/guide-quit-smoking.html
- **Centers for Disease Control and Prevention:** www.cdc.gov/tobacco/campaign/tips/quit-smoking/index.html

Or, ask your nurse for a copy of our handout "Resources to Quit Smoking or Using Tobacco."

High Blood Pressure

As blood is pumped through the arteries, it pushes against the arterial walls. This force against the artery wall is called *blood pressure*. High blood pressure (*hypertension*) is a risk factor for CAD.

Your blood pressure is made up of 2 numbers – such as 120/80:

- The top number is the *systolic pressure*. It is the pressure in your arteries after the heart has pumped a new surge of blood.
- The bottom number is the *diastolic pressure*. This is the pressure in your arteries while your heart is at rest, before it beats again.

The harder it is for blood to flow through your vessels, the higher both numbers are. Higher numbers mean there is more strain on your heart.

For most adults:

- *Healthy blood pressure* is less than 120/80.
- If your systolic pressure is 120 to 139, or your diastolic pressure is 80 to 89, or if both are true, you have *prehypertension*.
- *High blood pressure* is a pressure of 140 systolic or higher and/or 90 diastolic or higher, which stays high over time.

When either the systolic or diastolic pressure is high, it adds to the workload of the heart. This increases a person's risk of developing CAD. Even slightly high blood pressure can damage the heart.

High blood pressure may have no symptoms. Once it has been diagnosed, it must be monitored and treated for life.

About 90% of high blood pressure has no known cause. There are many steps that can be taken to control high blood pressure:

- Control your weight
- Quit smoking
- Exercise regularly
- Eat a low-sodium (low-salt) diet
- Manage your stress
- Have your blood pressure checked regularly
- If your doctor has prescribed medicine for you, take it as directed

Cholesterol

People with high cholesterol have a higher risk of CAD. The liver produces all the cholesterol the body needs to work. When you eat food high in cholesterol, your body gets more than it needs. When this happens, your body may build up fatty substances, known as plaque, inside your artery walls. Over time, the plaque clogs the flow of blood to your heart.

Blood Test for Cholesterol

To find out your cholesterol level, you will need a blood test. To get an accurate reading, do not eat or drink anything (except water) for 12 hours before the blood draw.

The blood test give a total cholesterol level. An ideal total cholesterol level is less than 200. The test will also show your *low density lipoprotein* (LDL) and *high density lipoprotein* (HDL) cholesterol levels.

- LDL is known as “bad” cholesterol. We believe LDL increases fat buildup and cholesterol inside blood vessel walls. Ideally, for people with coronary artery disease, LDL should be less than or equal to 110.
- HDL is known as “good” cholesterol. We believe HDL removes fat and cholesterol from the bloodstream and artery walls and returns them to the liver for disposal. Higher blood levels of HDL are

usually found in people who exercise, maintain a healthy weight, and don't smoke. Ideally, one's HDL level should be greater than or equal to 40.

Treatment for high cholesterol levels usually starts with nutritional counseling. Reducing your total fat, saturated fat, and cholesterol intake can help reduce your risk of heart disease.

Have your cholesterol level checked every 1 to 3 months after you make dietary changes. If your levels are still high, your doctor may prescribe medicines to lower your cholesterol..

Diabetes

Diabetes is a risk factor for CAD. We know that having diabetes for years damages large and small blood vessels. A person with diabetes has a much higher risk of CAD if they also have other risk factors.

People with diabetes may be able to lower their risk for heart disease by eating a low-fat diet, controlling their weight, and quitting smoking.

Stress and Having a “Type A” Personality

Our personality traits may also be a risk factor for CAD. If you have a “Type A” personality, you may be:

- Competitive
- Time-conscious
- Impatient
- Aggressive
- Abrupt
- Highly motivated and successful
- Tense
- Reluctant to relax, due to guilt
- Always in a hurry

“Type A” people often feel a lot of emotional stress and tension. This causes their body to produce a hormone called *adrenaline*. Adrenalin makes the heart pump faster and harder, causing the blood vessels to clamp down or narrow. Tension may also cause high blood pressure and raise blood cholesterol during times of stress.

Changing a “Type A” Personality

Know your body’s signals of stress You may have stiff, tight shoulder or neck muscles, “butterflies” in your stomach, acid stomach, or you may find yourself getting sick more often. When you have these signals, you can use relaxation or imagery to help yourself relax.

Here are some tips to help you lower stress in your life:

- Identify and try to reduce the things in your environment that cause you stress.
- Maintain a balance of work, play, and rest in your life.
- Exercise at least 3 times a week.
- Try meditation or relaxation training.
- Set small, concrete goals. Work on 1 goal at a time.
- Avoid hurrying. Adopt a leisurely pace. Breathe.
- Do 1 activity at a time. Make sure you leave some time for yourself.

To learn more about relaxation and reducing stress, visit the “Stress Management” page of the American Heart Association website: www.heart.org/en/healthy-living/healthy-lifestyle/stress-management.

Weight

Being overweight can increase your risk for CAD. It can also increase your risk of high blood pressure, diabetes, high blood cholesterol, and other health problems. Too much weight makes the heart work harder and may cause bone and joint injuries.

Maintaining an ideal weight can lower your risk for CAD. The keys to weight control are eating in moderation, eating a variety of healthy foods, exercising, and and taking care of other health issues that contribute to weight gain.

Tips to Losing Weight

- **Lose weight slowly.** Your long-term success depends on having new and better eating habits. A steady loss of 1 to 2 pounds a week is safe and more likely to be maintained.
- **Eat in moderation.** Include a variety of healthy foods that contain all the nutrients your body needs. Eat less fat and fatty foods. Eat less sugar and sweets. Avoid alcohol.
- **Avoid crash diets.** Avoid diets that limit you to eating less than 1,000 calories a day. You may want to work with a dietitian. Together you can create a diet plan that is right for you.

- **Slowly increase your daily physical activities.** When you are ready, begin regular aerobic exercise such as walking or swimming. A long-term exercise program is crucial for losing pounds and for maintaining a healthy weight. Check with your doctor before starting any exercise program to be sure it is right for you.
- **Reward yourself with items other than food.** As you lose weight, you might buy new clothes, see a movie, go on a trip, or do something else you enjoy that is not related to eating.

Sedentary Lifestyle

When someone gets little or no physical activity in their work or leisure time, we say that they have a *sedentary lifestyle*. These people are more likely to suffer angina and have a heart attack if they also have other risk factors.

Regular exercise means doing an activity for 20 to 30 minutes, 3 to 4 times a week. This kind of exercise can help lessen the workload on your heart. As your body becomes conditioned, your heart will work better. Other exercise benefits include:

- Better blood flow
- Better joint motion and muscle tone
- More strength and endurance
- Better blood cholesterol levels
- Weight loss
- Lower blood pressure
- Able to handle stress better
- Easing of tension
- More feelings of well-being
- Less stress and depression

Talk with your doctor before you start an exercise program. Slowly increase your exercise level.

Alcohol and Your Heart

Many people wonder if drinking alcohol is safe for those with heart disease. Alcohol can have varying effects on the heart, depending on your specific problem. Please talk with you doctor if you have any questions about drinking alcohol.

Drinking a lot of alcohol:

- Increases your risk of hypertension, stroke, cancer, and cirrhosis of the liver
- Can also damage the heart muscle, causing defects that lead to arrhythmias (disruptions in the normal, regular heartbeat)

Alcohol increases your heart rate and slightly decreases the strength of your heart muscle's contraction. This is why you should avoid exercise or other strenuous activity after drinking.

Heart Tests

Cardiac Catheterization (Coronary Angiography)

What it does: This test checks the coronary arteries, which supply blood to the heart muscle. A *catheter* (narrow tube) is inserted into an artery in the groin or arm, and is carefully guided to the heart with the use of a *fluoroscope* (special X-ray machine). *Contrast dye* is injected through the catheter into the coronary arteries and their images are recorded on film. These images show the arteries that are narrowed or blocked.

Takes about: 1 to 3 hours. Requires special instructions as well as your written consent.

Place done: Cardiac Cath Lab

Coronary Computed Tomography Angiogram (Coronary CTA)

What it does: This procedure studies the inside of your tiny heart vessels without physically going inside your heart. A *computed tomography* (CT) scanner can scan the entire heart during only 5 beats. A radiologist and a technologist will give you a nontoxic contrast through an IV into your vein. When the contrast reaches your heart vessels, the CT scanner takes thousands of pictures in a very short time. The images are then pieced together and the radiologist is able to evaluate them for blockage of an artery.

Takes about: 30 minutes

Place done: Radiology

Electrocardiogram (ECG, EKG, 12 Lead)

What it does: An ECG is a recording of your heart's electrical function. Electrode patches are attached to each wrist and ankle, and at six points on your chest. A recording is then made, giving your doctor 12 views of your heart's electrical activity. This way, your doctor can tell if the heart is experiencing any irregularities, stress, or damage.

Takes about: 5 to 10 minutes. No special preparation needed.

Place done: At your bedside or Heart Institute

Echocardiogram (Echo, Cardiac Ultrasound)

What it does: This test uses sound waves to create images of your heart. A small device (*transducer*) is held to your chest. Sound waves bounce off your heart structures and record images on film. These images show problems in the heart muscle or valves, as well as any fluid around the heart.

Takes about: 30 minutes to 1 hour

Place done: At your bedside or Heart Institute

Electrophysiology Study (EP Study, EPS)

What it does: This test provides more precise information about the electrical function of your heart. It is done by a specially trained cardiologist. A *catheter* (narrow tube) is inserted into an artery in the groin and carefully guided to the heart using a *fluoroscope* (special X-ray machine). Once the catheter is in place, we can measure your heart's electrical activity.

Takes about: 2 to 4 hours. Special instructions are needed before and after this procedure, as well as your written consent.

Place done: EP Lab, 2nd floor of UWMC - Montlake

Holter Monitor (Ambulatory Monitor)

What it does: This device records your heart's electrical activity over a set period. It may be worn at home or in the hospital. *Electrode* patches are placed on your chest, with wires going to a small device about the size of a small, portable tape recorder. You will wear this device on a shoulder or belt strap.

Takes about: We will ask you to keep a diary of your daily activities, symptoms, and medicines during the recording period. We will relate your recorded heart rhythms to your activities.

Place done: Heart Institute

Magnetic Resonance Imaging (MRI) Heart Scan

What it does: This scan uses radio waves and a strong magnetic field instead of X-rays to provide clear detailed pictures of the heart. An MRI exam typically consists of 2 to 6 sets of pictures, each lasting 2 to 15 minutes. Each set shows a cross-section of the heart.

Takes about: 30 minutes to 1 hour

Place done: Radiology

Radionuclide Ventriculogram (RNVG), Multi-gated Analysis (MUGA), Cardiac Nuclear Medicine Exam

What it does: These tests tell us about how well your heart muscles pumps. We will inject a very small amount of radioactive material into your vein. A special camera records the movement of the radioactive material through your heart with each heartbeat.

Takes about: 1 to 2 hours

Place done: Nuclear Medicine Department

Pulmonary Function Test (PFT)

What it does: This test measures your lung function. You will be asked to breathe in and out several times into a machine.

Takes about: 30 to 45 minutes

Place done: Lung Function Testing Lab

Telemetry Monitoring

What it does: Telemetry uses radio signals to send your heart's electrical activity to a monitor at the nurses' station or in your room. Electrode patches placed on your chest are connected to a small battery-powered telemetry box (about the size of a small, handheld radio). You will carry this device in a pouch around your neck or in your pocket. It allows us to monitor your heart rhythm at all times while you slowly increase your activity.

Takes about: Ongoing during your hospital stay

Place done: Bedside

Stress Tests

Stress tests help us diagnose CAD or angina. These are the types of stress tests we use most often:

Exercise Tolerance Test (ETT, Treadmill)

What it does: This test checks how well your heart tolerates activity. It records any abnormal heart rhythms or lack of blood flow to your heart during exercise. Electrode patches are placed on your chest and connected to a treadmill *electrocardiogram* (ECG) computer, which will record electrical signals from your heart during exercise. While you are walking and/or running on a treadmill, we will record your ECG, blood pressure, and pulse.

Takes about: 45 minutes to 1 hour

Place done: Heart Institute

Thallium Stress Test, Sestamibi Stress Tests, Persantine/Adenosine, Dobutamine Stress Test

What it does: These tests compare the amount of blood flowing through the heart muscle during stress and at rest. *Thallium* and *sestamibi* stress tests involve walking and/or running on a treadmill. *Persantine* and *dobutamine* stress tests involve causing stress on the heart by giving a medicine, not by actual physical exercise. Both types of stress tests use radioactive scans to detect the presence and extent of CAD. We will take pictures of your heart about ½ to 1 hour after we inject a very small amount of radioactive materials. We will do this while you are at rest, and again during exercise or medicine-induced stress. The exercise portion of the study may be done first.

Takes about: The total scanning time (picture-taking) takes about ½ hour. The entire test can be done over 1 to 2 days, and may need special instructions.

Place done: Nuclear Medicine Department

Stress Echocardiography Test (Exercise Echo, Dobutamine Echo)

What it does: This test checks how well the heart works at rest and under stress. When blood flow to the heart is reduced, the motion of the heart muscle changes. Echocardiography allows us to watch these changes (see “Echocardiogram” on page 14). This test begins as an exercise tolerance test,

either with actual physical exercise or *intravenous* (IV) medicine (dobutamine) to stress the heart muscle. Images of the heart are recorded by the echocardiography technician before and after the stress portion of the test.

Takes about: 1½ hours

Place done: Heart Institute

Resources to Learn More

There are many books that can teach you how to increase physical activity, reduce stress, manage your weight, and improve your overall health. You can borrow them from the library, or buy them from a bookstore or online bookseller. Ask your provider to suggest specific books, as well as helpful websites.

Books

Eating/Cooking/Weight Loss

There are many excellent cookbooks and magazines about cooking light and eating well. To start, try titles by the American Heart Association, Dean Ornish, Joseph Piscatella, and Brenda Ponichtera.

Emotional/Personal Concerns

- *The Healing Heart* by Norman Cousins
- *Transitions: Making Sense of Life's Changes* by William Bridges

Exercise

- *Burning Fat, Getting Fit: Exercise and Your Heart, A Guide to Physical Activity* by the American Heart Association
- *Fitting in Fitness* by the American Heart Association

Sexuality

- *Heart Illness and Intimacy* by Wayne Sotile
- *The Sensuous Heart: Guidelines for Sex After a Heart Attack or Heart Surgery* by Suzanne Cambre

Stress Management

- *Don't Sweat the Small Stuff* (any in the series) by Richard Carlson
- *The Relaxation Process* by Herbert Benson
- *The Relaxation and Stress Process* by Martha Davis, et. al.

Websites

American Heart Association

www.americanheart.org

This site provides links to dozens of other well-respected sites including government agencies, universities and research centers, scientific organizations, and other resources.

Harvard Heart Letter

www.health.harvard.edu

Suggested by UWMC clinicians, this site offers detailed information about many aspects of heart disease, rehabilitation, and a heart-healthy lifestyle. Click on “Heart Health” in the menu bar.

Questions?

Your questions are important. Call your doctor or healthcare provider if you have questions or concerns.

Heart Institute at UW Medical Center/Cardiovascular Clinic:
206.598.4300