Implementing Behavioral Medicine in a Lifestyle Medicine Practice

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Abbreviations

| Abbreviation | Description |
|--------------|-------------|
| AIDS         | Acquired immunodeficiency syndrome |
| apps         | Electronic applications |
| CBT          | Cognitive behavioral therapy |
| DARNCAT      | Desire, Ability, Reason, Need, Commitment, Activation, Taking steps |
| DPP          | Diabetes Prevention Program |
| 5 As         | Ask/Assess, Advise, Assess/Agree, Assist, and Arrange |
| HCP          | Healthcare professional |
| HIV          | Human immunodeficiency virus |
| MET          | Motivational enhancement therapy |
| MOHR         | My Own Health Report |
| OARS         | Open-ended questions, Affirmations, Reflections, and Summaries |
| SMART        | Specific, Measurable, Attainable, Realistic, and Timely |
| T2D          | Type 2 diabetes |

Definition of Behavioral Medicine

Behavioral medicine relies on empirical evidence as well as conceptual models to explain behavior change at multiple levels (individual, family/group, practice, community, and policy). Behavioral medicine is inherently interdisciplinary, developing and integrating behavioral and biomedical knowledge, as well as incorporating techniques to apply to prevention, diagnosis, treatment, and rehabilitation [1]. These techniques are adapted to both the level of change as well as the cultural context within which change occurs. Behavioral medicine addresses both physical and mental health and is closely related to fields such as health psychology, pediatric psychology, neuropsychology, geropsychology, rehabilitation psychology, and psychosomatic medicine [2]. The biopsychosocial model proposed by Engel presents similar concepts and serves as a critical reference [3, 4].

The Integrated Care Approach to Behavioral Medicine in Lifestyle Medicine

The integrated care approach configures a healthcare professional (HCP) with dedicated training and expertise in behavioral medicine as a core part of the medical team. Consequently, patients are routinely screened for behavioral concerns to promote patient engagement, including building trust and reducing barriers, such as stigma about mental health treatment. Referral to an off-site behavioral HCP can also be effective, particularly if the appointment can be made by the medical practice and followed up at subsequent visits. For example, in a recent study of integrated mental healthcare among patients diagnosed with diabetes, a behavioral HCP was introduced in the visit with another trusted HCP, thereby enhancing patient comfort while receiving behavioral treatment [5].

Brief, evidence-based treatments are most suitable to the primary care setting, with longer-term and more intensive treatments for those who are not responsive to the brief ones, or who have a more severe or urgent need (e.g., acute suicidality with intention and a plan, or serious mental illness such as psychotic disorders) [6]. Lifestyle behavior change requires a consistent approach with tapered maintenance and follow-up by the lifestyle medicine HCP to enhance adherence and address setbacks when they occur.

Diabetes education offers an example. Rather than a one-time course that patients undergo and thereby become permanently competent, diabetes self-management involves...
ongoing and recurring diabetes educator consultation to assist patients as they encounter challenging social, cultural, health, and other barriers to optimal self-care and also to learn how to handle setbacks. The diabetes educator also provides patients with new strategies as the available treatments progress. For instance, continuous glucose monitoring and partially automated insulin pump systems are a major advance over what was state of the art just a few years ago. As another example, new bariatric and metabolic procedures can improve diabetes and cardiovascular outcomes dramatically. Each of these modern treatments requires patient behavioral adherence to succeed.

**Models of Change in Behavioral Medicine**

Interventions at multiple levels help to overcome HCP barriers to implementing behavioral interventions, including limited HCP-patient encounter time and the need for specialized training. Behavior is multi-determined, affected by the culture, environment, clinical practice setting, family, and a range of individual patient factors. There are several widely used models of change that guide the delivery of behavioral medicine care. Many of these models offer explanations for behavior, and all offer levers for behavioral change. The Lifestyle Medicine Center can serve as the hub for behavioral counseling, while resources at other levels (e.g., policy, organizations, and community) can help patients to enact and sustain changes such as physical activity, smoking cessation, and healthy eating [7].

**The Social Ecology Model**

Ecology pertains to the relationships among organisms and their environments [8, 9]. The social ecology model, based on systems theory, and the early work of Bronfenbrenner [10], presume that the healthfulness of a situation and the well-being of participants are mutually influenced by aspects of the environment: physical (geography, architecture, and technology) and social (culture, economics, and politics) (Fig. 15.1).

Patient-environment interactions move through cycles of mutual influence, where each affects the other. The varied levels of human environments, such as worksites, are seen as complex systems in which each level is nested in more complex and distant levels. For example, the occupational health and safety of community work settings is directly influenced by state and local ordinances aimed at protecting public health and environmental quality [10–14].

The social ecology model recognizes the often-contradictory influences of environments and patients. For example, a socially supportive family or organization may enable patients to cope more effectively with physical constraints (e.g., overcrowding and drab surroundings). A well-designed physical environment may not spur much health, however, if promotion of interpersonal or intergroup relations results in conflict and stress, or individuals are required to be socially isolated (as in the coronavirus disease 2019 pandemic).

A focus on the impact of the physical, human-made, or “built environment” on health has received renewed attention [15]. A “sense of place” is a widely discussed concept in fields as diverse as geography, environmental psychology, and art [16]. Place includes geography (e.g., sprawl), aggregated group properties (e.g., census-tract level income), as well as broader political, cultural, or institutional effects (e.g., county-level physician supply) [17].

Patients may live in geographic areas that encourage walking, biking, and social interaction [18, 19]. These environments can influence their likelihood to regularly engage in physical activity. Alternatively, harmful geographic settings can adversely affect health. For example, locales with increasing motor vehicle exhaust could exacerbate pulmonary disease [20]. The presence of neighborhood liquor stores could increase alcohol consumption with the associated adverse health consequences [21, 22]. Lack of grocery stores or places to purchase fresh fruits and vegetables (food deserts), coupled with the proximity of convenience stores and fast-food outlets, could promote unhealthy dietary consumption and eating patterns, especially for those with limited transportation options. Food deserts may also lead to food insecurity, defined by the U.S. Department of Agriculture as the household’s limited or uncertain access to adequate food. Furthermore, food insecurity may result in individual hunger. The health impact of place (also including nature contact, buildings, public spaces, and urban form).
may include physical, psychological, social, spiritual, and aesthetic outcomes [16], many of which have not yet been systematically examined.

The Chronic Care Model

The Chronic Care Model is among the most widely used health services intervention structures in the field, having directed innovation throughout major integrated healthcare systems (e.g., Group Health Cooperative and the Veterans Health Administration) as well as federal agencies (e.g., Centers for Medicare and Medicaid Services Innovation Center) [23]. The Chronic Care Model is based on the premise that improved chronic disease outcomes result from productive interactions among informed, activated patients and a prepared, proactive practice team [24].

Six components facilitate productive interchanges among lifestyle medicine HCPs, the larger clinical practice team, and patients in primary care [24]:

1. **Self-management support**, resulting from the HCP and patient working together via patient education and activation, various tools and resources, collaborative decision-making, and the use of clinical practice guidelines.
2. **Delivery system design**, involving the organization of the practice through clarifying care management roles, team-building, proactive patient follow-up, and implementing visit system changes to improve patient care.
3. **Decision support**, including guidance for HCP behavior and decision-making, with the institutionalization of clinical practice guidelines, protocols, prompts, and nudges; HCP education; and expert consultation support.
4. **Clinical information systems**, involving the gathering of information or improved use of information systems via a patient registry; the use of information for care management; and the provision of performance data.
5. **An organized health system**, resulting from the creation of a culture focused on quality through leadership support, HCP participation, and coherent system improvement.
6. **Community resources and policies**, arising from resources outside the center to facilitate linkages among patients and the community [25, 26].

All six components of the Chronic Care Model are considered necessary for improving healthcare in general, and apply widely across chronic illnesses, healthcare settings, and patient populations [27, 28] (Fig. 15.2).

Theoretical Models of Change: Family-, Group-, and Individual-Levels

Behavioral scientists have led the development and testing of models of change. There are several classic theories applicable to the Lifestyle Medicine Center that identify different health promotion strategies. Each of these theoretical models posits a trajectory for change in attitudes, beliefs, or behaviors.

Stimulus-Response Learning Theory

Stimulus-response theory includes classical conditioning (passive learning associating two stimuli) and operant conditioning (active learning associating action and consequence). This strict behaviorist approach relies on empirical observations to analyze behavior patterns, disregarding what was considered as the unmeasurable “black box” of cognition [29, 30]. Learning principles derived from this approach apply equally well to animals and people. In classical (Pavlovian) conditioning, the organism learns to associate a stimulus (e.g., buzz sound) with a biologi-
ally important event (e.g., food appearing), which results in an involuntary response to the first stimulus (e.g., salivation) even when no food is presented. In operant conditioning, the organism learns to respond to a stimulus (e.g., buzz sound) with a voluntary response (e.g., press lever) that results in a desired reward (e.g., food). Reinforcements (e.g., food reward and/or avoiding pain) increase the probability of a behavior, and punishments (e.g., pain and/or loss of food reward) decrease behaviors. Extinction (cessing of a habitual behavior) is notoriously difficult to achieve with unpredictable reinforcements (e.g., child keeps misbehaving until parent gives in to demand). Given the slow progress of natural incentives for weight control and physical fitness (e.g., clothes fitting better, easier to climb stairs), more immediate incentives are a useful strategy to offset the intrinsically reinforcing value of energy-dense foods such as sweets, and sedentary activities such as screen time which may be required for work or school [31].

Stimulus control refers to behaviors which are triggered by a stimulus (i.e., cue), and are less likely to occur in the absence of that stimulus. Stimulus control strategies (placing cues to healthy behavior and removing cues to unhealthy behavior where the patient will encounter them) can enhance adherence to a particular lifestyle program [31]. As an example, for a person who finds donuts irresistible, avoiding visiting donut shops and bringing donuts home can help reduce eating donuts. Keeping walking shoes and a leash near the place where the patient sits down frequently and having a dog that wants to go for a walk (and will recognize the shoes as a cue) can help encourage physical activity. For a smoker, avoiding cues like spending time with friends who smoke, smelling tobacco smoke, or drinking alcohol if that was often paired with smoking, can help reduce the urge to smoke tobacco. Removing the television from the bedroom can help improve sleep habits. Making energy-dense, nutrient-poor foods (e.g., candy) less accessible, and putting an attractive bowl of fruit on the kitchen counter, or cut-up carrots and celery with an appealing dip in the front of the refrigerator or in a convenient to-go container, can encourage more nutritious food choices [31].

Social Learning Theory and Social Cognitive Theory

Social learning theory builds on stimulus-response theory by adding cognitive elements. It posits that learning novel behaviors (e.g., language and violence) can occur through social modeling (observation and imitation of others, such as parents) and without reinforcements [32]. Most learning occurs through modeling (i.e., social learning), such as watching others prepare and eat meals. Learning is affected by social influences, including reinforcements such as praise and inclusion in activities.

Bandura [33] built on social learning theory to develop social cognitive theory, where cognitive expectations, such as self-efficacy (e.g., feeling capable of stopping smoking), influence the behavior (e.g., smoking cessation). The cornerstone of the model is reciprocal determinism, or a dynamic interaction among the person, behavior, and the environment, within which the behavior is performed [34]. Individuals high in self-efficacy or more confident of their ability to maintain behavioral changes (e.g., smoking cessation or dietary changes) will execute them more readily with greater intensity and with greater perseverance in response to initial failure than will individuals with comparatively lower self-efficacy [35, 36]. Rather than focusing on the training of behavior by environmental forces, social cognitive theory emphasizes the importance of knowledge, skill, and self-control. Self-regulatory processes, including self-generated inducements and expectations (e.g., telling oneself to exercise daily so that one can climb a flight of stairs more easily), are also highlighted in this theory.

Stages of Change

The stages of change model is based on the presumption that individuals move through a series of predictable behavioral stages:

1. **Precontemplation** (not ready) – considering the change
2. **Contemplation** (getting ready) – starting to think about initiating change
3. **Preparation** (ready) – seriously thinking about the change within a given time period (e.g., the next 6 months) or taking early steps to change
4. **Action** (making a change) – starting/stopping the target behavior within a 6-month period; individuals modify their behavior, experiences, or environment in order to overcome their problems; this requires a considerable commitment of time and energy
5. **Maintenance** (maintaining the change) – the target behavior change is maintained for more than 6 months; this includes preventing and recovering from relapse [37–40]

The name “transtheoretical” is often applied to the stages of change model as it includes elements from other theories, such as stimulus control from learning theories, a key strategy in the action and maintenance stages [31, 39]. Relapse occurs less often in the maintenance phase, once the healthy behavior change is more established, than in the action phase. Termination is sometimes included as the final stage of change, where the unhealthy behavior is no longer a temptation. However, this final stage may not be achievable for many people, particularly those with addictive behaviors. These stages are not necessarily linear. For example, the average smoker who quits reports at least several and often many relapses before achieving and maintaining abstinence [41]. Nevertheless, the stages of change model may suggest intervention points for different individuals at varied stages [40].

The mechanisms that drive movement through the stages of change are termed the processes of change [38]. These processes draw heavily on components of other models, such as the Health Belief Model described below [42], and describe decision-making regarding the adoption of a behavior. The decisional balance approach compares the strength of the target behavior’s perceived pros with that of the per-
ceived cons [43]. The relative weights that people assign to a behavior’s pros and cons influence their decisions about behavioral change [43], such as continuing or ceasing to smoke.

Health Belief Model Theory
The goal of the Health Belief Model (as modified by Becker [42]) is to determine why some individuals who are illness-free take actions to avoid illness, whereas others fail to take protective actions. Another goal is to predict the conditions under which individuals would engage in simple preventive behaviors, such as immunizations. The model was based on the work of Kurt Lewin, who understood that the life space in which individuals live is composed of regions, some having a negative valence (one would seek to avoid), some a positive valence (one would seek to approach), and some a neutral valence [44].

The Health Belief Model suggests that before individuals take action, they must decide that the behavior, whether it is smoking, eating unhealthy foods, or engaging in unprotected sexual activity, creates a serious health problem. Moreover, they are personally susceptible to this health harm, and that moderating or stopping the behavior will be beneficial. The perceived barriers to undertaking a behavior are considered most important to health-promotive efforts [45]. An individual’s perceived susceptibility to a disease and severity of harm are largely based on personal knowledge of the disease and potential outcomes. Although the combination of perceived susceptibility to, and severity of harm provides the force for action and the perception of high benefits and low barriers provides a course of action, it is the cues to action that start the process of change [46].

Cultural influences can have strong effects on health beliefs and practices, for example, in the use of complementary or alternative practices, differing disease causation beliefs, and perceptions of risk and personal agency [47]. Cultural beliefs and strong community ties can support health behaviors. Taboos and stigma (e.g., blood, sexually transmitted diseases, illness, and contagion) may hinder a patient from performing self-care in the presence of others or interfere with adherence to health behaviors (e.g., healthy eating, physical activity, taking medication, and vaccination), however. HCP understanding of cultural context can personalize treatment for patients in various communities [48].

Theory of Planned Behavior
This theory postulates that most volitional behavior can be predicted by beliefs, attitudes, and intentions. Therefore, efforts to change behavior should be directed at an individual’s belief system. By altering the beliefs underlying attitudes or norms, changes in behavioral intentions, and subsequently in behavior, can also be induced [49, 50]. Individuals intend to do a behavior, such as brushing their teeth, when they evaluate it positively and believe that important others, such as parents, think they should do it [49].

Prospect Theory
This theory states that rather than being strictly rational, the degree to which a choice (or behavior) is seen as a gain or a loss can vary depending on how the consequences of the behavior are presented or framed [51]. When behavioral choices involve some risk, individuals will be more likely to accept these risks when information is framed in terms of relative disadvantages (i.e., losses or costs) of the outcomes. When behavioral choices involve little risk, individuals prefer options for which information is framed by relative advantages (i.e., gains or benefits). Choosing prevention behaviors (e.g., wearing a condom) is a risk-averse option for maintaining sexual health. These behaviors should be promoted with gain-framed messages, such as “using a condom during sexual intercourse can help to keep you healthy” [52]. Among asymptomatic or low risk patients, behaviors involving an uncertain, potentially negative outcome should be promoted with loss-framed messages (e.g., “failing to use a condom during sexual intercourse exposes you to various sexually transmitted diseases”) [52]. As other examples, loss-framed messages could be shared with low risk or asymptomatic patients for human immunodeficiency virus (HIV) testing (where the patient may find out that they have HIV) or breast self-examination (where even benign lumps may raise concern about cancer). Message framing approaches, derived from prospect theory, have been applied to breast cancer screening, sunscreen use, HIV testing, condom use, human papillomavirus vaccination, and dental mouthwashes, as well as defining quality of life outcomes.

Behavioral Economics Theory
Behavioral economics, like prospect theory, recognizes that choices are not strictly rational [53]. A nudge is a cue (sometimes electronic) that influences choice, without removing options. Making the best choice, the default dramatically increases the proportion of people who choose it. Choice architecture refers to design decisions such as planning a cafeteria so that you have to go by the salad bar before you get to the grill, or offering a child a few healthy choices for a snack. Making the healthy option the easiest or most obvious choice (e.g., presenting fruit in an attractive bowl at the front of the display, with the less healthy items further back behind a latched lid) can increase the selection of fruit without removing the other options. Healthy lifestyle nudges include text message reminders to record dietary intake or an app that prompts physical activity breaks.

Stimulus control strategies, such as placing cues toward desired behaviors in one’s routine (e.g., coming home to a dog that wants and might need to go for a walk; keeping ready-to-eat servings of vegetables with a healthy, tasty dip
at the front of the refrigerator) and avoiding cues to unhealthy behavior (e.g., avoiding places where peers smoke, not bringing home large quantities of tempting unhealthy items), tend to increase healthful behaviors. Delay discounting refers to the degree to which people prefer smaller, more immediate rewards (immediate gratification) rather than larger, delayed rewards [54]. Episodic future thinking, projecting oneself into the future to pre-experience an event, is a promising strategy to offset delay discounting for behavior changes, including obesity treatment and reducing smoking [31, 32, 54, 55].

**Effective Behavioral Interventions for Lifestyle Medicine**

There is evidence for the influential role of behavioral interventions in cardiovascular disease, diabetes, cancer, HIV/AIDS, and chronic pain [56]. Behavioral risk factor modification (e.g., tobacco use, unhealthy eating, and physical inactivity) improves quality of life and reduces healthcare costs [57, 58]. Behavioral treatments for pain are underutilized and may be especially important given the current opioid epidemic [58]. Behavioral treatment is valuable for regimen adherence and reducing obesity [31, 59].

Obesity and diabetes are exemplary conditions for lifestyle medicine interventions. Reducing risks for type 2 diabetes (T2D) and other sequela of obesity present common, daunting challenges for behavior change. According to a systematic review by the U.S. Preventive Services Task Force in 2018 [60], patients receiving behavior-based interventions had greater mean weight loss (−2.39 kg [95% CI, −2.86 to −1.93]; 67 studies [N = 22,065]) and less weight regain (−1.59 kg [95% CI, −2.38 to −0.79]; 8 studies [N = 1408]) at 12–18 months, compared with controls. In addition, 12 or more sessions per year of behavioral counseling delivered in-person, by phone, or electronically resulted in 4–7 kg weight loss, compared 1–2 kg weight loss with fewer sessions or counseling that did not include behavioral strategies such as motivational interviewing [61]. Furthermore, weight loss medication increased weight loss when added to behavioral treatment but also increased adverse events [60, 61].

The Diabetes Prevention Program (DPP) demonstrated that an intensive lifestyle intervention to lose weight through diet and physical activity was 58% effective in preventing or delaying onset of diabetes over 5 years, while metformin was only 31% effective [62]. The DPP was translated to the YMCA and has been adopted by the Centers for Disease Control and Prevention [63–66]. Lifestyle interventions based on the DPP are generally effective in community settings (−4% weight loss at 1 year) [63]. Very brief (<30 seconds) primary care physician advice with referral to a behavioral program (12 weekly sessions, 1 hour each) was also found effective in diabetes prevention (2.43 kg mean weight loss at 12 months; 1.04 kg mean weight loss at 12 months with just the very brief advice) in patients with obesity [64].

Specific behavioral interventions are useful in secondary prevention for patients with T2D. The Look AHEAD study reduced weight, cardiovascular risk factors, and medications in patients with T2D through an intensive lifestyle intervention [67]. The design and findings of this study have also been translated to group treatment at the YMCA. Such community settings offer durable and accessible support that is needed to maintain initial weight loss and lifestyle improvements [68].

Similarly, in chronic illnesses such as diabetes, diabetes self-management education should not be considered merely as a one-time treatment. Continuing support is needed to maintain the treatment regimen, especially when it is demanding for the patient, and to adjust for evolving treatment options [68, 69]. In addition, those with diabetes are prone to depression, which hampers adherence. In a small trial of distressed rural adults with T2D, a 12-session intervention tailored to severity, either cognitive behavioral therapy (CBT) with a psychologist for those with moderate to severe symptoms, or telephonic lifestyle coaching by a nurse for those with mild distress, have been shown to be feasible in a rural primary care clinic and effective in improving mood and adherence [5].

There is strong evidence for the effectiveness of brief clinician counseling in smoking cessation [70]. As described later in this chapter, brief motivational interviewing has demonstrated success in reducing drinking. The U.S. Preventive Services Task Force recommends offering adults with cardiovascular disease risk factors behavioral counseling interventions to promote a healthy diet and physical activity [71]. The overall magnitude of benefit related to these interventions is positive but small. Patients who are interested and ready to make behavioral changes may be most likely to benefit from behavioral counseling [70–75]. For example, the Patient-Centered Assessment and Counseling for Exercise approach has been successful [72].

Counseling of adults and children by HCPs can increase children’s practices of safety behaviors (e.g., the use of seat belts, child safety seats, and bicycle helmets), although the prevalence of this counseling is low in the United States [73]. Brief counseling interventions aimed at high-risk individuals can increase condom use and prevent the spread of sexually transmitted diseases [74]. Recommendations by HCPs are central to adherence with cancer screening tests, such as those for the breast, colon, and cervix [75], particularly as the guidelines differ by patient characteristics, such as age. The HCP often serves as a motivator for guideline adherence by patients, through advice and referrals. Importantly, comprehensive, well-resourced follow-up, including referral to community resources, is essential to help patients gain the
self-monitoring. Electronic applications (apps) can reduce the burden of processes can be especially useful in cases where more than the patient [83]. Using formal shared decision-making weighted according to the specific characteristics and values patients, is informed by the best evidence available, and is choice. Shared decision-making engages both HCPs and mechanisms, symptoms, treatment options, and prognosis [87]. After an interactive process with a final agreement, the HCP and patient plan steps to put their shared decision into action. Often, these decisions are supported by tools for values clarification [88] and information about the benefits and harms of treatment choices [89].

### Evidence-Based Behavior Change Techniques

A number of techniques have been found to change behaviors toward health, across different types of patients, risk factors, and within varied contexts. The techniques that are most easily applied to Lifestyle Medicine Centers include goal setting and self-monitoring, shared decision-making, the five As, and motivational interviewing. CBT is a more comprehensive approach to encourage patient engagement for healthy change. CBT uses each of these techniques and is generally most effective when applied by specially trained and licensed mental health professionals.

### Goal Setting and Self-Monitoring

After an assessment period, often using an automated or rapidly scored instrument, goal setting begins the change process. SMART (Specific, Measurable, Attainable, Realistic, and Timely) goals can begin the clinical collaboration for patient behavioral change, particularly when goals are reinforced by other team members (Table 15.1) [79]. Self-monitoring is essential to assess progress and identify challenges that call for a modified goal or behavioral strategy [31, 80, 81]. Technological solutions such as sensors and electronic applications (apps) can reduce the burden of self-monitoring.

### Shared Decision-Making

Given the more recent view of healthcare decision-making as a partnership between patients and HCPs, there is growing interest in shared decision-making. In fact, the Patient Protection and Affordable Care Act of 2010 (H. R. 3590) [82] includes eight provisions to facilitate and encourage the use of the shared decision-making process. In shared decision-making, the patient and HCP participate in all phases of the decision-making process together, share treatment preferences, and reach an agreement on treatment choice. Shared decision-making engages both HCPs and patients, is informed by the best evidence available, and is weighted according to the specific characteristics and values of the patient [83]. Using formal shared decision-making processes can be especially useful in cases where more than one treatment option is available and also when no treatment is considered best according to clinical evidence [84]. Shared decision-making is key to patient-centered care, defined as the extent to which discussions about care reflect the considered needs, values, and preferences of a well-informed patient [85].

One important prerequisite for shared decision-making is the mutual exchange of information between the patient and lifestyle medicine HCP, because the knowledge of both together is often greater than the knowledge of each separately, and can optimize the chances of successful management of an illness [86]. The patient discloses expectations, preferences, fears, attitudes toward risk, values, experience of illness, and social circumstances, whereas the HCP contributes expert medical knowledge on disease causes and mechanisms, symptoms, treatment options, and prognosis [87]. After an interactive process with a final agreement, the HCP and patient plan steps to put their shared decision into action. Often, these decisions are supported by tools for values clarification [88] and information about the benefits and harms of treatment choices [89].

### Table 15.1 SMART goals

| Smart item | Explanation | Example |
|------------|-------------|---------|
| Specific   | Is the goal specific in units of increase or decrease? | I will increase my running mileage by 10% each week |
| Measurable | Is the goal measurable in observable units? | I will keep track of my running distance each day so that I can track my progress toward my goal |
| Attainable | Is the goal attainable for me? | Yes, given my current schedule and my desire to accomplish this goal, this is attainable |
| Realistic  | Is the goal realistic for me? | Yes, I have everything I need to make this goal a reality. I have the support and resources in place |
| Timely     | Is the goal attainable in a reasonable period of time? | I will sign up to run a 5K in 3 months and a 10K in 6 months |

*Other examples of SMART goals are:

To increase adherence with medication and psychotherapy use for a depressed patient: I will take my fluoxetine (Prozac) each morning before I go to work and will go to Dr. Tappler’s office every Tuesday at 4 pm, as scheduled, for the next month.

To increase intake of fruits and vegetables: I will include at least one serving of vegetables for two meals each day and at least one serving of fruit per day over the next 4 weeks.

To stop smoking: I will substitute a walk for my morning cigarette, and chew 4 mg of nicotine replacement gum every time that I feel like smoking. I will wear a nicotine patch on my left arm for the next 3 months.

To increase physical activity: I will jog outside or use the elliptical machine at the gym at a moderate intensity for 30 minutes 4 times per week.

See Refs. [143, 144, 146]
Shared decision-making is central to prostate cancer screening. Since the benefits are not clearer than the risks for prostate cancer screening using the Prostate-Specific Antigen test (PSA), major professional groups, such as the American Cancer Society, the American Urological Association, the American Academy of Family Practitioners, and the U.S. Preventive Services Task Force recommend informed or shared decision-making between age-eligible men and their primary care HCPs [90].

### The Five As

The original five As framework (Ask, Advise, Assess, Assist, and Arrange, [91]) was developed for smoking-cessation counseling and has been adapted to other lifestyle changes, such as physical activity (Fig. 15.3) [7, 92]. The 5 As were first published alongside the 5 Rs to enhance motivation for tobacco cessation (Relevance, Risk, Rewards, Roadblocks, and Repetition) [93]. In 2002, The Counseling and Behavioral Interventions Work Group of the U.S. Preventive Services Task Force recommended adoption of the 5 As as a unifying framework for evaluating and describing health behavior counseling interventions in clinical settings [94].

A 2013 Cochrane review of randomized clinical trials on smoking cessation by physicians concluded that simple advice had a small effect on cessation rates [95]. Assuming an unassisted quit rate of 2–3%, a brief advice intervention can increase quitting by a further 1–3% at least 6 months post-counseling [95]. Additional components appear to have only a small effect, though there is a small additional benefit of more intensive interventions compared to very brief interventions [95]. Moreover, providing follow-up support after offering the advice may slightly increase the quit rates [96].

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**Fig. 15.3** The five As as applied to physical activity counseling. The five As framework (Ask, Advise, Assess, Assist, and Arrange) was first developed for smoking-cessation counseling and adapted to other lifestyle changes, such as physical activity [7, 91, 92]. The updated five As substitute Assess for the first A, and Agree for the third A [94, 99, 100].

| Assess | Physical activity level  |
|--------|--------------------------|
|        | Physical abilities       |
|        | Beliefs and knowledge    |

**Individual**

- “How much exercise do you currently get each day?”
- “What kinds of things make it hard to exercise?”

| Advise | Health risks           |
|--------|------------------------|
|        | Benefits of change     |
|        | Appropriate "dose" of physical activity |

**Health policy**

- “The national guidelines recommend at least 150 minutes of moderate activity each week. I strongly recommend that you begin to move around more regularly. We always recommend starting from where you are and building up slowly.”

| Agree  | Co-develop personalized action plan |
|--------|-------------------------------------|
|        | Set specific physical activity goals based on interests and confidence level |

**Social Support**

- “I understand that you have a busy work and family schedule. How do you feel about starting with 20-minute walks for 3 days next week? Maybe you could also use that time to spend with your daughter?”

| Assist | Identify barriers and create strategies to address them |
|--------|--------------------------------------------------------|
|        | Identify resources for physical activity and social support |

**Community Resources**

- “Do you have a gym, park, trail system, or other safe place to be active near your home or workplace?”

| Arrange | Specify plan for follow-up (e.g. visits, phone calls, text messages) |
|---------|-------------------------------------------------------------------|
|         | Check on progress/maintenance of physical activity change |

**Provider/Team**

- “We would like to hear about how the walking is going for you. The nurse will call you in one week to check in and see if you have any questions or concerns.”
Training programs have been designed to improve medical professionals’ effectiveness, skills, and self-efficacy in this area [96, 97]. In the short term, they have been effective in improving HCPs’ (particularly physicians’) confidence and perceived effectiveness and increasing rates of asking, advising, and providing self-help materials for cessation [95, 97].

The U.S. Public Health Service clinical practice guideline summarized the effects of physicians’ counseling on tobacco cessation, finding them more effective than any other professional group alone [98]. Various HCPs have been found to have critical influences on smoking cessation among their patients, yet they differ in their cessation efficacy [98]. Using a meta-analysis of 37 randomized clinical trials or quasi-experiments (with control groups) of HCP-delivered smoking cessation interventions, physicians (followed by multi-provider teams, dentists, and nurses) were found to be the most effective at inducing cessation [70]. These findings suggest that contact with an HCP will increase tobacco cessation; however, additional training in this area is warranted for nurses. Longer-term studies of smoking cessation, particularly among dentists and lifestyle medicine HCPs, are necessary [70].

Two Substitute As

The 5 As have been expanded to include elements of relationship formation (with the substitution of “Assess” for the first A, and “Agree” for the third A); these have been applied to other health behaviors to enhance patient self-management in chronic illness care [94, 99, 100]. This 5 As framework is closely linked to the principles of effective communication, as relationship skills (e.g., open-ended inquiry, reflective listening, and empathy) are essential elements of effective counseling interventions. However, unlike the 5 As for smoking cessation, these 5 As include a specific relationship-building component. Both 5 As frameworks have advantages as tools for learning and disseminating prevention behaviors [94, 101, 102].

Toward Routine Use of the 5 As in Clinical Practice

Given these findings, the lifestyle medicine HCP should ask about smoking at each visit, using a well-tested, brief model of the 5 As (Ask/Assess, Advise, Assess/Agree, Assist, and Arrange [91]). The Agency for Healthcare Research and Quality recommends that smoking be considered a “vital sign,” like blood pressure and weight, and thus should be queried and recorded at each visit. A worksheet can integrate the 5 As in clinical practices (Fig. 15.4) [102], although proposed routine (and often automated) patient assessment and screening tools, and many electronic health records, also include cues for smoking cessation [103].

Motivational Interviewing

The widely disseminated clinical method of motivational interviewing arose through a convergence of behavioral science and clinical practice [104]. Motivational interviewing focuses on exploring and resolving ambivalence, and centers on motivational processes within the individual that facilitate change. Motivational interviewing supports change in a manner congruent with the person’s own values and concerns, rather than coercing or imposing change. A definition of motivational interviewing is: “A collaborative, person-centered form of guiding to elicit and strengthen motivation for change” [104]. Components of motivational interviewing may be applied by the lifestyle medicine HCP, but it is best applied by a trained behavioral therapist.

The Motivational Interviewing Approach

Motivational interviewing focuses on building rapport in the initial stages of the counseling relationship. A central concept of motivational interviewing is the identification, examination, and resolution of ambivalence about changing behavior. With the client relationship central to the motivational interviewing process, the HCP expresses empathy, develops discrepancy, avoids argumentation, rolls with resistance, and supports self-efficacy [105].

Ambivalence – feeling two ways about behavior change – is seen as a natural part of the change process. By contrast, HCP exhortations or arguments for change tend to build resistance. Thus, when “change talk” is elicited or spontaneously expressed by the patient, the HCP provides positive...
affirmation and support to help build and deepen commitment [106, 107]. Rolling with resistance involves backing off when the patient expresses it, by acknowledging that change is difficult, while also inviting the patient to consider new information or perspectives [108, 109]. The HCP supports self-efficacy by helping the patient build on past successes, take achievable small steps toward change, and solve problems to overcome barriers [110].

Motivation for change occurs when people perceive a mismatch between where they are and where they want to be; a lifestyle medicine HCP practicing MI works to develop this by helping patients examine the discrepancies between their current circumstances or behaviors and their values and future goals. To address client ambivalence and “roll with resistance,” the HCP thoughtfully uses techniques and strategies that are responsive to the patient. These motivational interviewing strategies are built on three components of the counseling interchange: collaboration, evocation, and autonomy [108, 109, 111]. In short, the HCP employing motivational interviewing will seek to abide by four principles throughout treatment: express empathy, support self-efficacy, roll with resistance, and develop discrepancy [108, 109, 111].

Motivational Interviewing Strategies
The practice of motivational interviewing involves the skillful use of certain counseling techniques, including non-verbal communication, to establish a therapeutic alliance (or as it is originally termed, a “beneficial client-therapist attachment” [108]) and to capitalize on the patient’s potential for change. These are known by the acronym OARS, which describes Open-ended questions, Affirmations, Reflections, and Summaries [109, 111].

Open-ended questions are those that are not easily answered by yes/no, or by a short, specific, limited response. Open-ended questions invite elaboration and thinking more deeply about an issue. On the other hand, closed-ended questions (answerable by a simple yes/no) can be used for assessment.

Affirmations are statements that recognize patient strengths and support patient self-efficacy. They also assist in building rapport and in helping the patient see that change is possible. Affirmations include reframing behaviors or concerns as evidence of positive patient qualities.

Reflections, or reflective listening, are perhaps the most crucial skills in motivational interviewing. Reflections consist of repeating or rephrasing what the patient has said, paraphrasing the patient, or reflecting the patient’s feelings. Through the use of these skills, the patient comes to feel that the HCP understands the issues from his or her perspective and is empathic. The HCP guides the patient toward resolving ambivalence by focusing on the negative aspects of the status quo and the positive aspects of making change.

Summaries are a special type of reflection in which the clinician recaps what has occurred in all or part of a counseling session. Summaries communicate interest and understanding and call attention to important elements of the discussion. They may be used to shift attention or direction and to prepare the patient to move on. Summaries can highlight both sides of a patient’s ambivalence about change and can promote the development of discrepancy by strategically selecting what information should be included and what can be minimized or excluded.

Change Talk
The HCP implements OARS alongside the patient’s change talk. Change talk contains statements revealing the patient’s motivation for, or commitment to, change. This is also conceptualized as DARNCAT:

- Desire (I want to change)
- Ability (I can change)
- Reason (It’s important to change)
- Need (I should change)
- Commitment (I will make changes)
- Activation (I am ready, prepared, and willing to change)
- Taking steps (I am taking specific actions to change) [109, 111]

Example: Diabetes
A brief, scripted example of the use of motivational interviewing with a patient who has T2D to encourage eating less sugary foods follows:

- **Lifestyle Medicine HCP:** “You know, we’ve discussed this many times before; perhaps eating sugary foods is so important to you that you won’t give it up, no matter what the cost.” (Come alongside)
- **Patient response:** “I really should change; my health and staying around for my family is more important than eating Krispy Kreme donuts®.” (Change talk)
- **Lifestyle Medicine HCP:** “That’s great to hear you say; in what (specific) ways could you reduce the sugary foods in your diet?” (Ask for elaboration, examples)

Practical Motivational Interviewing for Lifestyle Medicine
Brief versions of MI have been developed for use by HCPs in primary care and other healthcare settings [106, 109]. These brief versions, including Motivational Enhancement Therapy (MET), still include motivational interviewing strategies, but with emphasis on two specific dimensions of motivation: conviction about the need for change and confidence (self-efficacy) about taking action [108, 112]. Assessment is fol-
ollowed by tailoring of counseling to address the patient’s level of conviction and confidence, agreeing on a realistic and achievable goal, and assisting the patient in developing a behavior change plan.

As a general rule, if both conviction and confidence are low, it is best to first focus on enhancing conviction. For patients with low conviction levels, effective counseling strategies include providing information and feedback (after asking the patient’s permission), exploring ambivalence, and providing a menu of options for treatment and follow-up. Patients not ready to commit to action may agree to simply think about the possibilities for change or to seek assistance when they are ready to take action. For patients with low confidence, strategies include reviewing past experience, especially successes; teaching problem-solving and coping skills; and encouraging small steps that are likely to lead to an initial success. For all patients, a follow-up plan is essential as an important evidence-based ingredient of counseling interventions and successful health behavior change [93, 102, 111, 113].

**Evaluation of Motivational Interviewing**

Motivational interviewing has been found effective in decreasing substance abuse in a number of multisite clinical trials [112, 114]. Outcomes through 3 years of follow-up were similar for a 4-session MET (Motivational Enhancement Therapy, a specific motivational interviewing intervention) and the two 12-session treatment methods with which it was compared, yielding a cost-effectiveness advantage for MET [112, 115–117]. Similar positive findings emerged from the 3-site United Kingdom Alcohol Treatment Trial comparing MET with an 8-session family-involved behavior therapy [104, 118, 119].

The Clinical Trials Network of the U.S. National Institute on Drug Abuse has undertaken six multisite trials of motivational interviewing and MET as compared with treatment-as-usual for drug problems and dependence [120]. Motivational interviewing-based interventions promoted sustained reductions in alcohol use [121] and increased treatment retention [122]. It is important to note that MET exerted a significant beneficial effect at some sites, but not others [104, 121, 123].

In fact, not all clinical trials with motivational interviewing have been positive. For example, null findings have been reported among those with eating disorders [124], drug abuse and dependence [123, 125], tobacco use [126, 127], and problem drinking [128]. It is apparent that some HCPs are significantly more effective than others in delivering the same motivational interviewing-based treatment [116]; even in positive trials, a certain proportion of patients do not respond to MI [104].

The efficacy of MI also can vary across populations. A meta-analysis found that the effect size of motivational interviewing was doubled when the recipients were predominantly from minority populations, as compared with white non-Hispanic Americans [129]. A retrospective analysis of Project MATCH data found that Native Americans responded better to MET, as compared with other treatments [130]. Similarly, the Clinical Trials Network studies found some evidence for differential benefit from MET among pregnant drug users from minority backgrounds relative to other women [104, 123]. Motivational interviewing appears to enhance diabetes education, even in non-Western cultures [131]. Given habits, preferences, and community factors including food availability, focusing on reducing portion sizes of calorie-dense and/or highly processed usual foods (such as sugar-sweetened beverages), and increasing fiber- and nutrient-dense fresh or minimally processed food intake may be helpful across cultures [132, 133].

**Cognitive Behavioral Therapy (CBT)**

CBT is the form of psychotherapy with the most extensive evidence base supporting its effectiveness [134]. On a base of essential trust and rapport, the therapist learns about the patient’s concerns, coping strategies, and strengths. The trained therapist, using the following techniques, supports patients to change their behaviors:

- **Reframing** – showing someone another perspective on how to understand a situation
- **Self-talk** – attending to the things a person says to themselves, about themselves
- **Cognitive distortions** – identifying and challenging unhelpful self-talk, such as catastrophization, to replace it with more realistic and kind self-talk
- **Building skills** – such as self-monitoring, goal-setting, and relaxation
- **Behavioral activation** – increasing enjoyable activities in varied settings, with other people, to improve mood, over time [135]

Relaxation methods are also widely used in CBT and include slow deep breathing, imagery, mindfulness, meditation, and progressive muscle relaxation [135]. CBT addresses current challenges that the patient is experiencing, and typically includes behavioral homework assignments: self-monitoring of behavior, thoughts, and mood to identify patterns and assess progress, and practice at identifying and challenging unhelpful self-talk [135]. CBT was developed for treating depression in adults and has been applied successfully for treatment of a wide variety of problems including stress management, insomnia, anxiety disorders such as post-traumatic stress disorder, and adaptation to chronic health conditions, such as diabetes [135–138].
Assessing Practice Effectiveness for Patients: The “My Own Health Report” Tool

Lifestyle medicine is enhanced by a set of tools to assess health behavior and mental health. These tools allow the HCP to tailor the intervention, as well as begin to examine the effectiveness of the practice on patient outcomes. The “My Own Health Report” (MOHR) patient evaluation tool is evidence-based and assesses health behavior and mental health among patients in a primary care setting [77, 139, 140]. The MOHR tool is paired with a feedback system to promote patient counseling and collaborative goal setting between patients and HCPs in the Lifestyle Medicine Center.

The MOHR tool assesses 17 health behavior and psychosocial risk screening questions and 6 demographic questions [77, 139, 140]. Each of the screening items assessed by the MOHR tool is recommended by the U.S. Preventive Services Task Force (with the exception of sleep, quality of life, and anxiety) [77, 139, 140]. For those patients who initially screen positive for symptoms, additional follow-up services are provided. The electronic version of the MOHR tool [141] provides a score and categorizes patients’ responses as being of “no concern,” “some concern,” or “high concern” [77, 139, 140]. For responses with some or high concern, patients are asked if they are ready to change and/or discuss the topic with their HCP [94, 99, 102, 142]. The MOHR tool provides patients with a summary containing motivational feedback, initial improvement steps, and space to create three SMART goals [143, 144]. An HCP summary is automatically shared with the practice via uploading to the electronic health record (sample SMART goals and feedback reports for patients and the practice team are found in Glasgow et al. [145] and Gorin and Krist [146]). The implementation of the MOHR tool was systematically evaluated within a practice-level, cluster-randomized, pragmatic implementation study using mixed methods [147].

Compared to patients from control practices, practices using the MOHR tool reported greater screening rates for each of the eight behaviors and mental health risks that were measured (range of differences, 5.3–15.8%, p < 0.001) [148]. Compared to controls, patients using the MOHR tool believed that their clinicians cared more for them and showed more interest in their concerns. Overall, the MOHR tool improved screening and goal setting.

Healthcare professionals who implemented the MOHR tool found that the patient and HCP reports helped to identify problem behaviors and streamlined the goal-setting process [149]. For example, one clinic “tie[d] the MOHR project into the clinic’s patient-centered medical home initiative...[by] providing patients with support in self-management, self-efficacy, and behavior change [with] self-management tools” [149]. The MOHR tool provided access to information technology and human resources of health systems (such as nurses in call centers) to foster implementation and reach (e.g., for a weight-loss project) [149]. The MOHR tool offers considerable promise for assessing patient risk factors and encouraging shared goal setting between patients and HCPs.

Information Technology and the Lifestyle Medicine Center

Electronic and personal health records track and coordinate patient care. Many practices also use e-mail to communicate with patients, as well as mobile health (mHealth) approaches, such as telehealth, sensors, and text messages. Security and privacy remain key concerns throughout their use.

Mobile Health

Mobile health interventions are one of the fastest growing areas of activity in lifestyle medicine information technology. mHealth uses mobile devices, including any wireless device carried by a person that transmits or accepts health information. The growth in popularity of cell phones, now carried by a majority of the US adult population, with their rapidly increasing capabilities, screen resolutions, add-ons such as sensors, video chat, and increased storage, has resulted in an explosion in new ways to foster health management and preventive services.

Telehealth, a growing HCP tool, may rely on mHealth approaches. Telehealth is defined as the use of electronic information and telecommunications technologies to support and promote long-distance clinical healthcare, patient and professional health-related education, public health and health administration (according to the Health Resources and Services Administration). Telehealth has increased due to the availability of billing codes for reimbursement and, most recently, with the rapid alterations in healthcare delivery models due to the coronavirus disease 2019 pandemic. In addition to mHealth approaches, telehealth technologies include: live (synchronous) videoconferencing between a patient and HCP; and store-and-forward (asynchronous) videoconferencing to transmit the patient’s health history to the HCP, usually a specialist. Other forms of remote electronic patient assessment and evaluation are discussed further in this chapter.

In 2017, 325,000 health-related apps were available for download on smartphones and tablets, with Android platforms the most popular [150]. Unfortunately, most digital health tools do not use behavior change theory [151]. Testing of these apps is rare, with resultant fraud, abuse, or even patient harm [152–154]. For example, in a case-control study, the performance of smartphone applications in assessing melanoma risk from photographs of skin lesions was evaluated; diagnostic accuracy of the apps varied considerably
Three of four smartphone applications incorrectly classified 30% or more of melanomas as not of concern. Reliance on these applications (which are not subject to regulatory oversight) in lieu of medical consultation, can delay the diagnosis of melanoma (and other diseases) and harm users [155]. Social media platforms have also been used to deliver lifestyle interventions, with modest effectiveness; however, social media is also rife with misinformation [152, 156]. Nonetheless, online-delivered interventions are more accessible and scalable than in-person treatments. Evidence-based mHealth weight loss interventions include an 18-month smartphone-based behavioral obesity treatment with monthly weigh-ins that were comparable to gold standard group sessions [153]. Of note, a pragmatic trial of Rx Weight Loss, a physician-referred online weight loss program that was effective for initial weight loss (half of participants achieved 5% weight loss) [154], is underway in 60 primary care clinics to evaluate weight loss maintenance and utility of clinician supports [157].

A promising use of the cell phone is ecological momentary assessment, or repeated sampling of an individual’s current behaviors and experiences in real time [158], to monitor smoking cessation or food choices. Unlike patient-reported behavior to the HCP, that can be biased and intermittent, the phone – which is carried throughout each day – can monitor behavior using sensors and/or diary entries. This monitoring can be timed appropriately (e.g., near lunch to query food choices) and can ask the patient specific questions in an easy-to-respond format. Data can be uploaded to centralized databases with online or mobile tracking tools. Visualizations can be viewed by the healthcare team and the patient, decisions made, and programs of treatment adjusted. Monitoring between visits is also possible with mobile health technologies. For example, sleep disorders or a smoking lapse may be recorded in real time by monitoring breathing patterns or movements.

Mobile health applications have the advantage of potential scalability to a large population, as devices are cheap and often already owned by the patient. These devices can be attached to specialized sensors, contain accelerometers and geographic location detection functions, collect, store, and transmit massive amounts of rich data in real time (allowing continuous data collection at many geographic locations), and therefore accommodate applications that provide real-time feedback.

**Sensors**

A number of sites and apps provide small wearable sensors capable of monitoring blood pressure, glucose, physical activity, and sleep (e.g., Apple Watch™, Omron HeartGuide™, Dexcom G6™, Freestyle Libre™, Medtronic Guardian™, Bodymedia™, FitArmband BW 2™, Philips DirectLife™, FitBit™, Gruve™, and Zeo Personal Sleep Coach™). Recent developments in glucose monitoring and partially automated insulin dosing (i.e., hybrid closed-loop artificial pancreas) have dramatically improved the available treatments for patients with diabetes, especially those with type 1 diabetes [159, 160]. Also, new sensor technology (Sweatronics™) is capable of measuring cortisol levels from sweat, which may reflect the stress response.

Sensor data can allow rapid reactions to events or environments and provide interfaces for HCPs and patients or their families to facilitate comprehension. These approaches, called sensor-enhanced health information systems, have already been used for cardiac monitoring [161]. Continuous monitoring, for example, of gait abnormalities [161] can assist with the diagnosis and treatment of musculoskeletal conditions such as knee arthritis, using data from the patient’s experiences with the activities of daily living. With the aging of the population, sensors may become more useful for at-home continuous monitoring and decision support to allow patients to remain at home with remote HCP support.

As one example of the promise of sensor-enhanced health information systems, the KNOWME Network, which is designed to reduce obesity among minority youth, is a suite of wearable, wireless sensors (a wireless body area network) that sends streaming data to a mobile phone for non-intrusive monitoring of metabolic health, vital signs such as heart rate and stress levels, and physical activity and other obesity-related behaviors [162]. The mobile phone collects, stores, and transmits data to a secure web server where data are analyzed and translated in real time. A record of behavior and health data that is time-stamped, synchronized, and geographically localized could be made available via secure Internet connections to a lifestyle medicine HCP. The phone allows for immediate, real-time feedback through the phone display and through text messaging, image, and voice tags. Some data will be immediately visualized on the phone for participants (for instance, a running tally of minutes of moderate to vigorous physical activity per day). In the future, networks such as KNOWME may yield a new generation of adaptive, personalized interventions for real-time monitoring, immediate data delivery, and rapid adaptive intervention response [162].

**Short Message Service Text Reminders**

Reminders are effective in engaging patients and prompting desired behaviors in a just-in-time manner. Two-way text messages can provide reminders, psychological support, triage, and verification of reported behaviors. For example, Text4baby is a widely disseminated application that provides advising prompts on healthy behaviors for pregnant women and mothers, such as prenatal care, safe sleep, immunizations,
breastfeeding, and oral health [163]. Other applications include text message reminders for AIDS medication adherence, both in the United States and abroad.

A recent comprehensive meta-analysis of mobile health interventions found modest but significant effectiveness of text messages for improving appointment adherence relative to no reminders [164]. A study conducted after the meta-analysis found that text message reminders improved adherence to malaria treatment guidelines by 23% [165]. A systematic review by Militello et al. [166] showed that text messages may be more effective as reminders supporting disease management behavior change in children and teens than in adults [166]. However, the authors note that many studies were not of high quality, and more rigorous studies are needed to establish the benefits of mobile intervention for various modalities. This is particularly true as cell phone capabilities and new innovations have expanded rapidly to include video and photo transmission.

Cultural Sensitivity in Behavioral Change

Adapting the HCP's approach to the cultural contexts experienced by ethnic and racial minority and immigrant groups, in particular, is key to behavioral change. For example, upon immigration to the United States, Latino/a immigrant adolescents and their parents can experience cultural stressors that result from navigating multiple cultural contexts, hostile attitudes, and discrimination in their new communities. These cultural stressors can negatively influence family functioning, emotional well-being, and health-risk behaviors (such as cigarette smoking and binge drinking) among adolescents and parents [167]. A recent longitudinal study of 302 adolescent-caregiver pairs who were new immigrants to the United States found that preventive interventions, targeting families with poor functioning, might be most influential in the early years following immigration. Equally important to improving behavioral health among both new immigrant parents and adolescents are systematic community- and policy-focused strategies that combat discrimination against Latino/a families and improve the attitudes of community members about immigrants [167].

Multilevel (3 or more) interventions have positive effects on several health behavior outcomes among racial/ethnic minority groups; these outcomes include cancer prevention and screening, as well improving the quality of HCP and healthcare system processes such as patient navigation, according to a recent descriptive review (N = 26 studies) [168]. Further, culturally leveraging multilevel interventions, by adapting appropriate cultural meaning and context into the intervention materials, messages, and delivery systems, may improve their effectiveness [168–170].

Some Ethical Considerations on the Use of Online Technology in Lifestyle Medicine

The narrative encounter between patient and HCP, which is at the heart of the practice of medicine and which is central to online communication, cannot serve the needs of patients if they are unable to communicate their symptoms, unable to understand how to take their medications, or are too intimidated by the medical hierarchy and medical jargon to speak up [171]. Patients with low health literacy, those who are deaf or of limited English facility, those facing a stigma of substance abuse, and those otherwise disadvantaged face unique ethical challenges. The lifestyle medicine HCP should be guided by extant and emerging professional ethical guidelines and legal regulations, particularly to guard patients’ privacy and the confidentiality of online and remote communications [171, 172].

Identifying Behavioral Change Experts

A number of trained HCPs may support patients’ behavioral changes in the Lifestyle Medicine Center, alongside other clinicians. Clinical health psychologists are trained in behavioral theory and evidence-based practice in the context of health (disease prevention, medical treatment, and management of illnesses). Clinical health psychologists hold a doctoral degree in psychology (e.g., PhD or PsyD) that requires post-baccalaureate clinical training in health settings. The PhD degree requires research training and a dissertation, while the PsyD is clinically focused. Clinical health psychologists conduct research, provide clinical treatment, consult with other HCPs, and advise organizations and policy makers [173]. The American Board of Professional Psychology credential indicates the successful completion of training and experience requirements for a specialty in psychology, plus an examination demonstrating competency in that specialty. Only around 4% of licensed psychologists hold this credential. Dietitians, nurses, social workers, exercise scientists, physical therapists, diabetes care and education specialists (formerly called certified diabetes educators) [158], applied behavior analysts, and epidemiologists are examples of other experts who are skilled in assessing and supporting patients’ behavior change.

Conclusion

Behavioral medicine provides an essential evidence base and personnel resource for lifestyle medicine. Resources are available to optimize a behavioral medicine program in a Lifestyle Medicine Center or Clinical Service Line (Table 15.2). Behavioral medicine HCPs play essential roles
in implementing lifestyle medicine interventions, as well as evaluating the effectiveness of Lifestyle Medicine Centers. The ideal lifestyle medicine practice team includes HCPs with behavioral expertise supplemented by specialized behavioral experts, such as health psychologists, diabetes educators, exercise scientists, and dieticians, to support their patients’ healthy lifestyle changes.

References

1. Schwartz GE, Weiss SM. Behavioral medicine revisited: an amended definition. J Behav Med. 1978;1:249–51.
2. Dekker J, Stauder A, Penedo FJ. Proposal for an update of the definition and scope of behavioral medicine. Int J Behav Med. 2017;24:1–4.
3. Engel GL. The need for a new medical model: a challenge for biomedicine. Science. 1977;196:129–36.
4. Engel GL. The clinical application of the biopsychosocial model. Am J Psychiat. 1980;137:535–44.
5. Cummings DM, Lutes LD, Littlewood K, et al. Randomized trial of a tailored cognitive behavioral intervention in type 2 diabetes with comorbid depressive and/or regimen-related distress symptoms: 12-month outcomes from COMRADE. Diabetes Care. 2019;42:841–8.
6. Phelps R, Bray JH, Kearney LK. A quarter century of psychological practice in mental health and health care: 1990–2016. Am Psychol. 2017;72:822–36.
7. AuYoung M, Linke SE, Pagoto S, et al. Integrating physical activity in primary care practice. Am J Med. 2016;129:1022–9.
8. Moos RH. Social ecological perspectives on health. In: Stone GC, Cohen F, Adler NE, editors. Health psychology: a handbook. San Francisco: Jossey-Bass; 1979. p. 523–47.
9. Hawley AH. Human ecology; a theory of community structure. New York: The Ronald Press Company; 1950.
10. Emery FE, Trist EL. Towards a social ecology: contextual appreciations of the future in the present. New York: Plenum; 1972.
61. LeBlanc ES, Patnode CD, Webber EM, et al. Behavioral and pharmacotherapy weight loss interventions to prevent obesity-related morbidity and mortality in adults: updated evidence report and systematic review for the US Preventive Services Task Force. JAMA. 2018;320:1172–91.

62. Knowler WC, Barrett-Connor E, Fowler SE, et al. Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. New Engl J Med. 2002;346:393–403.

63. Ali MK, Echouffo-Tcheugui J, Williamson DF. How effective were lifestyle interventions in real-world settings that were modeled on the Diabetes Prevention Program? Health Aff (Millwood). 2012;31:67–75.

64. Aveyard P, Lewis A, Teame S, et al. Screening and brief intervention for obesity in primary care: a parallel, two-arm, randomised trial. Lancet. 2016;388:2492–500.

65. Ackermann RT, Finch EA, Brizendine E, et al. Translating the Diabetes Prevention Program into the community. The DEPLOY Pilot Study. Am J Prev Med. 2008;35:357–63.

66. Ackermann RT, Liss DT, Finch EA, et al. A randomized comparative effectiveness trial for preventing type 2 diabetes. Am J Public Health. 2015;105:2328–34.

67. Pi-Sunyer X, Blackburn G, Brancati FL, et al. Reduction in weight and cardiovascular disease risk factors in individuals with type 2 diabetes: one-year results of the Look AHEAD trial. Diabetes Care. 2007;30:1374–83.

68. Marrero DG, Ackermann RT. Providing long-term support for lifestyle changes: a key to success in diabetes prevention. Diabetes Spectrum. 2007;20:205–9.

69. Powers MA, Bardsley J, Cypress M, et al. Diabetes self-management education and support in type 2 diabetes. Diabetes Educ. 2017;43:40–53.

70. Sheinfeld Gorin S, Heck JE. Meta-analysis of the efficacy of tobacco counseling by health care providers. Cancer Epidemiol Prev Biomarkers. 2004;13:2012–22.

71. U.S. Preventive Services Task Force. Draft Recommendation Statement Healthy Diet and Physical Activity to Prevent Cardiovascular Disease in Adults With Risk Factors: Behavioral Counseling Interventions. https://www.upto-date.org/protocol/27829#section35. Accessed May 29, 2020.

72. Calfas KJ, Hagler AS. Physical activity. In: Sheinfeld Gorin S, Heck JE, editors. Health promotion in practice. San Francisco, CA: Jossey-Bass; 2006. p. 192–221.

73. Chen J, Kressin NJ, Simon TR, et al. Injury-prevention counseling and behavior among US children: results from the second Injury Control and Risk Survey. Pediatrics. 2007;119:e958–65.

74. Noar SM. Behavioral interventions to reduce HIV-related sexual risk behavior: review and synthesis of meta-analytic evidence. AIDS Behav. 2008;12:335–53.

75. Mandelblatt JS, Yabroff KR. Effectiveness of interventions designed to increase mammography use: a meta-analysis of provider-targeted strategies. Cancer Epidemiol Prev Biomarkers. 1999;8:759–67.

76. Goetzl RZ, Staley P, Ogden L, et al. A framework for patient-centered health risk assessments: providing health promotion and disease prevention services to Medicare beneficiaries. US Department of Health and Human Services, Centers for Disease Control and Prevention, Atlanta, GA; 2011. Available at: http://www.cdc.gov/policy/opth/hras/. Accessed on 29 May 2020.

77. Krist AH, Phillips SM, Sabo RT, et al. Adoption, reach, implementation, and maintenance of a behavioral and mental health assessment in primary care. Ann Fam Med. 2014;12:525–33.

78. Shekelle PG, Tucker JS, Maglione MA, et al. Health risk appraisals and Medicare. Santa Monica: RAND Corporation; 2003.

79. Glasgow RE. Medical office-based interventions. In: Snoek F, Skinner TC, editors. Psychology in diabetes care. 2nd ed. Hoboken, NJ: Wiley; 2005. p. 109–33.

80. Michie S, Abraham C, Whittington C, et al. Effective techniques in healthy eating and physical activity interventions: a meta-regression. Health Psychol. 2009;28:690–701.

81. Carver CS, Scheier MF. Control theory: a useful conceptual framework for personality-social, clinical, and health psychology. Psychol Bull. 1982;92:111–35.

82. An act entitled The Patient Protection and Affordable Care Act, 42 U.S.C. §18001 et seq. 2010.

83. Healthywise. http://informedmedicaldecisions.org/. Accessed on 1 Aug 2019.

84. Health IT.gov. National Learning Consortium. Shared Decision Making, [Fact sheet]. 2013, https://www.healthit.gov/sites/default/files/nlc_shared_decision_making_fact_sheet.pdf. Accessed on 8 Mar 2020.

85. Sepucha KR, Fowler FJ Jr, Mulley AG Jr. Policy support for patient-centered care: the need for measurable improvements in decision quality. Health Aff. 2004;23(Suppl Variation):VAR54–62.

86. Charles C, Gafni A, Whelan T. Shared decision-making in the medical encounter: what does it mean? (or it takes at least two to tango). Social Sci Med. 1997;44:681–92.

87. Coulter A. Paternalism or partnership?: patients have grown up—and there’s no going back. BMJ. 1999;319:719–20.

88. Llewellyn-Thomas HA. Patients’ health-care decision making: a framework for descriptive and experimental investigations. Med Decis Making. 1995;15:101–6.

89. Greenfield S, Kaplan S, Ware JE. Expanding patient involvement in care. Ann Intern Med. 1985;102:520–8.

90. Smith RA, von Eschenbach AC, Wender R, et al. American Cancer Society guidelines for the early detection of cancer: update of early detection guidelines for prostate, colorectal, and endometrial cancers. CA Cancer J Clin. 2001;51:38–75.

91. Agency for Healthcare Research and Quality. Five Major Steps to Intervention (The “5 A’s”). https://www.ahrq.gov/prevention/guidelines/tobacco/5steps.html. Accessed 29 May 2020.

92. Glynn TJ, Manley MW. How to help your patients stop smoking: a National Cancer Institute manual for physicians. Bethesda, MD: Smoking, Tobacco, and Cancer Program, Division of Cancer Prevention and Control, National Cancer Institute, U.S. Dept. of Health and Human Services, Public Health Service, National Institutes of Health; 1989.

93. Fiore M. United States tobacco use and dependence guideline panel. Treatment tobacco use and dependence. Respir Care. 2000;45:1200–62.

94. Whitlock EP, Orleans CT, Pender N, et al. Evaluating primary care behavioral counseling interventions: an evidence-based approach. Am J Prev Med. 2002;22:267–84.

95. Stead LF, Buitrago D, Preciado N, Sanchez G, Hartmann-Boyce J, Lancaster T. Physician advice for smoking cessation. Cochrane Database Syst Rev. 2013:CD000165.

96. Kawakami M, Nakamura S, Fumimoto H, et al. Relation between smoking status of physicians and their enthusiasm to offer smoking cessation advice. Int Med. 1997;36:162–5.

97. Cornuz J, Zellweger J-P, Mounoud C, et al. Smoking cessation counseling by residents in an outpatient clinic. Prev Med. 1997;26:292–6.

98. Fiore MC, Jaen CR, Baker TB, et al. Treating tobacco use and dependence: 2008 update U.S. Public Health Service Clinical Practice Guideline executive summary. Respir Care. 2008;53:1217–22.
141. MyOwnHealthReport. https://myownhealthreport.org/. Accessed on 25 Oct 2019.
142. Krist AH, Woolf SH, Frazier CO, et al. An electronic linkage system for health behavior counseling: effect on delivery of the 5A’s. Am J Prev Med. 2008;35:S350–8.
143. Croteau J, Ryan D. Achieving your SMART health goals. https://bewell.stanford.edu/achieving-your-smart-health-goal/. Accessed on 29 Oct 2019.
144. O’Neill J. SMART goals, SMART schools. Educ Leadership. 2000;57:46–50.
145. Glasgow RE, Kessler RS, Ory MG, et al. Conducting rapid, relevant research: lessons learned from the My Own Health Report project. Am J Prev Med. 2014;47:212–9.
146. Gorin SS, Krist AH. Using MOHR for behavior change: a webinar for providers, 2013. http://connectpro72759986.adobeconnect.com/p8rvj6lrauv/; http://healthpolicy.ucla.edu/programs/health-economics/projects/mohr/Documents/MOHRIwebinar3-6-13.pdf. Accessed on 8 Mar 2020.
147. Krist AH, Glenn BA, Glasgow RE, et al. Designing a valid randomized primary care implementation trial: the my own health report (MOHR) project. Implement Sci. 2013;8:73. https://doi.org/10.1186/1748-5908-8-73.
148. Krist AH, Glasgow RE, Heurtin-Roberts S, et al. The impact of behavioral and mental health risk assessments on goal setting in primary care. Transl Behav Med. 2016;6:212–9.
149. Balasubramanian BA, Heurtin-Roberts S, Krasny S, et al. Factors related to implementation and reach of a pragmatic multisite trial: the my own health report (MOHR) study. J Am Board Fam Med. 2017;30:337–49.
150. Pohl M. 325,000 mobile health apps available in 2017 – Android now the leading mHealth platform. 2017. https://research2guidance.com/325000-mobile-health-apps-available-in-2017. Accessed on 29 Oct 2019.
151. Klonoff DC. Behavioral theory: the missing ingredient for digital health tools to change behavior and increase adherence. J Diabetes Sci Technol. 2019;13:276–81.
152. Waring ME, Jake-Schoffman DE, Holovatska MM, et al. Social media and obesity in adults: a review of recent research and future directions. Curr Diab Rep. 2018;18:34.
153. Thomas JG, Bond DS, Raynor HA, et al. Comparison of smartphone-based behavioral obesity treatment with gold standard group treatment and control: a randomized trial. Obesity. 2019;27:572–80.
154. Thomas JG, Leahy TM, Wing RR. An automated Internet behavioral weight-loss program by physician referral: a randomized controlled trial. Diabetes Care. 2015;38:9–15.
155. Wolf JA, Moreau JF, Akilov O, et al. Diagnostic inaccuracy of smartphone applications for melanoma detection. JAMA Dermatol. 2013;149:422–6.
156. An R, Ji M, Zhang S. Effectiveness of social media-based interventions on weight-related behaviors and body weight status: review and meta-analysis. Am J Health Behav. 2017;41:670–82.
157. Espel-Huynh HM, Wing RR, Goldstein CM, et al. Rationale and design for a pragmatic effectiveness-implementation trial of online behavioral obesity treatment in primary care. Contemp Clin Trials. 2019;82:9–16.
158. American Association of Diabetes Educators. Press release: a new title for the specialty. Am Assoc Diab Educ. 2019. https://www.diabeteseducator.org/about-adces/media-center/press-releases/press-releases/2019/08/20/a-statement-from-the-american-association-of-diabetes-educators%2D%2D-a-new-title-for-the-specialty. Accessed on 13 Mar 2020.
159. American Diabetes Association. 7. Diabetes technology: standards of medical care in diabetes — 2020. Diabetes Care. 2020;43(Suppl 1):S77–88.
160. Shan R, Sarkar S, Martin SS. Digital health technology and mobile devices for the management of diabetes mellitus: state of the art. Diabetologia. 2019;62:877–87.
161. Marschollek M, Gießelt M, Schulze M, et al. Wearable sensors in healthcare and sensor-enhanced health information systems: all our tomorrows? Healthcare Informat Res. 2012;18:97–104.
162. Emken BA, Li M, Thatte G, et al. Recognition of physical activities in overweight Hispanic youth using KNOWME Networks. J Phys Act Health. 2012;9:432–41.
163. Wellpass. Text4Baby 2017, text4baby.org. Accessed on 11 Aug 2019.
164. Free C, Phillips G, Watson L, et al. The effectiveness of mobile-health technologies to improve health care service delivery processes: a systematic review and meta-analysis. PLoS Med. 2013;10:e1001363.
165. Zurovac D, SudoRI, Akhwale WS, et al. The effect of mobile phone text-message reminders on Kenyan health workers’ adherence to malaria treatment guidelines: a cluster randomised trial. Lancet. 2011;378:795–803.
166. Militello LK, Kelly SA, Melnyk BM. Systematic review of text-messaging interventions to promote healthy behaviors in pediatric and adolescent populations: implications for clinical practice and research. Worldviews Evid-Based Nurs. 2012;9:66–77.
167. Lorenzo-Blanco EI, Meca A, Pina-Watson B, et al. Longitudinal trajectories of family functioning among recent immigrant adolescents and parents: links with adolescent and parent cultural stress, emotional well-being, and behavioral health. Child Dev. 2019;90:506–23.
168. Gorin SS, Badr H, Krebs P, et al. Multilevel interventions and racial/ethnic health disparities. J Natl Cancer Inst Monogr. 2012;2012:100–11.
169. Fisher TL, Burnet DL, Huang ES, et al. Cultural leverage: interventions using culture to narrow racial disparities in health care. Med Care Res Rev. 2007;64(5 Suppl):243S–82S.
170. Resnicow K, Baranowski T, Ahluwalia JS, et al. Cultural sensitivity in public health: defined and demystified. Ethnicity Dis. 1999;9:10–21.
171. Tauqeer Z. To understand and be understood: the ethics of language, literacy, and hierarchy in medicine. AMA J Ethics. 2017;19:234–7.
172. Beauchamp TL, Childress JF. Principles of biomedical ethics. 7th ed. New York: Oxford University Press; 2013.
173. American Psychological Association. Clinical Health Psychology 2019. https://www.apa.org/ed/graduate/specialize/health. Accessed on 29 Sept 2019.