STATION 13: EVIDENCE-BASED MEDICINE

You will have 25 minutes to complete this station; you will be given a warning when 5 minutes remain.

This station consists of several short sections:
        Section A: Ask
        Section B: Acquire
        Section C: Appraise Part 1
        Section D: Appraise Part 2
        Section E: Apply

You must complete each section before moving on to the next; you may <u>NOT</u> return to a section once you have completed it.

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SECTION A: ASK

CASE:
You are seeing a 55-year-old African-American woman who is new to your practice. She is worried because her younger brother was recently diagnosed with diabetes. She really wants to avoid this happening to her. She is 30 pounds overweight, has no history of hypertension or coronary artery disease, and does not take any medications.

You obtain a fasting glucose level on your patient and the result comes back elevated, but not quite at the level to give her the diagnosis of diabetes mellitus.

You wonder about the benefit to her of starting an exercise program for weight loss. You are not sure and wish to review the evidence.

SECTION A, PART I

Generate a Clinical Question that will help you search in the literature for evidence that you can use to help you care for your patient. Please write/type your question in the space below.

CASE:
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You obtain a fasting glucose level on your patient and the result comes back elevated, but not quite at the level to give her the diagnosis of diabetes mellitus.

You wonder about the benefit to her of starting an exercise program for weight loss. You are not sure and wish to review the evidence.

Using the same case (above), please write your question in the PICO format. This format is useful in helping to guide an efficient search for an answer in the literature.

P	Population	P
I	Intervention	I
C	Comparison	C
O	Outcome	O

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SECTION B: ACQUIRE

CASE:
You are seeing a 55-year-old African-American woman who is new to your practice. She is worried because her younger brother was recently diagnosed with diabetes. She really wants to avoid this happening to her. She is 30 pounds overweight, has no history of hypertension or coronary artery disease, and does not take any medications.

You obtain a fasting glucose level on your patient and the result comes back elevated, but not quite at the level to give her the diagnosis of diabetes mellitus.

Generate **search terms** that will allow you to use MEDLINE to find references in the literature that will answer the clinical question for this case:

P   In patients with an elevated fasting blood glucose,
I   how effective is exercise and weight loss,
C   as compared to standard care,
O   in preventing the development of type 2 diabetes?

(a) Please list your initial MEDLINE **search terms** below (between 2 and 4 total). Be as specific as possible:

(b) Your initial search retrieves 290 references. This is too many for you to look through. Please list **ONE** additional strategy to further limit this search, in order to reduce the number of references significantly.

SECTION C: APPRAISE PART 1

SECTION C

Select the Best Abstract:

Use **this** clinical question in the PICO format:

P   In patients with an elevated fasting blood glucose,
I   how effective is exercise and weight loss,
C   as compared to standard care,
O   in preventing the development of type 2 diabetes?

Your MEDLINE search and your scan yields the following abstracts as the most applicable to your clinical question (above). Please select the ONE abstract that applies best to your patient and state why. For each of the other two abstracts, please give 1-2 reasons why you did not select it.

Abstract A   Select ☐   Not Selected ☐

Why or Why Not?

Abstract B   Select ☐   Not Selected ☐

Why or Why Not?

Abstract C   Select ☐   Not Selected ☐

Why or Why Not?

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Long-Term Improvement in Insulin Sensitivity by Exercise in People with Impaired Glucose Tolerance: 4-Year Results From the Diabetes Prevention Study

BACKGROUND: Lifestyle interventions such as exercise reduce the incidence of type 2 diabetes among individuals with impaired glucose tolerance (IGT). However, it is unknown whether this is due to improved insulin sensitivity or insulin secretion.

METHODS: We investigated at baseline insulin sensitivity and insulin secretion applying frequently sampled intravenous glucose tolerance test (FSIGT) in 87 of 101 obese middle-aged subjects with IGT randomized into an intervention or a control group in the Diabetes Prevention Study. FSIGT was repeated after 4 years in 52 people.

RESULTS: There were no significant differences in any of the baseline anthropometric or metabolic characteristics between the groups. The 4-year weight and waist circumference decreases were greater in the intervention than in the control group ($P = 0.043$ and $P = 0.025$, respectively). At 4-year examination, insulin sensitivity (S_i) tended to be higher in the intervention group (the difference between the mean values 36%; $P = 0.067$, and $P = 0.136$ after adjustment for age, sex, BMI, and baseline S_i value). There was strong correlation between the 4-year changes in S_i and weight ($r = -0.628$ and $r = -0.710$, for intervention and control groups; $P < 0.001$ for both). In the entire group, S_i improved by 64% in the highest tertile of weight loss but deteriorated by 24% in those who gained weight (lowest tertile). Acute insulin response declined significantly in the control group.

Physical activity and incidence of non-insulin-dependent diabetes mellitus in women

BACKGROUND: The potential role of physical activity in the primary prevention of non-insulin-dependent diabetes mellitus (NIDDM) is largely unknown.

METHODS: We examined the association between regular vigorous exercise and the subsequent incidence of NIDDM in a prospective cohort of 87,253 US women aged 34-59 years and free of diagnosed diabetes, cardiovascular disease, and cancer.

RESULTS: During 8 years of follow-up, we confirmed 1303 cases of NIDDM. Women who engaged in vigorous exercise at least once per week had an age-adjusted relative risk (RR) of NIDDM of 0.67 (p less than 0.0001) compared with women who did not exercise weekly. After adjustment for body-mass index, the reduction in risk was attenuated but remained statistically significant (RR = 0.84, p = 0.005). When analysis was restricted to the first 2 years after ascertainment of physical activity level and to symptomatic NIDDM as the outcome, age-adjusted RR of those who exercised was 0.5, and age and body-mass index adjusted RR was 0.69. Among women who exercised at least once per week, there was no clear dose-response gradient according to frequency of exercise. Family history of diabetes did not modify the effect of exercise, and risk reduction with exercise was evident among both obese and nonobese women. Multivariate adjustments for age, body-mass index, family history of diabetes, and other variables did not alter the reduced risk found with exercise.

Reduction in the incidence of type 2 diabetes with lifestyle intervention

BACKGROUND: Type 2 diabetes affects approximately 8 percent of adults in the United States. Some risk factors--elevated plasma glucose concentrations in the fasting state and after an oral glucose load, overweight, and a sedentary lifestyle--are potentially reversible. We hypothesized that modifying these factors with a lifestyle-intervention program would prevent or delay the development of diabetes.

METHODS: We randomly assigned 2156 nondiabetic persons with elevated fasting and post-load plasma glucose concentrations to placebo or a lifestyle-modification program with the goals of at least a 7 percent weight loss and at least 150 minutes of physical activity per week. The mean age of the participants was 51 years, and the mean body-mass index (the weight in kilograms divided by the square of the height in meters) was 34.0; 68 percent were women, and 45 percent were members of minority groups.

RESULTS: The average follow-up was 3 years. The incidence of diabetes was 11.0 and 4.8 cases per 100 person-years in the placebo and lifestyle groups, respectively. The cumulative incidence of diabetes at three years was 28.9 percent and 14.4 percent in the placebo and lifestyle intervention groups, respectively. The lifestyle intervention reduced the incidence by 58 percent (95 percent confidence interval, 48 to 66 percent) as compared with placebo.

SECTION D: APPRAISE PART 2

Use the following abstract to answer the following question:

Reduction in the incidence of type 2 diabetes with lifestyle intervention

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Question:
Based on this study, the number of patients at risk for developing diabetes (based on elevated fasting blood glucose) that a clinician would need to treat with lifestyle intervention for three years in order to prevent 1 case of diabetes is:

Answer: (PLEASE INCLUDE HOW YOU ARRIVED AT THE ANSWER)

SECTION E: APPLY

Please review the detailed case presentation provided below, and then describe whether you can apply the evidence from the abstract below to your patient. Give the **major** reasons why you believe that you can or can not apply this evidence. **Please include at least two but no more than five reasons.**

CASE:
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You obtain a fasting glucose level on your patient and the result comes back elevated, but not quite at the level to give her the diagnosis of diabetes mellitus.

The patient tells you that she has tried regular exercise in the past, but has not been able to stick with it. She suffers from osteoarthritis of the knees which makes it difficult to exercise.

Reduction in the incidence of type 2 diabetes with lifestyle intervention

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Answers: