Web-based Interventions for the Prevention and Treatment of Substance Use Disorders

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Acknowledgement

Need for Widespread Dissemination of Evidence-based Behavior Change Interventions

- Although effective programs focused on substance abuse prevention and treatment exist, their delivery is often challenging.

- Many interventions (e.g., psychosocial interventions) that have been shown to effectively produce behavior change in research settings are not routinely available in real-world settings.

- Evidence-based interventions can be expensive to implement, often requiring financial and staffing resources not typically available in many community-based systems (e.g., treatment programs).

Need for Widespread Dissemination of Evidence-based Behavior Change Interventions (continued)

- Even if evidence-based programs are initiated in community-based programs, it is often difficult to ensure the fidelity of intervention delivery (e.g., given staff turnover, patient caseloads, limited time).

- Further, the availability of services may not fully meet demand in some areas (e.g., rural settings).

- Innovative approaches to bridging the gap between clinical research and practice are needed, thus allowing findings from clinical research to have a markedly increased public health impact.

Proposed Response for Promoting Widespread Reach of Evidence-based Behavior Change Interventions

- Technology-based therapeutic tools offer great promise for enabling the widespread dissemination of evidence-based prevention and treatment interventions targeting substance use disorders and other behavioral health issues.

- Technology-based (e.g., computer-delivered, mobile-technology delivered) interventions allow complex interventions to be delivered with fidelity at a low cost, without increasing demands on staff time or training needs, thus having high potential for widespread dissemination.

Potential Benefits of Technology-Delivered Interventions

Low Cost

Accessible in a wide array of settings

Easily exportable

Fidelity/Replicability is assured

May be less threatening when addressing sensitive topics

Requires active responding

Can be readily modified

Permits temporal flexibility

Permits more rapid diffusion

May increase adoption of science-based interventions

Tailoring/Customization Readily Accomplished

Permits expansion of prevention & treatment

Our Research Focused on Promoting Widespread Reach of Evidence-based Interventions

- We have developed and evaluated (in clinical trials research funded by the U.S. National Institute on Drug Abuse) technology-based interventions targeting substance abuse prevention among children and adolescents, HIV prevention among youth and adults, and substance abuse treatment among adults and adolescents.

- These therapeutic tools employ science-based content as well as informational technologies and multimedia approaches of demonstrated efficacy.

Our Research Focused on Promoting Widespread Reach of Evidence-based Interventions (continued)

- Our results from this line of research have demonstrated that technology-based interventions can be *as efficacious as* science-based interventions delivered by highly trained therapists/educators, cost-effective, and highly acceptable to a wide variety of target populations

  (e.g., in reducing HIV risk behavior in adults & youth and promoting skills training and drug abstinence in individuals with substance-use disorders).

Overview of our Web-based Substance Abuse Treatment Programs

— **Therapeutic Education System (TES)**, an interactive, psychosocial intervention for substance use disorders, grounded in the Community Reinforcement Approach (CRA) + Contingency Management Behavior Therapy *(Bickel, Marsch et al., 2008)*

— **TES has been evaluated with opioid-dependent individuals and is being evaluated with poly-substance users in community-based substance abuse treatment (NIDA's multi-site, Clinical Trials Network (CTN) platform**

— **TES for cannabis use disorders (currently developing/evaluating with Alan Budney, Ph.D.), integration of motivational enhancement therapy, CBT and contingency management**

— **Web-Based CRA for Adolescents (primarily those with cannabis use disorders)**

Overview of our Technology-based Substance Abuse Prevention Programs

- ***HeadOn: Substance Abuse Prevention (for Grades 6-8)***, an interactive, substance abuse prevention multimedia program for middle school-aged youth (*Marsch et al., 2007a; 2007b*)

- ***HeadOn: Making Good Choices (for Grades 3-5)***, an interactive, multimedia program to build up protective against drug use and other risk behavior among elementary school children *(Marsch et al., 2008)*

- ***Prescription Opioid Abuse Prevention Program***, an interactive, program focused on prevention of non-medical use of prescription opioids among youth (ongoing)

- **A customizable, interactive program focused on prevention of HIV, Hepatitis & Sexually Transmitted Infections (STIs)** among individuals in substance abuse treatment *(Marsch et al., 2004; 2007a; Bickel & Marsch, 2007, Marsch et al., In press)*

Computer-Based Informational Technologies employed in Interventions

- Fluency-Based Computer-Assisted Instruction (CAI)

  A learning technology that involves testing, providing immediate feedback, & requiring participants to demonstrate mastery of the information & skills being learned

  - Selectively presents information
  - Requires active, overt responding by the user to multiple choice and fill-in-the-blank questions
  - Evaluates and provides immediate feedback on user's responses
  - "Read & Response timing parameters" are manipulated in promoting fluency

- Interactive Video-based Computer Simulation
  - Simulates real-world experiences and enables "what if" scenarios & behavioral modeling
  - Enables exploration of various behavioral choices in "experiential learning" paradigm

Research Developing and Evaluating Web-based Substance Abuse Treatment Programs

Therapeutic Education System (TES) for Substance Abuse Treatment

- Composed of 65 interactive modules grounded in the efficacious Community Reinforcement Approach (CRA) psychosocial intervention

- Program is self-directed & includes a Training Module

- Therapists/Patients can use "customization plan" to establish individualized treatment plan for patients based on treatment needs

- Patients complete evidence-based program modules on skills training, interactive exercises and homework in accordance with their plan

- All module content includes accompanying audio

- Electronic reports of patients' activity available to therapists

- Can track earnings of incentives dependent on urine results or other target behavior

- New content can be readily added to the content delivery system

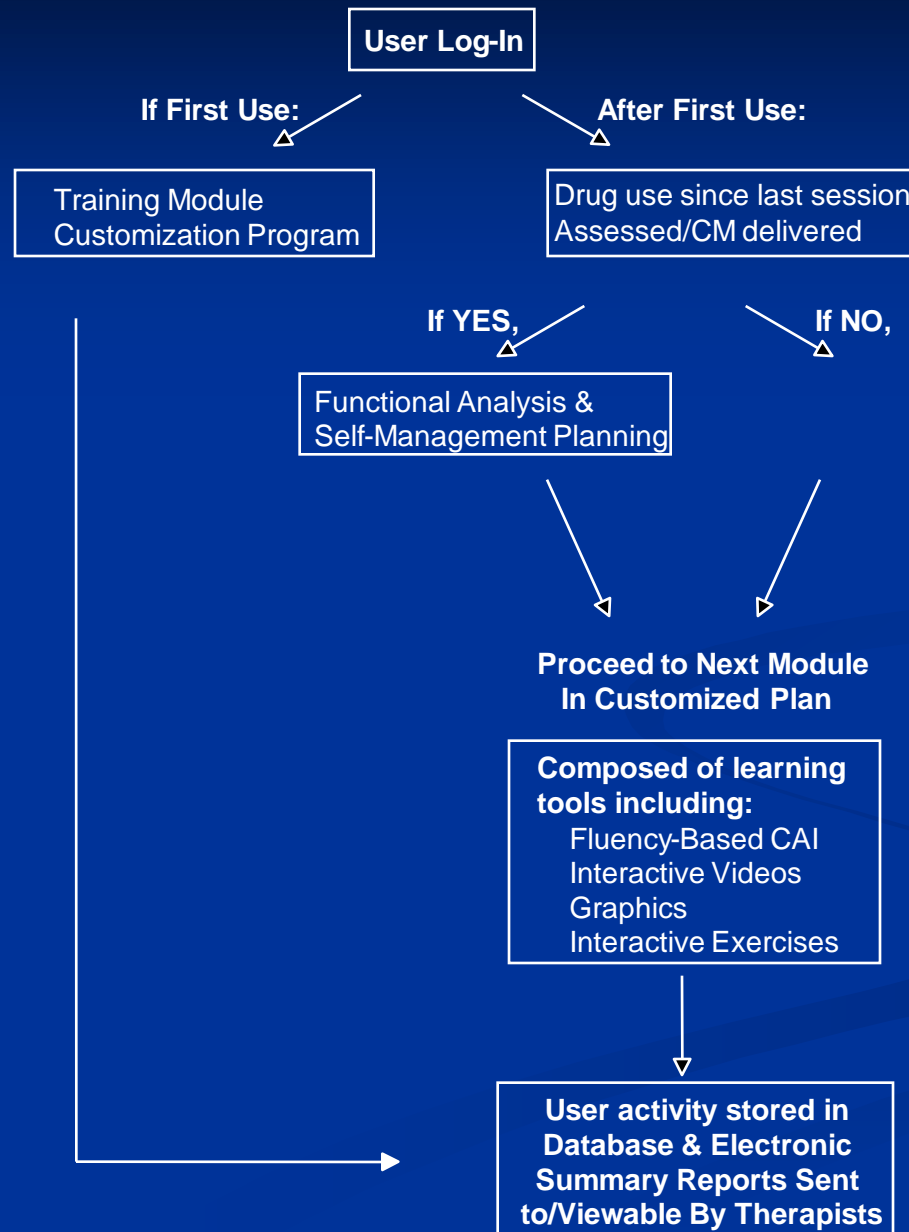# List of Module Topics in Therapeutic Education System (TES)

1 Training Module
2 What is a Functional Analysis?
3 Conducting a Functional Analysis
4 Self-Management Planning
5 Drug Refusal Skills Training
6 Awareness of Negative Thinking
7 Managing Negative Thinking
8 Managing Thoughts About Using
9 Managing Negative Moods and Depression
10 Introduction to Problem Solving
11 Effective Problem Solving
12 Progressive Muscle Relaxation Training
13 Receiving Criticism
14 Seemingly Irrelevant Decisions
15 Other Drug Use
16 Coping with Thoughts About Using
17 Introduction to Assertiveness
18 How to Express Oneself in an Assertive Manner
19 Introduction to Anger Management
20 How to Become More Aware of the Feeling of Anger
21 Coping with Anger
22 Introduction to Relaxation Training
23 Progressive Muscle Relaxation Generalization
24 Introduction to Giving Criticism
25 Steps for Giving Constructive Criticism
26 Receiving Criticism
27 Giving and Receiving Compliments
28 Sharing Feelings
29 Vocational Counseling
30 Naltrexone
31 Limited Alcohol Use
32 Financial Management
33 Insomnia

34 Time Management
35 Relationship Counseling Part 1
36 Relationship Counseling Part 2
37 Relationship Counseling Part 3
38 Alcohol and Disulfiram
39 Communication Skills
40 Nonverbal Communication
41 Social Recreational Counseling
42 Attentive Listening
43 HIV and AIDS
44 Sexually transmitted infections (STIs)
45 Hepatitis
46 Sexual transmission of HIV and STIs
47 The Female Condom
48 Birth control use and HIV and STIs
49 Drug Use, HIV and Hepatitis
50 Alcohol use and risk for HIV, STIs and hepatitis
51 Getting Tested for HIV, STIs and Hepatitis
52 Finding More HIV, STI and Hepatitis Information
53 Negotiating Safer Sex
54 Decision-Making Skills
55 Identifying/managing triggers for risky sex
56 Identifying and Managing Triggers for Risky Drug Use
57 Increasing-Self-Confidence in Decision Making
58 Taking Responsibility for Choices
59 Living with Hep C: Managing Treatment, Promoting Health
60 Living with Hep C: Coping Skills
61 Living with HIV: Coping skills and managing stigma
62 Living with HIV: Comm. skills for disclosing HIV status
63 Living with HIV: Managing treatment and medications
64 Living with HIV: Drug use and Immune System
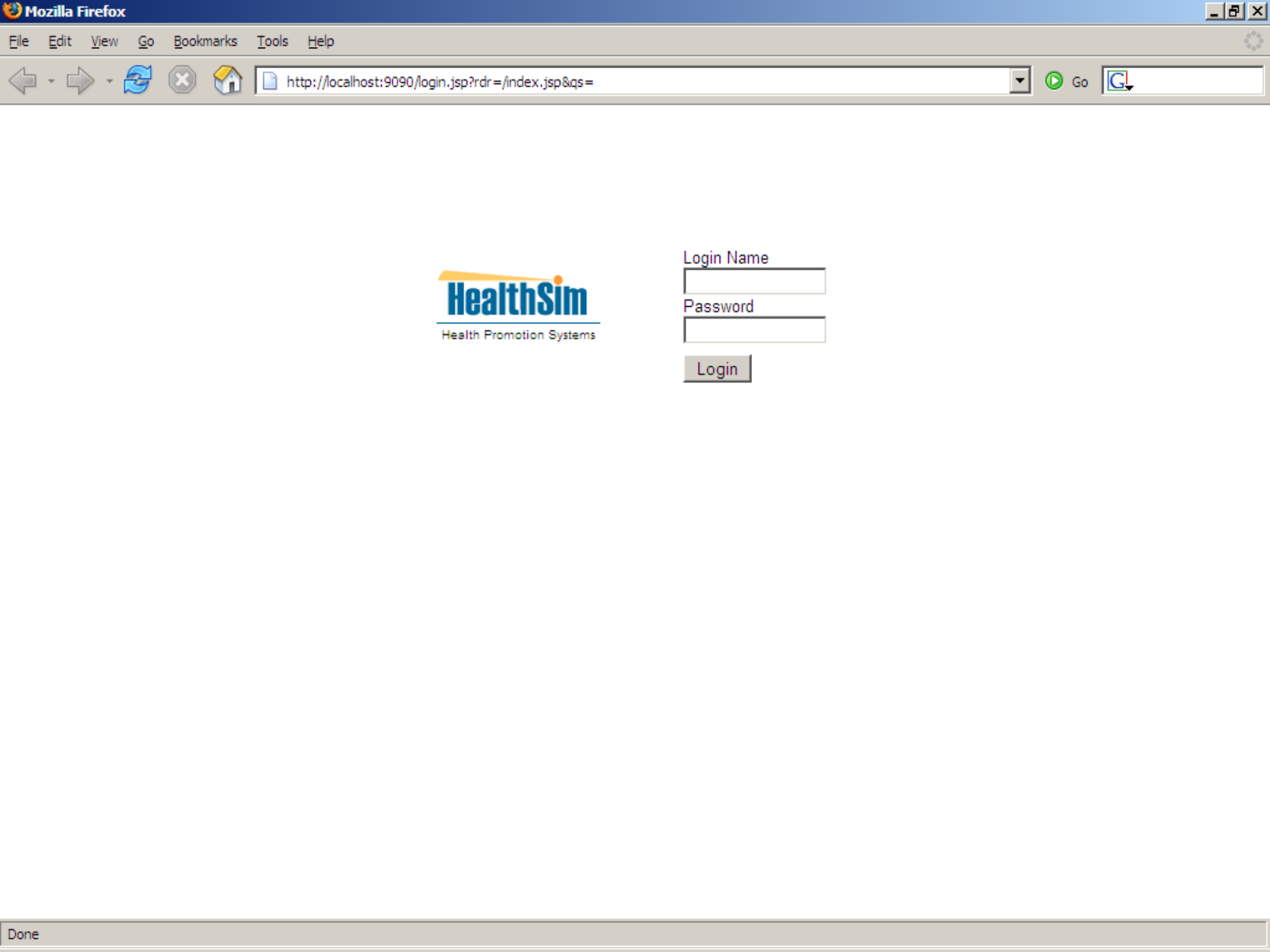65 Living with HIV: Daily routines to promote health

TES features a comprehensive contingency management system , with the following features:

- Flexible schedules of reinforcement

- Flexible number and type of target behaviors and/or assessments

- Flexible reward system including cash vouchers or fishbowl draws

- Features an animated, virtual fishbowl for cashing in fishbowl draws

- Participants can be assigned to multiple concurrent voucher programs with different schedules and/or reward systems

- Accounting system for tracking debits/credits in a participant's account

- Automatic "No Shows" can be entered on a predetermined schedule

- Real-time graphing of assessments and target behavior results

- Vouchers can be printed from the website

- Allows for yoked study designs

Therapeutic Education System (TES)
Flow of User Activity

User Log-In

If First Use:

After First Use:

Training Module
Customization Program

Drug use since last session
Assessed/CM delivered

If YES,

If NO,

Functional Analysis &
Self-Management Planning

**Proceed to Next Module
In Customized Plan**

**Composed of learning
tools including:**
Fluency-Based CAI
Interactive Videos
Graphics
Interactive Exercises

**User activity stored in
Database & Electronic
Summary Reports Sent
to/Viewable By Therapists**

File   Edit   View   Go   Bookmarks   Tools   Help

http://localhost:9090/login.jsp?rdr=/index.jsp&qs=   Go

HealthSim

Health Promotion Systems

Login Name

Password

Login

Done

Address http://localhost:9090/user/graph.jsp   Go

# Congratulations!

Click the (>>) button to continue >>

Congratulations for staying abstinent from opiates.

Your abstinence from opiates is shown on the graph below. A flat line for a given day indicates that you were positive for opiates for that day. An upward sloping line indicates that you were negative for that day.
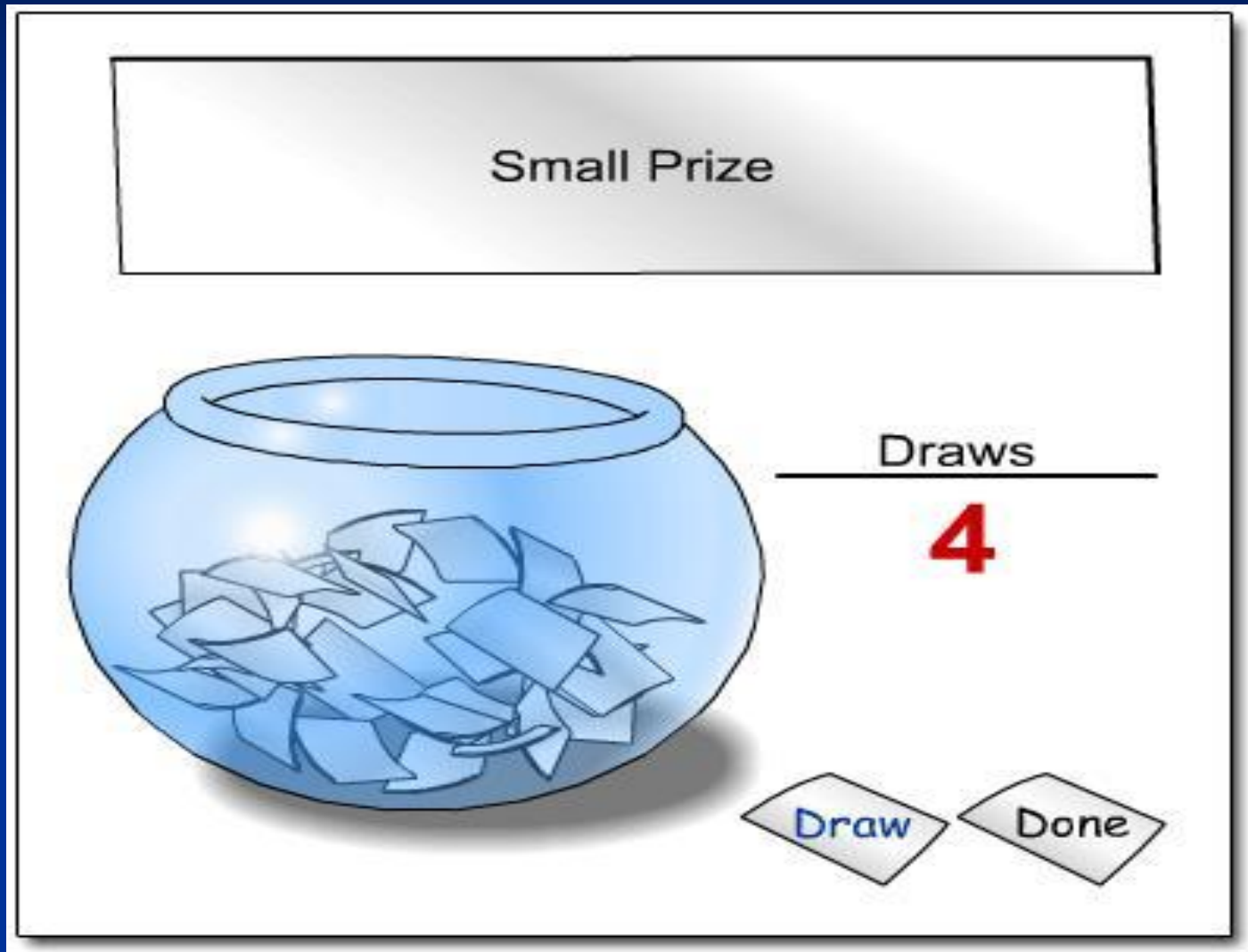
Continuous Abstinence

Sample Number

Done   Local intranet
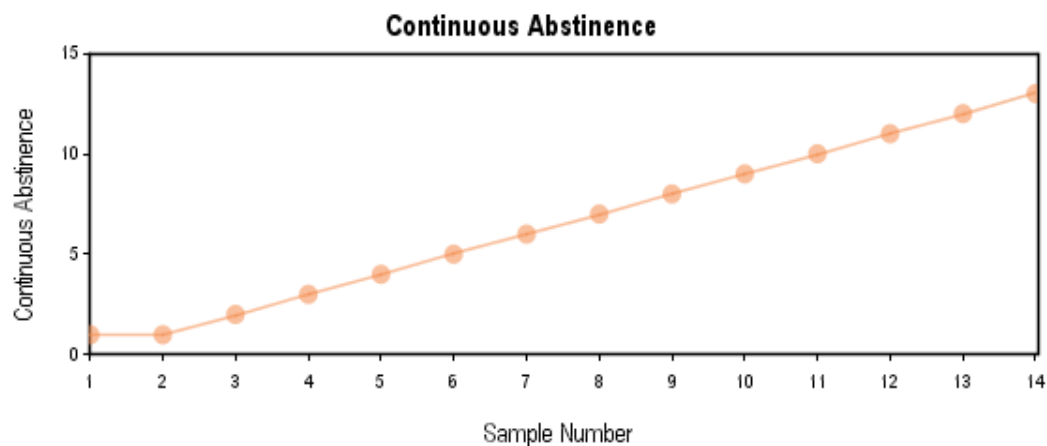
Virtual "Fishbowl" Example

Example of Prize Incentive in Virtual "Fishbowl"

Please provide an answer to the questions below.

For each question below, click on "Yes" or "No". After you've clicked on an answer to each question, click on the ">>" button to continue.

Have you been exposed to any high-risk situations (e.g. high-risk for drug use) since your last clinic visit?   ○ Yes ● No

Do you expect to be exposed to any high-risk situations between now and your next clinic visit?   ○ Yes ● No

Click the (>>) button to continue   >>

File Edit View Go Bookmarks Tools Help

http://localhost:9090/user/map.jsp

Google

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Home

Learn to Use the Program

Learn to Use the Program
▶ Training Module
Risk Assessment Survey
What is a Functional Analysis?
Conducting a Functional Analysis
Introduction to Problem Solving
Effective Problem Solving
Self-Management Planning

Click on a module name above to proceed or view the
current module group now.

▶ = Current Module   ■ = Incomplete   ■ = Completed   ■ = Not Yet Available

Done

Address   http://localhost:9090/user/modules/module.jsp?mid=14&smid=5053

Watch the following video and try to pick out the refusal skills.

Kate did a good job saying the right things, but her body language was not convincing at all, and drug abusers are generally very good at reading between the lines. Body language is important.
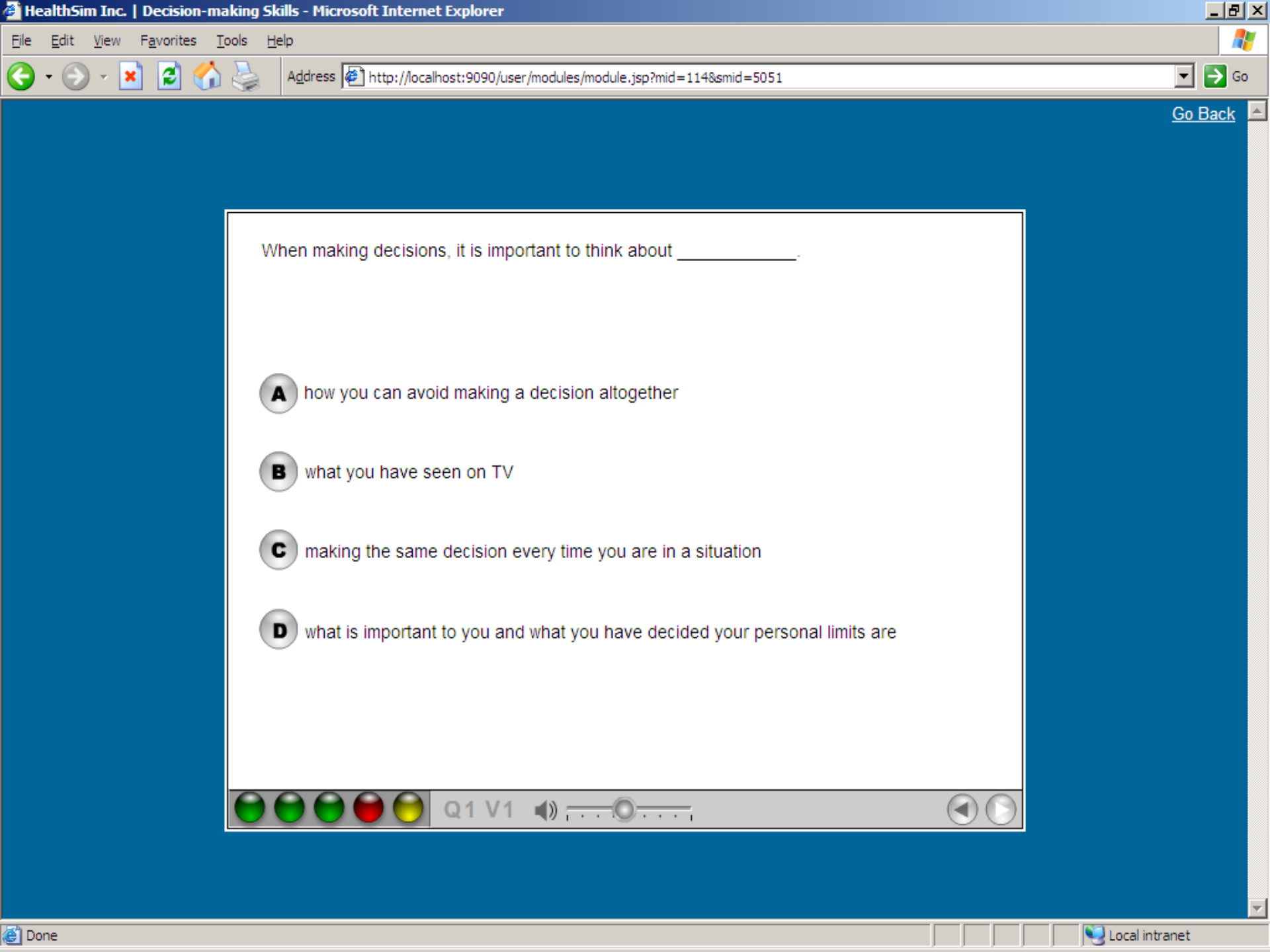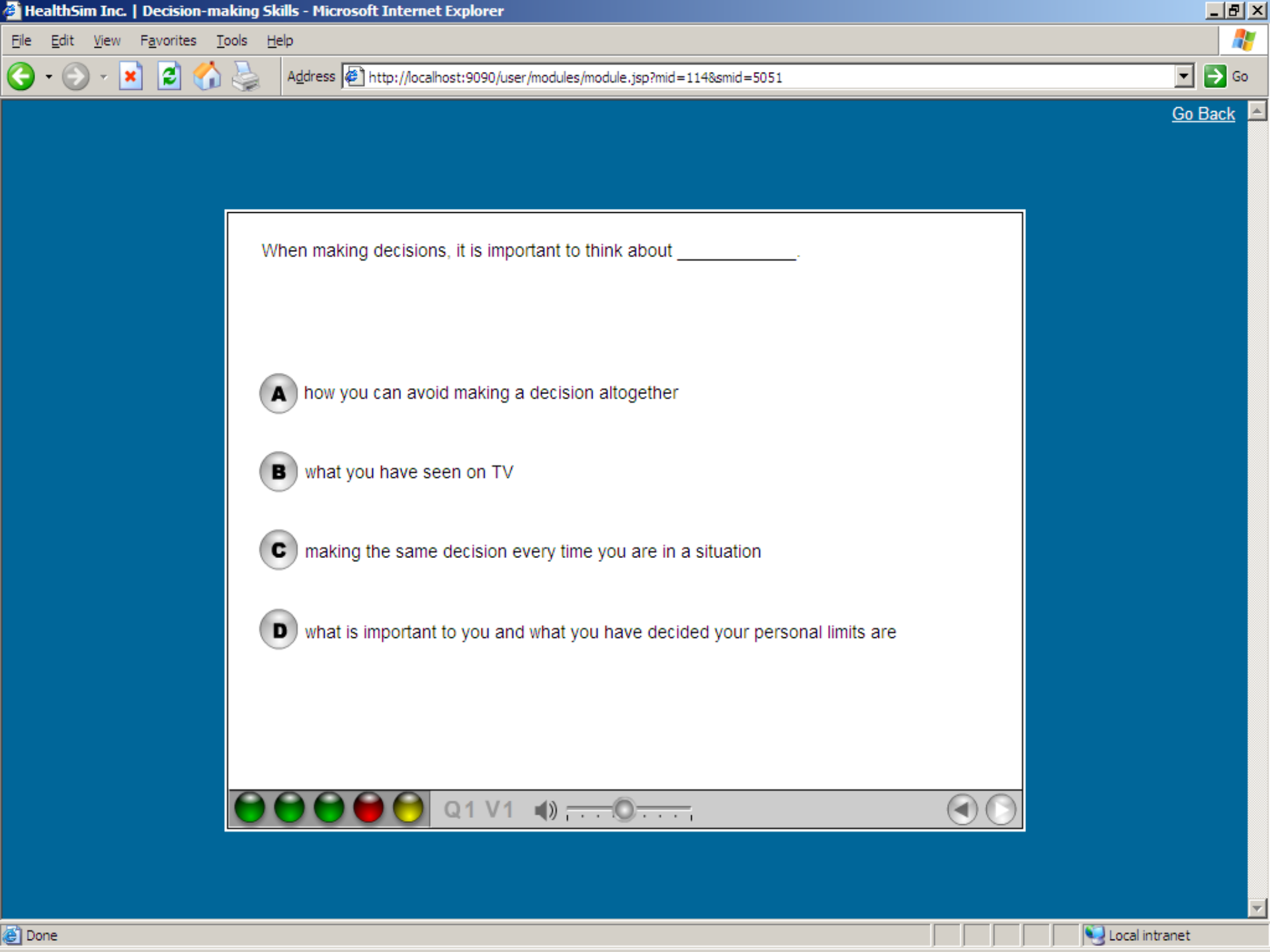
- Make continuous eye contact; look directly at the person when you answer.

- Your expression and tone should clearly show that you are serious. For example, smiling when you respond may suggest that you are not serious.
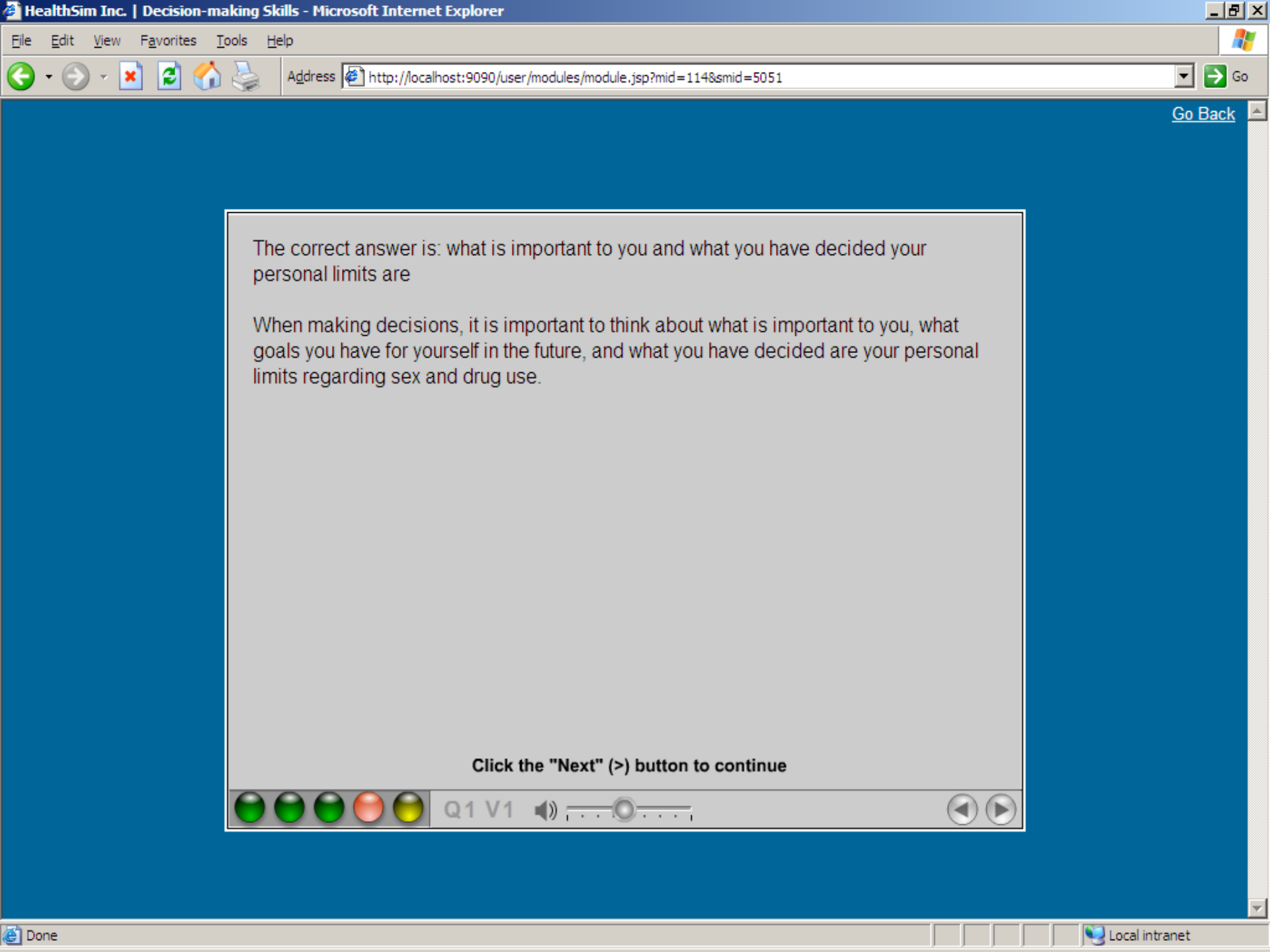
Watch the scene again and notice Kate's body language.

Say no
Make continuous eye contact

When making decisions, it is important to think about _____.

A how you can avoid making a decision altogether

B what you have seen on TV

C making the same decision every time you are in a situation

D what is important to you and what you have decided your personal limits are

Q1 V1

Address   http://localhost:9090/user/modules/module.jsp?mid=114&smid=5051

Go Back

The correct answer is: what is important to you and what you have decided your personal limits are
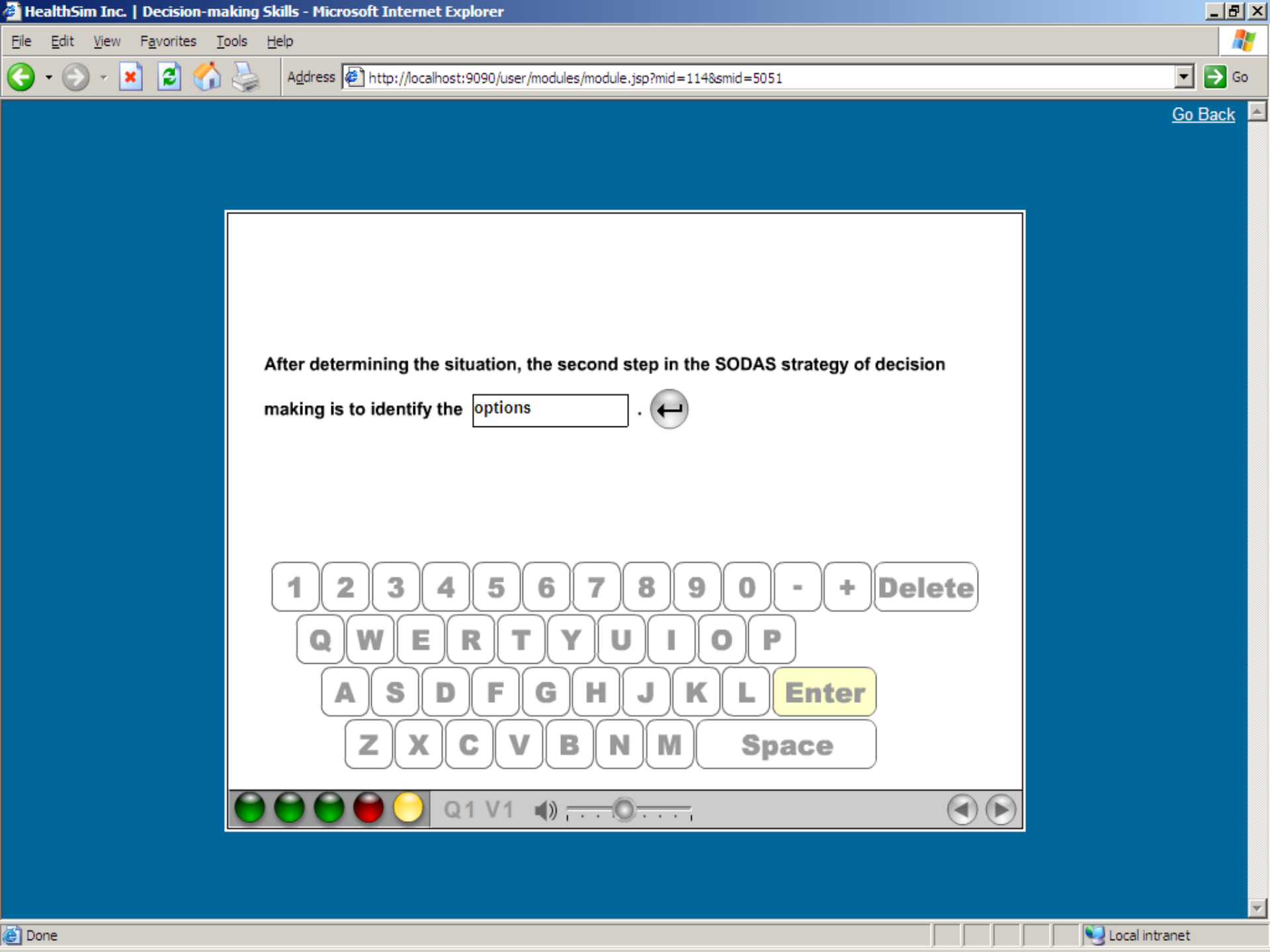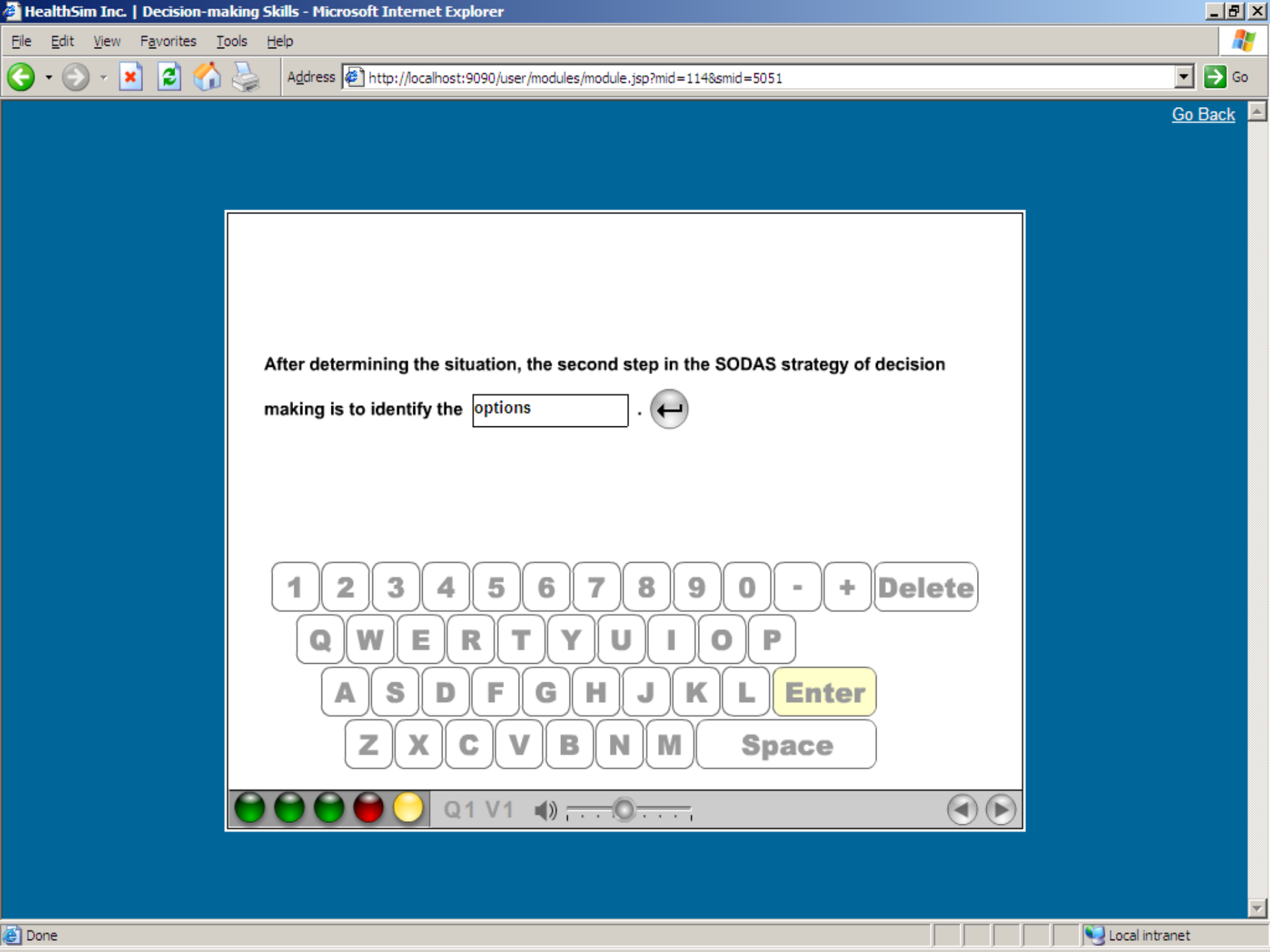
When making decisions, it is important to think about what is important to you, what goals you have for yourself in the future, and what you have decided are your personal limits regarding sex and drug use.

Click the "Next" (>) button to continue

Q1 V1

Done   Local intranet

Address http://localhost:9090/user/modules/module.jsp?mid=114&smid=5051

Go Back

After determining the situation, the second step in the SODAS strategy of decision

making is to identify the   options   .

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | - | + | Delete |

| Q | W | E | R | T | Y | U | I | O | P |

| A | S | D | F | G | H | J | K | L | Enter |

| Z | X | C | V | B | N | M | Space |

Q1 V1

Done   Local intranet

Randomized Controlled Trial

— Participants were opioid-dependent individuals in buprenorphine maintenance treatment for 23 weeks

— Participants randomly assigned to one of three groups:

- *Therapist Delivered CRA:* 30 mins. 3x/wk. w/therapist + vouchers
- *Computer Assisted CRA:* 30 mins.3x/wk. computer; 1 biweekly w/therapist + vouchers
- *Standard Counseling:* 30 mins. 1/wk. w/therapist - focus on rehabilitation & compliance with treatment program

— Vouchers for both cocaine and opioid-free urine samples

Participant Demographics by Group

Characteristic	Standard	Therapist	Computer
% White	98	98	93
% Male	58	56	53
% High school education	71	67	69
% Employed full-time	47	44	49
Age (in years)	30.1 ± 9.2	26.1 ± 6.9	29.7 ± 8.9
Mean Monthly income	523	698	675
% Prior treatment	64	68	70
Years of regular use	5.6 ± 6.2	5.2 ± 4.4	6.4 ± 6.3
% Injection Drug Users	62	80	68
% Cocaine Dependent	24	16	27
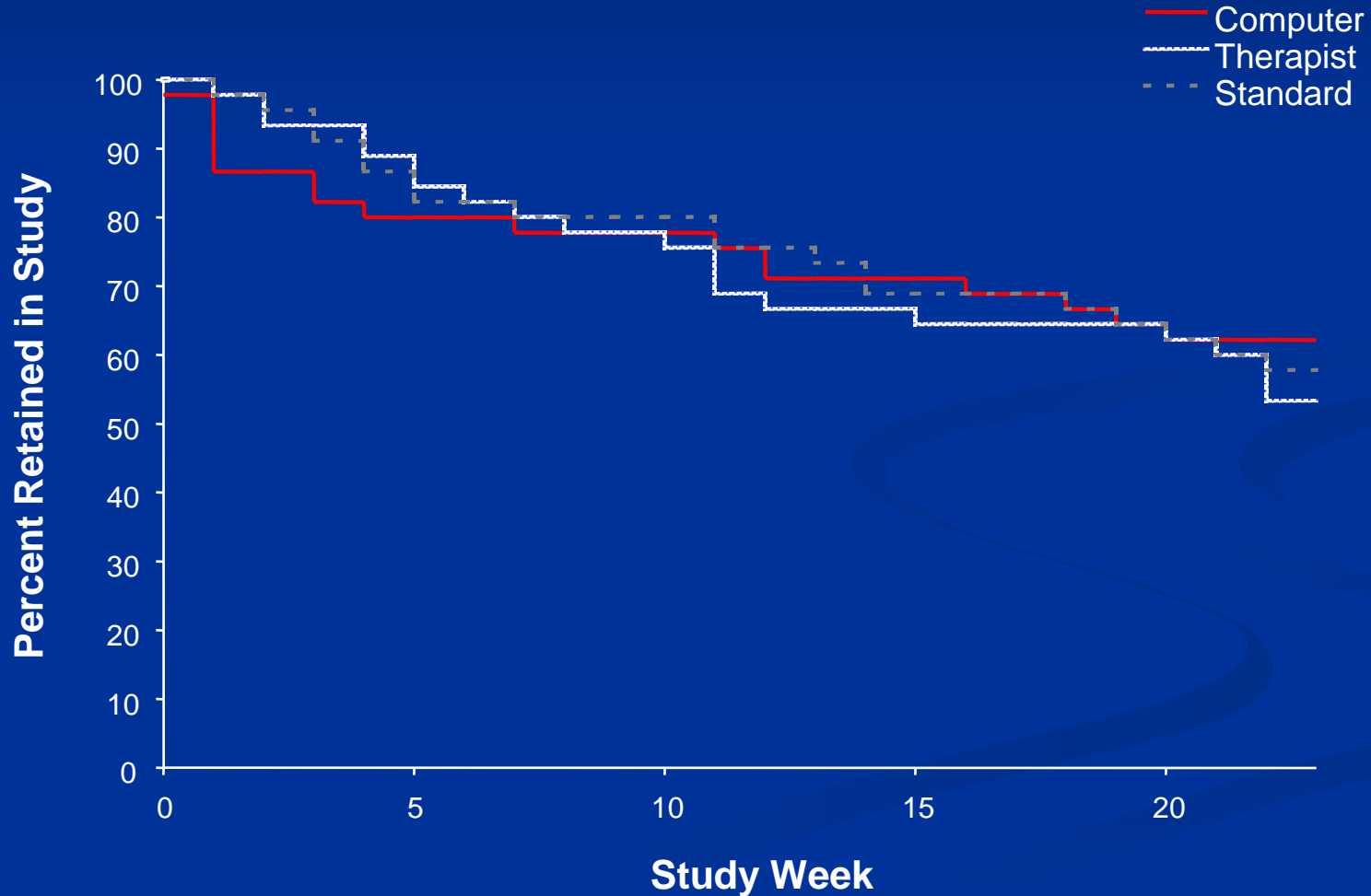
Continuous Abstinence from Opiates and Cocaine
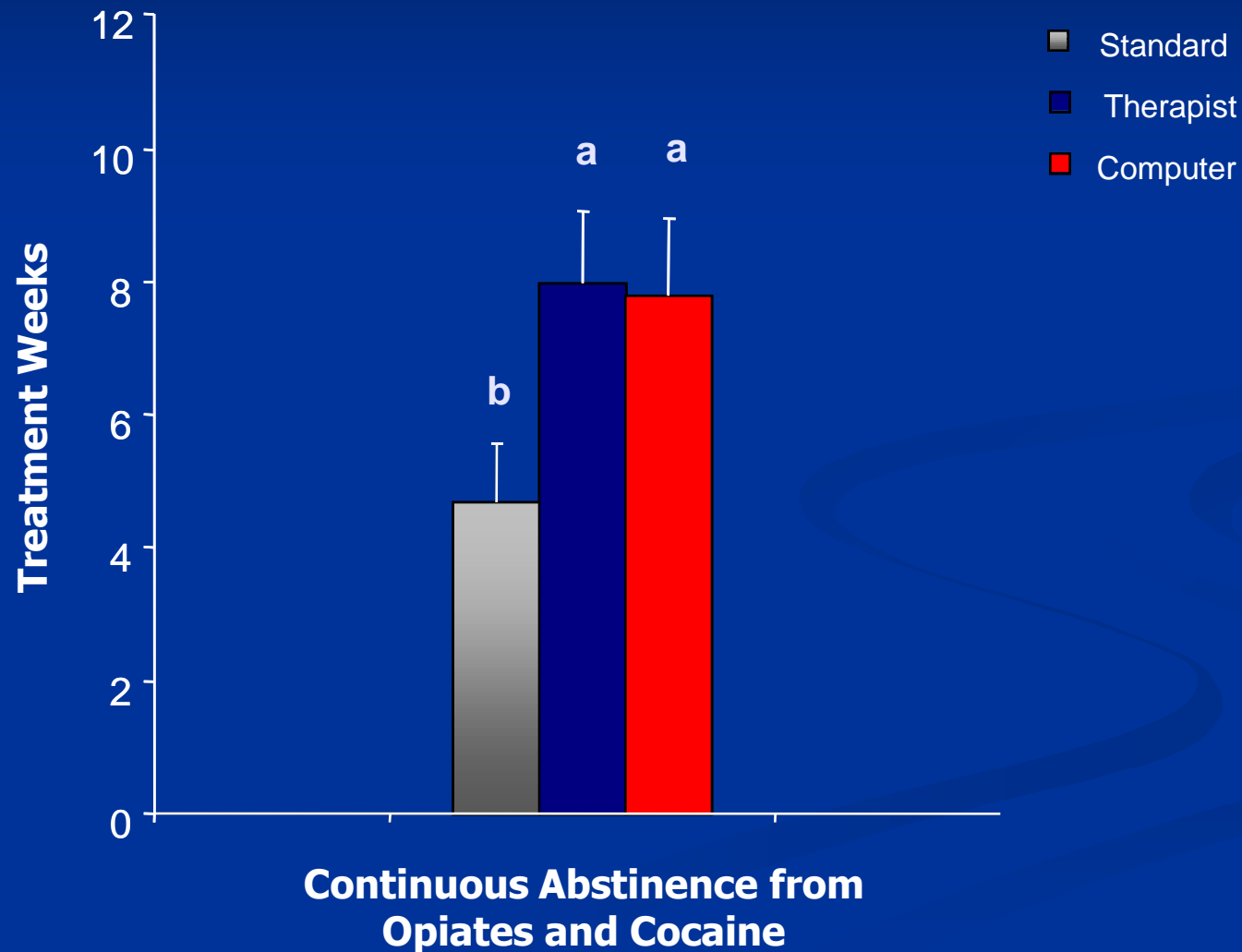
Abstinence Plotted
by Therapist Contact Time
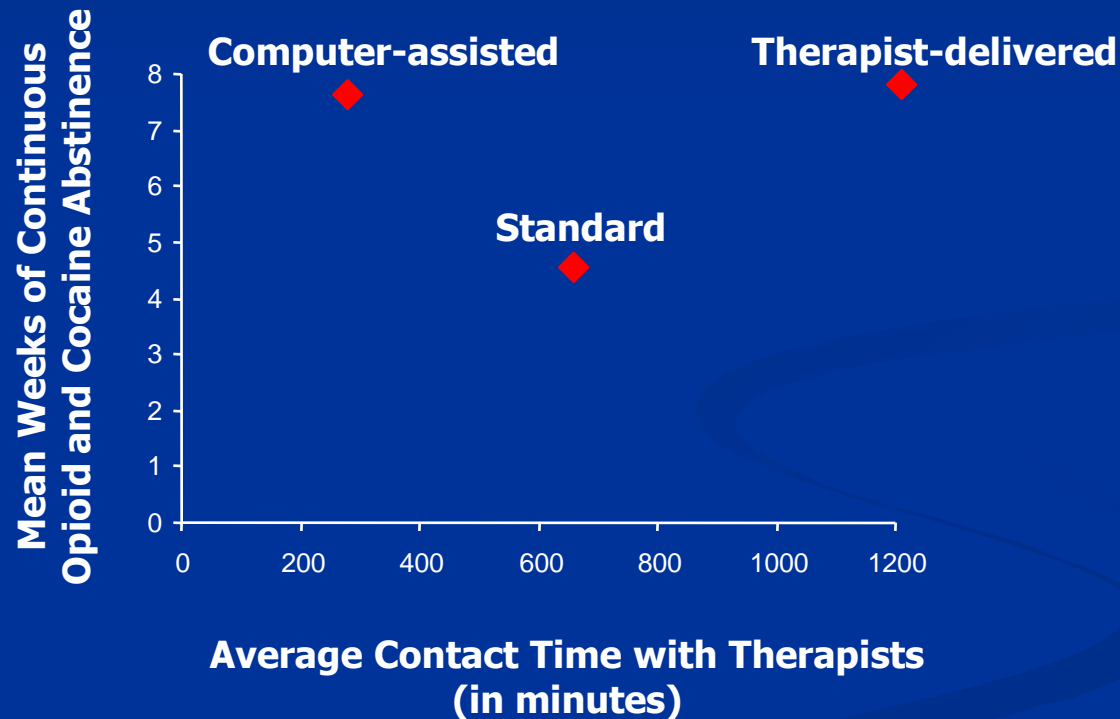
Summary of Clinical Trial Results

- The therapist-delivered and computer-assisted CRA plus vouchers interventions produced comparable weeks of continuous opioid & cocaine abstinence and significantly greater weeks of abstinence than the standard intervention, yet participants in the computer-assisted CRA condition had over 80% of their intervention delivered by an interactive computer program.

- The comparable efficacy obtained with computer-assisted and counselor-delivered therapy may enable more widespread dissemination of the evidence-based CRA plus vouchers intervention in a manner that is cost-effective and ensures treatment fidelity.

- Clinicians can use this tool to ensure that their patients have access to evidence-based skills training relevant to their treatment (and can optionally guide the focus of the intervention).

Ongoing Clinical Trial with TES in Community-Based Treatment Settings

- **In Methadone Treatment:** We are now evaluating the effectiveness and cost-effectiveness of adding TES as an adjunct to community-based, methadone maintenance treatment.

  (n=180, assigned to (1) Treatment as Usual (TAU) or (2) reduced TAU plus TES for 12 months)

- **In Drug-Free Treatment:** We are now evaluating the effectiveness and cost-effectiveness of adding TES as an adjunct to community-based, outpatient substance abuse treatment

  (n=500; To be conducted on NIDA's Clinical Trials Network (CTN) platform (approx. 10 sites) with random assignment to 12 weeks (with follow-up) of: (1) TAU or (2) reduced TAU plus TES with incentives for abstinence and completion of TES modules)

Ongoing Clinical Trial with TES Targeting Adult Cannabis Use

- **<u>For Cannabis Use Disorders:</u>** In collaboration with Dr. Alan Budney, we have developed a version of TES to specifically target cannabis use disorders in adults

- This version reflects an integration of motivational enhancement therapy (MET), CBT & contingency management (CM).

- This version of TES will be evaluated in a 3 arm trial (n=135): (1) Computer-delivered MET/CBT/CM, (2) therapist-delivered (2) MET/CBT/CM and (3) therapist-delivered MET

Your Marijuana Use

This is what you told us about your marijuana use:

You started smoking marijuana at age __15__ and
have been smoking marijuana regularly for __5__ years.
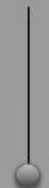
Your Benefits of Quitting Marijuana

The benefits you said you would expect to experience if you quit using marijuana are listed below.

Can you think of any other benefits that aren't on the list?

- Yes
- No

1. Be able to think more clearly
2. Be healthier
3. Be happier
4. Others would respect me more
5. Have more self respect
6. Feel more in control of things
7. Be able to express my feelings to others more easily
8. Enjoy sex more
9. Be more productive
10. Be More friendly and outgoing
11. My memory to improve
12. Be more relaxed and confident with others
13. Do better at my job
14. The world to look better
15. Breathe easier and cough less
16. Have more energy to do things
17. Have better relationships with others
18. Worry less about being caught
19. Have more money

Your Costs of Quitting Marijuana

When people consider quitting marijuana, it is helpful to think about the costs, or negatives, and benefits, or positives, of doing so. Below are the costs you said you would expect to experience if you quit using marijuana.

Are there any costs of quitting that are not on the list?   Yes

No

1. Have urges to smoke when I see/think about marijuana
2. Feel left out when others are smoking
3. Be moody
4. Feel pressured by friends to smoke
5. Feel lonely
6. Use alcohol or other drugs more often
7. Miss the pleasure from being high
8. Feel more tense or anxious
9. Be more difficult to sleep well
10. Feel more depressed
11. Be less outgoing around friends
12. Have more difficulty controlling my temper
13. Be bored more often
14. Miss the good times I had with others while high
15. Be less talkative with friends
16. Be less creative
17. Life to be less fun
18. Enjoy recreational activities less
19. Work to be less interesting

Weighing your Costs versus your Benefits of quitting marijuana can help you understand where you are regarding your marijuana use and why. Based on the number of costs and benefits you identified, it looks like the costs of quitting equal the benefits.

Not all Costs and Benefits are equal, however. It also depends on how much you value each cost and benefit of changing your marijuana use. So take some time now to think about how important each cost and benefit is to you, and indicate the level of importance for each item using the numbered scale provided.

Please rate the importance of each of the costs and benefits of stopping or cutting back on your marijuana use listed below by selecting a number from 1 to 5 below where 1 is "not at all important" and 5 is "extremely important".

Have better relationships with others

| 1 | 2 | 3 | 4 | 5 |

Not at all important

Extremely important

32   67

Costs   **Benefits**
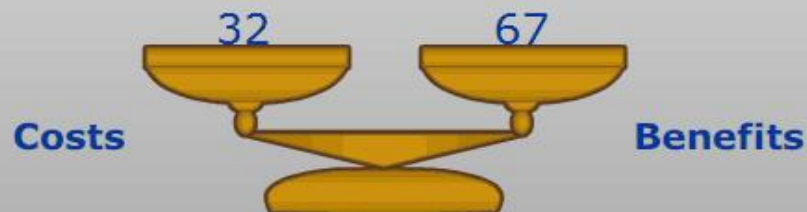
Ongoing Research with TES Targeting Adolescent Cannabis & Other Substance Use

- **<u>For Adolescent Substance Use Disorders:</u>** Grounded in Adolescent-Community Reinforcement Approach (A-CRA)

- Modules for youth and parents - to be developed via input from target audience and expert scientists

- To be evaluated in a 2-arm trial comparing (1) TAU vs. (2) reduced TAU + Computerized intervention

Research Developing and Evaluating Web-based Substance Abuse Prevention Programs

HeadOn: Substance Abuse Prevention (for Grades 6-8)

▬ An interactive, substance abuse prevention multimedia program for middle school-aged youth (*Marsch et al., 2007a; 2007b*)

Topics in HeadOn 6-8 Program:

- Experimenting With Drugs: The Risk of Losing Control of Drug Use
- Experimenting with Drugs: The Risk of Losing Control of One's Life
- Drug Use: "NOT Everyone is Doing It"
- What Should I Do When Offered a Drug?
- Drugs: How do they Work?
- Drug Refusal Skills Training
- Resisting Drug-related advertisements
- Enhancing Social Skills
- Self-Management Skills
- Prescription Drug Abuse Prevention

SKIP

The Right Crowd

20
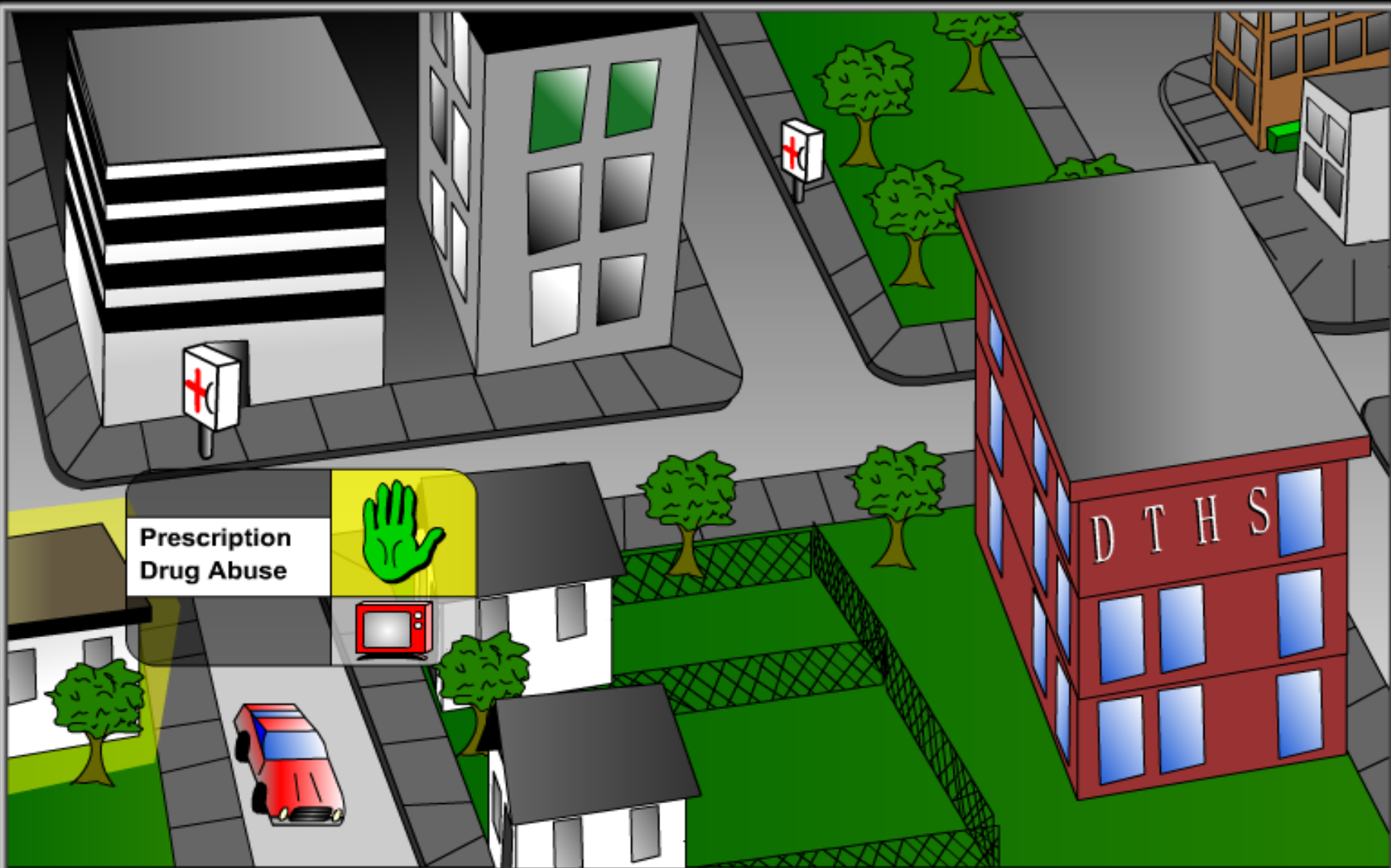
Hanging out with peers who are a positive influence on your life is essential if you are going to make healthy decisions about staying off drugs.

Good job!

u earned **25** new cards!
u scored: **97**
of a possible 100.

ck the arrow to continue.

uncommon

mon

rare

super-rare

Quiz Cards Rating

is deck may contain some
are cards.

Welcome **Home.User**

QUIT

Evaluation

- We conducted a multi-site, school based evaluation of the *HeadOn* computer-based prevention program relative to the demonstrably efficacious *Life Skills Training,* educator-delivered program (n=272).

- Both interventions were delivered across approx. 15 sessions (30-45 minutes per session) during the course of the school year.

- Assessments were conducted with both groups before and after their respective interventions.

Knowledge Gains
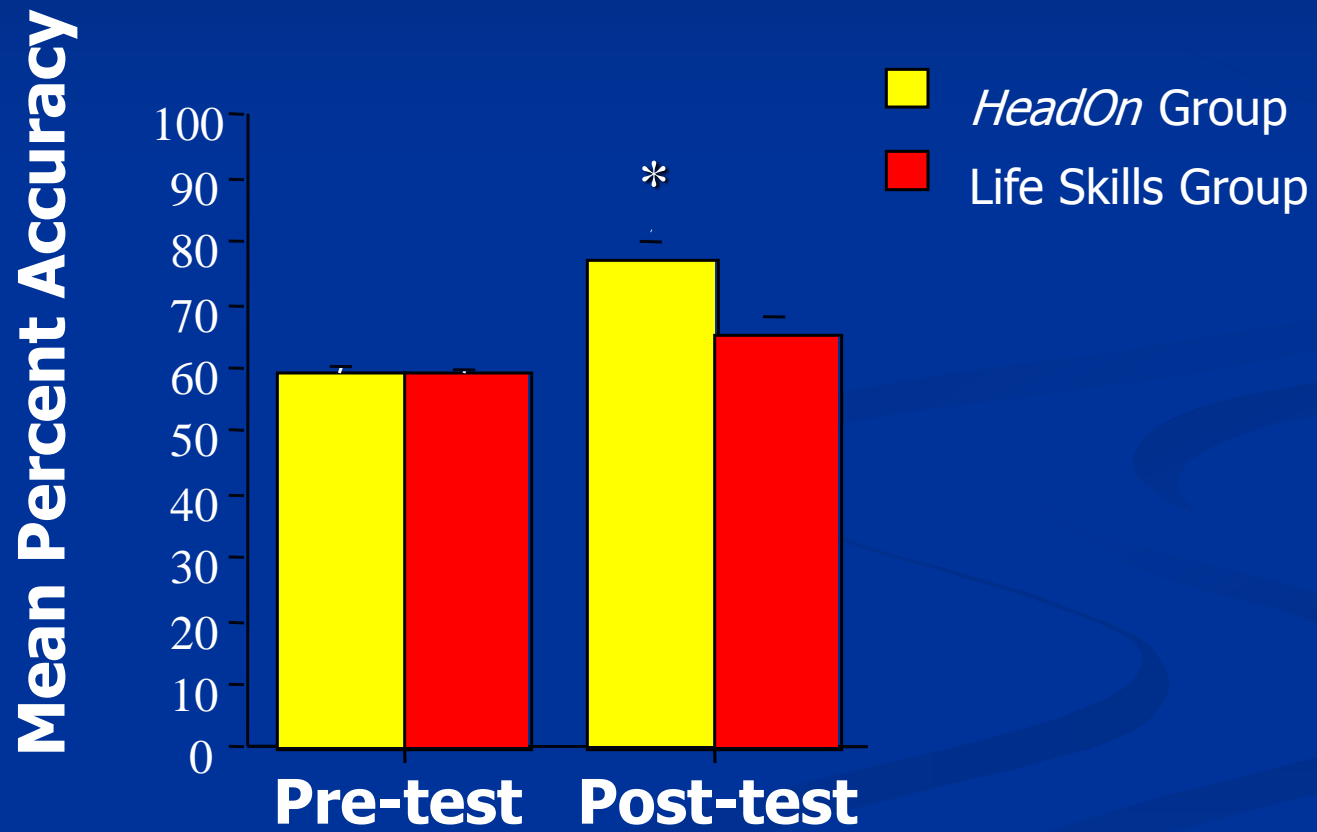
Other Results

Participants in the *HeadOn* and *Life Skills* groups generally achieved comparable, positive outcomes after completing their substance abuse prevention intervention on:

- actual self-reported rates of substance use

- intentions to use substances

- attitudes toward substances

- beliefs about prevalence of substance use among both their peers and adults

- likelihood of refusing a drug offer

HeadOn: Making Good Choices (for Grades 3-5)

— An interactive, multimedia program to build up protective factors against drug use and other risk behavior among elementary school children *(Marsch et al., 2008)*

Topics in HeadOn 3-5 Program:

- How to Establish & Maintain Healthy Relationships
  How to be Assertive
  Dealing with Stress
  Making Good Friends

- General Decision-Making Skills
  Setting & Reaching Goals
  Communicating Effectively
  Understanding Advertisements

- Consequences of Substance Use
  Effects of Cigarettes
  Consequences of Drug Use
  Refusing Drugs

http://www.healthsim.com/goodchoices/

Google

HEAD ON

Making Good Choices

Let's Go!

http://headon.preventionsciencemedia.com/headon3-5/index.jsp

Google

Making Good Friends

http://www.healthsim.com/goodchoices/

Google

Effects of Smoking

heart beats faster
bad breath
stained teeth
red eyes

poor sense of smell
cough a lot
bad habit
black lungs

The Effects of Cigarettes on Your Body

Transferring data from www.healthsim.com…

http://www.healthsim.com/goodchoices/

Google

QUIZ

TIME:

Which of the following is true if a person is addicted to cigarettes?

A It is easy to stop smoking at any time.

B Smoking becomes a habit that is hard to break.

C You never feel like you want to smoke.

D You never feel like you need to smoke.

The Effects of Cigarettes on Your Body

%/9

HOW TO MAKE A GOOD DECISION

- FIRST, WEIGH bOTH SIDES.
- THEN, DECIDE TO STOP OR GO.

SIMPLY SAY NO.
LEAVE THE SCENE.
SUGGEST A bETTER IDEA
CHANGE THE SUBJECT.

Refusing Drugs

9/9

http://headon.preventionsciencemedia.com/headon3-5/index.jsp

Information

Be a Good Communicator!
- Introduce yourself.
- Start a conversation.
- Be a good listener.
- Use good body language.
- Say thank you.

We can help you best if...

JUNE CARLSON

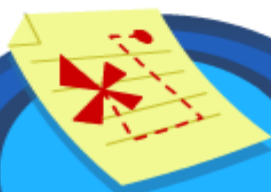**Communicating Effectively**

0/9

QUIZ

TIME:

What does it mean to be assertive?

A Yelling at another person if they aren't listening to you

B Saying what you really think and not doing things just because others want you to do them

C Doing things because others want you to do them

D Going along with whatever others are doing

How to be Assertive

0/9

HeadOn 3-5 **Evaluation**

- We conducted a multi-site, school based evaluation with 3rd, 4th & 5th graders (n=457), comparing:

    Group A: *HeadOn*: *Making Good Choices*

    Group B: *Life Skills Training* (a demonstrably efficacious educator-delivered intervention)

    Group C: *No-intervention Control group*

Results

– The web-based program produced significantly better outcomes relative to both other groups on:

- Drug abuse prevention knowledge
- Communication skills
- Stress management
- Self-esteem
- Impulsivity

– The web-based program comparable outcomes to *Life Skills* and significantly better outcomes to the control group on:

- Negative attitudes toward substances
- Decision-making skills
- Critical Thinking about Advertisements

– The web-based program was rated as significantly more useful than *Life Skills*.

Concluding Comments

- A technology-based approach to intervention delivery creates new opportunities and outlets for intervention efforts and may greatly increase the availability of science-based interventions.

- Well-designed, technology-based tools can produce comparable outcomes to highly trained interventionists at a markedly lower cost.

- Technology-based interventions can transcend geographic boundaries and may be used in a wide variety of settings, including home, community organizations, schools, emergency rooms, health care providers' offices, mobile devices, and online social networks.

For More Information

http://preventionsciencemedia.com

www.ndri.org/ctrs/cth.html