

Reducing Health Disparities Through Informatics

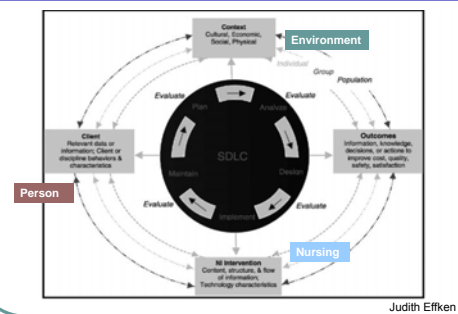
Suzanne Bakken, RN, DNSc, FAAN
 Summer Institute of Nursing Informatics
 University of Maryland

Health Disparities Abound

- "...racial or ethnic differences in the quality of healthcare that are not due to access-related factors or clinical needs, preferences, and appropriateness of intervention."
 ~ Institute of Medicine's *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care* (pages 3-4; © 2003)
- "...differences in the incidence, prevalence, mortality, and burden of diseases and other adverse health conditions that exist among specific population groups in the United States."
 ~ National Institutes of Health (NIH), *Strategic Research Plan to Reduce and Ultimately Eliminate Health Disparities* (October 6, 2000)
- "...differences that occur by gender, race or ethnicity, education or income, disability, geographic location, or sexual orientation."
 ~ United States Department of Health and Human Services, *Healthy People 2010: Understanding and Improving Health* (November 2000)

Is informatics part of the solution or will it contribute to increased health disparities?

Organizing Framework for Nursing Informatics Research



Digital Divide in 2009

- Access
 - Racial and ethnic differences decreasing
 - Rural versus urban differences
 - Age-related differences
- Use and understanding
 - Computer literacy
 - Functional literacy
 - Numeracy
 - Health literacy

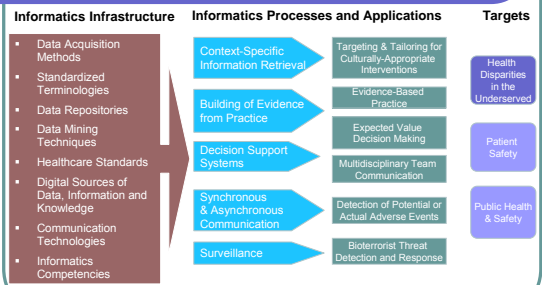
Addressing Health Disparities Through Nursing Informatics Research at Columbia

- Center for Evidence-based Practice in the Underserved
- APN screening and management of obesity, depression, and tobacco use
- Context-specific access to Cancer Information Service smoking cessation resources
- Self-management of depressive symptoms among PLWH
- Promoting physical activity among adolescent Latinos

Center for Evidence-based Practice in the Underserved

- 2001 - originally funded as P20 Exploratory Research Center with three major themes: evidence-based practice, underserved populations, and informatics
- 2004 – competitive renewal as P20 with expansion of underserved populations from individuals and families to also include community and public health systems and addition of economic analysis as method
- 2007 – funded as P30 Center of Excellence in Self-Management Research (P30NR010677)
 - Biobehavioral research capacity
 - Interdisciplinary
 - Informatics
 - Economic analysis

Informatics Infrastructure for Evidence-Based Practice Center for Evidence-based Practice in the Underserved



Feasibility Studies

- Self-management of Hypertension in Diabetes through Device Guided Breathing - Sally Aboelela
- Heart Healthy Living in HIV: A Preliminary Study - Bernadette Capili
- Self Assessment via a Personal Health Record (SAPHeR) – Leanne Currie
- Adolescents with Diabetes Engage in Problem Solving through Tailored Intervention (ADEPT) – Arlene Smaldone

Mobile Decision Support for APNs

- Randomized, controlled trial (R01NR008903)
- 3 arms – decision support for screening and guideline-based management of depression, obesity, or smoking cessation
- Unit of analysis is clinical encounter
- Subjects – nurses in APN training
- Technology – PDAs/cellular telephones
- Hypothesis – decision support as compared to no decision support will result in greater adherence to guideline

MODS-APN: Obesity

Encounter

Patient: Pat1 Enc Date: 4/8/08
 Site: Other FNP Site
 Visit: New-Well visit (40-64 Y)
 Payment: Medicare
 Disposition: Followup in 6mos
 Ht: 65 in Wt: 190 lbs BP: 130 / 80

CC PMH V Meds V

Age: 45 Years

Screening Home

MODS-APN: Obesity

Patient Screening

Screen for Obesity? Yes No

Encounter

MODS-APN: Obesity

Patient Screening

Screen for Obesity? Yes No

Ht: 65 in Wt: 190 lbs BMI: 31.6

Confounding Factors? Yes No

MODS-APN: Obesity

Patient Screening

Screen for Obesity? Yes No

Ht: 65 in Wt: 190 lbs BMI: 31.6

Confounding Factors? Yes No

Waist Circumference: 30.0-34.9

Risk Factors: ≥ 2

Screening Complete

Dx: BMI 30-34 obesity

Encounter Assess Create Obesity Plan

MODS-APN: Obesity

Dx: BMI 30-34 obesity Risk: ≥ 2

▼ Reduce body weight

No Plans Entered for this Dx:

Dx Pr Rx Pt Rf I

Screening Assess Encounter

MODS-APN: Obesity

Dx: BMI 30-34 obesity Risk: ≥ 2

▼ Reduce body weight

Diet: low calorie

Diet: portion control

Activity: Dec sedentary time

Dx Pr Rx Pt Rf I Del

Physical activity

▼ Activity: Dec sedentary time

Screening Assess Encounter

MODS-APN: Decision Support Approach

- Knowledge-based
- Knowledge centrally updated and pushed to devices during two-way synchronization process
- Knowledge executable
- Knowledge actionable
- Standards-based
- Integrated into APN workflow

MODS-APN: Results

- Sample – predominantly Hispanic or African-American
- Obesity
 - N=30,845 encounters (E=10,938, C=19,907)
 - Screening rate = 43.7% (>age 2)
 - Missed diagnosis – 24.5% E vs. 66.5% C
 - Number of diagnoses – significantly greater E>C
 - Number of interventions - significantly greater E>C
- Smoking Cessation
 - N=23,625 encounters (E=7,874, C=15,751)
 - Screening rate = 75.6% (>age 8)
 - Number of diagnoses – significantly greater E>C

MODS-APN: Results

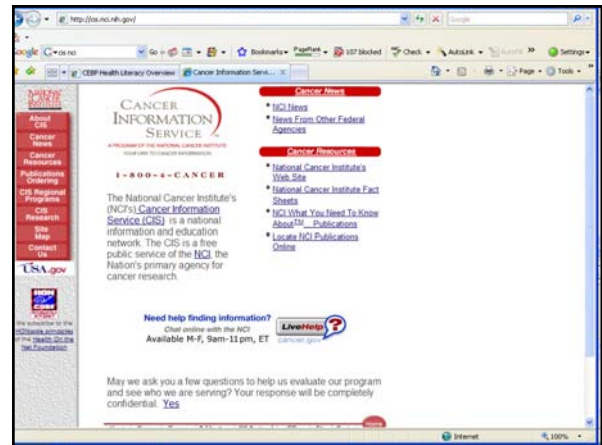
- **Adult Depression**
 - N=10,779 encounters (E=4,343, C=6,436)
 - Screening rate = 51.5% (>age 17)
 - Number of diagnoses – significantly greater E>C
- **Pediatric Depression**
 - N=7,085 encounters (E=2,832, C=4,253)
 - Screening rate = 22.5% (age 8-17)
 - Number of diagnoses – significantly greater E>C
- **Additional analyses in progress**

MODS-APN: Selected Publications

- Cimino JJ, Bakken S. **Personal digital educators**. *N Engl J Med*. 2005;352(9):860-862.
- Lee N-J, John R, Bakken S. **Functional requirements specification and data modeling for a PDA-based decision support system for the screening and management of obesity**. *Proceedings of the Annual Symposium on Computer Applications in Medical Care*. 2006:1002.
- Roberts WD, Patel VL, Stone PW, Bakken S. **Knowledge content of advance practice nurse and physician experts: a cognitive evaluation of clinical practice guideline comprehension**. *Stud Health Technol Inform*. 2006;122:476-480.
- Choi J, Currie LM, Wang D, Bakken S. **Encoding a clinical practice guideline using guideline interchange format: A case study of a depression screening and management guideline**. *Int J Med Inform*. 2007;76Suppl2:S302-07.
- Bakken S, Currie LM, Lee NJ, Roberts WD, Collins SA, Cimino JJ. **Integrating evidence into clinical information systems for nursing decision support**. *Int J Med Inform*. 2008;77(6):413-20.

Extending MODS-APN with "Infobuttons" and Information Prescriptions

- Improving Use of CIS in the Underserved Through Mobile Access and Decision Support (R21 CA126325)
- Smoking cessation model – Ask, Advise, Assess, Assist, and Arrange
- Reminder to screen/screening questions – Ask
- Guideline-based documentation template - Advise, Assess, Assist, and Arrange
- Context-specific access to Cancer Information Service Resources
- Information prescriptions
- Hypothesis – Approach will increase use of CIS by nurses in APN training and patients



NCI: Infobuttons



NCI: Infobuttons

Pick a date within the next 2 weeks to quit. That gives you enough time to get ready. But it's not so long that you will lose your drive to quit. Think about choosing a special day such as your birthday or wedding anniversary or New Year's Day. If you smoke at work quit on the weekend or during a day off. That way you'll already be cigarette-free when you return.

Resource from:
<http://www.smokefree.gov/guide/set.html>

An Information Prescription from Your Columbia Advanced Practice Nurse

You CAN Quit Smoking NOW!

Call the National Cancer Institute's Smoking Quitline 1-877-448-QUIT (1-877-448-7848). Smoking cessation resources are available to receive smoking-related questions in English or Spanish, Monday through Friday, 9:00 a.m. to 4:30 p.m. local time. Don't let that of course please contact the TTY service 1-800-312-8853.

Send an Instant message to a Smoking Cessation Counselor at quit@nccih.gov or www.nccih.gov.

Read the information that I have chosen for you:

- I have selected items for you and you will receive them in the mail.
- I have given items to you.
- Please order items by calling 1-877-448-QUIT (1-877-448-7848) or 1-800-4-CANCER (1-800-422-6277) or view via the web.

General Information	Targeted Information
<p>Choking for Air http://www.smokefree.gov/quitline_fa.pdf</p> <p>Smoking Guide in Spanish http://www.smokefree.gov/guide</p> <p>Smoking - The Facts (Spanish Print page) http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p> <p>Good Information for Smokers http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p>	<p>Advanced Resources - Products to Purchase http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p> <p>Smoking cessation app for iPhone http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p> <p>Smoking Quit - Power Page™ http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p> <p>Smoking Cessation http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p> <p>Smoking Cessation Resources http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p> <p>Smoking Cessation Resources http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p>

Handling Special Situations Without Smoking

<p>Smoking Stress - Without Smoking http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p> <p>Smoking Smoking and Pregnancy - Without Smoking http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p> <p>Smoking Around Your Smoker - Without Smoking http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p> <p>Smoking Around Your Smoker - Without Smoking http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p> <p>Smoking Around Your Smoker - Without Smoking http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p>	<p>Smoking Around Your Smoker - Without Smoking http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p> <p>Smoking Around Your Smoker - Without Smoking http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p> <p>Smoking Around Your Smoker - Without Smoking http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p> <p>Smoking Around Your Smoker - Without Smoking http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p> <p>Smoking Around Your Smoker - Without Smoking http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm</p>
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Registered Nurse _____ Date _____

Una Receta de Información de parte de su Enfermera de Práctica Avanzada de Columbia

¡PUÉDES Dejar de fumar YA!

Lláme a la línea del Instituto Nacional del Cáncer para dejar de fumar al 1-877-448-7848 (1-877-448-QUIT) entre las 9 de la mañana y las 4:30 de la tarde. Esperaristas le ayudarán a que aprenda por qué fumar causa. Le explicarán cómo mejorar su salud al dejar de fumar. Le ayudarán a descubrir diferentes formas de dejar de fumar y a descubrir un plan de acción en el que pueda hacer frente a sus circunstancias personales. Las personas con problemas de adicción que contactan con equipo TTY pueden llamar al 1-800-312-8853.

Lea la información que yo le elegí para usted:

- Si no lo ha leído para usted y usted los recibirá por correo.
- Si no lo ha leído a usted.
- Por favor envíelos llamando al 1-877-448-QUIT (1-877-448-7848) o 1-800-4-CANCER (1-800-422-6277) o envíelos por la red de comunicaciones a "Smoker".

Información

- Consejos para dejar de fumar: No lo deje para mañana, deje de fumar hoy
http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm
- Factores genéticos y el cáncer: preguntas y respuestas
http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm
- Preguntas y respuestas sobre dejar de fumar
http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm
- Tratamiento farmacológico de la adicción al tabaco (medicamentos)
http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm
- Recursos de información para fumadores
http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm
- Dejar de fumar para fumar
http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm
- Recursos en español y guías
http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm

Enfermera Titulada _____ Fecha _____

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For Adolescents

- Adolescent Stress: Youth & Tobacco
http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm
- The Health Consequences of Smoking: A Report of the Surgeon General
http://www.smokefree.gov/quitline/quitlinefacts/faq/faq_spa.htm

Registered Nurse _____ Date _____

NCI: Results

- Data collection in progress
- Use of CIS resources by nurse via PDA
- Use of CIS resources by patient (information prescriptions)

Tailored Interventions for Management of Depressive Symptoms - Microsoft Internet Explorer

TIDES Tailored Interventions for Management of Depressive Symptoms

You Deserve to Feel Good and Live Better

Do things you used to enjoy just not seem as fun anymore? Have you given up on activities, not because you can't do them, but because they just seem "blah"? Not quite?

If you feel this way a lot, you might have depression. Depression is not just a mood, it's also a common disorder in HIV-positive people.

About one in every ten people with HIV is depressed. It affects their quality of life and their ability to take medications.

Some people do not know they have depression because it creeps up on them slowly. Plus, they might think it is another HIV symptom.

TIDES will help you figure out how you are doing right now and what you can do to make yourself feel better. Please follow the instructions on each page.

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Register 1 of 2 - Microsoft Internet Explorer

TIDES Tailored Interventions for Management of Depressive Symptoms

Register (1 of 2)

Please pick a user name (Use between 4 and 8 characters without any spaces. You can use letters, numbers or both.)

User Name: _____

Please pick a password (Use between 6 and 8 characters without any spaces. You can use letters, numbers or both.)

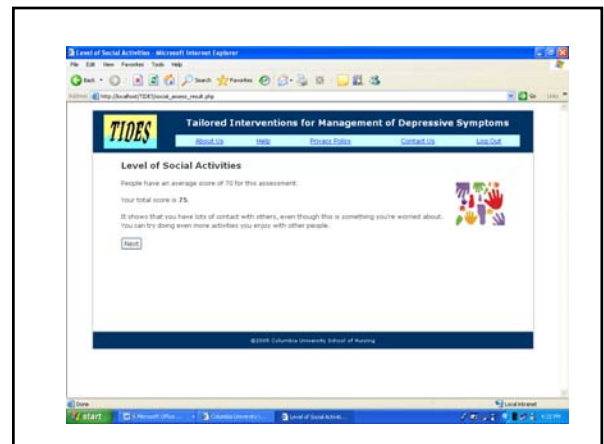
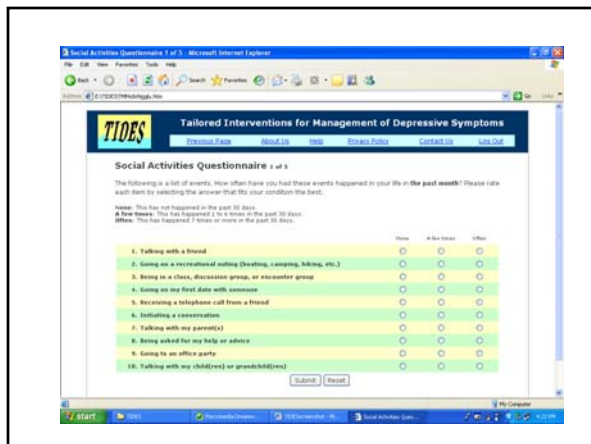
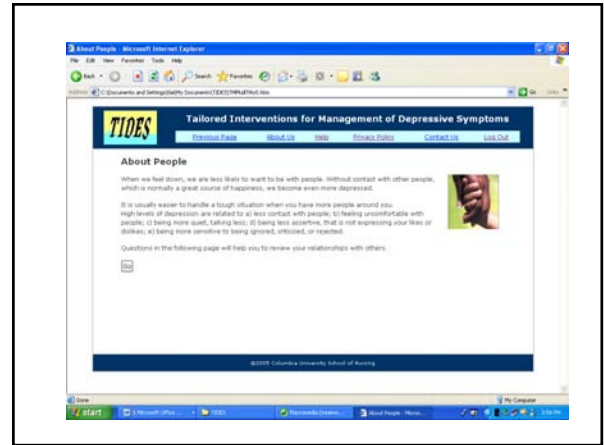
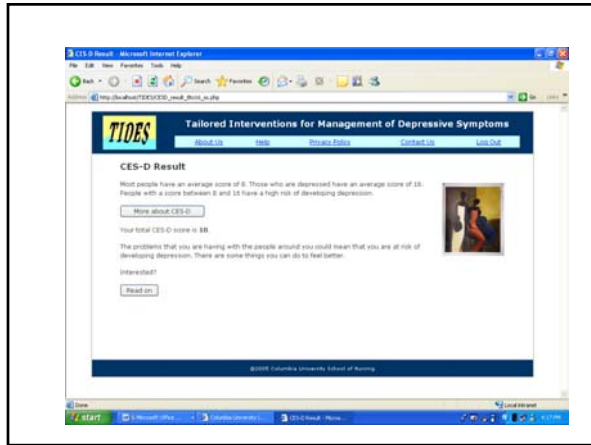
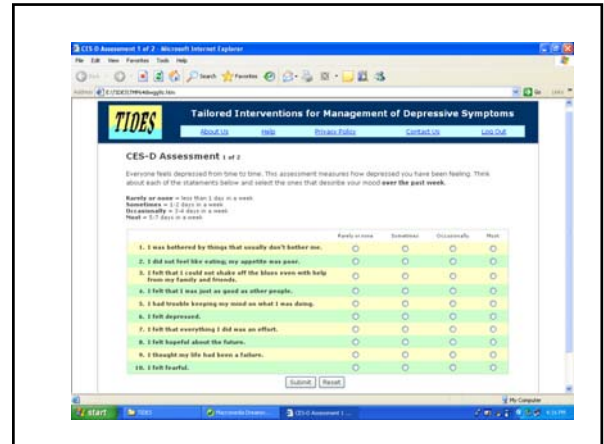
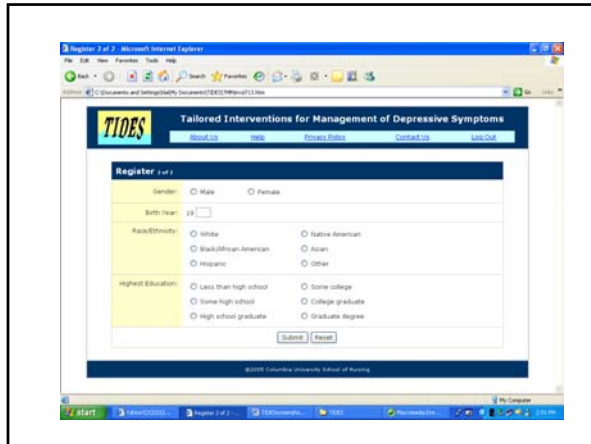
Password: _____

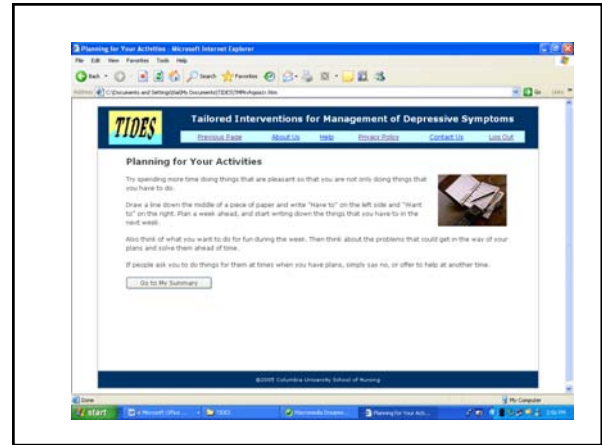
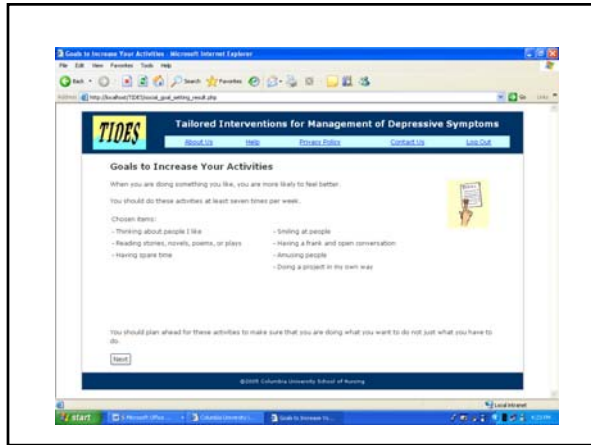
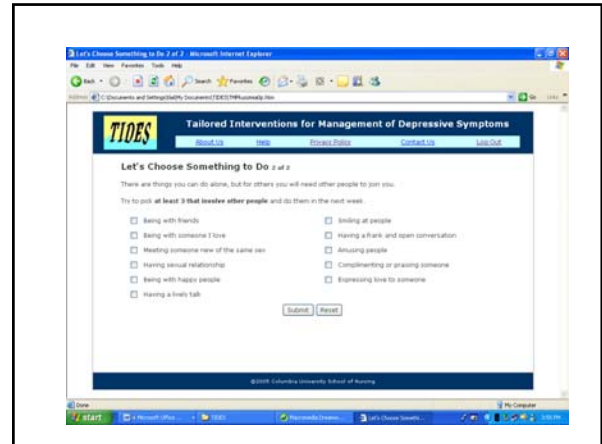
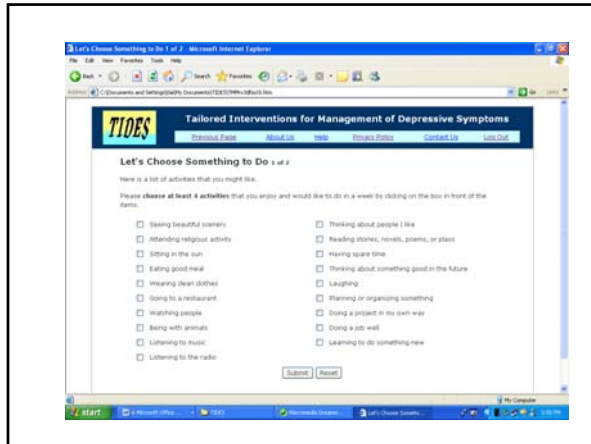
Please use your password again.

Confirm Password: _____

[Submit] [Reset]

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Results

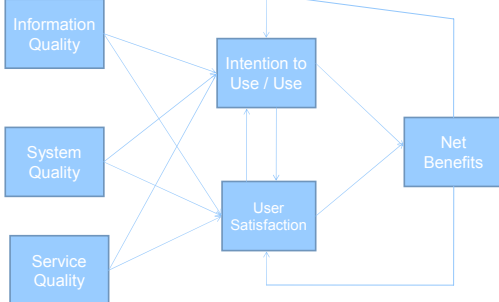
- Sample predominantly African-American
- The final version: 73 messages
 - Average Readability Level: 6.0
 - Average Word Count: 103
 - A short training session was developed
 - Acceptability high
- Lai T-Y, Larson EL, Rockoff ML, Bakken S. User Acceptance of HIV TIDES - Tailored interventions for management of depressive symptoms in Persons Living with HIV/AIDS. Journal of the American Medical Informatics Association 2008; 15(2):217-226.

Facebook PPAALS

- Facebook for **Promoting Physical Activity Among Adolescent Latinos (PPAALS)**
- Facebook API as technical platform
- Focus of promoting physical activity among adolescent Latino immigrants through dissemination and translation of CDC physical activity guidelines
- Participatory design process
 - Adolescents, parents, teachers, and staff
 - Focus groups, iterative usability testing
- Mixed methods
 - Focus groups, key informant interviews
 - Surveys
 - Log file analysis

Key Behavioral Concepts	Facebook Features/Functions ¹ and Additional Project-Specific Features/Functions
Goal setting	User Profile – collection of information about a particular individual including interests, activities, project-specific step-goals – can include multi-media such as videos.
Reward for reaching goal	Non-monetary rewards (gifts) given to a user appear on the recipient's Wall . Project-specific icons will be designed and awarded when students' step goals are met.
Self-monitoring	Pedometer data will be uploaded to Facebook via a project-specific utility.
Motivation	In addition to News Feeds and Walls (see below), the team will develop a project-specific Motivational Interviewing (MINT) application that will include assessment of goals and values and discrepancies between these goals and values and the individual's behaviors.
Peer modeling and social support	Peer modeling and social support will be supported by the social network features of Facebook. The Wall is a space on each user's profile page that allows friends to post messages for the user to see. A user's wall is visible to anyone with the ability to see their full profile, and different users' wall posts show up in an individual's News Feed . Many users use their friends' walls for leaving short, temporal notes. News Feeds highlight information that includes profile changes, upcoming events, and birthdays, among other updates. The project will include an application to post project-specific messages to the News Feed .
Information and education	Project-specific multi-media information and education will be developed. For example, a Physical Activity Mashup (map plus database) that will display safe places to engage in various types of physical activity. Building upon the Facebook rating utility for movies, another possibility is to have individuals rate physical activity places.

Information System Success Model



DeLone & McLean 2002, 2003

Net Benefits

- **Physical activity**
 - Motivation
 - Enjoyment
 - Competence
 - Level (3-day recall, pedometer, accelerometer)
- **Health indicators**
 - Body mass index
 - Body fatness
 - Arm and waist circumference
 - Insulin resistance

Net Benefits

- **Cost-consequence analysis**
 - Costs
 - Absenteeism
 - Healthcare utilization
- **Public health impact**
 - Reach
 - Effectiveness

Conclusions

- Significant health disparities exist
- Informatics can be part of the solution
- Careful attention must be paid to usability issues for those with low levels of computer, functional, and health literacy
- National agendas for HIT and health disparities require additional points of intersection