



Foundational Evaluations in Support of mHealth Development: A Case Study from SmokefreeMom

February 10, 2016



smokefree.gov

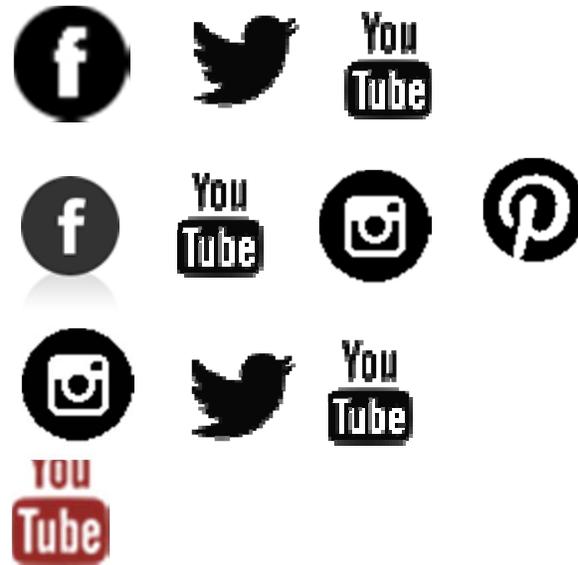
**NATIONAL
CANCER
INSTITUTE**

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smokefree.gov

INTRODUCTION

Smokefree.gov Initiative Overview



 **smokefreeVET**
 **smokefreeMIL**

SmokefreeMOM
HealthyYouTXT

Smokefree Apps:



PROMISE OF mHEALTH

- Mobile health (mHealth) resources offer significant potential to **expand reach and engagement** of behavioral health interventions, **particularly among vulnerable populations – including pregnant women**
- Need to better understand how mHealth technologies can be leveraged to promote health behavior change
- Conducted foundational evaluations to provide insights into the potential role of mHealth resources in reaching and engaging pregnant women who smoke

WHY FOCUS ON PREGNANT SMOKERS?

- Maternal smoking is a problem in high income countries (HICs)
 - Rates remain high despite ongoing public health efforts
 - **Higher prevalence in disadvantaged populations**
- Lack of accurate, population-based data on pregnant women's tobacco use in low-middle income countries (LMICs)
 - Prevalence generally lower than in high income countries
 - Rates likely to increase in the future

PRE/POSTNATAL HEALTH EFFECTS OF TOBACCO SMOKE EXPOSURE

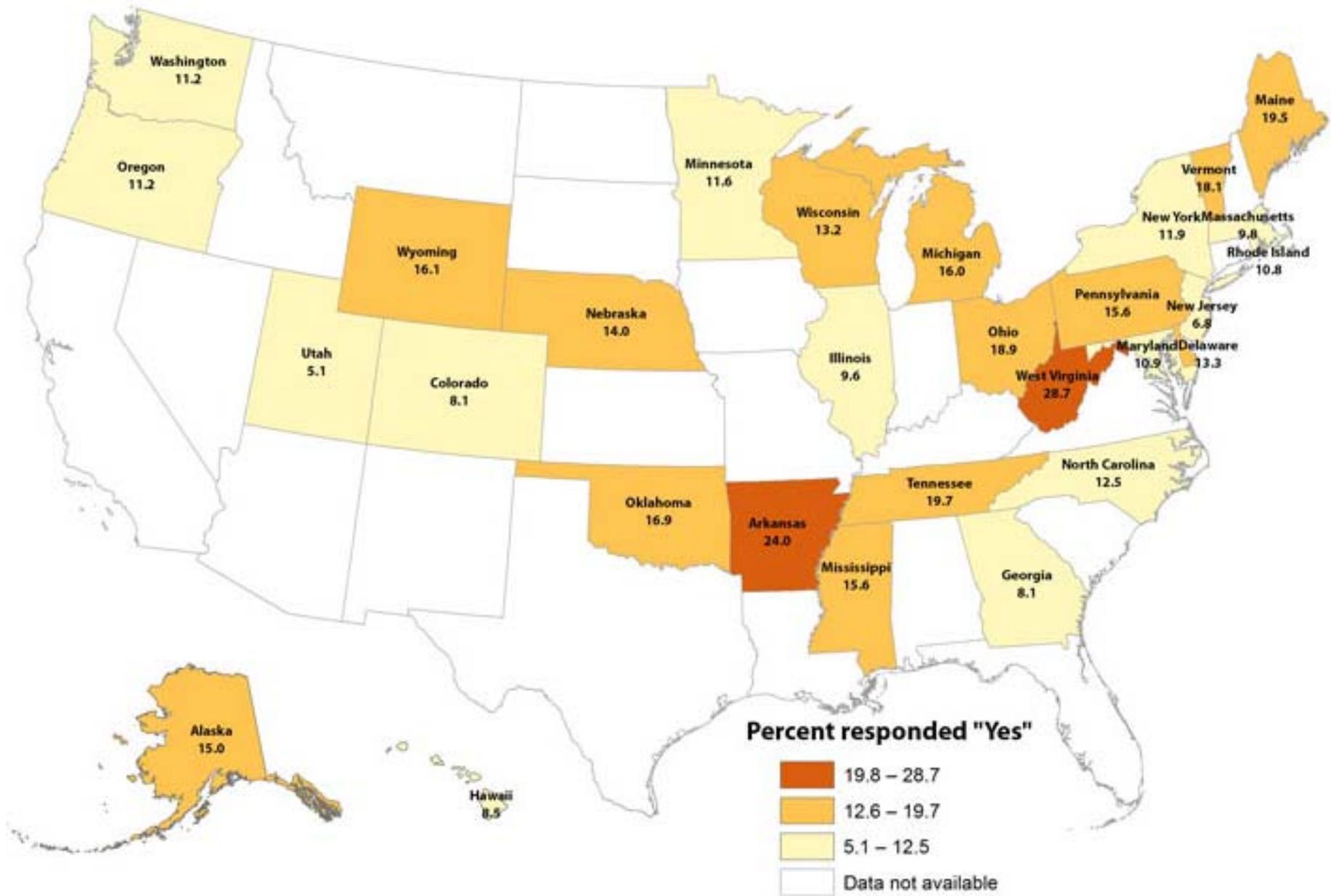
- Pre-term delivery
- Restricted fetal growth
- Low birth weight
- Sudden Infant Death Syndrome (SIDS)
- Respiratory & ear infections
- Reduced physical development
- Possible decrements on cognition & behavior?

CESSATION EFFORTS AMONG PREGNANT WOMEN

- **Natural History of Quitting**
 - Spontaneous quit rates between 45-50%
 - Of those who quit, most quit early in pregnancy
 - **70% relapse rate postpartum**

- **Barriers to Cessation**
 - Misconceptions
 - Stigma
 - Affect Management
 - Weight concerns

Figure 2: The Percentage of Mothers Who Smoked the Last 3 Months of Pregnancy, PRAMS States, 2008



EVALUATION PART 1: ENVIRONMENTAL SCAN OF ONLINE CONVERSATIONS

- Scan of content on social networking sites that target pregnant women, including pregnant smokers
- Environmental scan (“lurking”)
 - Who are pregnant smokers on the internet?
 - How do they interact with social media?
- Identify key social media platforms
- Develop tone and content
- Establish baseline metrics

MISINFORMATION/ MYTHS OF HEALTH EFFECTS OF TOBACCO ON BABY

Replies:

1-3 of 3 replies



by [candicesmommy](#) on Jul. 16, 2007 at 10:34 PM

i smoked all through my pregnancy and my daughter was 20 inches 6.8 lbs and about 5 days early. all women are different but maybe the gum or patches might make you feel better without putting all the other additives of cigarettes into your system. stress is always a factor in quitting, that is why i haven't quit yet. but it is just an idea...or research it online with stop smoking programs.



by [blismommy](#) on Jul. 16, 2007 at 10:34 PM

I also smoked thru both my pregnancies [sic]...My 1st daughter was 8 lbs and my second was 7.8 lbs and neither one had any problems and still don't. Just hang in there im sure everything will be fine.



by [mamajojo](#) on Jul. 16, 2007 at 10:34 PM

i hate seeing pregnant women who smoke... i don't know what to say... all i can say is that you did the right thing that first step!! you made it happen, but some of the things that come up, people say "that must have been from me smoking"...

my suggestion would be to think negative thoughts while you smoke... imagine all those chemicals and poisons that are going into into you and your babys blood stream....

i hope you can over come it, at least until you deliver. i tried quitting every pregnancy, but failed to not start again.. :(

I also smoked thru both my pregnancies [sic]...My 1st daughter was 8 lbs and my second was 7.8 lbs and neither one had any problems and still don't. Just hang in there im sure everything will be fine.

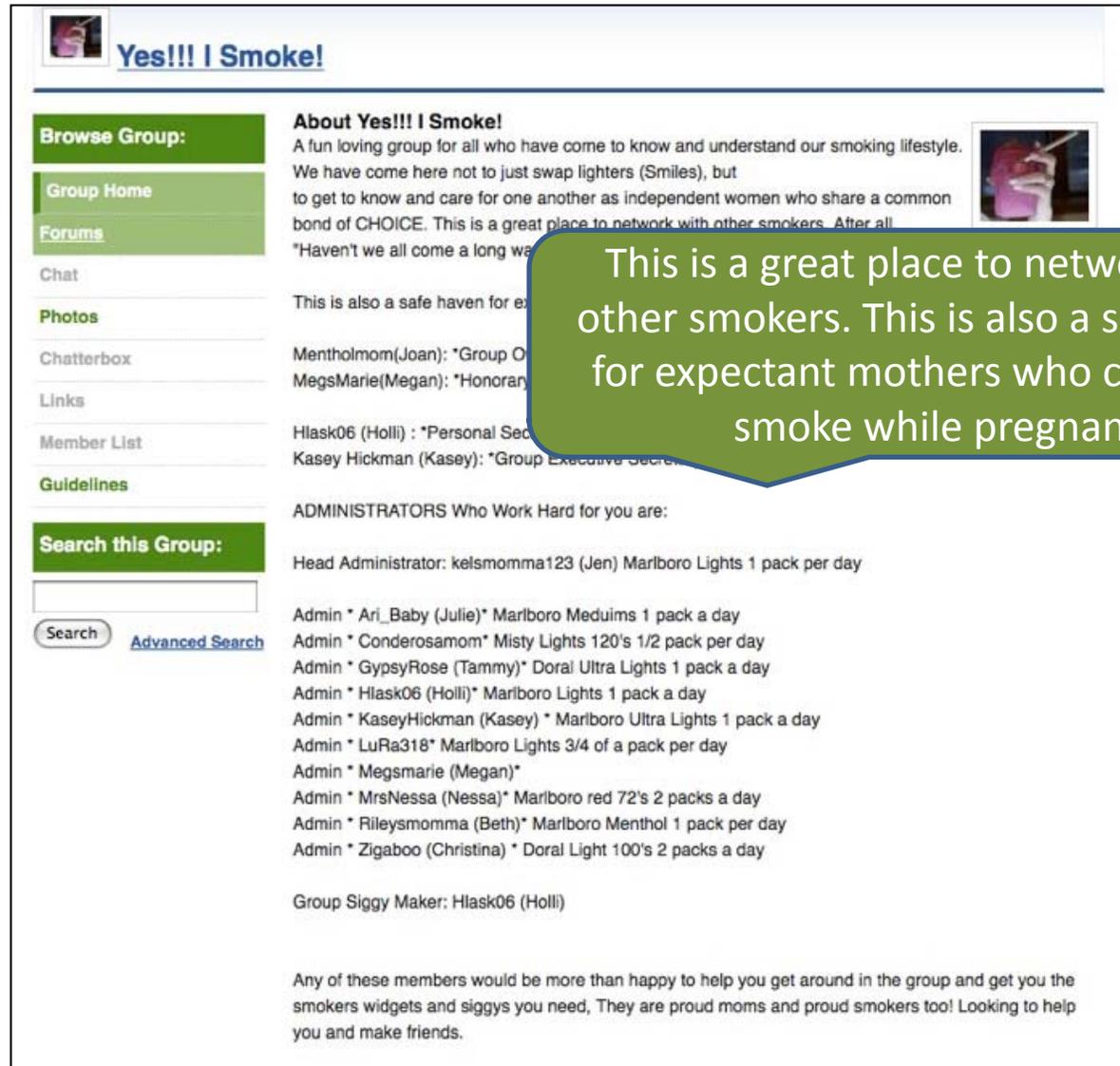
POOR SUPPORT BY NONSMOKERS IN ONLINE COMMUNITIES

The screenshot shows a forum thread titled "Smoking while breastfeeding". The main post is by user "imechard" from October 30, 2009. A blue callout box points to this post, containing the text: "I find it mind boggling that someone is allowed to treat a new human being like that and still justify it. You are giving your child a very unhealthy start in life...". Below this, a second post is by user "BluRapture80" from June 02, 2010. A red callout box points to a reply by user "Amanda345" from the same date, which reads: "Somking is bad for everyone around you, not just you!!!! Not only are you KILLING yourself, but your family as well!!!! Even if you just smoke outside, it's in your hair, it's on your clothes, it's on your skin, it's on your breath, it's in your body!!!! Children have enough to overcome already, why would you want to risk adding anything else to that list?!?". The thread also shows a "Share" button and a "Replies 33" indicator.

I find it mind boggling that someone is allowed to treat a new human being like that and still justify it. You are giving your child a very unhealthy start in life...

Not only are you KILLING yourself, but your family as well!!!! Children have enough to overcome already, why would you want to risk adding anything else to that list?!?

SUBGROUP OF PREGNANT SMOKERS WHO ARE HIGHLY RESISTANT TO QUITTING



The screenshot shows a Facebook group page for "Yes!!! I Smoke!". The page includes a navigation menu on the left with options like "Browse Group:", "Group Home", "Forums", "Chat", "Photos", "Chatterbox", "Links", "Member List", and "Guidelines". The main content area features an "About Yes!!! I Smoke!" section with a description of the group as a safe haven for smokers. Below this is a list of administrators and their smoking habits. A callout box with a green background and white text is overlaid on the right side of the page, stating: "This is a great place to network with other smokers. This is also a safe haven for expectant mothers who choose to smoke while pregnant".

Yes!!! I Smoke!

Browse Group:

- Group Home
- Forums
- Chat
- Photos
- Chatterbox
- Links
- Member List
- Guidelines

About Yes!!! I Smoke!

A fun loving group for all who have come to know and understand our smoking lifestyle. We have come here not to just swap lighters (Smiles), but to get to know and care for one another as independent women who share a common bond of CHOICE. This is a great place to network with other smokers. After all "Haven't we all come a long way

This is also a safe haven for expectant mothers who choose to smoke while pregnant

ADMINISTRATORS Who Work Hard for you are:

Head Administrator: kelsmomma123 (Jen) Marlboro Lights 1 pack per day

Admin * Ari_Baby (Julie)* Marlboro Meduims 1 pack a day
Admin * Conderosamom* Misty Lights 120's 1/2 pack per day
Admin * GypsyRose (Tammy)* Doral Ultra Lights 1 pack a day
Admin * Hlask06 (Holli)* Marlboro Lights 1 pack a day
Admin * KaseyHickman (Kasey)* Marlboro Ultra Lights 1 pack a day
Admin * LuRa318* Marlboro Lights 3/4 of a pack per day
Admin * Megsmarie (Megan)*
Admin * MrsNessa (Nessa)* Marlboro red 72's 2 packs a day
Admin * Rileysmomma (Beth)* Marlboro Menthol 1 pack per day
Admin * Zigaboo (Christina)* Doral Light 100's 2 packs a day

Group Siggie Maker: Hlask06 (Holli)

Any of these members would be more than happy to help you get around in the group and get you the smokers widgets and siggys you need, They are proud moms and proud smokers too! Looking to help you and make friends.

Smokefree Women

The screenshot shows the homepage of the Smokefree Women website. At the top left is the logo "smokefreewomen" in black and pink. To the right is a search bar with the placeholder text "Enter Search Criteria" and a "Search" button. Below the logo is a navigation menu with the following items: "Quit Smoking", "Pregnancy & Motherhood", "Support", "Stress & Mood", "Weight Management", "Healthier Lifestyle", and "Tools".

The main content area is divided into several sections:

- Smokefree MOM:** A photograph of a pregnant woman in a white shirt looking at her smartphone. Below the photo is a dark grey box with white text: "SmokefreeMOM is a mobile text messaging program that provides 24/7 tips, advice, and encouragement to help pregnant women quit smoking."
- Smokefree Women helps you or someone you care about quit smoking...** A light grey box with black text: "Smokefree Women helps you or someone you care about quit smoking by providing quitting advice, tips and support specific to women's needs, including expecting mothers."
- Quit Guide:** A light grey box with the heading "Quit Guide" and text: "From those of us at Smokefree Women... Congratulations! You are taking the first step towards a healthier, new lifestyle." Below the text is a photograph of a woman in a striped shirt and a green hat looking at her phone. An orange button labeled "Start Today" is at the bottom.
- Together WE ARE STRONG ENOUGH TO QUIT:** A section with social media icons for Facebook, Twitter, YouTube, Pinterest, and Instagram. Below the icons are small share icons.
- Pinterest QUIT KIT challenge:** A blue banner with a pink dotted border. The text reads: "Pinterest QUIT KIT challenge (May 18 - 31)".
- NEWS:** A section with the heading "NEWS" and a paragraph: "Thanks to everyone who joined the Pinterest Quit Kit Challenge. Be sure to check out our three featured participants!"
- Our Tools:** A light blue box with the heading "Our Tools" and text: "The Smokefree Women Web site includes a variety of interactive tools to help you quit smoking."

SFW Website Content: Pregnancy and Motherhood

The screenshot shows the website's navigation bar with 'smokefree' in black and 'women' in pink. The 'Pregnancy & Motherhood' menu item is highlighted. Below the navigation is a breadcrumb trail 'Home » Pregnancy & Motherhood' and a large heading 'PREGNANCY & MOTHERHOOD'. A video player features a thumbnail with a pregnant woman and the text '(With Voiceover) Re... And be healthy.' To the right, a text block explains that pregnancy doesn't make quitting smoking easier and offers resources. Below this is a list of five article links: 'Before Your Baby is Born', 'From Birth to 2 Years', 'Smokefree Mom', 'Healthy Kids', and 'Parenting & Relationships'. A 'Related Articles' section follows, with two article cards. The first card shows a pregnant woman in a red dress, titled 'Your Feelings, Your Friends', with a 'SHARE' button and a URL fragment 'cy-motherhood.aspx#'. The second card shows a woman holding a baby, titled 'A Healthy Start Can Begin Now', with a 'SHARE' button.

smokefreewomen

Quit Smoking **Pregnancy & Motherhood** Support Stress & Mood Weight Ma

Home » Pregnancy & Motherhood

PREGNANCY & MOTHERHOOD

(With Voiceover) Re...

And be *healthy.*

women.smokefree.gov

Being pregnant doesn't magically make quitting smoking easier. Even if women quit smoking when they're pregnant, the stress of parenting can lead some women to go back to smoking after they quit. This section has information to help you make the decision, when you're ready, to become and stay a smokefree mom. It also has a bunch of other information to help you and your kids live a healthier lifestyle.

Check out an article just for you:

- [Before Your Baby is Born](#)
- [From Birth to 2 Years](#)
- [Smokefree Mom](#)
- [Healthy Kids](#)
- [Parenting & Relationships](#)

Related Articles

Your Feelings, Your Friends
Read full story: [Your Feelings, Your Friends](#)
>>
[SHARE](#)

A Healthy Start Can Begin Now
Read full story: [A Healthy Start Can Begin Now](#)
>>
[SHARE](#)

cy-motherhood.aspx#

EVALUATION PART 2: SmokefreeTxt for Pregnant Women

smokefreewomen

**PREGNANCY &
NEW MOTHER
IN-DEPTH INTERVIEWS:
FINAL REPORT**

PURPOSE OF EVALUATION

- Explore **women's knowledge, attitudes, and behaviors** around health behaviors and **smoking cessation during pregnancy**
- Inform the development of messages and program structure for a text-based cessation intervention designed for pregnant women who smoke

EVALUATION DESIGN

- Nine in-depth interviews (IDI's)
- Six pregnant women and three new moms
- 45 min phone interview & \$25 gift card compensation
- Recruited eight women via text message from the SmokefreeTXT program and one woman via the Smokefree Women Twitter account

EVALUATION DESIGN

Topics Explored

- Pregnant smokers' **lifestyles**
- Pregnant smokers' **knowledge about cessation and health**
- Pregnant smokers' **attitudes about cessation and health**
- **Experiences of new mothers who attempted to quit while pregnant**
- **Changes in smokefree journey** since having a child
- **New mother's attitudes towards smoking cessation texts**

PARTICIPANT CHARACTERISTICS

Table 1. Summary of Pregnant Women (n=6)

Race/ethnicity	2: Black or African American	2: White	1: Native Hawaiian or Pacific Islander	1: Other		
Age	23	24	25	26	27	39
Location	FL	NV	NY	2: PA	TX	
Education level	1: less than high school	1: graduated high school	3: some college	1: graduated college		
Current smoking status	1: smokefree	4: ≤5 cigarettes per day	1: ½ pack per day			
Time smoking	4y	9y	2: 10y	13y	24y	
Months pregnant	1m	2m	3m	5m	2: 6m	
Own a smartphone	All 6					

Table 2. Summary of New Moms (n=3)

Race/ethnicity	All 3 White				
Age	2: 22		32		
Location	AL	IN	WI		
Education level	2: some college		1: graduated college		
Current smoking status	2: smokefree		1: <½ pack		
Time smoking	5–10y				
Age of newborn	4m	5m	6m		
Own a smartphone	All 3				

SMOKING HISTORY

- Most of the women started smoking in their teens
- All of the women had attempted to quit multiple times, using an array of methods
- Methods included:
 - Cold turkey
 - Gum
 - Weaning themselves off
 - Patch
 - Smoking cessation class/group
 - E-cigarettes
 - Reading smoking facts online
- Six of the nine women continued to smoke, demonstrating the **need for more effective interventions**

"I would smoke while I was pregnant and then I would quit when [my children] were born because I was always trying to breastfeed. But, when it [breastfeeding] didn't work out I would go back to it [smoking]." -22, 4 month old, 6 months smokefree

REASONS FOR SMOKING: STRESS

- **Stress was most commonly mentioned as reason for smoking**
- Biggest sources of stress in women's lives were family or current or former partners (boyfriends, their baby's father, or their ex-husband)
- Changing hormone levels caused stress
- Difficult previous pregnancies or miscarriages caused stress

"When my baby's dad calls and makes me mad, I may smoke three or four cigarettes. It depends on how upset I get." –26, 1 month pregnant, 2–3 cigarettes per day

"It's hard to quit, and smoking helps me deal with stress. I feel calmer when I smoke." –27, 5 months pregnant, 3 cigarettes per day

REASONS FOR SMOKING: BOREDOM

- **Many women smoked out of boredom**
- Women came up with a variety of ways to try and distract themselves from smoking cravings
- Distractions included: eating something instead of smoking, arts and crafts, writing poetry, exercise, painting nails, meditating and deep breathing, calculating \$ saved

"It [smoking] helps with boredom, it's something that you do—in the car, after you eat—I've been doing it for 24 years." –39, 3 months pregnant, 2 months smokefree

ENVIRONMENTAL INFLUENCES

Findings:

- **Many women lived with a smoker, or had family members or friends who smoked**
- **Pregnant women face environmental stigma for their smoking behavior** which is why they are a difficult to reach population

"My boyfriend smokes. He is somewhat supportive, but I think he forgets. He will offer me cigarettes." –27, 5 months pregnant, 3 cigarettes per day

"I didn't smoke outside of my house. I only smoked with my husband or with my in-laws. I knew the stigma people get when you see a pregnant lady smoking so I kind of kept it to myself." –22, 4 month old, 6 months smokefree

- **Environmental triggers to smoke** such as driving, being around friends who smoke, drinking alcohol, or after eating or showering were challenging to ignore

KNOWLEDGE AND BELIEFS ABOUT QUITTING WHILE PREGNANT

All participants acknowledged that quitting would be healthier for them and their unborn baby or children

- **Three women heard friends say that it was unsafe to quit while pregnant, although they didn't necessarily believe this**
- **Two women reported taking advice from their physician that it was more important to quit after their baby was born, rather than before**

"I've heard people say before that it's very stressful for the baby to quit, but every piece of research I've found disproves that." –23, 6 months pregnant, 3 cigarettes per day

"As I was smoking cigarettes I was always worried something would happen to the baby. That was a big fear. I always worried about the heartbeat, him being a small baby. The doctor said, 'I would rather you quit after you have the baby, because at least now there is a filter, and when he comes out there is no filter'." –22, 5 month old, 4 months smokefree

PROGRAM FEEDBACK

- 7 out of 9 women were currently or previously signed up for the SmokefreeTXT program
- Overall women found the SmokefreeTXT program helpful

"I liked the program. It keeps you going, it keeps you accountable. It helps." –22, 5 month old, 4 months

- Two women requested **more suggestions of alternative things to do instead of smoking** and more reminders about **the benefits of quitting**
- Two women suggested texts could be **more personalized**
 - including **womens' names** in messages,
 - **tailoring** the messages **based on individuals' goals**

IMPORTANCE OF PERSONALIZATION

- Interest in **text messages on health topics besides smoking:**
 - diet and nutrition, kid-friendly recipes, weight gain, stress, exercise, and general health

"Reading about baby development makes it real and makes me not want to smoke. I'm not showing, not feeling the baby, so it is easy to forget that you have so much going on inside"
-24, 2 months pregnant, <5 cigarettes per day

- **Other content distracting?**
- More about the **benefits of quitting**
- **Include women's names** in the messages
- **Personalizing** texts based on woman's goals
- A parallel text message program for people who are trying to support a pregnant smoker

"I thought I would get more information back. Maybe if the messages were more personal. It could ask, 'Why are you craving?', you answer back, and it would say, 'Here are some things to do instead,'—so it was more like a conversation." -27, 5 months pregnant, 3 cigarettes per day

MESSAGE TONE

- Participants described the tone of the messages as **positive, kind, open, and nonjudgmental.**
- Women **most liked that the messages were helpful, simple, and supportive**
- **Slightly over half** of women said that they would like **more negative toned text messages** for motivation to quit

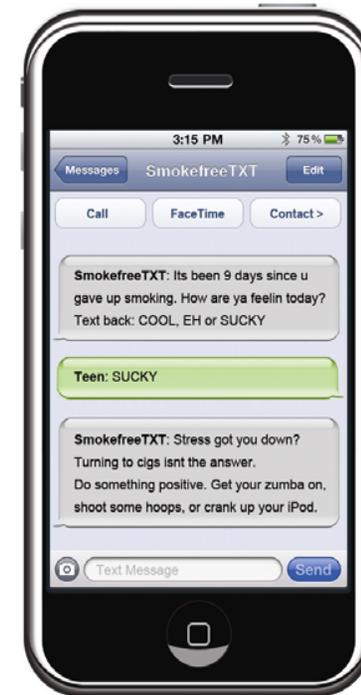
"I love that it gives you little kudos and tells you that you are doing a good job. It makes you want to try a little harder." –39, 3 months pregnant, 2 months smokefree

"Obviously it is not a real person, but it does keep you motivated. I don't know how else to explain it. It is something to keep you going if you don't have that support." –22, 5 month old, 4 months smokefree

"I would like more aggressive, persistent, drill instructor text messages. Like, 'this is what is happening to your baby right now'." –24, 2 months pregnant, <5 cigarettes per day

SmokefreeMOM

- **Based on SFTXT smoking cessation intervention**
- ****Users select quit goal****
- Opportunities to change goal
- **Bidirectional assessment:** Assess user's mood, craving, & smokefree status
- **Bidirectional keywords:** User initiated request for help (i.e. CRAVE, STRESS, SLIP)
- Text-based assessment at 1-,3- and 6-month post treatment
- Healthy Mom/Baby messages throughout
- Cessation/relapse prevention re-engagement around due date



FUTURE RECOMMENDATIONS

1. Allow users to select the **number** of text messages that they receive and the **timing** (including random).

2. Include a **core set of messages** and allow users to **personalize** additional message types they would like to receive

- Messages about diet, physical activity, or stress management
- Facts and statistics of smoking health risks for the woman and her baby/children.
- Monetary, and other non-health benefits of quitting

3. **Personalize** content based on characteristics of users:

- Pregnant or new mother
 - For pregnant women, messages debunking myths about quitting when pregnant
- Include user's name
- Whether others in their social network smoke

FUTURE RECOMMENDATIONS

4. Increase **interactivity** of program:

- Add additional probes to the on-demand and question features for users to respond to
- Give users the option to tell the program that they are not having any cravings
- Add new questions and keywords related to pregnancy that users can text to receive on-demand messages

5. Add a **greater variety** of suggestions on what users can do instead of smoking, particularly suggestions related to their baby or children.

6. Include messages that **link users** to other Smokefree resources

- Encourage users to go on Facebook, Instagram, Smokefree social media pages and Smokefree Women Challenge videos for ideas of things to do instead of smoking.

FUTURE RECOMMENDATIONS

7. Work with **healthcare settings** to integrate SmokefreeMOM into EMRs – as a resource providers can recommend to their patients in clinical encounters.

- Several of the women reported hearing about SmokefreeTXT from their doctor

THANK YOU FOR YOUR ATTENTION

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