

# Cancer Prevention with Mobile Messaging: Applications in Melanoma & Tobacco

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*2021 Cancer Prevention Dialogue*

*I have no relevant financial relationships within the past 24 months*

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# mHealth Technology for Cancer Prevention

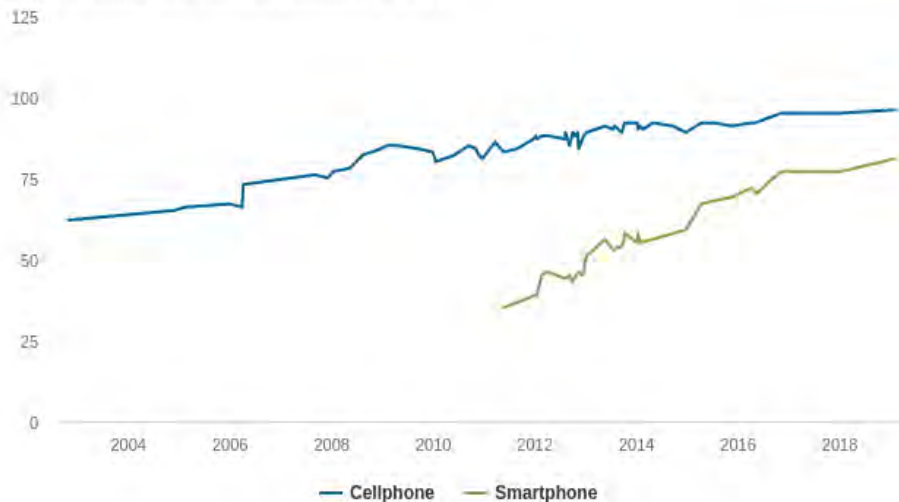
*“The boom in mHealth has been made possible by high penetration of internet access and increased use of smart phones...mHealth technologies offer the ability to scale and engage entire populations, develop supportive social networks, connect patients and providers, encourage adherence with cancer care, and collect vast quantities of data for advancing cancer research.”*

-Prochaska, Coughlin, & Lyons, 2017 [asco.org/edbook](http://asco.org/edbook)

# High Potential Reach

## Mobile phone ownership

% of U.S. adults who own the following devices



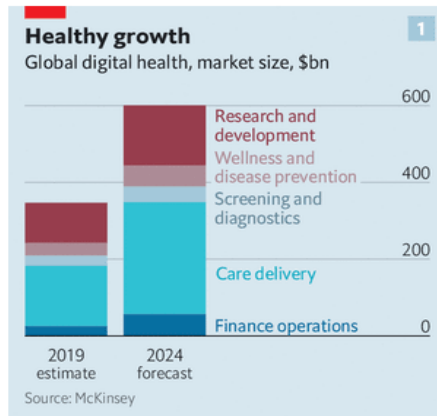
Source: Surveys conducted 2002-2019.

	Any cellphone	Smartphone	Cellphone, but not smartphone
Total	96%	81%	15%
Men	98%	84%	14%
Women	95%	79%	16%
Ages 18-29	99%	96%	4%
30-49	99%	92%	6%
50-64	95%	79%	17%
65+	91%	53%	39%
White	96%	82%	14%
Black	98%	80%	17%
Hispanic	96%	79%	17%
Less than high school graduate	92%	66%	25%
High school graduate	96%	72%	24%
Some college	96%	85%	11%
College graduate	98%	91%	7%
Less than \$30,000	95%	71%	23%
\$30,000-\$49,999	96%	78%	18%
\$50,000-\$74,999	98%	90%	8%
\$75,000+	100%	95%	5%
Urban	97%	83%	13%
Suburban	96%	83%	13%
Rural	95%	71%	24%

<https://www.pewresearch.org/internet/fact-sheet/mobile/>

# High Potential Impact

- Reach x Efficacy = Impact (Glasgow, RE-AIM Framework)
- 2020-2021 (pandemic) shift in public health and medicine



The Economist

*“Global digital health revenues – from telemedicine, online pharmacies, wearable devices, and so on – will rise from \$350 billion last year to \$600 billion in 2024...the groundwork for what looks poised to be the next trillion dollar business has been accelerated by the (COVID-19) pandemic.”*

-The Economist, The Dawn of Digital Medicine, 12/3/2020

# Two Examples

	Tanning	Tobacco (Waterpipe)
Established Cancer Risk Factor	X	X
Cancer Risk Preventable	X	X
Emerge in Young People	X	X
Addictive Behavior	X	X
Low Motivation to Change	X	X
Infrequent (Relatively)	X	X
No/Little Intervention Science	X	X

# Example 1: Indoor Tanning

- Population: Young adult women, + screen for indoor tanning addiction
- Design: 2 arm (control, intervention) parallel group RCT
- Intervention Duration/Dose: 4 weeks, 2 message days/week
- Intervention Content: Text only risks of indoor tanning, motivation-enhancement to support quitting, tailored to readiness to change
- Outcomes: Cessation, motivation to quit at 4 weeks (interim data, trial ongoing with follow up to 3 months)

Funding: Prevent Cancer Foundation; Trial Info: NCT04055272

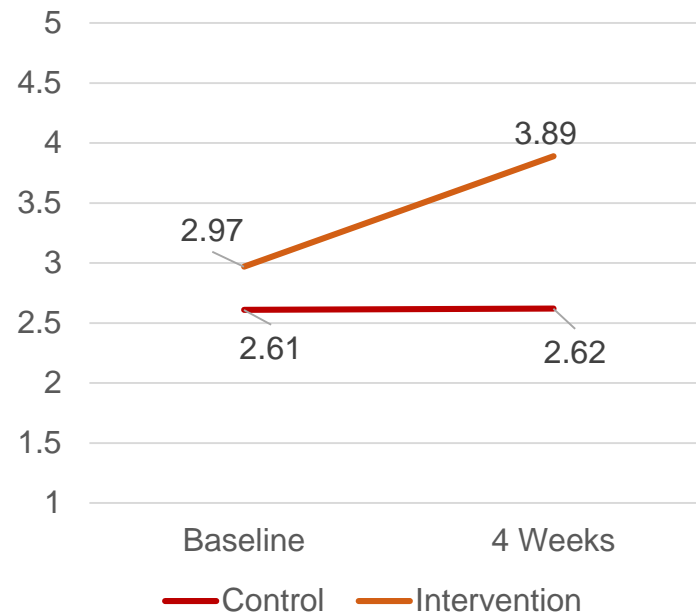
# Interim Outcomes

N=116	Control	Intervention
Quit at 4 Weeks		
Yes	12.3%	23.7%
No	87.7%	76.3%

P for quitting = 0.10 (interim analysis with ~50% accrual goal)

Motivation to Quit (MTQ, range 1-7) did not differ significantly at baseline, differed significantly at 4-week follow up ( $p < .001$ ) in intervention arm vs. control arm.

### Change in MTQ by Arm



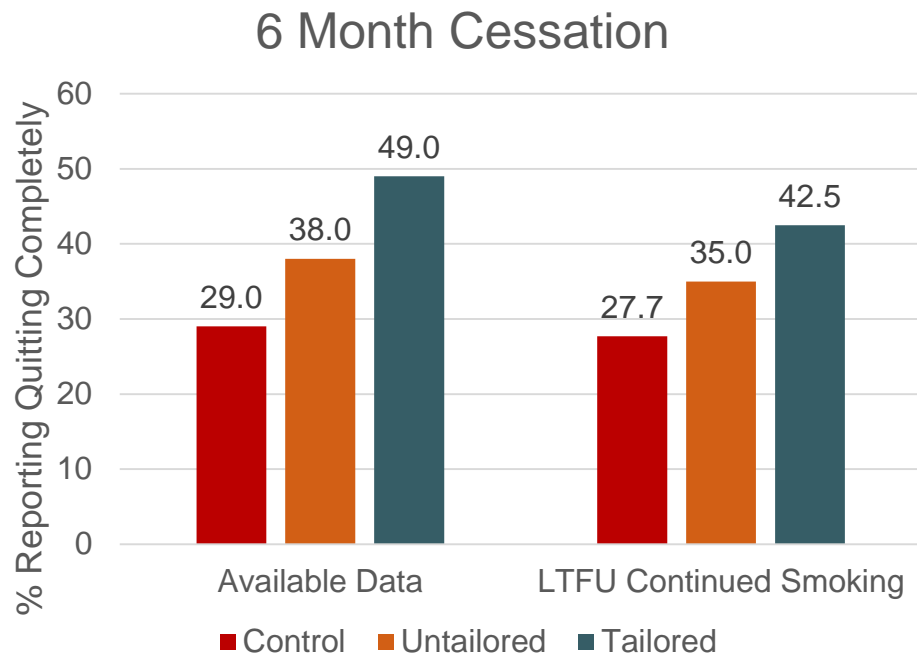
## Example 2: Waterpipe (Hookah) Smoking Cessation

- Population: Young adult waterpipe tobacco smokers
- Design: 3 arm (control, untailed intervention, tailored intervention) parallel group RCT
- Intervention Duration/Dose: 6 weeks, 2 message days/week
- Intervention Content: Text + image, risks of waterpipe tobacco use, motivation-enhancement to support quitting
- Outcomes: Cessation at 6 weeks, 3 months, 6 months

Funding: NIH R01CA217861; Trial Info: NCT03595280



# Cessation Outcomes



- Using available data, cessation was significantly higher in tailored arm (OR = 2.36, 95% CI 1.34, 4.15).
- Assuming those lost to follow-up continued smoking, cessation was significantly higher in tailored arm (OR = 1.92, 95% CI 1.11, 3.33).

# Thinking Forward 1: Focusing On Efficacy

- *“There is moderate certainty evidence of the benefit of text messaging interventions...the evidence comparing smart phone apps with less intensive support was of very low certainty, more RCTs are needed to test these interventions.”*  
–Whittaker et al. 2019, Cochrane Review of mHealth smoking cessation interventions
- In review of apps for smoking and other behavior change: *“Most included a limited number of techniques to promote sustained behavior change.”*  
–McKee et al., 2019

## Thinking Forward 2: Focusing On Equity

*“Just as...robust clinical trial evidence [is] critically necessary...consideration of how mHealth technology can be adapted and strategically delivered to...the most vulnerable patients is of equal value.”*

-Hswen & Vishwanath, 2015

- Smoking cessation & geographic disparities:

*“Smokers from non-metro areas appeared to seek out and use digital cessation resources...broadband availability and smartphone penetration may have facilitated the proportional increase...”*

Amato & Graham, 2018 (BecomeAnEx)

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Thank You!

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