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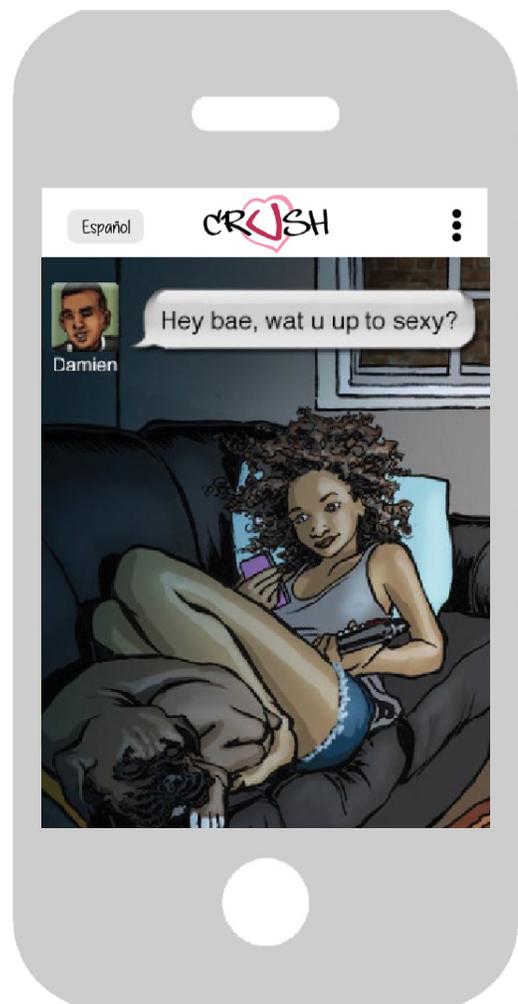
## Crush: Sex Ed for Real Life.

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### What is Crush?

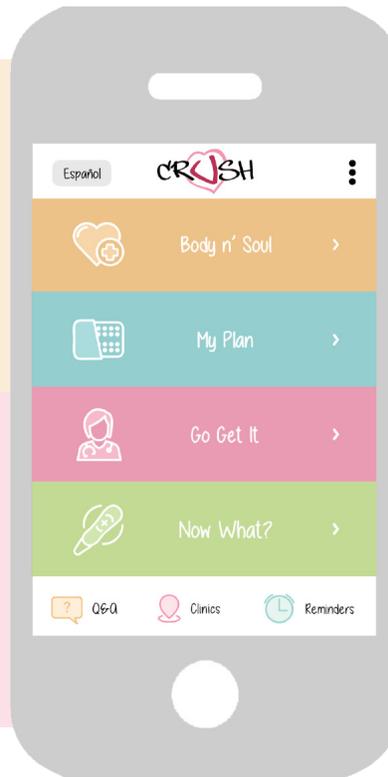
Crush is an innovative digital tool that disseminates non-judgmental information about sexual health directly to young women through their smartphones. Crush uses interactive, multimedia features to enhance engagement and support diverse learning styles. Crush is designed for today's generation of adolescent women who may be having sex or are considering doing so and need quick and convenient access to sexual health information.

Crush provides medically accurate information on a broad range of subjects related to adolescent sexual health, healthcare services, and interpersonal relationships. Its content is organized into four main topics: personal health and relationships (Body n' Soul), birth control (My Plan), utilization of health services (Go Get It), and pregnancy care (Now What). The content is supported by three tools, including a frequently asked questions section, a clinic locator, and a reminder function for birth control and clinic appointments. By covering a range of topics, Crush helps adolescents avoid the clutter of inaccurate or incomplete information they may find online.



**Body n' Soul** supports users who are considering initiating sexual activity, identify abusive behaviors in their relationship, and demonstrates how to negotiate condom use with a partner. It promotes sexual health by explaining basic anatomy and physiology, and how to prevent sexually transmitted infections.

**Go Get It!** allows users to search for health clinics near them based on their zip code. It also contains advice on what to expect during a clinic visit and addresses common concerns. & HIV testing sites.



**My Plan** supports sexually-active youth in assessing and selecting the best birth control for them. It promotes birth control literacy, and includes information about all birth control methods with an emphasis on long-acting reversible contraception (LARCs).

**Now What?** includes information about pregnancy and prenatal care.

Crush utilizes behavior change theories and constructs—Theory of Planned Behavior, Social Learning Theory, and self-efficacy—to increase adolescent sense of control over decisions regarding their sexual behavior. These theories together impact intentions and skills to engage in healthy behaviors.

Healthy Teen Network partnered with MetaMedia Training International to conceptualize, produce, and rigorously evaluate Crush's ability to promote sexual health among young women ages 15 to 17 years old. Dozens of young people around Maryland participated in the development of Crush contributing ideas, defining the content, and producing content. Experts at the Centers for Disease Control and Prevention provided the funds and expert advice that shaped the vision of Crush.

### What's in Crush?

Crush's content is delivered through interactive and multimedia features to enhance the user's interaction with the content and to support various learning styles. Dynamic text and graphics are used throughout to allow greater interactivity with

the content. For example, anatomical graphics allow users to click on any organ to reveal a brief description. Self-assessments on sexual readiness, intimate partner violence, and birth control consist of series of 'Yes' or 'No' questions and produce tailored response messages. Comics show various scenarios and the user advances the storyline until they reaches a decision point branching out to an outcome.

In addition, Crush includes videos explaining how birth control is used and how to access health services by addressing attitudes, social norms, behavioral control, and self-efficacy. Whiteboard animations bring various physiological processes to life by depicting live-action drawings along with voiceover narration. These animations include: fertility cycle, pregnancy physiology, and the mechanism of action of each birth control method. It relies on a combination of medically-accurate drawings and humorous renditions of physiological processes to keep users engaged. Through audio dialogues, users can listen to couples negotiating condom use and see a list of potential partner excuses.

## Young women who use Crush and CrushTEXT are...

1.6

times as likely to visit a clinic  
@ 3 months

1.6

times as likely to feel confident in  
going to the clinic  
@ 3 months

2.3

times as likely to believe that it is a good  
thing to use birth control at every sex  
@ 3 months

1.7

times as likely to feel that they have  
control to use birth control at every sex  
@ 6 months

1.5

times as likely to correctly report that they can  
get pregnant if they do not use birth control  
@ 6 months

1.5

times as likely to correctly report that the IUD  
and implant cannot make them infertile  
@ 6 months

## Does it work?

**Methods.** A rigorous evaluation shows that Crush lays the “behavioral groundwork” of sexual health empowerment even before youth start considering initiating sex. Healthy Teen Network’s researchers designed and conducted a rigorous evaluation of Crush using a two-armed randomized control trial design, the gold standard for health and medical interventions. We recruited 1,548 young women from across the United States between December 2016 and January 2017 using a social media recruitment campaign. To be eligible for the study, participants had to be between 14 and 18 years old age, have daily access to a smartphone, not be pregnant at the time of the study, understand written and spoken English, and live in the United States. After screening, consenting, and enrolling online, we randomly assigned participants to either a Crush group or a control group, which had access to a nutrition-focused mobile application. Besides having access to the corresponding interventions, both groups received three times week visually-rich text messages that supported the content disseminated in each intervention (CrushTEXT). We obtained IRB and OMB approval for this study.

**Demographics.** After removing duplicates and scammers from the study, we had a final sample of 1,210 young women. Our final sample consisted of mostly (78.7%) 15 to 17 years old women. Half of the sample (51.8%) were non-Hispanic White, while 23.7% self-reported as Hispanic, and 12.6 were non-Hispanic Black. Most of our sample (74.9%) had mothers with at least some college education, and half had mothers with a college diploma (55.5%). Although most of the sample self-identified as heterosexual (62.3%), a considerable portion (21.4%) considered themselves bisexual. At baseline, only a quarter (23.9%) had ever visited a clinic for sexual and reproductive health services, and a quarter (25.6%) reported ever having vaginal sex prior to the study. Among those reporting ever having vaginal sex, the mean age of sexual debut was 15.1 years old. There were no significant statistical differences in subject demographic distributions between study arms. Only 20 participants (8.9%) in the intervention group became sexually active during the study period, compared to 33 participants (13.1%) in the control group. There was no difference in the odds of becoming sexually active during the study between the two arms (aOR=0.67).

**Outcomes.** We assessed changes in behaviors, attitudes, behavioral control, self-efficacy, and knowledge about birth control and health services at baseline, three-months, and six-months post-baseline through online surveys. We used a multivariate logistic model to estimate odds ratios for the association between the outcomes and study arm adjusted for a priori established confounding variables. Adjusted odds ratios (aOR) were estimated separately for each follow-up survey. Statistical significance of adjusted odds ratios was assessed using the Wald Chi-Square statistic.

At three months post-baseline, women exposed to Crush were 1.6 times as likely to go to a clinic (aOR=1.607, p=0.052), and 1.5 times as likely to report feeling confident going to a clinic for sexual and reproductive health services (aOR=1.578, p= 0.014), compared to women exposed to the control app. In terms of birth control use, Crush participants reported more positive attitudes towards birth control. They were 2.3 as likely to believe that it is a good thing to use birth control every time they have sex (aOR= 2.291, p= 0.001). All other behavioral constructs related to clinic utilization and birth control use at three months post-baseline were not statistically significantly different between the two arms.

At six-month post-baseline, Crush participants continued to report greater levels of confidence in going to a clinic (aOR= 1.401, p=0.094) compared to the control group. They also exhibited greater levels of positive attitudes towards the safety of the intra-uterine device and the implant (aOR: 1.510, p=0.019). Crush participants were more likely to report having control whether birth control is used every time they have sex (aOR: 1.748, p=0.005), and a better assessment of pregnancy risk if birth control is not

used (aOR: 1.534, p=0.014). Although intentions to use any of the birth control methods were not found significantly different in the two arms, differences in intentions to use condoms approached significance (aOR: 1.610, p=0.0968). We did not find any difference in the use of birth control since most participants were not sexually active.

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*"I think that Crush has helped me be safer and has helped me gain knowledge about my body. I find it very helpful and informative."*

*"My school has a decent sex ed program, but nobody ever told me anything about birth control options, especially where and how to get them."*

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### What do users think of Crush?

Not only was Crush effective, but its content highly resonated with participants. In follow-up surveys, 93% of respondents reported that they either "liked" or "very much liked" Crush. Upon completion of the study, we gave access to Crush to the control group study participants. We asked all participants to provide feedback on Crush via text messages. Feedback was overwhelmingly positive. Most indicated that the content was highly useful and a good complement to the education they are currently receiving.

Crush offers another option for young women to find reliable, medically-accurate information about sex and sexuality. Our study confirms that digital interventions are powerful behavioral motivators and can significantly help young people achieve health and wellness.

93%  
of partici-  
pants liked  
Crush

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