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Using Facebook, Instagram, and Pinterest advertising campaigns to increase enrollment in newborn screening research

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Introduction: Social media ad campaigns can be an efficient, cost-effective way to recruit for studies online, especially as the onset of the COVID-19 pandemic limited in-person recruitment. Early Check, a large ongoing study offering testing for a panel of conditions for all newborns in North Carolina, uses social media ad campaigns, along with direct mail, email, print materials in health care settings, and messages through patient portals to contact pregnant women and mothers with eligible newborns. All materials refer women to the online Early Check portal for consent and enrollment in the study.

Methods: To evaluate social media options for outreach and recruitment, we ran two paid ad campaigns on Pinterest in May and July 2021 and compared performance to simultaneous Facebook and Instagram campaigns.

Results: Facebook and Instagram cost \$136.53 per sign-up in May and July. Our first Pinterest campaign in May resulted in 206,416 impressions, 529 link clicks, and a cost per sign-up of \$536.56. After adjusting the campaign to incorporate lessons learned about the platform, the second Pinterest campaign in July resulted in 225,286 impressions, 621 link clicks, and a cost per sign-up of \$216.55.

Discussion: Others looking to implement social media ad campaigns for public health recruitment should note that ad costs have increased since 2020. However, social media ad campaigns on Facebook, Instagram, and Pinterest remain a cost-effective and convenient way to recruit participants for studies, especially when in-person efforts are not feasible. Ad campaign strategy should also be tailored to the specific platform. Facebook and Instagram ads should be run together in the same campaign to optimize the budget across both platforms and should run using an on-off schedule. Pinterest campaigns should run for a longer period to optimize continually for sign-ups over time.

KEYWORDS

social media, social media ads, social media advertising campaigns, campaigns, recruitment, research, study enrollment, newborn screening (NBS)

Introduction

Newborn screening (NBS) is crucial to identify conditions in newborns before symptoms emerge and to provide early treatment to prevent morbidity and mortality. The Department of Health and Human Services [Advisory Committee on Heritable Disorders in Newborns Children \(2019\)](#) recommends that NBS programs use a uniform screening panel that includes 36 core and 26 secondary disorders. To screen for additional disorders, there must be evidence of the benefits of pre-symptomatic identification and treatment, which requires identifying a sufficient sample of newborns to participate in research ([Bailey and Gehlert, 2015](#)).

To meet this requirement, Early Check, a statewide research study, offers parents of all newborns born in North Carolina screening for a panel of rare diseases not currently part of standard NBS ([Bailey et al., 2019](#)). Led by RTI International, in partnership with the North Carolina State Laboratory of Public Health, Duke University, the University of North Carolina at Chapel Hill, and Wake Forest University, the ongoing study has enrolled more than 22,000 newborns between October 2018 and July 2022.

Parental permission is required to participate in the study. Our goal is to reach expectant and new parents with recruitment materials that refer them to the online Early Check portal for consent and enrollment in the study. To recruit as many expectant and new parents as possible, Early Check uses a variety of recruitment strategies and communication channels, including mailing a letter and study flyer to all birthing mothers in North Carolina, sending invitations to pregnant women through patient portals with Duke University and the University of North Carolina Health systems, distributing flyers in some health care settings ([Gehlert et al., 2022](#)), and placing ads on social media ([Guillory et al., 2020](#)).

Social media ads on Facebook and Instagram have been a successful strategy for Early Check, resulting in the recruitment of 234 eligible newborns over 7 weeks when social media ads were run in 2019 ([Guillory et al., 2020](#)). From April to November 2020, Early Check recruited a total of 680 newborns from social media ads. Social media has been recognized as an especially promising recruitment channel for hard-to-reach populations ([Topolovec-Vranic and Natarajan, 2016](#); [Benedict et al., 2019](#)). Some researchers have reported higher study enrollment rates *via* social media recruitment than *via* hospital-based recruitment for hard-to-reach populations ([Benedict et al., 2019](#)). Social media ads have also been used to recruit transgender and gender nonconforming people, pregnant women, and multiple other populations into research studies, but more information is needed to document and compare alternative social media recruitment strategies ([Shere et al., 2014](#); [Russomanno et al., 2019](#); [Darmawan et al., 2020](#)).

In addition to Facebook and Instagram, Pinterest, a popular social media platform with over 450 million monthly active users and a large mom userbase, offered a potential opportunity to expand Early Check enrollment ([Pinterest, 2020, 2021](#); [West, 2021](#)). Pinterest emerged in 2010 as a platform where users could save or upload images (called “pins”) onto various “boards” to organize and share ideas with others. The platform now generates 5 billion searches every month, making it a powerful place for information seeking ([Gavini, 2021](#)). Pinterest has previously been used to disseminate health information related to chronic obstructive pulmonary disease, skin cancer, and breast cancer among other topics, but it has not been used to inform or recruit expectant or new parents about NBS research opportunities ([Paige et al., 2015](#); [Tang and Park, 2017](#); [Renner et al., 2018](#); [Miller et al., 2019](#)).

Prenatal and postnatal women who are reached with materials about Early Check through the various communication channels, including social media ads, are encouraged to sign up their child for the study through the online electronic consent portal, where they can also learn more about the study. Those who are eligible include women whose infants (1) have NBS in North Carolina, (2) are residents of either North Carolina or South Carolina, and (3) are 4 weeks of age or younger. Women who are at least 13 weeks pregnant and plan to give birth in North Carolina are also eligible to sign up. Laboratory testing is performed using NBS dried spot specimens collected by the North Carolina State Laboratory of Public Health for standard NBS after the baby is born. Newborns who screen positive for fragile X syndrome or muscular dystrophy—the two conditions currently offered under the Early Check protocol—receive confirmatory testing, short-term follow-up, and referral to clinical care. The present study focuses on recruitment efforts for Early Check using paid Facebook, Instagram, and newly added Pinterest ad campaigns in 2021 and seeks to understand (1) whether Pinterest provides comparable results to Facebook’s and Instagram’s advertising campaigns in terms of cost per link clicks, sign-ups, and cost per sign-up, and (2) how advertising campaign strategy differs across Facebook, Instagram, and Pinterest.

Methods

To expand outreach to expectant and new mothers and test the feasibility of a new recruiting platform, we incorporated a paid Pinterest advertising campaign alongside ad campaigns on Facebook and Instagram in May and July 2021. Ad campaigns for all three platforms used the following targeting criteria: location (North Carolina), age (18–49 years), and gender (female and “unspecified” for Pinterest only). On Facebook and Instagram, demographic keywords [new parents (0–12 months)] and interests [pregnancy, *Pregnancy and Birth* (magazine)] were

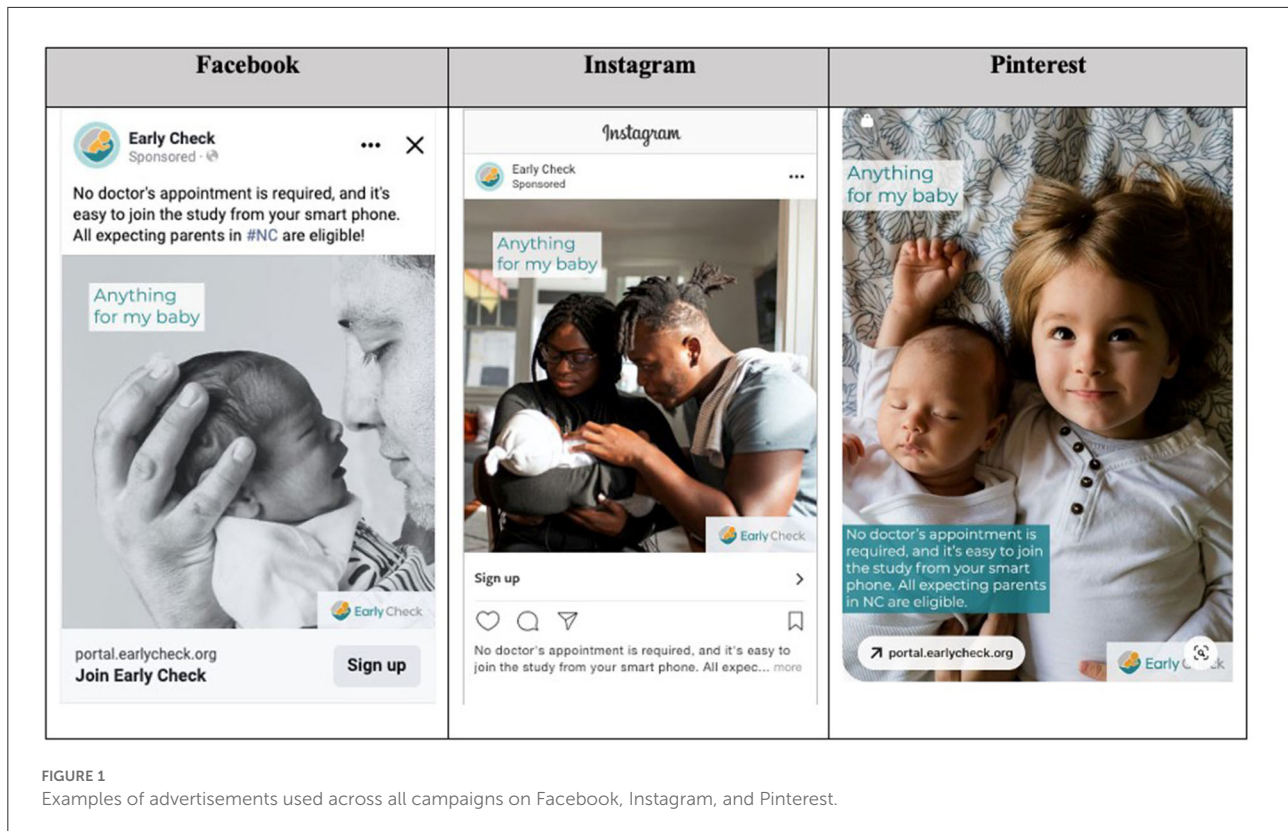


FIGURE 1
Examples of advertisements used across all campaigns on Facebook, Instagram, and Pinterest.

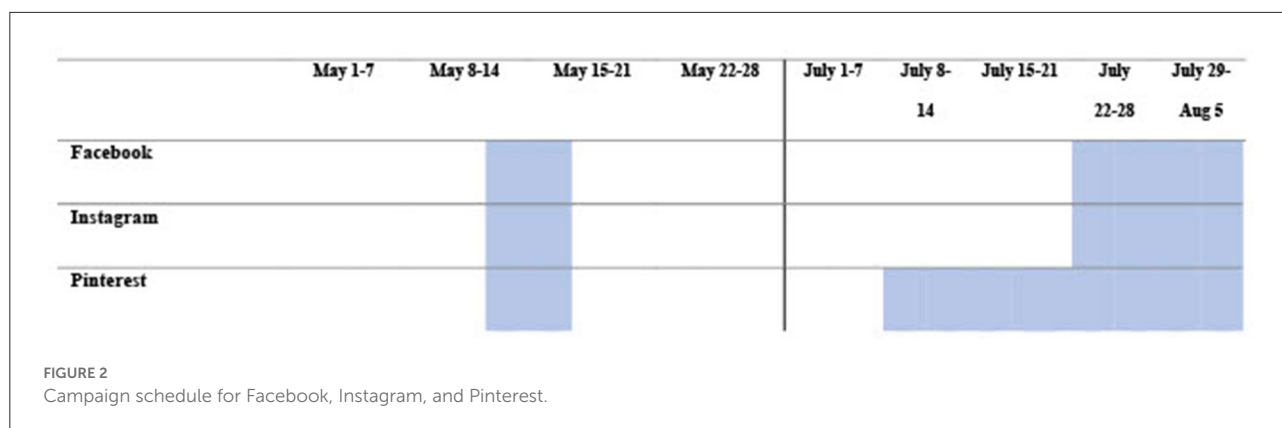
included using a Boolean OR operator, to include new mothers who also had pregnancy-related interests. On Pinterest, one interest category (Parenting) and 25 selected search keywords related to newborns and pregnancy were included, as the platform suggested a minimum of 25 keywords for best results. On all three platforms, we selected the option to expand our targeting to reach more people, which allowed each platform to distribute ads to users who were likely to be interested and eligible based on similar interests or characteristics.

Five paid ad creatives were developed for each platform, all featuring the same images and text, but in varying sizes based on platform requirements (see examples in Figure 1). Ads featured racially diverse expectant mothers, expectant couples, newborns, and families, as well as text that highlighted the eligibility criteria and the ease of signing up by phone. Ad creatives and copy were developed based on user-centered formative work we conducted to understand pregnant women's and new mother's preferences and perceptions. This included focus groups with women across North Carolina of diverse backgrounds and race and ethnicity (McInnis et al., 2019). Secondary research and previous performance of Early Check ads on Facebook and Instagram also informed our approach (Davis et al., 2006). All ads directed potentially eligible social media users to the Early Check online portal.

Each campaign (one for each platform) was given a \$350 daily spend and was optimized for conversions using a pixel.

This means a custom conversion event was placed in the back end of the Early Check portal to keep a record of users who screened eligible after clicking on or seeing an ad. Facebook, Instagram, and Pinterest used information about eligible users from the pixel to distribute ads to similar users who were also likely to be eligible. A custom conversion for each platform was also placed on the back end of the portal to keep a record of users who completed the online portal and those screened out as ineligible, for tracking purposes only.

We ran the campaigns across all three platforms for 1 week in May 2021 and then applied lessons learned to another paid advertising effort in July 2021. First, we combined Facebook and Instagram back under the same campaign to let the daily budget optimize across both platforms for the most sign-ups at the lowest cost. This strategy was previously used in the Facebook and Instagram campaigns run in 2019 (Guillory et al., 2020). We also let the Pinterest campaign run for 1 week before turning the Facebook and Instagram campaign on and allocated a smaller daily budget on Pinterest, to allow more time for the Pinterest ads to optimize fully, as suggested by a platform specialist. For the campaigns in July 2021, Pinterest ads ran for a total of 3 weeks with a daily spend of \$150, while Facebook and Instagram ads ran for 2 weeks with a daily spend of \$350. All other targeting options remained the same. The timeline for ads on each platform is shown in Figure 2.



Measures

The primary outcomes for the study were the number of Early Check eligible users and sign-ups attributed to each campaign, data gathered from the conversion tracking pixel. For the first Pinterest campaign in May 2021, the sign-up custom conversion event did not work as planned, and thus we relied on website referral data to estimate the total number of sign-ups. Secondary outcomes included six indicators to assess performance of and engagement with paid social media content: number of impressions (the number of unique views of social media content), reach (the number of individual users reached by ads), cost per thousand impressions (CPM), link clicks (clicks on social media content that directed participants to the permission portal), link click-through rate (the ratio of link clicks to impressions), and cost per link click (CPLC). We used impressions and reach as indicators of performance of social media content and link clicks as an indicator of engagement with content. CPM and CPLC were used to interpret whether changes in performance were due to rising ad costs.

Results

To compare results across platforms for the campaigns in May and July 2021, we used a variety of reach and engagement metrics, as shown in Table 1.

May campaign

In May 2021, the Facebook ad campaign spent \$2,997.79, reached 39,157 unique users, and resulted in 224,846 impressions, for a CPM of \$13.33. The ads resulted in 631 link clicks, a link click-through rate of 0.3%, and a CPLC of \$4.75. Of those who clicked on the ads, 65 (10.3%) completed the portal screener as eligible, and 42 (64.6%) of those who were eligible signed up for the study. The overall cost per

eligible respondent was \$46.12, and the cost per sign-up was \$71.38.

The Instagram ad campaign spent \$2,988.82, reached 55,749 unique users, and resulted in 147,639 impressions, for a CPM of \$20.24. The ads resulted in 204 link clicks, a link click-through rate of 0.1%, and a CPLC of \$14.65. Of those who clicked on the ads, 24 (11.8%) completed the portal screener as eligible, and 14 (58.3%) of those who were eligible signed up for the study. The overall cost per eligible respondent was \$124.53, and the cost per sign-up was \$213.49.

The Pinterest ad campaign spent \$2,682.80, reached 112,778 unique users, and resulted in 206,416 impressions, for a CPM of \$13.03. The ads resulted in 529 outbound clicks, an outbound click-through rate of 0.3%, and a cost per outbound click of \$5.07. Of those who clicked on the ads, 12 (2.3%) completed the portal screener as eligible, and 5 (41.6%) of those who were eligible signed up for the study. The overall cost per eligible respondent was \$223.56, and the cost per sign-up was \$536.56.

July campaign

In July 2021, the Facebook ad set in the campaign spent \$4,223.97, reached 58,336 users, and resulted in 242,016 impressions, for a CPM of \$17.45. The ads resulted in 886 link clicks, a link click-through rate of 0.4%, and a CPLC of \$4.77. Of those who clicked on the ads, 47 (5.3%) completed the portal screener as eligible, and 18 (39.1%) of those who were eligible signed up for the study. The overall cost per eligible respondent was \$89.87, and the cost per sign-up was \$234.67.

The Instagram ad set in the campaign spent \$985.31, reached 20,808 users, and resulted in 43,657 impressions, for a CPM of \$22.57. The ads resulted in 113 link clicks, a link click-through rate of 0.3%, and a CPLC of \$8.72. Of those who clicked on the ads, 13 (11.5%) completed the portal screener as eligible, and 8 (61.5%) of those who were eligible signed up for the study. The overall cost per eligible respondent was \$75.79, and the cost per sign-up was \$123.16.

TABLE 1 Cost, reach, and effectiveness of ads on Facebook, Instagram, and Pinterest.

Metric	Facebook		Instagram		Pinterest	
	May 2021	July 2021	May 2021	July 2021	May 2021	July 2021
\$\$ Spent	\$2,997.79	\$4,223.97	\$2,988.82	\$985.31	\$2,682.80	\$3,248.28
Reach	39,157	58,336	55,749	20,808	112,778	96,642
Impressions	224,846	242,016	147,639	43,657	206,416	225,286
Cost per 1,000 impressions (CPM)	\$13.33	\$17.45	\$20.24	\$22.57	\$13.03	\$14.41
Link clicks/outbound clicks	631	886	204	113	529	621
Link click-through rate/outbound click-through rate	0.28%	0.37%	0.14%	0.26%	0.26%	0.28%
Cost per link click	\$4.75	\$4.77	\$14.65	\$8.72	\$5.07	\$5.24
Eligible	65	47	24	13	12	22
Eligibility rate	10.3%	5.30%	11.8%	11.5%	2.27%	3.54%
Sign-ups	42	18	14	8	5*	15
Sign-up rate	64.6%	39.1%	58.3%	61.5%	41.6%	68.2%
Cost per eligible	\$46.12	\$89.87	\$124.53	\$75.79	\$223.56	\$147.65
Cost per Sign Up	\$71.38	\$234.67	\$213.49	\$123.16	\$536.56	\$216.55

*The number of sign-ups was determined by looking at website referral data on the Early Check portal sign-up complete page due to issues with the custom conversion event.

The Pinterest campaign spent \$3,248.28, reached 96,642 users, and resulted in 225,286 impressions, for a CPM of \$14.41. The ads resulted in 621 outbound clicks, an outbound click-through rate of 0.3%, and a cost per outbound click of \$5.24. Of those who clicked on the ads, 22 (3.5%) completed the portal screener as eligible, and 15 (68.2%) of those who were eligible signed up for the study. The overall cost per eligible respondent was \$147.92, and the cost per sign-up was \$216.95.

Discussion

Overall, this test between platforms helped us better understand the most effective social media advertising strategies for recruiting expectant and new mothers for the Early Check study on three popular platforms: Facebook, Instagram, and Pinterest. Because each platform operates differently, we learned that our advertising approaches needed to be specific to each platform to achieve the most sign-ups at the lowest cost. Our findings add to the body of social media research recruitment literature (Topolovec-Vranic and Natarajan, 2016; Darmawan et al., 2020; Guillory et al., 2020; Salvy et al., 2020). We offer nuance into how social media ad campaigns should be set up on Facebook, Instagram, and Pinterest, and how Early Check leveraged this recruitment method.

Facebook and Instagram, which are owned by the same parent company Meta, should be combined into one campaign with the budget optimized across both platforms. Even though the Instagram ads in July resulted in fewer sign-ups overall, the click-through rate almost doubled (from 0.14 to 0.26%) and the cost per sign-up decreased from \$213.49 to \$123.16, which is a much more efficient ad spend. By combining these platforms into one campaign, the tracking pixel could use more data to better identify eligible users and sign-ups for the lowest cost

In contrast to the optimization that resulted on Instagram after combining the campaigns, the Facebook ads saw a significant increase in cost per sign-up in July, from \$71.38 to \$234.67. This unexpected increase could be attributed to a variety of factors. First, both the eligibility and sign-up rates decreased by almost half from May to July, meaning that more people during this time were either not eligible or dropped off after clicking on the ad or before finishing the sign-up process. Additionally, in June 2021, Apple released an iOS update that allowed users to opt out of some online tracking, including the tracking pixel that Facebook relies on to report this information and find additional eligible users (Wagner, 2021).

Second, ad costs on Facebook decreased significantly in March 2020 at the start of the pandemic, when businesses were spending money cautiously, therefore decreasing online advertising competition (Aisle Rocket, 2021). By spring 2021, ad costs jumped and were closer to pre-pandemic numbers. Given the increased dependence of online and digital marketing, we continued to see ad costs increase through the summer. For Facebook, the CPM rose from \$13.33 in May to \$17.45 in July. However, the CPLC remained relatively stable, which may indicate that this increase in cost is mostly attributable to the tracking limitations and/or eligibility decrease during this time.

Advertising on Pinterest differed from advertising on Facebook and Instagram in several ways. One key difference is that Facebook and Instagram typically see the best performance in the first few days of a campaign and then begin to slow down, whereas a Pinterest campaign needs more time to optimize and benefits from an “always on” strategy with a lower daily budget. This was evident in the May campaign, which showed that when ads ran for the same period of time (1 week) across all platforms, Pinterest resulted in significantly fewer eligible participants and sign-ups at substantially higher cost per eligible respondent and cost per sign-up. After speaking with a Pinterest advertising

representative who confirmed it would be optimal to extend the number of days ads ran, we shifted our strategy to “always on” and ran it for 1 week before turning the Facebook and Instagram campaigns on to run simultaneously for two additional weeks. As a result, the budget and the tracking pixel were able to optimize better, resulting in a 59.6% decrease in cost per sign-up (from \$536.56 to \$216.55).

Due to the proprietary nature of these platforms, and the often dynamic algorithms that power how ads are delivered, we cannot be sure of the reasons behind these differences. However, we can assume that the way Facebook and Instagram are used compared to Pinterest might have an impact on this. For example, on Facebook and Instagram, users typically scroll through a feed of curated content from friends, influencers, brand profiles, and advertisers. Pinterest users, on the other hand, typically go to the platform to conduct specific searches based on topics or interests. This may result in Pinterest users visiting the platform less often, requiring ads to run for a longer time to ensure they are viewed by the right audience.

Overall, this test provided us with valuable insights for how best to implement a multi-channel marketing approach for recruiting new and expectant mothers online. We were able to identify the appropriate ad campaign time frame and cost per sign-up for expectant and new parents to enroll their newborns across Facebook, Instagram, and Pinterest. Some researchers may prioritize fast results, whereas others prioritize the cheapest cost per sign-up. Given that, researchers should identify social media recruitment strategies and platforms based on their goals and priorities. While these results are specific to new and expecting parents in North Carolina and results will differ depending on the target audience, 119,792 babies born were in North Carolina in 2021 (Hamilton et al., 2022). Although social media ad costs will continue to fluctuate over time, our team determined that spending \$17,126.97 across Pinterest, Facebook, and Instagram in May and July, for a total of 102 sign-ups and average sign-up cost of \$167.91, was an effective use of money.

We determined this for a few reasons. Previous research highlights the benefits of social media recruitment alongside other traditional forms of recruitment (Kayrouz et al., 2016; Salvy et al., 2020). Leveraging social media advertising allowed the team to continue recruitment while in-person options were unreliable or not feasible due to COVID-19. Maintaining an agile approach to recruiting allowed us to pivot as needed while minimizing time and startup costs. Increasing our understanding of other social media advertising options, including Pinterest, expands the team’s recruitment options, and flexibility moving forward.

In terms of time, social media recruitment offers quick results. A total of 678 participants were recruited in-person over the entire year in 2021. A total of 102 participants were recruited *via* social media over 6 weeks in May and July 2021. Although we cannot make assumptions about how many participants would be recruited if social media advertising campaigns were run all year, we can conclude that social media advertising

allows a timely solution to continue enrollment when in-person recruitment methods are not available.

Costs of in-person recruitment for Early Check varied based on a variety of factors, including contract mechanisms and institutional partnerships. Similarly, social media costs fluctuated over time. Previous research suggests that social media recruitment is not always the most cost-effective method (Topolovec-Vranic and Natarajan, 2016), but more research should be done to explore the cost-effectiveness of social media recruitment across Facebook, Instagram, and Pinterest compared with other methods, such as in-person or direct mailing. While social media ad costs fluctuate, researchers and practitioners looking for other low-cost options may find our paper comparing organic to paid social media efforts particularly helpful (Guillory et al., 2020).

It is difficult to make direct conclusions about the impact of the COVID-19 pandemic on Early Check enrollment. Multiple variables can impact enrollment, however, when in-person recruitment is not possible, as during the 1 month of the pandemic, social media ads can provide an opportunity to continue recruitment. Running ads did help us reach potential pregnant women and new moms when our in-person recruitment had to be paused.

Limitations

We were able to extract valuable insights from this test, but various external factors had an impact on our results. First, the changes in the tracking pixel as a result of the Apple iOS update happened between our two test periods, which could have resulted in increased costs and limited tracking abilities on Facebook. Second, ad costs on all three platforms use an auction system and, therefore, are dependent on the amount of competition during that time for reaching a similar audience. All of these factors could have had an impact on the overall costs of each campaign; however, we feel that our campaign strategy changes impacted ad optimization and had a direct impact on the changes we saw.

Another limitation was that the tracking pixel for sign-ups was not working during the first Pinterest campaign, and we therefore had to rely on website data for that metric. Our team uses tagged URLs to track the source across ad campaigns for those who click on the ads, but these are not 100% reliable and can sometimes get stripped during a re-direct depending on the user’s device, connection, and privacy settings. We feel these numbers are close to accurate for counting those who clicked directly on a Pinterest ad; however, we recognize these numbers may be missing a few users.

After giving birth in North Carolina, all mothers receive a letter in the mail prompting them to sign up for Early Check. We are unable to determine how many mothers who signed up *via* social media would have ended up signing up as a result of the letter mailed after birth. This limits our ability to measure the

added benefit of the social media ad campaigns compared with the other recruitment methods.

Conclusion

This research provides new information for public health researchers about how to set up and manage social media recruitment campaigns on Facebook, Instagram, and Pinterest. Others looking to recruit research participants on social media can use this study to inform strategy and better understand variables that affect the cost and effectiveness of social media recruitment. While many studies will continue to use traditional recruitment methods like in-person and direct mail, this research demonstrates the complementary use of social media recruitment.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

Ethical review and approval was not required for the study involving human participants in accordance with the local legislation and institutional requirements. Written informed consent to participate in this study was obtained from the participants' parents/legal guardians. The studies involving human participants were reviewed and approved by The University of North Carolina at Chapel Hill (UNC-CH).

Author contributions

SM, JS, MD, and LG wrote sections of the article. All authors contributed to conception, design of the study, manuscript revision, read, and approved, the submitted version.

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Conflict of interest

DB discloses no conflicts of interest but reports other industry funding to RTI International from Janssen Pharmaceuticals and Travele Therapeutics. He reports recent but completed funding to RTI from Orchard Therapeutics, Sarepta Pharmaceuticals, BioMarin, and the EveryLife Foundation, as well as donated reagents and equipment from Asuragen.

The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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