Behavioral Research on Biomedical Sexual Health Technologies: Opportunities and Directions

By Gregory D. Zimet

As new sexual health technologies are evaluated and ultimately introduced to the public, behavioral scientists will have unique research opportunities, because biomedical interventions will have limited effect unless individuals are willing to use them and adhere to their requirements. Achieving this acceptance depends upon an understanding of the attitudes and knowledge of the individuals targeted for the intervention, development of effective provider-patient communication methods, and evaluation and implementation of interventions to ensure that the new technology is adopted by the greatest number of users. By definition, research into acceptability—users’ attitudes toward an intervention or intention to use a product—and acceptance of biomedical technologies involves cross-disciplinary scholarship; the most obvious collaboration occurs between health behavior and biomedical researchers. However, other disciplines can make important, even necessary, contributions to this area of research and help to ensure that valuable technological innovations are successfully implemented. My own research focuses on behavioral issues related to acceptability and acceptance of vaccines and topical microbicides for the prevention of HIV and other STDs. I have collaborated with colleagues from medicine, nursing, marketing, anthropology and biostatistics, and have benefited from the contributions offered by a multidisciplinary approach.

Emerging Biomedical Technologies
The human papillomavirus (HPV) vaccine is one example of a new biomedical technology for sexual health promotion. Studies prior to its licensure identified potential concerns about the vaccine and showed that most parents were quite interested in having their children receive it.1-4 Some of the initial postlicensure research has identified barriers to vaccine uptake,5-8 and ongoing studies are using this information to develop and evaluate interventions to encourage vaccination. This same process can and should be applied to other sexual health technologies in development.

Additional emerging technologies include other STD vaccines,9 microbicides10 and pre-exposure prophylaxis for HIV prevention (PrEP).11 Each of these technologies has its own challenges with respect to effective utilization. For example, a vaccine to prevent herpes simplex virus type 2 (HSV-2) is currently being evaluated in a clinical trial of women who are “double-negative”: They have no history of HSV-2 or herpes simplex virus type 1 (HSV-1) infection.9 Results of an earlier clinical trial indicated that the vaccine was nearly 75% efficacious for prevention of genital herpes disease, but only among women who were double-negative; there was no evidence of protection for men or for women who had prior HSV-1 infection.12 HSV-1 is very common, and prevalence rises quickly through childhood.13 As a result, HSV-2 vaccination would have to be implemented at an early age to be most effective. Questions for researchers in the behavioral sciences include these: How can we best educate parents about the complexities associated with a female-only vaccine that works only for those who are double-negative? What are parents’ attitudes about a vaccine that prevents genital herpes? What do parents know about the adverse effects of HSV-2 infection (including its effects on the risk of HIV infection and neonatal herpes)? What is the best way to present information to parents to increase vaccine acceptance?

Microbicides are substances (creams, gels or foams) that are inserted into the vagina or rectum for the prevention of HIV or other STDs. Several microbicides are in development, the majority of which require use immediately before coitus. A number of research studies have found relatively high levels of willingness to try microbicides.14-15 However, unlike vaccination, use of microbicides is a recurring event, which requires a sustained behavior change. The connection between intentions and behavior, therefore, may be somewhat tenuous. Assuming microbicides move from clinical trials to commercial availability, behavioral researchers will need to investigate important questions: How well are individuals able to use microbicides as directed? To what extent does microbicide use require negotiations during a sexual encounter or in the context of an intimate relationship? What are the barriers to sustained use of microbicides, and can those barriers be minimized? When microbicides are used, does male condom use decrease, and if so, can behavioral interventions minimize this effect?

PrEP, another emerging biomedical intervention, involves the use of antiretroviral medications (e.g., tenofovir and emtricitabine) for HIV prevention.11 The hypothesis, as yet unproven,16 is that individuals at risk for exposure to HIV will be protected from infection through daily use of antiretrovirals. Numerous issues with PrEP will need to be addressed by behavioral scientists,17 including the potential problems with users’ adherence to a daily medication regimen, particularly in the context of prevention; assessment of the potential that individuals taking these medications will engage in behaviors that increase their vulnerability to other STDs; and development of communication strategies and behavioral interventions to minimize such “risk compensation.”

Multidisciplinary Research

My experiences working with professionals from other fields have made me aware of the tremendous value of cross-disciplinary research. Each discipline brings a unique perspective, enriching the quality of the research. For example, intention research is plagued by the frequent failure of intentions to translate into behavior.18-20 The field of market forecasting is specifically concerned with this issue and offers some approaches for addressing the problem:20,21

Similarly, a set of market research techniques called conjoint analysis is useful for evaluating attitudes about emerging technologies. Conjoint analysis systematically examines how product characteristics influence individuals’ intention to buy or use a product.22 For STD vaccines, important characteristics might include cost, efficacy, target (e.g., HIV, HPV or HSV-2), number of

*HSV-2 is the principal cause of genital herpes infection; HSV-1 is typically associated with oral herpes infection (i.e., cold sores), although genital HSV-1 infection is becoming increasingly common (source: Xu F et al., Trends in herpes simplex virus type 1 and type 2 seroprevalence in the United States, Journal of the American Medical Association, 2006, 296(8):964–973).
Research on acceptability and acceptance of sexual health technologies clearly is enhanced by the contributions of physicians, who are in the best position to ensure that descriptions of biomedical technologies are accurate. In addition, when behavioral clinical trials have as their outcome acceptance of vaccination or diagnostic testing, the contributions of medical experts to protocol development are absolutely necessary to ensure that appropriate safeguards and standard operating procedures are implemented. For example, the protocol for further laboratory testing of a rapid HIV test result that is not clearly positive or negative is best specified by someone with expertise in HIV-related medical care.

Qualitative research expertise, which can come from anthropology, nursing, sociology and other disciplines, also is invaluable. In-depth interviews and focus groups often reveal important information about attitudes and behavior that would otherwise remain undiscovered. Qualitative research can both inform the design of quantitative studies and elucidate results of those studies. For example, in-depth interviews can help identify critical product characteristics, which larger scale conjoint analytic studies can then evaluate.

**Conclusions**

Articles on HIV prevention often start with a statement suggesting that until a vaccine or cure is discovered, we have to rely on behavioral approaches to prevention. What is perhaps more true, however, is that until biomedical technologies for sexual health can be delivered so that no behavioral effort is required (as is the case with fluoridated water, for example), behavioral research will be necessary to ensure that the greatest numbers of persons adopt those technologies. I am convinced, therefore, that multidisciplinary behavioral research directed at acceptability and acceptance of sexual health technology has an important and vibrant future.

**REFERENCES**


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