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Editorial

Multipurpose prevention technologies for sexual and reproductive health: gaining momentum and promise

Over the past four decades, the world has made substantial gains in the effort to prevent unplanned pregnancies and reduce the risk of sexually transmitted infections (STIs), including HIV, and other reproductive tract infections (RTIs). Yet, STIs and RTIs still cause a heavy health burden, especially in developing countries, and there is an equally urgent unmet need for contraception [1–6].

To date, prevention strategies have focused largely on single indications, namely, the prevention of unplanned pregnancy, prevention of STIs or prevention of RTIs. This approach does not adequately recognize the intrinsic link between unplanned pregnancy and STIs: a woman at risk of an unplanned pregnancy is often simultaneously at risk for an STI, including HIV, or other RTI. Thus, there is a critical need for *multipurpose* prevention technologies that will allow people to avoid more than one adverse health outcome.

Multipurpose prevention technologies were the focus of Advancing Prevention Technologies for Sexual and Reproductive Health, an international symposium held in Berkeley, CA, in March 2009. For 2 days, more than 150 participants from developing and industrialized countries discussed and debated the opportunities and challenges for advancing technologies that address multiple sexual and reproductive health (SRH) needs. The symposium proceedings draw from those presentations and the subsequent discussions [2]. This editorial seeks to convey the key points of these discussions and engage health care professionals in the effort to fulfill the potential that these technologies might offer.

1. A universal health need

Unplanned pregnancy and STIs typically affect the most disadvantaged groups — especially young women, adolescents and the poor — the hardest. But women from all socioeconomic groups face challenges to their SRH [7–11]. Each year:

- More than 120 million couples have an unmet need for contraception.
- An estimated 80 million women experience an unplanned pregnancy (45 million of which end in abortion).
- More than half a million women die from complications associated with pregnancy, childbirth and the postpartum period.
- Roughly 340 million people acquire new gonorrhea, syphilis, chlamydia or trichomonas infections.

In addition, untold numbers of individuals acquire chronic infections with the herpes simplex virus (HSV) and human papillomavirus (HPV), which is the primary cause of cervical cancer [12].

Millions of women are vulnerable to several of these adverse outcomes, yet many women are only able to access or afford prevention for a single intervention, such as contraception or treatment for an STI. At the same time, many providers struggle to ensure that their clients have access to all prevention methods that meet their multiple needs.

2. A new approach

It is time to address SRH prevention in a more holistic way and to develop prevention tools that address multiple health risks; are acceptable, affordable, accessible and easy to use; and can meet individuals' varying health needs and reproductive intentions. Such interventions could have a dramatic effect on the health and well-being of millions of women and their families.

Multipurpose preventive technologies for SRH could include vaccines, microbicides and devices [such as intravaginal rings (IVRs), diaphragms and condoms] that provide protection from unplanned pregnancy; STIs including HIV; and/or other common RTIs. As the report from the Berkeley symposium explains, "Providing people with suitable protection is a continuing challenge, especially in settings where access to health services is limited, and the availability of technologies that address more than one indication would be a significant improvement in terms of efficiency and convenience. The provider would be able to stock, supply, and advise on a more compact range of products, and the user would need to purchase, understand, store, and use fewer products. A further advantage is that users would be protected automatically against more than one indication even if they had obtained the product with regard to a single perceived risk" [2].

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While such technologies will benefit both men and women, women will gain the most, as they are more vulnerable to these risks for both physiological and societal reasons.

Some multipurpose prevention technologies already exist, but they are woefully underutilized. Male and female condoms, for instance, prevent both unplanned pregnancy and STIs. Male condoms are not always used consistently. While the launch of the UNFPA Global Female Condom Initiative in 2005 has significantly increased access to female condoms, this woman-controlled prevention method has nonetheless been slow to achieve widespread distribution or user acceptance and more must be done to increase its demand and access [13].

Extensive experience with existing prevention methods — condoms, diaphragms, IVRs, hormonal methods and vaccines — and recent advances in the development of microbicides and oral pre-exposure prophylaxis with antiretroviral drugs have laid a solid foundation for the development of new prevention technologies for multiple SRH risks. Several of these technologies, such as more user-friendly female condoms and diaphragms, are in the late stages of clinical testing. The PATH Women's Condom, for example, has gone through several clinical studies and is entering a regulatory study for its approval in China and the US. A new generation of microbicides, including products based on antiretroviral drugs, continues to hold promise despite the failure of some of the earlier products to protect, including the polyanion PRO 2000 (http://www.mdp.mrc.ac.uk).

Momentum is building. The National Institutes of Health, US Agency for International Development, the Ministry of Health of China and other donors are currently supporting efforts to advance multipurpose prevention strategies, including preclinical research, effectiveness trials and pre- and postintroduction studies on a range of potential multipurpose prevention products, both coitally dependent and long acting [2]. Collaborations between different organizations and research disciplines, such as behavioral scientists, immunologists, engineers, epidemiologists, drug developers, clinicians, and advocates, are evolving and helping to advance some exciting novel SRH prevention approaches [14–17]. Research efforts include semisolid gels, gel capsules, films, IVRs, sponges, compound-releasing intrauterine systems, diaphragms, and male and female condoms with and without spermicidal or anti-infective agents. Listed here are some of the various entities which are currently pursuing this work: CONRAD, Family Health International, International Partnership for Microbicides, Ministry of Health of China, PATH, the Population Council, Queens University of Belfast, University of Witwatersrand, University of Alabama, University of California Berkeley, University of California San Francisco, University of Utah, biotech companies (e.g., ReProtect, Mapp Biopharmaceutical, Inc., and Osel, Inc.) and others. The CONRAD program, for example, has dedicated a major portion of its portfolio to combined approaches [2]. The Population Council, PATH, International Partnership for Microbicides, University of Utah and CONRAD are working on multipurpose IVRs and diaphragms which would be impregnated with contraceptives and anti-STI microbicides [2,18]. Other technologies in development include probiotics that prevent bacterial and urinary infections and could be modified to serve as drug-delivery systems [19,20]. Multipurpose vaccines are also in development and the discovery of potentially suitable antigens for several STI pathogens is progressing, including chlamydia, HIV, HSV, gonorrhea and trichomonas. For each of the technologies, the challenge will be to ensure that their production and deployment can be sufficiently cost-effective for widespread use in developing countries with minimal health care infrastructure. The Berkeley symposium gave voice to many promising ideas and a shared belief that multipurpose technologies can and should be developed. It is, of course, recognized that these technologies will not by themselves achieve all the desired goals and that they will need to be introduced with care, and their deployment preceded and accompanied by well-designed educational programs.

The effort to develop multipurpose prevention technologies and bring them to populations in need will encounter many complex challenges. The work will require technical innovation, scientific persistence, significant human and technical resources, and, crucially, political will. Given the rapid evolution of relevant technologies and an increasingly focused effort, these challenges can be overcome. With sufficient funding, new tools such as these could become the building blocks for cost-effective prevention efforts. When combined with more effective programming of existing prevention technologies, women and communities will benefit from improved health.

3. Recommended actions

Multifaceted collaboration will be required to bring multipurpose prevention technologies within reach. Researchers, funders, product developers, engineers, microbiologists, behavioral scientists, advocates and others must work together to maximize their technical expertise, community involvement and political will. In addition, these stakeholders must promote cross-disciplinary communication and collaboration, ensuring that parallel development tracks interact at strategic points.

Health professionals can contribute their expertise and voice toward this effort in multiple ways. For example, they can:

- Educate clients about the intrinsic link between STIs and unplanned pregnancies and the need for simultaneous prevention.
  - Clinicians can educate their clients about the need to prevent STIs and unplanned pregnancy and encourage clients to use existing combined methods to increase their levels of protection, such as male or female condoms for STI/HIV prevention combined with hormonal methods and IUDs, since these are the most effective contraceptive options now available.

- Seek opportunities to facilitate cross-disciplinary collaboration.
  - Researchers can explore opportunities to collaborate with researchers in different fields that can complement their work. They can also participate in conferences and learn about relevant work outside their particular research area.
  - Clinicians can find ways to help researchers recruit participants into clinical trials of new prevention products and participate in product acceptability research. Data on these topics are needed in diverse geographic regions in the US and internationally as well as in communities with diverse social and demographic characteristics.
- Advocate for increased support for multipurpose prevention technologies.
  - All health care professionals can educate donors and funders about the need for intensive, multidisciplinary research aimed at providing affordable and acceptable multipurpose prevention technologies.
  - Professionals can also educate legislators and policymakers about the importance of multipurpose prevention technologies.
  - They can inform other stakeholders — professional societies, organizations and coalitions; reproductive health and HIV organizations; and health advocacy groups — about the need for greater investment in multipurpose prevention technologies for SRH.
  - All supporters can spread the word within their professional networks by presenting on this topic and submitting articles to these networks' newsletters and related communication outlets.

4. Conclusion

This is a pivotal time for reproductive health professionals. We have the opportunity to identify and prioritize opportunities to achieve a significant health impact in industrialized as well as in developing countries by accelerating the development of multipurpose prevention technologies. Together, we can address this need and improve the health and well-being of women and their families around the world.

Bethany Young Holt
CAMI, Public Health Institute
Sacramento, CA 95630, USA
E-mail address: byh@cami-health.com

Maggie Kilbourne-Brook
PATH, Seattle, WA, USA

Alan Stone
MEDSA Ltd.
London, United Kingdom

Polly Harrison
Alliance for Microbicide Development
Silver Spring, MD, USA

Wayne C. Shields
President and CEO
Association of Reproductive Health Professionals
Washington, DC 20037, USA

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