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Attuning Contraception Choice and Patient Values

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Abstract: In designed medical decision aids, supporting contraception decision-making is typically approached as supporting choice-making via the examination of features and benefits of the various contraceptive methods. In this paper, we examine the relevant goals of the immediate actors: personal goals of the patient and physician as well as the goals of the public health system. We argue that rather than supporting a single choice, that designing for contraception decision-making is best re-framed as supporting iterative attunement between the patient's values, body and a contraceptive regimen.

Keywords: contraception; decision aid; mobile technology

1. Introduction

Designing to support health decisions is a burgeoning area of practice for designers. Currently, activity in this area is driven by growing complementary interest in shared decision-making as an aspect of clinical care in the medical profession.

Designers who endeavor to design for shared decision-making face a challenging and complex situation. They are designing to support a conversation between a patient and a medical professional that is nested in an ongoing web of relationships that includes the needs of the patient, the various medical professionals, institutions, and (at times) is conducted while the patient is experiencing unexpected medical ailments. Designers are designing to support decision-making between the doctor and patient, attempting to create artifacts that provide information and support, and encourage deliberative conversations in fraught or emotionally difficult situations. In these conversations, patients often need material support to help them make sense of information in a domain where they have little expertise.

Decision aids (DAs) are a form of material support for patients or physicians attempting to evaluate different options, surface their values in the face of uncertainty, or plan for ongoing medical care. DAs might be used by patients or physicians to help structure a conversation

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or communicate complex information, including — for example — trade-offs in treatment regimens, efficacy or side effects of a variety of medications, or risk of lifestyle impacts upon health outcomes.

This paper focuses upon understanding the context of designing to support decision-making about revocable contraception options in the context of the encounter between an adolescent female and her physician. This situation holds particular interest as a design case. The adolescent female may approach the encounter as her first experience with a consequential medical decision. The decision process may serve as a model for future decisions regarding her own health. From this experience, she may be able to develop, and later transfer skills developed in consulting resources, identifying personal values, and advocating for herself and her needs with a person in a perceived authority role.

In this paper, we approached this process from a different perspective, adopting design approaches from deliberative inquiry and integrating them with service and interaction design approaches. Our goal is to develop a rich understanding of each actor's goals in the situation and support the patient in surfacing their values as pertains to contraception. Ultimately, we feel much of the work supporting patient decisions is authored from a predominantly medical perspective, focusing on communicating medical knowledge, such as efficacy, side-effects, and medical risk. Although this is of predominant importance, we feel design has the opportunity to reframe the conversation, leveraging attention to the human aspects of the experience, namely: supporting the dignity of the patients, considering how a medical experience might be perceived in the context of a broader set of services offered by the medical profession, and supporting ongoing attunement between systems of contraception and the needs and values of adolescent women.

2. Goals in medical contexts

The consideration of goals in software design and usability contexts is well established. (Cooper, 2007) When thinking of designing a facilitative object — an object that provides a catalyst for a number of actors to interact within the context of a system — like a decision aid, it is useful to think of goals for both the user and the service-provider. Further, goals may be considered beyond the immediate user of the product or service. Goals may be meaningfully considered beyond the scope of the individual human, to account for goals of relevant system, in this case, the goals of public health, or the goals of the set of systems that provides and funds healthcare activity. The following section delineates relevant goals from the perspective of the patient, and the physician, as well as the goals for the broader system of public health. Considering goals as multi-level, as complementary or conflicting helps to gain a richer picture of how a facilitative object, like a decision aid, might function in situ.

2.1 Goals for the physician

In the United States, a consultation with a certified health care provider is required in order to receive a prescription for contraception. As a result, the role this provider has during the

process of making a decision regarding contraception is integral. The health care provider is the clinical expert and most equipped to answer any questions regarding the factual-based inquiries for contraceptives which includes efficacy, safety, and proper instructions for administration (Madden & Kleinlugtenbelt, 2017). As a result, it is integral to the physician to be able to provide medically accurate information utilizing evidence-based recommendations to help a patient be appropriately informed when making a decision about contraception.

The use of a decision aid (DA) may be an appropriate supplement for a patient to use in conjunction with or outside of the consultation. It is important to ensure the information represented in a DA is medically accurate and appropriate for a patient to reference. Not only is the information itself important to be in line with the provider's clinical knowledge, but it must also appropriately communicate the benefits and harms.

The physician's promise to the patient is that they will uphold the values of medical ethics. There are four fundamental primary values as stated in the *Principles of Biomedical Ethics* which are patient autonomy, non-maleficence, beneficence, and justice. (Beauchamp & Childress, 2013) To effectively support the consultation, and the decision-making process, it is imperative the DA is representative of and upholding of these values. Moreover, to support the contraception conversation, the DA must have an equal and fair display of the safety risks associated with contraception while also highlighting the efficacy and appropriate additional benefits.

Furthermore, in today's practice environment, efficiency and time maximization of each visit (which is often limited) is important to the physician. The addition of a DA may help reduce the time spent going over the basic principles and lead to a more productive conversation in person (Jardine & Robinson, 2013). The DA may be utilized as a tool to give to a patient prior to presenting to a consultation as an introduction or during the visit as a reference to guide the patient through the options. Having a physical piece of paper to show a patient and consult during the process is helpful to alleviate some of the time the physician would use to convey specific information that can be easily read by a patient.

The identification of the physician's goals shows the importance of the physician's values and responsibilities, pertaining to themselves in terms of medical accuracy, their patient in terms of beneficence, and the medical system in terms of efficiency.

2.2 Goals for the patient

Goals for the patient as regards this experience could be meaningfully organized into two aspects: the goals of the patient as pertains to the use of the decision aid (DA) in the consultation situation, and the goals of the patient as pertains to the use and ongoing contraceptive care management and health.

The patient in this context is female in her adolescent years. At this age, the majority of young women in the United States have led generally uneventful medical lives with 97.8% of 12–17 year olds surveyed indicating they are in good, very good or excellent health during the combined years 2017–2018 (USDHHS 2019). It is likely that she has not had a

previous interaction where she was responsible for making a decision pertaining to her own health. The decision to choose a contraceptive method may therefore be the first significant interaction she has, where she has primary agency for decision-making (Hartman, Monasterio & Hwang, 2012). Navigating this unfamiliar world may result in feelings of being lost and confused. In the United States, there is no consistent curriculum to teach children skills in health literacy, and therefore, the medical jargon describing all of the possible methods holds the potential to derail her inquiry.

Specific goals for the use of the DA include allowing the individual's own values and preferences to be heard by the medical professional in the context of the decision encounter. Just as the physician is the expert on medical facts, the patient is the expert on her own values and lived experience (Madden & Kleinlugtenbelt, 2017). It is important to be able to help the young female identify what factors are important for her, and what would make her feel most comfortable and secure. Examples of values include desired levels of efficacy, permanency, convenience, religious/cultural synchronicity, cost and accessibility (Rubin, Felsher, Korich, & Jacobs, 2016). These factors may have differing levels of importance to each individual. Therefore, it is important to recognize how a specific ordering and weighting of each value can impact her choices. For the DA, taking these considerations into account is paramount. It must be flexible and adaptive in responding to her preferences.

Having the ability to take her time to consider the fit of a medication with her lifestyle, values and preferences, and also the ability to change her decision without repercussions is unique to contraception decision-making. The DA, although inherently supposed to conclude with the arrival of a decision, should actually be written in a more open manner to mimic the dynamic nature of her options (Hartman, Monasterio, & Hwang, 2012). It should convey to the user that her options do not close even if she makes a decision. All of her options are still available and just as valid as they were before. For the adolescent woman, contraceptive activity is an ongoing process of attunement (Mol, 2008) to an approach, rather than a moment of choice that is experienced and passes.

Tangential to understanding the patient's goals in the context of decision-making in a clinical encounter, is understanding the patient's goals in the ongoing use of a contraceptive approach. The relation between the patient's goals in the decision-making process and the use of contraception are related, but subtly different. Goals for use inform and shape goals for decision-making.

A number of studies have shown that for predominantly healthy adolescent women, pregnancy is a more prevalent concern motivating contraceptive use than the prevention of sexually-transmitted disease (STD). Pregnancy avoidance remains a key factor motivating adolescents and young women to seek contraception. Over time, a number of studies (Weisman et al. 1991, Royce & Seals 2001, Melo et al., 2016) have examined decision-making processes as regards contraception choice and found the avoidance of unintended pregnancy to be one of the most salient factors motivating adolescents and young women to seek out contraception. Royce & Seals (2001), go so far as to suggest attending nurses reframe condom

use as an additional protection against pregnancy as well as disease prevention for women using hormonal contraception to increase condom use among women already using oral contraceptives.

Bernstein & Jones (2019) cite the existence of an “expectation effect” in which a woman may expect whether and when to have a child, which allows her the individual freedom to plan her future around her own goals. The control contraception gives to the adolescent is incomparable to anything else that can be offered. It allows her to have the freedom to aspire for continued education and opens up the career field options. By giving the resources to appropriately inform and educate adolescent women about their options regarding their own body, an adolescent female is able to take control of her future.

Barriers to effective use of contraception are an additional consideration an adolescent woman may experience. Such barriers may be relational in character, such as partner assent (Weisman et al., 1991) or parental attitudes (Fisher & Hall 1988, Royce & Seals 2001), physical, such as a physical feeling of irritation when using condoms (Royce & Seals 2001) or a response to the hormonal content of OCs or long-term contraception. Misinformation and the consequent misuse (Dehlendorf et al., 2017) presents another significant barrier to effective contraceptive use. Identification of barriers that are specific to the patient experience are important to surface in the clinical encounter. The DA must therefore allow the patient to share and reflect on possible barriers pertinent to her story. This will allow health care professionals to help provide outcomes that facilitate her overcoming any anticipated problems.

Finally, as pertains to the patient’s goals and the maintenance of a contraceptive regimen, there is also a fundamental difference in the revocability of contraception decision-making and use that differs from most other medical contexts. Generally, if a patient needs to make a decision from a selection of treatment options such as: wait and see, medication, or surgery, there is a gradient of ascending irrevocability (also understood as permanence or opportunity cost) the patient needs to be made aware of. In many medical contexts risk assessment for different choices is a critical component. For example, if a patient elects to delay medical intervention (*wait and see*) and the condition worsens, that entails consequences. However, in the context of contraception, the impact of possible consequences is minimal by comparison. A patient is able to switch between methods — such as an oral contraceptive to an intrauterine device, and vice versa — without impacting her successful return to pregnancy or increasing risk of an unintended pregnancy. Furthermore, if the patient decides to suspend the decision, and wait, she does not need to fear that she is incurring risk or diminishing future opportunity.

2.3 Goals as pertains to public health

The introduction of contraception, with the approval of the first contraception pill in the United States in 1960, resulted in significant improvements in a variety of aspects for women and the general public health. For example, there is a positive economic impact as avoidance

of unintended pregnancy, especially for adolescents, allows a woman to complete her high school or college education and thus, yield a higher future earning potential (Bernstein & Jones, 2019).

Educating adolescents about contraception is a fairly inexpensive solution that yields a high economic savings. Not only does it result in reduced chances of living in poverty for the adolescent, but it also helps save the health system the additional costs of abortions or cost of birth. In 2010, the direct medical costs of unintended pregnancies was found to be \$21 billion USD. When the total federal and state governmental spending on unintended pregnancies are averaged, it comes out to \$336 USD for every woman aged 15-44 in the United States (Sonfield & Kost, 2015). Imagine how those funds could be better allocated for preventive services and education.

Not only is there a benefit for the individual adolescent, but there is also a benefit for the subsequent generation. When a mother is able to choose to delay her pregnancy until she is mentally and financially prepared, it results in an improved situation for the child. There is greater financial and emotional security available for the child with family planning. Being appropriately prepared for pregnancy also results in a healthier baby overall with higher rates of prenatal care measures taken, folic acid appropriately supplemented, and breastfeeding initiated earlier and lasting longer. (Kingston, Heaman, Fell, Chalmers 2012)

By educating adolescents about contraception, not only are unintended pregnancies lowered, but also a reduction of sexually transmitted infections (STIs) occurs through talk of safe sex practices. There is an additional economic savings from avoidance of STIs that occurs through reduction of clinic appointments, treatment of the STI, and treatment of complications arising from the STI.

Moreover, there have been studies linking unintended pregnancy with having a greater impact on the new mother's mental health. The risk of postpartum depression is twice as likely for an adolescent mother than a woman giving birth at age 25 and older. (Kingston et al., 2012) Other associations included (and which may also influence each other) are higher levels of stress, depression, and substance abuse. (Hodgkinson, Beers, Southammakosane, Lewin, 2014) The resulting impact on the public health landscape via appropriately educating adolescent women about contraception yields a benefit in a multitude of ways.

3. Developing a platform to explore values

3.1 Critical Questions

When we initiated this project, the goal was to design a decision aid to support female Hispanic adolescents to better engage in a discussion with a healthcare practitioner about contraception choices. In the course of developing preliminary research, and examining the problem of designing an interface to support deliberative engagement with contraception choices, we surfaced a number of critical questions and came to realize that there were some important culturally local specificities, and there were broad similarities — many shared

needs among female adolescents seeking contraception advice from a physician — that current DAs do not support.

Adolescents are in a prolonged liminal state. Turner (1970) considers liminality primarily as an ambiguous state that occurs during *rites du passage*. However, in a culture like that of the United States, where there are fewer formal ritualized events that mark the transition from youth to adulthood, the idea of the liminal state may be extended to encompass the state characterizing biological adolescence. Neither children nor adults, adolescents are entering into a stage of life where they might make adult decisions and experience the consequences of those decisions, but they have yet to develop a catalog of personal experiences.

Adolescent women from a variety of cultures may have this particular experience: a discussion of contraception being the first significant time that they ask for the support of a health-care professional in an independent way. Contraception is an intensely personal decision, and engages the body physically, biologically and psychologically. While the decision for nearly all methods of contraception is revocable and without consequence, the experience of the doctor-patient interaction at this early point in life may become an aspect of a frame through which the adolescent woman views future healthcare interactions.

3.2 Artifact Review

As has been detailed above, a healthcare decision aid (DA) is a tool that helps inform patients about available treatments, possibilities, risks, consequences, costs and other information during a medical encounter. It seeks to use the best available evidence to guide decisions about the care of an individual patient, taking into account their needs, values and preferences. DAs also endeavor to provide a frame for the questions and solutions discussed to facilitate interaction and shared understanding between patient and physician. One key approach the design team encountered is DAs can go beyond supporting choice-making. DAs can facilitate engagement of patient and physician in a deeper deliberative conversation that entails attunement and fit of the contraceptive regimen to the patient's life, values and preferences.

High-quality DAs can facilitate patient and physician engagement and can be used before, during or after a consultation to enable patient participation. It may help to improve a person's knowledge of the options and outcomes and give them more realistic expectations. No matter what form they come in, an effective DA should serve to empower women by giving them options, address concerns, and define values for informed preferences.

Table 1 *Content frequency in 6 decision aids.*

Mechanistic					
Ease of use					
Probability of omission					
How used					
Frequency of use					
Return to fertility					
Effect latency					
Foreign body phobia					
Needle phobia					
Use of hormones					
Requirement of healthcare provider					
Post-coital					
Pre-sex preparation					
Method Effect					
Efficacy					
Maximizing Efficacy					
STI prevention					
Side effects/Health risks					
Noncontraceptive benefits					
Menstrual changes					
Postpartum compatibility					
Alarm signs					
Social/Normative					
Partner support					
Prior experience					
Vicarious experience					
Expectations					
Religions/moral considerations					
Concealability					
Reputation					
Requires parental consent					
Practical					
Cost (financial)					
Effect on sexual pleasure					
Availability					
Level of sexual activity					

As pertains to supporting contraceptive decision-making, there are a number of shared decision-making aid tools available, produced by Planned Parenthood, the National Institute of Health (NIH), physicians conducting research, among others. While each DA has their particular focus and supports patients answering existing questions, extant DAs mostly serve to provide information in a one-sided approach of question and answer. What is lacking in the picture is the humane side of a patient's needs: the fear of an unfamiliar healthcare system, the lack of intimacy with a physician, and the sense of independence an adolescent woman might want emerging to adulthood.

Using an evaluation rubric developed by Wyatt et al. (2014) we examined several contraception DAs not available in Wyatt's study. Out of the seven we examined, three take the form of an app, three are HTML/javascript web-based articles/sites, and one video. One of the seven — an online decision assistance tool — was discontinued during the writing of this paper.

Wyatt's rubric accounts for four main aspects of information: mechanistic, method effect, social normative, and practical, each with a number of subordinate aspects. In reviewing the relevant attributes included in decision aids, Wyatt derived these overarching categories and subordinate aspects that influence contraceptive choices. The *mechanistic* category covers contraceptive usage, the frequency of use and reversibility. This attribute is covered by most DAs we have examined. The second category is *method effect*, which covers efficacy, side-effects and potential symptoms after the use of contraceptives. As with the *mechanistic* information, information about contraceptive *method effect* is also effectively presented. Third, is *social/normative*, covering information derived from social interactions between the patient and other people (sexual partners) or normative societal systems. Similarly to the artifacts covered in Wyatt et al., *social/normative* information received significantly less coverage in the DAs examined. The fourth category *practical*, examines issues of cost, frequency of use or other aspects of use that can be externally quantified. We found this to be moderately well discussed in the DAs examined. Information included in each DA is accounted in Table 1.

	T ParaGard IUD	↑ Hormonal IUD	\ Implant
Best at preventing pregnancy	✓✓✓	✓✓✓	✓✓✓
Doesn't reduce sexual pleasure	✓✓✓	✓✓✓	✓✓✓
Easy to use	✓✓✓	✓✓✓	✓✓✓
Easy to get	✓✓	✓✓	✓✓
Reduces periods			

Figure 1 Example screens from My Birth Control (Planned Parenthood)

Among the DAs examined, from the perspective of accomplishing the user's goals, we found the *My Birth Control* app made by Planned Parenthood (Figure 1) to be the least effective. Intended for informational purposes, the mobile application comes in the form of a quiz, and promises it will "Find out which method is right for you." The first section collects demographic information of a user's age, gender, ethnicity and location of residency. After this, the app experience involves rating the importance of the three to five top concerns of users, followed by questions like: whether the user has insurance, are they open to use method of hormones and vaginal contraception. There are no forms of dialogue or feedback

that allow for the user's doubts and concerns. A user could potentially feel trapped in the limited options without much prior information about contraceptive methods.

Figure 2 Example screens from *My Contraception*

A DA that we identified as providing a successful user experience was *My Contraception* (Figure 2) (Dehlendorf et al., 2017). Delivered in the form of a tablet-based application, it states a very simple and focused goal on the introductory screen — “we’re helping make the decision-making process much easier.” The home page greets users with a bright and vibrant color background displaying the text “Hello Beautiful...” in an informal, cursive script. The app provides information that is separate from the survey of preference, and allows young women to find out about five major topics: how efficient each contraceptive method is, how to use, frequency of intervention, side-effects, and what to do if you want to get pregnant.

My Contraception uses simple and familiar graphics to visualize basic information, and also allows for user's interaction supporting the exploration and comparison of different contraceptive methods, displaying the information in multiple modes: text, illustration, photograph. It puts the needs of users first and allows users to learn about potential methods before a consultation and allows them to prioritize their needs and consider the side effects, efficacy and ease of use.

After a thorough examination of these approaches, as well as the original study by Wyatt et al. (2014) we came to the conclusion that a rationalistic, scientific model of decision-making for contraception is extremely well-supported by many DAs. There are a number of DAs that support developing an understanding of the mechanical usage, different side-effects, and the practical aspects of contraceptive methods. Considering the contraception decision as multimodal, complex and relational, (Downey, Arteaga, Villaseñor, Gomez, 2017) and imminently patient-centered (Dehlendorf, Fox, Sobel, Borrero 2016) supporting the decision process with other models besides rationalistic offers the opportunity to generate new knowledge as relates to the medical decision process.

3.3 Mapping Values

The question of contraception may be approached from many perspectives, but one valuable and rigorous perspective is the perspective of deliberation. Further, a mobile phone experience provides an effective mix of familiarity, personal privacy, and access to many adolescents. While democratic deliberation is typically practiced in small groups, where participants engage with other participants and hear a range of values, beliefs and approaches, (Fishkin, 2008) the mobile phone facilitates a more solipsistic experience, involving interaction principally with the self, and with other participants mediated through software.

To ensure that a mobile phone-based deliberation offers the opportunity to encompass a range of values, the design team mapped their collective view of the scope of approaches that might be taken, from a philosophic or ethical standpoint (Figure 4). The maps are used to ensure that a diversity of perspectives are represented. For example, one could approach an understanding of the scope of dialog graphically by mapping the range of attitudes toward sex, from conservative to liberal. Other opportunities for gradients of understanding could include other aspects of a contraception choice, such as physical versus hormonal interventions. While some scales of attitudes towards sex include only a single variable, focusing on permissive versus conservative attitudes towards sex (Fisher, Hall 1988), we agree that the complexity of the decision space as pertains to contraception is better served by a multidimensional perspective of understanding several aspects of contraception in relation to one another. (Hendrick, Hendrick 1987)

Considering designing to develop an understanding of the values that intersect a contraception choice, we noticed that different questions entail a different choice architecture. When considering the importance of the effectiveness of a contraception method, a related, and quite consequential question might be: “What would an unintended pregnancy mean for me?” While the actual experience of an unintended pregnancy might be complex, from a reductive viewpoint this might be understood as three potential paths (Figure 3) that might be taken: voluntary termination of a pregnancy or carrying the pregnancy to term, then raising the child or adoption. A second valence that could frame each of these potential paths would be how the woman feels about a decision. Other questions related to contraception have more diffuse and less consequential outcomes.

Figure 3 Unintended pregnancy decision tree

Figure 4 Displays preliminary mapping of values versus preference of degree of medical intervention

For example, the choice of contraception method itself is more multi-modal, and may include a variety of variables. Figure 4 shows currently available contraceptive methods mapped on a scale of sexual attitudes from liberal to conservative, a second axis that describes the degree of medical intervention necessary to engage in that method, with a third axis of value displaying risk of failure. Some additional variables that might be considered in the decision space are cost, the physical interaction of the method with the body, and the experience of potentially positive or negative side-effects of the method.

4. Sharing peer experiences

A number of studies cite family, peers and partners as key influencers shaping the adolescent woman's views of sex and contraception. In a qualitative interview-based study of 21 adolescent women, Melo, Peters, Teal, & Guiahi (2015) derived a 4-stage model of decision-making characterized by the following stages: contemplation, preparation, action and maintenance. During this process, the first two stages are characterized by different kinds of information seeking behavior. Melo et al. (2015) found that during the first two stages, which might be characterized as thinking about contraception, and actively seeking information about contraception, adolescents considered the viewpoints of medical professionals, as well as friends, family and sexual partners along with their own personal contraceptive concerns.

In any deliberative decision-making process, peer stories provide important context. Considering deliberation as a *filter* through which a participant might reframe their own ideas of a complex matter, the central experience of deliberation is a peer-to-peer interaction where participants are confronted with and interrogate other opinions. (Fishkin 2008) The resulting dialog is what informs and shapes participants' opinions and provides a richer basis

for decision-making. Deliberation results in *considered* judgements, where people have had the chance to consider different opinions and points of view. (Fishkin 2008)

Medical professionals play a key role in the conversation about treatment options. Elwyn et al. (2012) offer a model of shared decision-making that begins with deliberation, followed by a three-step supportive process of choice talk, option talk, and decision talk. Elwyn focuses upon the patient <> physician interaction supported by specific decision support tools as the most effective model for shared decision making. This may hold true for many medical situations. In the context of the contraception choice, however, peer stories can figure prominently in both contraception choice, and contraception continuance. (Melo et al., 2015)

An adolescent engaged in the process of choosing contraception methods might want to hear a range of stories to inform their own viewpoint. Stories could encompass considered information for why a peer decided to choose or not choose a particular method of contraception, stories that might correct common misconceptions (such as return to fertility after using a LARC), stories that share positive or negative consequences of a particular contraception-related experience. Many adolescents gather information from peers as well as medical professionals, and they view this information as holding different kinds of importance. (Melo et al., 2015) Peer information can also be valuable as a means to reduce infection. Roye & Seals (2001) found that information provided by STD-infected peers was effective both when provided in person or by video.

5. Implications for design

Considering the previous points, we find that designing for the situation of the contraception conversation is a richer, more complex endeavor than the presenting of medical options and warning of specific side effects. Adolescent women encounter the contraception conversation at a liminal point in life. What seems to be a revocable decision that can be made upon the basis of medication and side-effects preferences may actually serve as a model for deliberation that can be used in future, more consequential medical decisions. The goals of physicians, patients, and goals for public health are mutually co-affective, and play an important role in how the contemporary doctor-patient conversation is enacted.

There are critical questions that must be addressed during this contraception conversation with the adolescent female. Through the exploration of current DAs, there are various aspects that are currently well-covered—however, something important is missing. The critical piece missing is the cultural weight that this process bears as a landmark for the adolescent woman's health journey. As perhaps the first decision she will have to make regarding her own body, with additional impact on her psychological state, there is a compelling need to provide appropriate support for the weight of this decision-making process.

Designers of shared decision-making tools should consider the various aspects of contraceptive choices as pertains to young female's values. In this experience, it is crucial

for females to feel understood when approaching thinking about different methods of contraception, which in turn helps the healthcare professionals better respond to patients' need. A decision-making aid which serves as a platform for storytelling and exchange of information provides a way for females to communicate their feelings and experience empathy from peers. Designers should work in tandem with patients and providers to offer a values-based platform that helps to amplify the voice of the patient in the health care conversation.

Enabling an interactive approach to contraception choice through identification and assessment of personal values on a multi-dimensional map of important variables is a more effective way to navigate this process. Through providing this platform for an adolescent female, the contraception decision-making process becomes both more easily understandable and allows for the female to feel understood and heard by allowing her to map her own values, and share that information with her practitioner. Additionally, supporting deliberation with a story-centered approach that is delivered by mobile phone seems to offer an effective mix of apparent peer-to-peer advice, supporting feelings of personal privacy, and the opportunity to provide prompts to capture viewpoints and reflect the viewpoints back to the user. Early prototypes of this work have been received positively in informal user interviews.

Fundamentally, we believe that the foundational problem of engagement in contraceptive practices is mischaracterized as choice of a contraceptive medication or regimen. The organization of the DAs examined by Wyatt et al., (2014) and the additional 6 aids that we analyzed using Wyatt's framework use a model of rational choice that treats the engagement as an encapsulated event that occurs once. We advocate approaching contraception DAs from a different perspective, supporting periodically revisiting the decision process, engaged consideration through deliberative inquiry into the adolescent woman's values, and supporting a process of ongoing attunement between the patient and the contraceptive regimen.

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