By 2050 more than half of pregnancies in the US may well start in laboratories.

By the middle of the twenty-first century, according to Henry T. Greely, a professor of law at Stanford University, improvements in preimplantation genetic diagnosis (PGD) and in vitro fertilization (IVF) will mean that 50-70 percent of pregnancies in the United States will start in laboratories rather than in the bedroom or the back seat of a car. Parents will be able to minimize the likelihood of transmitting diseases that run in the family and select the genetically influenced traits of their children (including gender, height, hair color, and perhaps intelligence, athletic and musical ability) from several embryonic options. This future “is coming,” Greely writes. “The question is whether and how to try to shape it.”

In *The End of Sex and the Future of Human Reproduction* Greely addresses many facets of this question. He lays out the developments in genetics, stem cell research, and biological technology that will make what he calls “easy PGD” feasible, widely available, and inexpensive within a few decades. And he provides an extraordinarily sophisticated analysis of the practical, political, legal, and ethical implications of the new world of human reproduction. His book is a model of highly informed, rigorous, thought-provoking speculation about an immensely important topic.

Clearly, Greely has thought long and hard about the implications of easy PGD. The benefits, he indicates, are clear. If widely adopted, the procedure will decrease the amount of human suffering caused by genetically transmitted diseases. Easy PGD can also result in a closer match “between the children parents want and the children parents get.” More abstractly, Greely
suggests, the ability to use a safe and effective technology “should count as a benefit, at least by people who prefer freedom.”

Greely devotes six chapters to the risks. He analyzes scenarios related to safety, family relationships, equality, coercion, “naturalness,” and implementation, making sure to “apply principles to concrete cases, rich with facts and context.”

A few examples. There is no perfect safety, Greeley reminds us. IVF is not much riskier than natural conception, except for the disproportionate number of IVF babies born as twins, triplets and more (who have lower birth weights and more long term problems than singletons). Even more important, Greely notes that we cannot draw definitive conclusions about the safety of an as yet un-invented process. With the health of huge numbers of people at stake, he recommends that the FDA mandate especially rigorous pre-clinical trials, first with non-human animals and then with human beings. He also suggests that the FDA, which does not now have the power to regulate how an approved product is used, require long term follow-ups of children born from the procedure.

Greely recognizes as well that easy PGD may alter family relationships. It opens up, or expands, parenting possibilities for gay and lesbian partners, individuals for whom the biological clock has stopped ticking, “incestuous” couples, folks from whom cells were taken without their permission, and “uni-parents,” who combine eggs and sperm derived from themselves. Should the government prohibit any of these practices, Greely asks.

Greely also wonders whether celebrities or Nobel Prize winners should be allowed to sell their sperm to the highest bidder. And whether humanity would be diminished by the disappearance of deaf children or children with Down syndrome, even though parents and siblings maintain that the affected family member is a joyous, loving person who taught them so much about life.

Greely recommends that the FDA scrupulously investigate PGD safety, including surveillance of PGD children, before granting approval - but not regulate choices made by informed prospective parents about the genetic traits they are choosing. He acknowledges that he is conflicted about allowing anyone to knowingly select an embryo with a severe genetic disease and (given the preference for boys) about sex selection, but opposes prohibitions because they might well spill over into less clear-cut cases. Greely would, however, ban making anyone a genetic parent without his or her consent. He finds the idea of selling sperms and eggs distasteful but can find “no good reason” to ban the practice. Most importantly, he advocates subsidies to make PGD affordable to everyone.

Choices on these matters will be made, Greely emphasizes. If informed people don’t help make them, ignorant people will fill the void. “I charge you, I beg you,” Greely concludes, to use the information in his book as a stimulus to further investigation, thought and action to help craft policies to insure that emerging reproductive technologies bring “as much benefit, with as little harm, as is humanly possible.”