

Achieving the goals of the HGP would have been impossible without major advances in technology. Over the course of the 13 years since the project began, the cost of sequencing has dropped from \$10 per nucleotide base (A, T, C, or G) to less than nine cents. Thanks to the development of new, low-



cost, rapid processing, DNA sequencing machines, which determine the specific order of nucleotide bases in the genome, what would have taken months to sequence now takes seconds. It was also necessary to develop major advances in laboratory tools, complex databases and analytical software, and take advantage of vast improvements in computer

processing speeds. Today, there are a large number of resources that search, compare and analyze the human genome, available to the public at no cost. (You can access the human genome from any computer by going to www.genome.gov, clicking on The Human Genome Project and going to the Genome Hub.)

Ethical, Legal and Social Implications

With the powerful new tools of genomics, society needs to look carefully at the ethical, legal and social implications (referred to as "ELSI") that may arise from this science. So, the Human Genome Project included the establishment of an ELSI program to study these issues and to play a central role in encouraging society to use appropriately the knowledge gained from genomic research. How should this new genetic information be interpreted and used? Who should have access to it? How can people be protected from the harm that might result from its improper disclosure or use? How will the study of genomics affect society's concepts of race and ethnicity? Consideration of ELSI issues such as these will help develop the public policy options that include the consideration of the philosophical, theological and ethical consequences of understanding our own DNA blueprint. In this way, sensitive areas can be identified and solutions developed before scientific information is integrated into health care practice.