In the last decade human exposure to nanoparticles has become inevitable since nanotechnology made myriad inroads into mainstream society through products such as coatings on cell phones, antimicrobial socks, static-free pants, self-cleaning toilets, food packaging, solar paint, lighter and stronger baseball bats, lighter and damage-tolerant wind turbine blades, and fuel cells. However, while the number of nanoparticle types and applications continues to increase, studies to characterize their effects after exposure and to address their potential toxicity are few in comparison.

**PHARMACEUTICALS AND THERAPEUTICS**
Targeted drug delivered
Increasing drug safety and efficacy.

**DIAGNOSTIC & IMAGING**
Malignant tumors are highly localized during the early stage of their development.

**NANOSCALE SURGERY**
Minimally invasive surgical procedures are increasingly being done using laparoscopic techniques. Surgical tools are being embedded with miniature sensors to provide real-time information.

**IMPLANTS & TISSUE ENGINEERING**
Biocompatibility of synthetic materials that can be implanted in the human body to replace tissues or organs that have been damaged by disease, injury or simple wear and tear.

**NANODEVICES & NANOMATERIALS**
Multifunctional nanodevices equipped with molecular motors, sensors and actuators to operate as a self-contained entity to diagnose, treat, and monitor diseases.

**PERSONALIZED MEDICINE**
Shift in the traditional western model of medicine from diagnosing and treating acute disease once it develops to an increasingly predictive and preventative model.

**ISSUES OF NANOTECHNOLOGY IN HEALTH AND MEDICINE**

- **Prioritization of research:** Who has a greater claim to scare research dollars - those in need of preventive medicine or those in need of curative medicine?

- **Cost:** When weighed against the cost and benefit of other social goods, are we morally obligated to develop and provide the services of personalized medicine to everyone?

- **Access:** Will the benefits of nanomedicine be equitably and fairly distributed?

- **Implications of personalized medicine:** Does nanotechnology has the potential to change the way medicine is practiced?

- **Cytotoxicity:** Nanoparticles have the ability to change the behavior of materials; therefore, their interaction with living systems must be analyzed. In human beings it could have consequences for health at long and short terms.

Texas State University and the University of Texas at Tyler; have recently received a NSF-NUE (Nanotechnology Undergraduate Education) grant to develop introductory and advanced curricula that address “nanotechnology safety issues” that include social, ethical, environmental, health; and safety issues of nanotechnology. Introductory course has been successfully implemented during summer 2013 at University of Texas at Tyler, and fall 2013 at Texas State University. Nanotechnology safety in health and medicine is one of the modules of the introductory course. [http://nsf-nue-nanotra.engineering.txstate.edu](http://nsf-nue-nanotra.engineering.txstate.edu)