Basic Research - Regulation

• Institutional Biosafety Committees
  – Focus on laboratory safety

• Institutional Review Boards
  – Focus on protection of privacy and other interests of those whose tissues or cells are being used

• NIH Recombinant DNA Advisory Committee
  – Advice on conduct of research; venue for public discussion
Somatic Therapy - Regulation

• Institutional Biosafety Committees

• Institutional Review Boards
  – Protection of subjects in clinical trials; informed consent

• Recombinant DNA Advisory Committee
  – Advice and some protocol review; venue for public discussion

• FDA
  – Control over initiating clinical trials
  – Control over approval for clinical use
  – Long term follow-up
RECOMMENDATIONS
Basic Research & Somatic Therapy

• Already managed under existing ethical norms and regulatory regimes at local, state, and federal levels
• Use existing regulatory processes to oversee basic laboratory research and somatic research and uses
• Limit clinical trials or therapies to treatment and prevention of disease or disability at this time
• Evaluate safety and efficacy in the context of risks and benefits of intended use
• Somatic genome editing; efficiency, specificity and off-target events, must be evaluated in the context of the specific intended use and method. No single standard can be defined at this time.
Heritable Genome Editing - Regulations

- Regulations covering laboratory work and human subject protections in clinical trials are applicable
- If done with embryos (as opposed to gametes), it would be prohibited in some states; at federal level there are restrictions on funding
- At this time, clinical trials are not possible in U.S. due to limitations on FDA authority
- Other countries vary, from prohibition to possible authorization under strict regulation
Heritable Editing Clinical Trials

• Caution is needed but being cautious does not mean prohibition

• Heritable genome editing research trials might be permitted, but only after:
  – much more research to meet existing risk/benefit standards,
  – under strict oversight, and
  – restricted to specific set of criteria
Criteria to Initiate Clinical Trials

- Absence of reasonable alternatives;
- Restriction to prevention of a serious disease or condition;
- Editing only genes that have been convincingly demonstrated to cause or to strongly predispose to the disease or condition;
- Converting such genes to versions that are prevalent in the population and are known to be associated with ordinary health with little or no evidence of adverse effects;
- Availability of credible pre-clinical and/or clinical data on risks and potential health benefits of the procedures;
Criteria to Initiate Clinical Trials

• ongoing, rigorous oversight during clinical trials of the effects of the procedure on the health and safety of the research participants;

• comprehensive plans for long-term, multigenerational follow-up;

• maximum transparency consistent with patient privacy;

• continued reassessment of both health and societal benefits and risks, with broad on-going participation and input by the public; and

• reliable oversight mechanisms to prevent extension to uses other than preventing a serious disease or condition
Public Engagement

It is essential that transparent and inclusive public policy debates precede any consideration of whether to authorize clinical trials for indications that go beyond treatment or prevention of disease or disability.

- For laboratory research and gene therapy, there are existing mechanisms that provide opportunities for public engagement.
- For somatic cell editing, public policy debates should precede any clinical trial use beyond treatment or prevention of disease and disability.
- For heritable editing, public input should precede any clinical trial.
Key Messages of Report

• Genome editing in the context of basic research and somatic gene therapy is valuable and adequately regulated.

• Somatic therapy should be used only for treatment and prevention of disease and disability; it should not be tried for enhancement at this time; public engagement and input is needed.

• Heritable genome editing needs more research before it might be ready to be tried; also, public input and engagement needed.

• When tried, heritable genome editing must be approached cautiously: used only for treating or preventing severe diseases (no enhancement), and according to strict criteria with stringent oversight.