

Table of Contents

Introduction 2

Executive Summary 2

Mission and Vision 3

Four Strategic Objectives and Key Outcomes 4

Strategies and Tactics Toward Success..... 4

Accelerate Stem Cell Science 5

Advance Science into Clinical Trials 8

Drive Economic Development in California 11

Maintain Support for California’s Leadership in the Field..... 13

Target Goals and Metrics Going Forward (to come).....X

Financial Projections (to come).....X

AppendicesX

A, Summary of External Advisory Panel Report and Leadership Response..... x

B, The Process for, and Summary of, Stakeholder Inputs..... x

C, Progress to the 2006 Five-year and Ten-year Goals..... x

DRAFT

INTRODUCTION AND CONTEXT

In November 2004 the voters of California adopted Proposition 71 (the California Stem Cell Research and Cures Act), authorizing the issuance of \$3 billion in state bonds to support stem cell research in California. The act created the California Institute for Regenerative Medicine (CIRM) and charged the institute with determining the most effective means of distributing state funds to accelerate the entire field of stem cell biology and regenerative medicine.

In December 2006 CIRM's governing board, the Independent Citizens Oversight Committee, adopted its first scientific strategic plan, which has served as the blueprint for CIRM's scientific programs and procedures. CIRM relied on that plan as the foundation upon which an update to the plan was developed in 2009/2010 and that document is the starting point for the current revision.

As a responsible steward of public funds, CIRM must periodically reevaluate both its funding priorities and operations to stay sharply focused on those research opportunities most likely to achieve therapies and cures. The 2006 scientific strategic plan was intended to be a "living plan" with formal assessment by an outside panel and revision as necessary recommended at years three and seven. Year 1 for the plan was designated to start July 1, 2007, making the first formal assessment due around July 2010.

Accordingly, CIRM's governing board adopted an update to the 2006 plan in the spring of 2010. That document was then provided to an External Advisory Panel (EAP) that was selected in July. The EAP, an eight-member blue ribbon panel was composed of individuals fitting the categories outlined in the 2006 Plan: "... scientists, clinicians, ethicists and patient advocates both from within and from outside of California."

The Governing Board accepted the report from the EAP in December 2010 (see appendix A), and senior leadership submitted a response to the report in February. (also appendix A)

This 2012 strategic plan update builds on the solid foundation of the 2006 plan and on the 2009-2010 update and re-assessment. It addresses the recommendations of the EAP, recognizes the rapidly changing scientific landscape of stem cell science and reflects the views of numerous stakeholders who were asked to provide their perspectives on the current and future direction of the agency. (see appendix B)

EXECUTIVE SUMMARY

TO COME

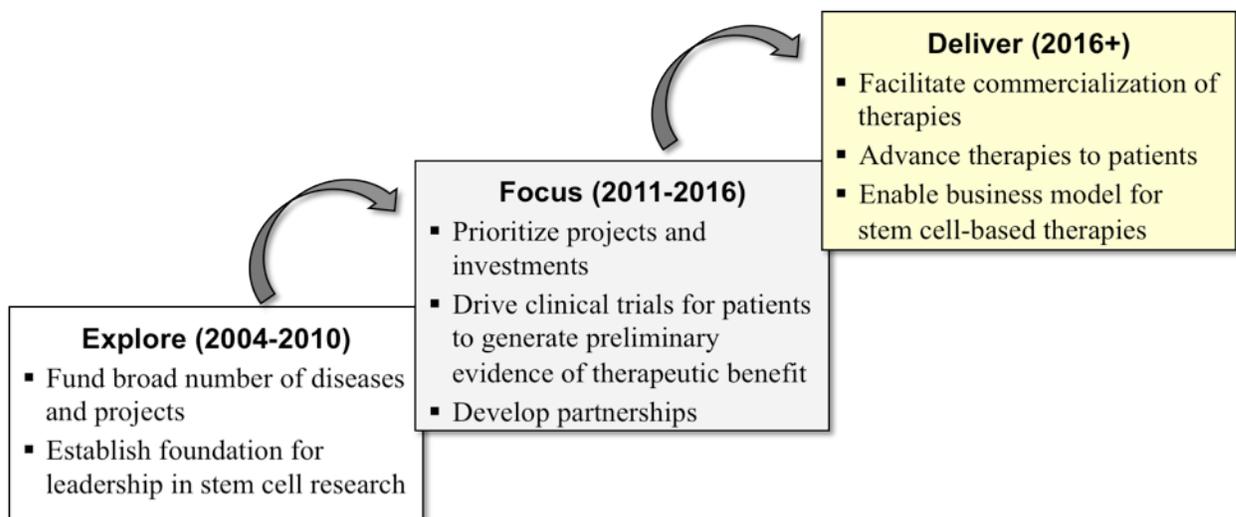
VISION

The Mission of CIRM is:

“To support and advance stem cell research and regenerative medicine under the highest ethical and medical standards for the discovery and development of cures, therapies, diagnostics and research technologies to relieve human suffering from chronic disease and injury.”

CIRM’s first five years set priorities based on establishing a strong foundation for leadership in stem cell research, seeding the entire field with discoveries using a variety of stem cell-based platforms. This resulted in over 1.3 billion in awards to 59 institutions, the publication of more than 1,000 journal articles (28 percent with impact factors greater than 10), the construction of 12 dedicated stem cell facilities, the migration of more than 100 faculty level stem cell researchers to the state, and 43 translational projects in 26 therapeutic areas.

As CIRM enters its next five years its focus will be on driving science to clinical trials that have the potential to generate evidence of therapeutic benefit for patients. We intend to fund work that will result in clinical proofs of concept while maintaining the full pipeline of discovery including the basic science that has the potential to fundamentally transform the field.



STRATEGIC OBJECTIVES

In order to complete the transition to a new “Focused” phase, CIRM senior leadership identified four key strategic objectives that align to the overarching mission and vision.

Proposed strategic objectives for next five years			
Scientific	Clinical	Economic	Community
Accelerate understanding of stem cell science and its applications towards human diseases and injuries	Advance stem cell science into clinical trials to achieve evidence of therapeutic benefit to patients	Drive economic development for California from stem cell science and therapies	Maintain California as the world stem cell leader

Single most important key outcomes			
Scientific	Clinical	Economic	Community
Achieve transformative research discoveries	Achieve clinical proof of concept for stem cell therapies	Leverage CIRM’s investment in California	California universally recognized as the “Stem Cell State”

Strategies for Achieving Success on the 2012 Objectives

CIRM senior leadership, with input from the Independent Citizens Oversight Committee and a wide array of stakeholders, has developed strategies for success for each of the 2012 objectives, summarized in the table below.

Scientific Strategies	Clinical Strategies	Economic Strategies	Community Strategies
<ul style="list-style-type: none"> ▪ Foster an engine of discovery and transformative research ▪ Create a collaborative research community that enhances California’s leadership and competitiveness ▪ Realign funding programs, review and decision making with current strategic objectives 	<ul style="list-style-type: none"> ▪ Foster disease-specific research toward clinical proofs of concept ▪ Expand multidisciplinary collaborative efforts to enhance clinical outcome ▪ Foster developing a regulatory path for stem cell therapies ▪ Enable opportunities for commercialization ▪ Focus, prioritize and evaluate projects to move the most promising forward ▪ Enhance interactions with patients and advocates 	<ul style="list-style-type: none"> ▪ Attract co-funding and follow-on financing of CIRM projects ▪ Foster the growth of California’s stem cell industry and the creation of stem cell clusters that accelerate investment ▪ Establish a platform to enable grantees, disease foundations, venture capitalists and others to pursue CIRM’s mission upon the expiration of CIRM’s bond funding 	<ul style="list-style-type: none"> ▪ Communicate value proposition of CIRM and the stem cell field ▪ Engage with stakeholders on why stem cell science matters to them ▪ Create an awareness among stakeholders of CIRM’s role in making California the leader in the field

Scientific Objective *to accelerate understanding of stem cell science and its applications toward human diseases and injuries.*

Strategies and Tactics

Foster an engine of discovery and transformative research—CIRM has built the foundation for such an engine. With more than 1,000 research papers published using CIRM funding, 546 thousand square feet of new research space either completed or near completion and more than 100 faculty level stem cell researchers attracted to the state, the agency has a solid base to build upon. Going forward tactics include:

- We expect the recruitment to California of innovators in stem cell science through CIRM’s Research Leadership Award program in 2012 -13.
- CIRM will explore approaches to fund highly innovative researchers to enhance breakthrough discoveries.

- CIRM will be seeking applications under a specific RFA targeted to draw more medical researchers to bring their unique perspective to discovery and translational research that could lead to transformative therapies for patients.
- CIRM will continue to identify critical roadblocks to achieving therapies that could be overcome with basic or translational research and incorporate proposals to overcome those barriers into funding opportunities.
- Through targeted RFAs CIRM is developing iPSC cell lines and banking representing major complex diseases. This should provide California scientists and biotechnologists a major ongoing resource for disease modeling and drug discovery.
- CIRM will explore the opportunities to leverage existing high throughput compound screening and genomic screening capacities in the state to screen stem cell based disease models for drug development and toxicology.
- CIRM plans to launch a major funding initiative in stem cell genomics to develop centers of excellence, which will apply rapidly advancing developments in genomics to stem cell biology, disease modeling, and therapeutics (link to whitepaper).

Create a collaborative research community that enhances California's leadership and competitiveness— CIRM has a strong track record for creating research collaborations within institutions, across institutions and across state and international boundaries. Going forward tactics include:

- CIRM will expand and increase the effectiveness of the CIRM network of Collaborative Funding Partners, both nationally and internationally to enable the best scientists, biotechnologists and clinicians nationally, and from around the globe, to work with Californian colleagues.
- CIRM plans to continue to utilize workshops and to support critical conferences to foster collaboration with California stem cell scientists. CIRM is also exploring creation of a portal within its web site to make it easier for potential collaborators to find researchers doing complementary work.
- CIRM will continue to hold CIRM Grantee and the CIRM Bridges Trainee meetings to further foster collaboration and the community of stem cell scientists. CIRM is working towards a partnership with a leading not-for-profit conferencing agency to promote stem cell research and applications in regenerative medicine.
- The CIRM Shared Lab grants have been renewed and we have set up a web portal for the directors of those labs to share best practices in how they teach and foster stem cell biology.

- CIRM's planned stem cell genomics program will forge new collaborations between stem cell scientists and top experts in genomics and bio-computing.

- The External Innovation component of the recently Board approved Opportunity Fund allows CIRM to identify outstanding research taking place outside California and/or within the jurisdiction of any of the agency's external network of funding partners. CIRM can fund new awards or supplement existing awards to California researchers who form partnerships with the external scientist.

- The Bridging component of the Opportunity Fund provides supplemental support to the most promising previously CIRM-funded projects, within the existing stage and defined project area, to enable the research to continue uninterrupted until next applicable round of CIRM funding or receipt of other funds.

- CIRM will continue to further enable industry participation and collaboration. Specifically:
 - CIRM will make the grant and loan process more streamlined and transparent.

 - CIRM's active management of our translational portfolio projects in conjunction with external advice will help make our stem cell projects attractive for industry collaborative investment.

 - The Strategic Partnership Funding Program, the third component of the Opportunity Fund, was designed to attract co-funding and follow on financing by the pharmaceutical industry, major biotechnology companies and the venture capital industry to support new and existing CIRM funded projects. This program will offer a biannual review, enabling CIRM to become more nimble in working with the constraints and timelines of industry

Realign funding programs, review and decision making with current strategic objectives—As CIRM moves from a broad exploratory phase to a more focused phase it must align our funding to achieve key outcomes for current strategic objectives. There must be a push for projects that deliver on clinical proof of principal while maintaining support the basic and translational research that is the foundation for creative change and is necessary for the discovery of new therapeutic opportunities and new approaches to resolving barriers to progression of therapies. Going forward tactics include:

- CIRM plans to continue to develop tools to aid reviewers and decision makers to

incorporate portfolio prioritization considerations, where applicable, into their respective roles in making funding recommendations or funding decisions .

- CIRM will prioritize its translational, especially its development portfolio, to identify those projects that offer the most promise to patients and to regenerative medicine and actively work to enable their success.
- The Clinical and Development Advisory Panel along with other industry expertise will be utilized in identifying these promising projects and in evaluating the strengths and weaknesses of our development portfolio.

Clinical Objective *to advance science into clinical trials to achieve evidence of therapeutic benefit to patients.*

Strategies and Tactics

Foster disease-specific research toward clinical proofs of concept — The 43 projects in 26 therapeutic areas in CIRM’s development portfolio provide an initial base for moving selected projects toward and into early phase clinical trials. CIRM’s Clinical Development Advisory panels, constituted in July 2011, are composed of experts with expertise in preclinical, manufacturing, clinical, regulatory, specific diseases, and commercial viability. They met with each of CIRM’s disease teams to engage in an interactive dialog on the challenges and complexities our translational programs face in moving toward the clinic, with the intent of helping them be positioned for success. Going forward the tactics include:

- CIRM will work with the Clinical and Development Advisory panels and other industry experts to provide guidance at key milestones of ongoing disease teams to better position these projects to advance into clinical trials.
- CIRM will strengthen its robust peer review groups with additional product development, regulatory and commercial viability experts for the 2012 Disease Team Therapy Development Awards, Strategic Partnership Awards, and other future translational awards to better identify programs that have the potential to advance towards and into the clinic.
- CIRM will raise awareness of existing resources and provide more opportunities to engage with potential applicants on lessons learned to enhance potential for successful award submissions.

Expand multidisciplinary collaborative efforts to enhance clinical outcomes — CIRM’s considerable effort in building collaborations to date, most notably through

its Disease Teams and its network of Collaborative Funding Partners, provides a solid foundation for ratcheting up this effort in its second phase. Going forward the tactics include:

- CIRM will explore and facilitate the creation of stem cell clinics (Alpha Stem Cell Clinics [link to whitepaper](#)) in California and beyond to enhance clinical trials and delivery of stem cell based therapies for patients.
- CIRM will work in collaboration with the NIH-funded California Clinical and Translational Science Institutes and the NIH Clinical Center in Bethesda to leverage expertise and infrastructure to accelerate clinical development.
- Collaborative Funding Partners have expressed interest in the possibility of replicating the business and clinical model that may evolve from the CIRM “Alpha” Clinic network. A network of clinics for cell therapies could be expanded nationally and internationally.
- The Opportunity Fund will be used to foster collaboration and investment by industry and venture capital. As CIRM projects move through preclinical testing and Phase 1 and Phase 2 clinical trials the Strategic Partnership Funding program will be instrumental in attracting follow-on financing for the definitive Phase 3 trials.
- CIRM will provide access for academic grantees to product development, regulatory, and industry expertise during the developmental phases of research in order to improve understanding and capacity for translational and preclinical/clinical processes necessary for regulatory approval.
- CIRM will, through mechanisms that include the new translational journal (Stem Cells Translational Medicine), workshops and on-line information portals, enable opportunities to share information on experiences learned in moving a product through regulatory pathways toward and into the clinic.

Foster developing a regulatory path—CIRM has taken a leadership role by organizing webinars and face-to-face roundtables with the FDA and researchers, and co-sponsored and participated in an interactive workshop with patient advocates, FDA, industry, and researchers, focused on the role of the patient advocate in product development.. These meetings and on-line presentations have addressed a wide range of issues on various aspects of regulatory consideration. CIRM is also a founding member of the Alliance for Regenerative Medicine (ARM), that is exploring a number complex issues such as “potency” of cell products and other critical matters in defining acceptable clinical parameters for cell therapies and other aspects of the regulatory pipeline. Going forward the tactics include:

- Leveraging the experience and sharing lessons learned of grantees and others on regulatory requirements for stem cell based therapies.

- Webinars and roundtables with FDA and researchers in the field will continue to address critical regulatory and harmonization issues in cell therapies and regenerative medicine.
- Members of the CIRM leadership team will continue to serve and expand their participation on committees for ARM, which is moving key scientific, regulatory and legislative initiatives forward in regenerative medicine.
- Through a targeted RFA, CIRM will support physician scientists and will explore the possibility of creating a translational fellowship program to further enhance the training of key research personnel in cell therapeutics and translation.

Enable opportunities for commercialization — CIRM has funded and published online a whitepaper on reimbursement ([link](#)) and flagged this as a key issue. Going forward the tactics include:

- CIRM will leverage the experience of the venture capital, disease foundation, and industry sectors to develop business strategies essential for the success of stem cell firms.
- CIRM co-organized with ARM and Connect the first ever “investor and partnering” forum for the sector in 2011, which brought together 244 representatives from academia, start-up biotechnology firms, major biotechnology firms, large pharmaceutical companies and venture capital financiers to discuss opportunities for collaboration and follow-on financing. CIRM will continue to support the partnering forum as an annual calendared event.

Focus, prioritize and evaluate projects to move most promising translational research forward— While investments in early stage discovery will continue, CIRM will institute processes that ensure investments in translational projects are focused on those most likely to progress toward and into clinical trials. Going forward tactics will include:

- CIRM will enhance use of reviewers and advisors with product development and industry expertise when reviewing and making recommendations on the likelihood of moving projects toward and into clinical trials as well as assessment of opportunities for commercialization and application in viable markets.

Enhance interactions with patients and advocates — Patient advocates are a powerful resource for promoting awareness of clinical trials and educating the public about potential therapies. CIRM began interactive discussions with patient advocates in August of 2010. That effort started with a listening tour of one-on-one meetings summarized in a Voice of the Patient Advocate document, which directed

the next phase of the project centered on information exchange. That effort has developed a list of nearly 900 patient advocates who have signed up to stay connected to the agency and receive materials on its activities. Going forward the tactics include:

- In the next phase of this project, CIRM will develop a handbook for our grantees on approaches to consider for facilitating constructive interactions with patient advocates.
- CIRM will also identify leading advocates/organizations for each disease represented in the CIRM Disease Teams and explore points of mutual interest.
- CIRM will develop an advocate venue that can be used for calls/meetings to seek input and feedback on issues related to CIRM's clinically relevant activities on a regular basis..

Economic Objective *to drive economic development for California from stem cell science and therapy.*

Strategies and Tactics

Attract co-funding and follow-On financing of CIRM projects—CIRM has been very successful in leveraging taxpayer investment. The \$271 million commitment of state funds to the CIRM Major Facilities resulted in more than \$800 million in private donor and institutional funds for construction, equipment and for recruitment packages for top talent. In addition, as of December 2011, CIRM's collaborative funding partners had committed approximately \$60 million to CIRM-funded projects and California firms had committed considerable company resources to projects for which they had CIRM awards. Going forward the tactics include:

- CIRM will create additional research and development collaborations, co-funding arrangements and opportunities for investment in CIRM's portfolio. New approaches will include a "Bolt-On" strategy where collaborators including disease foundations and funding agencies, can join a project after it has ICOC approval.
- CIRM will explore collaborative funding relationships with multiple partners on the same project and early inputs sourced from collaborative funding partners.
- CIRM is exploring creating a portal within its web site to make it easier for potential collaborators to find researchers doing similar work and find other ways for our partner organizations to use existing information on our web site.

- The Strategic Partnership Funding Program is designed to attract significant amounts of co-funding and follow-on financing to California stem cell projects. This funding could come from major pharmaceutical firms, biotechnology companies, disease foundations, collaborative funding partners or venture capital.

Foster the growth of California's stem cell industry and the creation of stem cell clusters that accelerate investment – CIRM has created stem cell clusters within existing biotech clusters in the Bay Area and San Diego county and has made significant progress toward a third cluster with critical mass in the Los Angeles basin. Going forward the tactics include:

- CIRM will work closely with the state and local governments to further leverage CIRM's funding by attracting new companies to the state and to enable growth for the industry already in California.
- The Bridges Training and Creativity programs will continue to engage and advance many students who often would not have had the opportunity to consider a career in research and biotechnology. These programs provide critical personnel resources needed by our growing industry.
- The various components of the Opportunity Fund will be effective in drawing companies to California.
- CIRM will create financing arrangements that will attract companies with critical assets to work with CIRM and appropriate academic teams on development and clinical programs, new technologies and transformational research.
- Access to CIRM resources, such as cell banks, genomic centers of excellence, clinical trial sites in Alpha Stem Cell Clinics and other opportunities will draw companies to California.

Establish a platform to enable grantees, industry, other government agencies, disease foundations, venture capitalists and others to continue to pursue CIRM's mission upon the expiration of CIRM's bond funding – CIRM's bond funding is limited to \$3 billion. Although additional funding could be a possibility in the future, it would be premature even to consider another bond measure at this time. Instead, CIRM should focus its efforts on creating a platform that enables others to carry on CIRM's work. Through its funding of state of the art research facilities, collaborative funding agreements, and industry engagement, CIRM has already made progress in creating this platform. CIRM's efforts will include:

- CIRM will explore and facilitate the creation of Alpha Stem Cell Clinics for the delivery of stem cell based therapies to patients and will work with its collaborative

funding partners to replicate the model nationally and internationally.

- CIRM will continue to pursue and strengthen its joint funding efforts with state and international partners, the NIH, disease foundations, industry and venture capitalists in order to build relationships and promote follow-on funding for CIRM's research projects.
- CIRM will work to create and bring new biotechnology companies to California and create stem cell clusters to promote collaborations with California researchers and to provide a vehicle to translate stem cell discoveries into clinical applications.
- CIRM will explore the creation of a nonprofit venture philanthropy fund to provide funding for stem cell research projects, from IND-enabling research through Phase 2 clinical trials.
- CIRM will fund the creation of an iPSC bank as a resource for California researchers and companies interested in disease modeling and drug discovery.
- CIRM will provide regulatory and product development guidance to its grantees to ensure that they have the tools necessary to take their discoveries from the bench to the bedside.
- CIRM will support efforts by its grantees to protect CIRM-funded intellectual property in order to safeguard the state's investment and promote the commercialization of CIRM-funded therapies.

Community Objective *to maintain California as the world leader in stem cell research.*

Strategies and Tactics

Communicate the value proposition of CIRM and the stem cell field—CIRM is a good investment for the state when you compare the jobs created and new tax revenue generated to the debt service on its bonds (link to economic impact study). Additional value will develop as CIRM fosters more industry growth in the state, and in the long-term, from stem cell related therapies with enhanced effectiveness that result in reduced cost of care for Californians, thereby lowering costs to MediCal and for employers providing health insurance. Going forward the tactics include:

- CIRM will develop tools and strategies to more broadly communicate the value of CIRM funding to state legislators, state executives, opinion leaders and the general public.

- CIRM will utilize legislative briefings, media briefings, and public speaking opportunities to inform the broad community on the value created by CIRM activities.
- CIRM will incorporate the value message in its electronic and social media and encourage broader sharing of this information

Engage with stakeholders on why stem cell science matters to them—CIRM has robust content explaining its science product to the public and to high school students. A number of advocates consider CIRM’s web content some of the best and most appropriate anywhere on disease conditions and regenerative medicine. Going forward tactics will include:

- CIRM will find ways to encourage more people to visit its website so that CIRM becomes “the accepted source of stem cell information.”
- CIRM will work to broaden the reach of this content and make sure that it provides the full context of the value proposition while penetrating deeper to reach a wider sector of audiences more fully.
- CIRM will use the Patient Advocate network developed to support its clinical mission (noted on page 10) as ambassadors to carry this information to their constituents.
- CIRM will increase its provision of feature story ideas to media outlets, both print and broadcast.
- CIRM will continue to investigate new tools in the constantly evolving world of social media to create a broader recognition of CIRM through content that is read and shared more widely.
- The CIRM school curriculum, while popular among those teachers who have been introduced to it, needs more users. CIRM will continue to showcase the curriculum program at national and state science teacher conventions, expand on the email marketing program and develop a summer professional development course to immerse a core set of teachers in the materials.

Create an awareness among stakeholders of CIRM’s role in making California the leader in the field — CIRM’s reputation for leadership among scientist stakeholders is sound and we generally have the materials to make the case to other stakeholders but a more robust and targeted effort to reach them is required. Going forward the tactics include:

- CIRM will seek further opportunities to engage elected representatives on the value of CIRM and its leadership in the stem cell field.
- CIRM intends to expand the patient advocate partnering program to reach a broader group of advocates, empowering them with more informational materials produced at a level appropriate for their constituents.
- CIRM will incorporate a patient advocate role in all appropriate communication efforts.
- CIRM will look for more opportunities for its Governing Board members to engage with stakeholders to spread the message of our leadership in stem cell science.
- CIRM will continue global public outreach through participation in Stem Cell Awareness Day, a public education opportunity we created along with our Australian partners in 2008.
- CIRM will develop more opportunities to engage with our collaborative funding partners in reaching the public to support the programs evolving from CIRM.
- With the spread of “stem cell tourism,” where people spend large sums of money to access largely untested and unproven therapies at unregulated clinics around the world, CIRM intends to explore options for fostering public dialogue and awareness on this issue taking a leadership role in educating the public on the dangers involved. The Alpha Clinics could be a valuable tool in this effort.

SCIENTIFIC AND THERAPEUTIC GOALS

Restatement of goals to be inserted here

FINANCIAL PROJECTIONS

(chart to come)

Appendices

**A, External Advisory Panel report Summary
and Senior Leadership Report on Implementation**

B. The Process for and Summary of Stakeholder Inputs

C, Progress to 2006 Five-year and Ten-year goals