The Voice of the Donor for a Cure

Juvenile Diabetes Cure Alliance

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Peter Miselis, CFA

Director of Research Analysis

212.308.7433

pdm@thejdca.org

What Are the Characteristics of Practical Cure Research Projects?

Conclusions:

→ Practical Cure research is differentiated from other types of cure research by its defined outcomes and the potential to cure individuals now living with type 1 by 2025.

→ The vast majority of the research that the non-profits call cure research targets results other than Practical Cure outcomes. Just 2% of the research grants funded by the non-profits in 2011 have the potential to deliver a Practical Cure.

→ Shifting more cure research funding toward Practical Cure projects would materially increase the likelihood of curing individuals who are now living with type 1.

→ Donors who seek the development of a Practical Cure can immediately impact the funding for this type of research by stipulating that their contribution fund only this work.

Organizations of Focus:

American Diabetes Association (ADA)

Diabetes Research Institute Foundation (DRIF)

JDRF

Joslin Diabetes Center (Joslin)

This report describes the characteristics of Practical Cure research and distinguishes it from other types of cure research. The criteria that determines whether research is Practical Cure research can be objectively applied to all cure research projects funded by the non-profits. Our analysis assesses whether research is endeavoring to deliver Practical Cure outcomes, but we do not assign any probability to its ultimate success, nor do we favor any particular scientific approach, as long as it has the potential to deliver the defined outcomes in the relevant timeframe.

What is and is not Practical Cure research?

Practical Cure research is outcome oriented. It is defined by criteria that materially impact the quality of life of individuals with type 1. Specifically, Practical Cure research endeavors to deliver a set of outcomes that include:

- → no blood glucose monitoring beyond once per week
- → A1c levels between 5-7%
- → an unrestricted diet with no carb counting
- → worry free sleep
- → low risk and little to no side effects
- → reasonable meds if a pharmacological solution or a fast recovery if surgical

In addition, **Practical Cure research is time bound**. It seeks to deliver these outcomes by 2025, a timeframe that could benefit most individuals who are now living with type 1. Establishing a time goal imparts focus to the research and urgency to fully develop a cure as quickly as possible.

In determining what constitutes Practical Cure research, we first examine the complete body of research funded by the four major non-profits. The major research areas include:

- → Idealized Cure
- → Prevention
- → Practical Cure
- → Glucose Control
- → Complications

Idealized Cure research includes exploratory research that is designed to expand the base of knowledge surrounding the disease. It may delve into the root causes and examine genetic underpinnings of type 1. It could also encompass projects that create tools which may serve to facilitate other research into the disease, but alone does not have the potential to deliver a cure. Idealized Cure research is not designed to deliver defined cure outcomes and does not have immediate or practical applicability. Therefore, Idealized Cure research is not Practical Cure research. Idealized Cure research can take many forms such as:[1]

- → research that does not endeavor to deliver all of the outcomes in the Practical Cure definition above
- → basic or theoretical research whose primary purpose is to generate a better understanding of the disease
- → projects that cannot meet a 2025 time goal

A great deal of diabetes research is rationalized as cure research when, in fact, it has no potential to deliver a cure, for example:

- → projects that are primarily type 2, but are described as diabetes research
- → projects that are primarily oriented toward better day-to-day management of the disease or to ameliorate complications that may be associated with type 1

Other types of projects that are not Practical Cure research would include the following:[2]

- → research where a cure for type 1 is not the primary goal, but a possible ancillary outcome or by-product of another more immediate goal such as improving glucose control or curing another disease
- → potential cures that pose risks or side effects greater than those associated with using insulin to control blood glucose levels for the typical person with type 1
- → projects that could not deliver Practical Cure outcomes on their own, but could potentially target these outcomes only if they were combined with other research

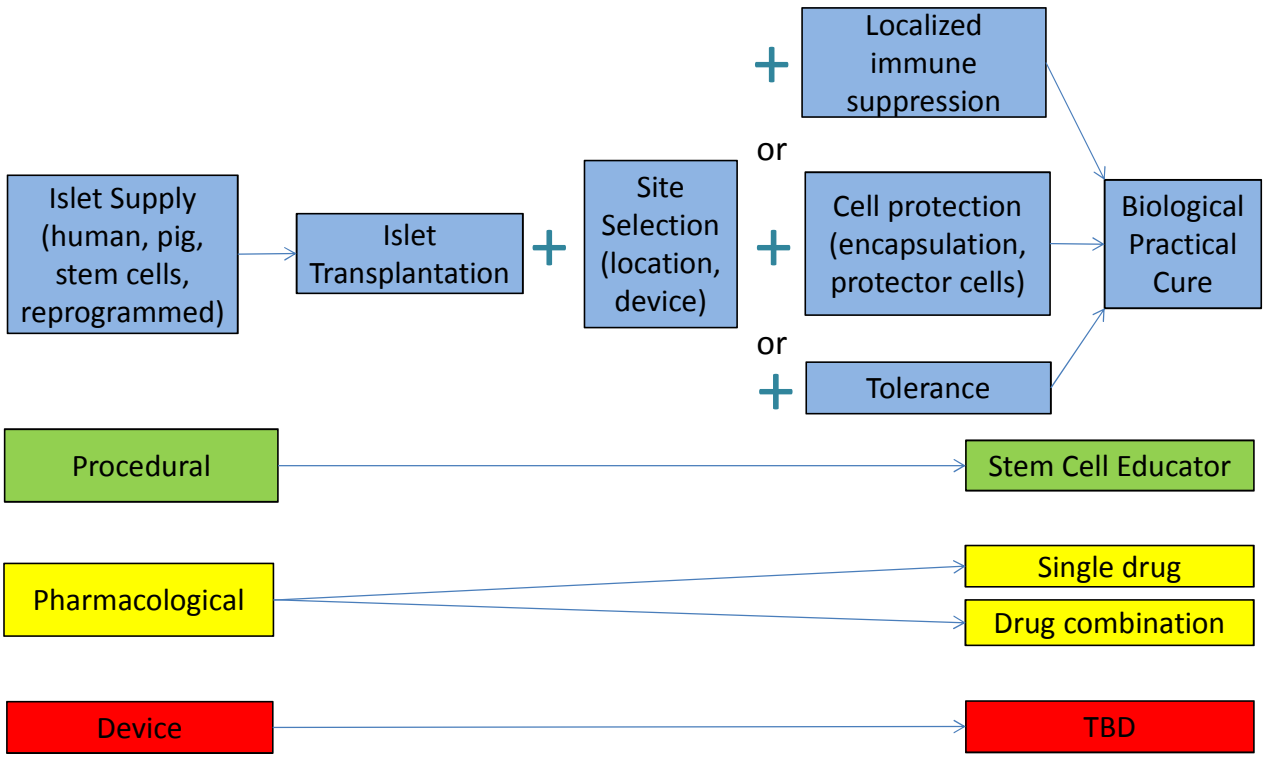
What about prevention?

Prevention encompasses efforts that are designed to prevent the initial immune system attack (e.g. a vaccine) or to delay the onset of insulin dependence after type 1 is first diagnosed. Successful development of an effective type 1 preventative would not cure those now living with type 1. History shows that the development of a vaccine to prevent diseases does not lead to a cure for individuals who are already afflicted.[3] Some organizations attempt to justify prevention efforts as cure research, but **prevention research is not Practical Cure research**.

Practical Cure research platforms

Although nearly all of the cure research funded by the non-profits targets an Idealized Cure or is prevention research, **there are several existing research platforms that may have the potential to deliver a Practical Cure,** including biological, pharmacological, and procedural. The JDCA is neutral with regard to scientific approach and any methodology is acceptable as long as the work attempts to meet the requisite outcomes. Other approaches may exist and we encourage the research community to design projects that endeavor to meet the criteria. Chart A illustrates some of the possible research approaches to a Practical Cure.

Chart A: Potential Practical Cure Platforms



Source: JDCA Research

Islet transplantation

The relationship of islet transplantation to Practical Cure research requires some clarification. Islet implantation procedures performed today involve a regimen of systemic immune suppressing drugs to prevent rejection of the transplanted islets. This procedure represents a plausible treatment option for individuals with hard-to-control type 1. However, systemic immune suppressing drugs pose a risk of serious side effects which makes this an unattractive treatment alternative for the majority of individuals with type 1 that are able to effectively control blood glucose levels with insulin.

As seen in the diagram, one Practical Cure research platform does involve islet transplantation. However, potential Practical Cure approaches that utilize transplanted islets involve technologies that endeavor to protect the transplanted cells from an immune system attack without systemic immune suppressing drugs. We believe that islet transplantation used in conjunction with cell protection or localized immune suppression technologies could potentially result in a Practical Cure. As with many projects targeting a Practical Cure, a combination approach may be required.

Is there any Practical Cure work being done?

There is a small body of Practical Cure research currently underway that is in human clinical trials and also some in the pre-clinical stage of development. We have identified six projects that are in human clinical trials (pre-clinical Practical Cure research will be the topic of a future JDCA report).[4] Chart B depicts the six trials with Practical Cure potential:

Chart B: Practical Cure projects in human clinical trials

Project Name	Description	Location
DIABECELL	Transplanted porcine islets that are micro-encapsulated	LCT
Monolayer Cellular Device	A beta cell encapsulation approach that uses human islets	Cliniques universitaires Saint-Luc
ATG/GCSF	Drug combination aimed at stopping both the autoimmune attack and stimulating growth of beta cells	UF Diabetes Center of Excellence, University of Florida
Sitagliptin/ Lansoprazole	Drug combination aimed at stopping both the autoimmune attack and stimulating growth of beta cells	Sanford Research
BCG	Drug that kills disease-causing autoimmune cells and restores pancreatic beta-cell function through regeneration	faustmanlab.org
Stem Cell Educator	An individual's blood is treated with stem cells which has the effect of reversing autoimmunity and stimulating beta cell growth	Tianhe Stemcell Biotechnologies; UIC University of Illinois at Chicago

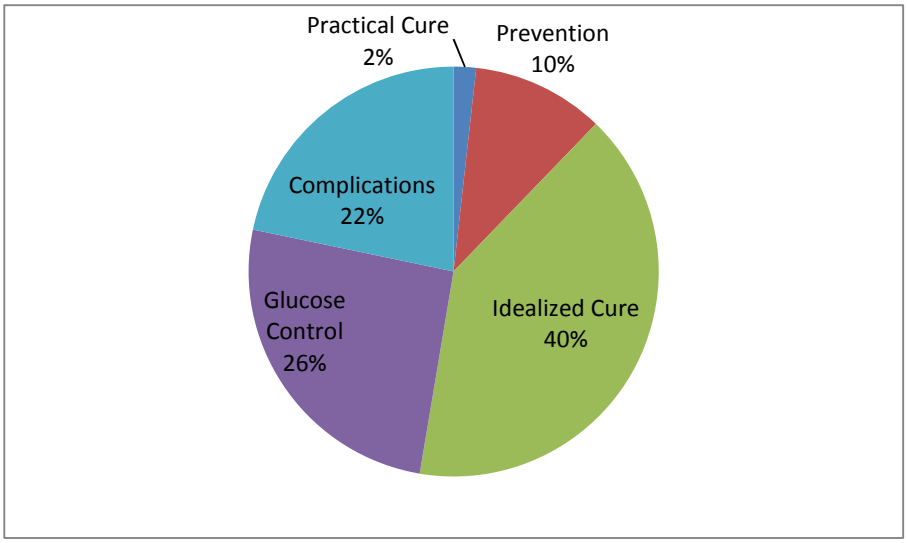
Source: JDCA Research

Practical Cure research funding

The JDCA estimates that **in 2011 the major non-profits directed only two percent of their combined total research grant dollars to Practical Cure projects that could potentially meet a time goal of 2025**.[5] (We will be updating this figure for 2012 in an forthcoming report.) The overwhelming majority of the cure portion of the research budget that the non-profits collectively fund does not target a Practical Cure, but instead focuses on Idealized Cure or Prevention work. This is consistent with the fact that the six Practical Cure projects noted above in Chart B account for only two percent of all type 1 research that is currently in human clinical trials. [6]

In Chart C we estimate the breakdown of the four major non-profits' total research grants for 2011 according to the major research categories.

Chart C: Breakdown of the four major non-profits' research grants by major area for 2011



Source: Charity and Foundation data; JDCA Research, please see footnote 5 for additional details

Chart C Observations:

→ Cure research, as defined by the non-profits, accounted for 52% of the total, with Idealized Cure being the dominant area

→ Extremely little (2%) of the total research dollars were directed toward Practical Cure projects

→ Funding for each of the four non-Practical Cure areas was 5-20 times that of Practical Cure

The JDCA is not implying that research that targets areas outside of a Practical Cure does not have value. Instead, we highlight that Practical Cure research is clearly not a priority for most of the major non-profits and that the non-profits collectively direct only a small fraction of their cure research budget to projects intended to cure individuals with established type 1 in the near future. **If Practical Cure research was made a priority, substantial funding would shift from Idealized Cure to Practical Cure projects**.

Implications for cure development

When only a small portion of donors' contributions are allocated to the type of cure research that could deliver a cure in the near future, it indicates that cure development efforts are not as effective as they could be. Practical Cure projects in human clinical trials and in the pre-clinical stage of testing are not fully funded. Directing more dollars to these projects would speed their time to completion.

Furthermore, the non-profits could better align their cure development efforts with donors' intentions. Donors overwhelmingly prefer the pursuit of Practical Cure research over Idealized Cure research.[7] **If the non-profits were to shift funding from Idealized Cure research to Practical Cure research, they would better align their cure research spending with the objective of most cure donors**.

Cure donors who would like to see increased funding of Practical Cure research have a crucial role in making this a reality. One way to ensure that your donation funds Practical Cure research is to stipulate that your contribution be used only for this purpose. The JDCA has a variety of tools to guide donors through the stipulation process. Please visit our website for a sample stipulation letter (http://www.thejdca.org/wp-content/uploads/2012/11/Donor-Action-Letter.pdf) and for other tools that can be used to structure more complex philanthropic relationships with the charities.

Summary/Conclusion

Practical Cure research is defined by the outcomes it targets, which could be delivered within a timeframe that will benefit the majority of people who are currently living with type 1. The vast majority of the cure research that is funded by the non-profits does not meet these criteria. Instead, the non-profits collectively direct significant funding toward the pursuit of an Idealized Cure or prevention research. Very little research funded by the four non-profits combined, only about two percent, is Practical Cure research.

The good news, on the other hand, is that there are several Practical Cure research platforms that endeavor to develop a Practical Cure by 2025. The Practical Cure projects that are currently underway, however, are underfunded which only delays the research necessary to determine their ultimate viability. If you're a donor that seeks a Practical Cure, you can take an active role in increasing the funding for it by stipulating that your donation only be used for this type of research.

Juvenile Diabetes Cure Alliance

14 East 60th Street
Suite 208
New York, NY 10022

Phone: 212.308.7433
E-mail: info@thejdca.org
www.thejdca.org

Endnotes

1. JDCA report, "A Practical Cure vs. an Idealized Cure For Type 1," dated October 20, 2011.

2. JDCA report, "A Practical Cure vs. an Idealized Cure For Type 1," dated October 20, 2011.

3. JDCA report, "Prevention Does Not Lead To a Cure," dated February 23, 2012.

4. JDCA report, "Update of Type 1 Human Clinical Trials That Target a Practical Cure," dated December 17, 2012.

5. Charity and Foundation data for the ADA and DRIF. The JDCA estimate for JDRF is based upon the information in JDRF's 2011 Research Funding Fact Sheet. The JDCA estimate for Joslin is based upon Joslin supplied data for the year 2010 which indicated that the research split between type 1/type 2 was 40/60; we assume that the split for 2011 was a similar 40/60; we further estimate that for the type 1 allocation the percentages for Practical Cure/Prevention/ Idealized Cure/Glucose Control/Complications were 0/4/30/16/50.

6. JDCA report, "Update of Type 1 Human Clinical Trials That Target a Practical Cure," dated December 17, 2012.

7. JDCA report, "Do Donors Feel That Practical Cure Research Is Important?," dated January 31, 2013.

Analyst Certification

The JDCA analyst responsible for the content of this report certifies that with respect to each organization covered in this report: 1) the views expressed accurately reflect his own personal views about the organizations; and 2) no part of his compensation was, is, or will be, directly or indirectly, related to the specific views expressed in this research report.

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