

The Center for Accelerating Practices to End Suicide Through Technology Translation



P50MH129701

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UMass Chan
MEDICAL SCHOOL

CAPEs Mission Statement

- To prevent suicide by accelerating delivery of evidenced-based, compassionate suicide care.
 - P50: To study how suicide-care technologies can support this primary mission



9/1/2020

Started Prep



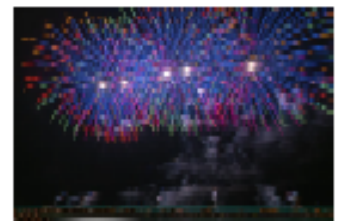
6/16/2021

First Submission



2/18/2022

Second Submission



5/17/2023

Kickoff

4/5/2023

NOA



10/25/2021

First Review

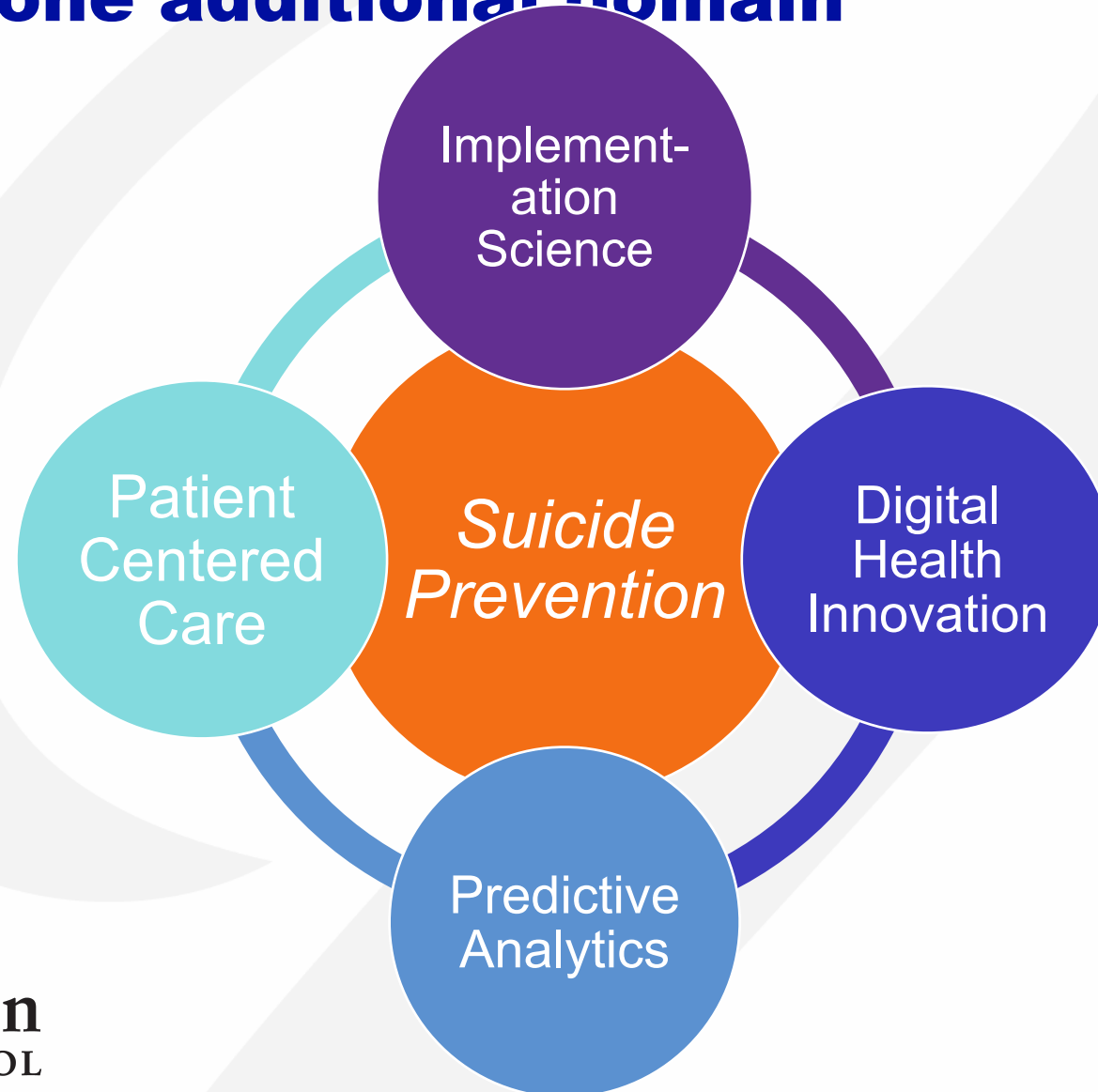


7/19/2022

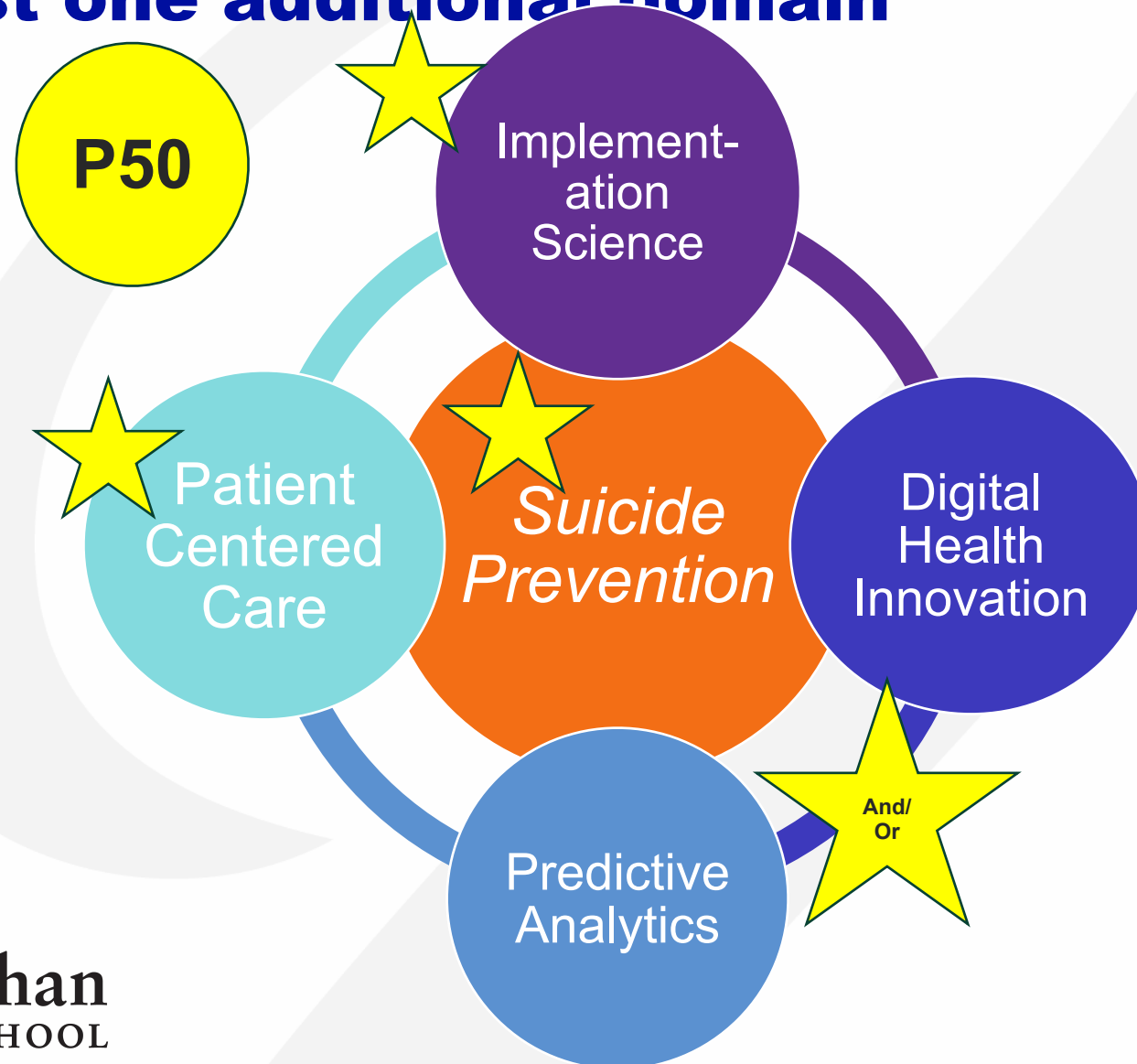
Second Review



True north: The effort must advance suicide prevention and at least one additional domain



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CAPES will accelerate implementation of suicide-related best-practices through leveraging technologies

Settings

- ♦ Emergency departments
- ♦ Inpatient units
- ♦ Primary care
- ♦ Mental health outpatient
- ♦ College health centers

Key Performance Elements, EBP (Selected)

- ♦ Identify: validated screening and assessment tools, machine learning algorithms using health data
- ♦ Engage: Safety Planning Intervention, Lethal Means Safety Counseling
- ♦ Treat: CAMS, CBT-SI
- ♦ Transition: ED-SAFE post-visit calls, Caring Contact Cards

Technologies

- ♦ Direct: acts as the performance element itself, e.g., computerized screener
- ♦ Enabling: helps systems implement the performance element, e.g., EHR screener flowsheet

Implementation Studies

- ♦ Common EPIS framework
- ♦ Deployment focused
- ♦ Common measures and data elements
- ♦ Synthesize cross-setting similarities, differences

CAPES will accelerate suicide prevention through multi-channel dissemination strategies

Individual Projects

- Jaspr (Signature)
- CATS (Exploratory)
- ADAPT (Exploratory)
- LEMURS (Exploratory)
 - Pilot Projects
 - New projects

Cross-Center Projects

- EHR Best-Practice
 - Innovation Briefs
- Accelerating suicide-care tech implementation
 - EPIS Measure development
- Suicide implementation outcome measure

Resources

- (1) Knowledge and science (e.g., presentations, articles, monographs)
- (2) Suicide care technologies, including technical documents
- (3) Implementation know-how (e.g., blueprints, toolkits)
- (4) Economic summaries
- (5) Research manuals of procedures
- (6) Materials for lay public
- (7) Databases and support documents

Channels

- (1) Scientific/Trade conferences
- (2) Scientific journals
- (3) CAPES website
- (4) CAPES Bulletin
- (5) UMass Office of Communications
- (6) Social media (multi-platform)
- (7) eScholarship@UMassChan
- (8) Work with influencers
- (9) NIMH Data Archive
- (10) Business development, technology transfer
- (11) Healthcare System Consortium (direct)

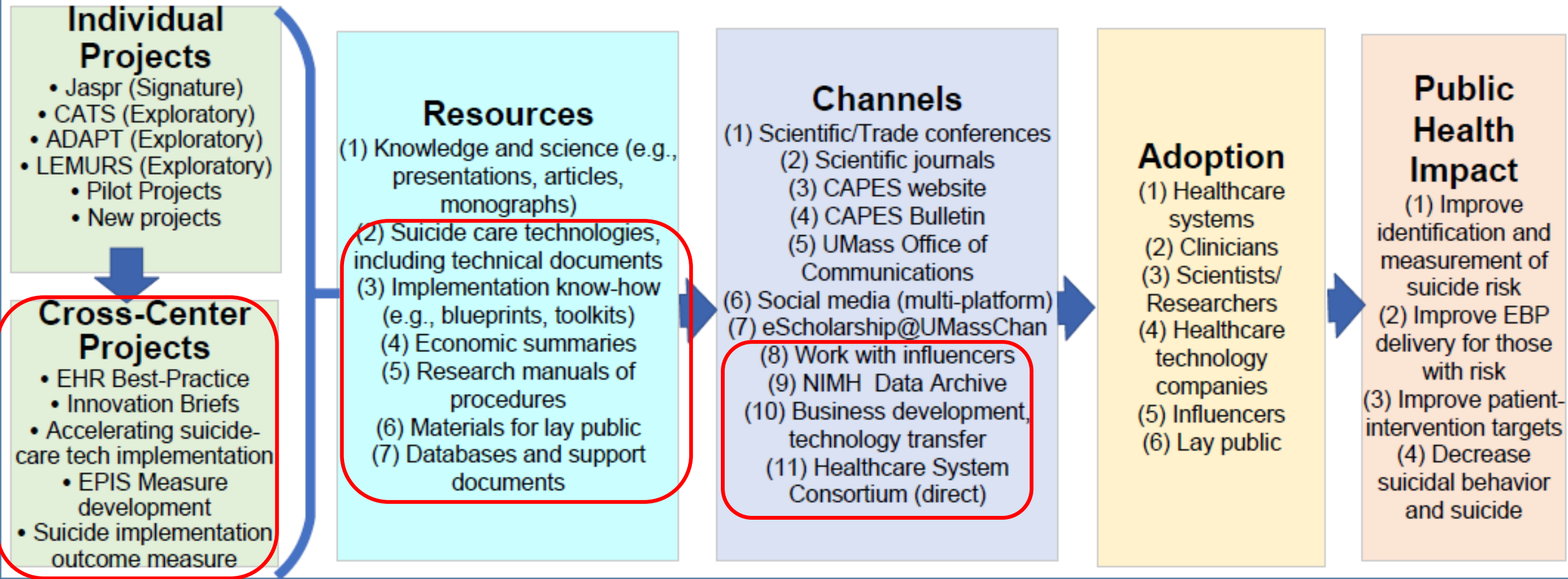
Adoption

- (1) Healthcare systems
- (2) Clinicians
- (3) Scientists/Researchers
- (4) Healthcare technology companies
- (5) Influencers
- (6) Lay public

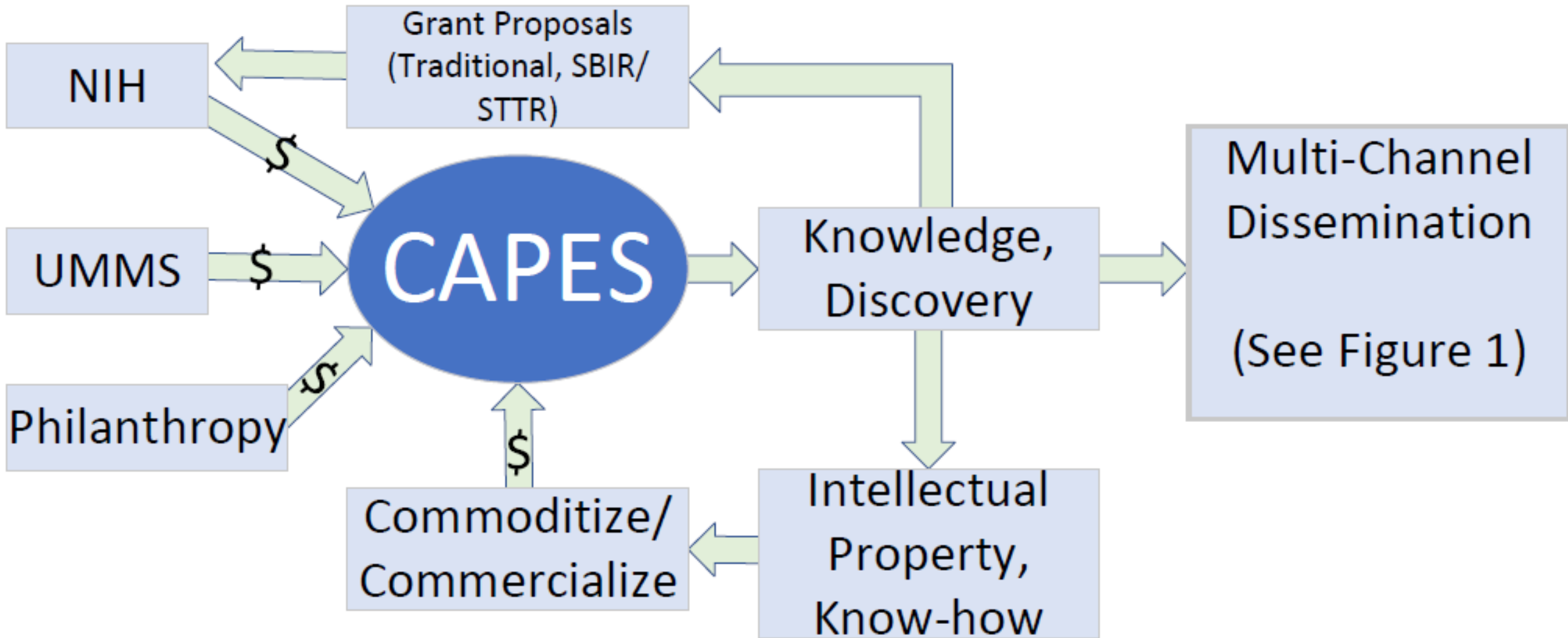
Public Health Impact

- (1) Improve identification and measurement of suicide risk
- (2) Improve EBP delivery for those with risk
- (3) Improve patient-intervention targets
- (4) Decrease suicidal behavior and suicide

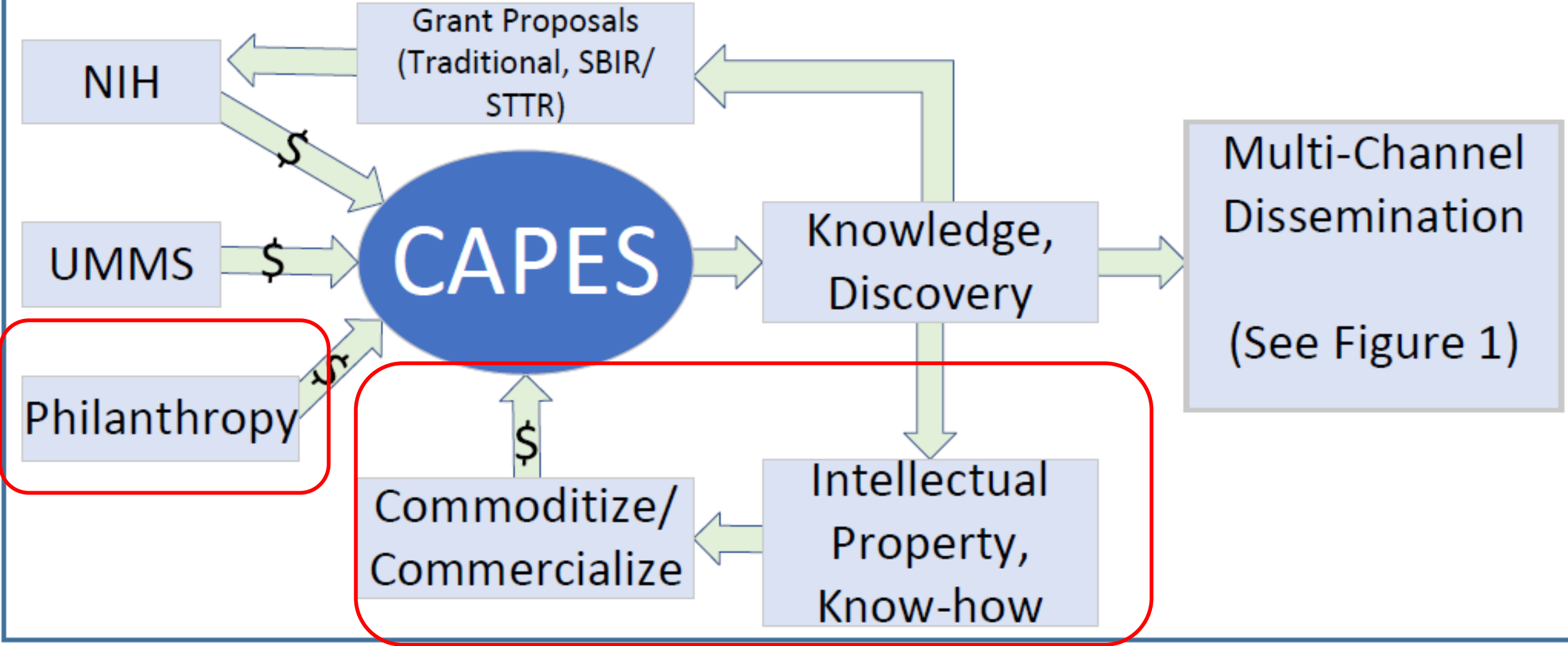
CAPES will accelerate suicide prevention through multi-channel dissemination strategies



CAPES resource sharing and relationship to sustainability



CAPES resource sharing and relationship to sustainability



UMASS CHAN MEDICAL SCHOOL
(Emergency Medicine,
Population and Quantitative Health Sciences,
Psychiatry)

Primary
Faculty

Worcester Polytechnic Institute

UMass Campuses (Amherst, Lowell)

UC San Diego

Butler Hospital

Affiliate
Faculty

UMass Memorial Health

Ohio State Medical School

University of Colorado

Healthcare System Consortium

Jaspr Health

Zero Suicide Institute

Adaptive Testing Technologies

Epic

Corporate
Partners

PointClickCare

Cerner

Programation

Cogitas Consulting

Precision Healthsoft

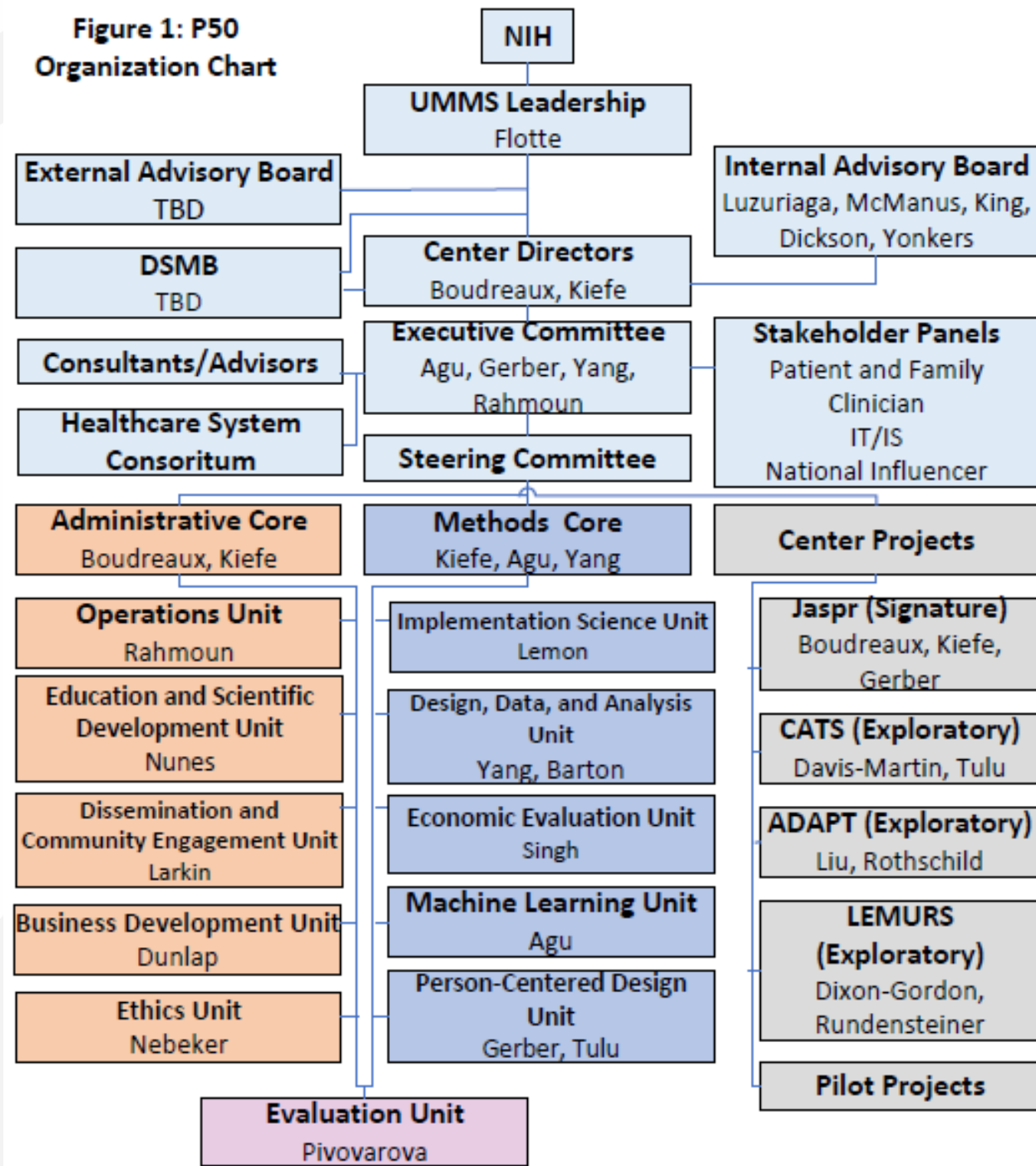
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Organizations



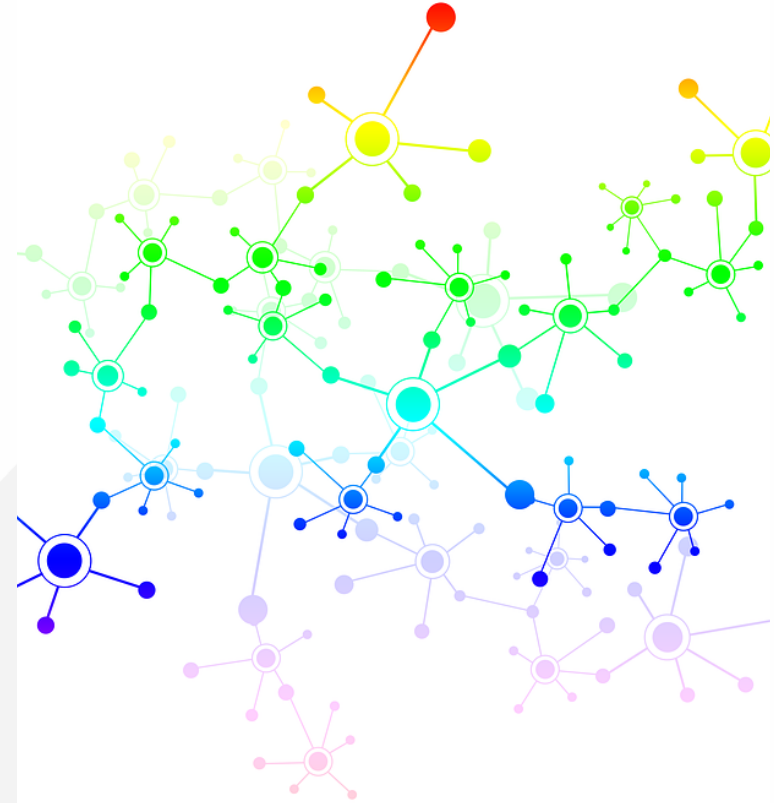
Organizational Chart

**Figure 1: P50
Organization Chart**



There is value in being a part of CAPES.

1. Access to an incredible network of scientists across a range of disciplines



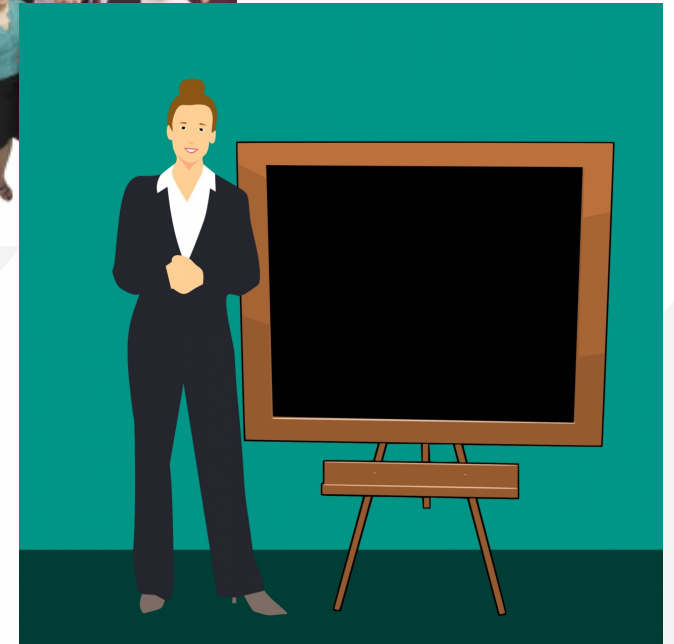
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3. Training events and mentoring opportunities



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4. Access to Pilot Project funding



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2. Access to a rich variety of stakeholders
3. Training events and mentoring opportunities
4. Access to Pilot Project Funding
5. Assistance with building, submitting new grants



Administrative Core

Boudreaux, Kiefe

Build and support an Administrative Core

1. Support CAPES operations;
2. Select and fund R03-like Pilot Projects;
3. Recruit and manage stakeholders;
4. Train scholars;
5. Promote synergy across faculty and projects;
6. Keep abreast of latest best-practices, technologies;
7. Disseminate resources; and
8. Evaluate CAPES progress, plan future efforts (with Methods Core)



Admin Core Units

Name	Director	Purpose
Operations	Rahmoun 	<ul style="list-style-type: none">• Support the Center's infrastructure and operations.• Establishes/Follows milestone-driven management plan, communication plan, and meeting plan.• Disseminates study-related deliverables, including updating the Center website and social media.• Assists in management of stakeholder panels and Healthcare System Consortium.
Education and Scientific Development	Nunes 	<p>Builds infrastructure for soliciting, reviewing, selecting, and executing up to 2 pilot feasibility projects each year proposed by early-stage or established investigators and trainees.</p> <ul style="list-style-type: none">• Organizes training opportunities across a range of topics and disciplines important for suicide-related care translation and research: didactics, workshops, mini-courses, and hands-on project experiences.• Vets and selects the Emerging and Advanced Collaborating Scholars.

Admin Core Units

Name	Director	Purpose
Dissemination and Community Engagement	Larkin 	<ul style="list-style-type: none">• Builds and engages Stakeholder Panels and Healthcare System Consortium to maximize their potential for synergy across Center projects.• Executes the dissemination plan described in the Admin Core's <i>Master Resource Sharing Plan</i>, including working with Stakeholders to develop direct-to-community materials.
Business Development	Dunlap 	<ul style="list-style-type: none">• Very experienced Advisors with range of practical and academic business and tech transfer experience.• Mentors each project team in business, commercialization, and intellectual property related issues.• Rich connections with business and organizations designed to foster commercialization.

Admin Core Units

Name	Director	Purpose
Ethics	Nebeker 	<ul style="list-style-type: none">• Provides guidance related to digital health ethics and human subjects' protections.• Provides training opportunities in digital health ethics.
Evaluation	Pivovarova 	<ul style="list-style-type: none">• Evaluate CAPES• Comprehensive evaluation of all CAPES activities and public health impact• Includes evaluation by Internal and External Advisory Boards.

Methods Core

Kiefe, Agu, Yang

Build and support a Methods Core

1. Provide implementation science, study design, data analysis and management, economics, machine learning, and person-centered design expertise and technical infrastructure;
2. Advance methods, including analytic and implementation methods, to study the implementation of suicide care technologies;
3. Create guidance on best practices in health system implementation of suicide care technologies, including operationalizing how they can facilitate Zero Suicide and identifying trans-setting and setting-specific implementation drivers; and
4. Evaluate all CAPES research activities, plan future efforts.



There is value in having access to the Methods Core

The Methods Core provides, through its 6 Units:



1. Consultations with Unit scientists
 - a. for CAPES funded projects
 - b. New project development
2. Technical services for funded projects, e.g.
 - a. Statistical computing
 - b. Database development/management/QC
 - c. Economic evaluations
3. Cross-project harmonization and synthesis
4. Evaluative performance feedback





Methods Core Units

Name	Director	Purpose
Design, Data, and Analysis	Barton, Yang 	<ul style="list-style-type: none"> • Support design & analysis of CAPES projects • Track analytic and publication activity across projects • Perform database development/management/QC • Harmonize data collection across all projects • Offer psychometric expertise • Develop/disseminate new stat/epi methods for suicide prevention
Implementation Science	Lemon, Larkin 	<ul style="list-style-type: none"> • Support integration & measurement of EPIS framework • Help select implementation strategies adapted from ERIC • Harmonize implementation outcome measures using Proctor taxonomy • Support Stakeholder Panels and dissemination efforts using Implementation Science • Contribute to development of new implementation measures

Methods Core Units

Name	Director	Purpose
Machine Learning (ML)	Agu 	<ul style="list-style-type: none">• Work with ADAPT and LEMURS on ML system design & implementation• Develop innovative ML learning approaches for suicide prevention• Provide ML expertise for new study design• Work with Ethics Unit re ethics in AI
Person-centered design	Gerber, Tulu 	<ul style="list-style-type: none">• Engage stakeholders to refine prototypes• Develop innovative design approaches for suicide prevention• Ensure user-centric, culturally and equity tailored interventions• Help development and support new studies involving person-centered designs

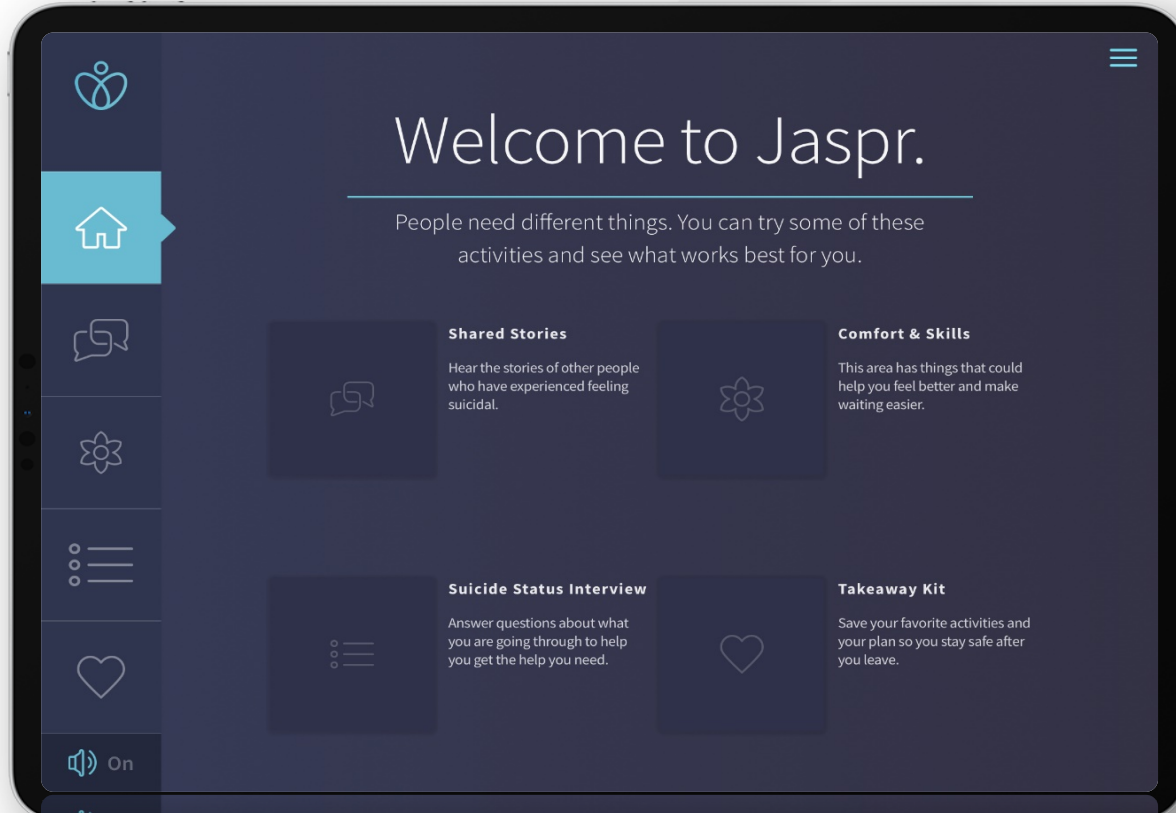
Methods Core Units

Name	Director	Purpose
Economic Evaluation	Clements 	<ul style="list-style-type: none">• Advise on economic evaluations for CAPES projects, funded and future• Identify data capture needs for economic evaluations• Perform economic valuations• Participate in policy-relevant discussions
Evaluation (joint Unit of Admin & Methods Cores)	Pivovarova 	<ul style="list-style-type: none">• Evaluate CAPES• Comprehensive evaluation of all CAPES activities and public health impact• Includes evaluation by Internal and External Advisory Boards.•

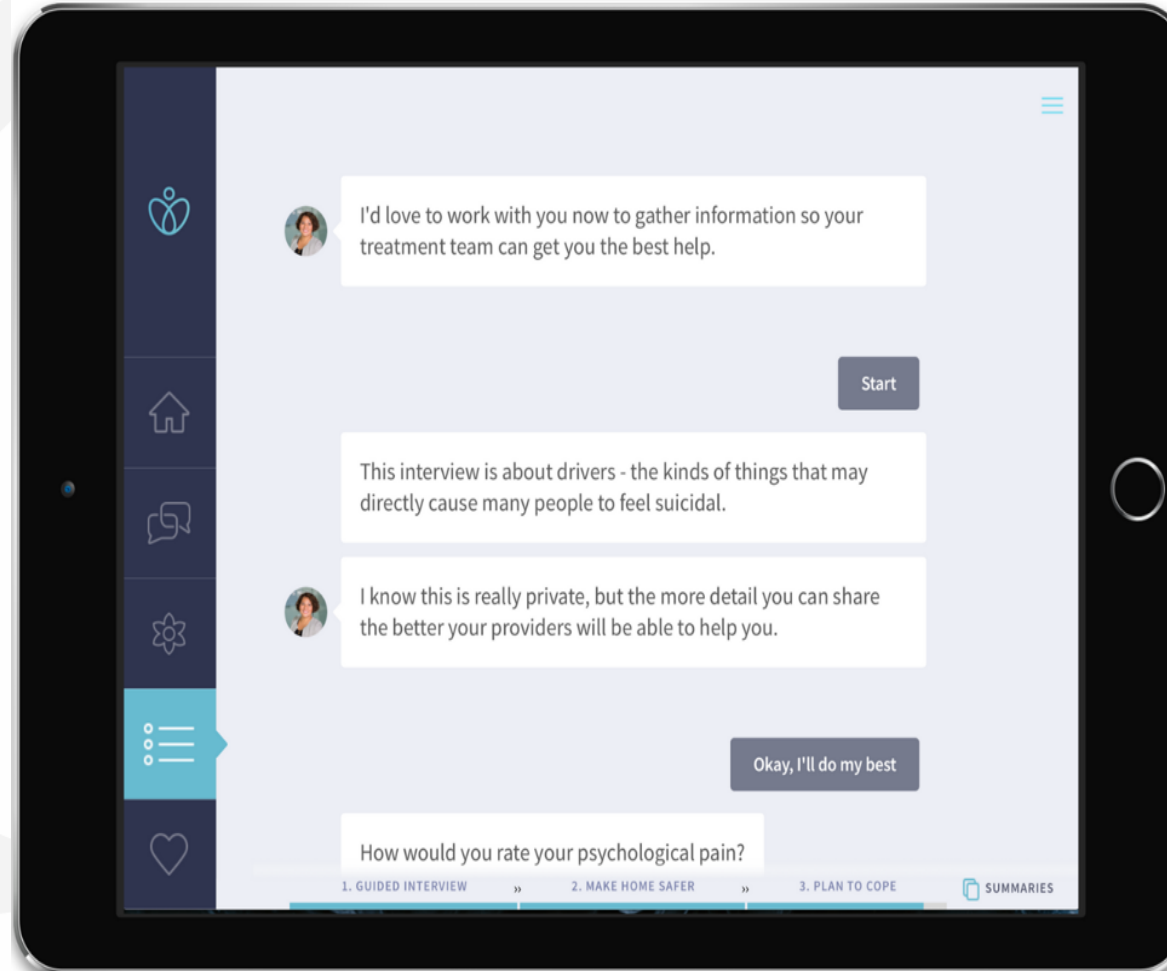
Jaspr (Signature Project)

Boudreaux, Kiefe, Gerber

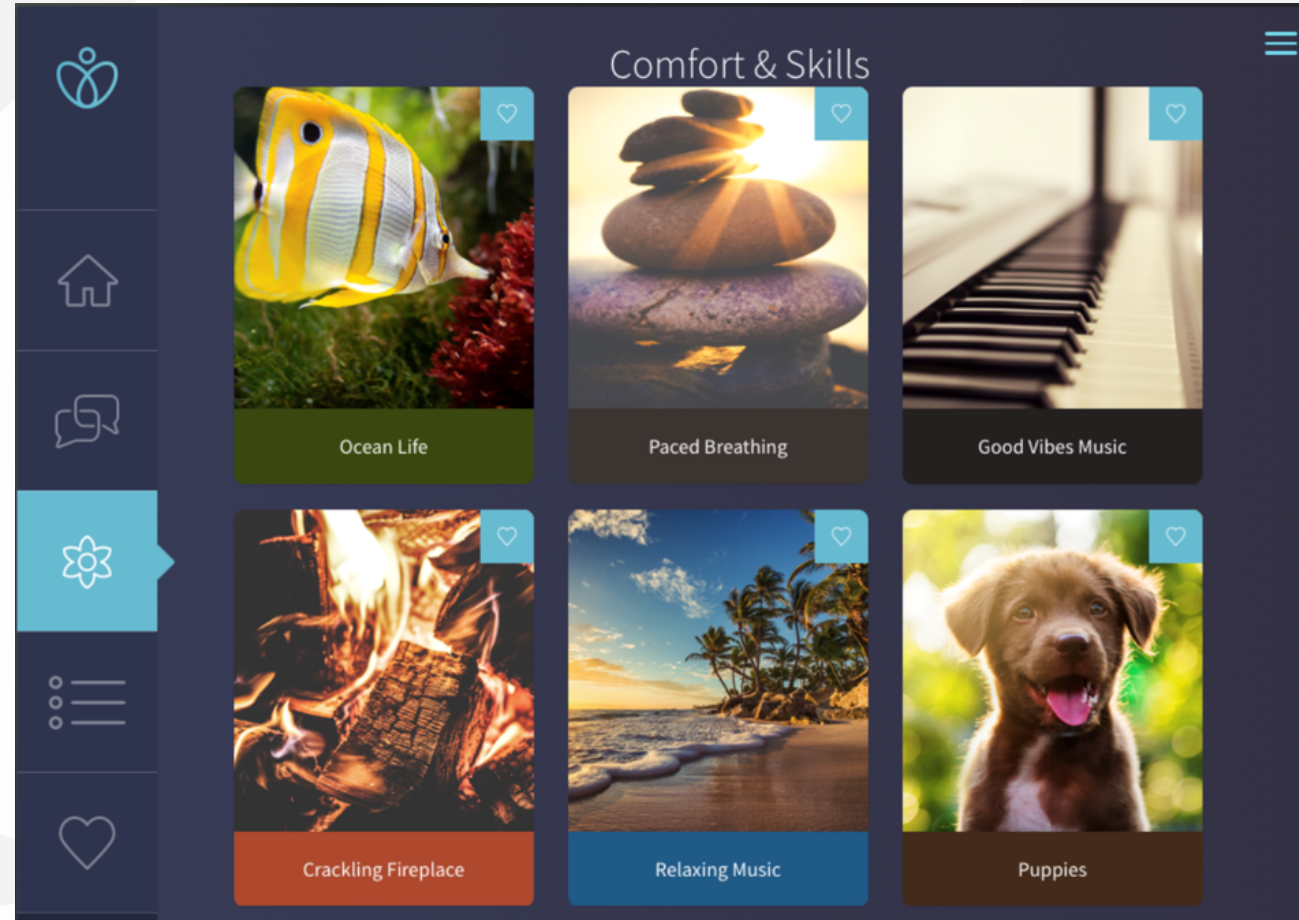
Jaspr: get better while you wait!



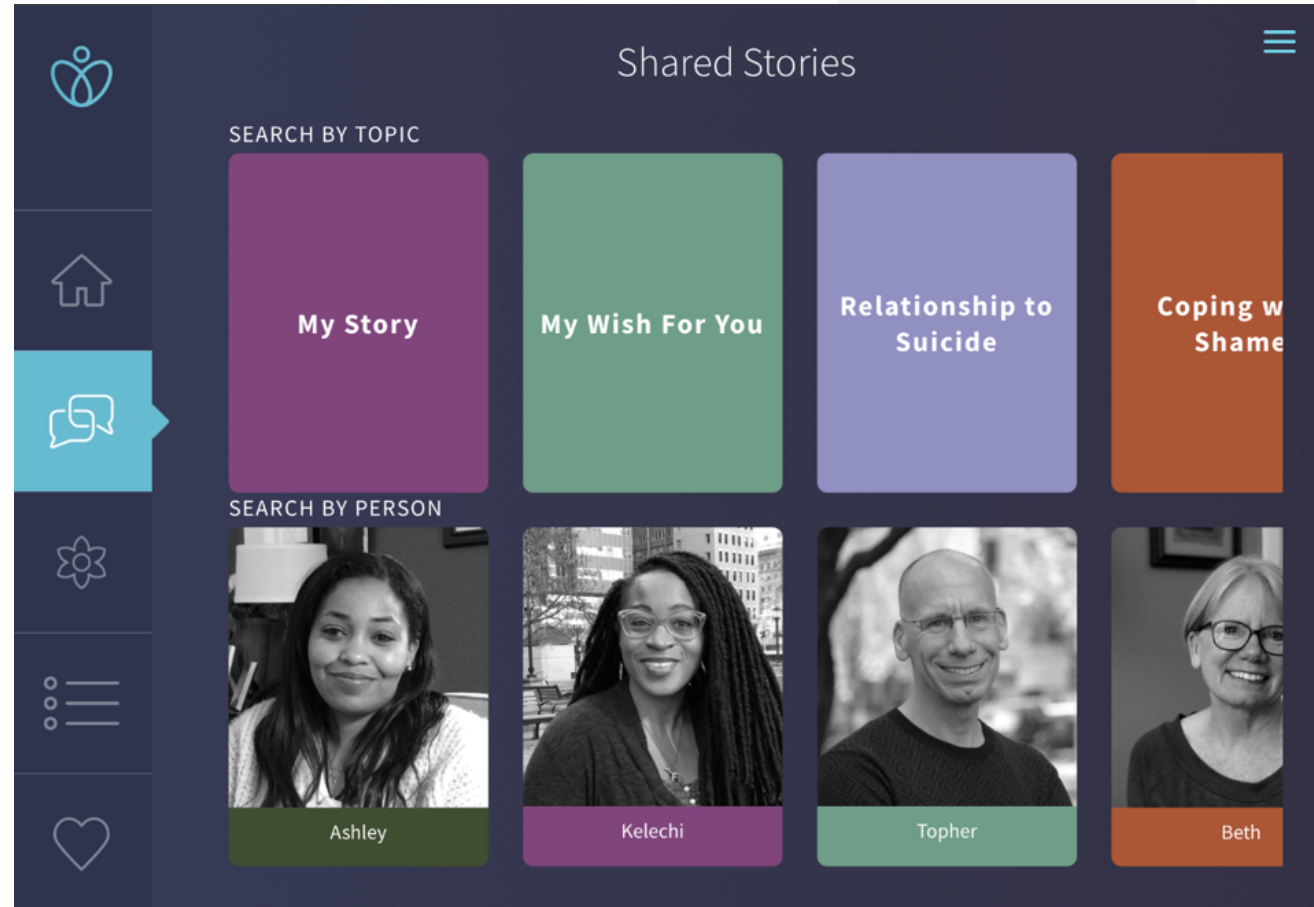
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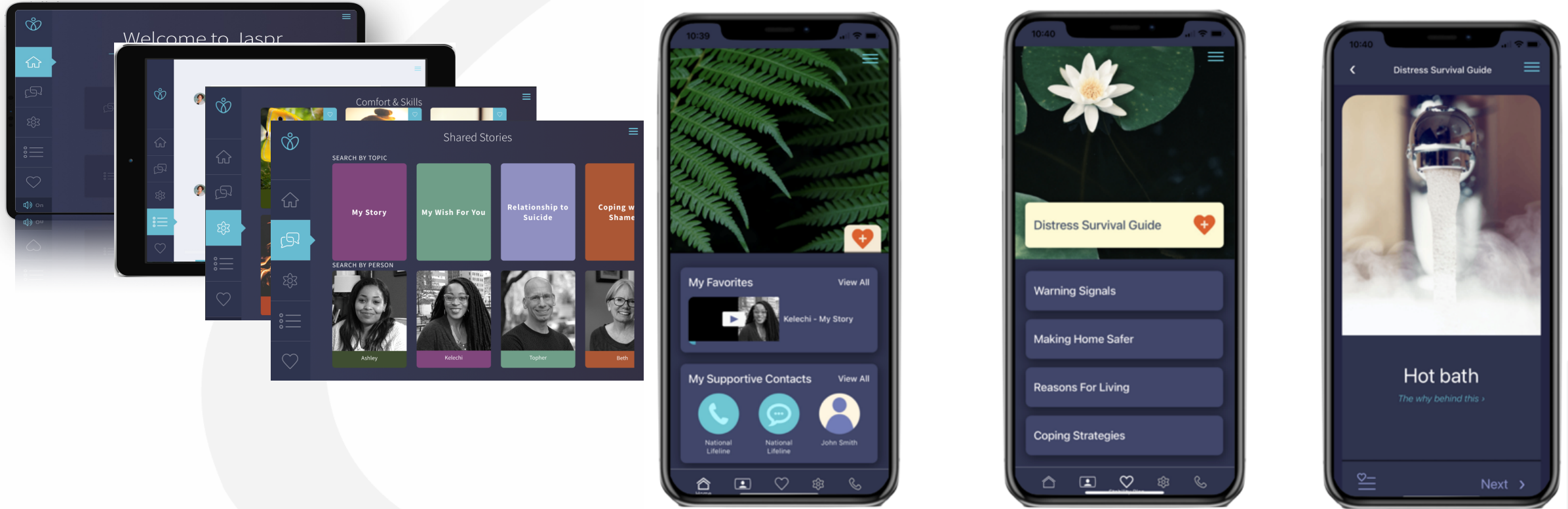
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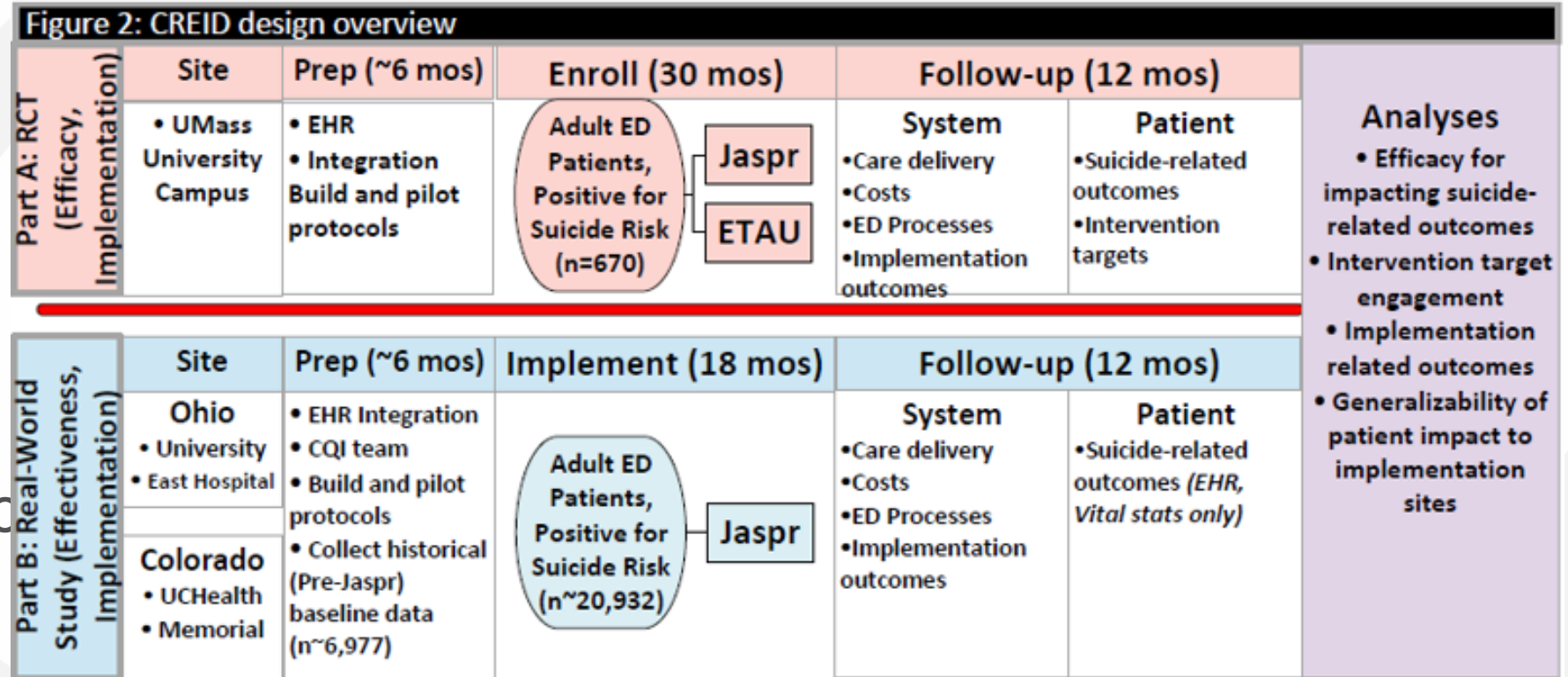


Jaspr: get better while you wait!



Jaspr: is it efficacious, effective, and implementable – all in one study!

- Is it efficacious?
- Is it effective?
- What factors drive implementation success?



UMass Memorial Health



University of Colorado Anschutz Medical Campus

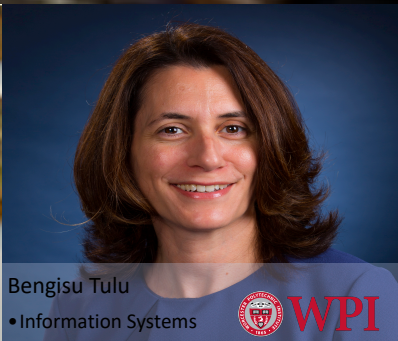


THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

CATs (Exploratory Project)

Davis-Martin, Tulu

Computerized Adaptive Tests (CATs) can be Transformative in identifying and tracking Suicide Risk in Primary Care



A1



A2



A3



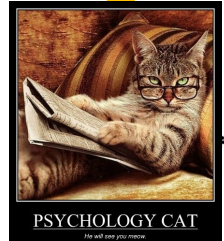
Patient takes CAT-MH



CAT-MH results



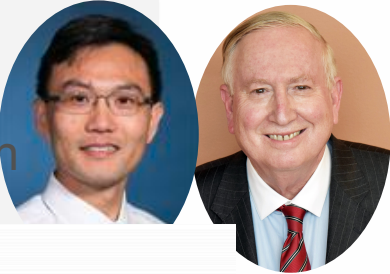
Next steps based on CAT-MH results



ADAPT (Exploratory Project)

Liu, Rothschild

ADAPT: Automated, Data-driven, AdaPtable, and Transferable learning for suicide risk prediction



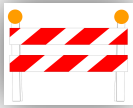
Project Leads : Feifan Liu, PhD, UMass Chan; Anthony Rothschild, MD, UMass Chan



Machine Learning for suicide prediction has been gaining more attention



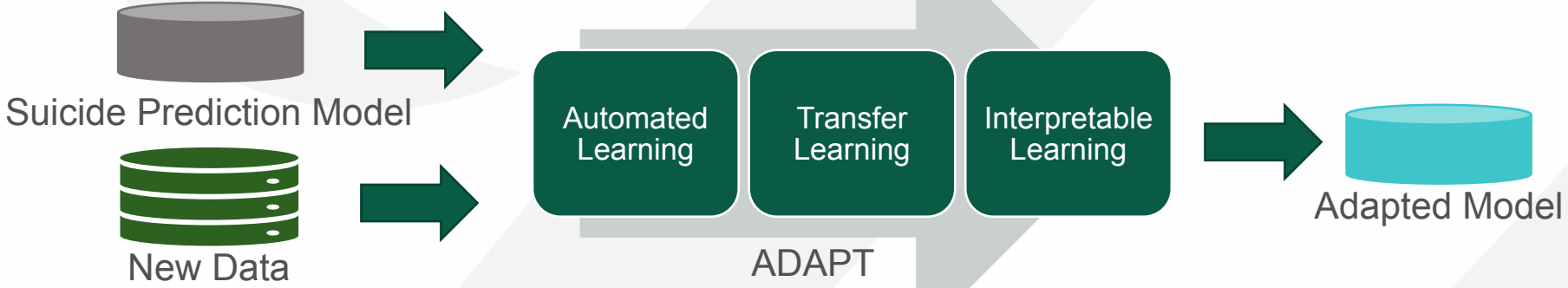
Lack of tools to assess and improve prediction model's generalizability



Gaps between research results and clinical utility impede wide adoption



Goals: Explore advanced AI techniques to build an **automated end-to-end pipeline** to guide the **transfer** of existing suicide prediction models to other healthcare systems and clinical contexts for **wide AI adoption and dissemination**.



Applying AI Techniques for Better Model Adaption

ADAPT specific aims

Aim 1

- Assessing generalizability and adaptability of NIH funded MHRN risk prediction model
- Primary care and mental health specialty settings (MHRN and UMMH)

Aim 2

- Developing the ADAPT pipeline for automatic adaption
- Preprocessing, model adaption, hyperparameter tuning, interpretation

Aim 3

- Exploring deep learning for suicide risk prediction (DeepSuicide)
- Assessing ADAPT's usability, acceptability, and feasibility



LEMURS (Exploratory Project)

Dixon-Gordon, Rundensteiner

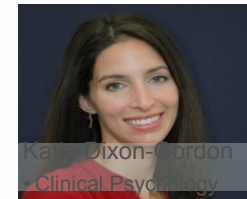
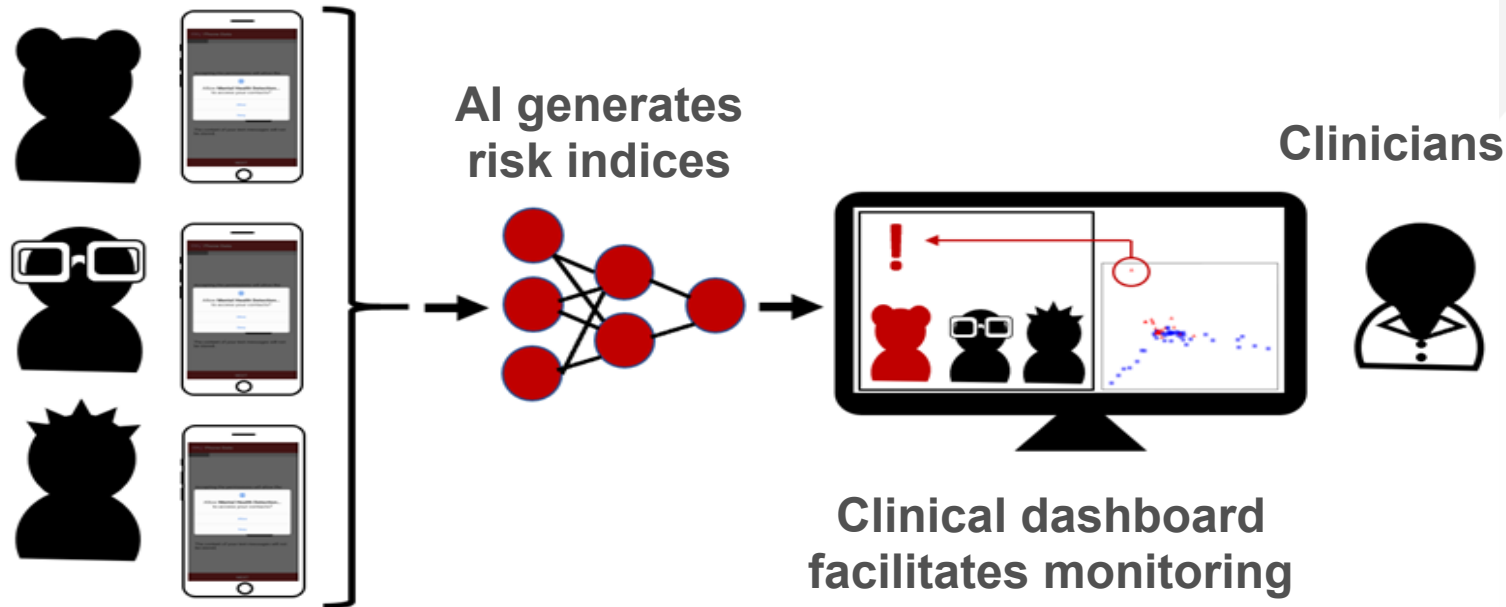


Exploratory Project:

Lemurs Leveraging Early Mental Health Uncovering Risk for Suicide

Goal: Streamline universal suicide risk screening and monitoring of college campuses plagued by a high rate of onset of suicidal thoughts/behaviors.

Approach: Design **Smartphone App** that leverages passive smartphone data to derive a **suicide risk index** monitored via **Clinician-facing Dashboard**





Exploratory Project:

Leveraging Early Mental Health Uncovering Risk for Suicide

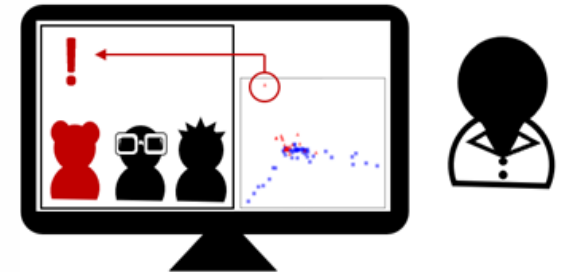
Aim 1

- Stakeholder interviews to understand needs of student and clinician users
- 8 students, 4 clinicians, 2 staff



Aim 2

- Develop LEMURS dashboard for risk monitoring and integrate with LEMURS app
- 4 clinicians, 2 staff



Aim 3

- Evaluate feasibility of LEMURS by correlating with daily self-reported suicidal thoughts/behaviors
- 40 students, 2 clinicians



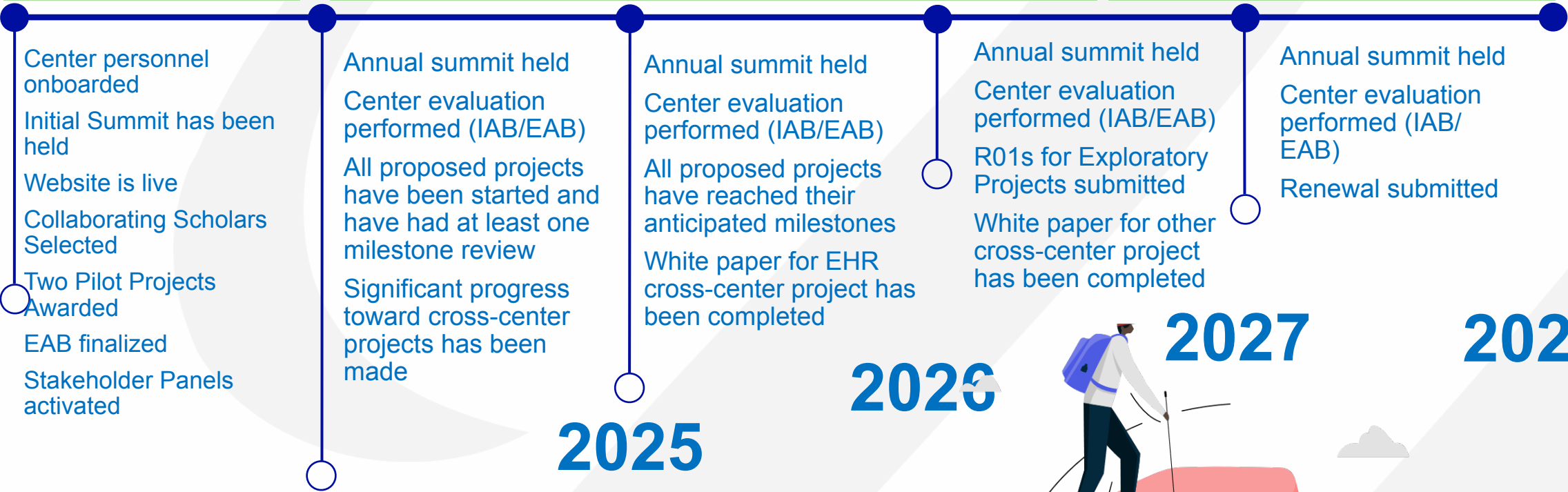
Timeline

CAPEs TIMELINE AND MILESTONES

Infrastructure
Faculty orientation,
Personnel onboarding,
Selecting stakeholder
panels, orienting EAB

Projects & Training
JASPR, ADAPT, CATS, LEMURE
Train emerging and advanced scholars.

Knowledge Dissemination
Create guidance on best practices in health
systems. Disseminate Center research,
resources, trainings, and products.



2023

2024

2025

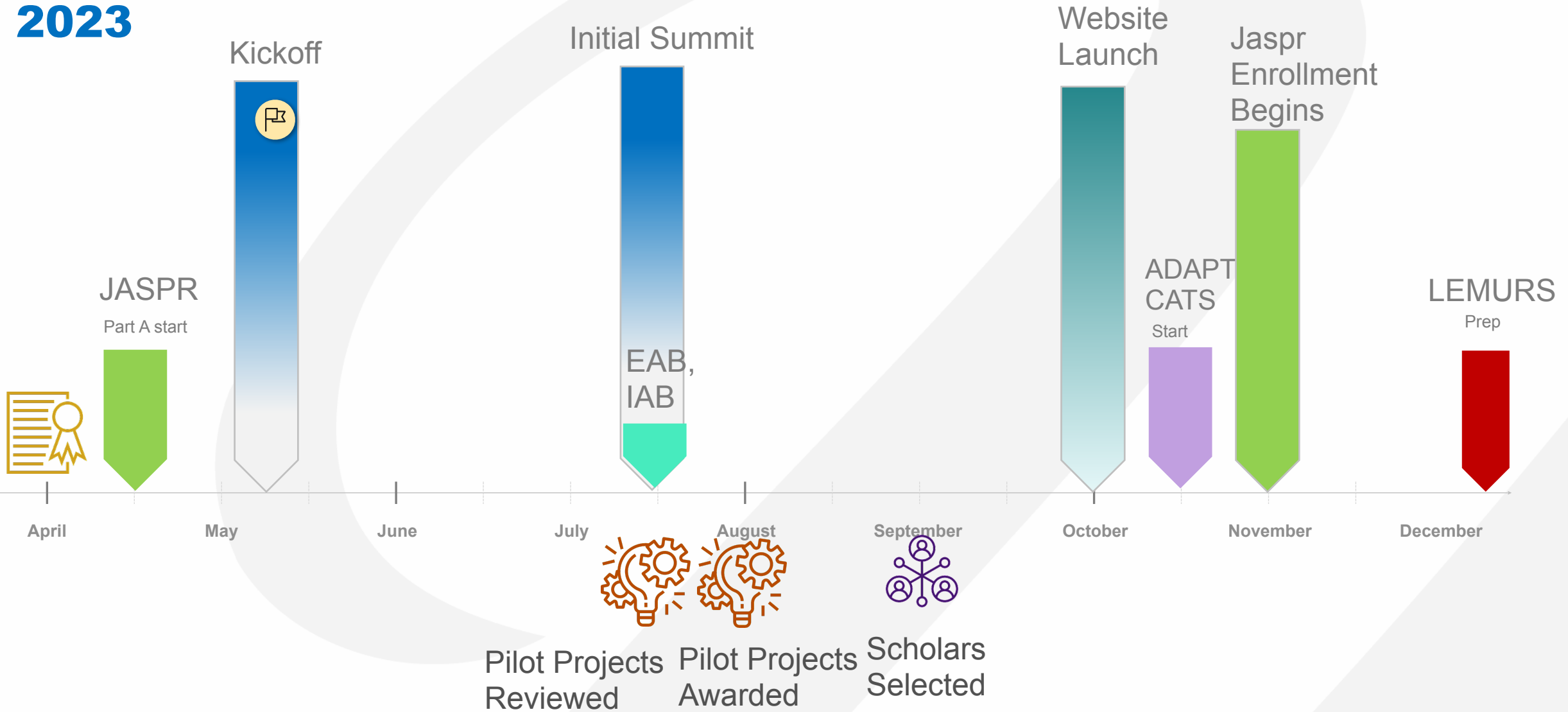
2026

2027

2028



2023

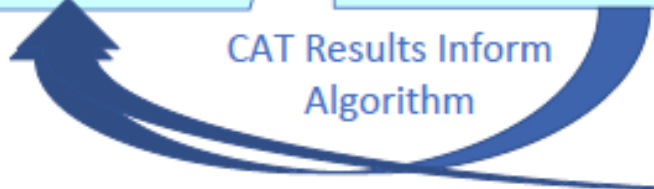
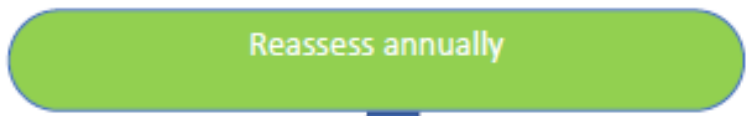
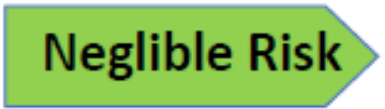
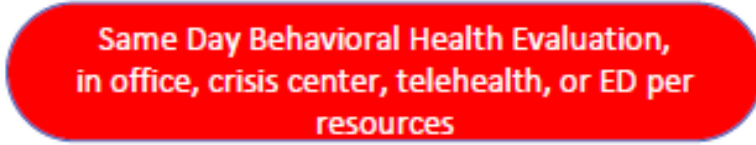
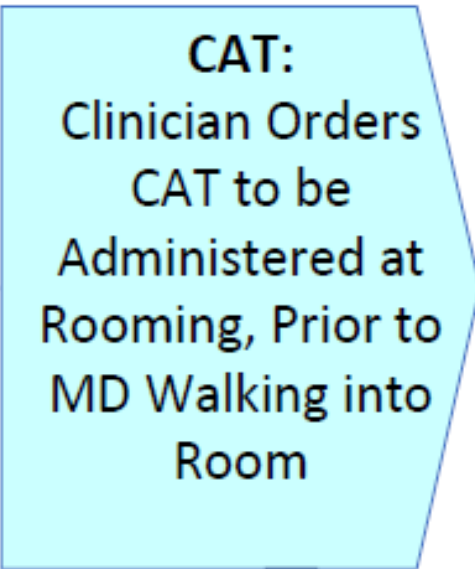
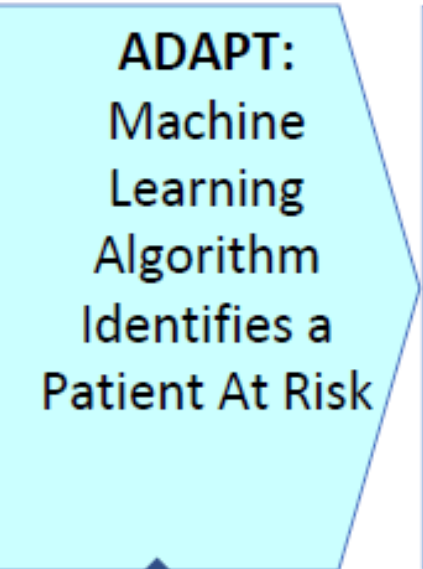
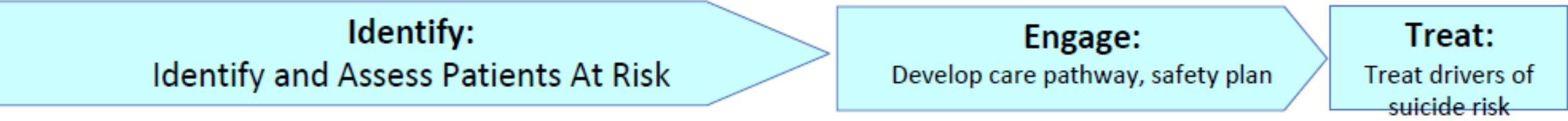


**Thank you for your support and
engagement in our common
effort to prevent suicide.**

Extra Slides



Example of how the various technologies can be integrated



Human in the Loop Decision Making Informs Algorithm

Breakdowns in suicide care technology adoption and implementation and how CAPES will address it

TRANSLATION BREAKDOWNS

- Never makes it to market
- Health system does not purchase it
- Not supported by larger health system drivers (policy, reimbursement)

- Input device (hardware) not available
- Poor usability
- Patient can't access prior to being seen by clinician

- Results/Tools are outside of EHR
- Results/Tools "buried" in EHR
- Inconsistent with workflow
- Poor training

- Results not interpretable
- Unsure how to communicate results to patient
 - Follow-up actions not clear
- Slows workflow

- Results do not cross healthcare systems
- Results/Tools not accessible after encounter

New Suicide Care Technology

1

Health System Makes it Available

2

Patient Access and Engagement

3

Clinician Access to Tools/Results

4

Clinician Action

5

Post-encounter Access

CAPES STRATEGIES (SELECTED)

- Develop business plan to get to market
- Provide compelling value propositions for adoption
 - Use both pull + push dissemination strategies

- Enhance usability
- Implementation blueprints to guide hardware, workflow, access

- EHR integration
- Build intuitive access, user friendly workflow
 - Build good trainings and just-in-time job aids

- Create intuitive reports/data visualization
 - Guide provider/patient communication
- Maximize efficiency

- Integrate with Health Information Exchanges
- Build resources to support "bridging the gap"

CAPES evaluation logic model

