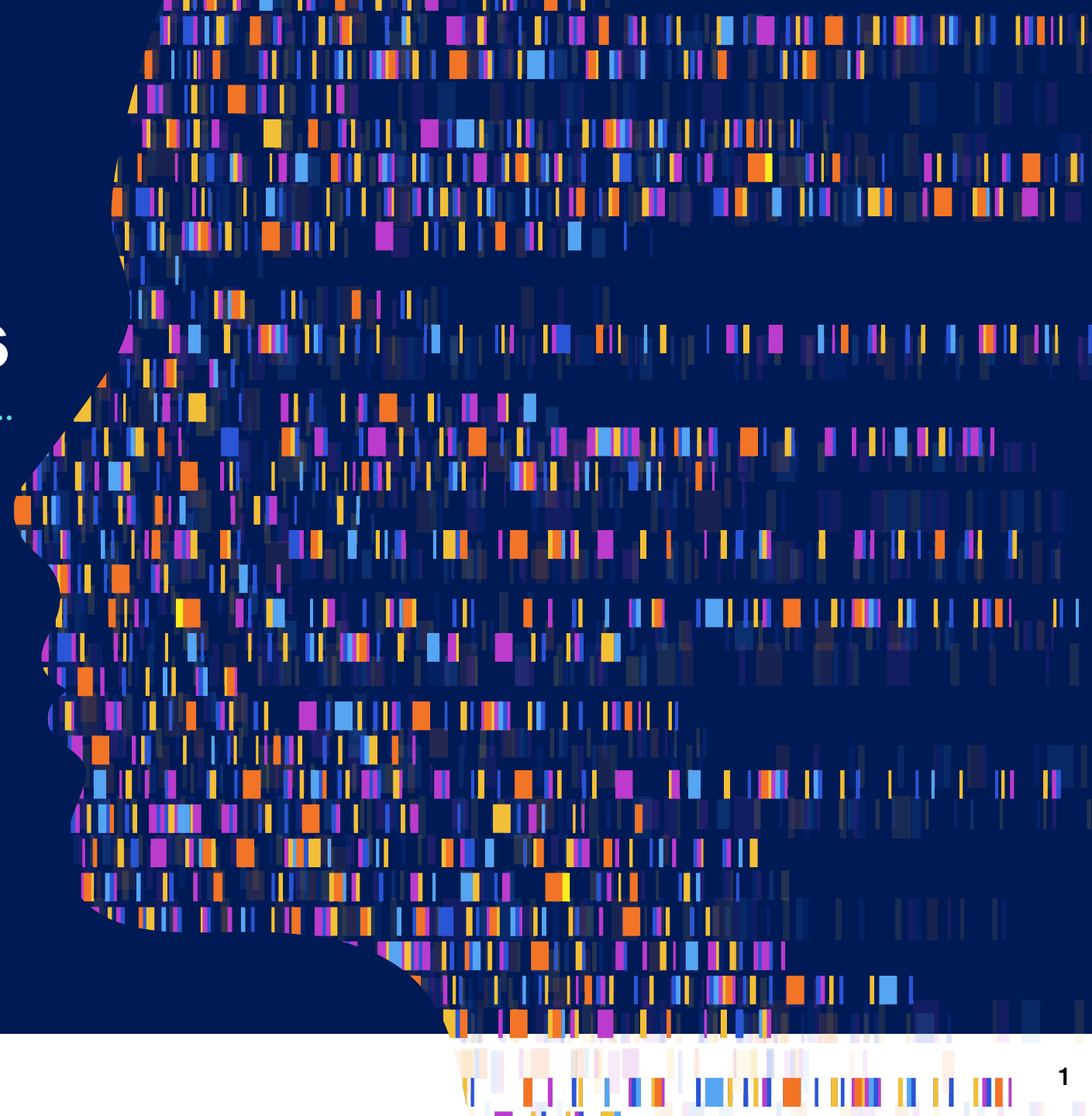


Identifying and Evaluating Trainee Outcomes

- I. Introduction
- II. Trainee success
- III. Trainee outcomes
- IV. Tools for evaluating trainee outcomes
- V. Successful practices
- VI. Barriers to identifying and evaluating trainee outcomes
- VII. Components of an Ideal Evaluation System
- VIII. Conclusions



Welcome Video



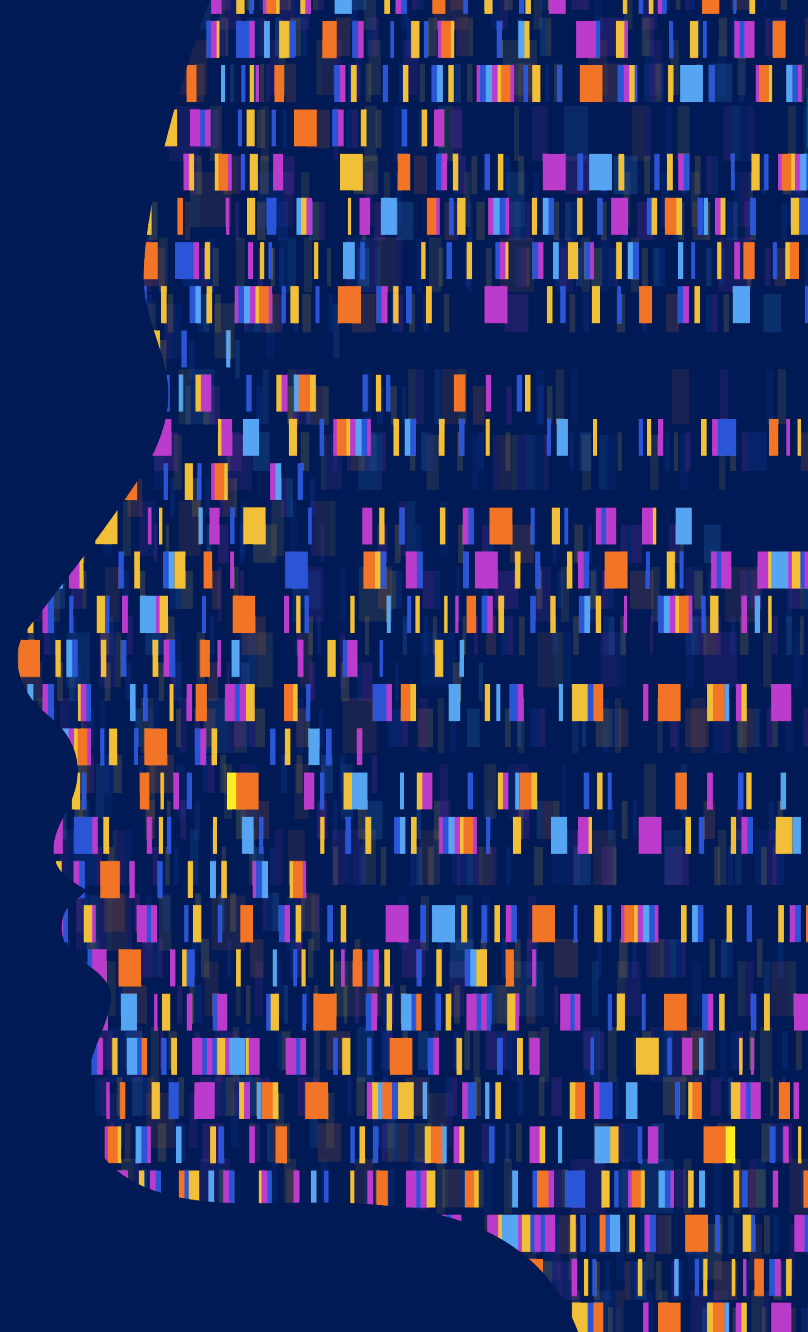
Key Takeaways from Video

- NHGRI is dedicated to cultivating a diverse pool of future researchers, clinician-scientists, healthcare providers, and educators.
 - We have supported training and workforce development programs with a core commitment to enhance the diversity of the biomedical workforce.
- The Training, Diversity, and Health Equity (TiDHE) office along with other NHGRI colleagues have worked to develop this toolkit to help programs from all over the country learn more about best practices for evaluating training programs related to genomic workforce diversity, research, and genomic workforce programs.
- The hope is this toolkit will be instrumental in supporting programs in monitoring the success of participants in training programs.

Key Takeaways from Video

- The toolkit provides:
 - Information to complement ongoing evaluation efforts
 - A source of ideas for those trying to reinvigorate existing efforts
 - Information on how trainee success can be measured and examples of successful practices for following trainees' careers
 - Metrics to measure trainee outcomes and success
 - Barriers to identifying and evaluating trainee outcomes
 - Overview of common methods used for data collection
- A supplemental report was developed and provides more in-depth information on the contents of the toolkit including references, methodology, and other details.
- Feel free to contact us at NHGRITiDHEOffice@mail.nih.gov with any questions that you may have.

Introduction



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What's in the Toolkit?

The toolkit provides an overview of current methods, challenges, and best practices to consider when identifying and evaluating trainee outcomes and success in biomedical research.



Note: Clicking this symbol throughout the toolkit will directly link to the Supplemental Report where you can find additional information related to the section!

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Navigate the Toolkit

To navigate aspects of the toolkit that are of most interest to you, click on the topic:

- [Importance of identifying and evaluating trainee outcomes](#)
- [Resources used to build this toolkit](#)
- [Trainee outcome definitions and success measures](#)
 - [What outcomes do programs consider when evaluating trainee outcomes?](#)
 - [Do trainees in non-traditional career paths have different outcomes?](#)
 - [What defines a successful trainee outcome?](#)

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- Methods of identifying and evaluating trainee outcomes
 - What methods are most used?
 - What methods are less commonly used?
- Successful practices to identify and evaluate trainee outcomes
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Importance of Identification and Evaluation of Trainee Outcomes

Information gained from outcomes can inform program policy changes and improvements and help programs and mentors understand disparities in trainee experiences and outcomes. Programs can assess whether they are achieving their own goals by knowing the outcomes of their trainees. They can also assess if their trainees are prepared for their own career paths.

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Importance of Identification and Evaluation of Trainee Outcomes

The toolkit is meant to inform and guide those within the biomedical research enterprise on identifying and evaluating trainee outcomes.

Click below to see how YOU can benefit from using this toolkit!

I am a:

Program
Manager or
Director*

PI/ Mentor

Biomedical
Research
Trainee

*Program manager/director includes program directors, coordinators, and those responsible for managing training programs

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What Can You Learn– Program Manager/Director

- Practices that will aid in monitoring the success of current and past trainees.
- Ways to overcome common barriers to evaluating trainee outcomes.
- Range of resources to effectively monitor and evaluate trainee success.
- Data-driven decisions to support trainee success, career development, and long impact of your training program.

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What Can You Learn– PI/Mentor

- The importance of mentor-mentee relationship building for tracking trainee outcomes.
- Effective methods to maintain long term connections with trainees.
- Ways to help overcome barriers to evaluating trainee outcomes and success.

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What Can You Learn– Trainee in Biomedical Research

- How your progress will be evaluated and assessed.
- The importance of maintaining relationships and establishing effective communication with mentors and supervisors.
- How publicly accessible information can be positively used by programs.

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Resources Used to Build the Toolkit



Literature review



Select biomedical research program review



NIH staff interviews

Used to compile

Common methods that biomedical research training programs use to collect trainee outcomes

Barriers to identifying and evaluating trainee outcomes

Successful practices for identifying and evaluating biomedical research trainee outcomes

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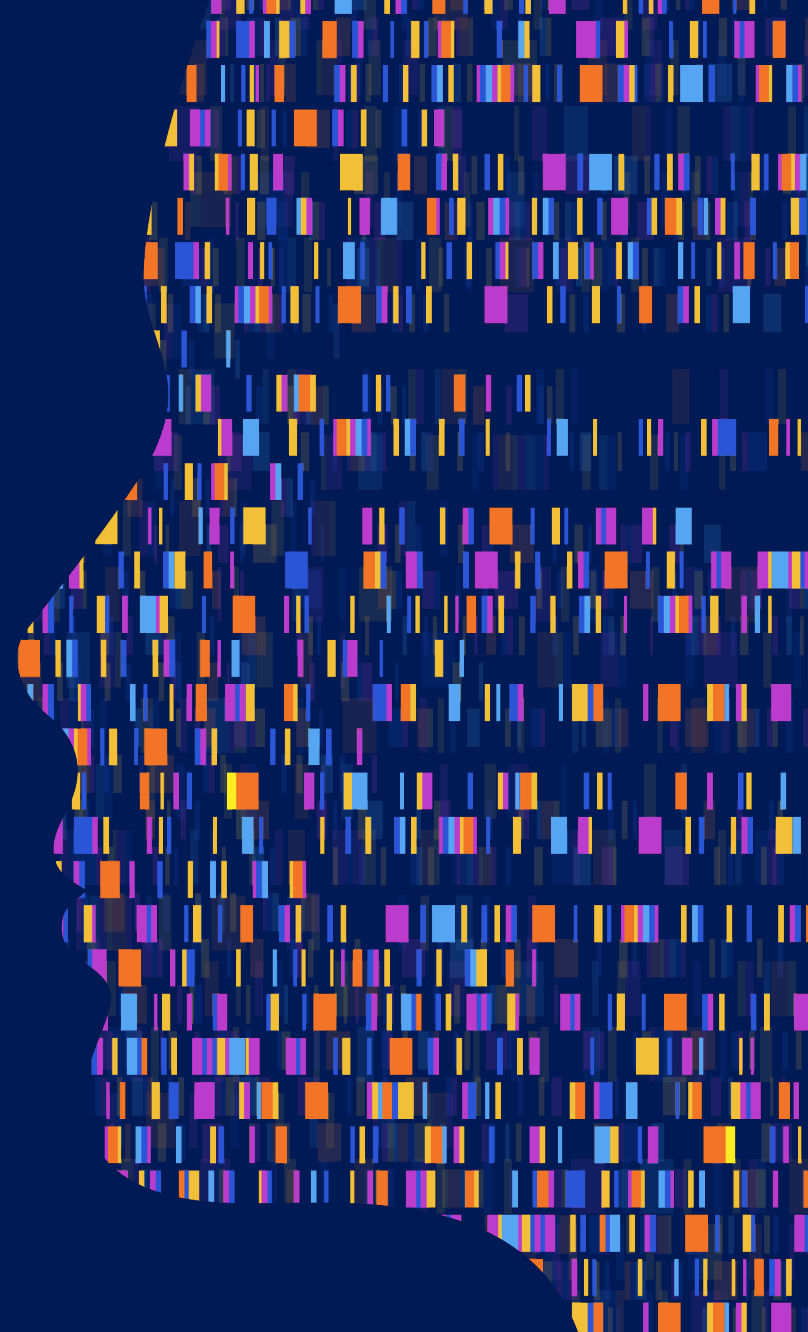
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Trainee Success Measures and Outcome Definitions



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Most Training Programs Define Success Based on Their Own Program's Mission and Goals

The goal of most biomedical research programs is to prepare trainees to be successful in a career in STEM. Definitions of success, therefore, tend to center around professional outcomes focused on academic success in STEM.

This includes:

- Entering into a STEM PhD program
- Choosing a career in research
- Publishing papers

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Program Success Is Not Always the Same as Trainee Success

It is important to note that definitions of success for individual trainees do not always align with their program's success.

Many trainees choose careers outside of STEM or academia, which are often considered non-traditional or alternative career choices, or not identified altogether; however, they are successful outcomes relative to the trainees themselves.

This highlights the subjectivity in defining successful outcomes and emphasizes the importance of relaying that to trainees.

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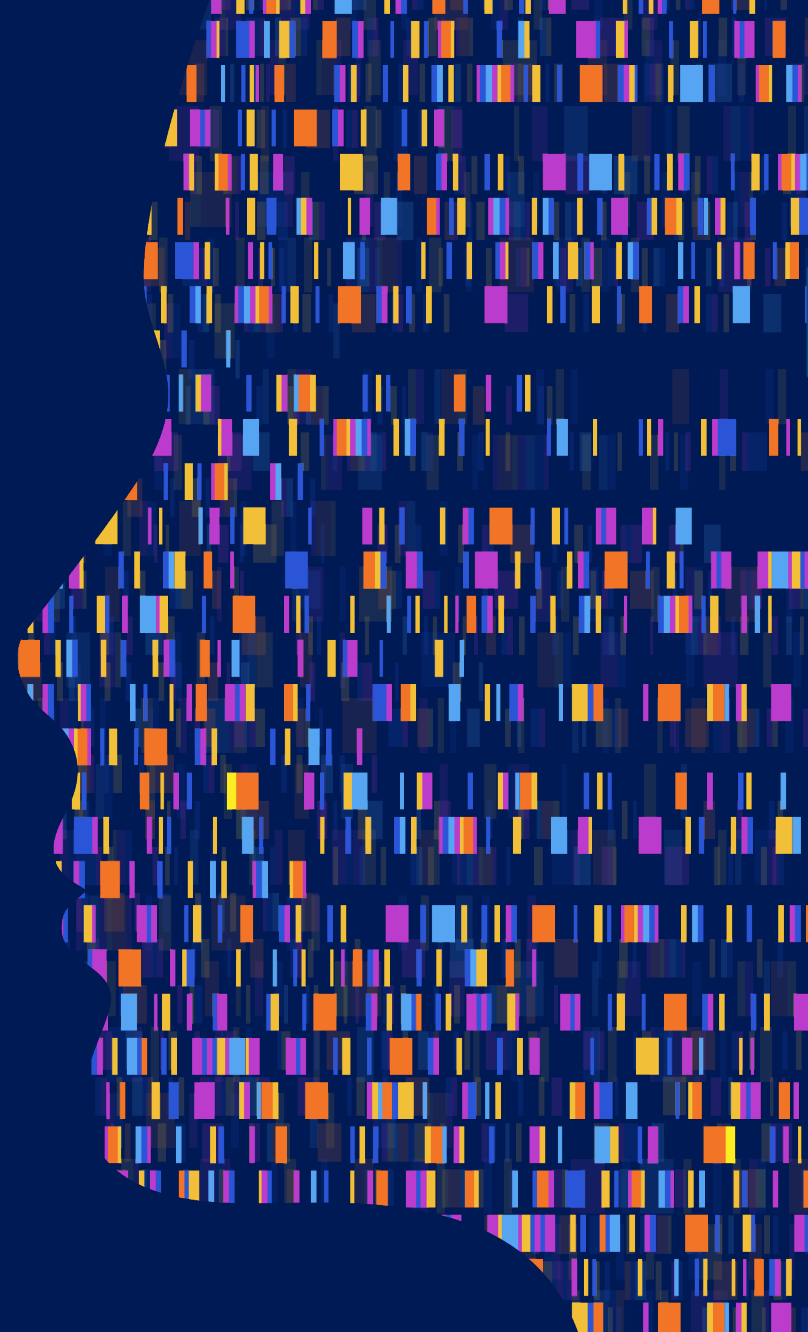
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Trainee Outcomes



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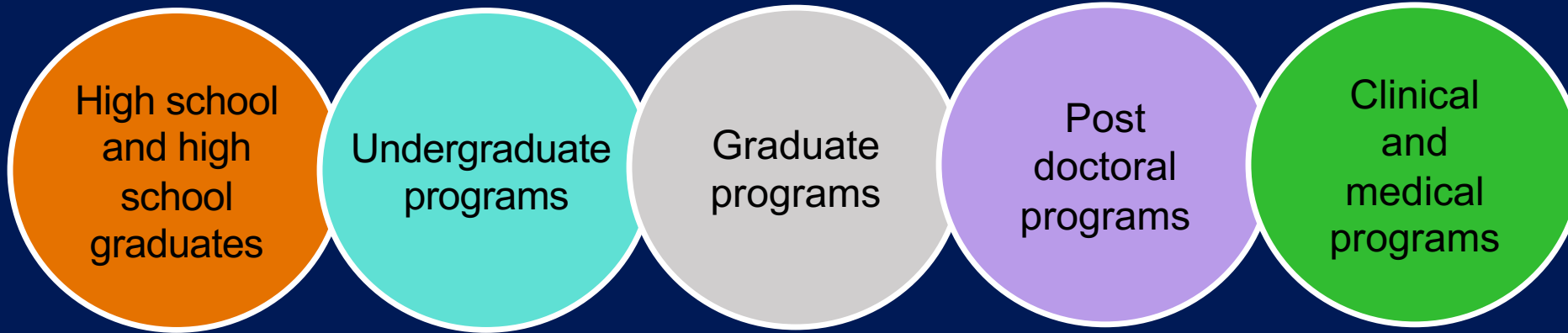
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There Is No Standard Definition for Trainee Outcomes Across Career Categories or Within a Category



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Categories of Trainee Outcomes

Although there is no standard list of outcomes all biomedical research training programs collect, trainee outcomes can be broadly categorized as:



Psychosocial outcomes:

Considers a trainee's psychological, emotional, social, and cognitive well-being.



Professional outcomes:

Outcomes that may not consider some of the significant factors such as socio-economic status of trainees, research self-efficacy, mentorship, etc.

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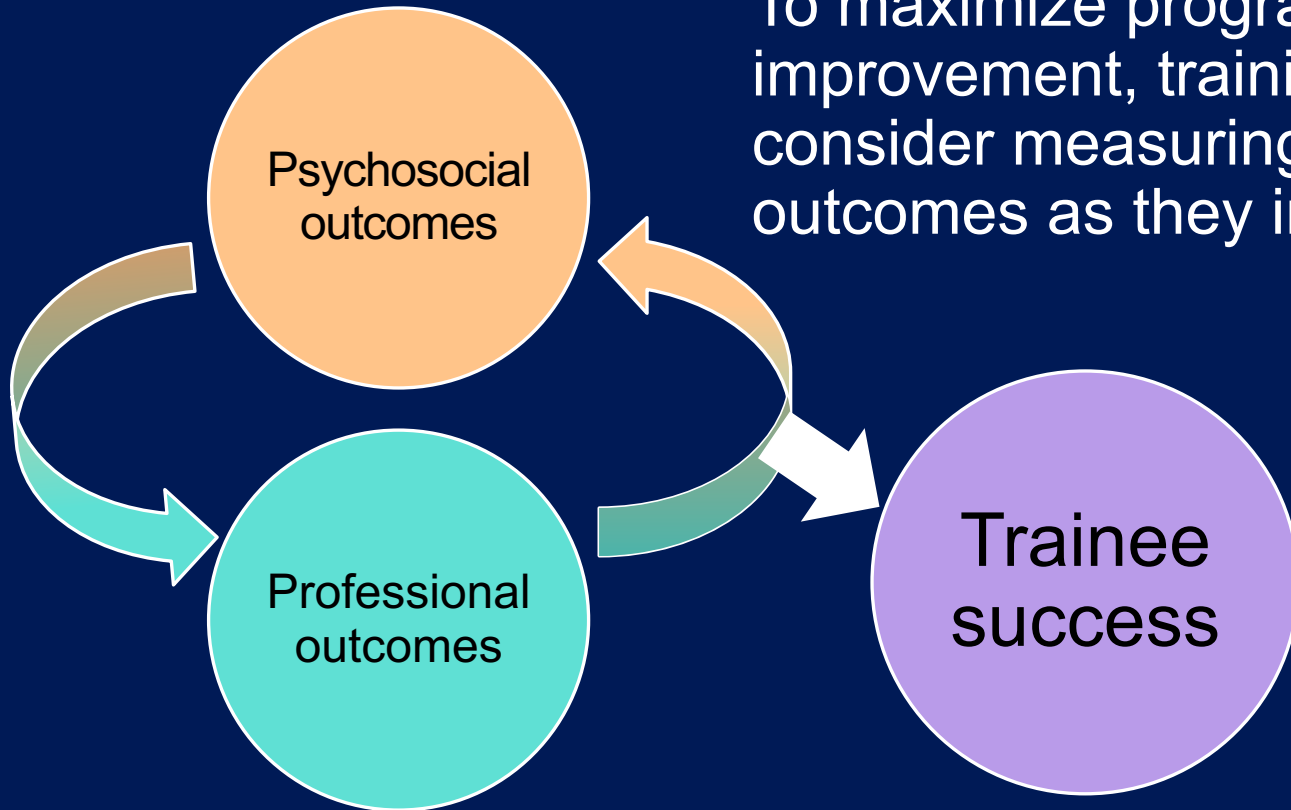
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Importance of Identifying and Evaluating Different Outcomes

To maximize program learning and improvement, training programs should consider measuring both types of outcomes as they impact one another.



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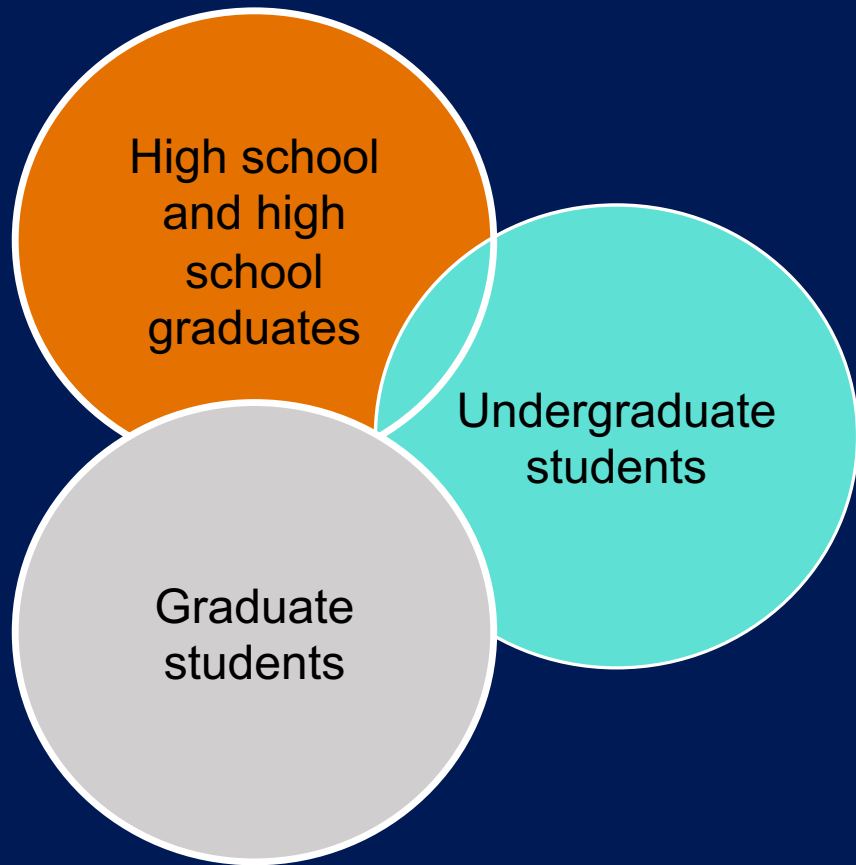
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Examples of Psychosocial Outcomes for Different Program Categories



- Career satisfaction
- Confidence in research
- Community involvement
- Research self-efficacy

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Examples of Psychosocial Outcomes for Different Program Categories



- Career and professional development skills
- Team building
- Time management
- Oral and written communication
- Self-reflection
- Cognitive assessment of leadership
- Conflict and negotiation skills
- Completion of board exams and obtaining an academic/clinical job

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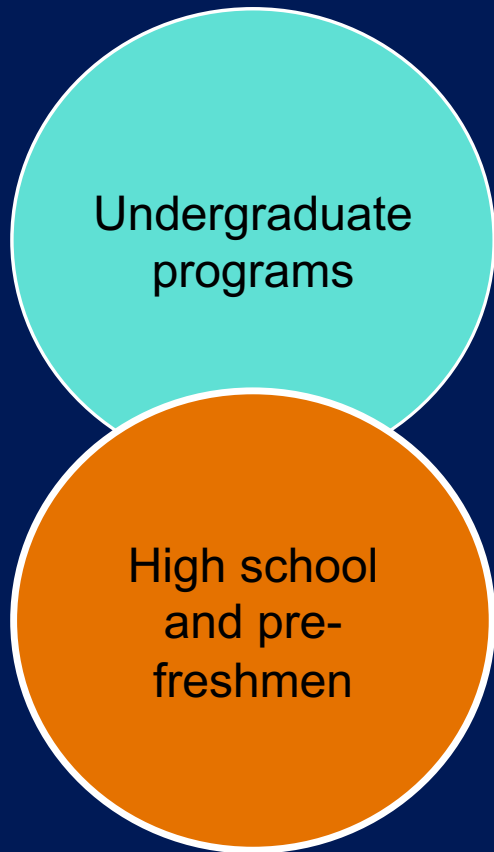
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Examples of Professional Outcomes for Different Program Categories



- Field of study
- Highest degree pursued
- Graduation status
- GPA
- Academic and non-academic employment
- Conference presentations, peer-reviewed publications, honors and awards, milestones and accomplishments

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Examples of Professional Outcomes for Different Program Categories



- Graduation rate
- Peer-reviewed publications
- Grant funding
- Position post-graduation
- Field of employment
- Patents and intellectual property

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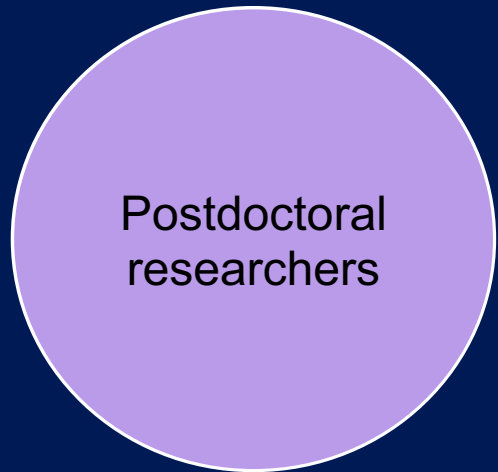
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Examples of Professional Outcomes for Different Program Categories



- Mentorship
- Peer-reviewed publications and presentations
- Grant funding
- Position post program
- Field of employment
- Patents and intellectual property

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Examples of Professional Outcomes for Different Program Categories



- Completion of board exams
- Obtaining an academic/clinical job
- Publications
- Engagement in professional societies and meetings
- Career development and leadership positions within organizations and professional societies

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Do Trainees in Non-Academic Career Paths Have Other Outcomes That Should Be Considered?

Many trainees in biomedical research choose careers that are not in academia or STEM research.

In 2008, only 23% of biomedical research PhD holders were tenured or on the tenure track. Postdoctoral appointments declined by 3.6% since 2020 and by 2.2% since 2017.

Despite this, many of the psychosocial and professional outcomes commonly evaluated are specific to academic and STEM career paths.

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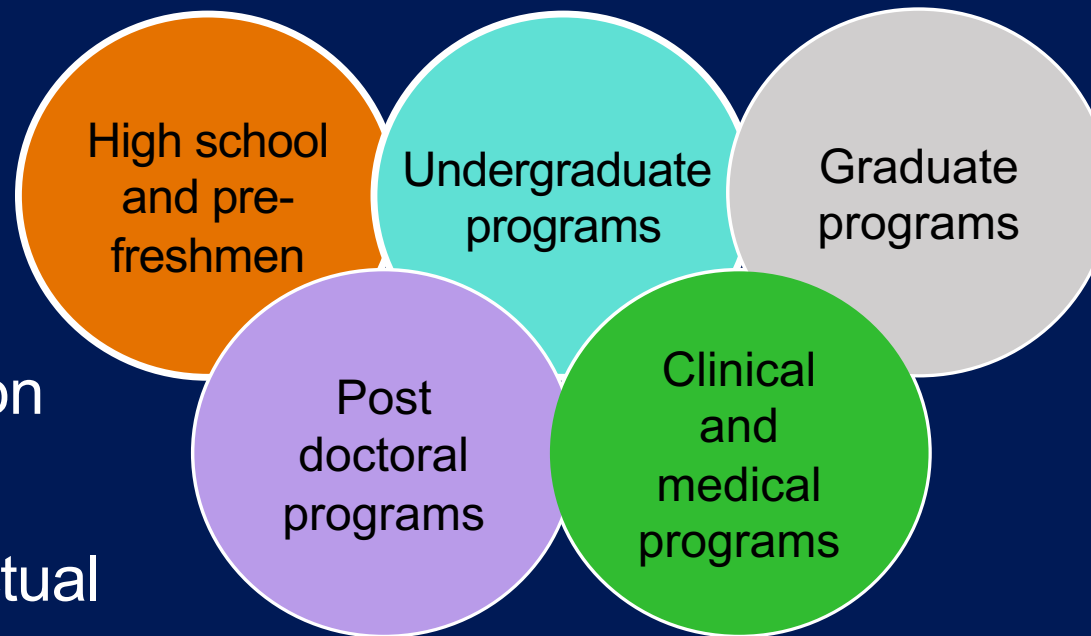
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Non-Academic Career Path Outcomes to Consider

Some studies suggest the following outcomes should be considered:

- Product development
- Intellectual property
- Business growth
- Impact on society
- Awards and recognition
- Patents
- Other forms of intellectual property



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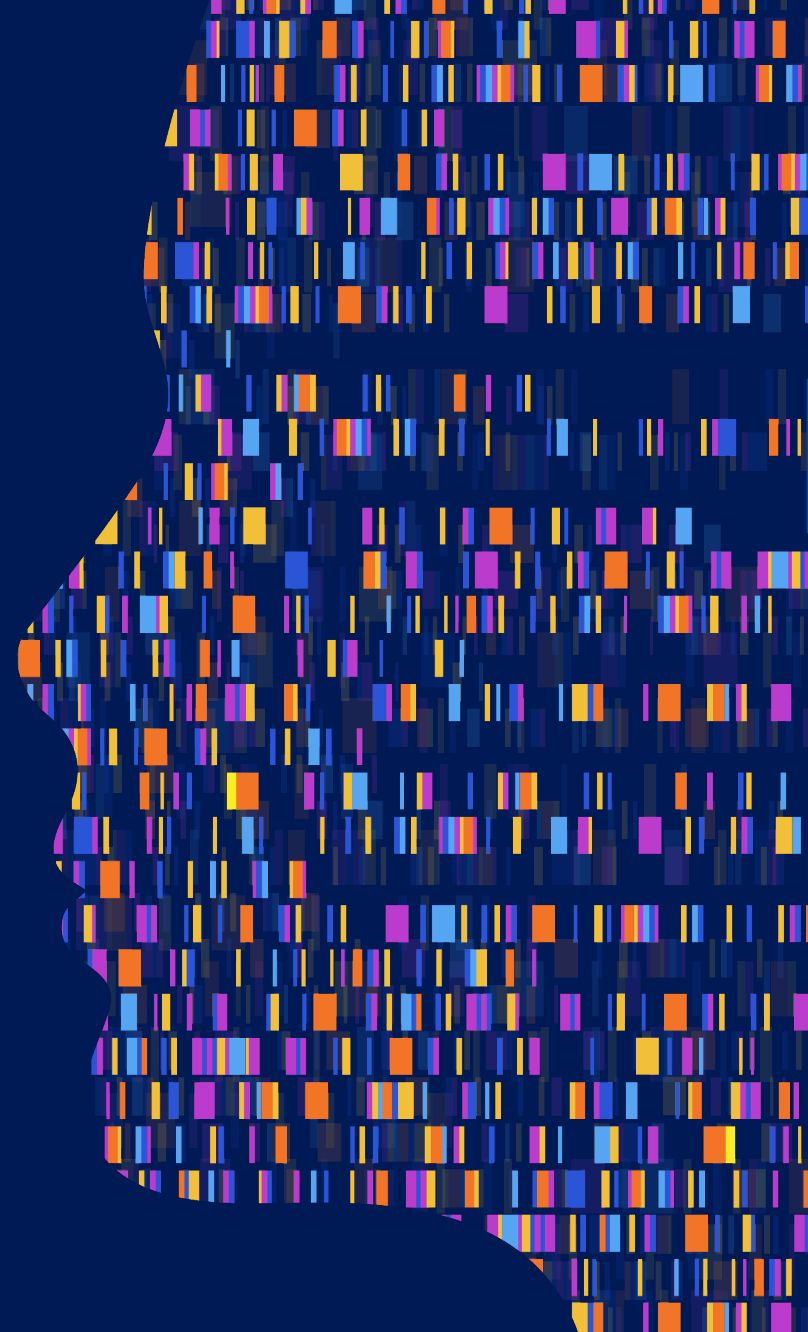
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Methods for Identifying and Evaluating Trainee Outcomes



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Common Methods Used to Identify and Evaluate Trainee Outcomes



Surveys

1. Exit surveys
2. Annual surveys sent to alumni
3. Surveys to current program trainees



Professional networking platforms

1. LinkedIn
2. MyNRMN
3. ResearchGate



Emails

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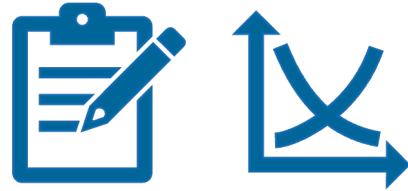
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Less Common Methods Used to Identify and Evaluate Trainee Outcomes



Interviews and focus groups



Evaluation

1. Formative evaluation
2. Summative evaluation
3. Process evaluation
4. Impact evaluation



Others

1. MyNRMN
2. AAAS Fellows Central

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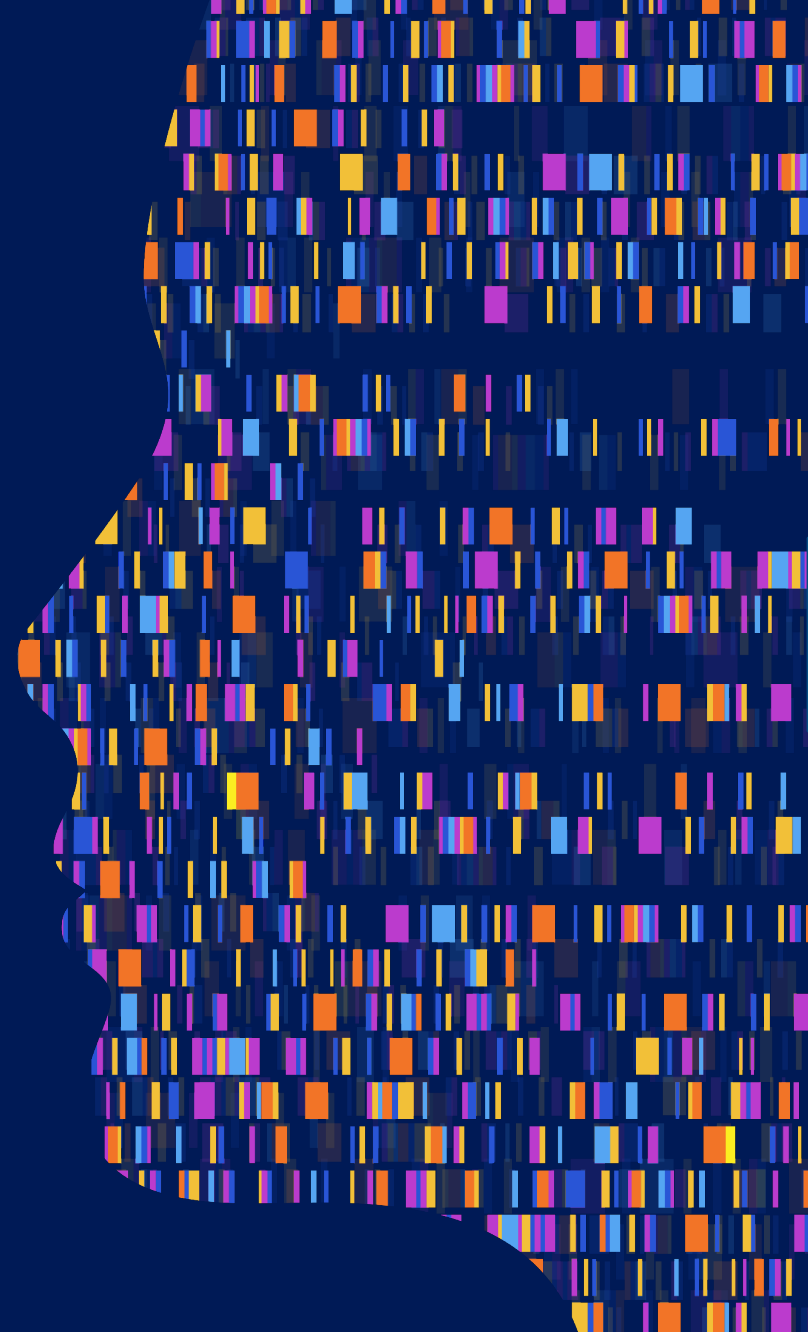
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Successful Practices

Dedicate personnel to oversee identification and evaluation of trainee outcomes

Perform regular program evaluations

Develop and maintain an institutional/program database

Commit to data transparency with your trainees

Engage with and empower trainees

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Successful Practices

Dedicate personnel to oversee identification and evaluation of trainee outcomes

Dedicating staff members to:

- Develop an institutional/program database
- Consistently update and maintain database
- Connect with alumni and trainees on a regular basis

This allows for continuity and consistency in data collection and maintenance.

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Successful Practices

Develop and maintain an institutional/program database

If hiring personnel is a limitation to maintaining a database, automated integration of data collection and a user managed database can help.

- Examples include AAAS Fellows Central and NIH Trainee Alumni Database
- Limited information can also be obtained from MyNRMN and NIH RePORTER where database development is not feasible

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Successful Practices

Commit to data transparency with your trainees

Share with trainees:

- The importance of sharing their information with the program (this includes the influence on their career trajectories)
- How that data will be used by the program

This motivates trainees to participate in surveys and other data collection methods.

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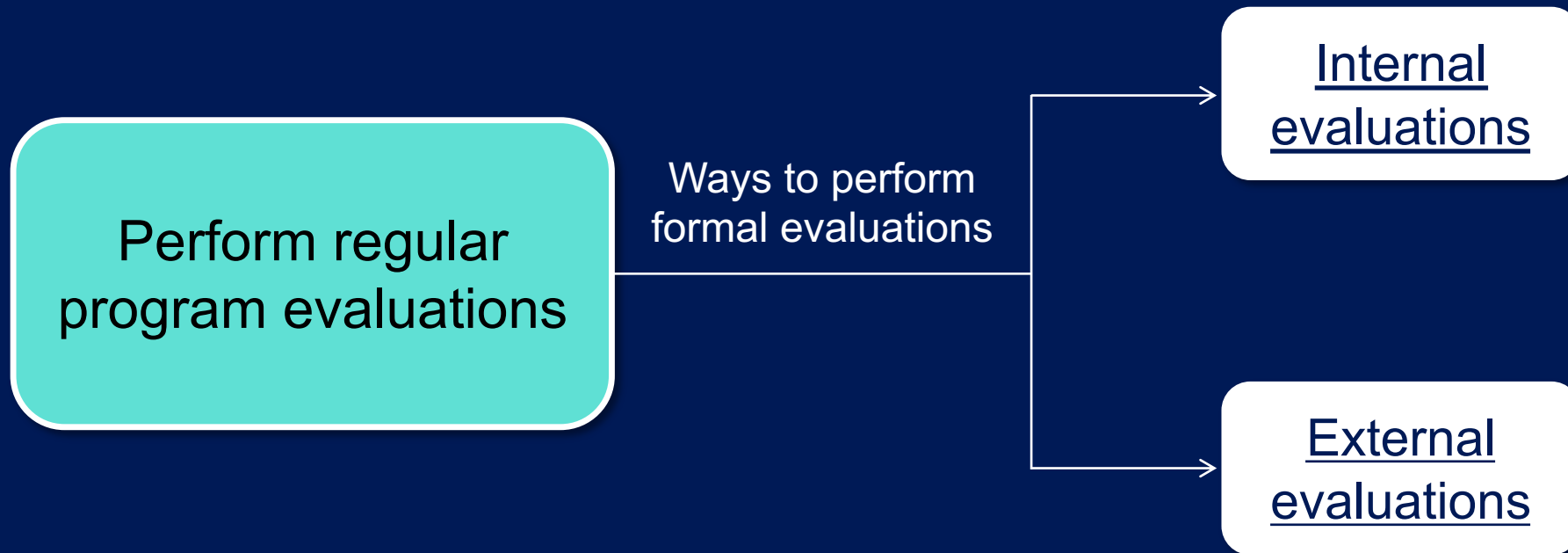
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Successful Practices



Click on each evaluation method to explore more!

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Internal Evaluations

Evaluating a program or project using internal evaluation staff and resources. Benefits include:

- Allows for obtaining trainee outcome information that the program can use to evaluate their effectiveness.
- Provides opportunity to discover risks and determine how effective trainee activities are.
- Gains trainee perspective on improvement to the program shows to be effective in maximizing the potential for success of the program.
- Provides a cost-efficient approach compared to external evaluations.

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External Evaluations

External evaluations include contracting a third party to perform formal evaluation depending upon the need of the program. Benefits include:

- Allows non-biased approach to evaluating trainee outcomes and program success.
- Provides data that are meaningful to the program and separates any internal pressure that may be apparent with program staff.

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Successful Practices

Engage with and empower trainees

Trainee engagement in the methods of evaluation is essential to tracking their outcomes and success.

[Click here to explore some of those techniques](#)

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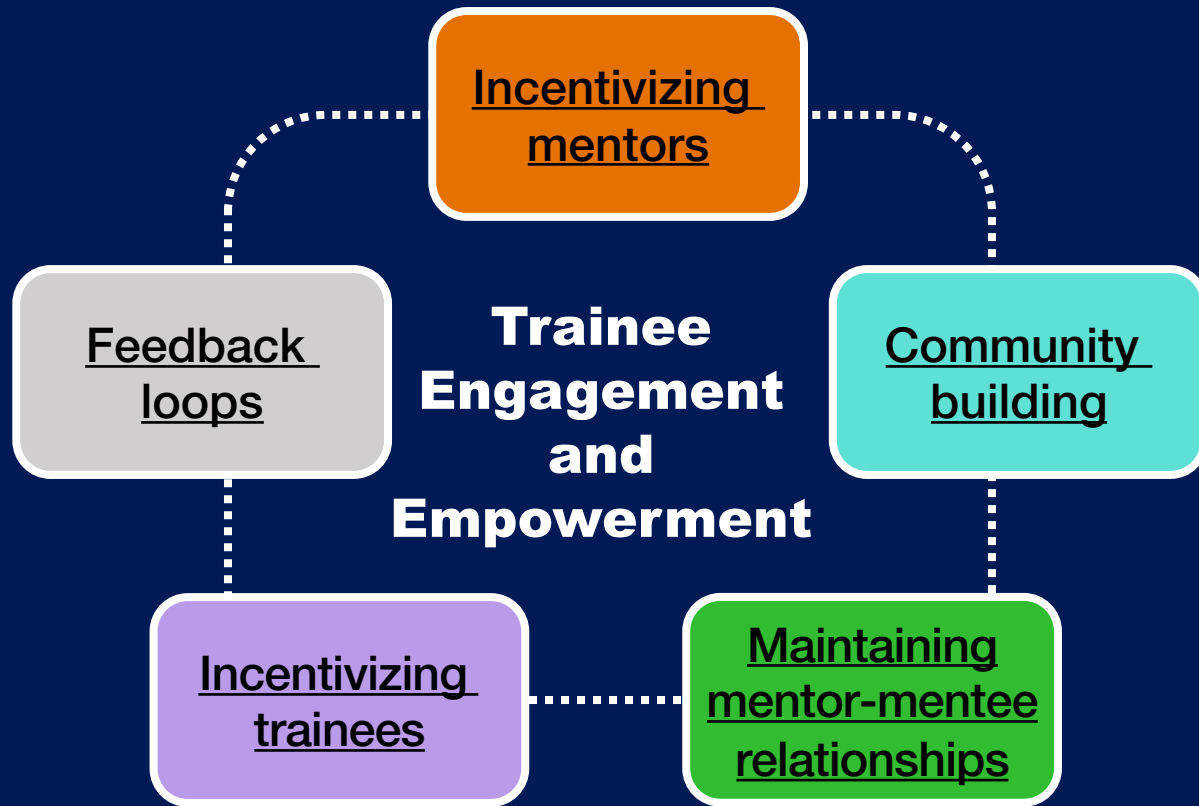
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Trainee Engagement and Empowerment Techniques



Compared to other successful practices highlighted, this centers the trainees, their training experiences, and how that feeds back into engagement in program evaluation.

See how you can integrate each technique into your programming by clicking on it!

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Trainee Engagement and Empowerment Techniques- **Community Building**

- Foster a sense of belonging to the program by:
 - Providing opportunities for social interaction during the program
 - Providing the necessary resources and mentorship to support success
 - Recognizing trainee achievements
- Create networks of mentor/trainee support by facilitating informal virtual or in-person meetups.
- Establish strong alumni/trainee networks by:
 - Inviting alumni to speak with trainees showcasing program prolonged connection with alumni
 - Creating LinkedIn groups that connect trainees with alumni, mentors, and program staff

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Trainee Engagement and Empowerment Techniques- **Maintain Mentor-Mentee Relationships**

- Connect with trainees via email or professional networking platforms like LinkedIn to check in on their career progress – consistency is KEY.
- Develop mentorship programs and facilitate efficient mentor-mentee communication.

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Trainee Engagement and Empowerment Techniques- Incentivize Trainees to Share Their Career Trajectory

- Include exit survey or interview participation in program completion requirements.
- Educate trainees on the importance of surveys and how program success reflects on their success.
- Require participation to receive access to an alumni portal and alumni resources.
- Incentivize trainees to share honest program feedback as it can contribute to program improvement and indirect peer-to-peer support.

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Trainee Engagement and Empowerment Techniques- **Incentivize Mentors to Continue Rapport Building**

Incentivize university mentors to continue rapport building with trainees and alumni by:

- Incorporating mentorship as a criteria for review in annual performance reviews and tenure-track promotion packets.
- Reducing faculty teaching hours to accommodate mentorship efforts. Example: NIH-I³ is an early career training program that provides 5% full time equivalent (FTE) per mentee for mentors.

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Trainee Engagement and Empowerment Techniques- **Provide Opportunities for Feedback**

- Include questions about trainee satisfaction with program in evaluation surveys.
- Use the information and improve on program shortcomings. This shows the program's interest in trainee success.
- Allow trainees to provide feedback on current methods of identifying and evaluating trainee outcomes and improve on them to ensure future trainee engagement.

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Combining Successful Practices is the Best Practice to Identifying and Evaluating Trainee Outcomes

As explored in this toolkit, there are [many methods](#) to identifying and evaluating trainee outcomes and several suggested [successful practices](#) to incorporate into your programming.

- Combining engagement and empowerment techniques with more common techniques to tracking trainee outcomes tends to yield the most information.
- The goal is to help trainees feel engaged and empowered which then results in their willingness to share more information through techniques such as surveys, emails, and other [successful practices](#) mentioned previously.

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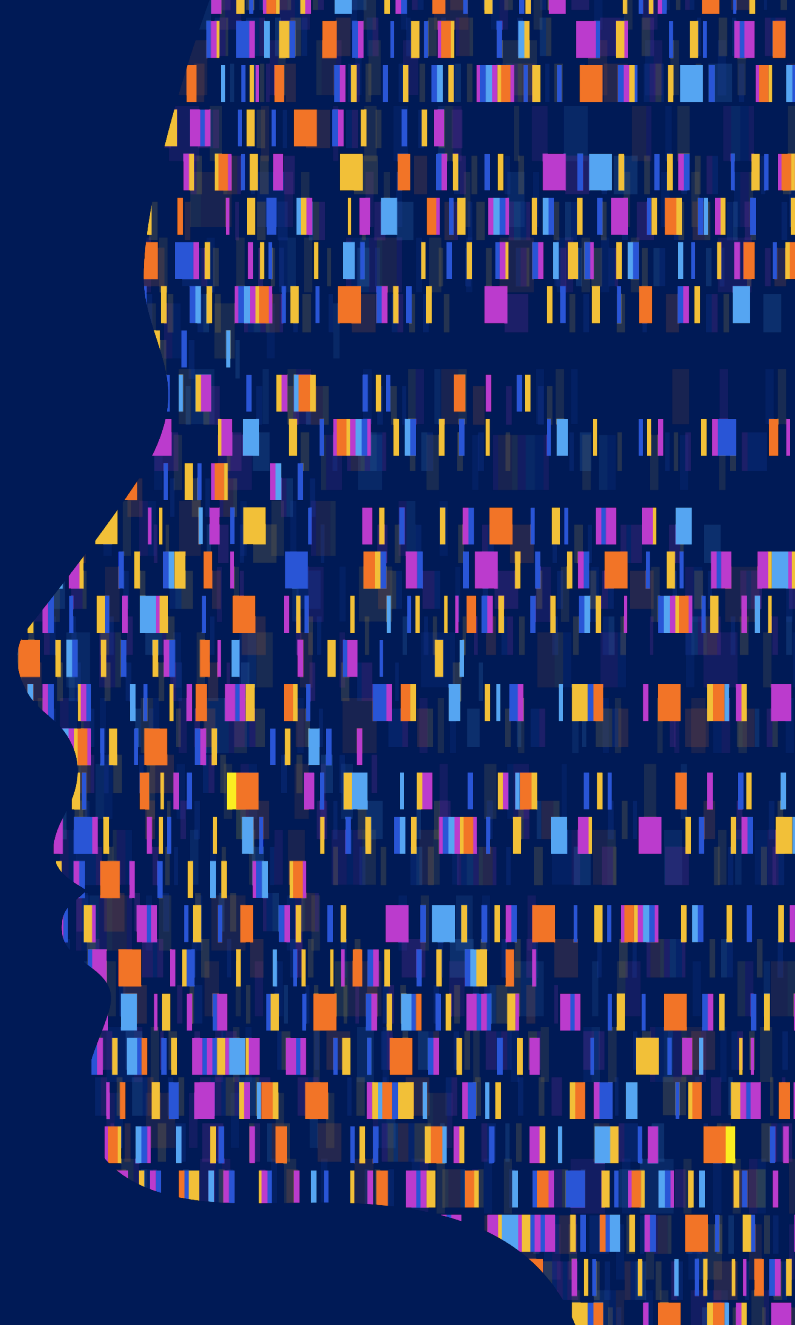
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Barriers to Identifying and Evaluating Trainee Outcomes



Lack of time, effort, funding, and resources



Lack of standardized metrics collected



Inconsistent trainee engagement



Restricted data sharing policies and regulations



Trainee privacy concerns

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Barriers to Identifying and Evaluating Trainee Outcomes

Lack of time, effort, funding, and resources

Identification and evaluation of trainee outcomes requires a lot of time and effort needed to:

- Collect accurate information
- Maintain consistency in the collected information
- Establish databases to store, maintain, and protect the collected data
- Analyze collected data and use it to inform training program changes

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Barriers to Identifying and Evaluating Trainee Outcomes

Lack of time, effort, funding, and resources

- Organizations or programs may not have the resources needed to develop and implement an automated evaluation system.
- Limited funding to outsource database management or to establish mentor-mentee relationships.

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Barriers to Tracking Trainee Outcomes

Lack of
standardized
metrics collected

There is broad inconsistency in collected information on trainee outcomes due to:

- Having no standard definitions for trainee outcomes and success:
 - Both psychosocial and professional outcomes need to be considered.
- Not having consistent staff members or standardized procedures for collecting and maintaining trainee outcome information.
- Not having a well-maintained database over the years.

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Barriers to Identifying and Evaluating Trainee Outcomes

Inconsistent
trainee
engagement

Identification and evaluation of trainee outcomes and success relies heavily on trainees engaging with programs to:

- Update their information on platforms like LinkedIn
- Respond to surveys and email requests

Maintaining consistent trainee engagement is challenging.

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Barriers to Identifying and Evaluating Trainee Outcomes

Trainee privacy concerns

Trainees may have a fear of misuse or having a lack of knowledge regarding data utilization.

- A fear of data security and privacy breaches may be a concern.
- These concerns may result in trainees being hesitant to share their data.

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Barriers to Identifying and Evaluating Trainee Outcomes

Restricted data sharing policies and regulations

Policies and regulations related to what trainee information a program can collect is constantly changing, especially demographic data/personal identifiable information (PII). This:

- Limits what information can be collected
- Contributes to the larger inconsistency in the information in databases

Office of Management and Budget (OMB) clearance also needs to be considered for data collection.

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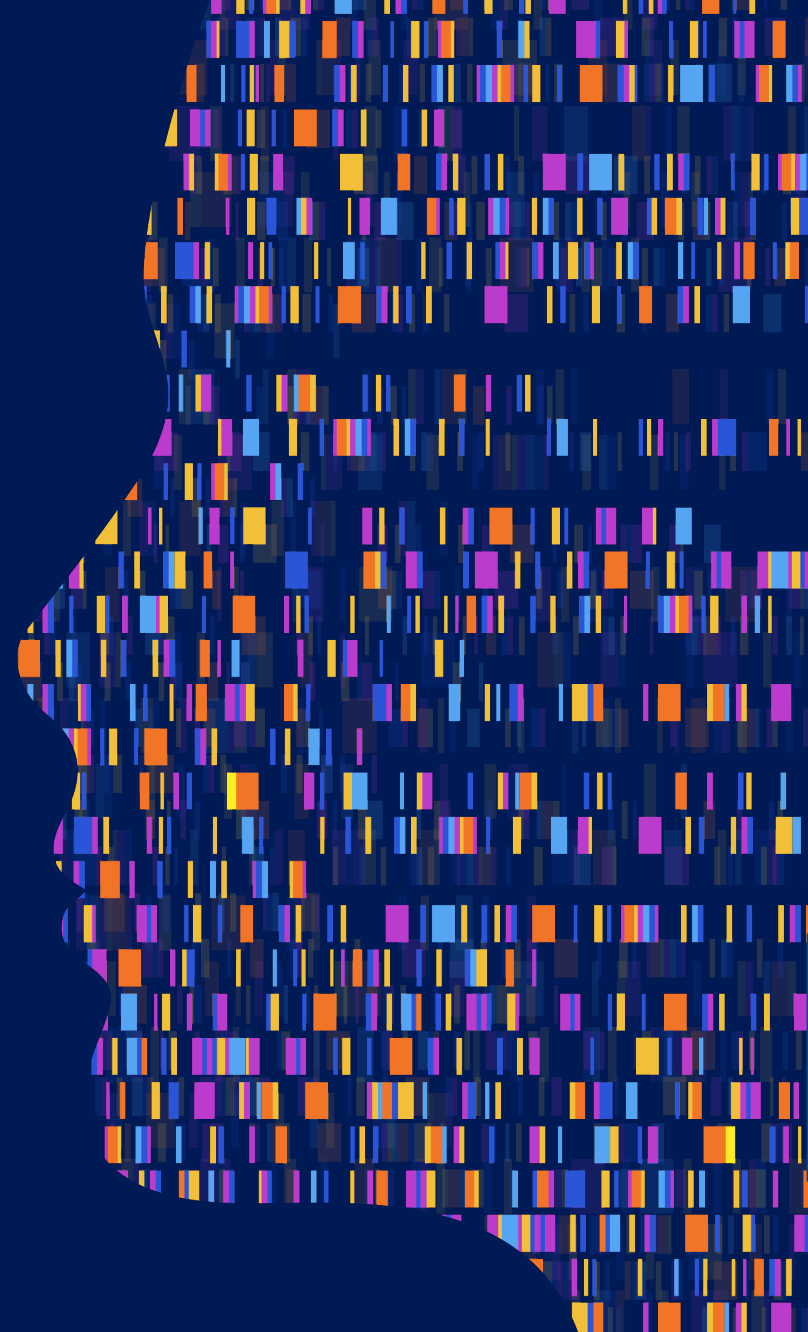
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Components of an Ideal System for Identification and Evaluation of Trainee Outcomes



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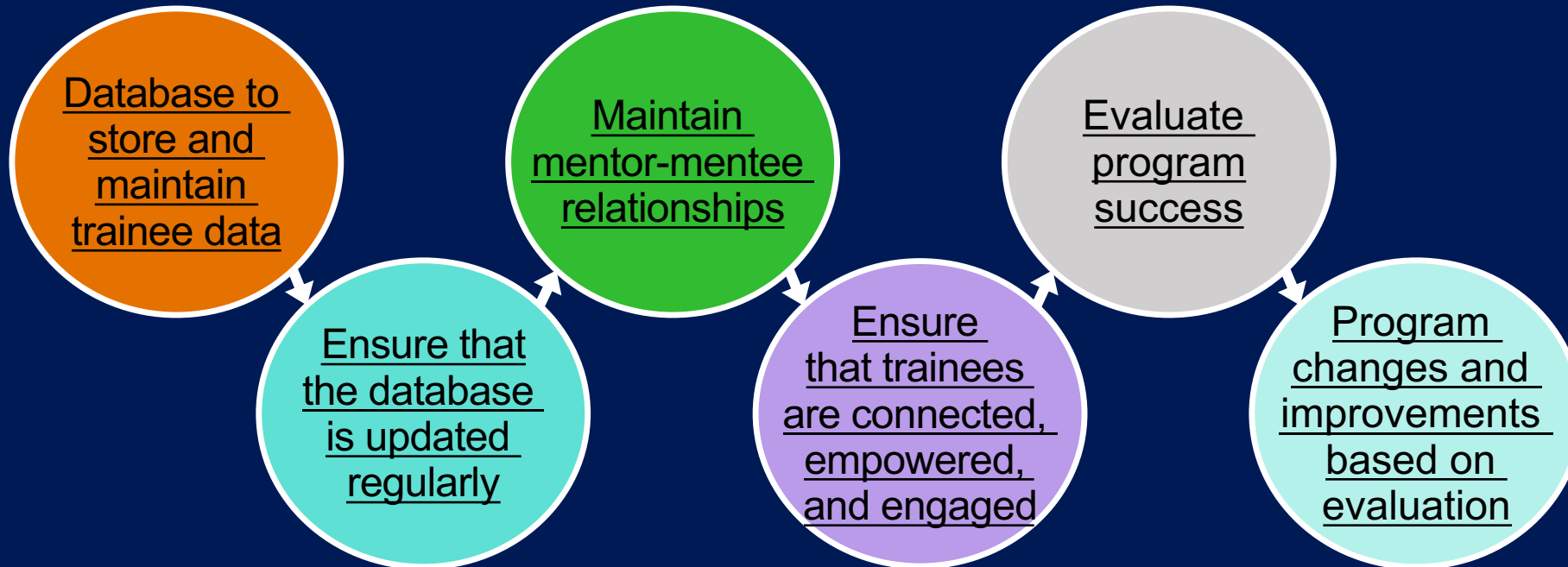
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Components of an Ideal System for Identification and Evaluation of Trainee Outcomes

An ideal system incorporates successful practices from different elements of a system. Here are some recommendations that together make up a successful system to identify and evaluate trainee outcomes. To review how each element can be incorporated, click on it!



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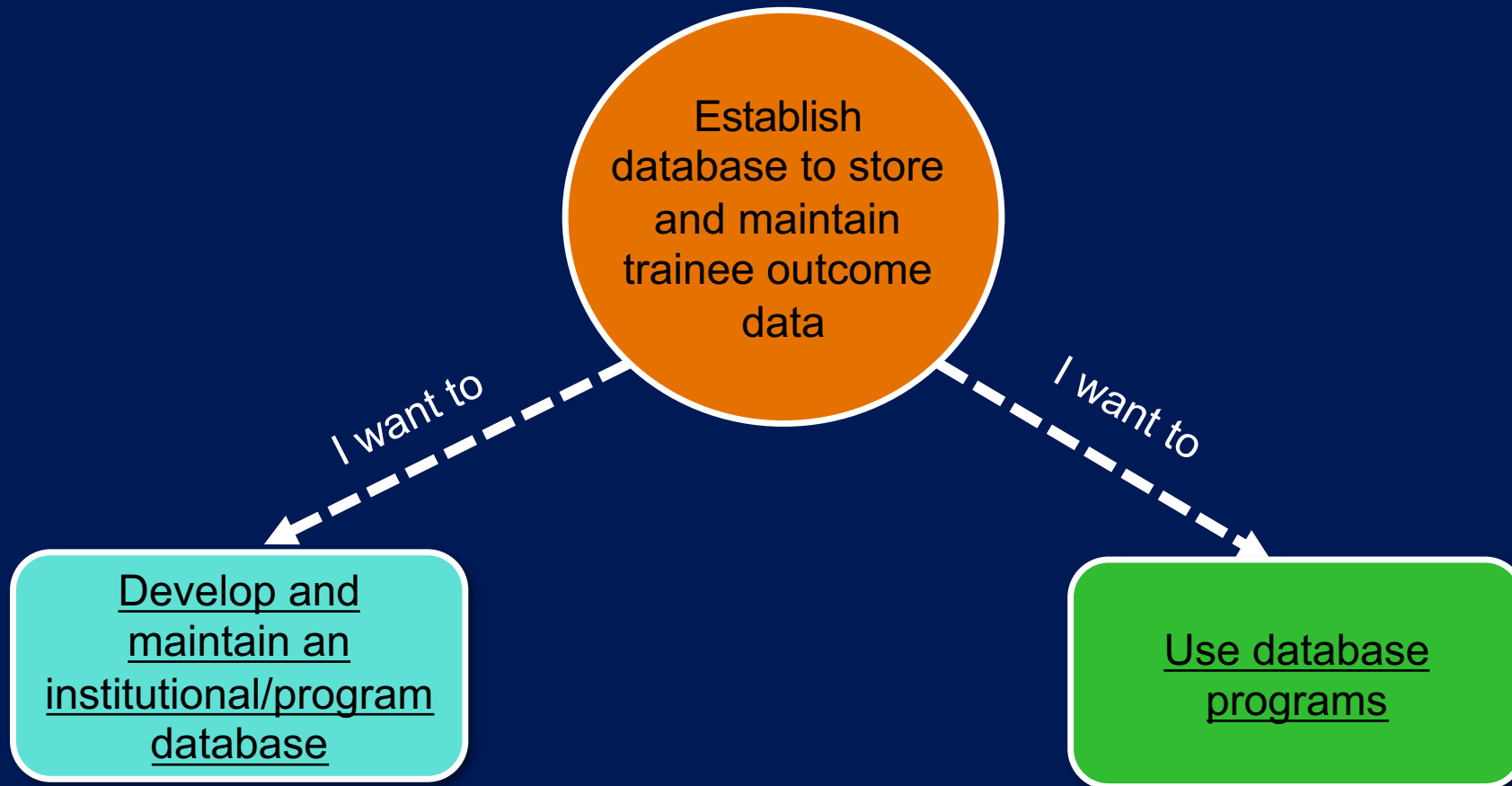
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Components of an Ideal Evaluation System



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Develop and Maintain an Institutional/Program Database

- Provides a secure location that can be systematically updated in a prepopulated database.
 - Avoids duplication of work when collecting trainee information.
- Can run data analysis to effectively determine trainee outcomes and program success.

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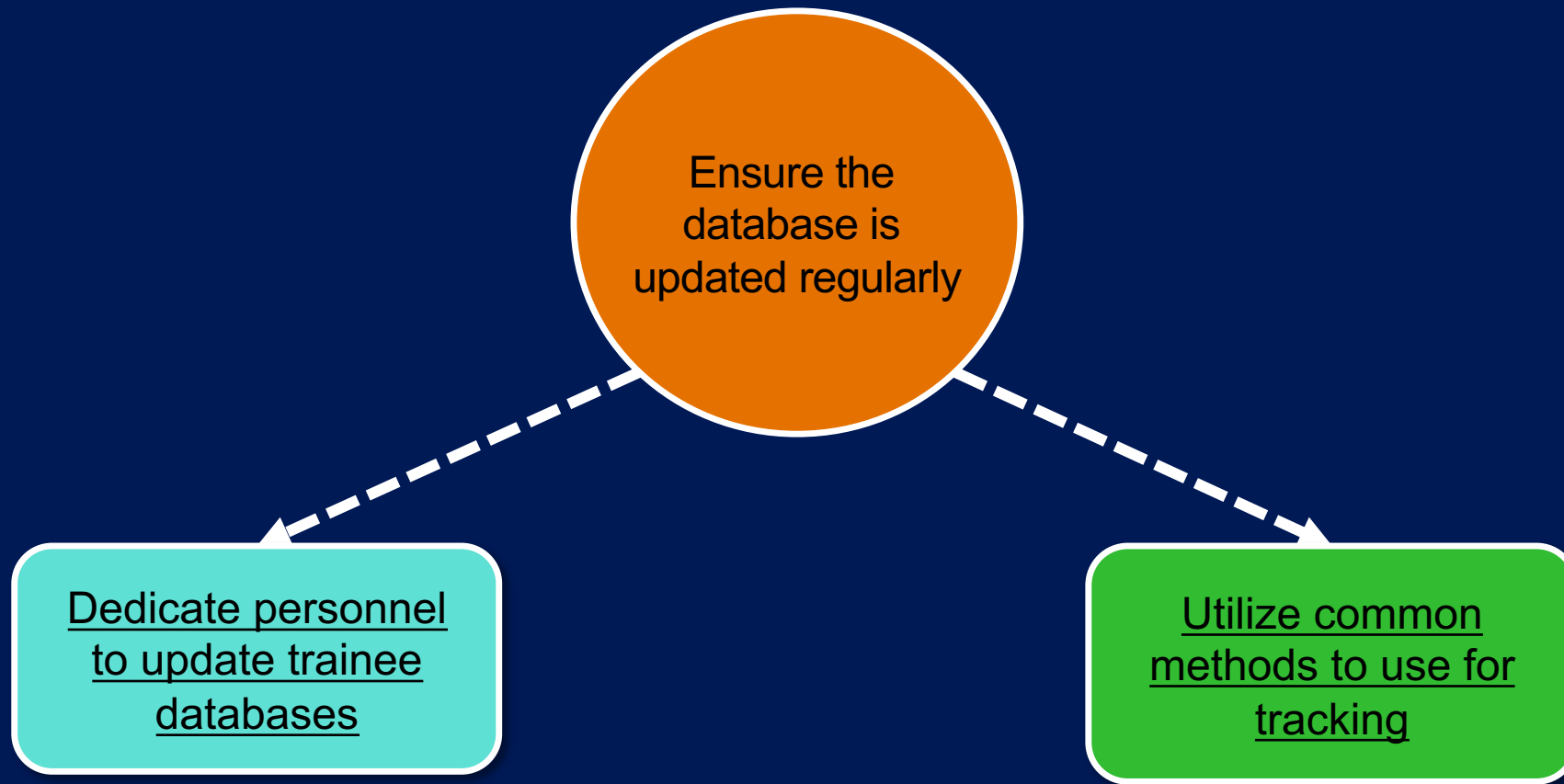
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Consistently Updating Program Database



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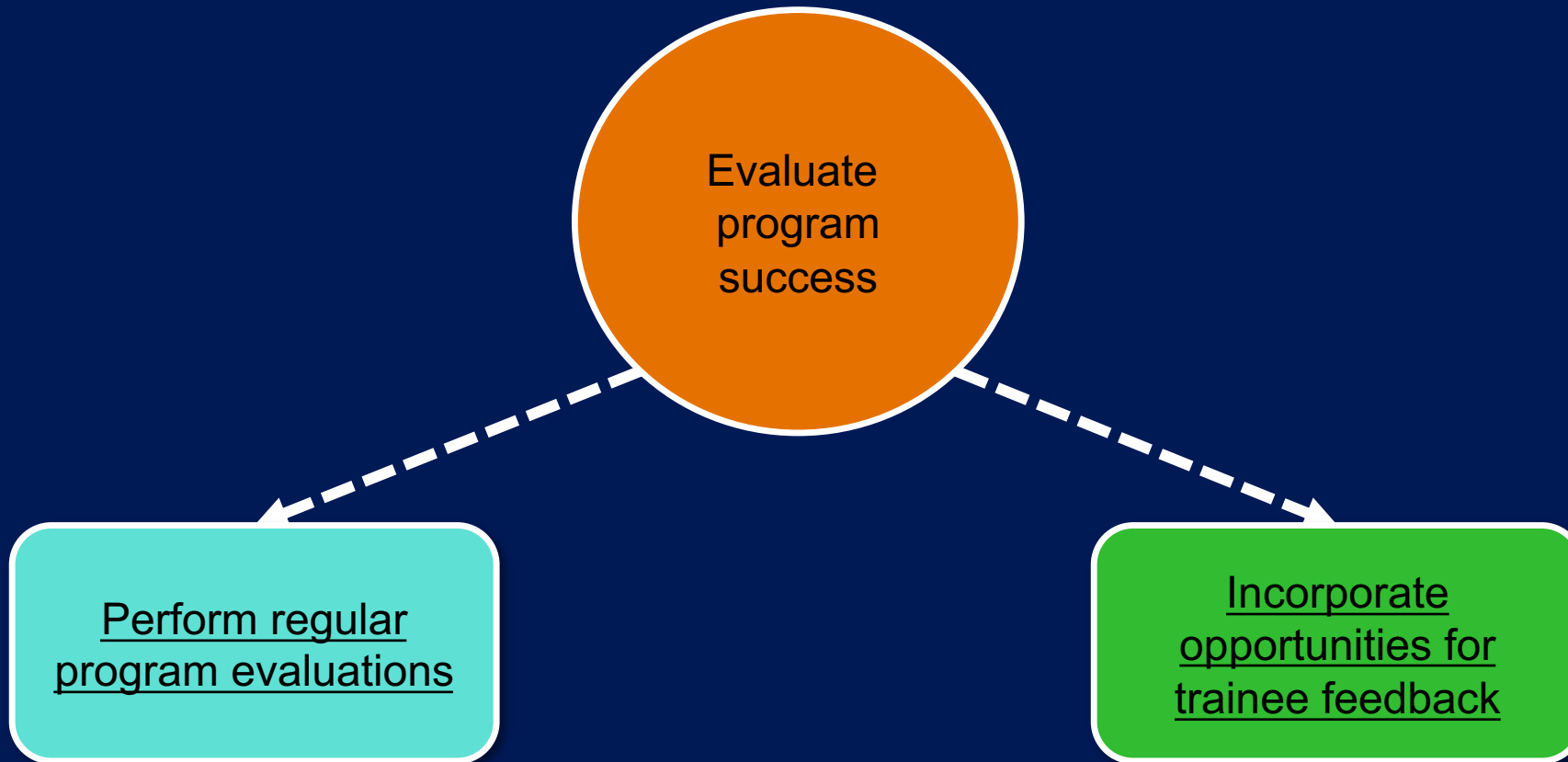
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Evaluate Program Success



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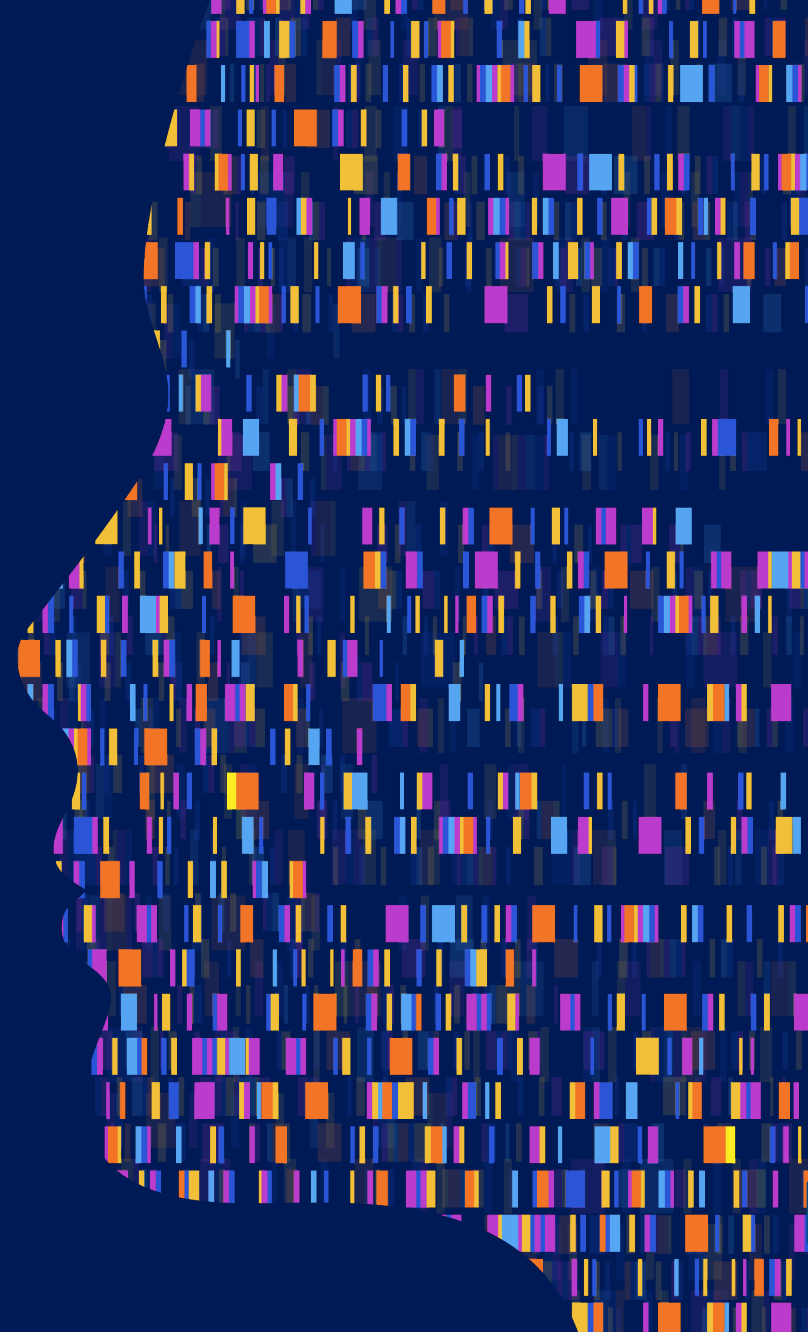
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Additional Considerations

- Investing in program evaluations and utilizing the collected data to improve many aspects of a program such as culture and training.
- Investing in trainee well-being and community building is crucial to trainee outcome success and evaluation.
- Recognizing that trainee success and program success are not always the same and emphasizing to trainees that their individual success is valued and recognized.

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Additional Considerations

- Considering outcomes to evaluate career trajectories that are commensurate with a range of options and pathways.
 - Pathways differ across academia, industry, and non-profit or government settings.
- Ensuring that both psychosocial and professional outcomes are collected.

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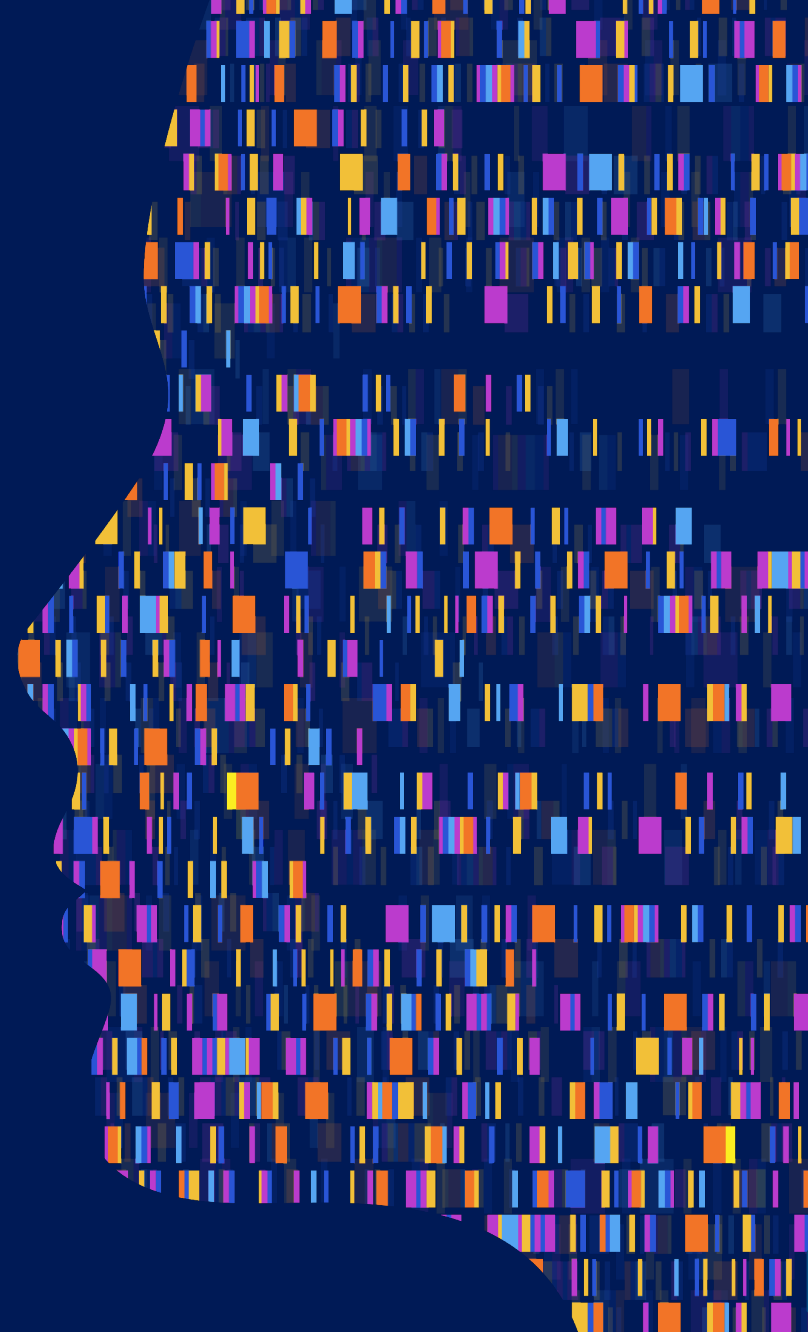
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Links to Resources

For more details on the resources and programs used to build this toolkit, review the following:

- [The Supplemental Report](#) associated with the toolkit, explores in detail the content in this toolkit and the resources used to create it.

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