The State of Clinical Trials: Charting the Path to 2030

May 22, 2025

The Westin DC Downtown
999 9th St. NW
Washington, D.C.

CLINICAL TRIALS TRANSFORMATION INITIATIVE

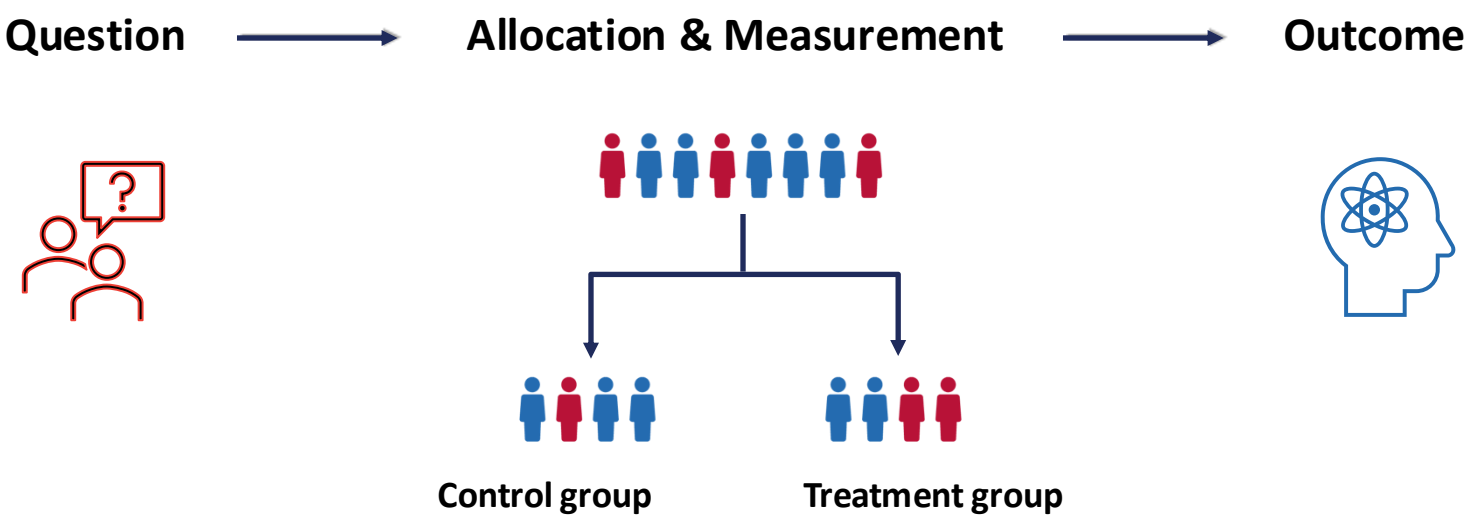
Welcome from CTTI's Executive Director

Morgan Hanger

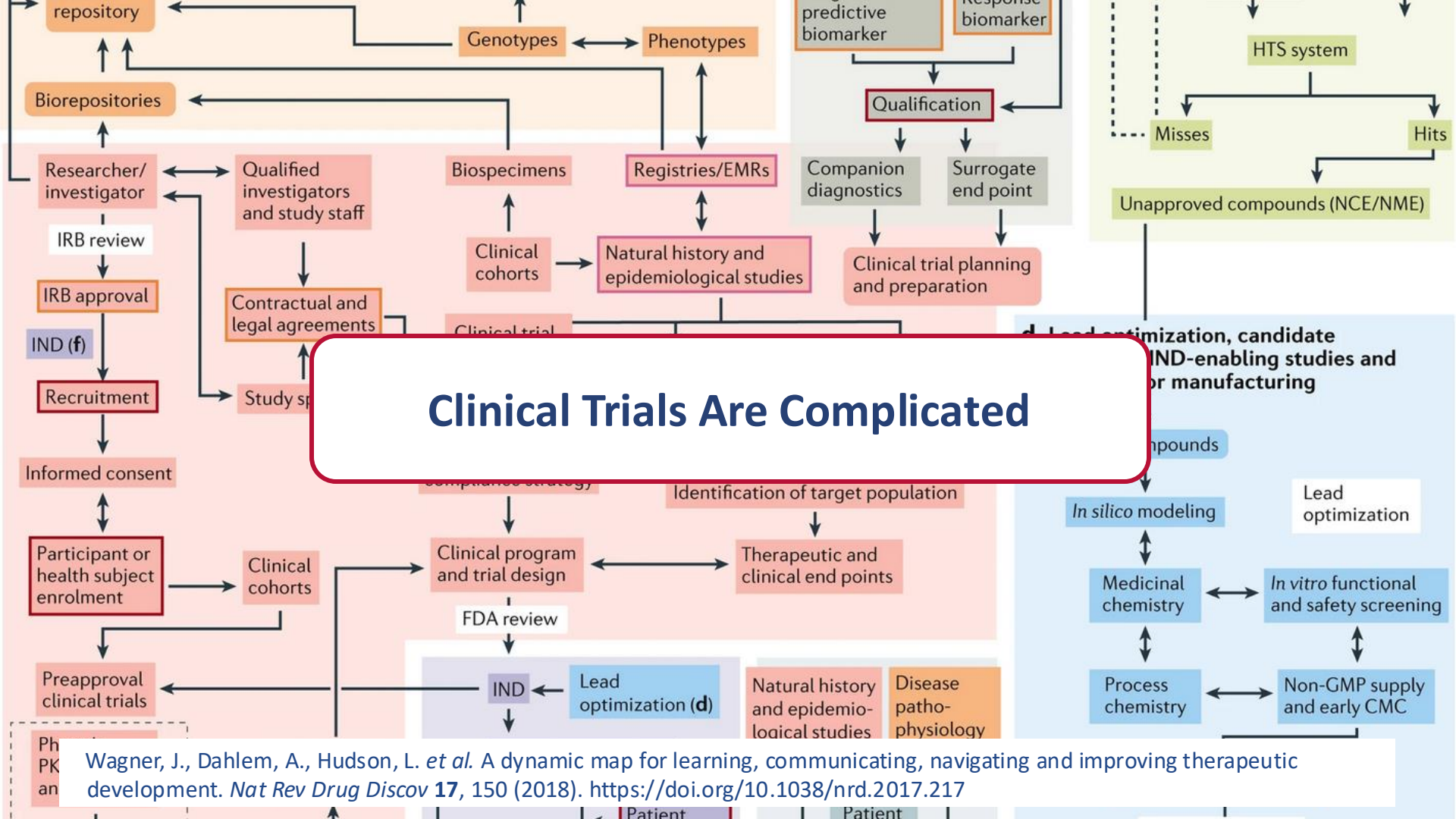
Executive Director

Clinical Trials Transformation Initiative

Clinical Trials Are Simple



Clinical Trials Are Complicated



Wagner, J., Dahlem, A., Hudson, L. *et al.* A dynamic map for learning, communicating, navigating and improving therapeutic development. *Nat Rev Drug Discov* **17**, 150 (2018). https://doi.org/10.1038/nrd.2017.217

Modernizing Trials Together

MISSION

To develop and drive adoption of practices that will increase the quality and efficiency of clinical trials.

VISION

A high-quality clinical trial system that is patient-centered and efficient, enabling reliable and timely access to evidence-based therapeutic prevention and treatment options.

PUBLIC-PRIVATE PARTNERSHIP

- Co-founded in 2007 by FDA and Duke University
- Active collaboration with +500 individuals and groups
- All materials are freely available

SCOPE

Focus on clinical trials of FDA-regulated medical products, recognizing that clinical trials are international and acting as a collaborative global citizen.

Over 15 Years of CTTI

30+
Recommendations

50+
Case Studies

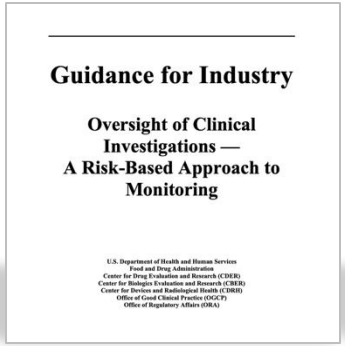
80+
Implementation Tools

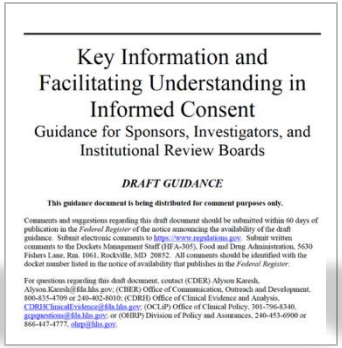
130+
Articles & Publications

550+
Presentations & Workshops

30,000+
Downloads per year

40,000+
Media Impressions per year





Transforming Trials 2030

This is solvable.

Today's Agenda

8:30 Welcome

8:45 Presentations & Discussion: Where Are We Now?

10:45 Break

11:00 Workshop Part 1: Scoping the Issues

12:15 Lunch

1:00 Workshop Part 2: Charting the Path Forward

2:30 Break

2:45 Perspective: Sustaining Excellence in the Clinical Trials Enterprise

3:50 Closing Remarks

4:00 Adjourn

CTTI

Thank You, Members

Genentech – A Member of the Roche Group
Care Evolution
florence
Chiesi
EMD Serono
TriNetX
Novartis
Regeneron
Amgen
Bristol Myers Squibb
Medable
Vertex
novo nordisk
GSK
Lilly
IONIS
Merck

AHRQ
BARDA
CDC
CMS
FDA
NIH
OHRP
VA – U.S. Department of Veterans Affairs
pcori

Crohn's & Colitis Foundation
Cystic Fibrosis Foundation
Day Sooner
Parent Project Muscular Dystrophy
Foundation for Prader-Willi Research
Arthritis Foundation
Lupus Research Alliance
Dravet Syndrome Foundation
Parkinson's Foundation
Tigerlily Foundation – Beauty. Strength. Transformation.
The Michael J. Fox Foundation for Parkinson's Research
aa
Colorectal Cancer Canada
Pulmonary Fibrosis Foundation
Susan G. Komen
Friends of Cancer Research

University of Oxford
Duke
Northwell Health
Mayo Clinic
ETH zürich
HCA Healthcare
Nuvance Health
C5Research
MedStar Health Research Institute
Population Health Research Institute – Health through knowledge
Massachusetts General Hospital – Founding Member, Mass General Brigham
NYU Langone Health
UC-Irvine ICTS – from lab to life
Yale

wcg
LindusHealth
Advarra
SCRS
ACRP
PhRMA
ASCO – American Society of Clinical Oncology
SCT – Society for Clinical Trials
Biotechnology Innovation Organization
Palo Alto Investors
DIA
BRANY
FasterCures – A Center of the Milken Institute

Version: April 23, 2025

Opening Remarks from CTTI Chair

Mark McClellan

Robert J. Margolis Professor of Business, Medicine, and Policy

Director, Duke-Margolis Institute for Health Policy, Duke University

State of Clinical Trials – Where Are We Now?

Ken Getz

Tufts CSDD

Summer Starling

CTTI

Donna Cryer

Global Liver Institute

Ramita Tandon

Walgreens

Rob Califf

Duke

Brad Hirsch

Highlander Health

Esther Krofah

Milken Institute

State of Clinical Trials – Where Are We Now?
A Look at the Data

Ken Getz

Executive Director

Tufts Center for the Study of Drug Development

CTTI State of Clinical Trials

Drug Development Operating Trends

Ken Getz, MBA

Executive Director and Research Professor

Tufts CSDD, Tufts University School of Medicine

May 2025

Tufts Center for the Study of Drug Development

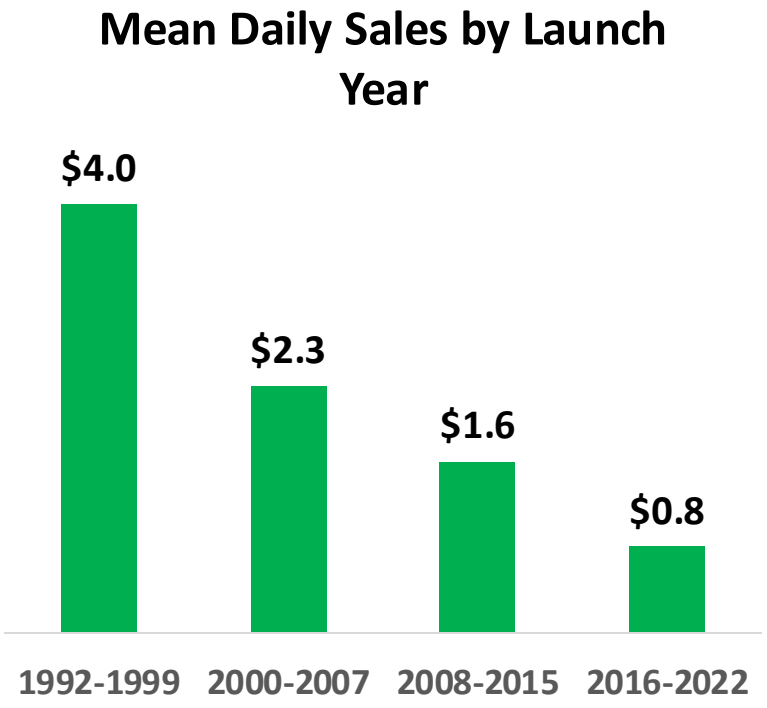
TUFTS UNIVERSITY

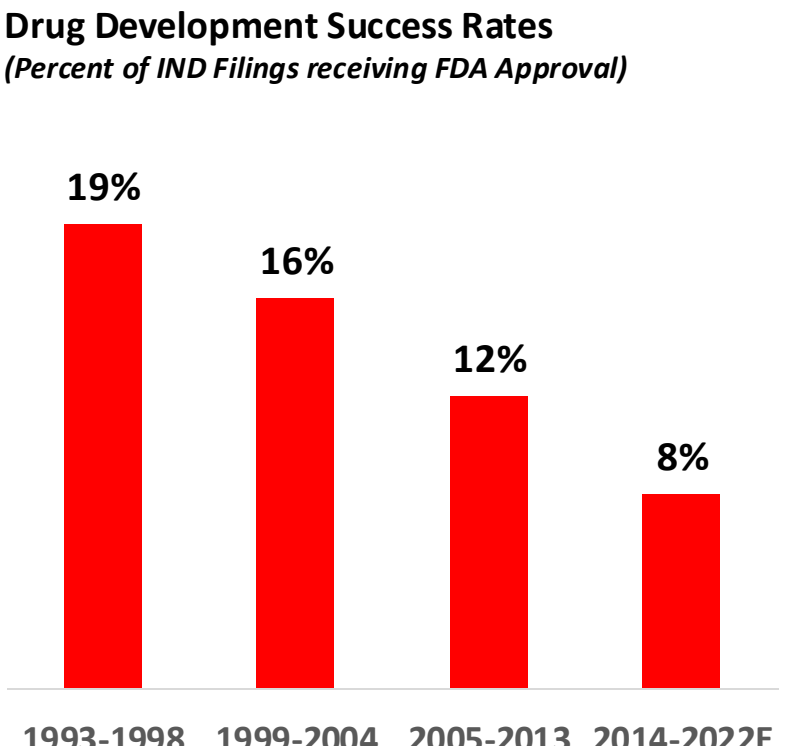
Declining Return on Development Investment

	Total Global R&D Spend ($US Billions)	Mean Peak Sales per Approval ($US Millions)	Mean Percent of Total Sales Invested in R&D	Return on R&D Investment
2000s	$94.2	$757	18.2%	12–15%
2010s	$136.4	$816	18.4%	9-11%
2020s	$188.1	$396	20.9%	3-5%

Sources: Statista, Evaluate Pharma, Deloitte, Oliver Wyman

The Value of a Development Day

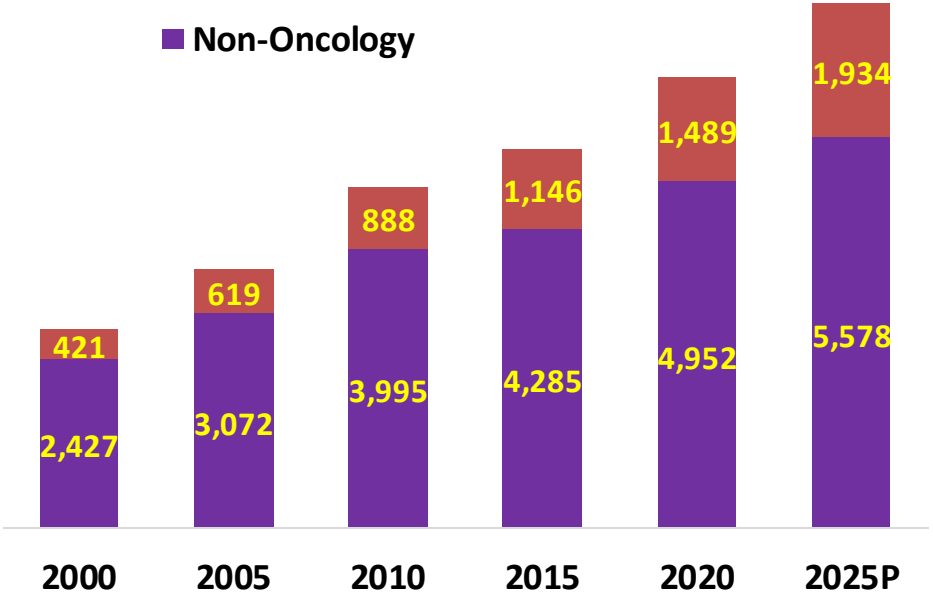




Source: Tufts CSDD

Changing Global Pipeline Composition

Total Drugs and Biologics in the Pipeline



Pipeline Composition

	Percent of Drugs in R&D that are Personalized Therapies	Percent of Drugs in R&D Targeting Rare Diseases
2010	19%	14%
2015	21%	25%
2020	26%	34%
2025E	38%	41%

Source: PharmaProjects; Evaluate Pharma, Statista, Tufts CSDD

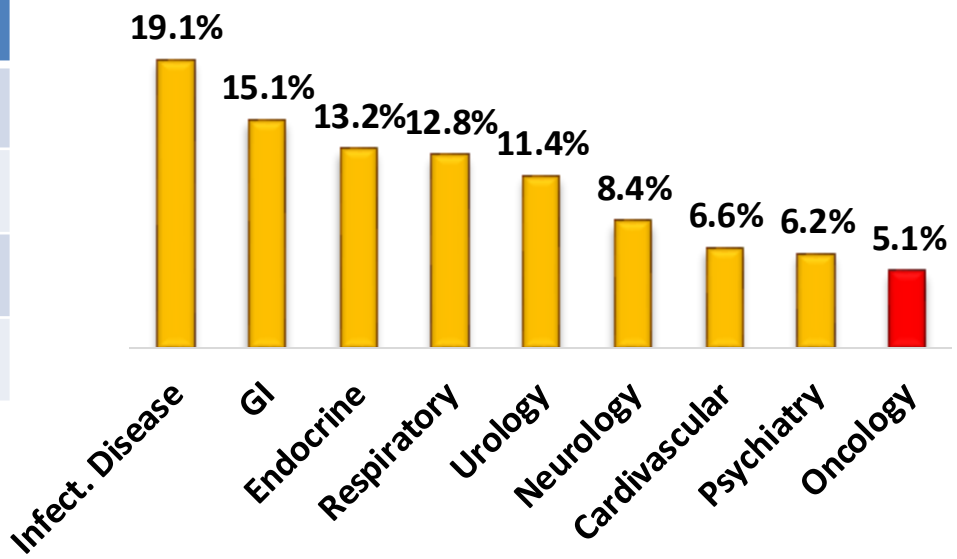
Drug Development Risk by Phase and TA

Phase Transition Probabilities

	1993 to 1998	1999 to 2004	2005 to 2013	2014 to 2021
Phase 1-2	67%	64%	58%	63%
Phase 2-3	41%	39%	34%	31%
Phase 3 – submission	63%	66%	62%	58%

Source: Tufts CSDD

Overall Probability of Achieving Regulatory Approval

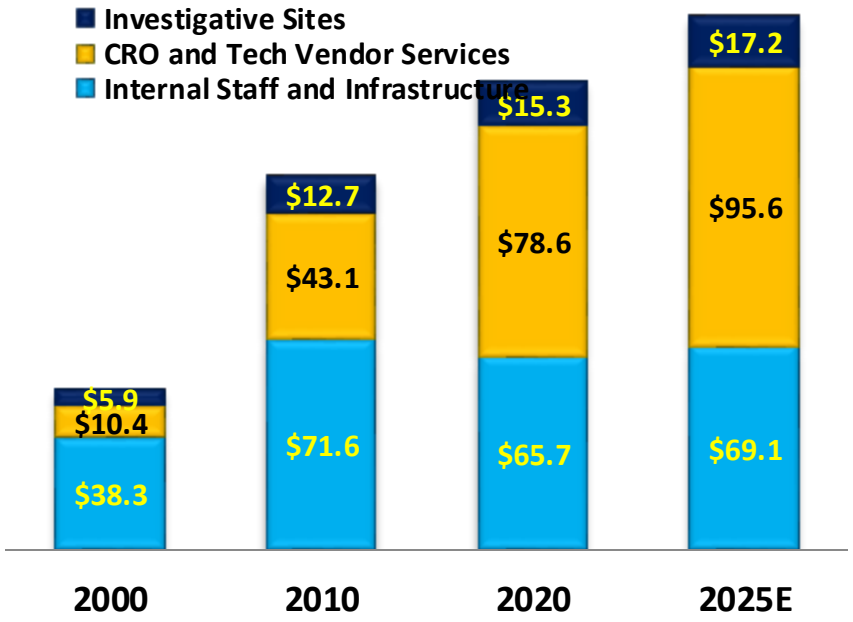


Design and Executional Customization

Protocol Design

Phase III Pivotal Trials *(Means per Protocol)*	Overall	
	2015	2025
Total Endpoints	14	18
Total Eligibility Criteria	31	35
Total Procedures	187	301
Total Countries	9	13
Total Investigative Sites	65	106
Total Patients Randomized	597	737
Total Data Volume	1.8 million	~4.9 million

Executional Fragmentation



Source: Tufts CSDD

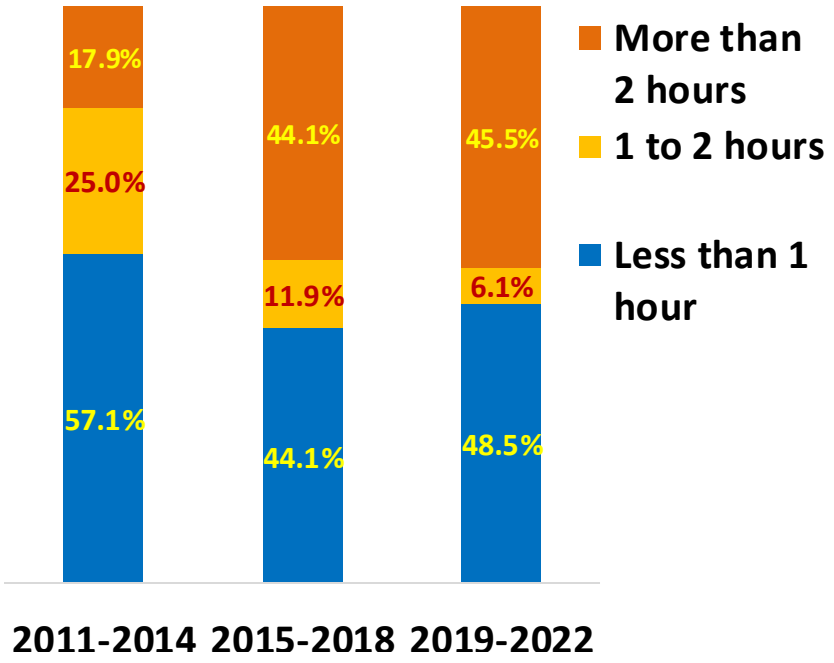
Investigative Site and Patient Participation Burden

Enrollment Effectiveness by Select Therapeutic Areas

Phase II/III Trials	Randomization Rates		Completion Rates	
	2019	2023	2019	2023
Cardio/Metabolic	84%	66%	93%	61%
CNS/Neurosciences	25%	16%	74%	66%
Inflammatory	75%	68%	81%	54%
Oncology	63%	56%	69%	22%

Source: Tufts CSDD; n= 11,000 global investigative sites

Distribution of Protocols by Average Visit Duration



Tufts Center for the Study of Drug Development
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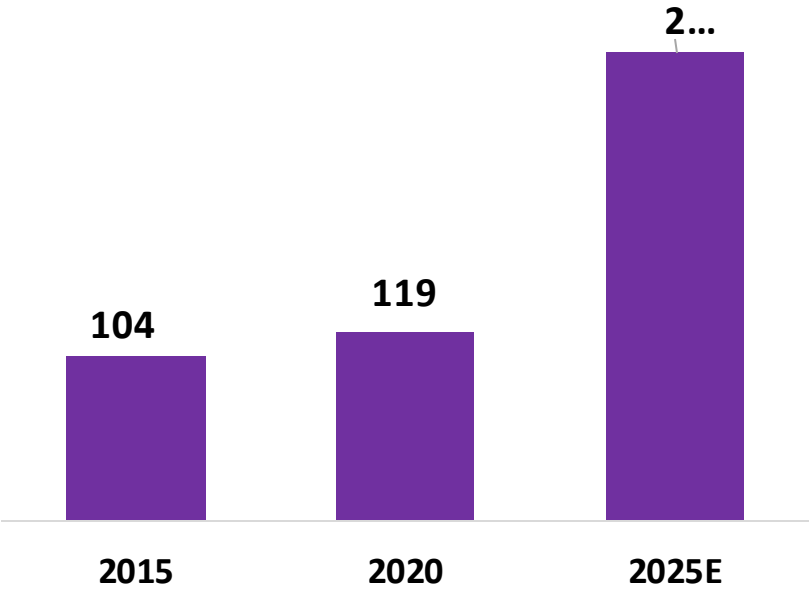
Deviations and Amendments per Protocol

Mean Deviations per Pivotal Trial



Source: Tufts CSDD

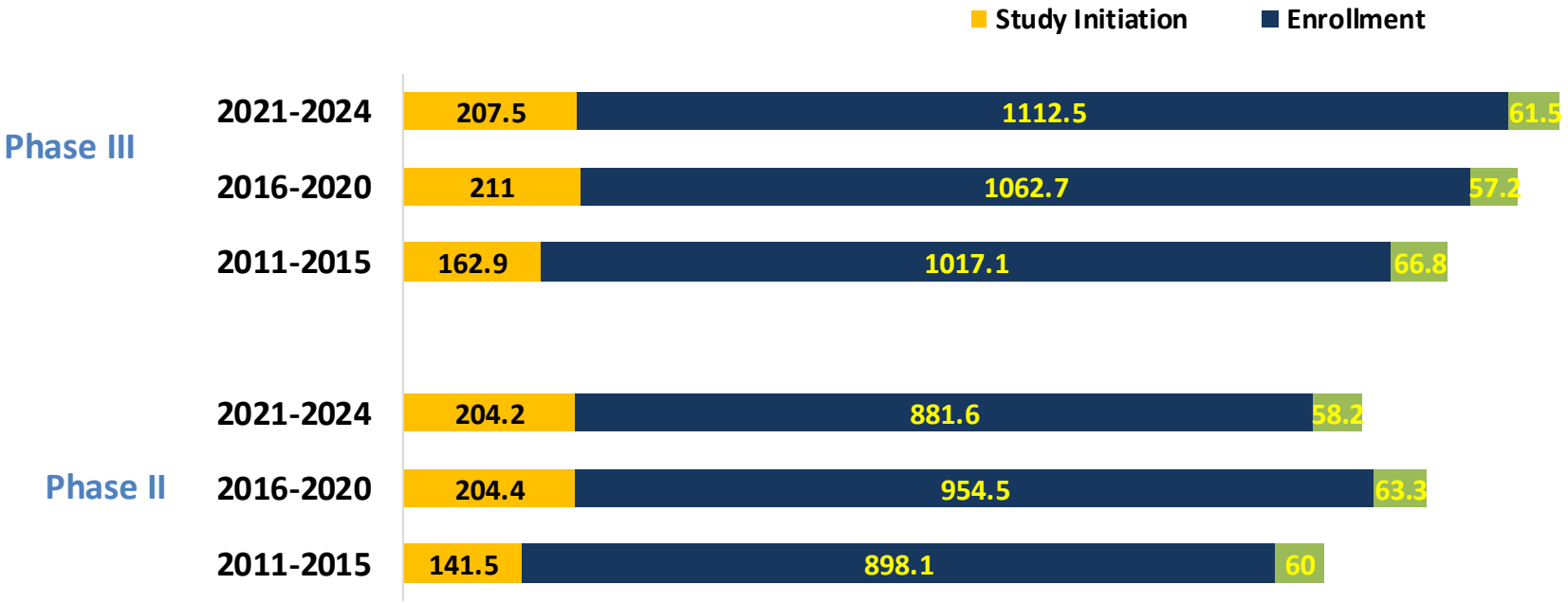
Substantial Amendments per Pivotal Trial

	2013-2015 (N=836)		2018-2021 (N=952)	
	Percent with at least 1 amendment	Mean Number	Percent with at least 1 amendment	Mean Number
Phase I	52%	1.8	67%	3.1
Phase II	77%	2.2	89%	3.3
Phase III	66%	2.3	82%	3.5

Source: Tufts CSDD 2015 and 2022 Studies

Clinical Trial Durations

Duration in business days across three time periods



Source: Tufts CSDD

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Trial Performance by Patient Community

Phase II/III Protocols *(Mean Days and Percents)*	Non-Oncology	Oncology	Rare Diseases
Total Duration (Final Protocol to DBL)	1,080.9	1,598.7	1,304.8
Study Initiation (Final Protocol to FPFV)	146.4	148.3	173.3
Enrollment Duration (FPFV – LPLV)	852.1	1,327.2	1,073.6
Close-Out Duration (LPLV – DBL)	59.9	68.5	61.4
Randomization Rate (Enrolled/Screened)	70.9%	67.1%	76.3%
Completion Rate (Completed/Enrolled)	80.0%	31.4%	48.8%

Source: Tufts CSDD, 2022

State of Clinical Trials – Where Are We Now?
A Look at the Data

Summer Starling

Sr. Project Manager; Lead, Strategic Operations

Clinical Trials Transformation Initiative

CLINICAL TRIALS TRANSFORMATION INITIATIVE

Where Are We Now? A Look at the Data

Preliminary Findings from CTTI on Measuring Trials Transformation

Summer Starling, May 22, 2025

Measurement Matters

- Lack of common understanding for common understanding of design and conduct elements across trials
- Aim is to establish baselines for metrics for vision in collaboration with others who can take it further

CTTI's Metrics Framework

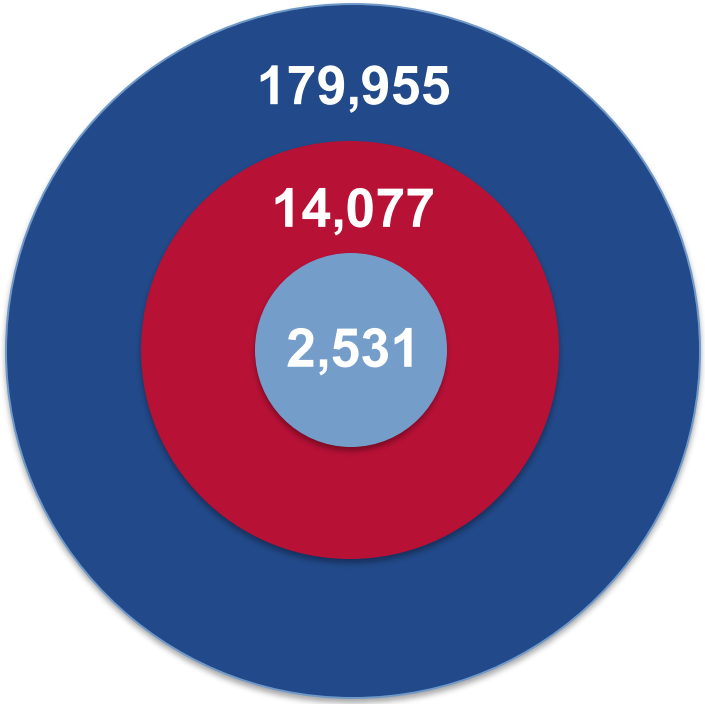
- Metrics framework consists of 57 parsimonious metrics across 19 domains of CTTI's 2030 vision
- Metrics range in temporality and ability to be measured
- Metrics first conceptualized in 2022 by CTTI executive leadership; further refined by concept elicitation interviews with subject matter experts (SMEs) (n=9) and expert opinion surveys (n=65)
- Framework finalized after 8-week public comment period, 2023

Data Sources for Assessing Metrics

For studies begun between 2018 and 2024, **179,955** interventional trials have records in ClinicalTrials.gov.

14,077 are Phase 3 interventional trials with at least 1 site in the U.S.

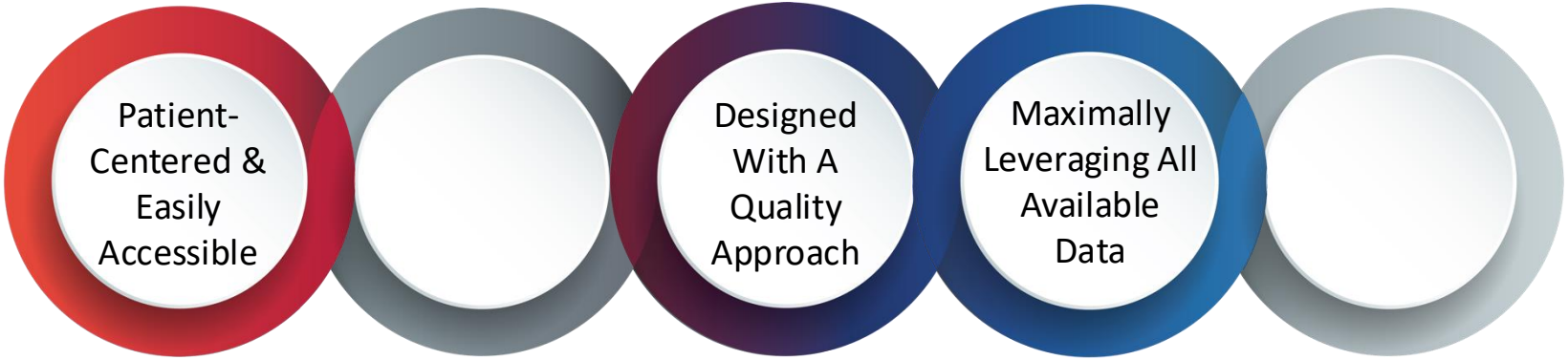
Of the 14,077 Phase 3 interventional trials (2018-2024) with records in *ClinicalTrials.gov*, **2,531** included original trial documentation with their records (n=2,531, 17.9%).



CTTI Methodologies for Individual Metrics Analysis

- Two-pronged initial analysis exploration using data sourced from the database for aggregate analysis of ClinicalTrials.gov (AACT), for Phase 3, interventional trials in the U.S. started between 2018-2024
- Cross sectional summary statistical analysis of AACT data
- Lexicon- and semantic-based approaches for interrogating original trial documents: study protocols, statistical analysis plans (SAPs), informed consent forms (ICFs), protocol amendments
- Use of large language models (LLM) to uncover contextual metrics indications in trial documents uploaded to ClinicalTrials.gov
- Key analysis partner: ClinConnect.

Patient-Centered & Easily Accessible
Fully Integrated Into Health Processes
Designed With A Quality Approach
Maximally Leveraging All Available Data
Improving Population Health



Accessibility **Innovation** **Privacy**

25.1 %

of trials indicate attempts to mitigate common enrollment burdens prior to trial initiation

Sponsors attempt to make it easier for people to get into trials

PILLAR 1
(Trials are patient-centered and easily accessible)

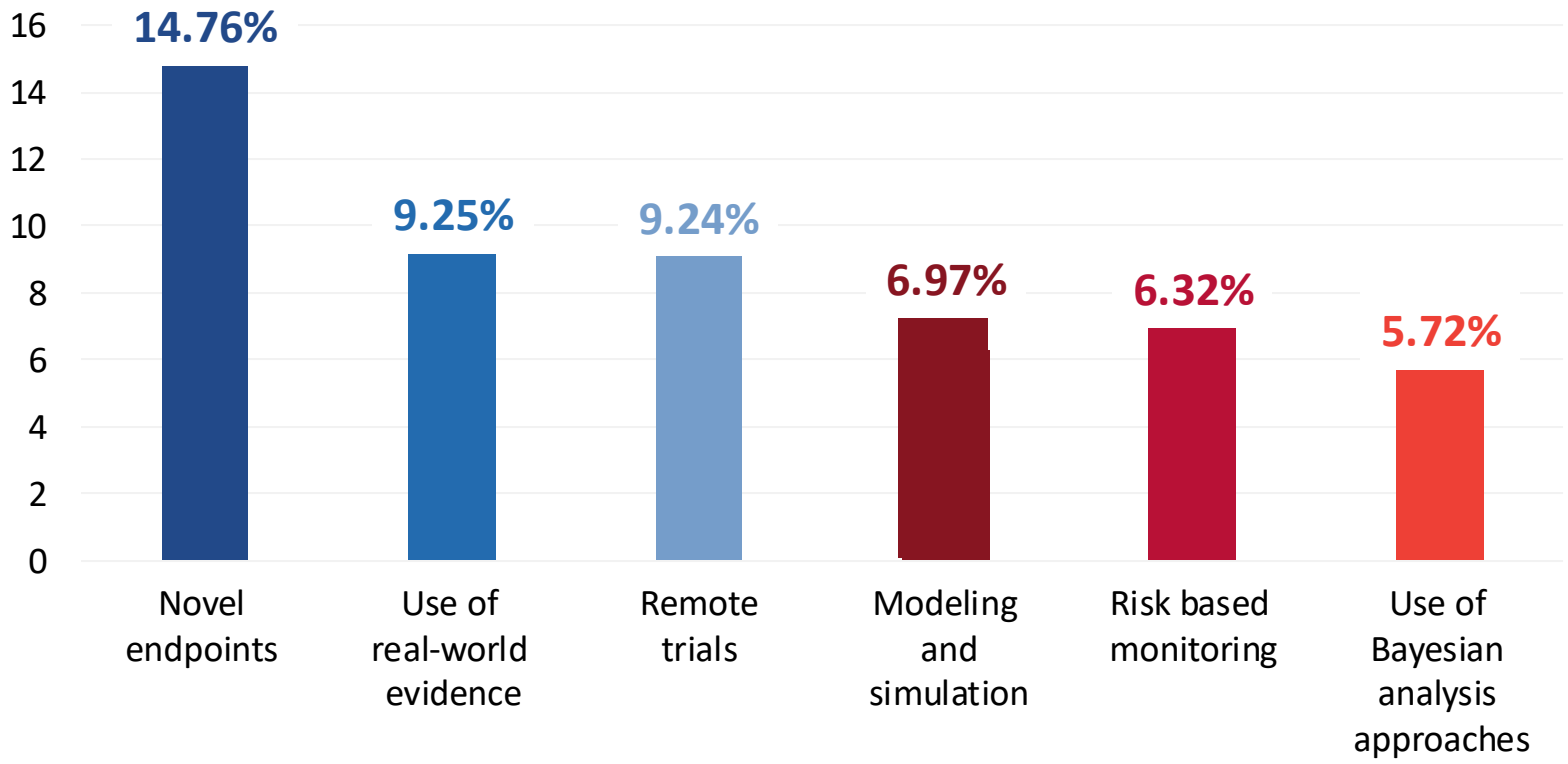
51.6 %

of trials employed innovative design or analytic techniques

Trials deploy new methods

PILLAR 3
(Trials are designed with a quality approach)

Most Common Indicators of Innovation in Documents



28.2 %

of trials report in ClinicalTrials.gov plans to share Individual Participant Data (IPD) for data re-use

The clinical trials environment supports responsible re-use of data

PILLAR 4
(Trials maximally leverage all available data)

CTTI

Multi-Partner Project Team

Team Leads

Kelly Avery (Mayo Clinic)*

Josh Fessel (Independent / Former NIH)

Executive Committee Champion

John Alexander (Duke University)

Social Science Lead

Amy Corneli (Duke University)

Collaborators

Robert Maxwell (ClinConnect)

Team Members

Carol Chapman (Crohn's & Colitis Foundation)

Catherine Cheok (Singapore Clinical Research Institute)*

Dale Gamble (Mayo Clinic)

David Rodin (Advisory, formerly Merck and Pfizer)

Ed Ramos (CareEvolution)

Elise Berliner (Cerner Enviza)

Jason Kim (Arthritis Foundation)

Jeff Brown (TriNetX)

Kristin Surdam (Independent Consultant)

Kristine McGowan (Northwell Health)*

Michelle McLeod (Arthritis Foundation)

Michelle Rowe (HCA Healthcare)*

Nuru Noor (Medical Research Council, Clinical Trials, University College London)*

Patricia Hurley (American Society of Clinical Oncology)*

Robbin Seago (HCA Healthcare)

Sabine Goldhahn (ETH Zurich)

Sara Doshi (Eli Lilly and Company)*

Sarah Plush (TransCelerate BioPharma)*

Project Manager

Summer Starling (CTTI)

Communications Lead

Hannah Faulkner (CTTI)

*former team lead or member

Looking Ahead

- Continued individual metrics and summary analysis to establish baselines
- Refine/uncover new analysis approaches
- New partnerships for metrics use

CTTI METRICS FOR MEASURING TRIALS TRANSFORMATION

See CTTI's Metrics Framework:

Pillar 1: Trials for People

Donna Cryer

Founder, Senior Advisor, & Board Member

Global Liver Institute

Pillar 2: Trials Where People Are

Ramita Tandon

Chief Clinical Trials Officer

Walgreens

Building the future of clinical trials.

We're making clinical trials more accessible and convenient in the communities we serve because each effort is not just a clinical trial—*it's hope*.

Walgreens

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Clinical trials face persistent access, recruitment and retention challenges

+75% of patients cited **structural and clinical barriers** as reasons for not participating in clinical trials[1]

67% of consumers were **less likely** to participate in a COVID-19 treatment trial if they had to **travel outside** of local area to a trial site[2]

~5% Only about 5% of the U.S. population participates in clinical trials

80% of trials **fail to meet enrollment goals** in the stated timeframes[5]

~20% **Dropout rates** among those who enroll[6]

Up to $8M potential **daily impact** to sponsors due to **suboptimal patient recruitment and retention delays**[7]

** Industry insight sources available upon request*

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The industry needs collaboration and new models

Clinical trial execution is harder than ever.

Growing demands are stretching the capacity of traditional research sites.

Investigators are navigating staffing shortages, site burden, and rising costs.

This isn't about replacing traditional sites — it's about expanding capacity, improving access, and bringing more options to the table for patients and sponsors.

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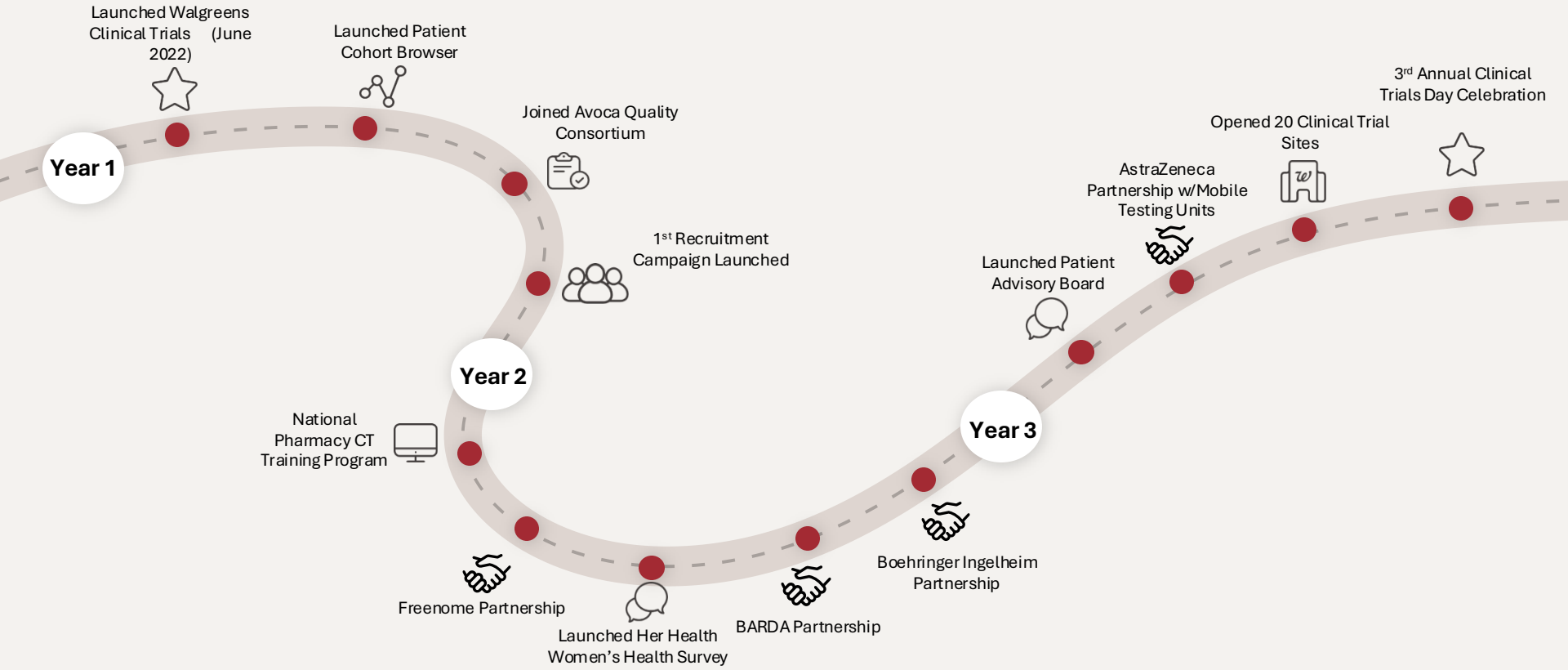
Walgreens Clinical Trials: 3 Years of Changing Clinical Research



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Community-based clinical trials are the future to bring *trials to patients faster*.

Insights-Driven Patient Recruitment

Trials to Patients

Real World Evidence & Informatics

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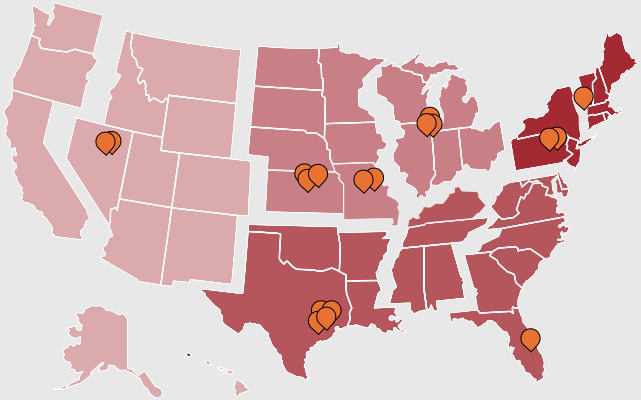
Our Most Important Partners – our In-Store Teams



Active sites across the country

There are 20 active clinical trials sites across the country and the team has the processes in place to expand as business needs arise

Amplifying our pharmacists' trust and relationships

"Clinical trials and Retail pharmacy were never in the same sentence when I was in pharmacy school. Joining these two worlds not only makes perfect sense for a broader reach but also, it's a testament to the ever-changing world of healthcare and its possibilities."

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Thank you!

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Pillar 3: Balancing Quality and Efficiency

Rob Califf

Instructor of Medicine

Duke University School of Medicine

Pillar 4: Balancing Privacy and Data Access/Use

Brad Hirsch

Cofounder

Highlander Health

Pillar 5: Aligning Incentives Around Evidence

Esther Krofah

Executive Vice President of Health

Milken Institute

State of Policy for Aligning Incentives for Improving Population Health

Shared understanding of **broad population health challenges:** U.S. spends the most of peer OECD countries on health and experiences the poorest health outcomes on average

Fiscal and policy uncertainties risk U.S. leadership in biomedical innovation

Current policy environment risks **exacerbating health disparities**

Researchers/sponsors have been working on more **"patient-centric" trials** for a decade, but it has primarily resulted in trials that are **more complex and require higher effort**

State of Clinical Trials

The term **“diversity” encompasses more than race and ethnicity** - it includes geography, language, sex, gender identity, sexual orientation, ability, income, education level, etc. Avoiding the word "diversity" can undermine broader efforts to reach underrepresented, marginalized and underserved communities across the entire health ecosystem.

Community serving organizations are confused, beginning to feel abandoned, and are questioning the commitment of the research establishment. **Frequent** and **honest communication, transparency** and **consistency can preserve trust** during uncertain times.

High turnover across government levels is **disrupting continuity in public health and research efforts** - not only through rescinded funding ("hard" implications) but also via "soft" consequences such as the loss of institutional knowledge.

MILKEN INSTITUTE

Lessons Learned: COVID-19

- **Coordinate research efforts**
- **Make it easier to participate**
- **Build trust**
- **Integrate research into care**

MILKEN INSTITUTE

The Role of the Private Sector in this Current Climate

- Private sector demonstrates sustained commitment to **Diversity Action Plans** and embedding equity in drug development
- Global biopharmaceutical companies are proactively aligning their strategies to anticipate future **international guidance**

- Leadership's role in **sustaining momentum** around diversity in clinical trials
- Regulatory uncertainty does not mean the "**science changes**"
- Cross-sector **collaboration**

Workshops

Catalyzing Change

Moderators

Stacey Adam

Barbara Bierer

Nakela Cook

John Alexander

Chris Boone

Khair ElZarrad

Ella Balasa

Rachael Fleurence

Moderators (cont.)

Martin Landray

Carla Rodriguez-Watson

Allison Shimooka

Michelle McMurry-Heath

Azizi Seixas

Stephen Pyke

Megan O'Neil

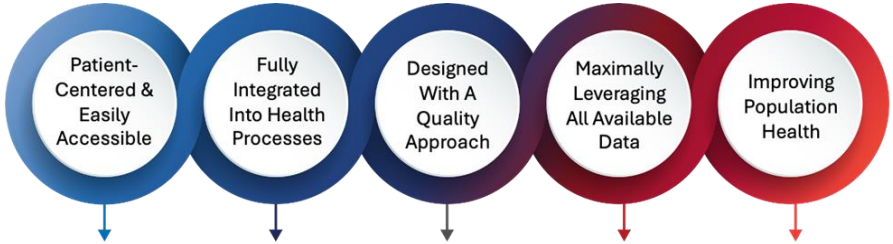
Pam Tenaerts

Workshop Group Assignment

- **7 Break Out Groups** designated by colored dots on back of your name tag:
  - Pillar 1 = red — Meeting Room 2 with Pam and Ella
  - Pillar 2 = orange — Meeting Room 8 with John and Allison
  - Pillar 3 = yellow — Meeting Room 3 with Martin, Khair, and Stacey
  - Pillar 4 = green — Meeting Room 11 with Chris and Stephen
  - Pillar 5 = blue — Meeting Room 4 with Barbara, Carla, and Nakela
  - Pillar 1 = purple — Meeting Room 9 Room with Michelle and Megan
  - Pillar 4 = pink — Meeting Room 10 with Azizi and Rachael
- Duration = 75 minutes (pre-lunch) and 75 minutes (post-lunch)

Workshop Part 1

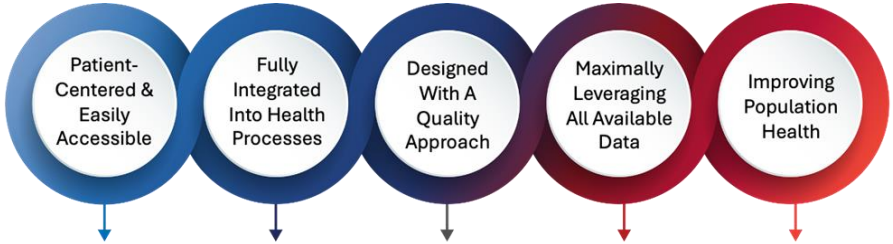
- **Scoping the Issue (11:00am-12:15pm)**
- Objectives:
  - Define the core issue(s)
  - Discuss why efforts to address the core issue have been unsuccessful
  - Note incentives, interdependencies and business model considerations



A critical part of the Evidence Generating System

Workshop Part 2

- **Charting the path forward (1:00-2:15pm)**
- Objectives:
  - Identify solutions and the critical players to address the core issue(s)
  - Determine key leaders and collaborators
  - Identify success metrics



A critical part of the Evidence Generating System

Workshop Guidelines

- Engage openly with respect and collaboration
- Groups are pre-assigned to ensure diverse perspectives
- Use name tents—tip up when ready to speak
- Each group includes a CTTI notetaker
- Audio will be recorded for notetaking and transcribed (de-identified)
- Recordings will be securely stored, then deleted

Social Media Sharing

Share Your CTTI Experience on Social Media!
We encourage you to share your involvement with CTTI—just be mindful of what you post.

- ✅ **Please Share:**
  - Photos of yourself at CTTI meetings/events
  - Group photos—with permission from those pictured
  - Your role or participation in CTTI projects
- 🚫 **Please Avoid Sharing:**
  - Sensitive content (e.g., private meetings, presentation slides, confidential discussions)
- 📲 **Tag us at #CTTI so we can re-share your posts!**
  - **X/Twitter:** @CTTI_Trials
  - **LinkedIn:** Clinical Trials Transformation Initiative
  - **BlueSky**: ctti-trials.bsky.social

Ella Balasa • 2nd
Patient Expert & Founder @ BalasaConsulting | Speaker | Patient engagement con...
7mo •

Attended my first Clinical Trials Transformation Initiative (CTTI) Steering Committee meeting as the newest patient representative member this week.

The biggest takeaway I had was the need for multi stakeholder collaboration, bidirectional communication, and the development of frameworks to exchange best practices and case studies that prioritize efficiency, shorten timelines, and increase flexibility for sites, sponsors, regulatory, and patients.

A future with robust #diversity action plans is essential—and not just in the planning but for execution. Collating insights on trial sites practices for effective #recruitment allows for shared learning and resource optimization. Developing #masterprotocols that support the inclusion of a much greater patient population is needed. Appraising trials on various metrics, can save costs for the industry while enhancing #patientoutcomes.

Together, we must drive meaningful change in clinical research! #ClinicalTrials #CTTI #DiversityInResearch #patientengagement

Ed Ramos Lindsay Kehoe Summer Starling, DrPH, MPH Lynne Quittell

Example of a great social media post

Sustaining Excellence in the Trial Enterprise

Moderator:
Morgan Hanger

Executive Director

CTTI

Stacey Adam

Vice President

Foundation for the National Institutes of Health

Chris Boone

Group Vice President of Life Sciences Research Services

Oracle

Tala Fakhouri

Associate Director for Data Science and Artificial Intelligence Policy

FDA

Susan Landis

Executive Director

Association of Clinical Research Professionals

Closing Remarks

Morgan Hanger

Executive Director

Clinical Trials Transformation Initiative

Reflections from Today's Discussions

- Relevance of CTTI's vision
- Perceptions of risks and challenges
- Clear sense of opportunity and urgency

Workshop Highlights

What’s Ahead

- Full summary for attendees
- Executive summary to share broadly
- Reach out to us!

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THANK YOU

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