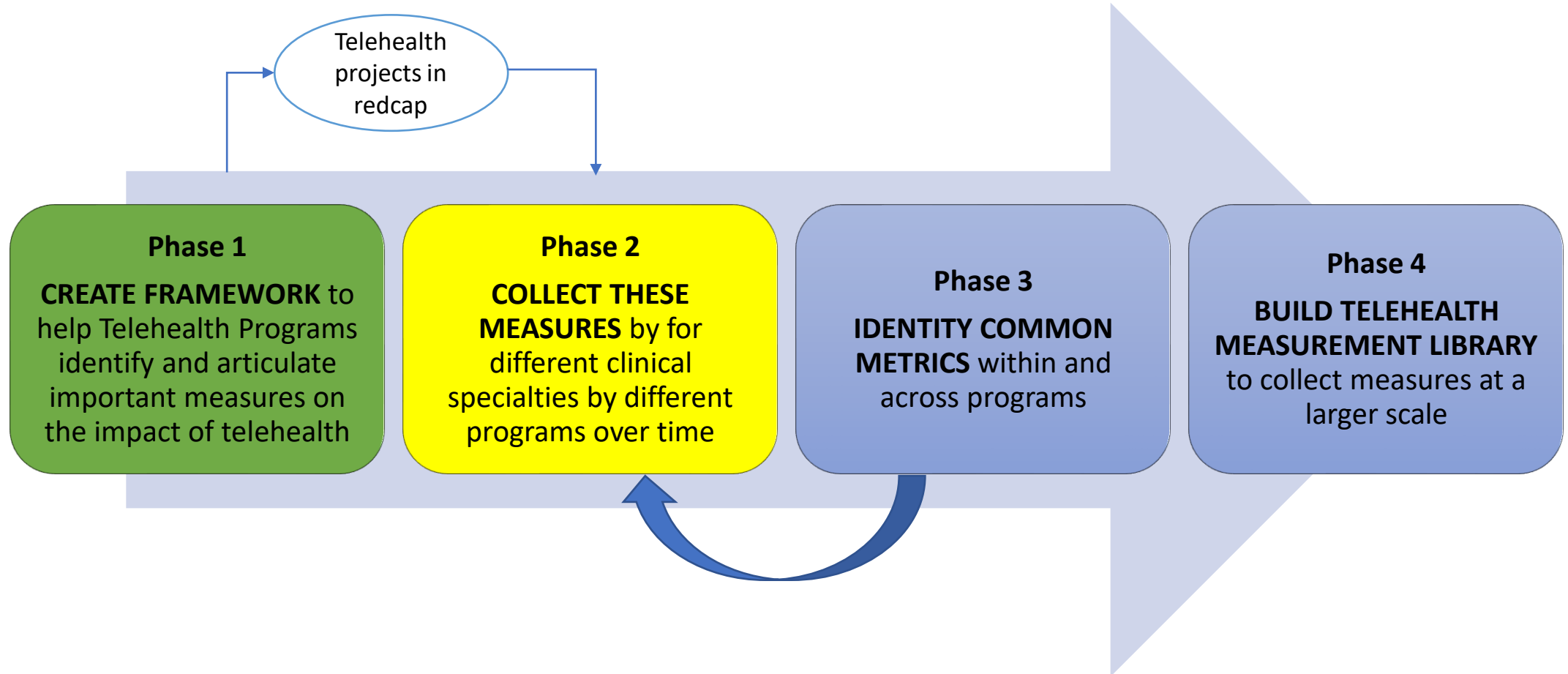# STEM Framework
STEM QI Framework
RE-AIM

Workshop Supplements + Crosswalk with RE-AIM
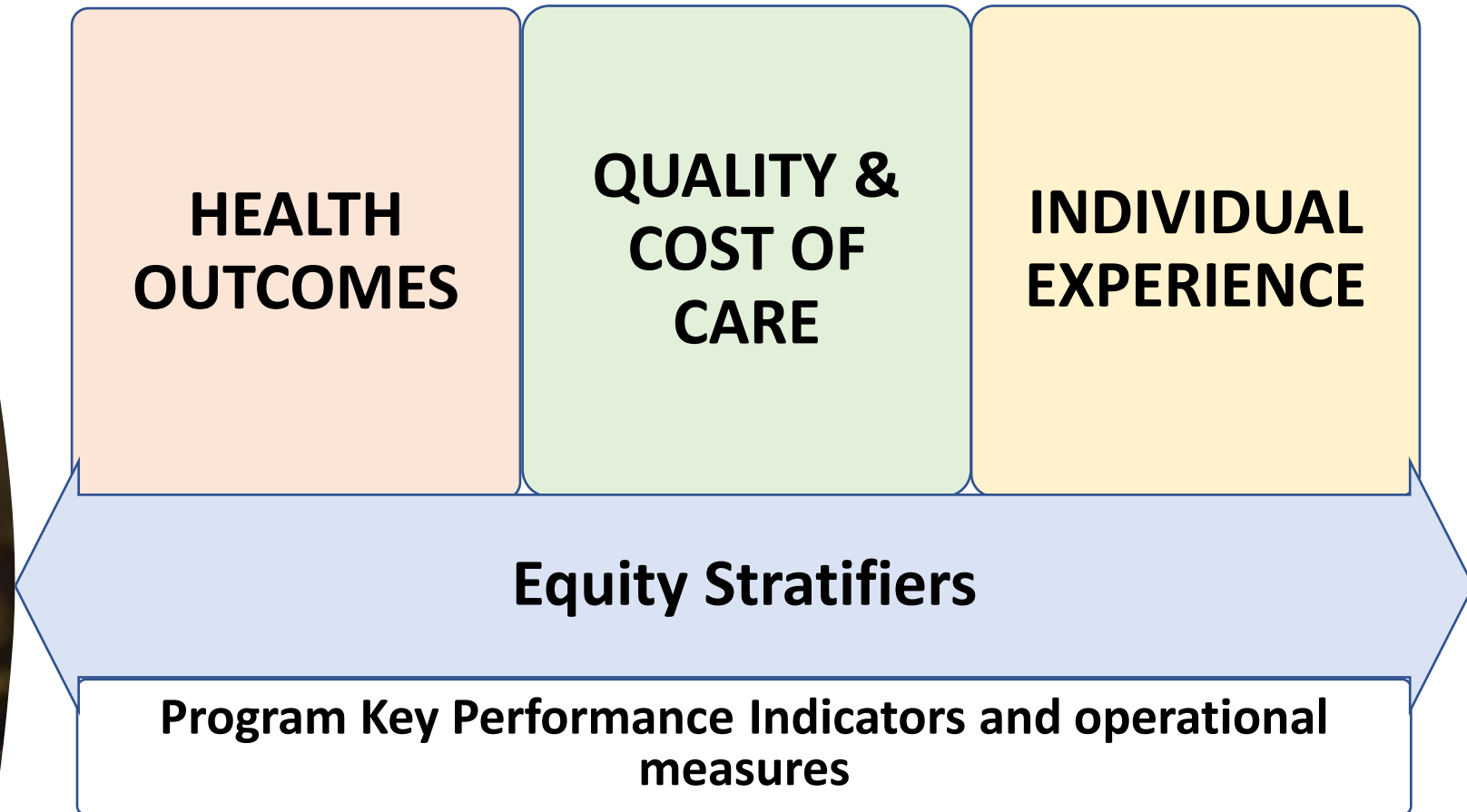
NCATS award measurement framework aims:
Implementing the STEM Framework in four phases

Telehealth projects in redcap

Phase 1

CREATE FRAMEWORK to help Telehealth Programs identify and articulate important measures on the impact of telehealth

Phase 2

COLLECT THESE MEASURES by for different clinical specialties by different programs over time

Phase 3

IDENTITY COMMON METRICS within and across programs

Phase 4

BUILD TELEHEALTH MEASUREMENT LIBRARY to collect measures at a larger scale

What is the STEM Framework?

STEM Framework for evaluating Telehealth Interventions

HEALTH OUTCOMES

QUALITY & COST OF CARE

INDIVIDUAL EXPERIENCE

Equity Stratifiers

Program Key Performance Indicators and operational measures

Chuo J, Macy ML, Lorch SA. Strategies for Evaluating Telehealth. Pediatrics. 2020 Nov;146(5):e20201781. doi: 10.1542/peds.2020-1781. Epub 2020 Aug 18. PMID: 32817398; PMCID: PMC7887706.

Chuo J, Chandler A, Lorch S. Evaluating Neonatal Telehealth Programs Using the STEM Framework. Semin Perinatol. 2021 Aug;45(5):151429. doi: 10.1016/j.semperi.2021.151429. Epub 2021 Apr 5. PMID: 33994012; PMCID: PMC8693890.

© SPROUT

DOMAIN 1: Health Outcomes

Operational Definition: Measurement of a Medical Condition that directly affects the length or quality of a person's life

These measures answer "so what, who cares?" and often represent the physical and mental health of a person or population

Many already exist in:

National Quality Committees

Academic Networks

Population Health work

Patient reported outcomes

Examples:
Mortality rate
Disease morbidity measures
Disease or condition specific measures
Functionality measures (i.e. QOL)
Some HEDIS measures (NCQA)
Some Patient reported outcomes (i.e., PAM)

Domain 2: Quality and Cost of Delivering the Care

Operational Definition: Metrics that ***describe the healthcare that is being delivered*** by practitioners, hospitals, and health systems. These are often process measures that ultimately impact health outcomes. These measures may belong in the National Academy of Medicine's quality domains (timeliness, effectiveness, safety, efficiency/cost), as well as diagnostic accuracy and other characteristics of the technology being used.

Does telehealth increase, decrease, or do not change:

1) **Effective:** adherence to best or consensus guided practices to all who can benefit (avoid underuse), and/or reduce the provision of services to those not likely to benefit (avoiding misuse).
    1) Adherence to care plans or discharge instructions
    2) Adherence to evidence-based guidelines
    3) Compliance with medication regimen
    4) Antibiotic prescribing rates

2) **Timely:** wait time and potentially harmful delays for those who receive and those who give care.
    1) Wait time to be seen by provider (i.e., primary care, mental health care)
    2) Wait time to be seen by a subspecialist or health consultant
    3) Wait time for a diagnostic procedure or test

Domain 2: Quality and Cost of Delivering the Care

3) **Efficient/cost:** Avoidable health utilization, including waste/cost of care, equipment, supplies, staff, ideas, $ and energy.
   1) Avoidable Readmission rates or ED visits
   2) # of appointments needed for the same condition
   3) Cost of care (equipment and supplies, $, staffing FTE)
   4) Burnout factors

4) **Safety:** harm to patients from the care that is intended to help them.
   1) Adverse event rate
   2) Serious harm
   3) Near misses
   4) Diagnostic errors / mis-diagnoses

5) **Diagnostic Accuracy**: Quality of the media and/or diagnostic method (device and/or operator) that would impact the accuracy of the diagnostic result
   1) Video, image, sound quality
   2) Ability to detect health conditions
   3) Accuracy of various device that make be used in telemedicine

6) **Technology Characteristics**
   1) Connectivity / broadband / bandwidth
   2) System reliability over time

Domain 3: The Individual's Experience

> **Operational Definition**: The personal experience of patient(s) and/or provider(s) when they are using the system. System covers not only the technology, but also its operators and the workflows they follow in order to do the job

1. **Feasibility** – capability of being done successfully in a controlled / test setting

2. **Usability-** quality of a user's experience (i.e., ease of use) when interacting with the system. Degree to which something can be used in "real life"

3. **Acceptability -** degree of being tolerated or allowed, willingness to change for it, suitability, adequacy, appropriateness, adaptability

4. **Patient centeredness-** provision of care that is respectful of, and responsive to, individual patient preferences, needs, values, and ensuring that patient values guide all clinical decisions

5. **Recommendablity** – Net Promoter Score with care, providers, technology

6. **Satisfaction** with care, patient, providers, technology

7. **Workload** burden – subjective measure of "burdensomeness" in using the system

Domain 4: Equity Stratifiers

Operational Definition:

Variables used to subdivide patient cohorts in order to detect and/or monitor for disparities in healthcare delivery, health outcomes, and the individual experience

Example:

- Race
- Ethnicity
- Gender
- Age
- Gender Identity
- Language
- Disabilities
- Social Determinants of Health
- Housing access
- Food insecurities
- Income
- Access to broadband and technology

Domain 5: Program KPI and Operations

Operational Definition: Measurements of a program's success according to enterprise/institutional targets. These can be taken from measures from domains 1, 2, 3 OR other measures of the system's performance reliability, change burden to the system or organization. They can also be measured used for benchmarking across and amongst organizations

Example:

# of safety issues (from domain 2)
Readmissions, ED visits (from domain 2)
Wait time for appointment (from domain 2)
Blood pressure monitoring, HgA1c measures (domain 1)
Logistics: # of tele-visits, # and type of technical issues
System cost: Staffing requirements and implementation cost,
Benchmarks: with other programs

Using STEM in a QI project

Linking QI SMART Aims to Telehealth interventions

Step 1:
Identify the health outcome: Improved Vanderbilt Assessment Scale (follow up version)

Step 3:
Identify Key Drivers: (does not need to be telehealth drivers)

Step 4:
Identify Telehealth Interventions to support drivers

Step 2:
Identify Healthcare Delivery measure:

Increase 30 day Follow up rate for children with ADHD after starting medication from 40% to 50% *(Effectiveness)*

KEY DRIVERS FOR SUCCESS

Robust knowledge dissemination on best practices for ADHD

High quality, efficient Patient-Provider Encounters

Parental understanding / buy in to treatment plan

Address disparities / equity issues

TELEMEDICINE INTERVENTION TO SUPPORT KEY DRIVERS

Tele-Education

Using virtual meeting tools to derive consensus

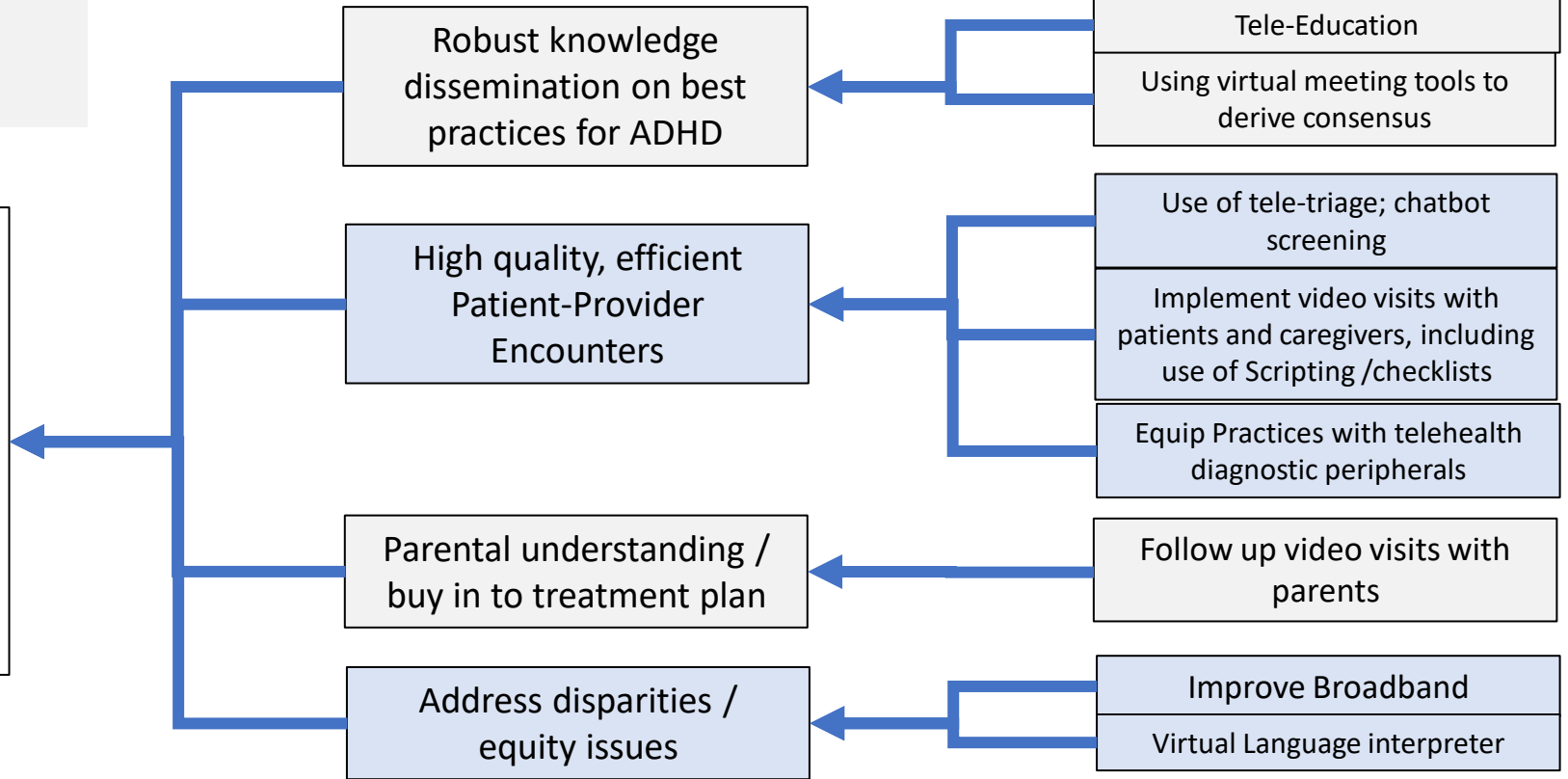Use of tele-triage; chatbot screening

Implement video visits with patients and caregivers, including use of Scripting /checklists

Equip Practices with telehealth diagnostic peripherals

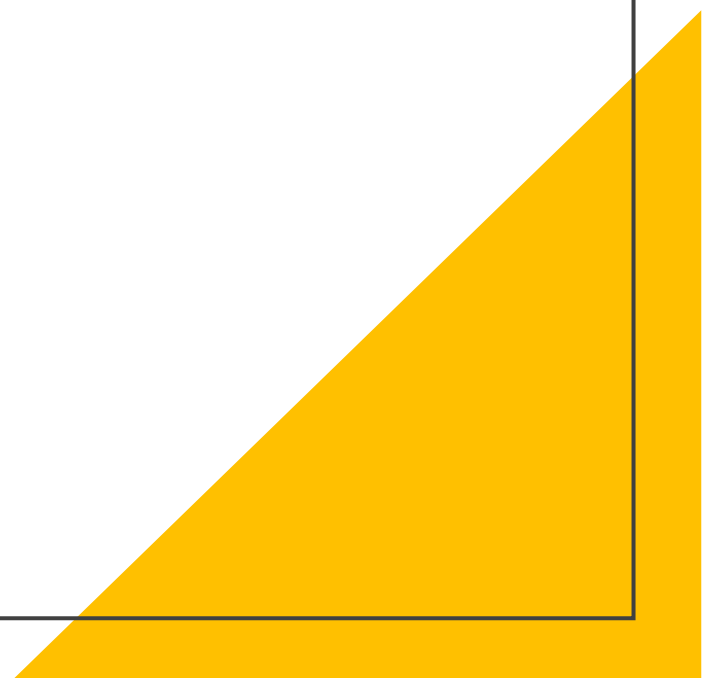Follow up video visits with parents

Improve Broadband

Virtual Language interpreter

Crosswalk with RE-AIM

Linking QI SMART Aims to Telehealth interventions

STEM domains		RE-AIM components
Health Outcome	Measure of a medical condition that affects quality and length of life	
Quality and Cost of Healthcare Delivery	Effectiveness	**Effectiveness/Efficacy** (impact of intervention on important outcomes such as health, quality of life and economy). In essence, looking at ratio of benefit over cost ('Value') from perspective of stakeholders groups – patient, provider, health system, policy makers, and payers.
	Timely	
	Efficient/Cost	
	Safety	
	Diagnostic Accuracy	
	Technology characteristics	
Individual Experience	Feasibility	**Adoption/Implementation/Maintenance** – *While effectiveness and efficacy are critical, they are not enough for adoption.* The individual experience is a significant adoption driver. It is entirely possible for an intervention can be feasible and usable, but not readily accepted as the "new way of doing things." – the understanding of micro, meso, and macro level system barriers and affordances is key to successful implementation, adoption, sustainment and spread.
	Usability	
	Acceptability	
	Patient-Centeredness	
	Recommendation	
	Satisfaction	
	Workload burden	
Equity Stratifiers	RAcE, SDOH, SVI, COI, etc	**Reach** – are all members in the target population getting equitable healthcare? How do we know? Using equity stratifiers in control charts over time can detect gaps and monitor progress as interventions are enacted to mitigate these gaps.