

Clinical research for  
evidence-based care



Steve

Combining multiple  
data sources



Rebecca

Data collection in  
clinical practice



Heiko

Identification  
of individuals



Patricia

Biometrics

Workflow integration

Controlled vocabularies

# What Are the Benefits of Capturing Clinical Data

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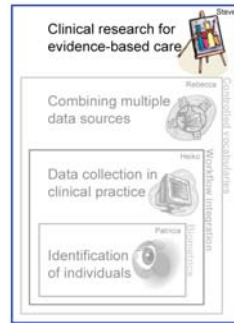
Informatics and Public Health Symposium

American Association of Public Health Dentistry



University of Pittsburgh

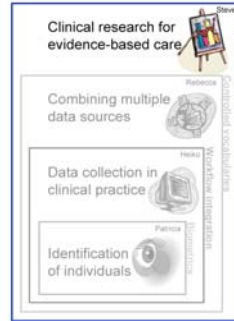
# Abstract



Clinical research is often conceptualized as clinical trials and the most common source of information used to establish evidence-based guidelines. While a powerful means for establishing therapeutic efficacy, clinical trials are not well designed to explore effectiveness when therapies move into routine and widespread use. Clinical data captured during the provision of routine care (Phase IV studies) can be an important source of information on effectiveness and improve the quality of the evidence used to recommend particularly clinical practices. This presentation will explore how establishing efficacy and effectiveness are both necessary prerequisites for evidence-based care.

# What have we learned thus far?

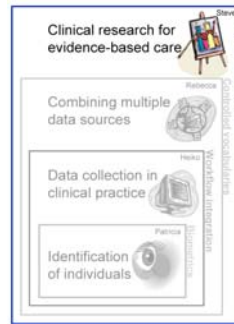
- Systems for historic data using biometrics
- Capture of routine clinical data



# How do we incorporate this into clinical trial designs?

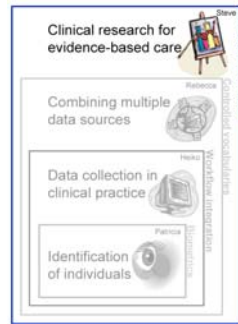
# What is an Efficacy Trial?

- Randomized Clinical Trial
- Often referred to as a Phase III trial
- Interested in the true biologic effect of a treatment
- Describes the benefits generated by a treatment administered under ideal condition.

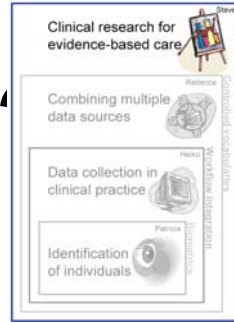


# General Characteristics of an Efficacy Trial

- Strict inclusion/exclusion criteria
- Strict control of the delivery of the treatment
- Homogenous population
- Tests a specific biologic question
- Collect a large amount of detailed and complex data



# What is an Effectiveness Trial

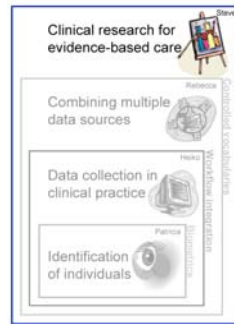


- Randomized Clinical Trial
- Assess the benefit of treatments that are realized under clinical conditions that reflect usual circumstances under which medical care is provided

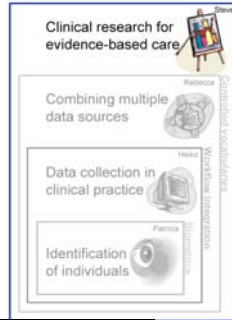


# General Characteristics of an Effectiveness Trial

- Broad inclusion/exclusion criteria
- No or limited control of the delivery of the treatment
- Heterogeneous population
- Assesses effectiveness
- Collect a relatively small amount of data

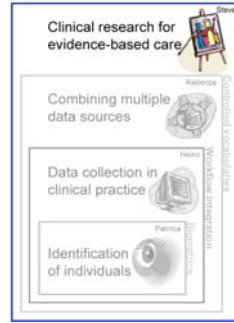


# Differences Between Effectiveness and Efficacy Trials



Characteristic	Efficacy	Effectiveness
Purpose	Test a biological question	Assess effectiveness
Size	“Small”	“Large”
Cost	“Moderate”	“Large”
Cohort	Homogenous	Heterogeneous
Treatment	Control	No or limited control
Data	Complex and detailed	Simple
Eligibility	Strict	Relaxed

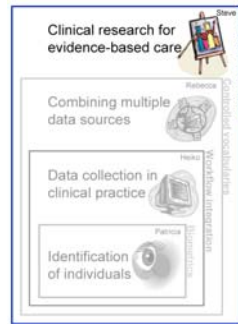
# Problems



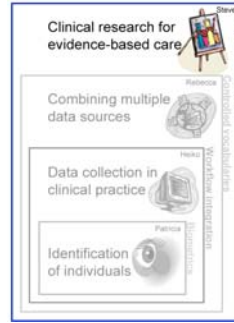
- Efficacy: Due to the strict inclusion and exclusion criteria, are the results generalizable to the entire “at risk” population?
- Effectiveness: Because of the lack of control of the delivery of the treatment, is the actual treatment being tested as it was intended to be delivered?

# Solution to the Problem: The Hybrid Design

- Basic Idea: Combine the rigor of treatment delivery of the efficacy trial with the generalizable population of the effectiveness trial.
- By combining these two characteristics, a trial can be conducted that tests the effectiveness of a treatment, as it was intended to be delivered.

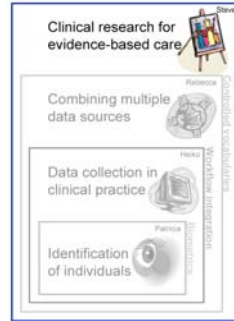


# Example of a Hybrid Design



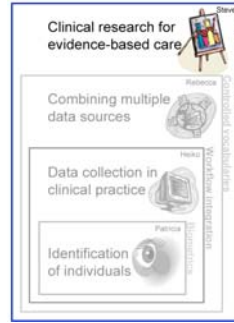
- The Sequenced Treatment Alternatives to Relieve Depression (STAR\*D).
- Funded by the National Institutes of Mental Health
- Goal of STAR\*D: To identify the most effective next-step treatment for patients with an inadequate response to prior treatments.

# Basic Problem of Depression Efficacy Trial



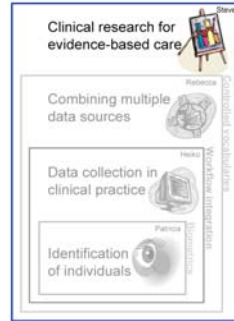
- Patients generally recruited from academic institutions.
- May sponsored by the pharmaceutical industry to compare a new treatment vs. placebo.
- Populations exclude those with general medical and psychiatric comorbidities.

# The STAR\*D Solution



- Increase the generalizability of the sample by not excluding patients with general medical and psychiatric comorbidities.
- Provide care at non-academic settings, both primary care and specialty (psychiatry) care.

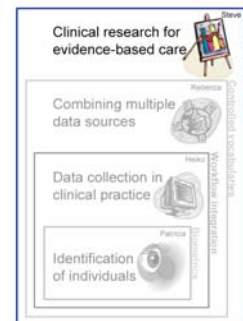
# The STAR\*D Solution



- Provide physicians, both family practice and psychiatrists, with a detailed treatment algorithm based on:
  - Time in treatment
  - Severity of Depression
  - Presence of Side Effects



# STAR\*D Treatment Algorithm



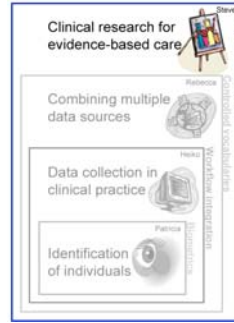
CDP, Week 6

STAR\*D Level 1

*Symptom Improvement (SEs tolerable):*

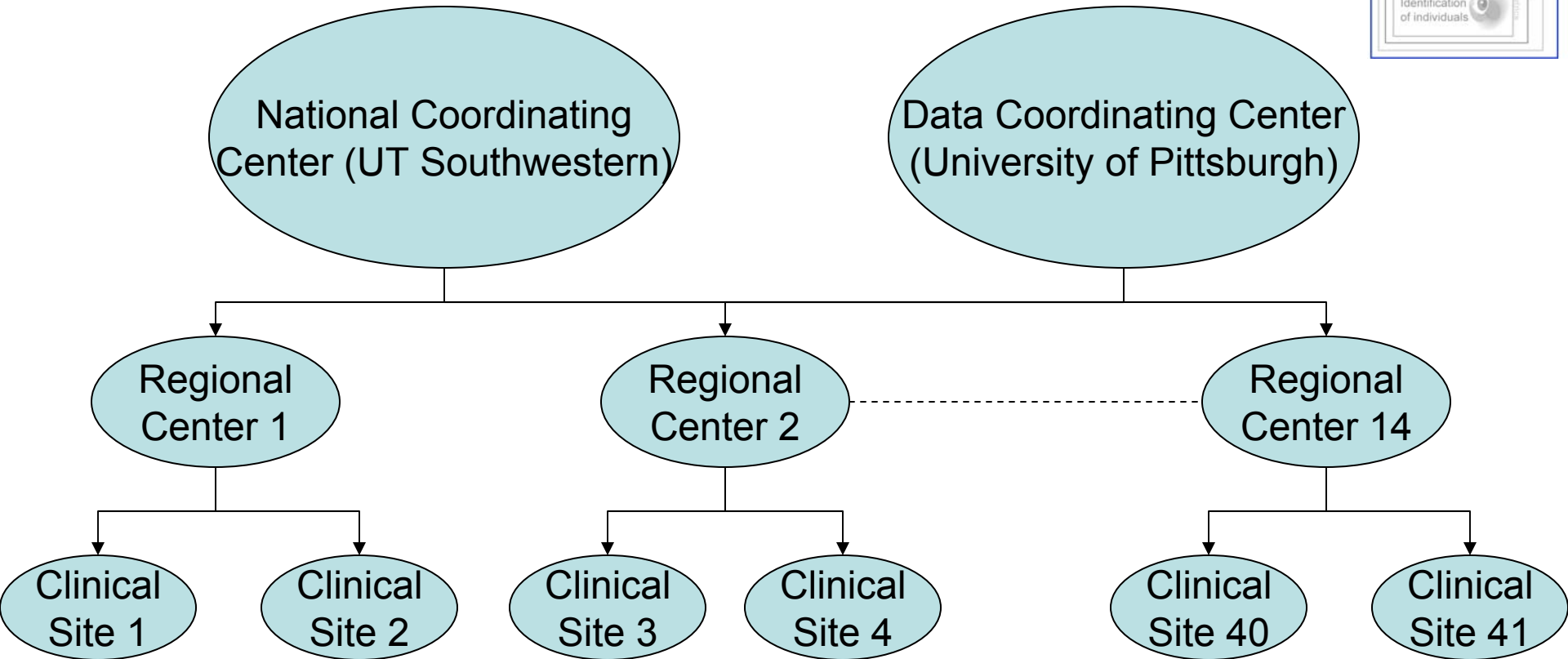
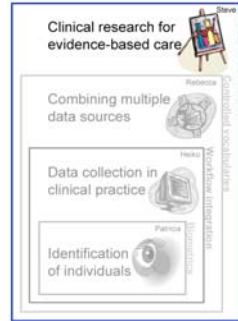
QIDS-C <sub>16</sub> ≥ 9	<ul style="list-style-type: none"> <li>Increase dose to 60 mg/day.</li> </ul>
QIDS-C <sub>16</sub> = 6-8	Increase dose to 60mg/day, <i>or</i> Continue current dose.
QIDS-C <sub>16</sub> ≤ 5	Continue current dose.
<i>Improved, but SEs are intolerable</i>	Continue current dose and address SEs, <i>or</i> Decrease dose and continue for 2 additional weeks, <i>or</i> Go to the next level.
<i>Not improved and SEs are intolerable</i>	Go to the next level.
Return to clinic:	Return in 3 weeks.

# The STAR\*D Solution



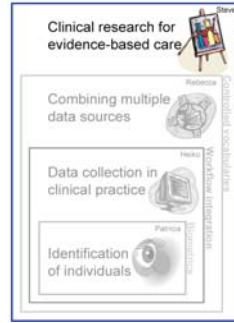
- Provide physicians, both family practice and psychiatrists, with a detailed treatment algorithm based on:
  - Time in treatment
  - Severity of Depression
  - Presence of Side Effects
- Monitor the care delivered by physicians
  - Decentralized overview system

# STAR\*D Organization



STAR\*D consisted of 14 Regional Centers, each with 2 to Clinical Sites, for a total of 41 Clinical Sites

# The STAR\*D Solution



- Provide physicians, both family practice and psychiatrists, with a detailed treatment algorithm based on:
  - Time in treatment
  - Severity of Depression
  - Presence of Side Effects
- Monitor the care delivered by physicians
  - Decentralized overview system
  - Web-based monitoring of adherence to treatment algorithm

# STAR\*D Web-based Reporting

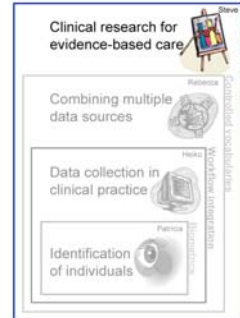


## STAR\*D Clinical Monitoring Report: All Patients

Dates with \* were ad hoc visits

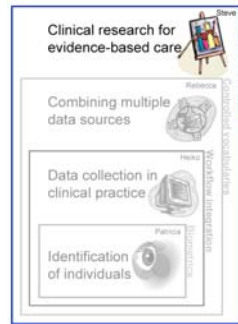
Clinic X

Patient ID	Level	Week	Visit	Clinician	QIDS-C	GRSEB	Flag	Rx 1	Rx 2	Rx 3	Rx 4	Rx 5
3501018DON	1	0	04/04/02		17		OK	CIT 20 (03/28)				
3501018DON	1	2	04/22/02		17	0	OK	CIT 40				
3501018DON	1	4	05/06/02		17	0	Dose too high	CIT 60				
3501018DON	1	6	05/21/02		16	0	OK	CIT 60				
3501018DON	1	9	06/11/02		10	0	Continued tx	CIT 60				
3501018DON	1	12	06/26/02		7	0	Continued tx	CIT 60				
3501018DON	1	14	07/17/02		5	0	OK	CIT 60				
3501052BOW	1	0	11/04/02		20		OK	CIT 20 (11/01)				
3501052BOW	1	2	11/15/02		20	0	OK	CIT 40				
3501052BOW	1	4	12/02/02		19	0	Dose too high	CIT 60				
3501052BOW	1	6	12/13/02		11	0	OK	CIT 60				
3501052BOW	1	12	01/31/03		0	0	OK	CIT 60				

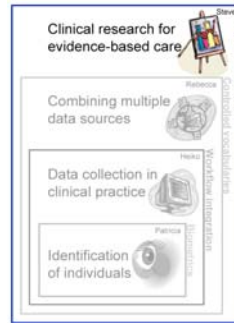


# Was STAR\*D Successful

- Was able to enroll 4,041 patients with depression
- The largest study of depression ever conducted.
- High quality care was delivered.
- Patients were generalizable in that, on average a patient had 3 general medical comorbidities and 65% at least one psychiatric comorbidity

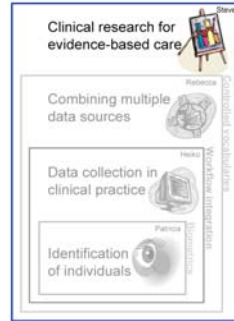


# Data Collection Issues in STAR\*D



- Because collecting data in non-research based settings, there are issues with data collection:
  - Clinicians:
    - Trained in data collection
    - Time for data collection
    - Burden of data collection
  - Patients:
    - No anticipating participating in a study when first approached, so may not have time
  - Must have space in these non-research based settings to collect data
  - Try to integrate as much as possible with existing clinic structure.
  - Need timely data entry for monitoring of reports

# Data Collection in STAR\*D

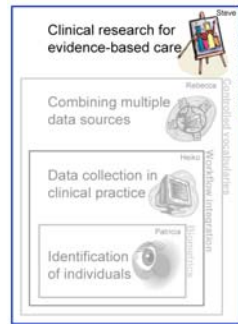


- Data collected on paper forms
- Faxed to server at the Epidemiology Data Center
- Data entered into database using optical character recognition software
- All data verified
- New reports posted on the web site every other day

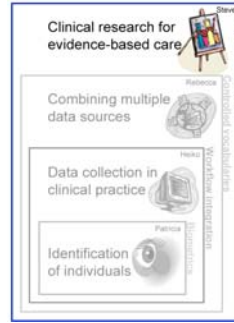


# How did it work?

- Faxing – generally fine, but some problems.
  - Forgetting to fax
  - Problems with transmission
- Data collection
  - Completeness of forms
  - Out of range
- Timeliness of reporting
  - Sometimes a lag
- Integration to existing systems
  - Beyond payment and scheduling not much of an exiting system at each Clinical Site



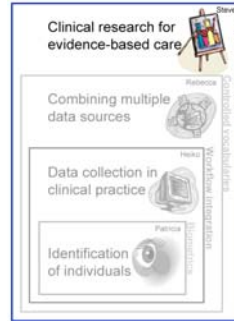
# Upgrades for STAR\*D 2



- Use Tablet PCs to collect data instead of paper forms.
- Advantages
  - Will require coordinator to dock the Tablet PC each night, and have automated, unattended data transfer
  - Can enforce completeness of forms, edit check and adherence to algorithm
  - Can have up-to-date data available for reporting

# Upgrades for STAR\*D 2

- Disadvantages
  - Technology bias
  - May forget to dock
  - Still not integrated into existing system.



# Where do we go from here?

- Full integration is not here.
- As you can see from STAR\*D, we have attempted to incorporate into existing systems as best we can.
- Need more work on the integration process.

