



# Toward Defining Predictors of Upper Extremity Recovery Suitable for Inpatient Stroke Population at Methodist Rehabilitation Center



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## OVERVIEW OF CAPSTONE SITE

- Methodist Rehabilitation Center (MRC) is located in Jackson, Mississippi, is the state's only free-standing physical rehabilitation hospital center, and is accredited by both The Joint Commission and the Commission on Accreditation for Rehabilitation Facilities (CARF).
- Clinical services offered at MRC's 124-bed hospital are provided to patients suffering from one or more of the following: brain injury, spinal cord injury, stroke, post-amputation, neurological disease, joint and back pain, orthopedics, and other medical conditions that require specialized technologies and therapies.
- MRC is known for having Mississippi's only stroke-specific rehabilitation program that is able to provide patients that suffered mild, moderate, and severe strokes with access to stroke research, treatment, and care.
- MRC's research efforts conducted through the Center for Neuroscience and Neurological Recovery (CNR) are made up of three laboratories — the Human Neurophysiology Lab, the Motion Analysis Lab, and the NeuroRobotics Lab — along with several individual research offices, all of which are located inside the main hospital and can be found on the second floor (Methodist Rehab Research Center website, n.d.).

### CNR's Mission:

- Advance patient care and restore lives of people suffering from neurological conditions by conducting high-quality research that enables increased knowledge about the changes in neurological functions that occur after injury or disease; the conduction of multidisciplinary, novel, and translational research with an emphasis on stroke, SCI, and TBI; and the application of new knowledge to improve diagnoses and treatments.
- Disseminate research findings and provide professional development for neurorehabilitation researchers and practitioners of different backgrounds and at all stages within their careers.
- Increase awareness about the need for neurorehabilitation research in Mississippi.

## PRELIMINARY LITERATURE SUMMARY

### Guiding Theory: Motor Learning Theory

Associated Frames of Reference (FORs): Biomechanical & Rehabilitative

### Relevant Evidence:

- Measurement of patient outcomes remains an essential component of routine clinical rehabilitation practice because standardized assessments can be utilized for determining patient prognosis and function over time
- Use of more than one assessment can provide objective measurements within various clinical areas that provide relevant information about level of impairment, activity limitations, and restrictions in participation that play an essential role in patient-centered intervention and discharge planning
- For post-stroke upper extremity motor impairments, research findings suggest frequent assessment utilizing more than one type of measurement can be an effective way to monitor whether any changes in treatment may better target the patient's current level of impairment ultimately resulting in more effective and personalized therapeutic interventions

## NEEDS ASSESSMENT

The specific need of the Capstone site addressed through the Capstone project was proposed by the Capstone mentor as the following question:  
"Which clinical evaluation instruments are the most useful for assessing the level of impairment and recovery of arm function during inpatient (and outpatient) rehabilitation after a recent stroke?"

The Capstone mentor provided sound evidence that a need exists for informing stroke rehab clinical practitioners on the latest clinical research recommendations for evidence-based practice (EBP). These findings are consistent with gaps in the literature identified in the Preliminary Literature Review.

## PROJECT GOALS / OBJECTIVES

**Overall Goal:** Investigate and identify which clinical evaluation instruments would be the most useful for assessing and tracking the level of impairment and recovery of upper extremity (UE) function during initial 6 months of stroke recovery for inpatient rehab patients at Methodist Rehabilitation Center (MRC).

**Objective One:** Define the population of MRC stroke patients in terms of demographics (age, race, comorbidities, etc) and relevant clinical dates and time parameters (stroke onset, admission, discharge, etc.) as evidenced by completion of a patient population profile and data summary report

**Objective Two:** Analyze the literature to identify clinical assessments utilized as predictors/outcome measures of UE function following stroke as evidenced by completion of a literature matrix summary table.

**Objective Three:** Aggregate and organize collected findings on MRC's defined patient population profile identified in Objective One with the post-stroke predictor/outcome UE assessment measures identified in Objective Two as evidenced by completion of various in-depth analyses spreadsheets.

**Objective Four:** Synthesize previous objects' findings into a culminating product with recommended selections of identified clinical assessments of UE function with assessment timepoints that are specific to MRC and best fit MRC to track patient progression during initial 6 months following stroke.

## PROJECT DEVELOPMENT

### Objective One: Define the population of MRC stroke patients in terms of demographics (age, race, comorbidities, etc) and relevant clinical dates and time parameters

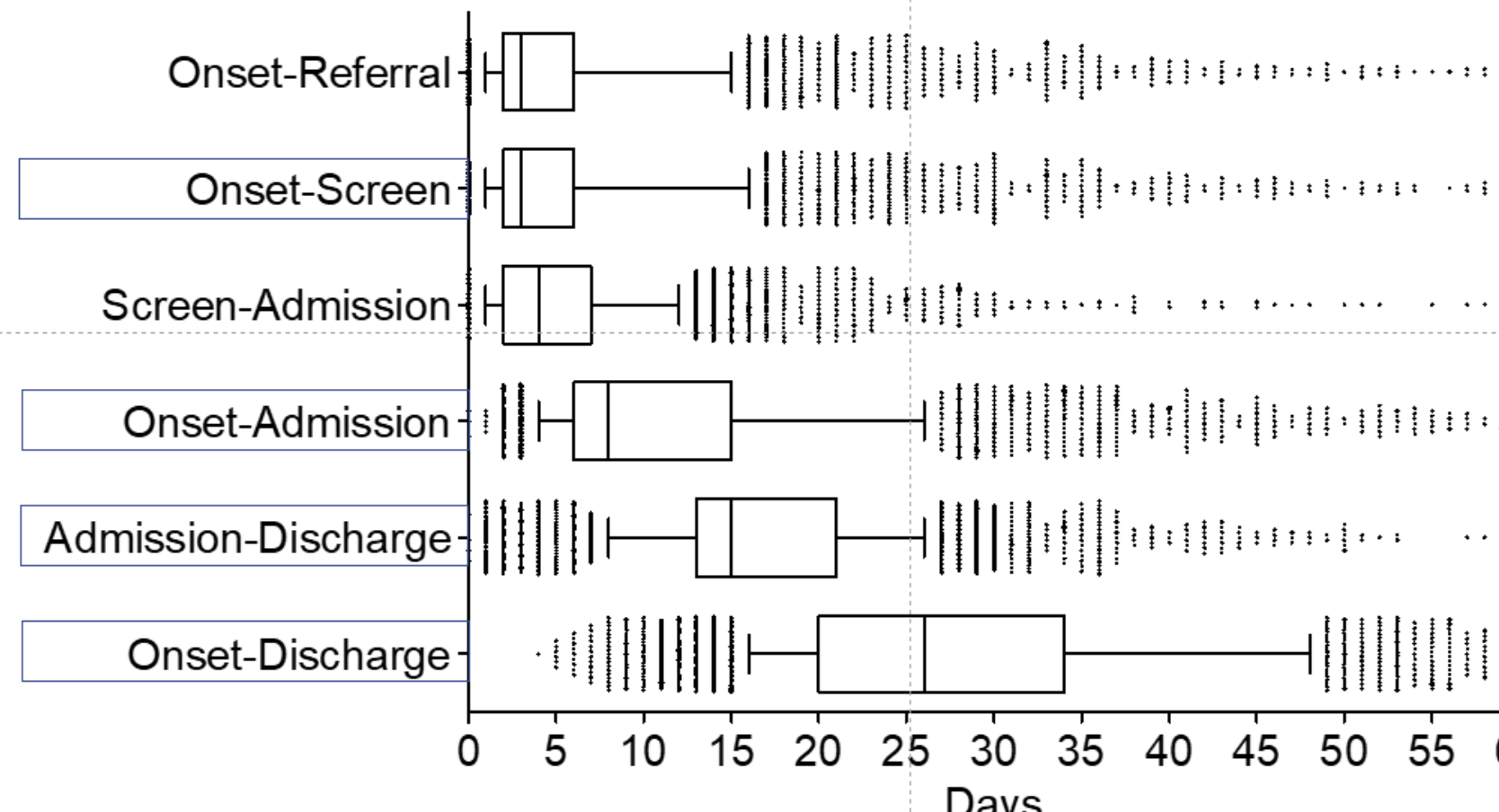
#### MRC Patient Assessment Time Points

Stroke Onset Percentiles	Screen MRC #Days	Stroke Onset Percentiles	Admission MRC #Days	Stroke Onset Percentiles	Discharge MRC #Days
10th	1	10th	4	10th	16
25th	3	25th	6	25th	20
50th	5	50th	8	50th	23
75th	9	75th	15	75th	34
90th	14	90th	26	90th	48
MIN	0	MIN	0	MIN	0
MAX	60	MAX	90	MAX	130
Q1	5	Q1	7	Q1	20
Median	4	Median	8	Median	23
Q3	6	Q3	15	Q3	34
IQR	6	IQR	9	IQR	14
Average	6.77	Average	12.55	Average	29.50

Screen MRC Percentiles	Admission MRC #Days	Admission MRC Percentiles	Discharge MRC #Days
10th	1	10th	8
25th	2	25th	11
50th	4	50th	15
75th	7	75th	21
90th	12	90th	26
MIN	0	MIN	0
MAX	60	MAX	90
Q1	2	Q1	11
Median	4	Median	15
Q3	7	Q3	21
IQR	7	IQR	19
Average	5.88	Average	17.04

The above tables provide percentile, median, interquartile, and average values, in number of days, for key patient assessment timepoints identified from the eRehab database information on MRC's stroke patient population.

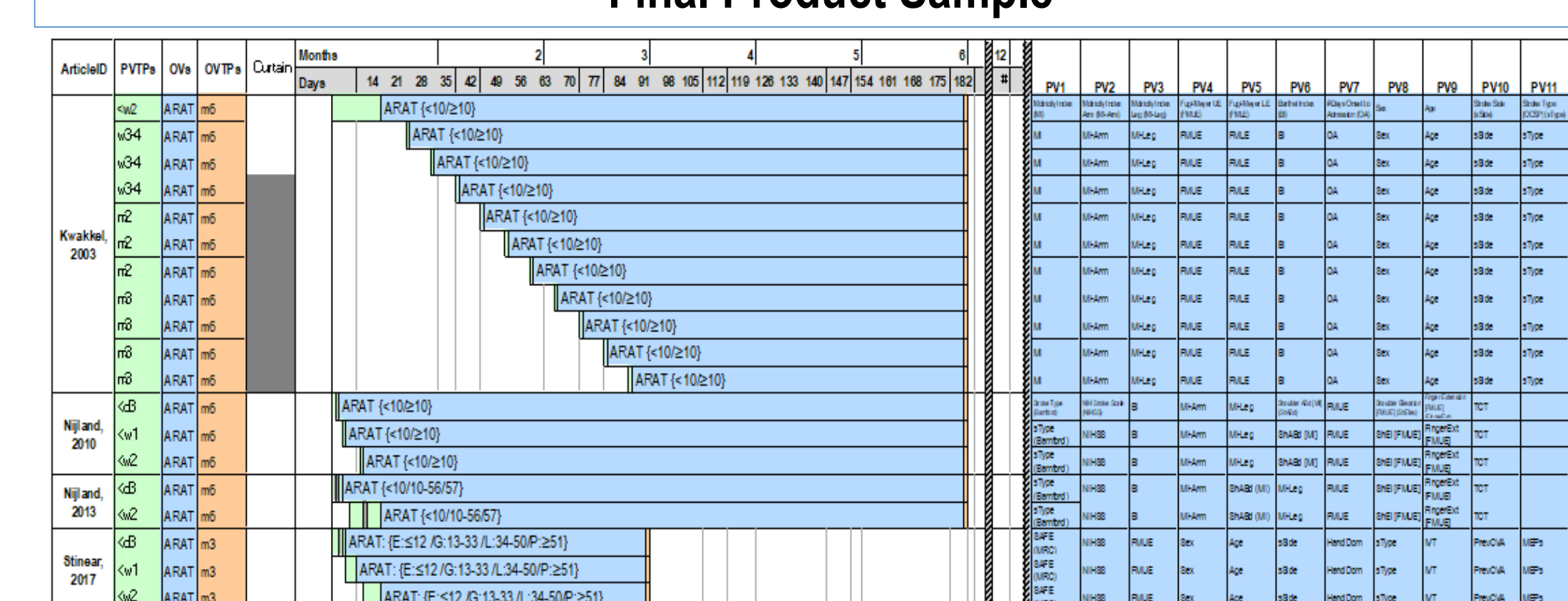
#### MRC Patient Assessment Time Points



The above figure is a graphical representation of the values provided in the tables provided to the left

### Objective Three: Synthesis of Objectives One & Two

#### Final Product Sample



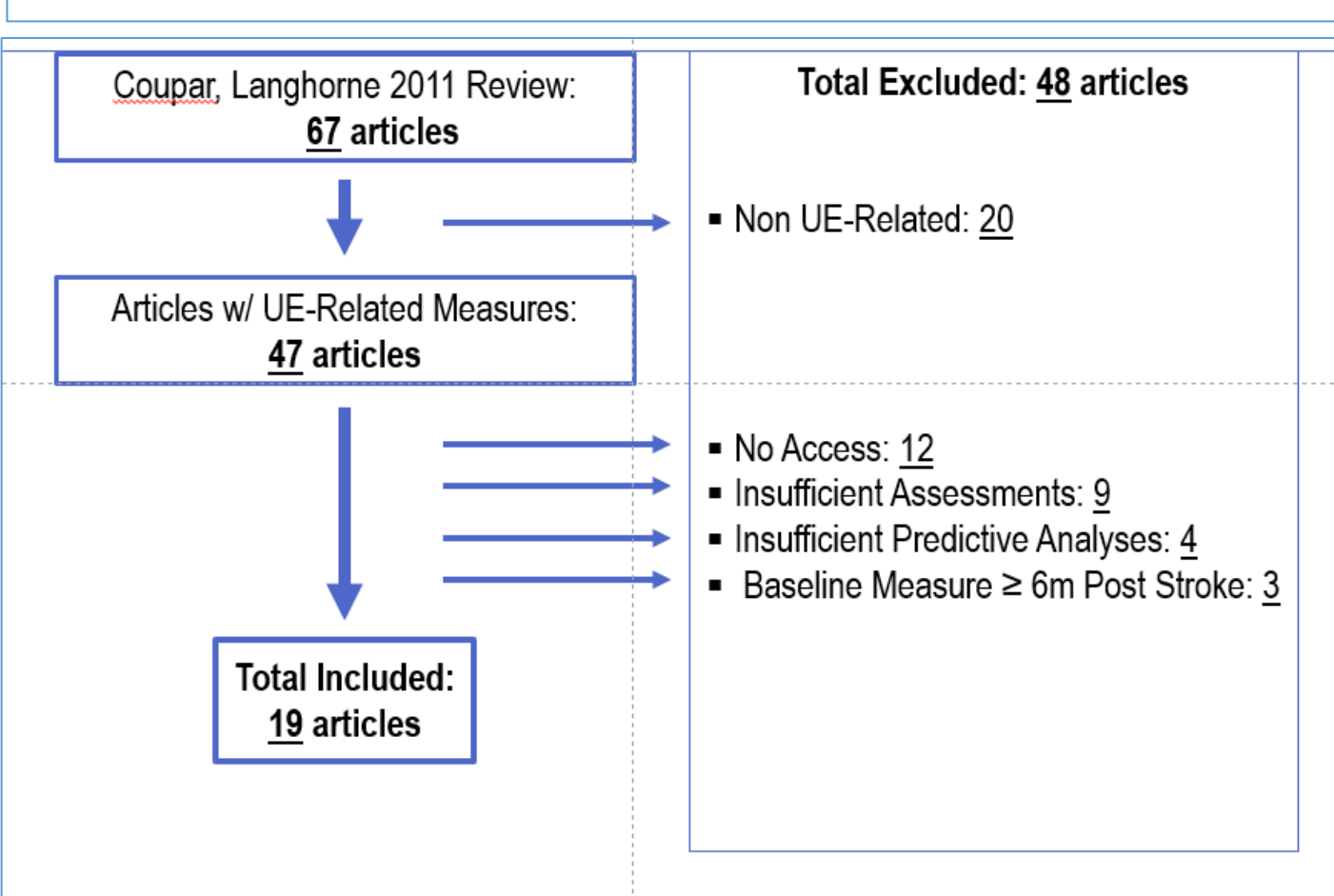
The above diagram is a sample of entries that can be found in the final product Excel File. Each bar is color-coded by outcome measure/assessment used and represents a different prediction model including predictor assessment timepoint, outcome assessment timepoints.

#### Time Point "Hot Spots" for Different Predictor Variable Categories from the Literature

PREDICTOR TIMEPOINT	OUTCOME TIMEPOINT						TOTAL			
	w2	w2-4	m1	m2	m3	m6	y1	N	%	Cumm
<w2	4	0	4	0	9	6	9	32	21%	21%
<w1	4	5	4	7	13	16	1	50	34%	55%
<w2	0	0	0	0	4	7	0	11	7%	62%
w3-4	0	0	2	15	9	8	5	39	26%	89%
m2	0	0	0	0	1	6	4	11	7%	96%
m3	0	0	0	0	0	5	0	5	3%	99%
m6	0	0	0	0	0	0	1	1	1%	100%
TOTAL	8	5	10	22	36	48	20	149		
%TOTAL	5%	3%	7%	15%	24%	32%	13%		100%	
CumTOTAL	5%	9%	15%	30%	54%	87%	100%			

### Objective Two: On-Site Literature Review Selection Process & Matrix Samples

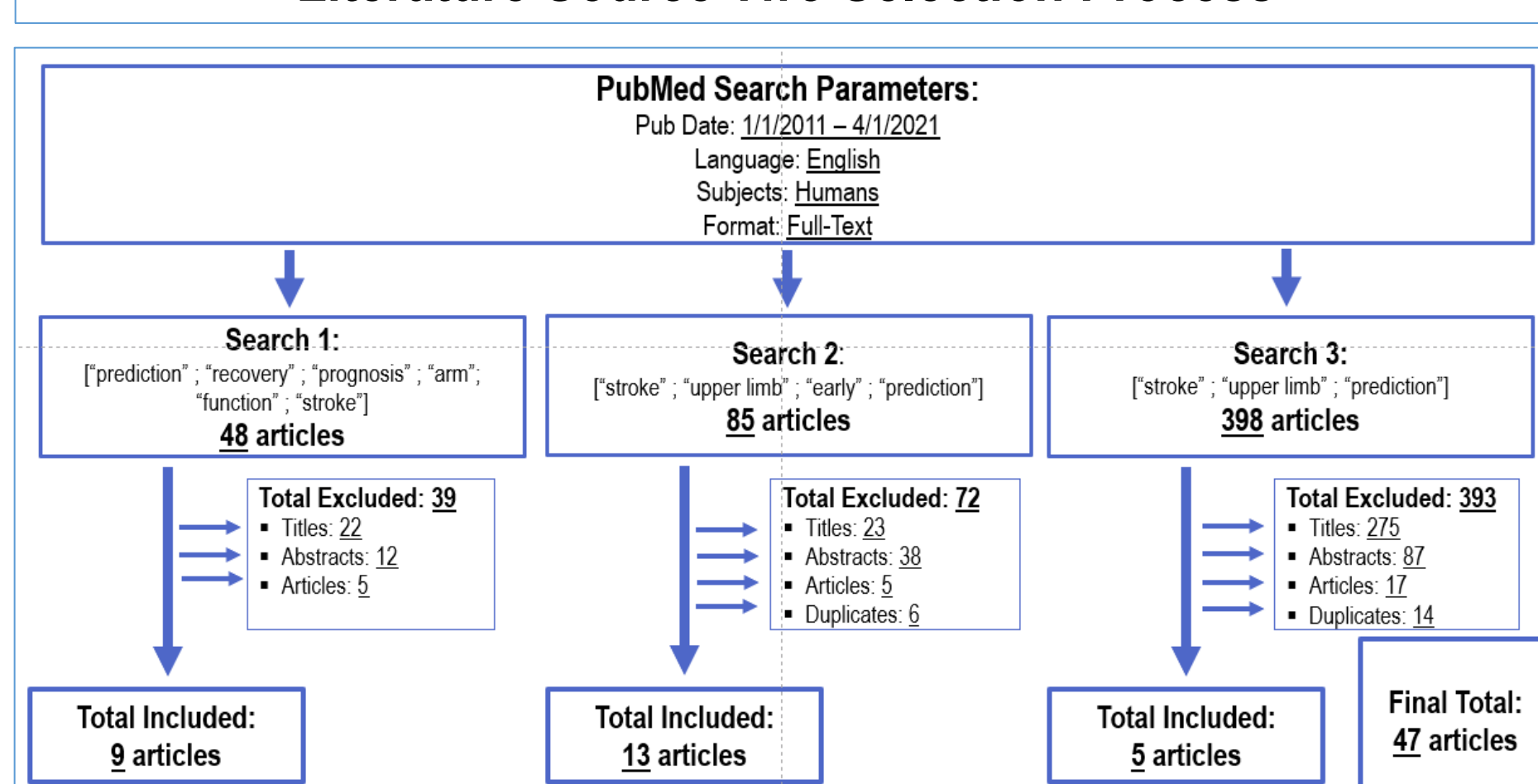
#### Literature Source One Selection Process



#### Literature Source One Matrix Sample Entry

#	Reference	Sample	Setting	POP	PRO	PRO	PRO	Analysis	Results
7	Swoboda 2003	MCA	7 Hospitals	Stroke	Stroke	Stroke	Stroke	Stroke	Stroke

#### Literature Source Two Selection Process



#### Literature Source Two Matrix Sample Entry

#	Reference	Sample	Setting	POP	PRO	PRO	PRO	Analysis	Results
8	Swoboda 2003	MCA	7 Hospitals	Stroke	Stroke	Stroke	Stroke	Stroke	Stroke

## PLAN FOR PROJECT EVALUATION

The Capstone project was partly assessed through a semi-structured interview with the Capstone mentor during the final 14th week of the Capstone experience in order to obtain the mentor's expert and objective evaluation of the outcome and overall impact of the Capstone project.

The impact of the Capstone project also assessed during the final week of the Capstone experience using a participant feedback survey instrument administered after the Capstone student provided a formal presentation on the Capstone project's final culminating product to MRC leadership and appropriate staff (research team, stroke OTs, etc.) at the Capstone site. The participant feedback survey instrument will be used to obtain objective feedback on usefulness of information presented and overall usability of the Capstone project at the Capstone site. Lastly, the outcome data collected from the semi-structured interview with the Capstone mentor and the feedback survey responses collected from the presentation audience members in order to complete an outcome assessment summary of overall Capstone project effectiveness.

**Responses:** Overall, responses were 4/5 to 5/5 ratings for question related to usefulness of information provided and overall usefulness of final product at the Capstone site.

## PROJECT SUMMARY AND FUTURE RECOMMENDATIONS

### Relevance of Capstone project findings:

- Provides a detailed completion of initial steps necessary to expand the scope of addressing the identified need at MRC on an institutional level in the future
- Provides a comprehensive selection of post-stroke UE assessments utilized as predictor/outcome measures of stroke recovery

### Recommended Future Steps:

- Continue analyses on collected data provided from the Capstone project
- Expand scope to MRC outpatient setting and services in order to fully envelope stroke patient continuum of therapy services provided at MRC

### OT Implications:

- Provides a foundation of information to enhance clinician decision-making with UE outcome measure assessment selection within inpatient stroke rehab setting