

# Simulation through Orthopaedic Device Lifecycle

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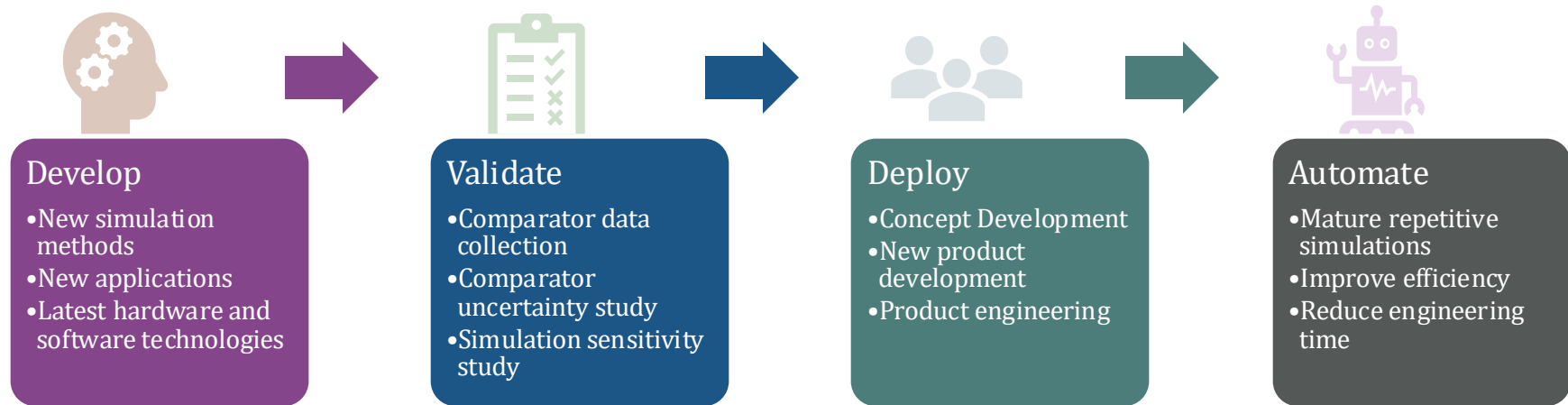
**Director, Computer Modeling & Simulation  
Stryker Joint Replacement**

# Overview

## Stryker JR Modeling and Simulation

### Objectives

- Develop, validate, and deploy **advanced simulation technologies** and process automations

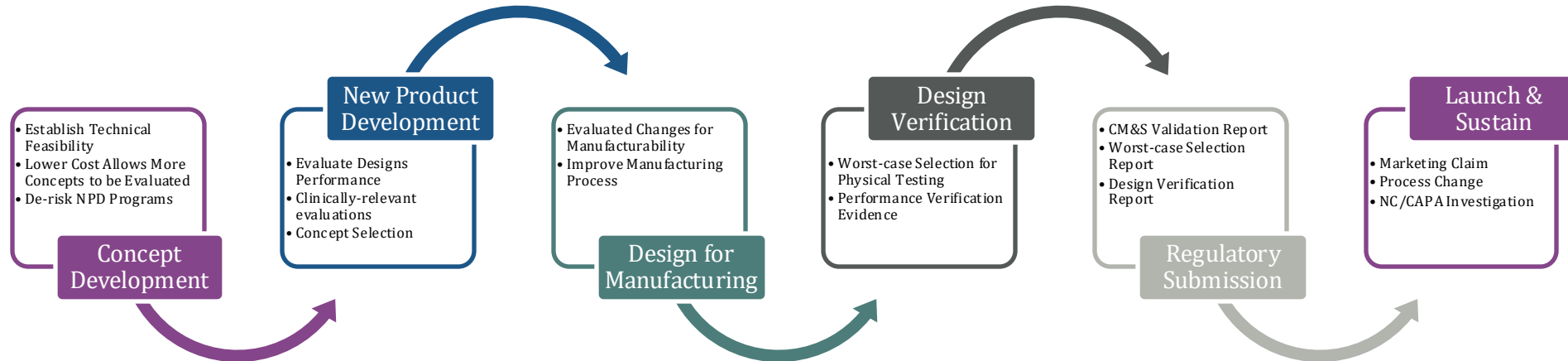


# Overview

## Stryker JR Modeling and Simulation

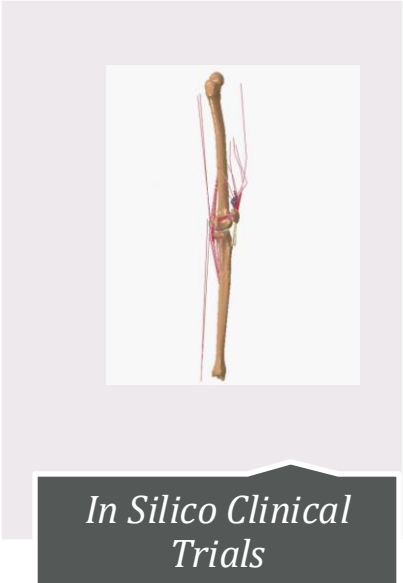
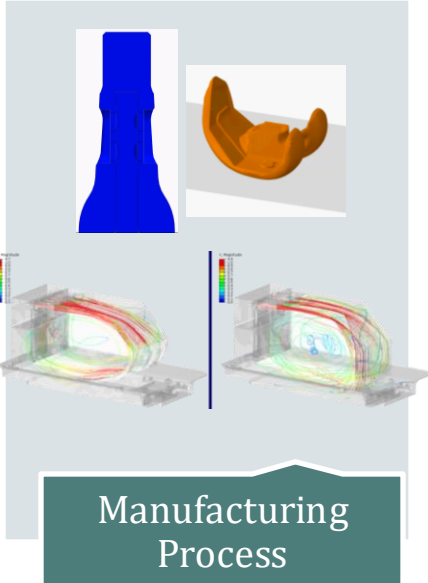
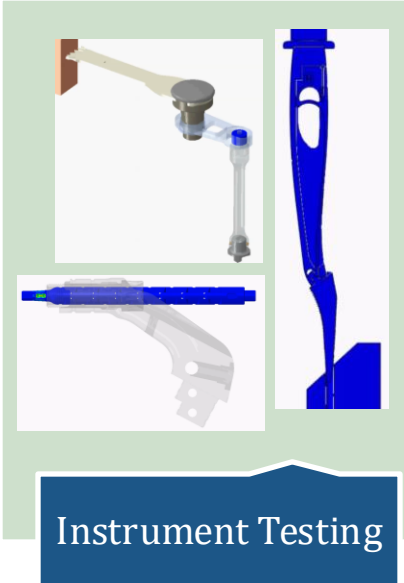
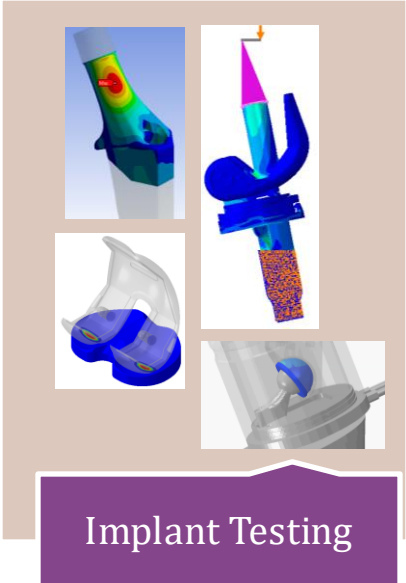
### Objectives

- Support orthopaedic device lifecycle for better, faster, and cheaper innovations that make healthcare better



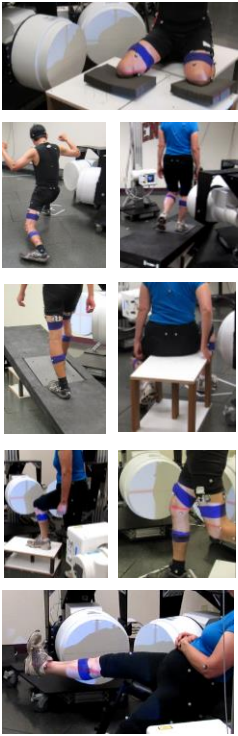
# Applications

## Stryker JR Modeling and Simulation



# *In Silico* Clinical Trial

## Stryker JR Knee Kinematic Model Library



### ADL

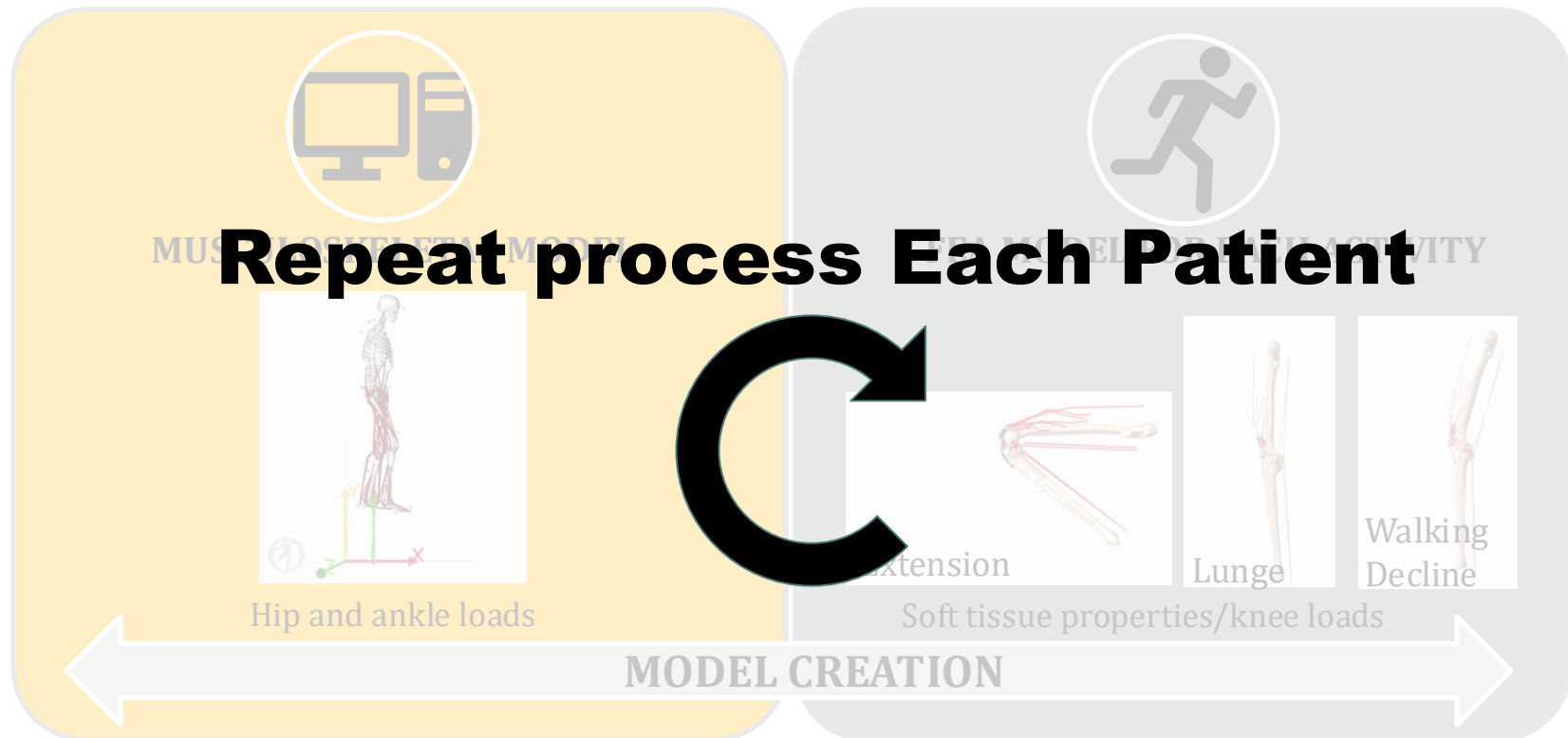
- Level walk
- Decline walk
- Incline walk
- Pivot walk
- Chair rise
- Step up
- Step down

### Deep Flexion

- Kneeling
- Lunge
- Extension

# ***In Silico Clinical Trial***

## **Stryker JR Knee Kinematic Model Library**



# *In Silico* Clinical Trial

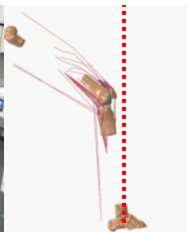
## Stryker JR Knee Kinematic Model Library

Subject	Gender	Age	BMI	Limb Coronal Alignment	Activities											
					Extension	Lunge	Decline	Incline	Step Down	Step Up	Chair Rise	Normal Level Walking	Pivot Walk	Seiza	Laxity Assessment	Leg Press
01	F	63	23.5	2° Valgus	x	x	x	x	x	x	x	x	x	x		
02	M	51	19.3	3° Varus	x	x	x	x	x	x	x	x	x	x		
03	M	72	23.3	3° Varus	x	x	x	x	x	x	x	x	x	x		
04	F	76	18.1	1.5° Valgus	x	x	x	x		x		x	x	x		
05	M	73	22.7	6° Valgus	x	x	x	x	x	x	x	x	x	x		
06	F	76	23.7	5° Valgus	x	x	x	x	x	x	x	x	x	x		
07	M	64	31.5	5° Varus	x	x	x	x	x	x	x	x	x	x		
08	F	62	31.4	7° Varus	x	x	x	x	x	x	x	x	x			
09	M	72	34.9	6° Varus	x	x	x	x	x	x	x	x	x			
10	M	73	26.7	1° Valgus	x	x			x	x	x	x	x		x	x
11	F	58	38.4	3° Valgus	x	x			x	x	x	x	x			x
12	M	51	31.5	1° Varus	x	x			x	x	x	x	x		x	x

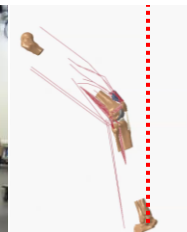
Subject  
#02



Subject  
#04

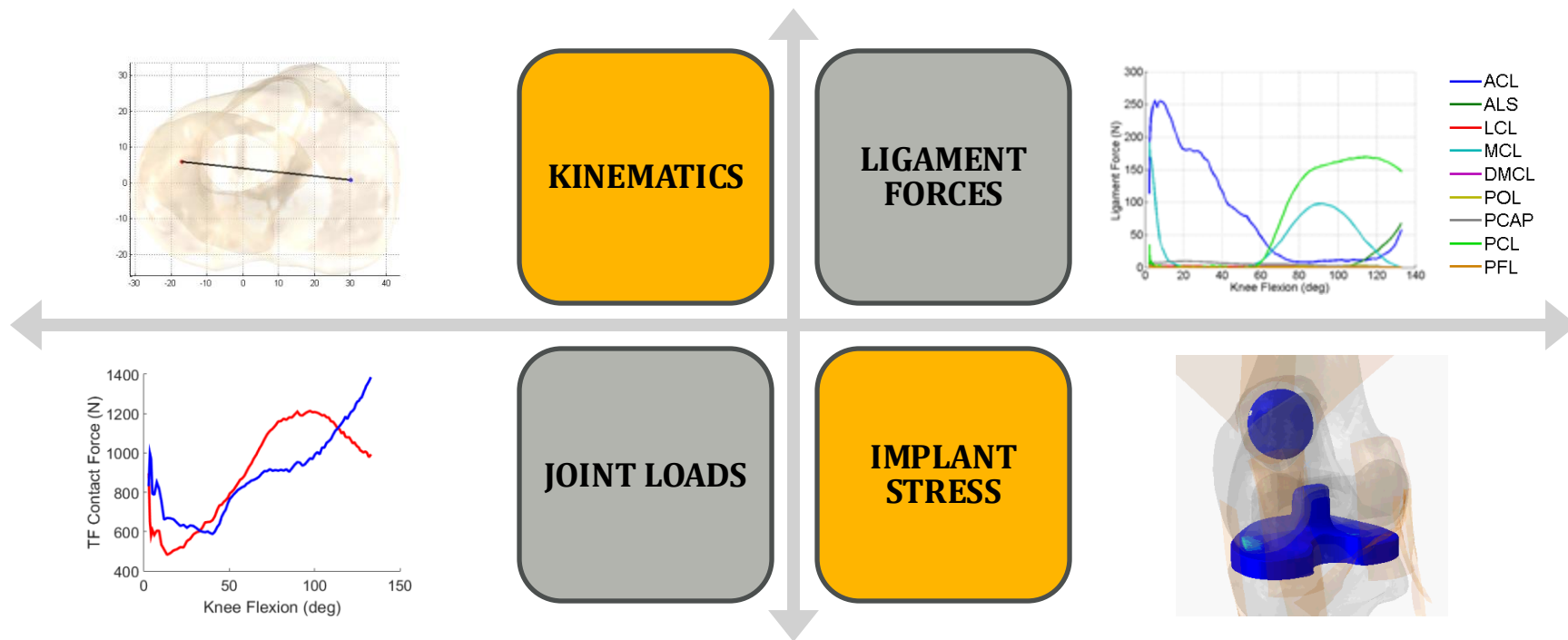


Subject  
#06



# *In Silico* Clinical Trial

## Stryker JR Knee Kinematic Model Library



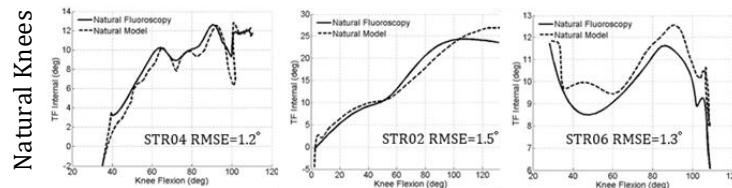


# *In Silico* Clinical Trial

## Stryker JR Knee Kinematic Model Library

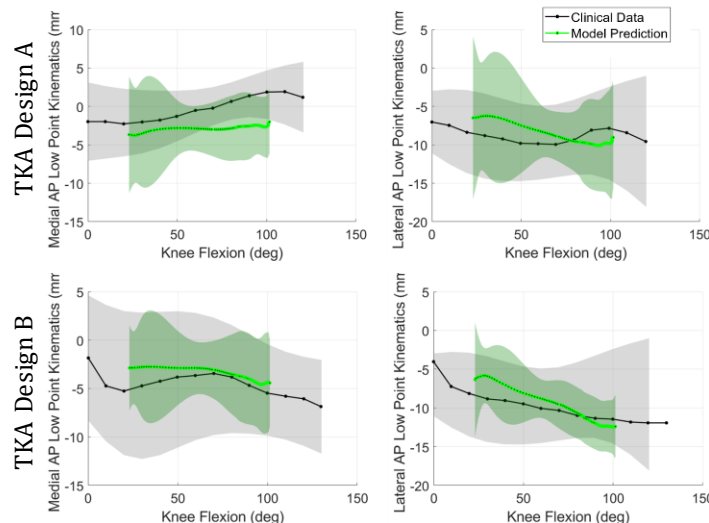
### *in vivo* Validation

- Can each subject- and activity-specific model capture natural kinematics?



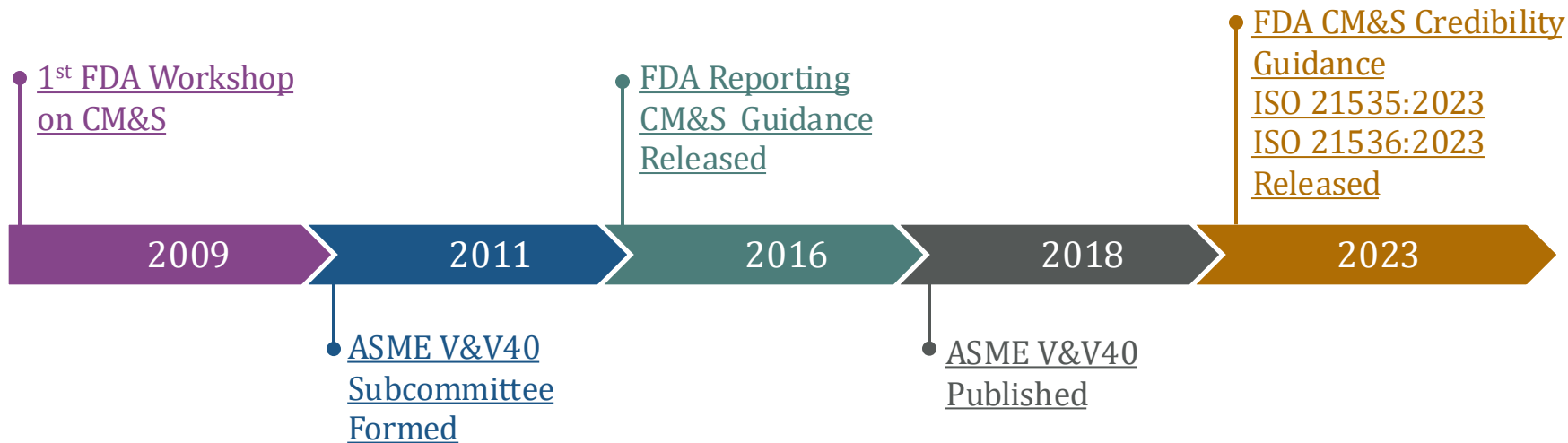
### Population-based validation

- Can model library capture implant-specific post-op fluoroscopic kinematics?
- Can model library capture fluoroscopic kinematic difference between implant designs?

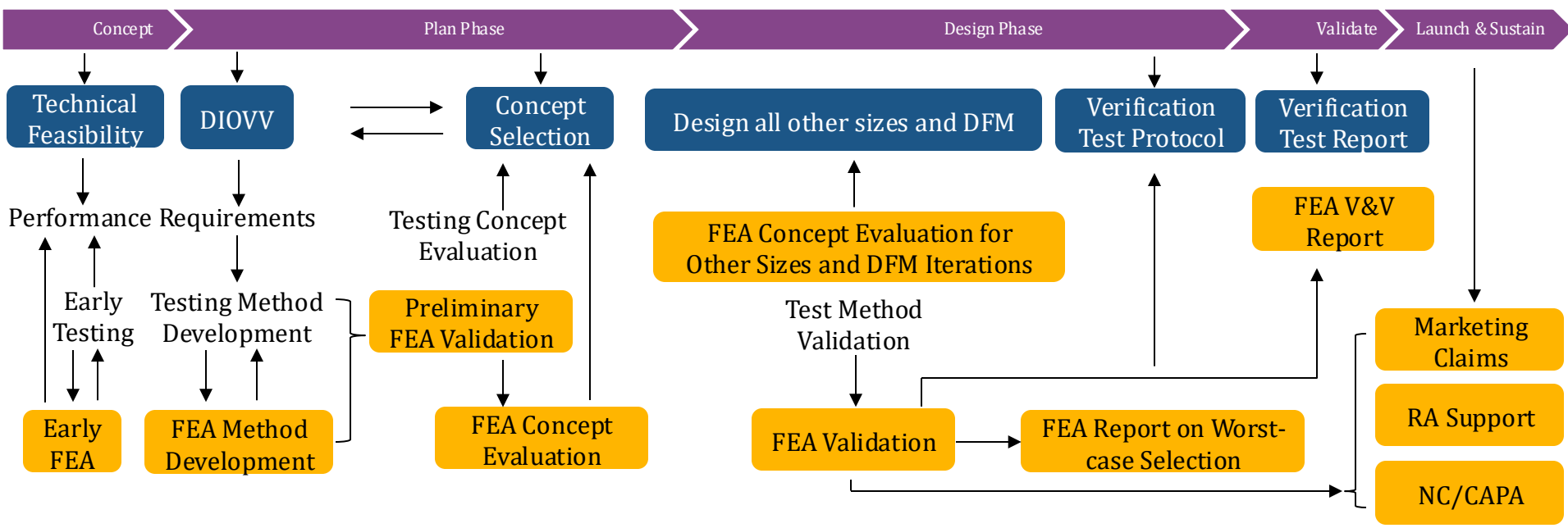


# Evolution of Regulatory Guidance

## Key Events for Stryker JR

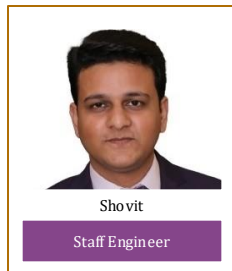
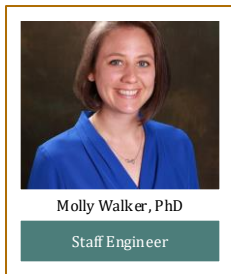
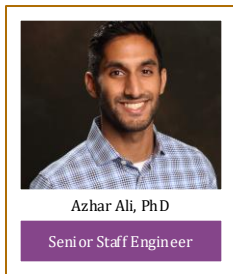


# Model Credibility Integrated into Stryker JR product lifecycle



# Acknowledgement

Small but highly effective and impactful team!



*Thank you!*

# Disclaimer

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**Content ID: JR-GSNPS-PPT-1801889**

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