



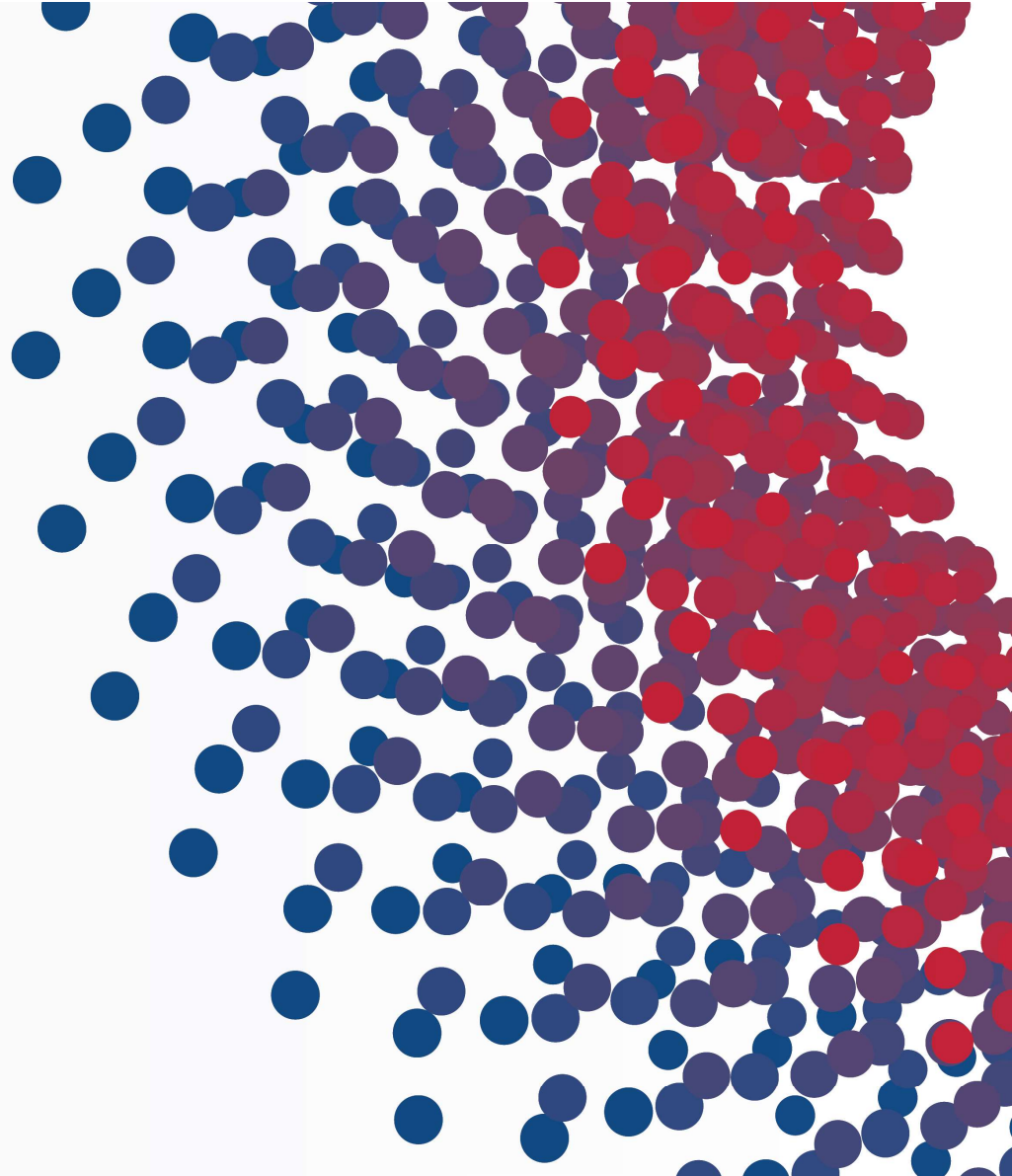
Setting the Stage: Where we want to be

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And Bioengineering**

Disclosures:

- **Co-Founder:** Hyperfine, Identifeye, Detect, Protein Evolution
- **Advisor:** Panaxiom, Beacon Neuro, Butterfly IQ
- **Penn Licensed IP:** NeuroPace (divested), MCI0



My NeuroModulation Clinic in 2040



Current: Years Before Treatment

8:00 AM	New onset idiopathic Parkinson's	13
9:00 AM	Focal seizures LMTS 1st line*	15
10:00 AM	Familial Depression, 1st line*	time to ECT?
11:00 AM	Child w/ congenital hearing loss	evolving
12:00 AM	Blind adult, from Macular degeneration	?

NeuroModulation Clinic in 2040



	<u>Now</u>	<u>2040</u>
When	Last resort	1 st or 2 nd line
Who	Broad	Specific
Where	Specialty centers	Mainstream
Cost	High	Lower

Drivers

- Converging Tech: **Platforms: IPG, Cloud, algorithms, techs**
- Knowledge
- Less Invasive Procedures (**Robots**)
- Total Value Care

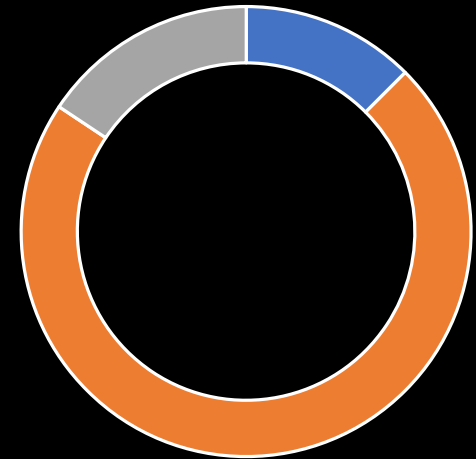
What drives utilization?



Factors

- Effectiveness
- Patient/ clinician acceptance
- Risk/ Morbidity/ *measurable* outcome
- Complexity
- Regulatory
- Total Value

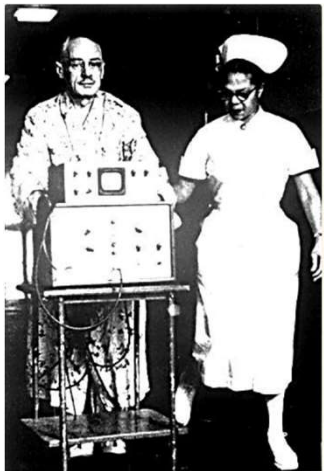
3.5 Million Implanted Devices in the US



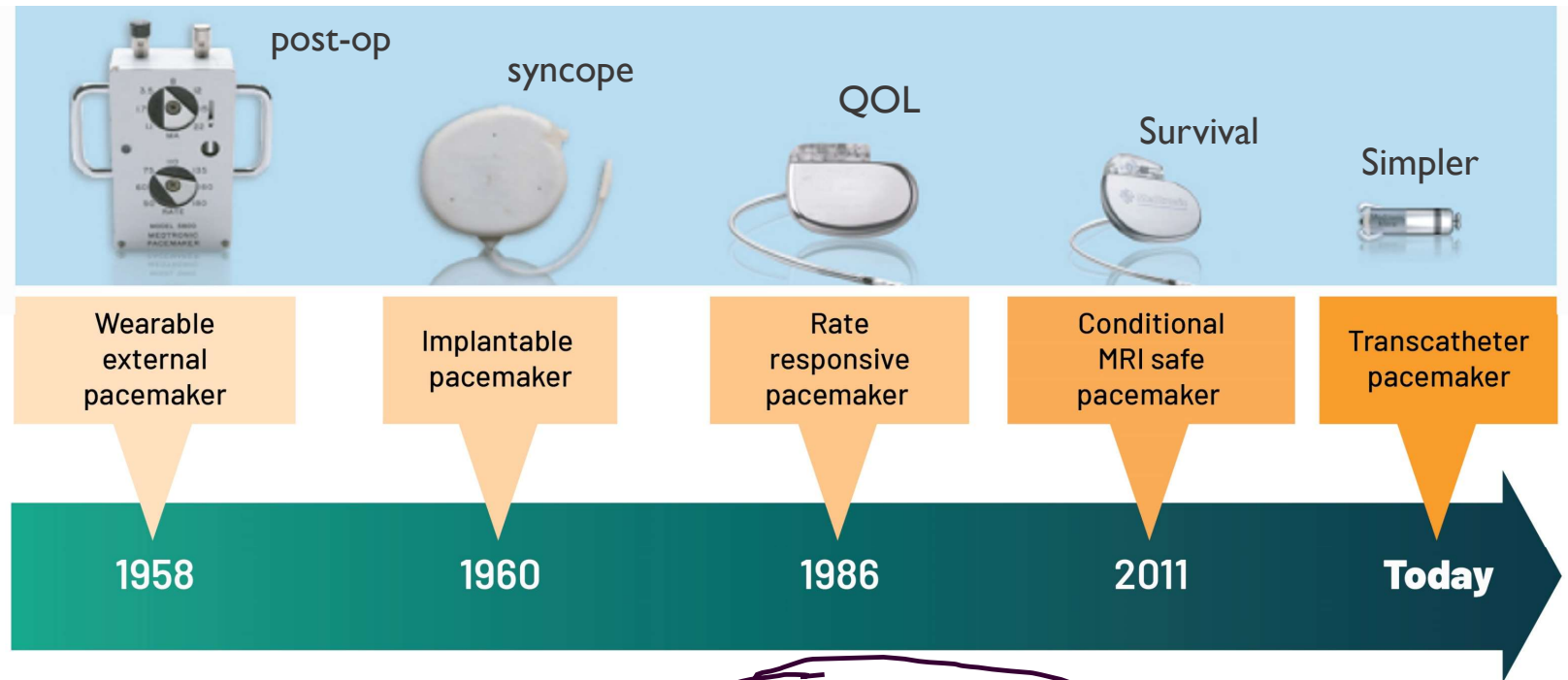
■ Endocrine ■ Cardiac ■ Neuro

Cardiac Devices: A model of success

1889: William – theory of pacing



Electrodyne PM 65 1951



**Implantable
Defibrillator**

**1960
Mirowski/ Mower**

**1980
First in human**

**1996
MADIT: 54% incr survival!**

**2019
Intravascular**

Pacemakers & Defibrillators: *Prolongs life 8.5-20 yrs*



- Effectiveness
- Patient/ provider acceptance
- Risk/ Morbidity/ clear outcomes
- Complexity
- Regulatory
- Total value

Lifesaving ~98.7% effective

Mostly/ 100%

Very low/ death,
hospitalizations

Turnkey/ phone call

Predicates!

High

Indications grew: *Primary prevention*

Take Home Messages



- Multiple factors drive adoption
- Build on 1st indication
- Development cycle shortening: DBS, RNS
- Circuit knowledge
- 1st line trials*
- It takes time (and \$)...

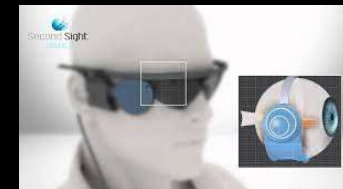
Learning from success and “failure”



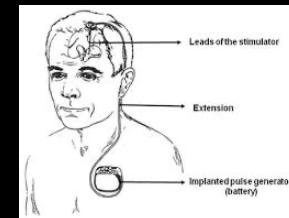
Vivek
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Carla Mann
Woods, CEO



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