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# Vascular access device innovation – future advances. Engineering out complications

Shayne Messerly, R&D Director, Vascular Access Technologies

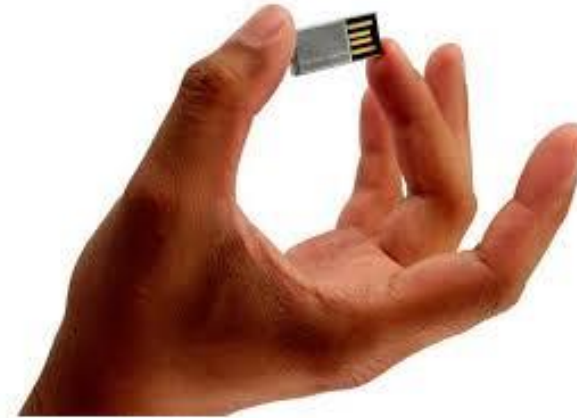


# Dramatic Example of Innovation Data Storage



1960

- Capacity: 5Mb
- Size: 1.5m X 1.7m X .75m
- Weight: 900kg
- Power Consumption: 5500 Watt/Hours
- Cost: \$250,000 (includes inflation)



2019

- Capacity: 4Tb (800,000x)
- Size: 1cm X 2cm X .2cm
- Weight: ~1g
- Power Consumption: .17 Watt/Hours
- Cost: \$100

# Innovation Process

Necessity is the Mother of Invention (Innovation)

- Deterministic Innovation (Moore's Law)

- Data Storage
- CPU's
- Flat Screen Televisions

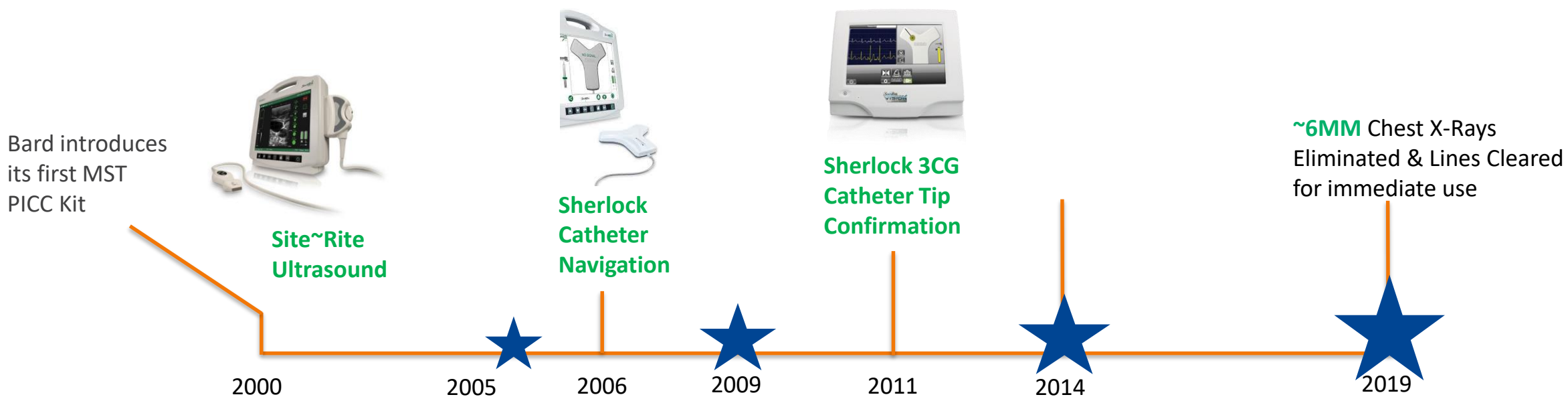


- Non-Deterministic Innovation

- Access to Data
- Amazon, Airbnb, Uber



# US Nursing based PICC Innovation Timeline (Imaging Team)



**Low Tech Nursing PICC Teams**

Placement Tools

- OTN Placement
- Lower Arm Only

Success

- **65% Cannulation**
- **10-15% Malposition**

**High Tech I Nursing PICC Teams**

Placement Tools

- MST (Microintroducer)
- Ultrasound

Success

- **98% Cannulation**
- **10-15% Malposition**

**High Tech II Nursing PICC Teams**

Placement Tools

- MST
- Ultrasound
- Sherlock Navigation

Success

- **98% Cannulation**
- **>2% Malposition**

**High Tech III Nursing PICC Teams**

Placement Tools

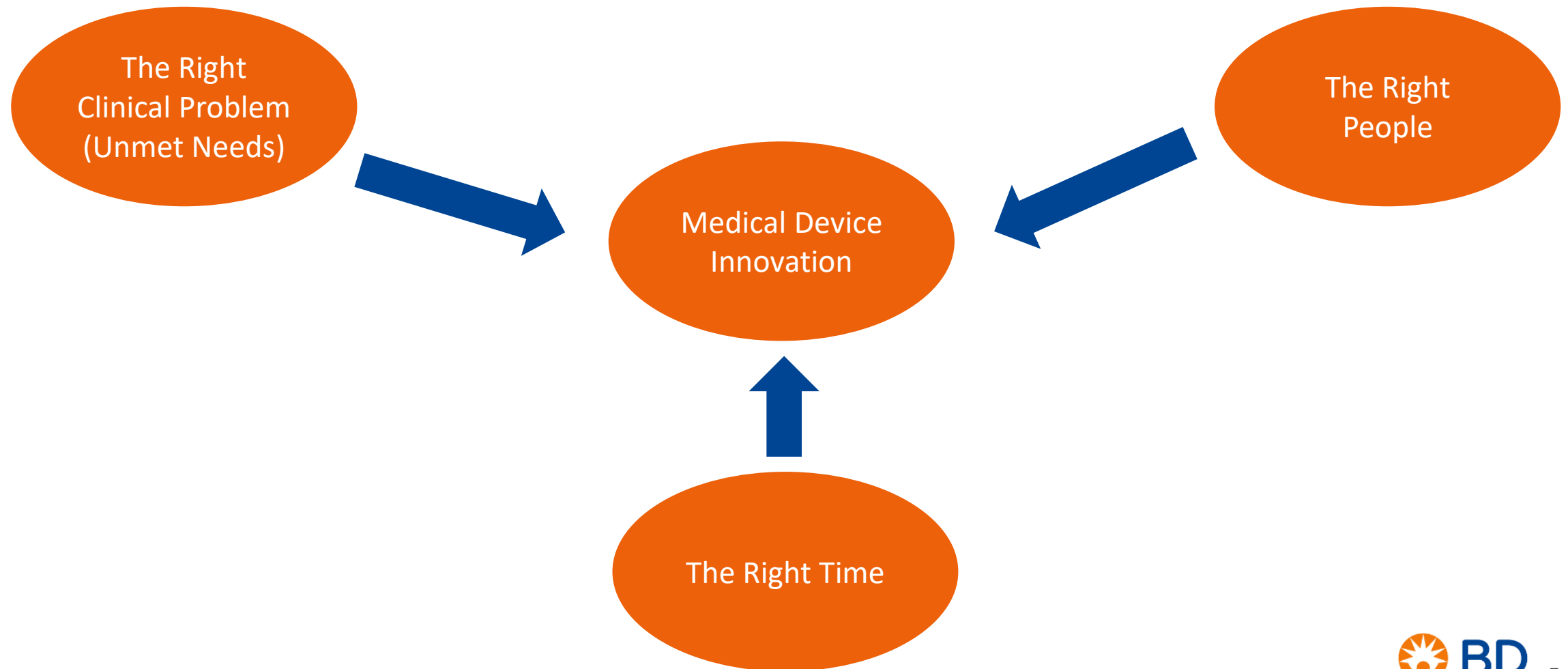
- MST & US
- Sherlock Navigation
- 3CG Confirmation

Success

- **98% Cannulation**
- **>2% Malposition**
- **Chest X-Ray Elimination**



# Innovation Process (cont.)



# Current Unmet Needs (And Solutions)

- Infection Prevention
  - Anti-Microbial Catheters
  - Sensor-less Catheter Tracking
  - Wireless/Display-less Ultrasound
  - Self-Cleaning Probes & Sensors
- First Stick Success
  - Accessibility to Ultrasound
  - 3D Needle Tracking
  - Smart Needles
  - Vessel Highlighting
  - Enhancements to Needles & Catheter tips

# Current Unmet Needs (And Solutions)

- Thrombosis & Catheter Occlusions
  - Anti-Thrombotic Catheters
  - Even Smaller Catheters w/equivalent flow rates
  - Occlusion prevention/detection/removal
- Access to Training
  - Augmented reality
  - Gamification & Interactive Tutorials
  - Training Simulators
- Access to Data
  - Smart Catheters
  - Connected devices
  - Data Analytics



THE ONLY WAY TO  
**DISCOVER**  
THE LIMITS OF THE  
**POSSIBLE**  
IS TO GO BEYOND THEM INTO THE  
**IMPOSSIBLE.**

Arthur C. Clarke

