



Emerging Technologies in Cardiovascular Diseases

Digitalization in Cardiac Rhythm Management

12th April 2019

Dr. Monika Pusha
Sr. Manager- Market Access
India and Subcontinent

IMPROVING LIVES FOR 130 YEARS



1880s

Dr. Wallace Abbott employs advanced science to improve accuracy and effectiveness of medications.

1930s—1960s

Abbott expands into vitamins and later infant formula, marking decades of growth in nutrition.

1970s—1980s

Pioneers in the modern diagnostics industry with ground-breaking systems and tests.

1990s—2000s

Sharpens its focus on medical devices to deliver unprecedented innovation.

TODAY

Abbott continues to shape new ways to bring better health to people all over the world, with a broad range of products to help everyone in your family live better.

LEADING WITH SOLUTIONS FOR ALL STAGES OF LIFE

#1 in blood screening and
immunoassay diagnostics

#1 in drug-eluting stents

#1 in non-opioid treatment of
chronic pain

#1 in coronary and mechanical
circulatory systems

#1 worldwide in adult nutrition

#1 in U.S. pediatric nutrition





GETTING PEOPLE BACK TO DOING THE THINGS THEY LOVE



Nutrition



Diagnostics



Medical devices



Branded generic
pharmaceuticals

Medical Devices

LESS INVASIVE, MORE ACCURATE TECHNOLOGIES TO ENHANCE LIVES

Vascular disease

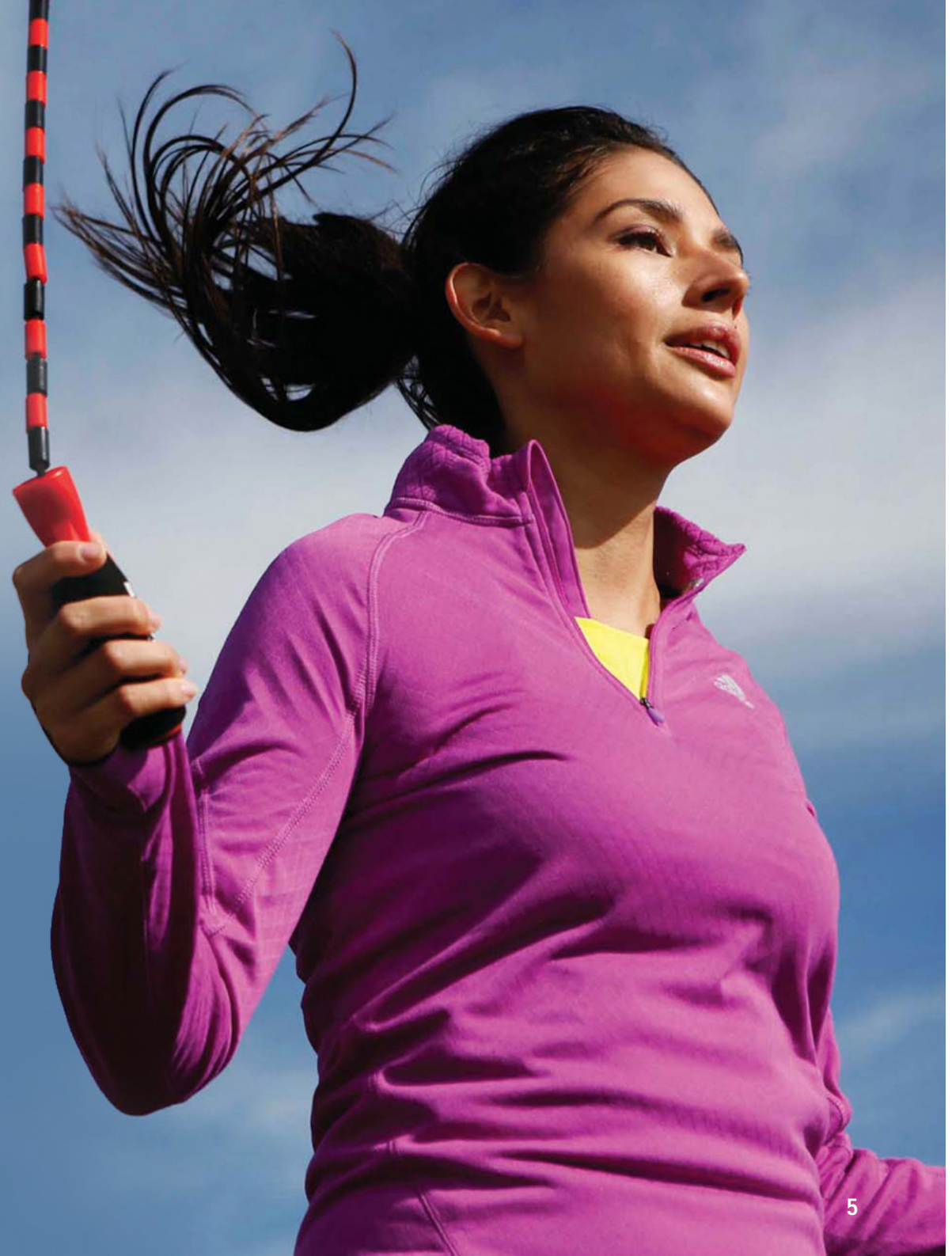
Cardiac rhythm management

Structural heart

Heart failure

Neuromodulation

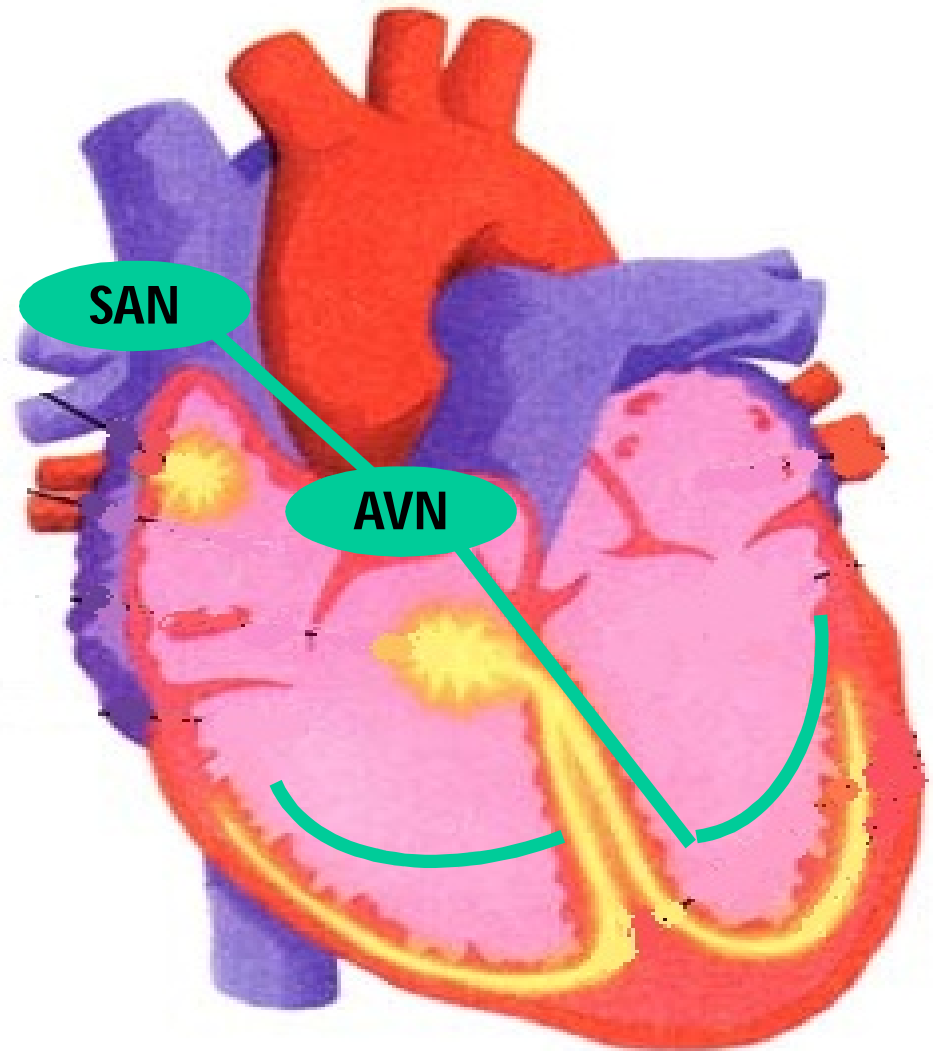
Diabetes care



Human Heart Electrical System

Conduction Pathways:

- The Sino Atrial Node: The natural pacemaker of the heart
- Impulses originate regularly at a frequency of **60-100 beat/min**



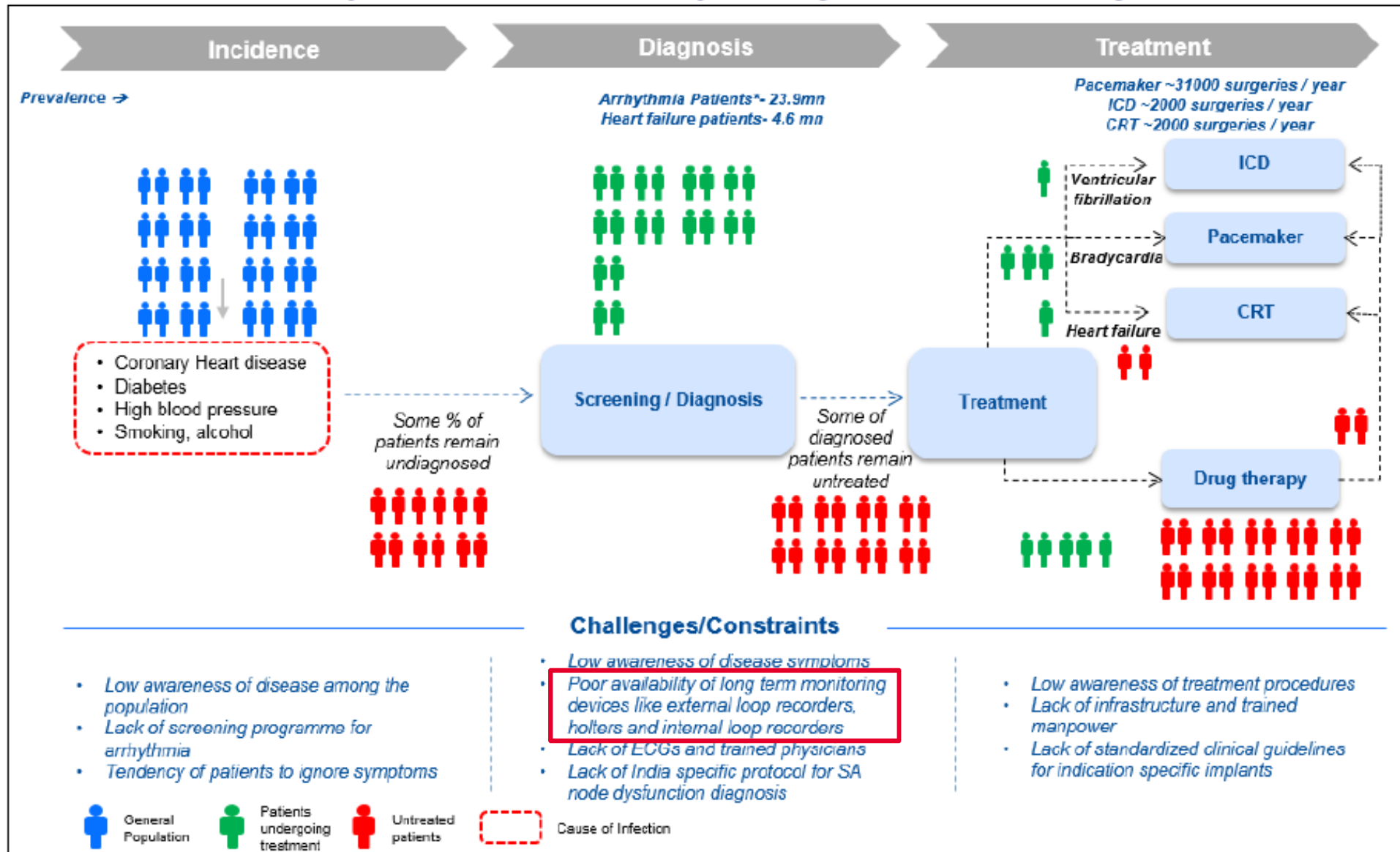
Disturbance in Cardiac Electrical System - Arrhythmias

- An abnormality of the cardiac rhythm is called Arrhythmias
- Arrhythmias may cause sudden death, syncope, heart failure, dizziness, palpitations or no symptoms at all.
- There are two main types of arrhythmia:
 - Bradycardia: slow heart rate (< 60 b.p.m).
 - Tachycardia: Rapid/fast heart rate (> 100 b.p.m).



Challenges in Managing Cardiac Arrhythmias

Large % of Patients remain undetected

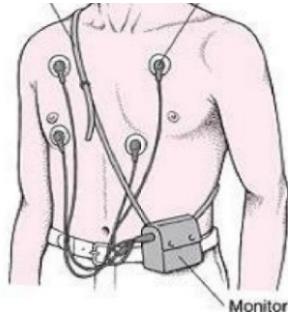


Note- Infographic is for the purpose of illustration only.

*Estimated considering 66% of total arrhythmia patients are AF patients based on PANARM study. AF patient prevalence based on APHRS Whitebook 2015

Ambulatory Arrhythmia Diagnostic Tools - Traditional

24-48 Hrs Holter



- Fixed term (24-48) Hrs monitoring
- Access to continuous, full disclosure of ECG
- Morphology analysis, quantitative representation of all arrhythmias
- No real time transmission
- No patient trigger
- Low patient compliance
- Low diagnostic yield

~7 Days Event Recorders



- ~7 days, event-based monitoring
- Records patient triggered events and not asymptomatic events
- No real time transmission
- Low patient compliance and diagnostic yield

Emerging Technologies -Remote Diagnosis and Monitoring

Mobile Cardiac Telemetry



- Fixed term disposable electrodes/device (up to 30 days monitoring)
- Real-time & remote access to results, reports symptomatic events only
- High disposable cost
- No display on device, does not allow patient to input symptom data
- Does not capture full-length ECG
- High patient compliance

PocketECG



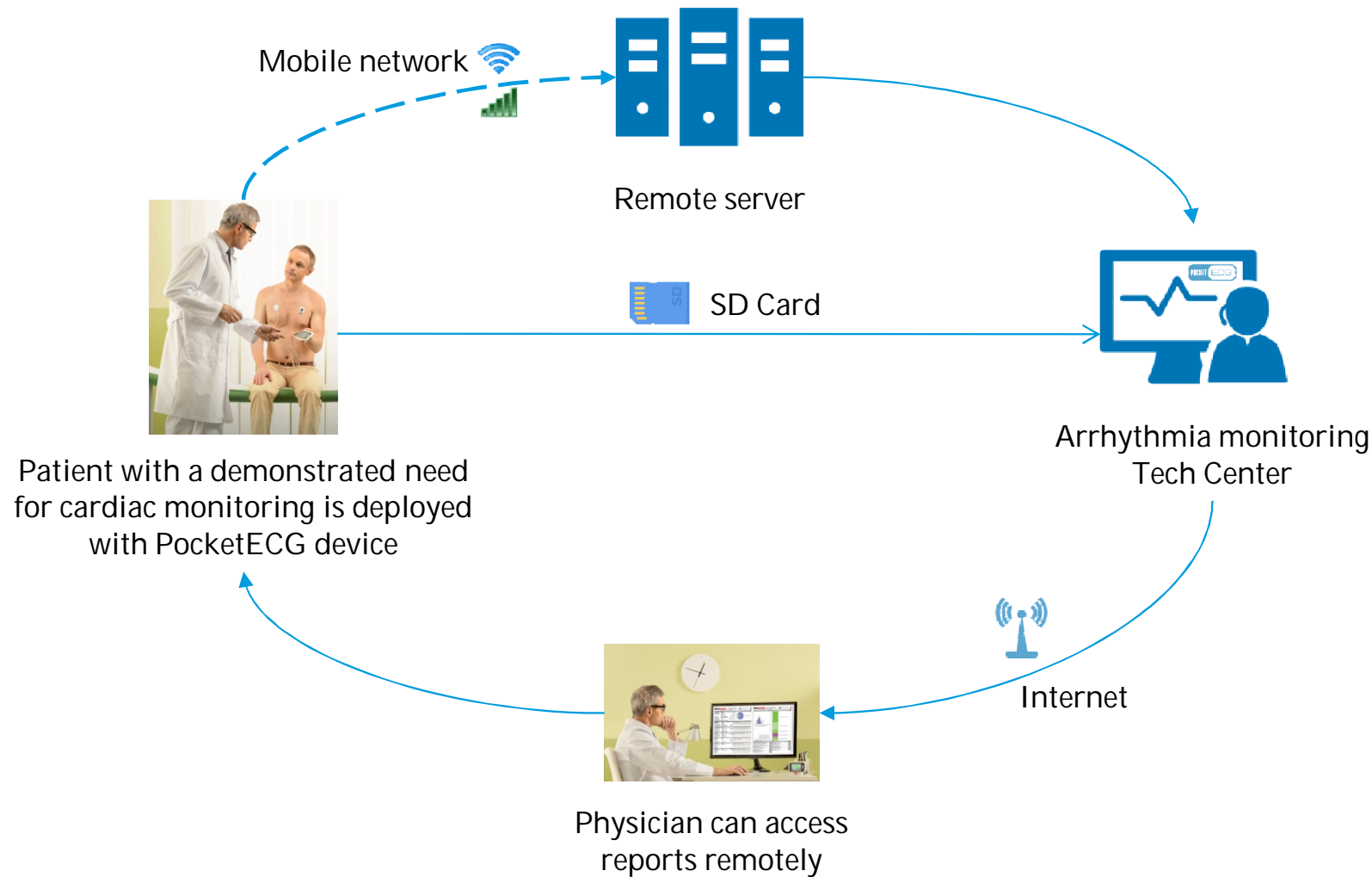
- Extendable Holter + Event + Telemetry capabilities
- Built-in accelerometer for continuous monitoring
- Customizable reports, real-time & remote access
- Records full-length ECG, Events, Activity, Symptoms (patient reported)
- Morphological & quantitative analysis of all arrhythmias & patient symptoms, correlates results
- High patient compliance and diagnostic yield

Implantable Cardiac Monitor

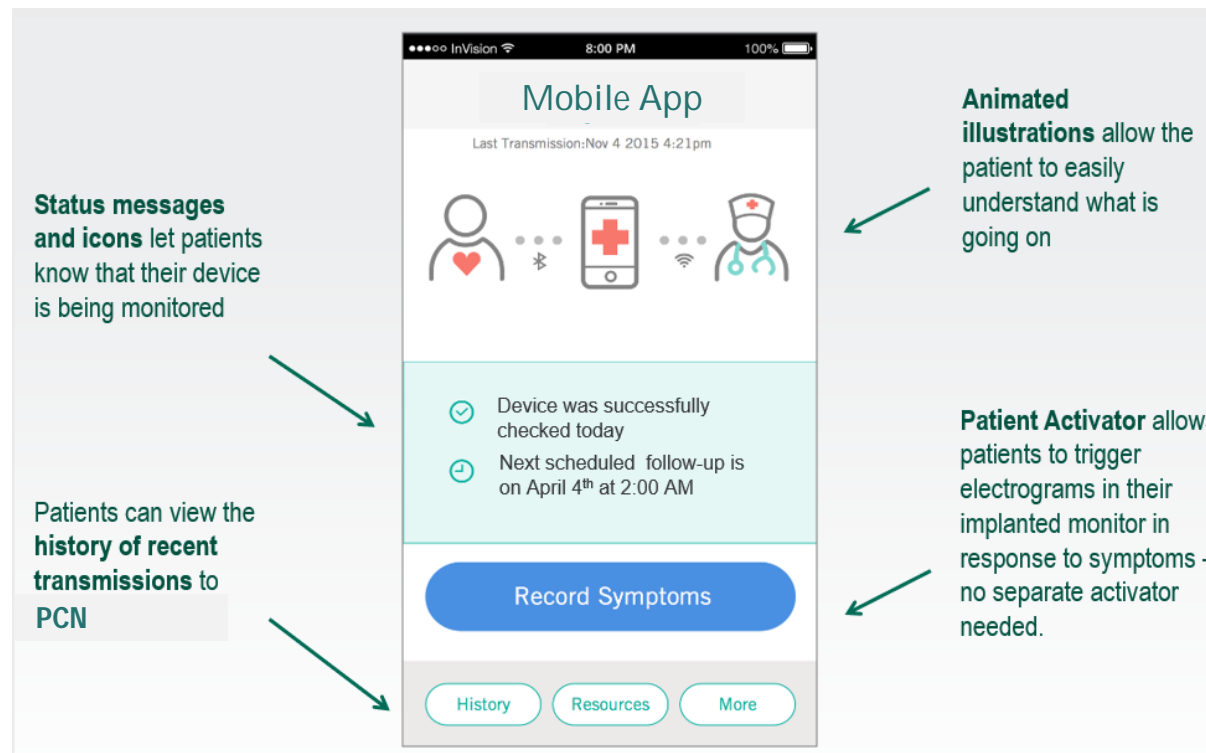
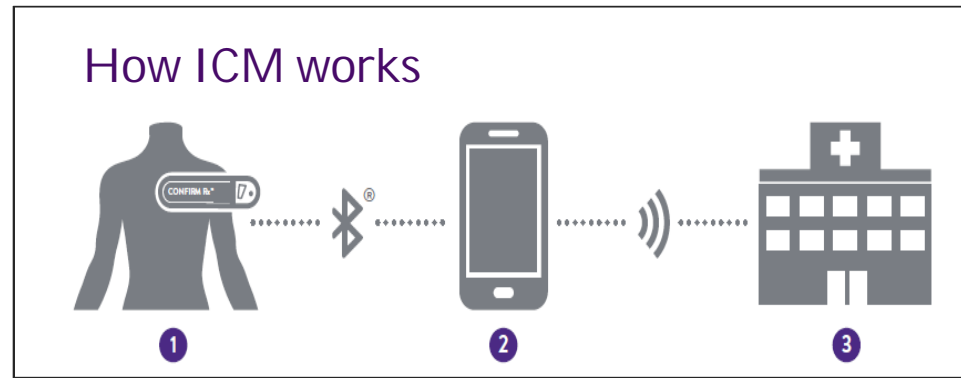


- Long-term monitoring
- Bluetooth-enabled implantable cardiac rhythm monitoring system
- Wireless connectivity between device, patient smartphone and programmer
- Remote monitoring

PocketECG System - Process Flow

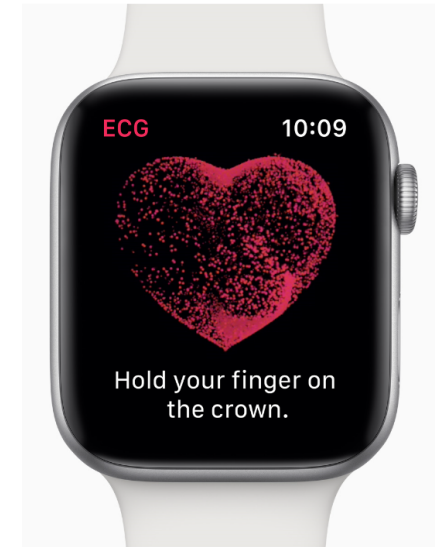


Implantable Cardiac Monitor - Process Flow

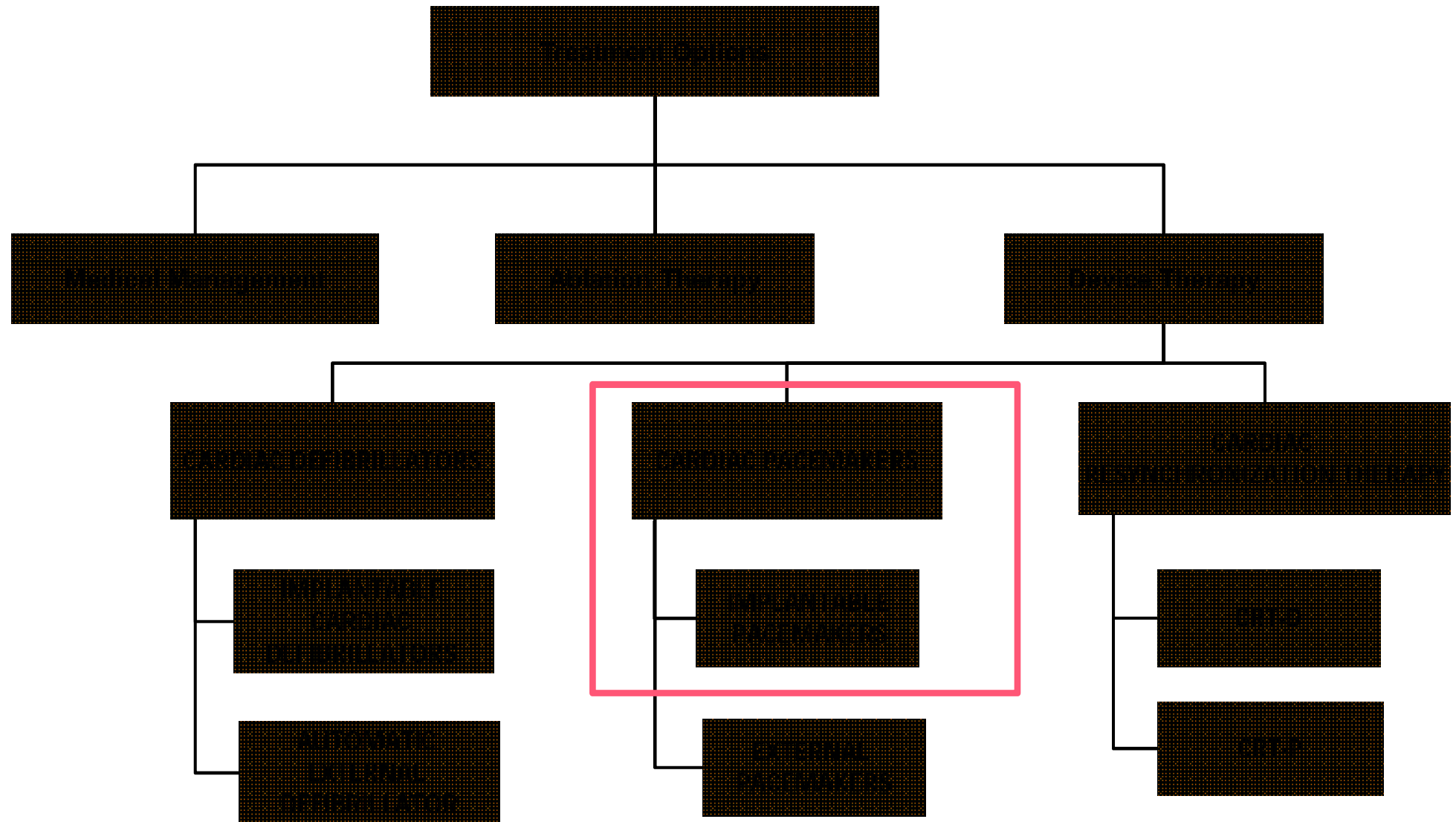


Remote Monitoring/Screening through Smart Watches (Apple) – Way forward

- Uses in-built sensors to perform an electrocardiogram (ECG) similar to a single-lead ECG
- Activation feature by touching the crown of the watch for 30 seconds
- Notification of any irregular patterns linked to conditions such as atrial fibrillation, a leading cause of strokes
- A heart health record can be downloaded and shared with GP
- CE marked
- A study of over 400,000 participants in total notified 2,000 users about irregular heart patterns, a third of whom were found to have atrial fibrillation. (Results presented in ACC March 2019)



Cardiac Rhythm Management



Evolution of Pacemaker Technology

Device/Pocket related challenges (weight)

- Discomfort
- Hematomas
- Infection
- Cosmetic concerns

Lead related challenges

- Mechanical failures
- Dislodgement
- Infections
- Extractions

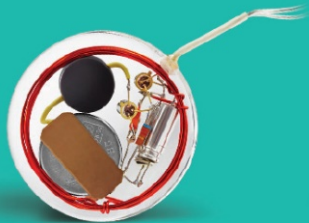


2013

Weight: 2g
Size: 1cc

**First leadless
pacemaker**

EVOLUTION OF PACEMAKER TECHNOLOGY



1958

Weight: 73.4g
Size: 35cc

First implantable
pacemaker



1981

Weight: 55g
Size: 25cc

First microprocessor
based pacemaker



1995

Weight: 14g
Size: 6cc

First AutoCapture
pacemaker



2009

Weight: 23g
Size: 12.8cc

First fully wireless
pacemaker

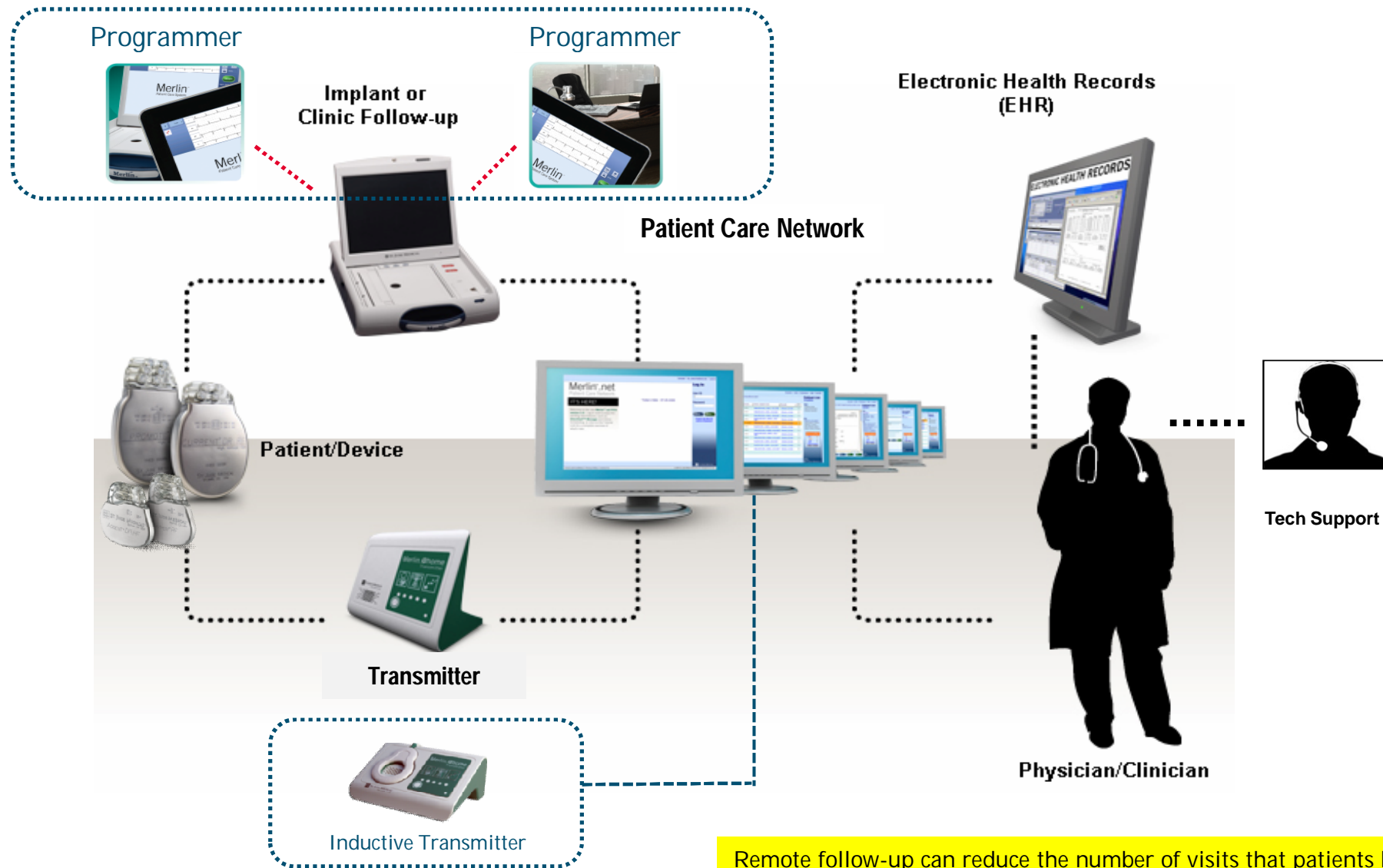


2013

Weight: 2g
Size: 1cc

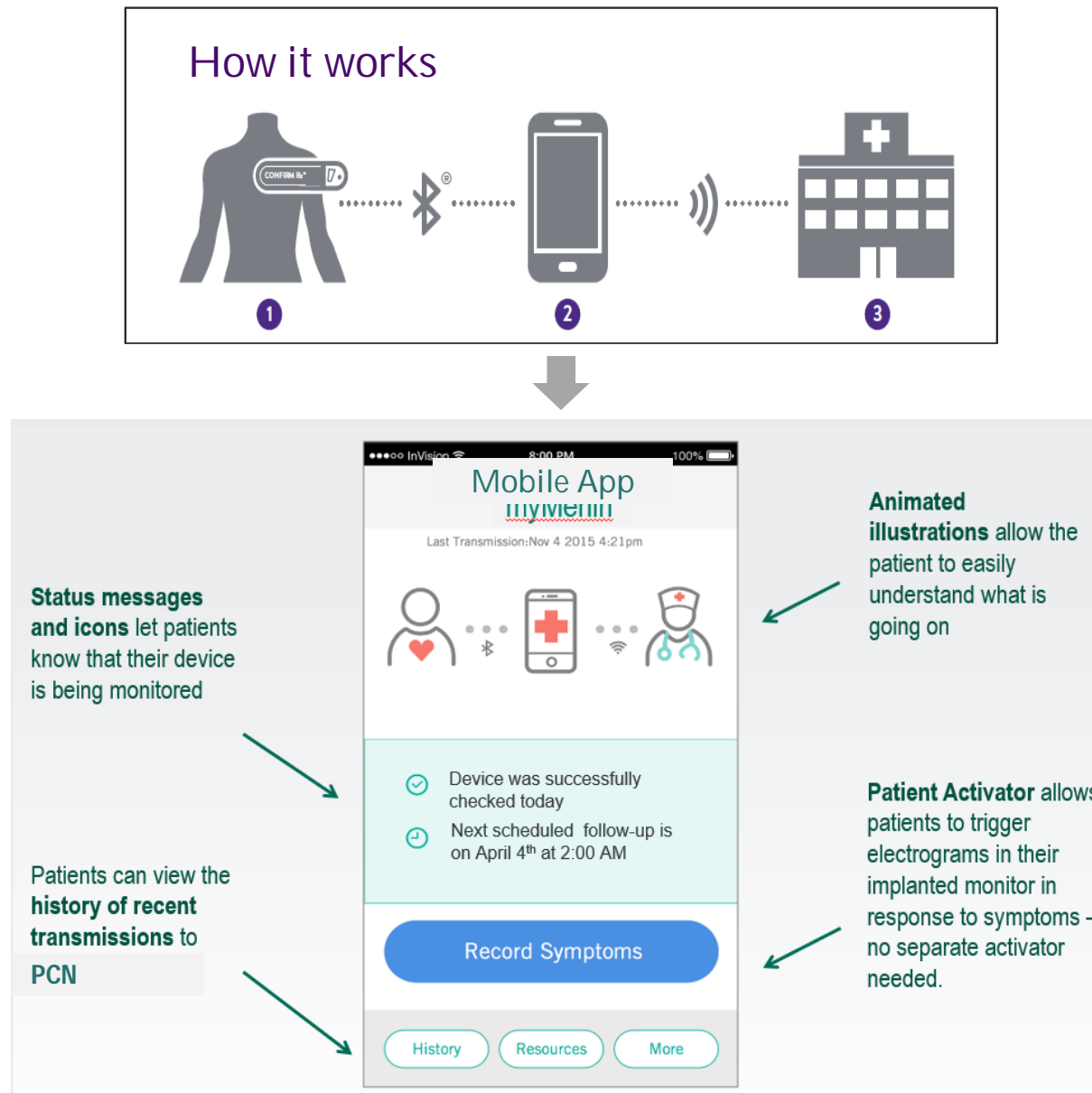
First leadless
pacemaker

Remote Follow Up -Patient Management Solution



Remote follow-up can reduce the number of visits that patients have to make to the device clinics and provide healthcare professionals the direct access to data and diagnostics that normally can be accessed only at a face to face visit.

Future Pacemaker technology – Remote Monitoring through Bluetooth and mobile app



Cardiac Arrhythmias

A FULL OFFERING OF INNOVATIVE DEVICES TO KEEP THE HEART BEATING AT A HEALTHY PACE

Pacemakers

Implantable cardioverter defibrillators

Diagnostic and ablation catheters

Mapping and visualization systems

Implantable cardiac monitors





Abbott