



SAVING YOUR LIFE WITH WEARABLE TECHNOLOGY

BY *RONALD T. BROWN M.D.*



GOAL OF THIS PRESENTATION



Teach you



- Two common medical conditions that will lead to incapacitation or stroke

Teach you



How wearable technology can help you identify these conditions and seek medical help



Disclaimer

The Information in this presentation are my thoughts :

Not the views of any organization

Not meant to be any personal medical advice

You should always check with your health care provider before changing any treatment plan

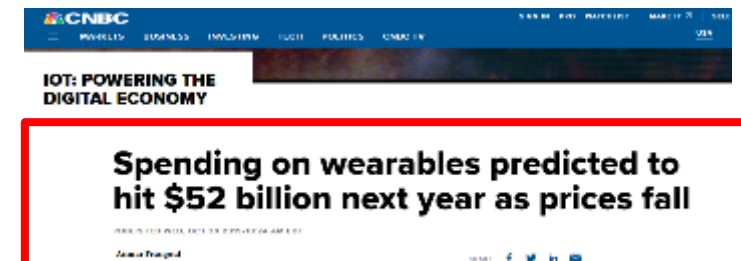
The people in this presentation are fictitious and do not portrait any member of our community

WEARABLE MEDICAL DEVICES ARE REVOLUTIONIZING THE HEALTHCARE FIELD.

- Global wearable medical device market will grow from 10.3 Billion/year to \$66 Billion by 2026

KEY POINTS

- Gartner says that end-users set to spend the most money on smartwatches and smart clothing.
- For this year, global end-user spending on wearables is set to hit \$41 billion, according to the forecast.



GLOBAL WEARABLE COMPUTING MARKET LEADING MANUFACTURERS

Google 2.1 B

Apple
Fitbit
Garmin
Jawbone
LG Electronics
Pebble Technology
Samsung Electronics
Sony
Zephyr Technology

When you hear the terms “wearable technology”, “wearable devices” or “wearable gadgets”,

Step Trackers

Smart Watches

GPS Trackers

Precision Trackers.



Wearable Devices let us do everything from communicate easier to monitor biological data.



Glasses from Aira to help Blind

ITBra that detects Breast Cancer



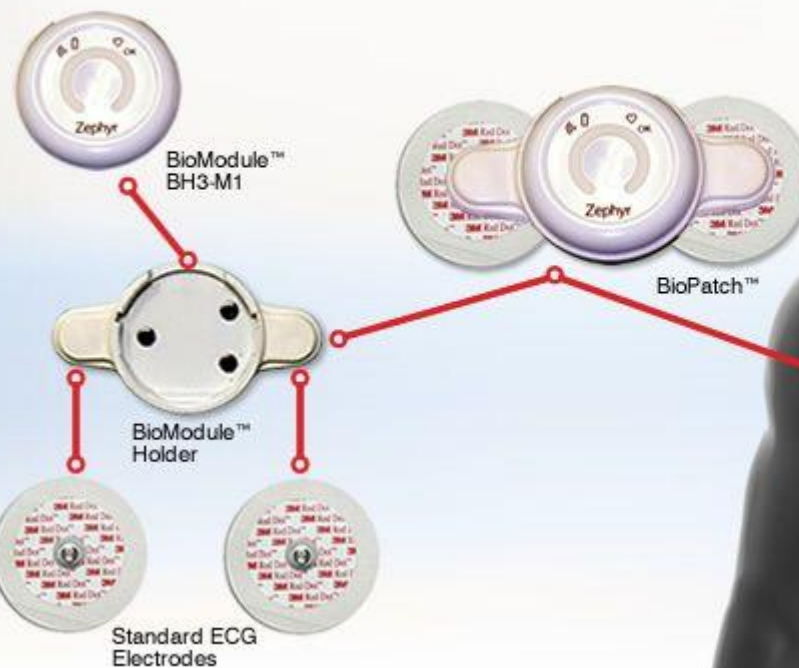
Apple Watch – Heart Rate

BioPatch™
WIRELESS SENSOR MODULE

Patient Monitoring
should be **this** easy.



Patient Monitoring should be **this** easy





RED WINE MAY
HOLD THE KEY
TO NEXT-GEN
WEARABLE
TECHNOLOGY



MARY IS 74 ,WIDOWED AND LIVES
FULL TIME @ SILVERIDGE RV RESORT



Mary

Mary has lived at Silveridge for 7 years and has won the hearts of all the residents

She lives by herself in a Park Model with Arizona Room and has a very good friend across the street who she walks with @ 9AM every morning.

Alice and Mary walk around the Silveridge perimeter and then have a cup of tea

Mary is very active and is a member of the Pickle Ball club

Her highlight of the year is Monday morning meetings @ SilvercomCTC

***Mary has been widowed for 12 years
Her daughter (Meg) is an accountant and lives in Palm
Desert but comes to visit once a month
Mary has pretty good computer skills and Skypes
frequently with Meg
Mary doesn't drive any more and uses Uber for
transportation***



Alice



Dr.Jones

Mary's Health

Mary likes Dr. Jones who has been her Family Physician for the past 12 years

Mary sees him twice a year at his office by Fry's on Ellsworth Avenue

Mary is overweight and on a mild BP Pill

On her last physical exam Dr. Jones found her to be in excellent health And noted her BP as 146/86 with a pulse of 88 and regular.

Mary told Dr. Jones about her daily walks with Alice and would try to get in an extra game of Pickle Ball to lose weight



John

On July 2 Mary is walking home from the mail room and feels a bit “ Light Headed”

She has no Chest Pain or Palpitations but sits down on the grass.

John comes by in his golf cart and asks if she is ok.

She gets up and feels fine but he insists on taking her home in the golf cart.

The “ Light Headed “ feeling is gone and John phones later to make sure she is fine

Meg calls and Mary promises to see Dr. Jones tomorrow



Dr.Jones sees Mary the next day.

Her symptoms have gone and she feels fine.

Her exam was normal

BP 142/86 Pulse 86 &R

Both decided no investigations were needed

On Monday, July 17 Mary was cooking supper and felt a similar “ Light Headed “ feeling lasting for 30 minutes.

She had no chest pain or palpitations and the sympts went away while she rested in her Lazy Boy Chair.

She saw Dr.Jones who again found nothing wrong but did an ECG which was normal.

Because this was Mary’s second episode they decided to do some investigations which would include Blood Work and a Cardiac Holter Monitor for 24 hours.

Mary had Meg coming on Friday so wanted to do the test the next week.



On Wednesday @ 2:30 AM Mary got out of Bed to Void.

While getting up off the toilet she got another “Attack” and fell to the floor and heard a “Crack” in her right hip. She was in terrible pain and wedged between the toilet and shower.

She couldn’t move and called for help but no one came.

Alice found Mary @ 9 AM when she came for a walk

When EMS arrived Mary was Hypothermic, with a pulse of 46 and BP 80/60





On arrival to Banner Hospital she had a temporary pacemaker inserted in the ER.

She was transferred to ICU where she was stabilized and had a permanent pacemaker.

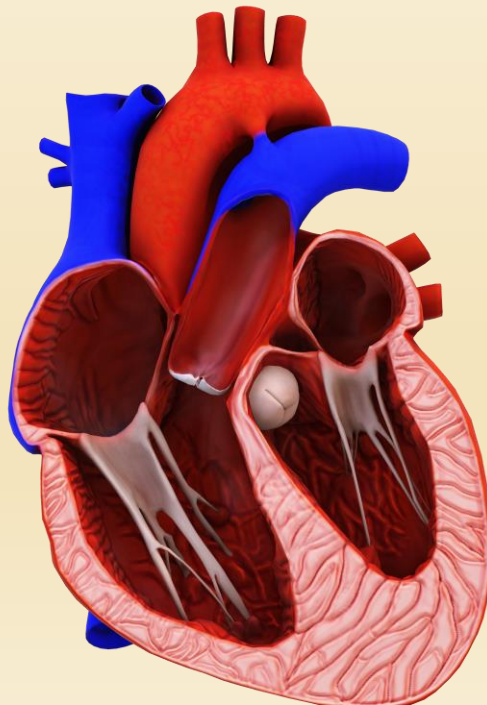
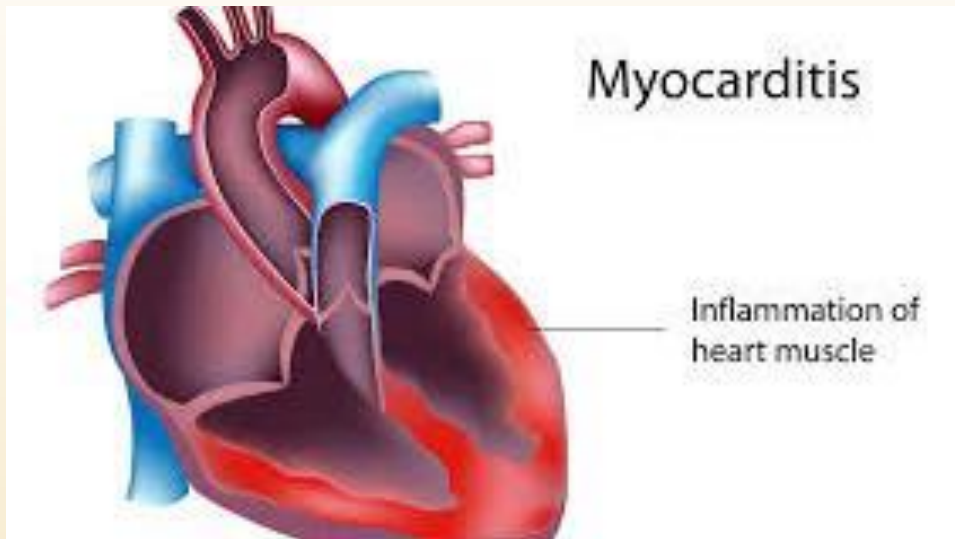
Her Hip was repaired and to the delight of very one Mary had an uneventful recovery

She is back doing her daily walks with Alice but has given up Pickle Ball.

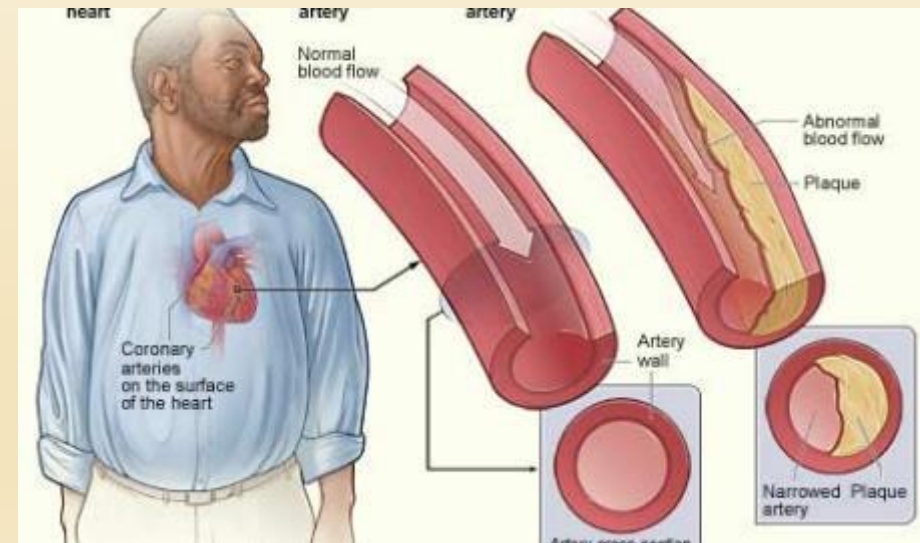
What was Mary's Diagnosis?

What could Mary have done to be better prepared for a Medical Emergency

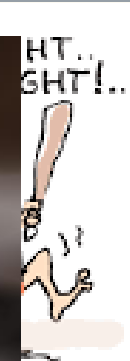
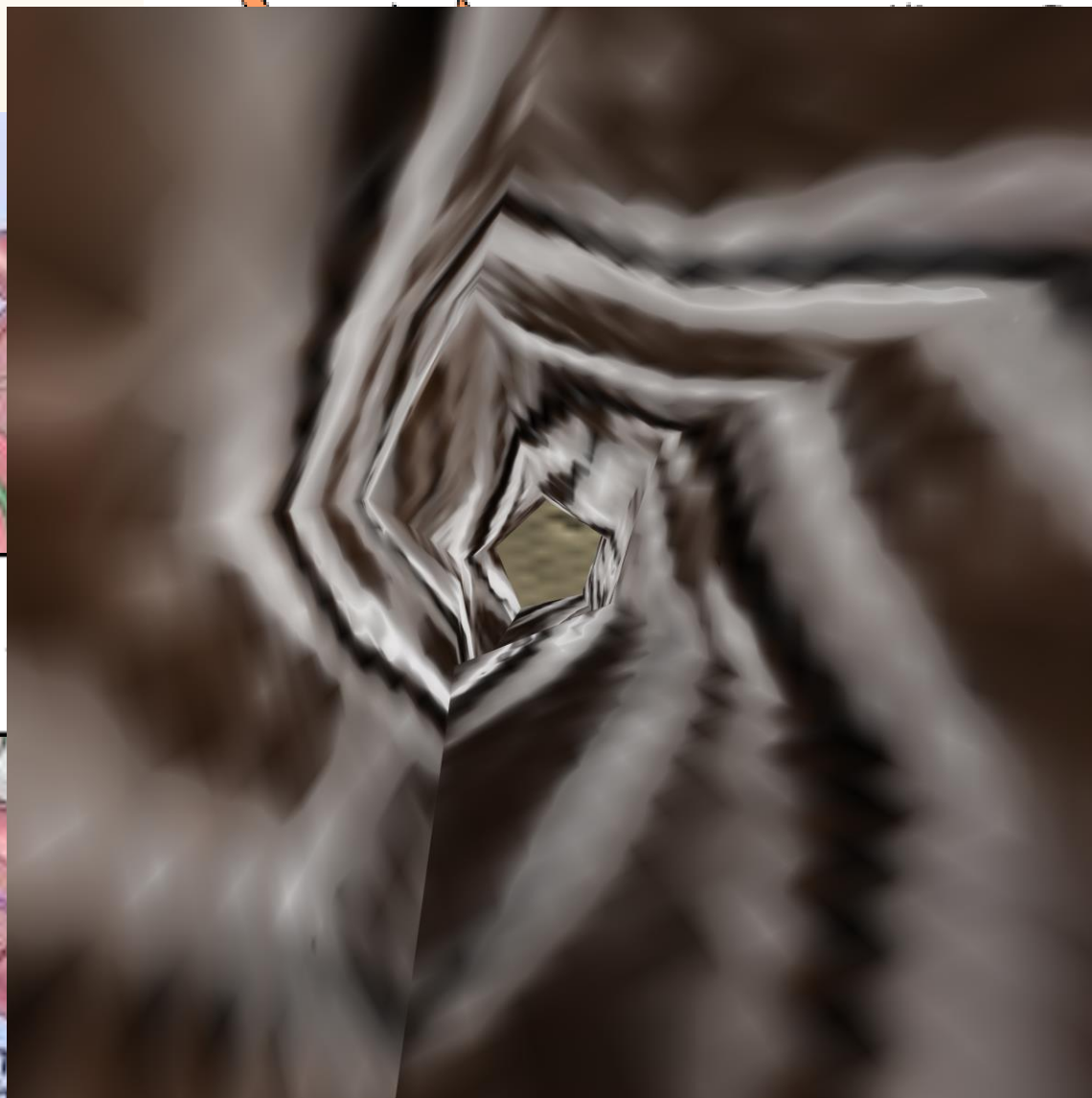
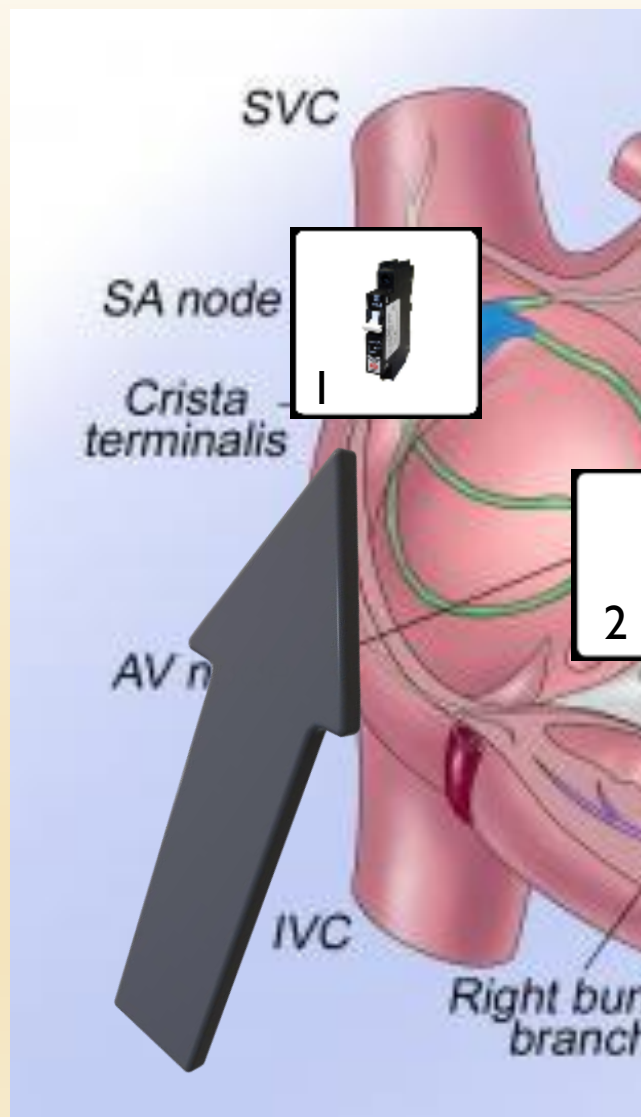
What were clues in her history that could be expanded on.



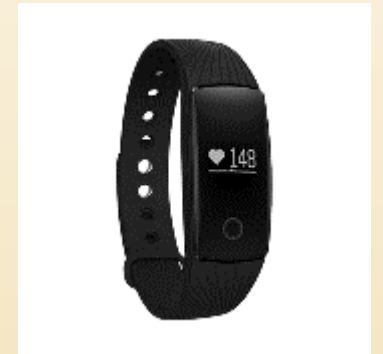
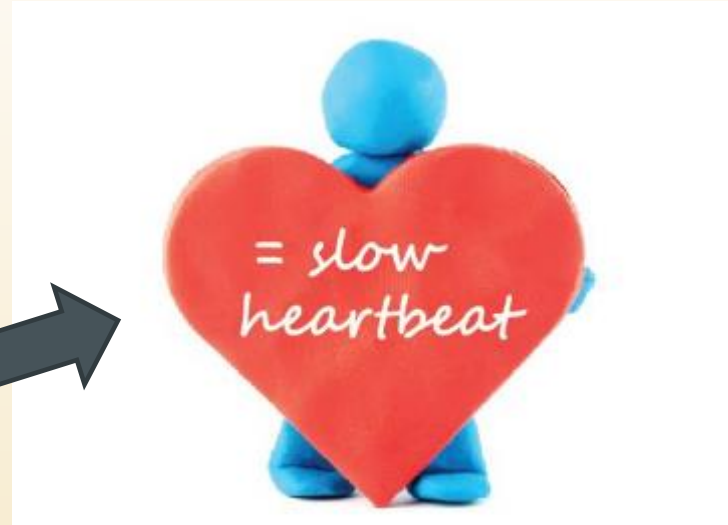
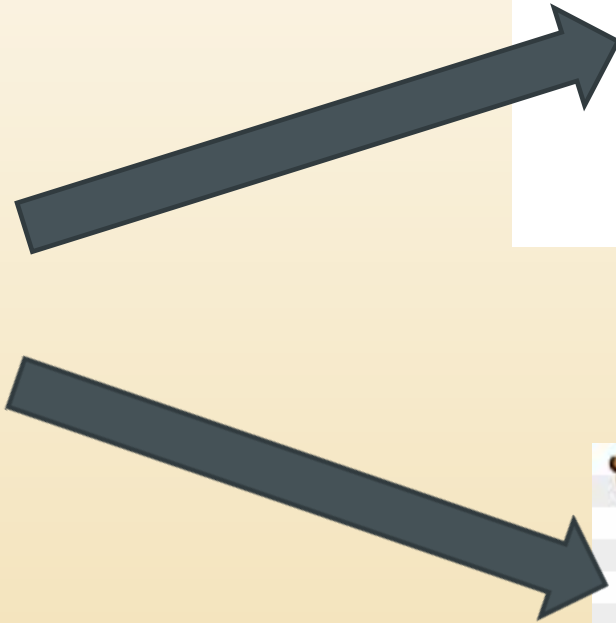
Valvular Disease



Coronary Artery Disease



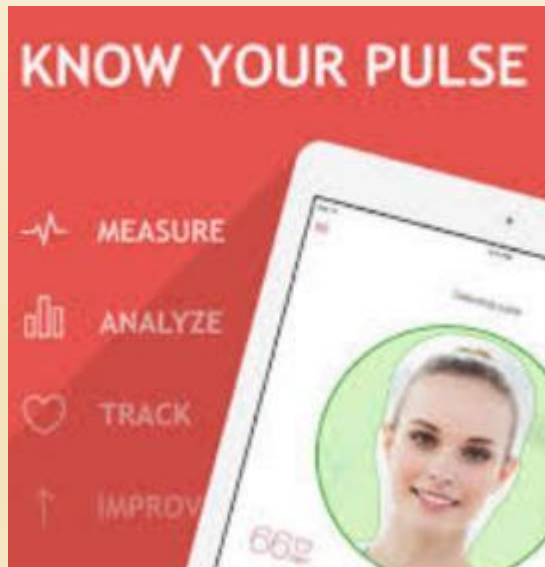
rt Electrical Wiring



Monitor your pulse



How to measure your pulse?



Apple Watch

VS



FitBit
Garmin
Amazefit

All Activity Trackers Measure your pulse

Most are paired with Bluetooth to your Smart phone

Most have an APP on your phone that stores your data

The data is usually exportable

Some have GPS function --- phone/device

All can be used as trainers for exercise



Value for Seniors

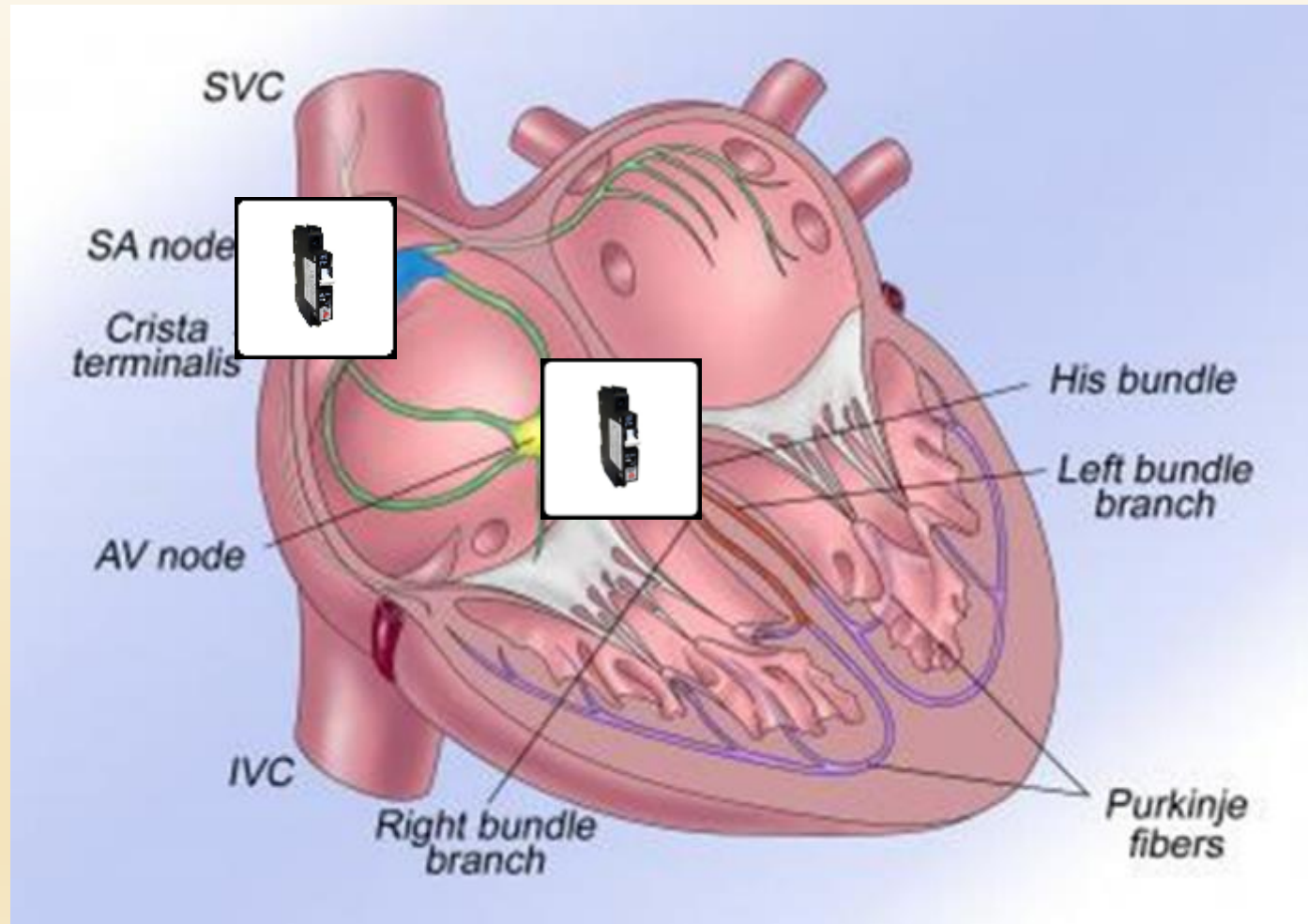
Monitor your pulse

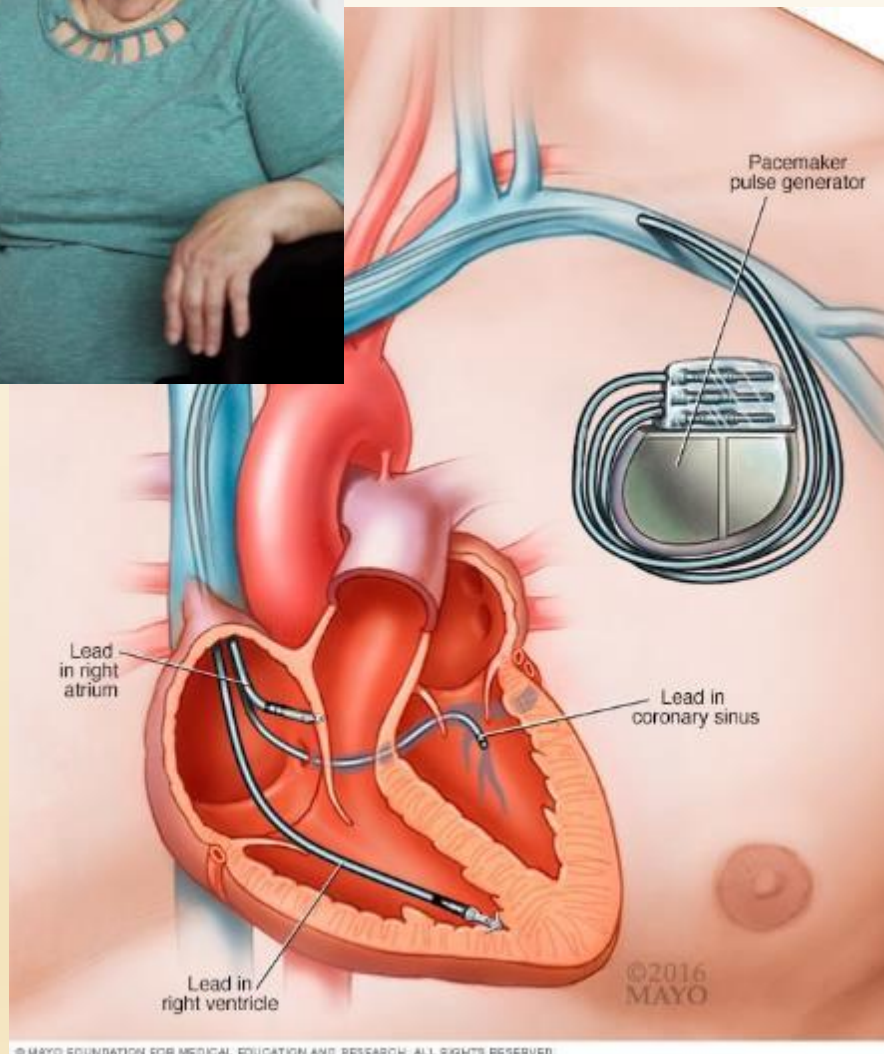
Accelerometer for Falls - Emergency Contact

Emergency notification



Circuit Breaker(SA) Fails in Closed Position
No stimulus to heart
Reverts to AV node Speed
Heart Rate Slows
Intermittent
Elderly don't tolerate slow heart rates





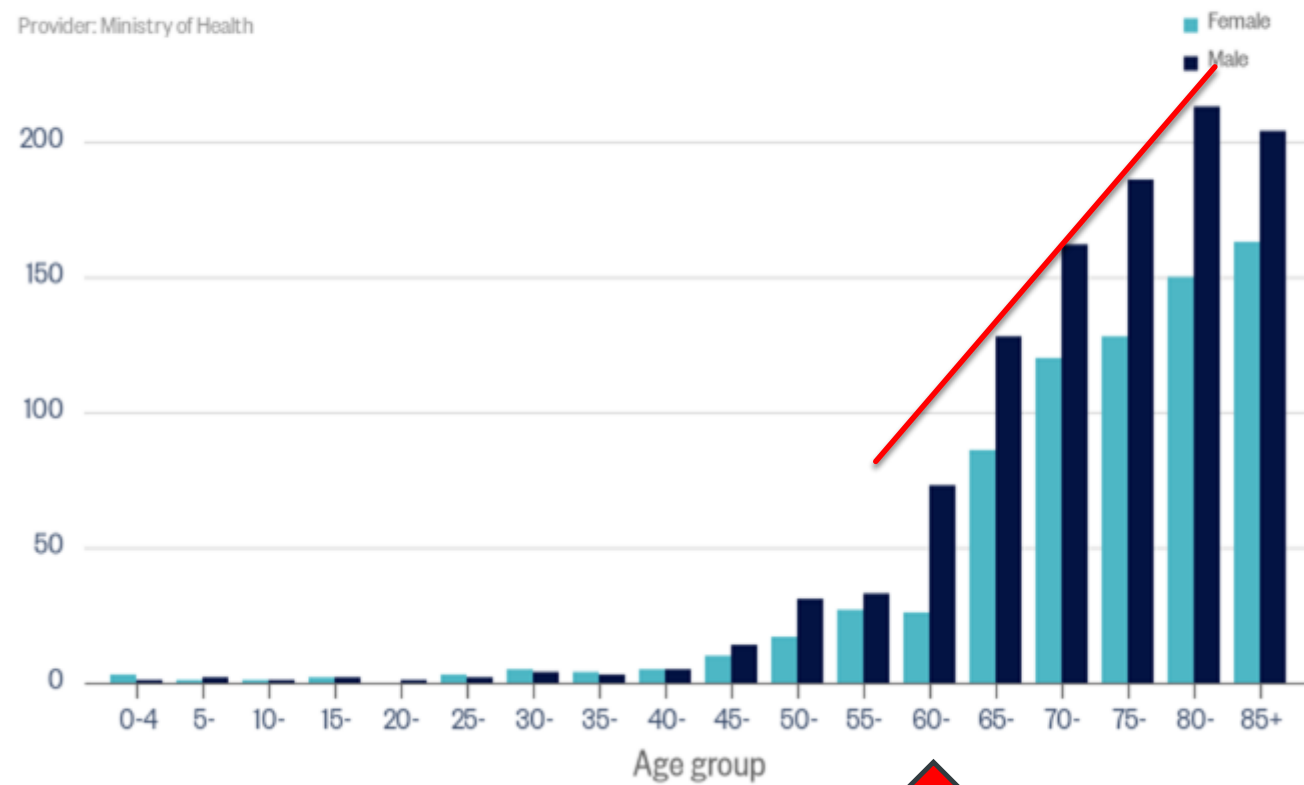
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Insertion of cardiac pacemaker generator in New Zealand hospitals

By sex and age group, year ended June 2016, number of procedures (publicly funded)

Provider: Ministry of Health

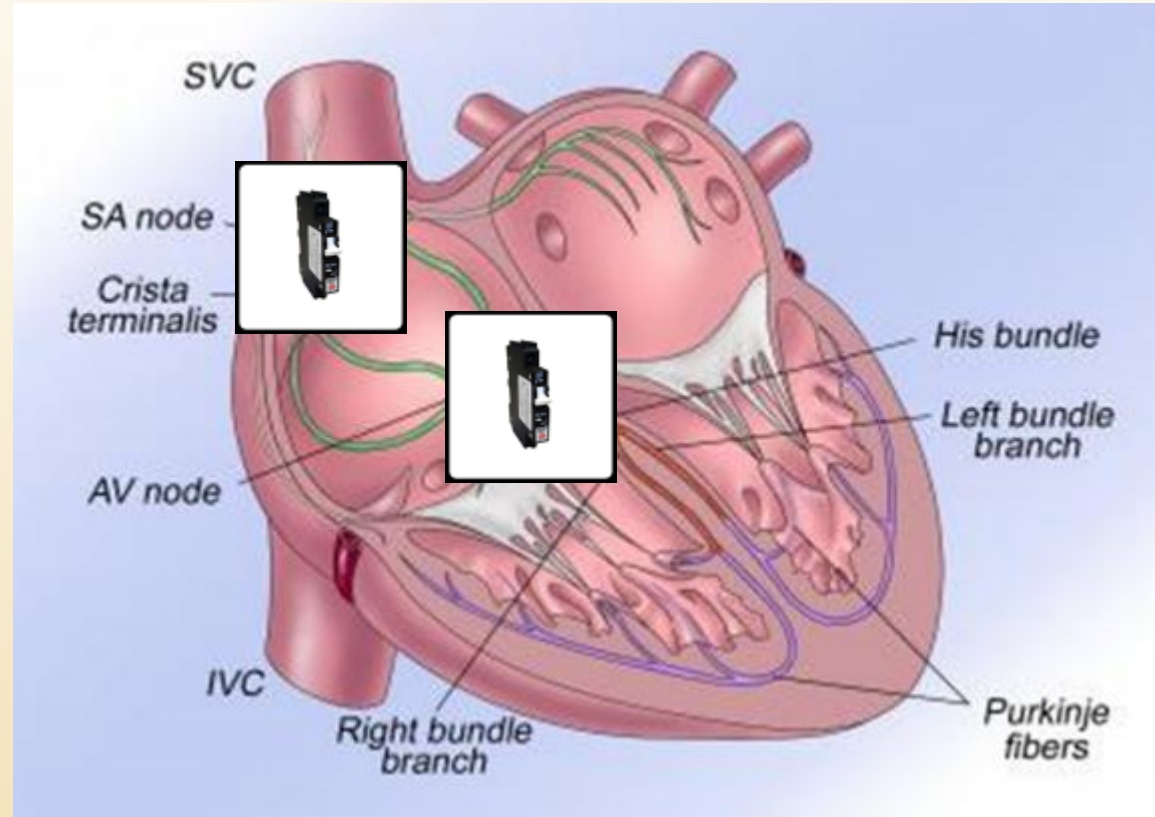
figure.nz



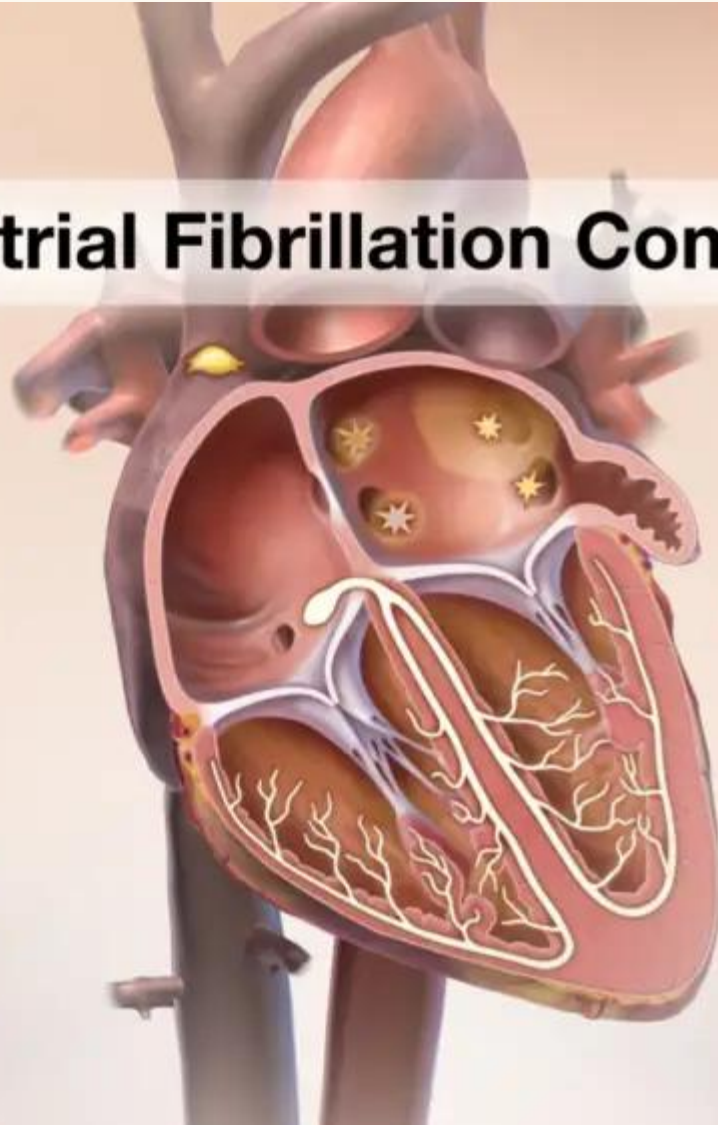




Heart Rate too fast (140-180)
SA Circuit Breaker stuck in open position
Often feel Palpitations
Atrial Fibrillation



Atrial Fibrillation Complications



Atrial Fibrillation
increases risk of:

- Blood clots
- Stroke
- Heart failure

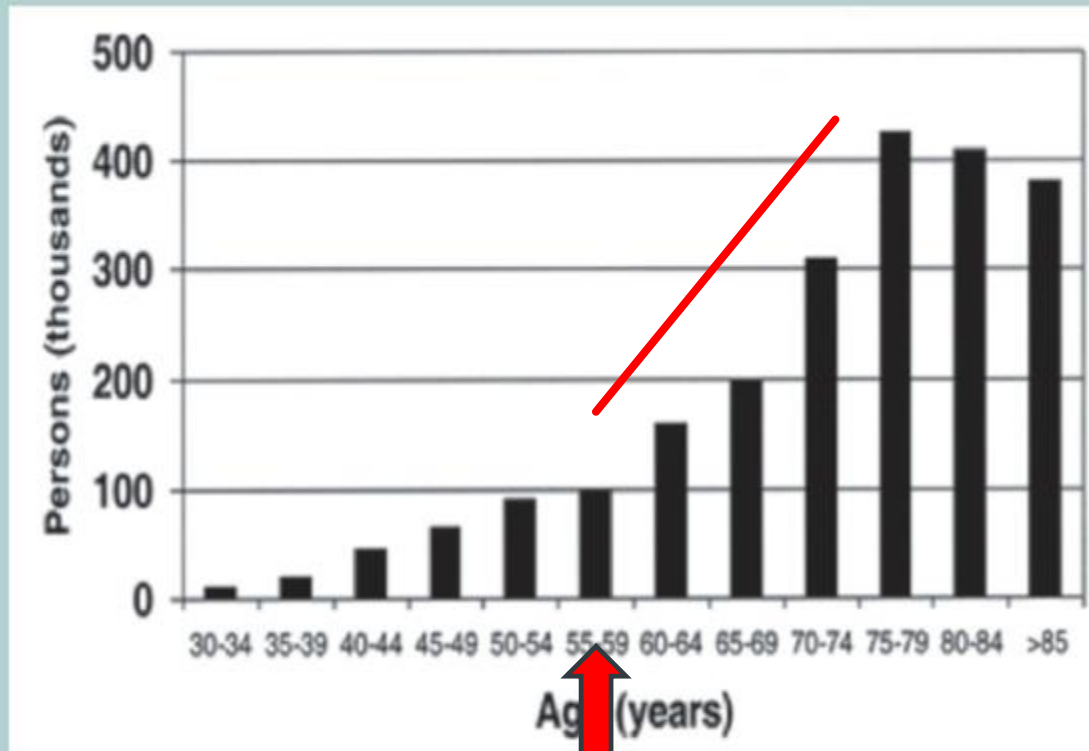
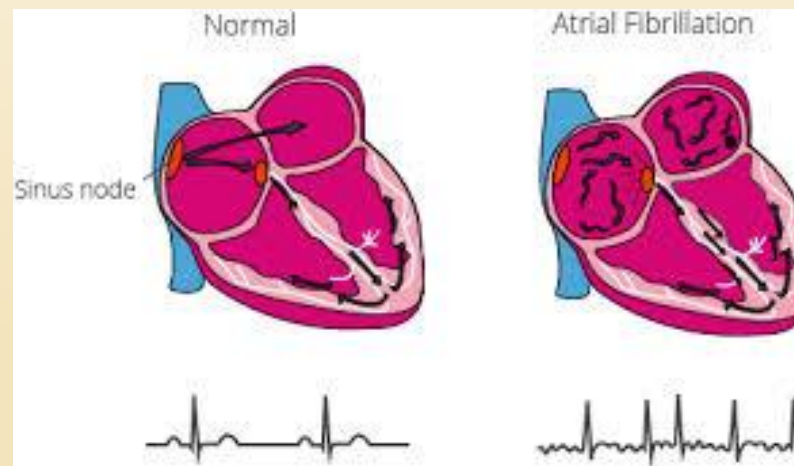
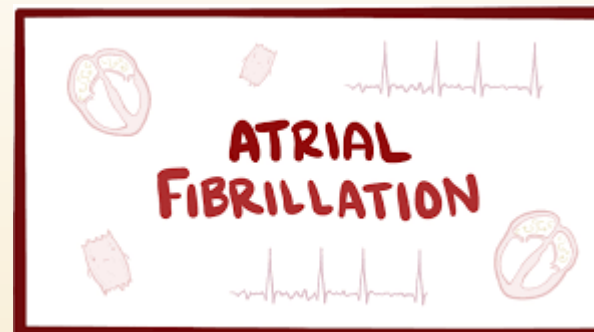


Figure 1. The age-related prevalence of atrial fibrillation.

Reprinted with permission from Archives of Internal Medicine, volume 155, number 5. Feinberg WM, Blackshear JL, Laupacis A, Kronmal R, Hart RG. Prevalence, age distribution, and gender of patients with atrial fibrillation. Pages 469-473. Copyright © 1995 American Medical Association. All rights reserved.



An Apple Watch with a black band is shown against a black background. The watch face displays a notification for heart rate. At the top left is a red heart icon inside a grey circle. To its right is the time 10:09. Below the heart icon is a grey bar with the text HEART RATE. The main body of the notification contains two paragraphs of white text.

10:09

HEART RATE

Your heart has shown signs of an irregular rhythm suggestive of atrial fibrillation.

If you have not been diagnosed with AFib by a physician, you



FRONT PAGE

ALL NEWS

TOPICS

MULTIMEDIA

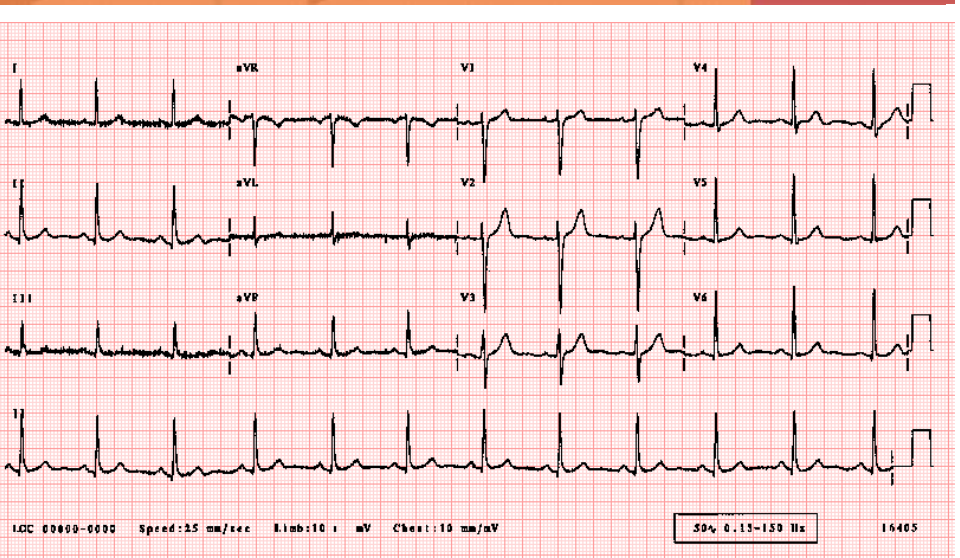
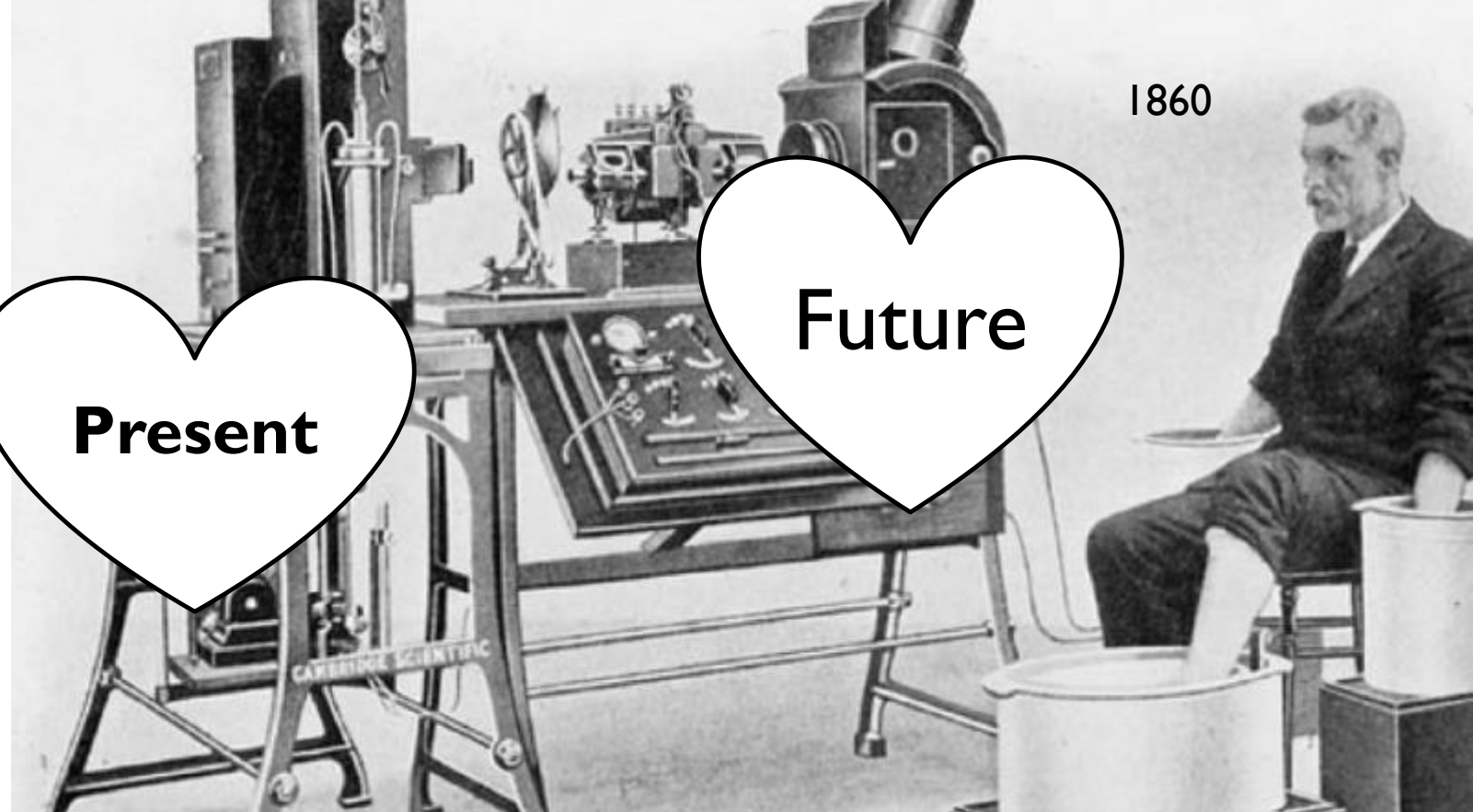
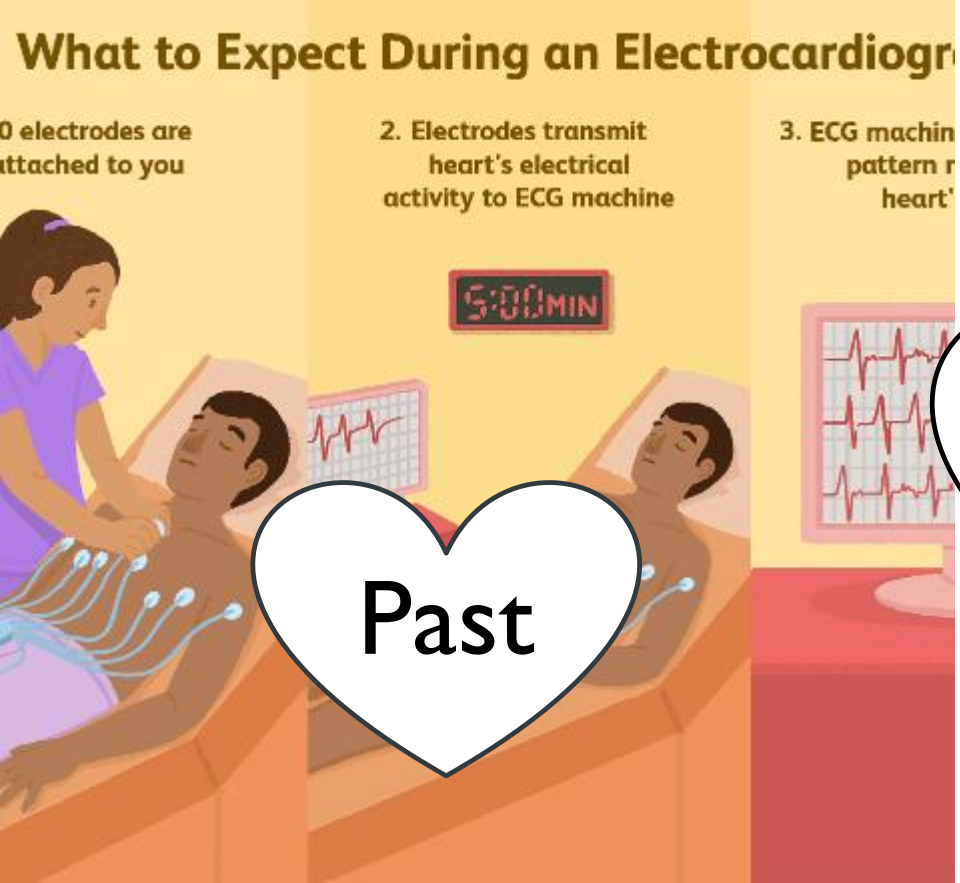
Email →

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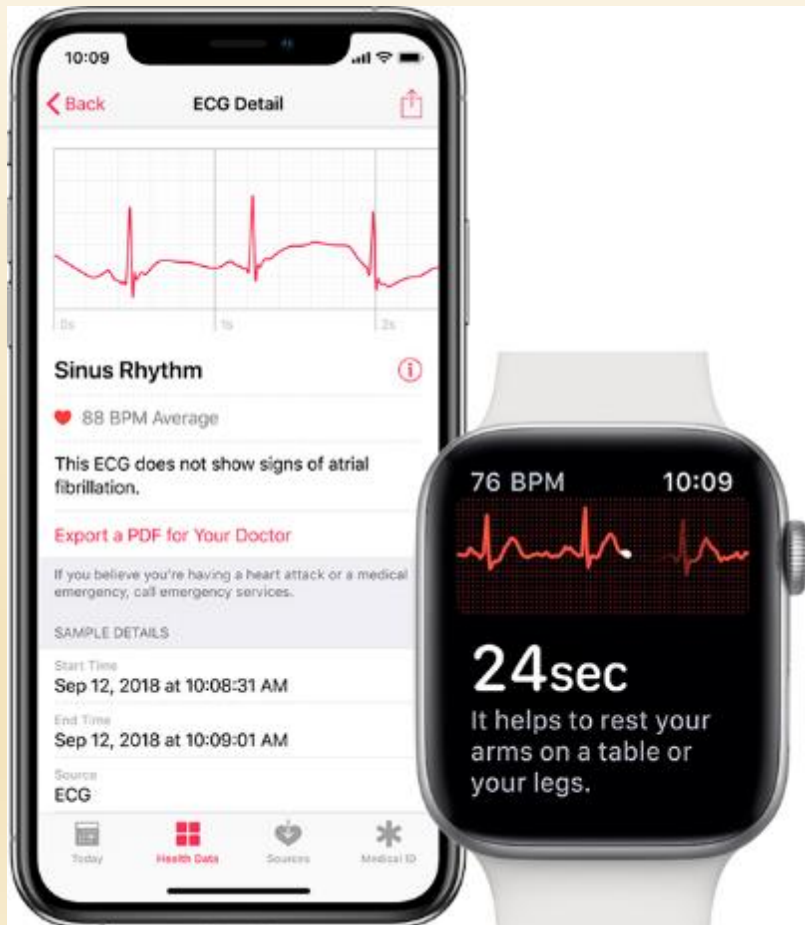
Apple Heart Study demonstrates ability of wearable technology to detect atrial fibrillation

Stanford researchers presented preliminary findings from a virtual study that enrolled more than 400,000 participants.





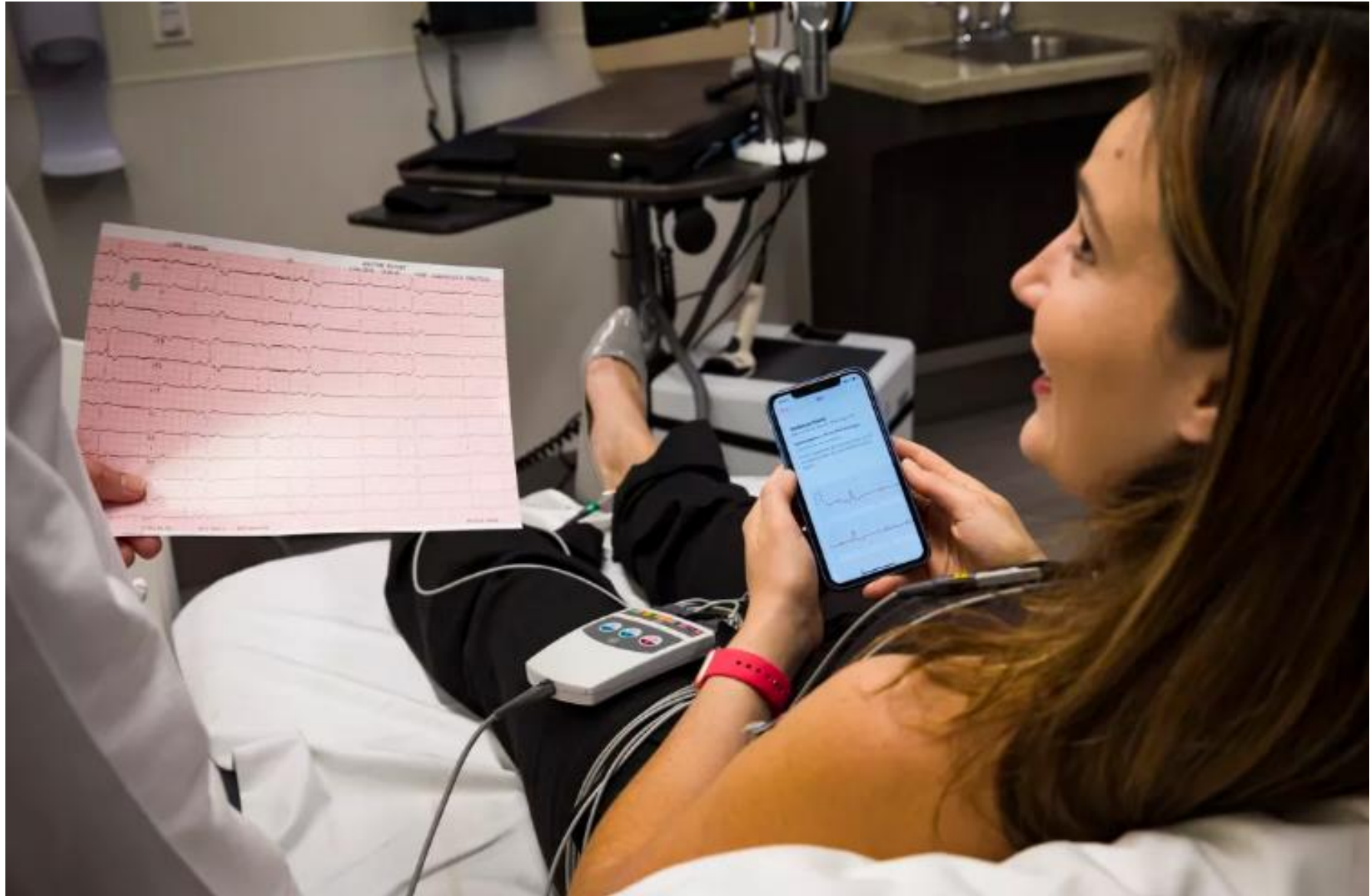
COPY OF ECG FROM APPLE WATCH



Sinus Rhythm — ❤️ 62 BPM Average

This ECG does not show signs of atrial fibrillation.







THE APPLE WATCH
IS MEANT TO BE
USED WITH THE
HEALTH APP ON
YOUR IPHONE



AMAZFIT VERGE 2 IS A BUDGET RUNNING WATCH WITH AN ECG MONITOR ON BOARD

WEEKS OF BATTERY LIFE FOR MINIMAL CASH ON THIS SMARTWATCH



The Verge 2 is one of the very first smartwatches to come with an ECG monitor



Amazfit Bip Smartwatch by Huami with All-Day Heart Rate and Activity Tracking, Sleep Monitoring, GPS, Ultra-Long Battery Life, Bluetooth, US Service and Warranty (A1608 Black)

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author of Cutting for Time*



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AN EARLY LOOK AT ALIVECOR'S AMAZING
KARDIAMOBILE 6L: ACCURATE 6 LEAD ECG ON
YOUR SMARTPHONE



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Review



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Howto

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AliveCor® KardiaMobile EKG Monitor | FDA-Cleared | Wireless Personal EKG | Works with Smartphone | Detects AFib Bradycardia and Tachycardia in 30 seconds by AliveCor

★★★★☆ 2,336 customer reviews | 905 answered questions

Amazon's Choice for "kardia mobile heart monitor"

Price: **\$99.00** ✓prime

FREE delivery: **Wednesday** Details

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In Stock. Sold by Kardia Mobile and Fulfilled by Amazon.
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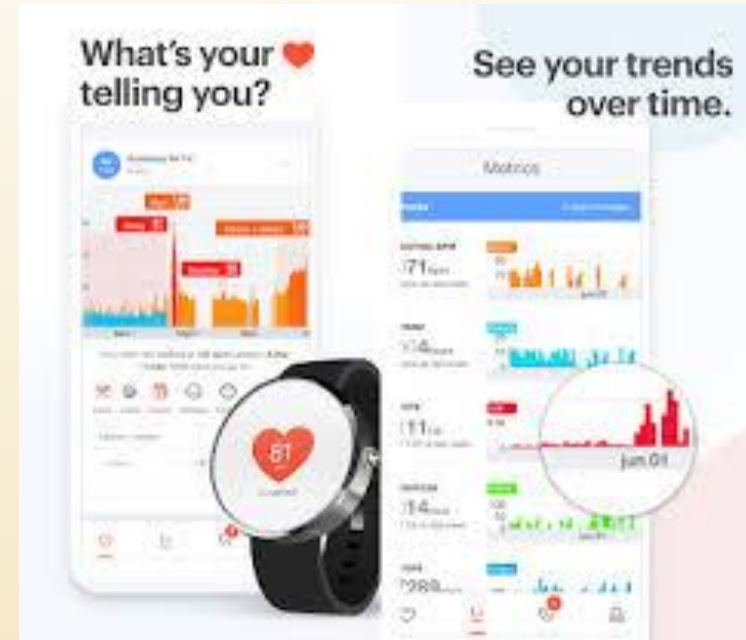
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AliveCor
KardiaMobile



THE CARDIOGRAM APP CAN FINALLY TAP INTO FITBIT, GARMIN AND APPLE WATCH HEART RATE SENSORS

WearOS by Google.



Favorite



Share

Mon
7/1

Summary for Mon

a day

...



RESTING BPM

83 bpm



PEAK BPM

120 bpm



STEP COUNT

8,962 steps



SLEEP DURATION

-- hours



Favorite



Add tag



Share



Timeline



Metrics



Habits



Health Insurance

Cardiogram is working with insurers and employers on programs that use your smart watch to keep you healthy.

Do you currently have health insurance?

Yes

No

Plan Name e.g. Aetna, United, Medicare

Member ID See your insurance card

Employer Company Name

☐ I have secondary insurance

Where do you currently reside?

Select location...

SAVE INSURANCE INFO

You won't be billed or charged. Your information will only be used to look up eligibility for our wearable health programs.

LINK TO
HEALTH
INSURANCE

GOAL OF THIS PRESENTATION



Identify



- A slow heart beat - Pacemaker

Identify



Rapid Heart Beat – Atrial Fibrillation

HOW COULD MARY HAVE BEEN BETTER PREPARED

- Personal monitoring of own health
- Using technology to communicate with health care
- Using technology to communicate with daughter/family
- Using technology for emergency response





Questions?

Saving your life with wearable technology

SilvercomCTC – Mesa AZ

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**SilvercomCTC – Mesa
Arizona**



Fitbit Versa™
WATCH

\$249.95



NEW



Fitbit Versa™
WATCH
LITE EDITION

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Fitbit Versa™
WATCH
SPECIAL EDITION

SHOP NOW



Fitbit Charge 3™
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SPECIAL EDITION

\$219.95



Fitbit Charge 3™
TRACKER

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NEW



Fitbit Inspire HR™
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\$129.95



NEW



Fitbit Inspire™
TRACKER

\$99.95



NEW



Fitbit Ace 2™
ACTIVITY TRACKER
FOR KIDS 6+


\$99.95



APPLE WATCH WEARER IN THE UK DETAILS HOW THE ECG APP HELPED SAVE HIS LIFE - AGE 30

Back in April while nearing the end of training for the Brighton marathon and feeling like I was doing pretty well. When on the 5th of April I was getting palpitations all of a sudden which didn't seem to stop. While wearing my Apple Watch series 4 which had just had the ECG function just released a week before i thought I would use it just to see what was happen when it flagged up with an atrial fibrillation warning it made me more concerned with what was happening.

With a series of events which ended up with me in accident and emergency that evening to being told that I shouldn't do the marathon which was only 10 days away just on a precaution to now 2 and a half months later after a series of tests being told I need to have a valve repair surgery via open heart surgery sooner rather than later which is currently booked for Wednesday 3rd of July.



"As physicians, we are going to want to use it," Campbell said. "However, you're going to need software, you're going to need artificial intelligence, you're going to need other ways to sort through that data, so that data is delivered to the physician in a way that's easily digestible and manageable."

Dr. Kernison pointed out that seniors not only have to afford the watch, they also have to have it paired with an iPhone, remember to charge it, and actually wear it.

A larger concern beyond the specific features is Apple's suggestion, through its advertising campaign, that the Apple Watch can save lives.

Campbell takes issue with the implication, mainly because the Apple Watch is not an FDA-approved medical device, and therefore does not have the data to back up the live-saving "claim."







THE GALAXY
WATCH ACTIVE
2 WILL
PROBABLY
LOOK LIKE
THIS WHEN IT
LAUNCHES

Accelerometer



- An **accelerometer** is a device that measures the proper acceleration of the device.
- It is an electromechanical device that will measure acceleration forces.
- These forces may be static, like the constant force of gravity pulling at your feet, or they could be dynamic - caused by moving or vibrating the accelerometer.



www.HVW7ech.com

FITBIT – 3 AXIS ACCELEROMETER

VERY ACCURATE FOR STEP COUNTING





How could Mary have been better prepared

ALEXA COULD DETECT WHETHER YOU'RE HAVING A HEART ATTACK, STUDY SUGGESTS



That's according to researchers at the University of Washington who found that around half of people experiencing a heart attack made sounds known as agonal breathing

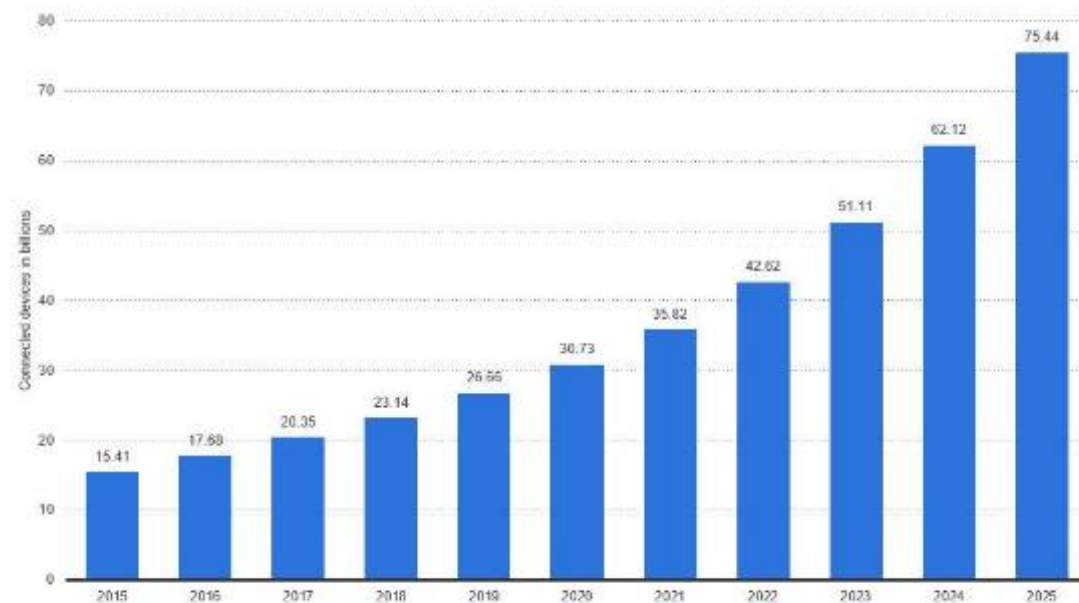
The researchers gathered 162 clips of the abnormal breathing patterns from recorded 911 calls. They found the sounds could be detected by a wide array of smart devices including Amazon Alexa, an iPhone 5s and Samsung Galaxy S4.





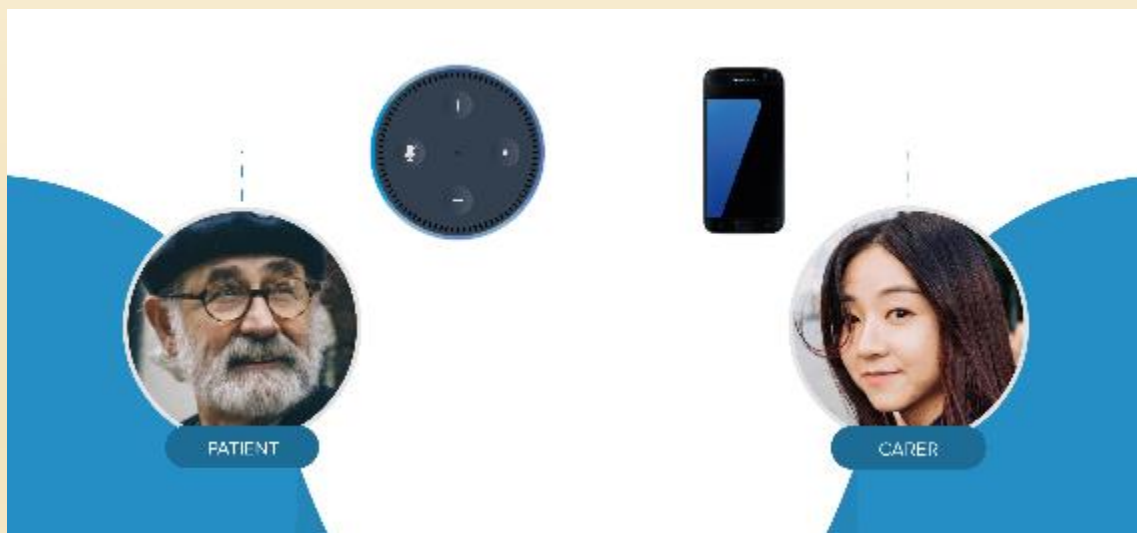
Internet of Things - number of connected devices worldwide 2015-2025

Internet of Things (IoT) connected devices installed base worldwide from 2015 to 2025 (in billions)





"Alexa, call Mom."





Bread and Butter

5.0 ★★★★★ (153)

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📄 Summary description snippet usually
something like 2 lines maximum.





APPLE'S WATCHOS 6 UPDATE INCLUDES A NEW FEATURE CALLED NOISE



You can turn on the option in the new Apple Watch app, which will be available in the fall.





key



Car key



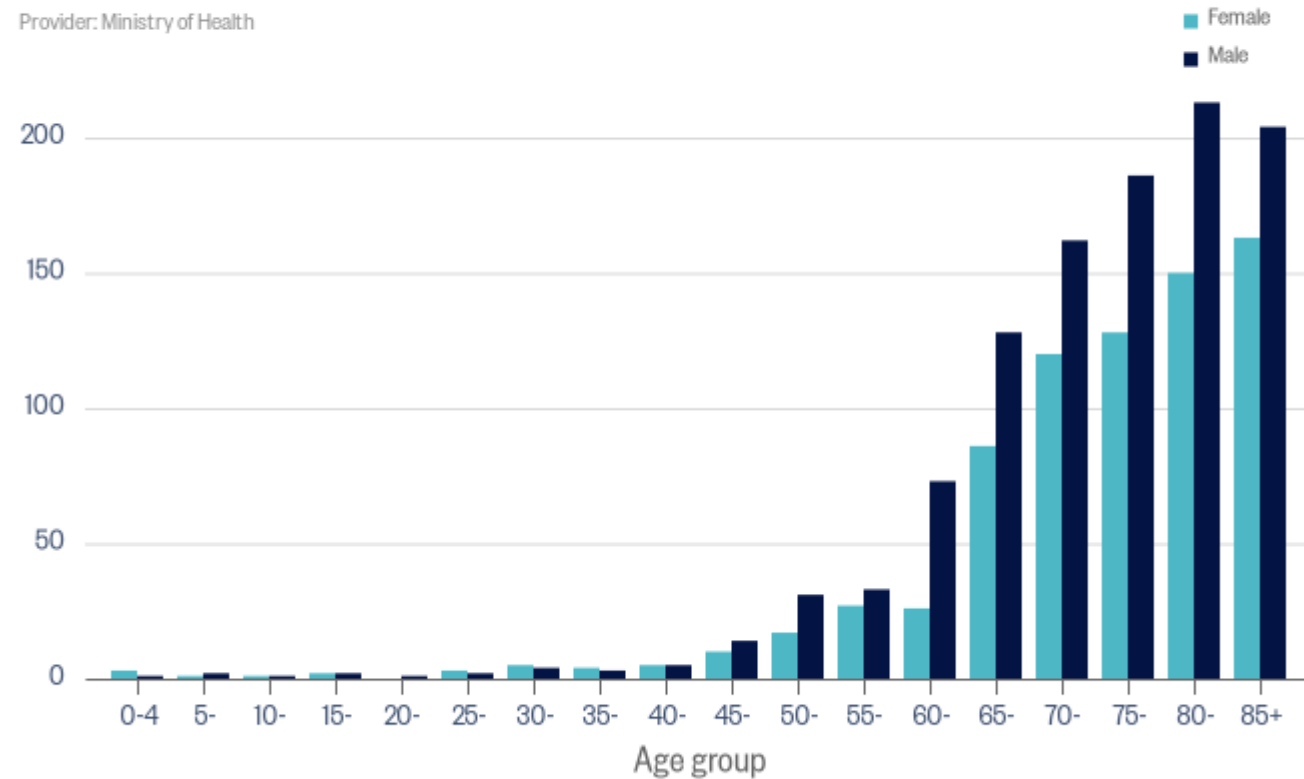
Umbrella

Insertion of cardiac pacemaker generator in New Zealand hospitals

By sex and age group, year ended June 2016, number of procedures (publicly funded)

Provider: Ministry of Health

figure.nz



openheart

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BMJ

[Open Heart](#). 2014; 1(1): e000177.

PMCID: PMC4265147

Published online 2014 Dec 10. doi: [10.1136/openhrt-2014-000177](https://doi.org/10.1136/openhrt-2014-000177)

PMID: [25512875](https://pubmed.ncbi.nlm.nih.gov/25512875/)


Original research article

Trends in the incidence and prevalence of cardiac pacemaker insertions in an ageing population

[Pamela J Bradshaw](#),¹ [Paul Stobie](#),² [Matthew W Knuiman](#),¹ [Thomas G Briffa](#),¹ and [Michael S T Hobbs](#)¹

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Conclusions

Go to: 

The demand for cardiac pacing is strongly related to ageing, driving the trends to rising rates of incidence and prevalence. With continued ageing of the population the demand for electrophysiology/pacing services is likely to continue to increase.

PERFORMING AN ECG CAN HELP A PHYSICIAN DIAGNOSE A RAPID HEART RATE



- You need to activate the app on the phone and then hold the Digital Crown down to complete the electrical circuit in your body.
- This spits out a set of data from the ECG to your Health app on the iPhone, which can be exported as a PDF and give information on rhythm to a physician, plus you're able to write notes to contextualize what was happening at the same time.