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## **Wearables and their Insurance Implications**

Understanding the History and  
Evolution of Wearables and  
Biometrics



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In keeping with the non-partisan, non-advocative mission of The Griffith Foundation, I will keep my comments and contributions to today's program unbiased and purely educational.



# Telematics and Biometrics – A History

## Progressive Insurance Autograph (late 1990s)

- Install expensive GPS unit in vehicles to obtain accurate mileage information
  - Log miles driven
  - Log time of day
- Provide discount for installing
- Adjust premium based on driving history
- Additional GPS services included

*“A mile driven at 2 a.m. is four or five times as expensive than one driven at 7 a.m.”*

–Robert McMillan, Progressive manager, 2000



April 19, 2000

WHAT'S NEXT

**Paying for Car Insurance by the Mile**



# Telematics and Biometrics – A History

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## Autograph Disposition

- Development and roll-out was discontinued
  - High cost of installation (\$500 per vehicle)
  - Privacy concerns
  - Regulatory approval of variable rates
- Re-deployed as TripSense in 2004
- Expanded nationwide as MyRate in 2008
  - GPS device costs fell
  - Multiple car households could see significant premium savings
  - Reports 15% of customers have enrolled
  - Similar programs offered by State Farm and Allstate



# A Separating Equilibrium

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## Adverse Selection

- If all insured are priced equally, regardless of risk
  - The most risky will buy insurance (which is inexpensive for them)
  - The least risky will not buy insurance (which is expensive for them)
  - The insurer will lose money
- The insurer is willing to invest to identify the most and least risky
- Insurers have focused on separating policyholders as narrowly as possible
  - Cost-effectiveness is an issue
  - How much should a life insurer invest in paying for a physical exam for every applicant?
  - How much would your insurer have to pay you to give up your wearable database?
- More on Adverse Selection from Dr. Hoy later



# Biometrics and Insurance

- Employers collect data
  - Opt-in process
  - Includes premium discounts
  - Used to incentivize healthy behaviors

Health Indicator	My Results	Normal Values
Weight		
Height		
Waist Circumference		<35" women < 40" men
Blood Pressure		<b>Systolic</b> <120 & <b>Diastolic</b> <80 Normal
Glucose		<100 optimal (fasting) <140 (non-fasting) 140 - 200 pre diabetes > 200 diabetes
Total Cholesterol		< 200 desirable 200 - 239 borderline high >240 high
HDL Cholesterol		> 60 best 50 - 59 average <40 poor
LDL Cholesterol (optional)		<100 optimal 100 - 129 near optimal 130 - 159 borderline high >160 very high
Triglycerides (optional)		<150 desirable 150 - 199 borderline high >200 high



# Biometrics and Insurance

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- Employers collect data
  - Opt-in process
  - Includes premium discounts
  - Used to incentivize healthy behaviors
- Employers use data
  - To design health-improvement programs
  - To provide aggregate data to health insurance providers
  - Additional premium discounts can be provided for participating in health interventions
- Employers protect data
  - Biometric data is not provided to supervisors
  - Biometric data are maintained separately from personnel files
  - Neither biometric results, nor refusal to participate cannot be used to discriminate





# What are Wearables?

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- Electronic devices, often worn on the wrist or carried in the pocket.
- Collects limited biometric data (steps, speed, location, heart rate)
- Communicates with a computer or server
- Data from wearables could supplement annual biometric indicators



*Garmin ForeRunner 235*



*Fitbit Charge 2*

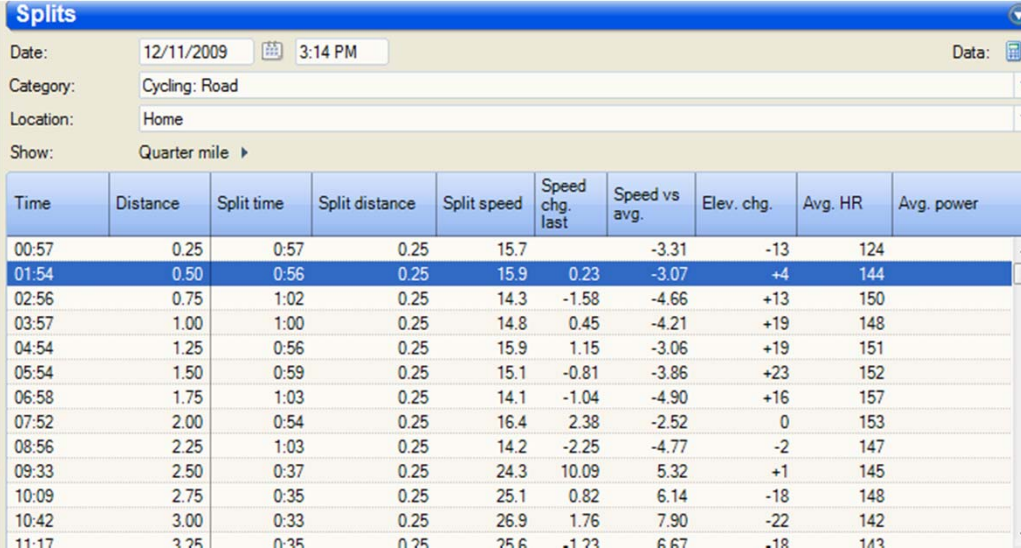


*Apple Watch*



# Why are they Popular?

- Simple exercise tracking
- Collects limited biometric data (steps, speed, location, heart rate)
- Communicates with a computer or server



The screenshot shows a software interface titled "Splits" with a table of cycling performance data. The interface includes fields for Date (12/11/2009), Category (Cycling: Road), Location (Home), and Show (Quarter mile). The table has 10 columns: Time, Distance, Split time, Split distance, Split speed, Speed chg. last, Speed vs avg., Elev. chg., Avg. HR, and Avg. power. The data is presented in a grid with alternating row colors.

Time	Distance	Split time	Split distance	Split speed	Speed chg. last	Speed vs avg.	Elev. chg.	Avg. HR	Avg. power
00:57	0.25	0:57	0.25	15.7		-3.31	-13	124	
01:54	0.50	0:56	0.25	15.9	0.23	-3.07	+4	144	
02:56	0.75	1:02	0.25	14.3	-1.58	-4.66	+13	150	
03:57	1.00	1:00	0.25	14.8	0.45	-4.21	+19	148	
04:54	1.25	0:56	0.25	15.9	1.15	-3.06	+19	151	
05:54	1.50	0:59	0.25	15.1	-0.81	-3.86	+23	152	
06:58	1.75	1:03	0.25	14.1	-1.04	-4.90	+16	157	
07:52	2.00	0:54	0.25	16.4	2.38	-2.52	0	153	
08:56	2.25	1:03	0.25	14.2	-2.25	-4.77	-2	147	
09:33	2.50	0:37	0.25	24.3	10.09	5.32	+1	145	
10:09	2.75	0:35	0.25	25.1	0.82	6.14	-18	148	
10:42	3.00	0:33	0.25	26.9	1.76	7.90	-22	142	
11:17	3.25	0:35	0.25	26.6	-1.23	6.67	-18	143	



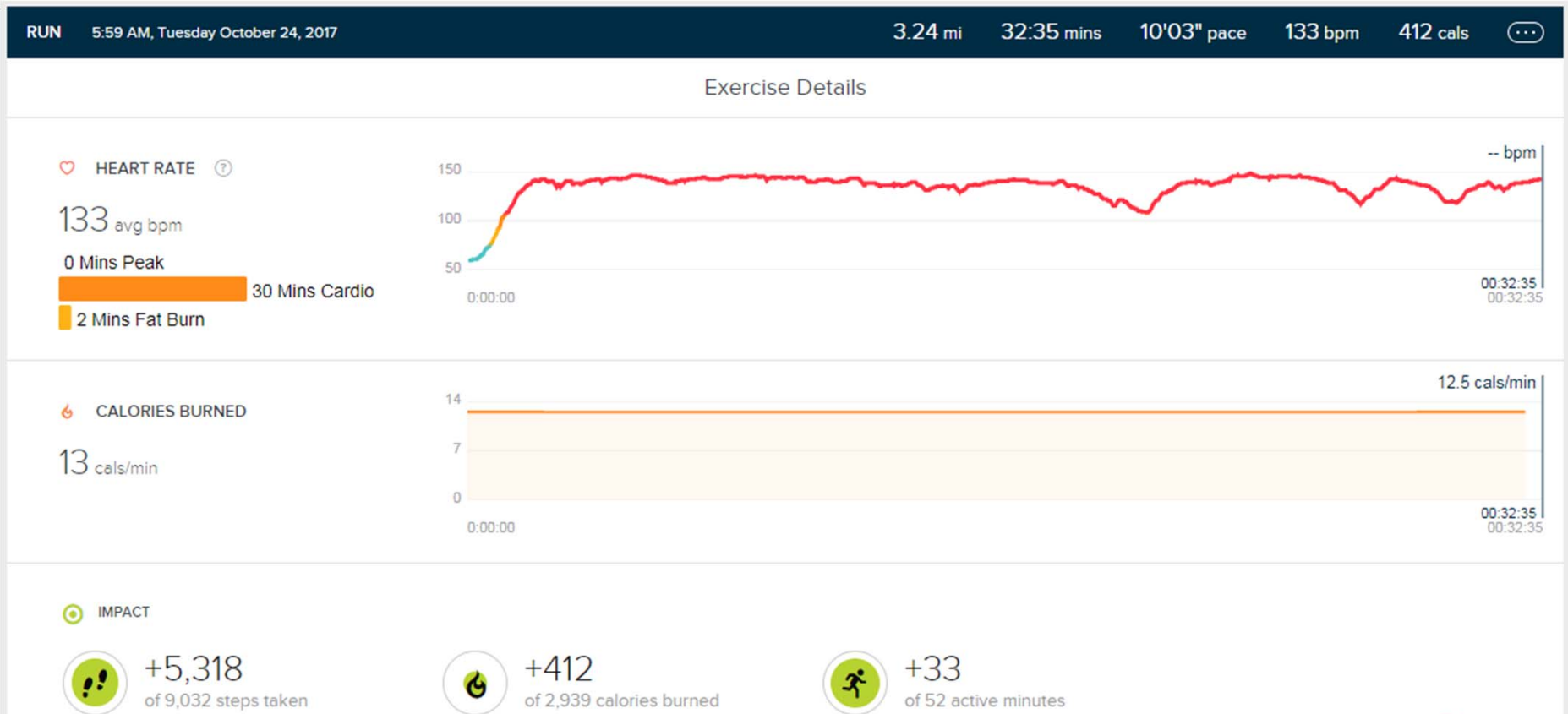
# The “Fitbit” Revolution

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- Seamless connection to smartphones
- Bluetooth tether to phone reduces equipment cost
- Wearable services use social media, badges, and haptic feedback to motivate movement
- Some models record heart rate and sleep habits
- Can be paired with a wi-fi scale to track weight changes



# Examples



# Examples

The image displays three screenshots from a mobile health application. The first screenshot shows the 'Sleep' page for Saturday, Oct 28, featuring a bar chart of 'Hours Slept' and a 'Sleep Stages' graph. The second screenshot shows the 'Weight' page with a 'Weight Trends 30 Days (lbs)' line graph. The third screenshot shows the 'Badges and Trophies' page with a list of step-based achievements.

**Screenshot 1: Sleep**  
 - Title: Sleep  
 - Date: Saturday, Oct 28  
 - Hours Slept: Bar chart showing sleep duration for the week (T, W, T, F, S, S, M).  
 - Sleep Stages: Graph showing Awake, REM, Light, and Deep sleep stages over time (8:38 PM to 7:32 AM).

**Screenshot 2: Weight**  
 - Title: Weight  
 - Weight Trends 30 Days (lbs): Line graph showing 'Weight (lbs)' and 'Your Weight Trend'.

**Screenshot 3: Badges and Trophies**  
 - Title: Badges and Trophies  
 - Badges: Trail Shoe (30,000 steps), Classics (25,000 steps), High Tops (20,000 steps), Urban Boot (15,000 steps), Sneakers (10,000 steps), Boat Shoe (5,000 steps).

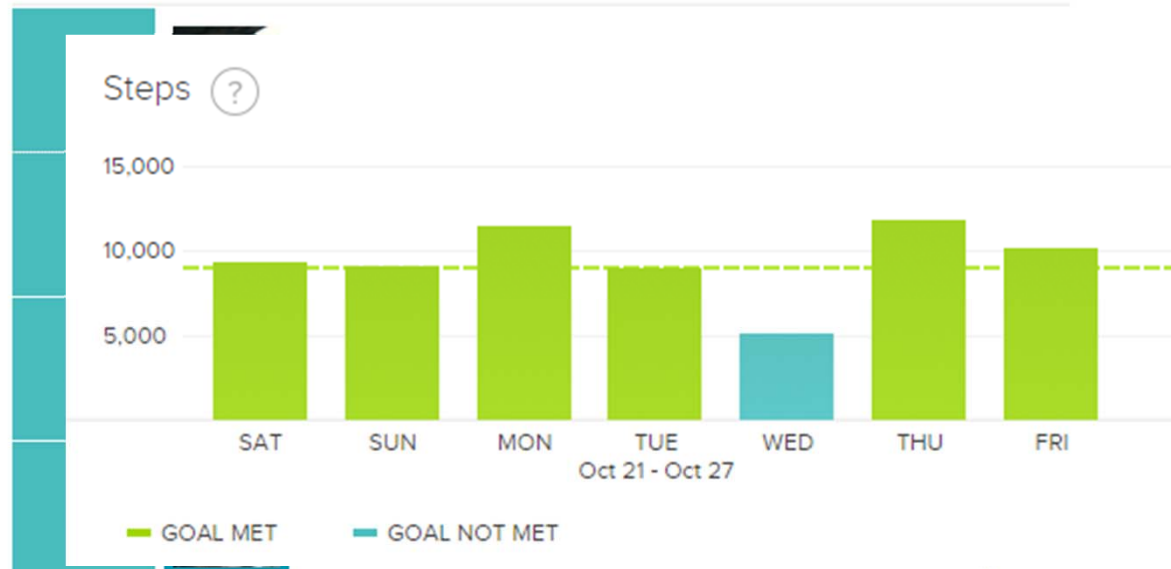
**Bottom Panel: Sleep Insights and Goals**  
 - **Sleep Insights:** Wonder what makes you sleepy? It's all because of a chemical in the body called 'adenosine'.  
 - **TIME ASLEEP:** 9 hr 35 min  
 - **SLEEP STAGES:** Time spent in each stage of sleep (Sat, 30 Day Avg, Benchmark).  
 - **GOAL PROGRESS:** 4.6 lbs lost since 4/16, 11.8 lbs to go and this goal is in the bag.  
 - **Log Weight:** A smarter scale for better results. Reach your weight goals with a scale that keeps you on track. Shop Aria.



# Examples

## Friends

7-DAY STEPS



! ! v 7 Days v

7-Day Average

9,423 steps

7-Day Total

66,284 steps

Weekly Goal Progress

95% of 70,000

5  Amber D. **36,286**  
5 hrs ago



# Wearable Concerns

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- What data are *automatically* provided to the wearable server?
  - Varies based on model
  - Activity logs
  - Sleep history
  - Heart rate history
- What data are provided to the server after user intervention?
  - Weight history
  - Food intake
  - Water intake
- Who owns these data? What about privacy and security?

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--Fitbit Terms of Service



# Wearable and Biometrics

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- Linking wearable data with biometric program
  - Provides data collected daily rather than annually
  - Links snapshot biometric results to regular interventions
  - Provides further data about desired health interventions
- Social aspect of wearables in the workplace
  - Challenges may help employees support each other in healthy lifestyles
  - Subsidize employee fitness center fees for participants
- Reduce employer health expenses
  - Driving healthy workplace behaviors can reduce short- and long-term health expenses
  - Especially valuable for self-insured employers
- PPACA currently permits rewards and penalties for wellness programs (including biometric screening) up to 30% of the employee-only premium

