Innovation Seminar
Wearables and Smoking Validation

Brian Ro
07-30-18

Jim

Wearables Current State

Consumer wearables

- Built for Fitness and Exercise
- Productivity
- Fashion

Withings

FOSSIL GROUP

fitbit

JAWBONE

WATCH

GARMIN

Clinical wearables

- Complex user experience
- Cost-prohibitive for brief episodes of care

CHRONO THERAPEUTICS

iRhythm

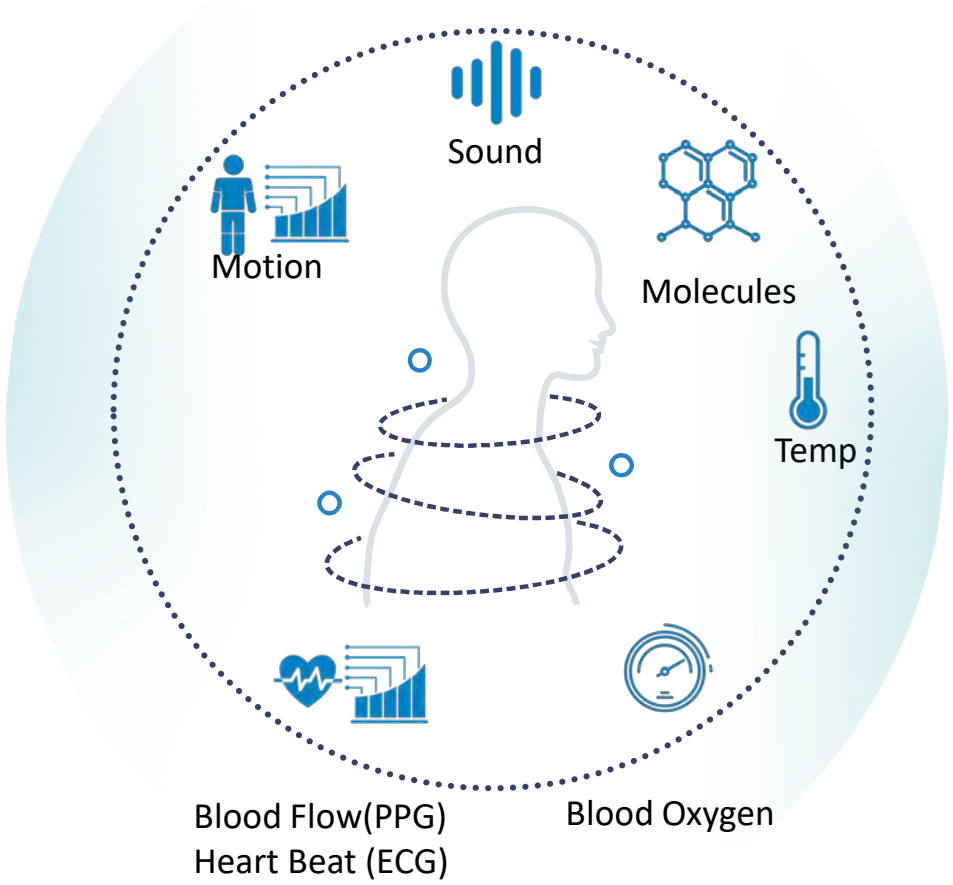
proteus DIGITAL HEALTH

Dexcom

Medtronic

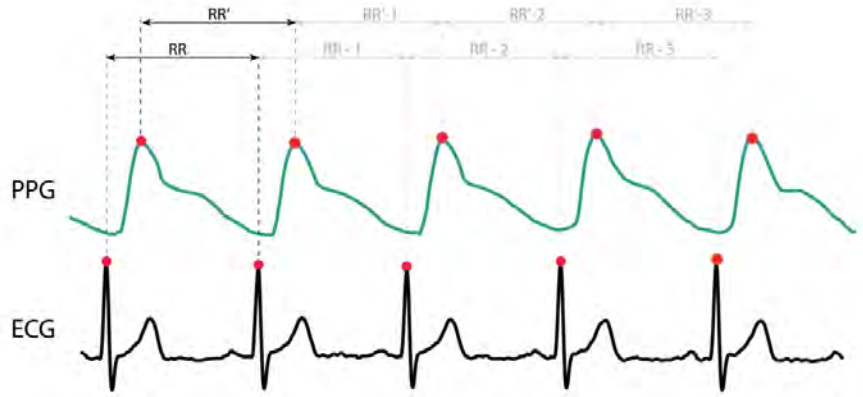
Wearable Data Insights

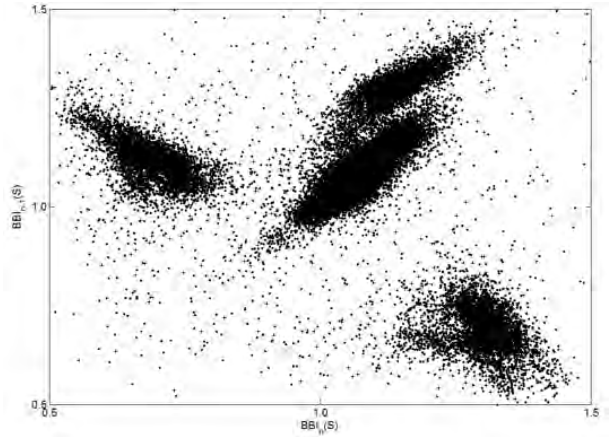
Human Data



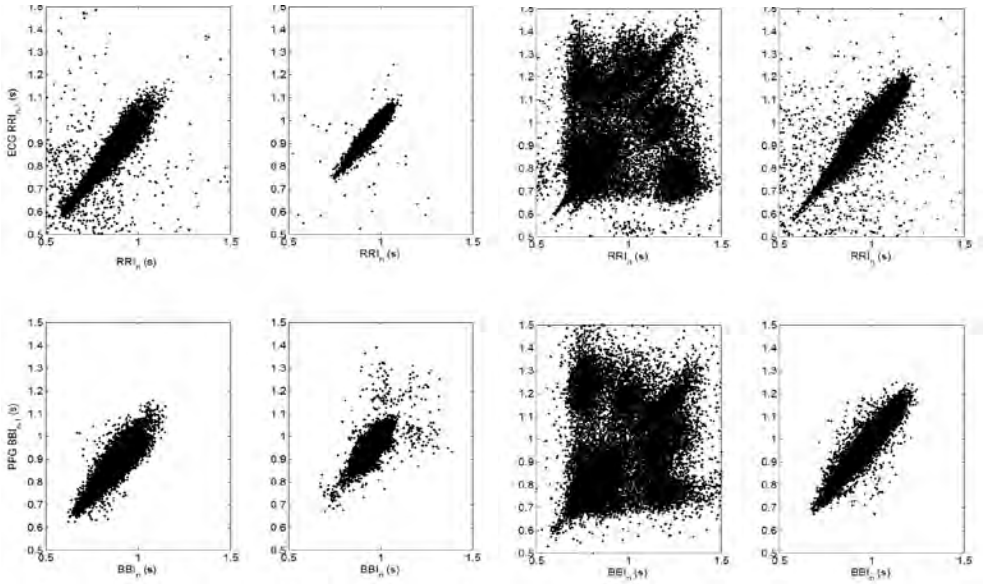
How is Striiv Different

Individual heart beats





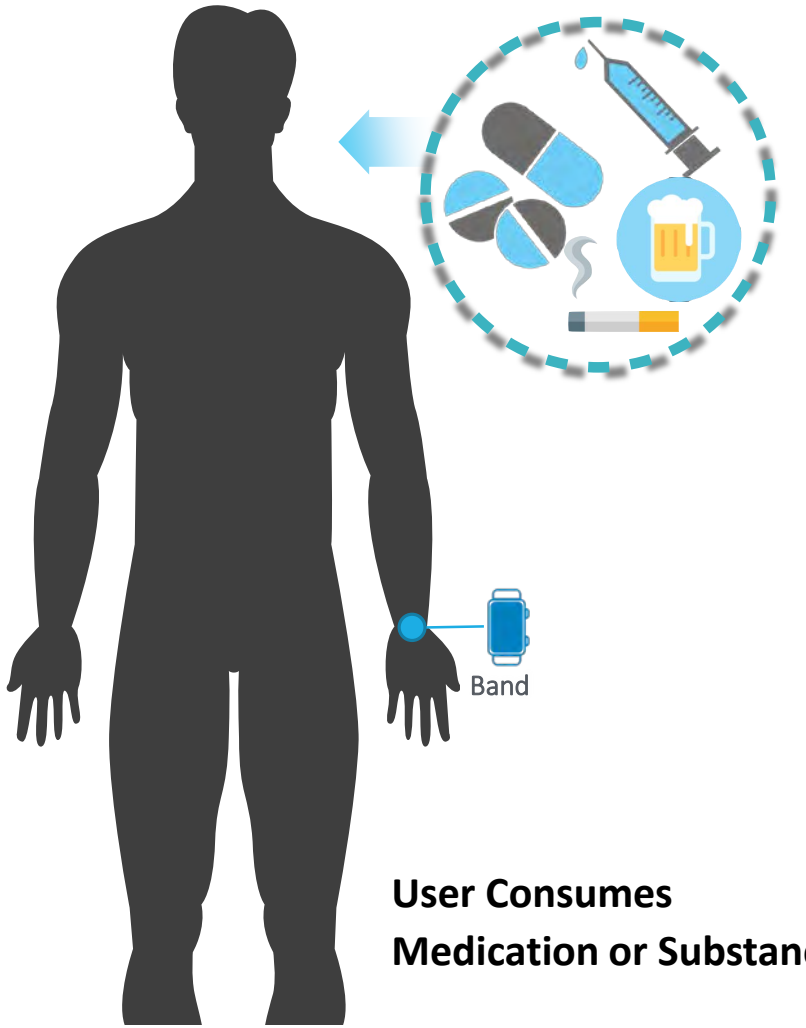
#1 #2 #3 #4



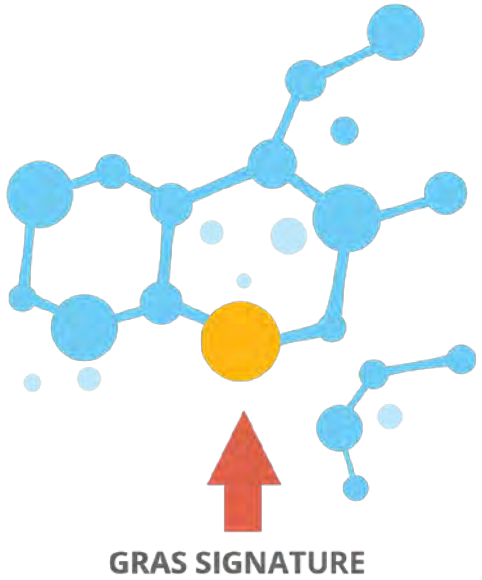
striiv

Bittium

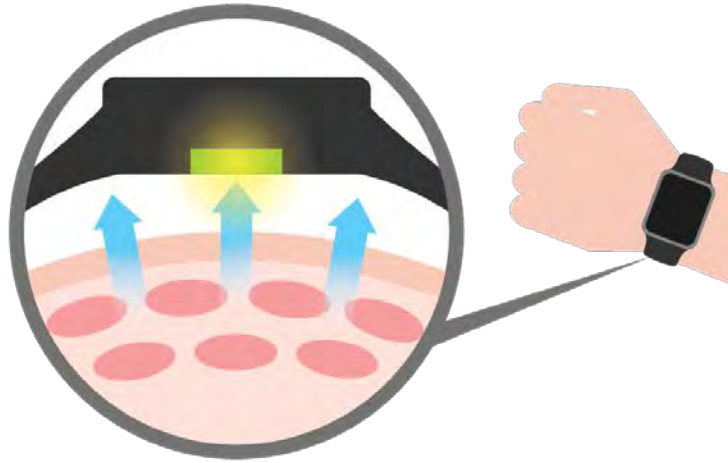
Sweat Vapor Technology



User Consumes Medication or Substance



Sensors are tuned to look for specific compounds



Molecules in Sweat Vapor detected by Striiv Device

Striiv History

Track Record & Team

Shipped over $50M (USD) revenue in last 4 years.

High Volume Scale to United Healthcare & Pfizer

Leadership: Stanford & Caltech (Across multiple Startups)

Screening & Validation Programs

Cardiac

Activity

Works Out of the Box

Customers: Healthcare

UnitedHealthcare

Pfizer

QUALCOMM LIFE
a Qualcomm company

Walgreens

Thank You

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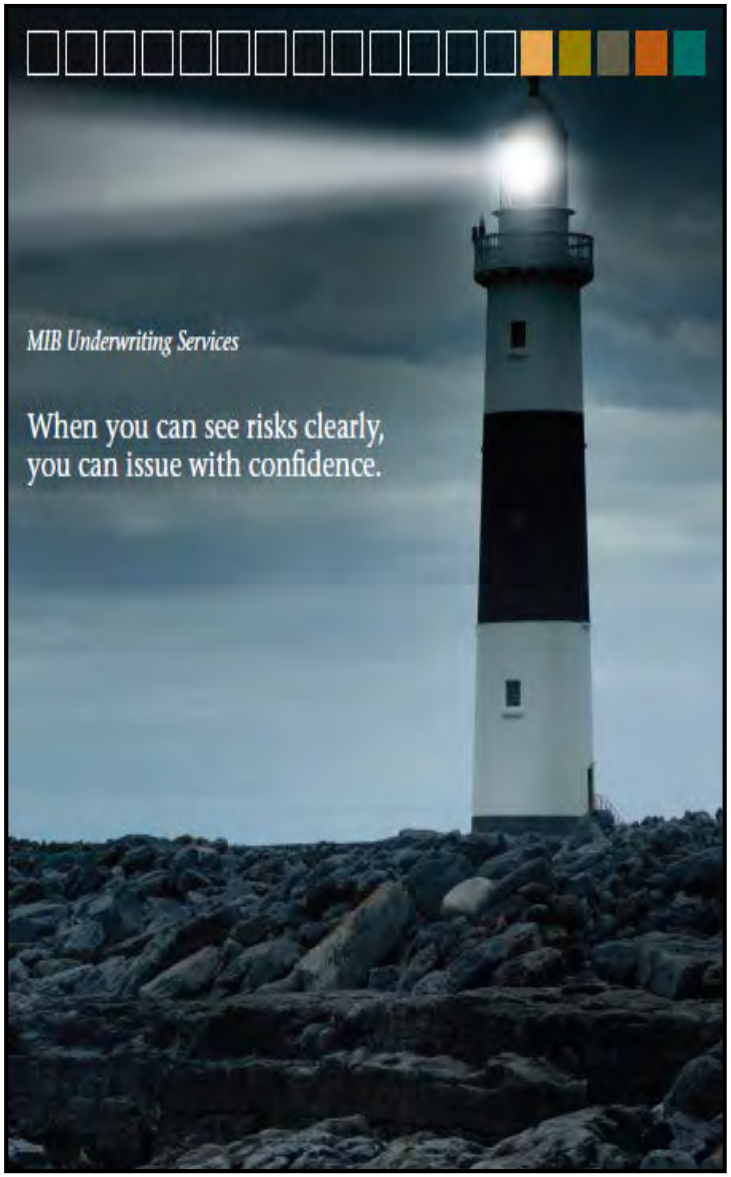
Underwriting Issues & Innovation
July, 2018

Stacy Gill

Agenda

- Goal Statement & Background
- Design Principles
- Development
- Validation
- Challenges
- Challenges - accepted



Goal Statement & Background

- Goal Statement
  - Provide carriers with a means to detect potential undisclosed tobacco use in fluids-free underwriting workflows
- Background
  - MIB – LPA partnership (www.lpa.com)
  - LPA Software Solutions – premier boutique analytics firm
  - Fall 2015 workshop “How can predictive analytics yield tangible benefits for the life insurance enterprise” - Top 3 ideas
    - #1 – reliably identify applicants who may misrepresent tobacco status

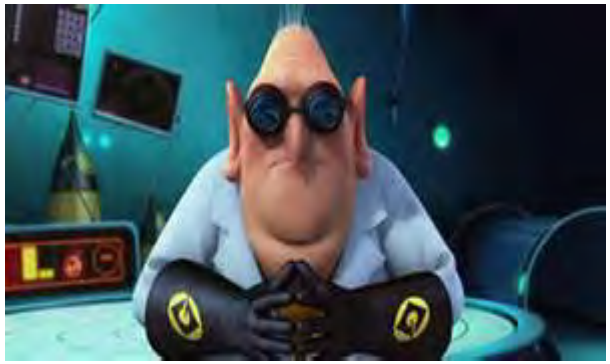
Development

- Use data taken wholly from the application episode (authentication, authorization, nonrepudiation)
  - Demographic/Product/Face data
  - Health Hx, Family Hx
  - Regulators like this approach

- Service bureau model (MIB hosts service, deals with configuration and model maintenance)
- Each model is configured on the basis of a given carrier's data and experience

Development

- Identify a trial data source - NHANES
  (National Health and Nutrition Examination Survey)
  - CDC-sponsored & administered
    - Behavioral/ self assessment data
    - Clinical data
    - Social/Economic data
    - Blood test data
  - NHANES participants claim nonsmoker status when their serum cotinine says otherwise



Development - continued

- Screen NHANES to approximate a life insurance population
  - Top quartile of income
  - Generally in good health
- Develop preliminary models
- Identify model variables
  - Are these available in a life insurance application
- Finalize model framework
  - Stability vs overfitting

Development - continued

- Results
  - Sensitivity=0.747
  - Specificity=0.776

NHANES	"insurable", Stated Income >=$55k	Replied "Non-Tobacco" on questionnaire		
Actual Cotinine Status	Predicted Cotinine Status		Pct	
Neg	Neg		67.8%	78% correct
Neg	Pos		19.5%	22% false pos
Pos	Neg		3.2%	25% false neg
Pos	Pos		9.5%	75% correct
	Total		100.0%	

Validation

- 4 POC's – 3 with usable results
  - One carrier was unable to deliver usable data
- All cases in POC's KNEW they were getting tested!

Sens=0.789
Spec=0.918

Face $0 - $1m		Non-Tobacco Applicants		
Actual Cotinine Status	Predicted Cotinine Status		Pct	
Neg	Neg		85.3%	92% correct
Neg	Pos		7.6%	8% false pos
Pos	Neg		1.5%	21% false neg
Pos	Pos		5.6%	79% correct
	Total		100.0%	7.1%

Validation - continued

- Eckler protective value study

Face $0 - $1m	Non-Tobacco Applicants
Avg Face Amt	$633,736
Avg Cost/$1k Face	$0.024
NPV/$1k Face	$3.20
Savings:Cost	131:1

Assumption	Sensitivity
Lapse rate	Medium
Anti-selective lapse	High
Discount rate	High
Profit target	Medium
Mortality base rate	Low
“Walk aways”	Low
Tool cost	Low

- No benefit calculated for “sentinel effect”

Challenges

- Model build using historical/tested data
- Workflow compatibility issues
- Ongoing Tuning and model support

Challenges - Accepted

- Model build using historical/tested data
  - Universal model built to establish initial company implementation
- Workflow compatibility issues
  - Consultative approach with our partner on deployment
- Ongoing Tuning and model support
  - Programmatic solution as part of program implementation

Conclusion – A look back

- SOA Preferred Risk POG – ca.1996