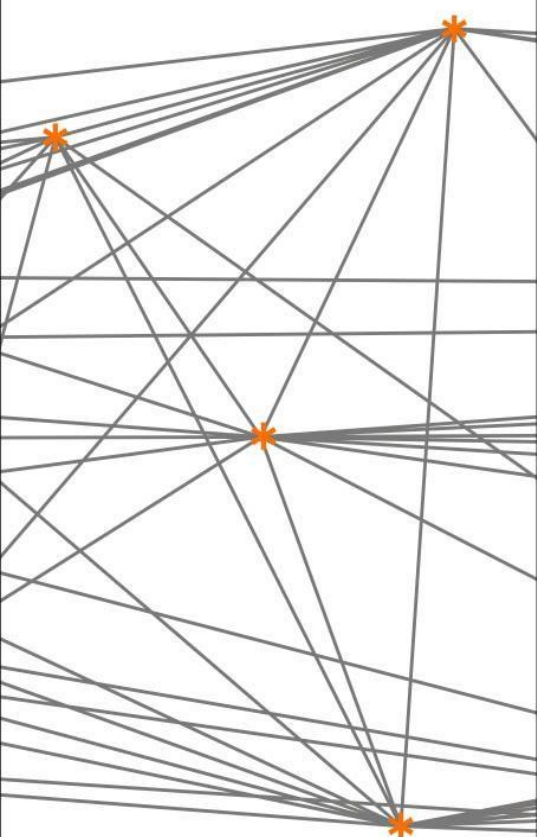


# REALITY OF DRIED BLOOD SPOT COLLECTION

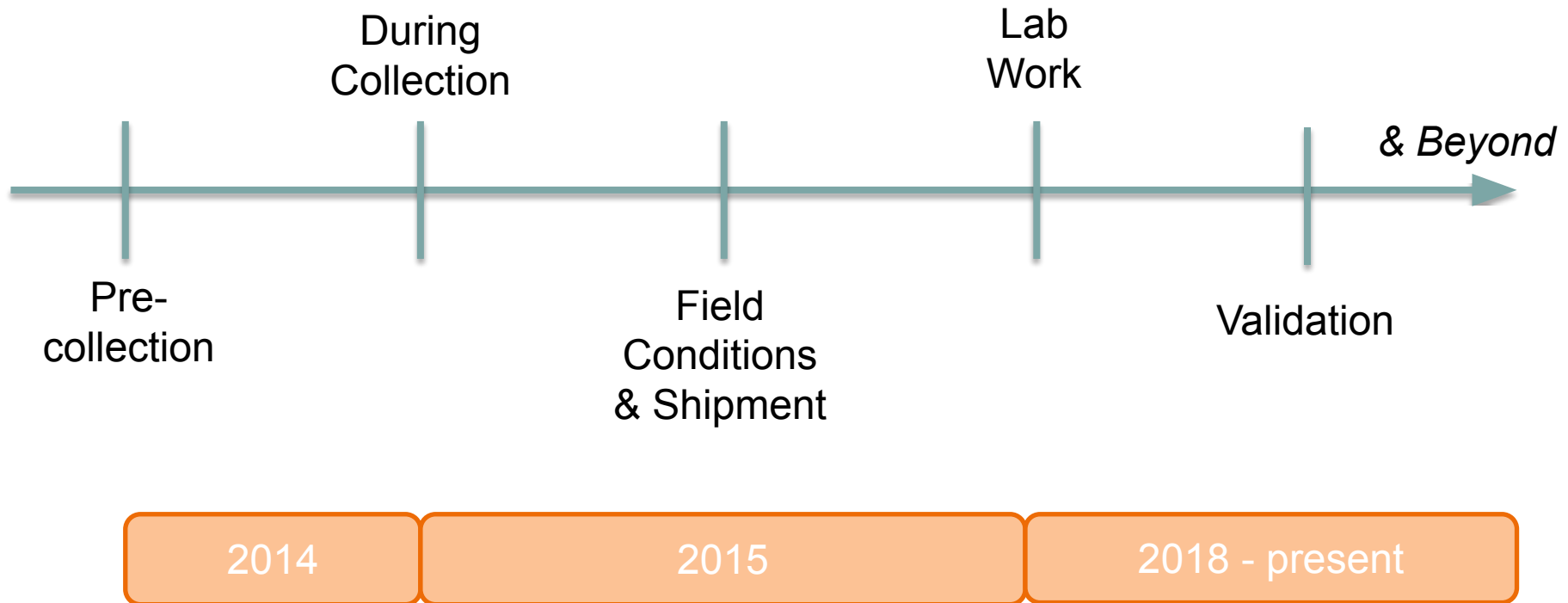
What to consider, control for, and common mishaps

Hannah Marie Horton (MEA)



- 4 23,709 observations from 11 European countries (DE, SE, ES, IT, FR, DK, GR, CH, BE, SI, EE) + Israel
- 4 DBS collection starting in 2015
- 4 17 markers
  - 4 A & B markers
    - 4 (A): HDL, Total Hemoglobin, HbA1c, (B): Total Cholesterol, Triglycerides, C Reactive Protein, Cystatin C
  - 4 C-markers
    - 4 ApoE4, Clusterin, IL-16, IL-18, IL-8, IL-12, MCP1, BDNF, EGF, VEGF

# SHARE DBS Timeline



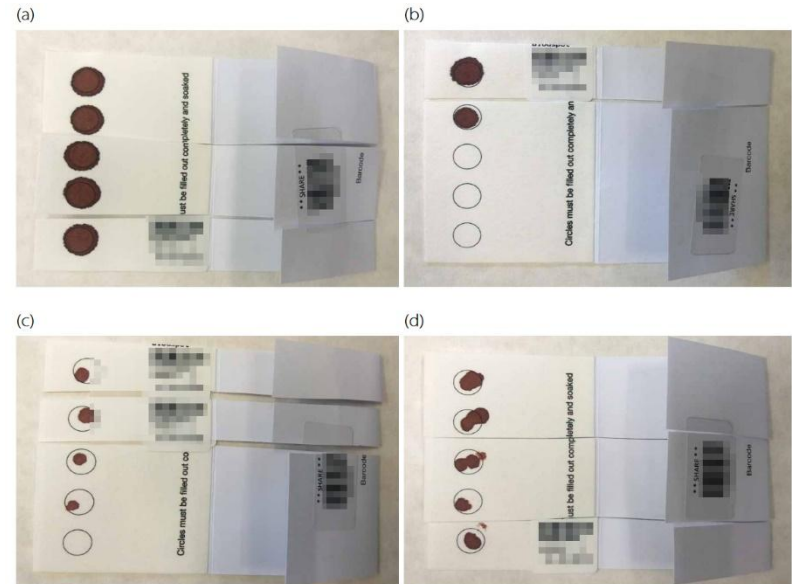
## 4 When to conduct collection?

- 4 Temperature/humidity
- 4 Ambient light

## 4 Ethical guidelines and informed consent

## 4 Training interviewers

- 4 Large spots (1 cm diameter)
- 4 Warm hands
- 4 Dont be afraid to punch hard
- 4 Be patient – no milking/dabbing!



## 4 Materials

- 4 Lancets
- 4 Bags
- 4 Desiccants



## 4 Choosing reliable markers

- 4 What are the conditions it takes to measure? Some can be very sensitive.

# During Collection

- 4 Factors that influence blood spot quality
  - 4 Age, Health conditions, Medication, etc
- 4 Factors that influence analyte value during collection
  - 4 Drying time
  - 4 Spot Size
- 4 Respondent behavior and lifestyle that influence analyte value (smoking, food intake vs fasted state, medication, current infection, health status)
- 4 Importance of monitoring

**TABLE 5** Effect of spot size on analyte values relative to a spot diameter of 1 cm, based on Model 1

Diameter	HDL	tHb	HbA1c	TC	TG	CRP	CysC
1.3	2.04% <sup>***</sup>	5.63% <sup>***</sup>	-0.75% <sup>***</sup>	1.97% <sup>***</sup>	0.29%	4.48%	0.00%
1.2	0.33%	4.23% <sup>***</sup>	-0.29% <sup>*</sup>	1.67% <sup>***</sup>	0.62%	2.88%	0.44%
1.1	-0.28%	2.46% <sup>***</sup>	-0.08%	1.11% <sup>***</sup>	0.62%	1.34%	0.53%
1	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.9	-1.18% <sup>***</sup>	-3.17% <sup>***</sup>	0.09%	-2.09% <sup>***</sup>	-1.74% <sup>**</sup>	0.62%	-1.57% <sup>***</sup>
0.8	-5.45% <sup>***</sup>	-6.69% <sup>***</sup>	0.46% <sup>***</sup>	-4.93% <sup>***</sup>	-4.42% <sup>***</sup>	1.44%	-4.11% <sup>***</sup>
0.7	-11.13% <sup>***</sup>	-10.56% <sup>***</sup>	1.19% <sup>***</sup>	-8.82% <sup>***</sup>	-7.61% <sup>***</sup>	6.28% <sup>*</sup>	-7.43% <sup>***</sup>
0.6	-14.54% <sup>***</sup>	-15.14% <sup>***</sup>	2.03% <sup>***</sup>	-12.11% <sup>***</sup>	-9.57% <sup>***</sup>	14.82% <sup>***</sup>	-10.14% <sup>***</sup>
0.5	-15.59% <sup>***</sup>	-19.72% <sup>***</sup>	2.84% <sup>***</sup>	-11.81% <sup>***</sup>	-8.14% <sup>***</sup>	15.44% <sup>***</sup>	-8.92% <sup>***</sup>

*Note:* Asterisks measure whether the marker value of a given diameter differs significantly from the marker value obtained in a blood spot with a diameter of 1 cm.

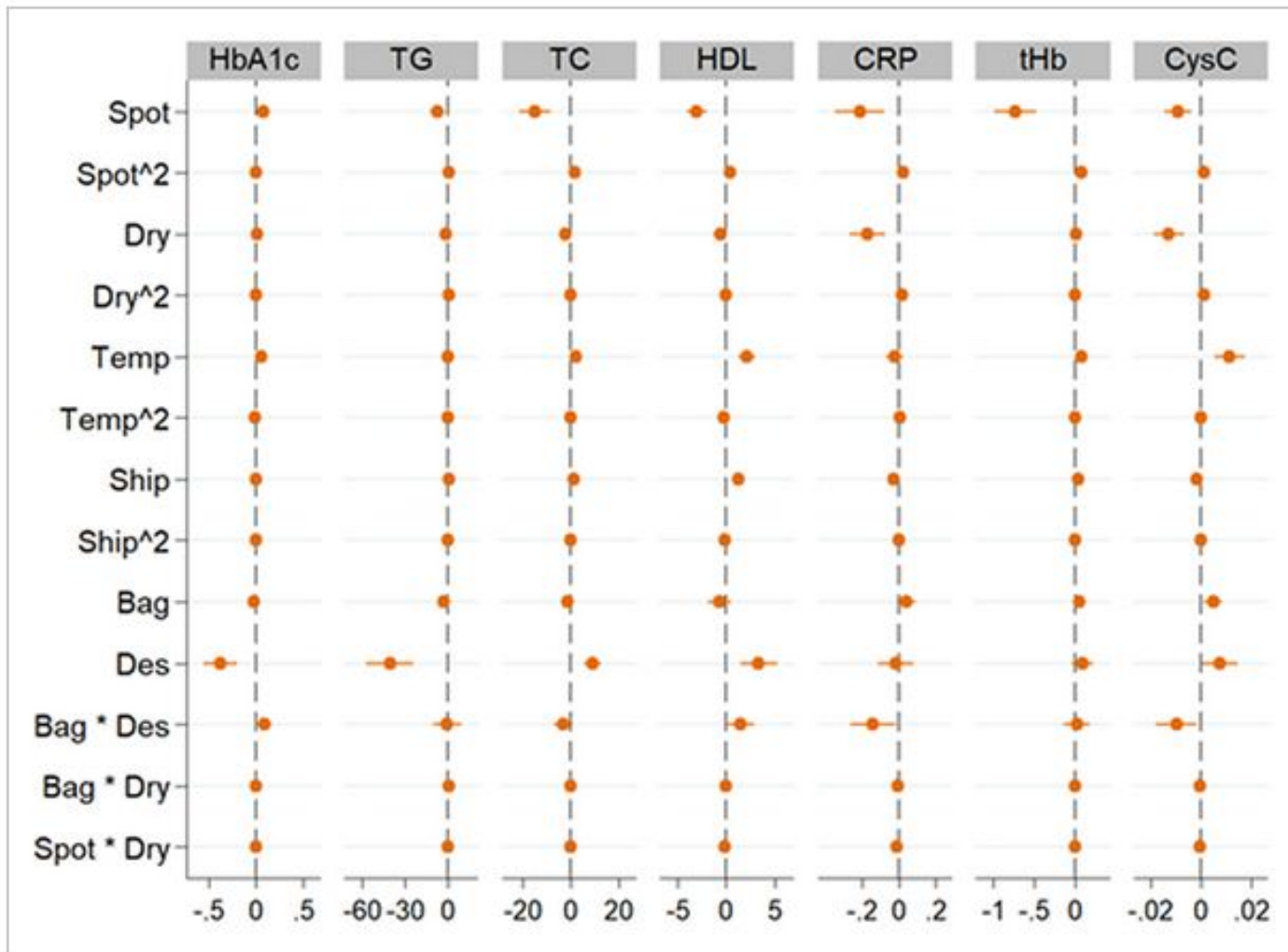
\* $p < .1$ . \*\* $p < .05$ . \*\*\* $p < .01$ .

Groh, R., Weiss, L. M., Börsch-Supan, M., & Börsch-Supan, A. (2022). Effects of spot size on biomarker levels offield-collected dried blood spots: A new algorithmfor exact dried blood spot size measurement. *American Journal of Human Biology*, 34(10), e23777. <https://doi.org/10.1002/ajhb.23777>

- 4 Collection ➡ Odense, DK ➡ Seattle, USA
- 4 Fieldwork conditions that influence analyte value
  - 4 Drying Time
  - 4 Spot Size
  - 4 Shipment Time
  - 4 Temperature
  - 4 Dessicant (Packed/Unpacked)
  - 4 Bag (Open/Closed)
- 4 Others (storage at -20 vs -70°C)



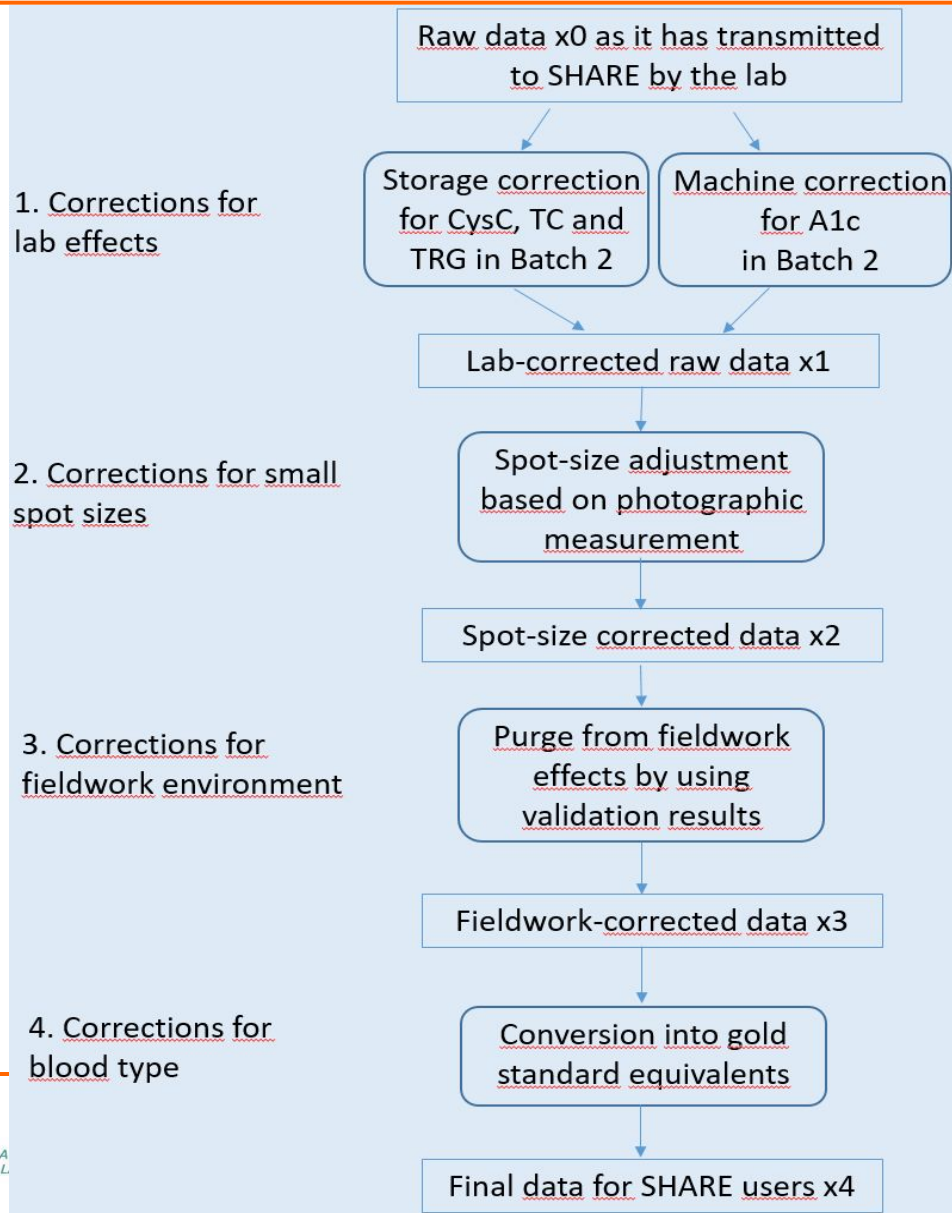
# Influence of Fieldwork Conditions by Marker



Börsch-Supan et al. (2021).  
Dried blood spot collection,  
sample quality, and fieldwork  
conditions: Structural  
validations for conversion into  
standard values. *American  
Journal of Human Biology*, 33,  
e23517

Marker	Medication /Dietary Suppl.	Alcohol	Smoking	Caffeine	Infections	Daily	Daily Food Intake	Seasonality	Lifetime
CHO	Statins Vit C Antibiotics	✓					✓		✓ (↑)
HDL		✓					✓ (↑)		
TRG	Estrogenes VitC Antibiotics	✓						✓ (↓)	
CRP	Statins	✓			✓ (↑↑)				✓ (↑)
HbA1c	Antibiotics, Antidepress ants, opioids (↑)	Alcoholism (↑)							
tHb	Antibiotics, NSAIDs (↓)	✓							✓ (↓)
Glucose		✓ (↓)	✓	✓ Mixed Findings		✓	✓		
CysC									✓ (↑)
BDNF						✓		✓ (↑↓)	
Vit D								✓ (↑↓)	✓ (↓)
Blood Pressure				(↑) short, or long-term >3Hrs) and can be dramatic		✓			
Hormones			✓			✓			✓

# Validation Scheme



- 4 Issues we encountered A1C (lab based)
  - 4 Machine changes: VII □ D100
  - 4 Some unfortunate chromatograms – non-A1c peaks

# Thank you!

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