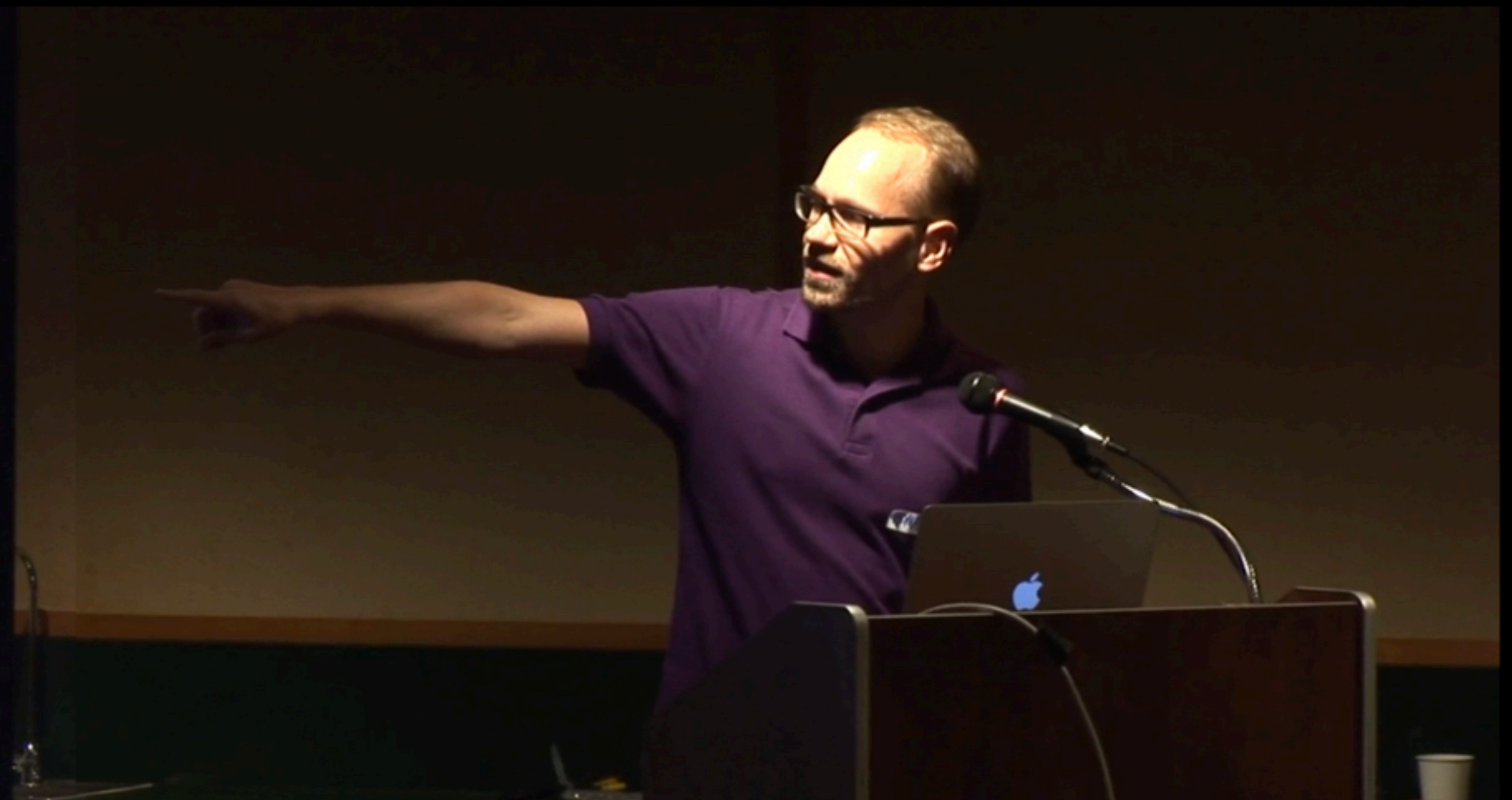
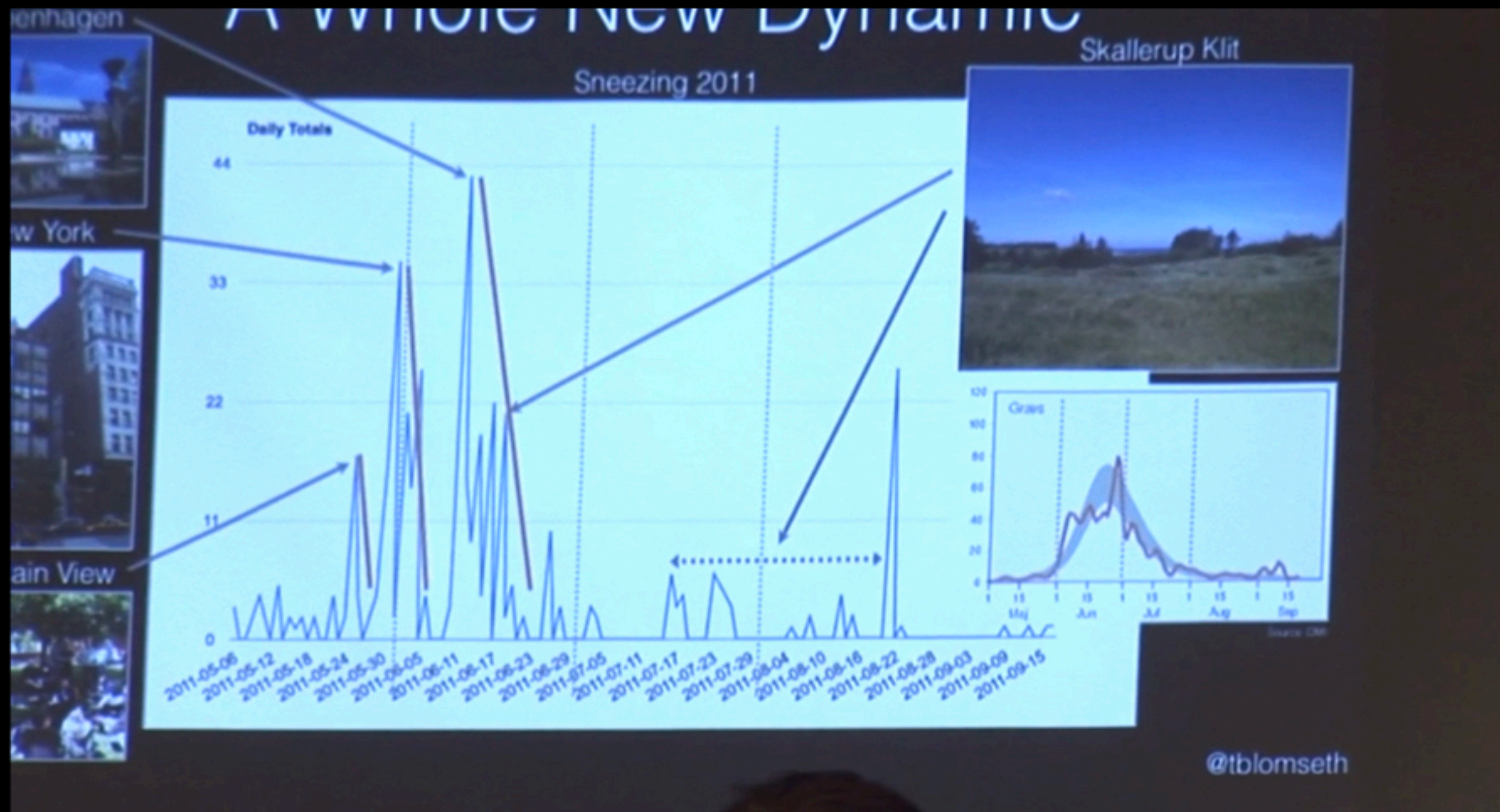


Caring for Health in the One-Person Laboratory

Thomas Blomseth Christiansen, self-tracker, co-founder of TOTTI Labs
@tblomseth

Konferens Spetspatienter 2019
Stockholm, Sverige, 2019-11-18

Show&Tell at Bay Area Quantified Self San Francisco, October 2011



QS Show&Tell:

- What did you do?
- How did you do it?
- What did you learn?



<https://quantifiedself.com/>

@tblomseth

What did I do?

From not good to worse: 25 years of allergy and eczema



1981

- Grass pollen allergy
- Eczema
- Fatigue
- Gut issues

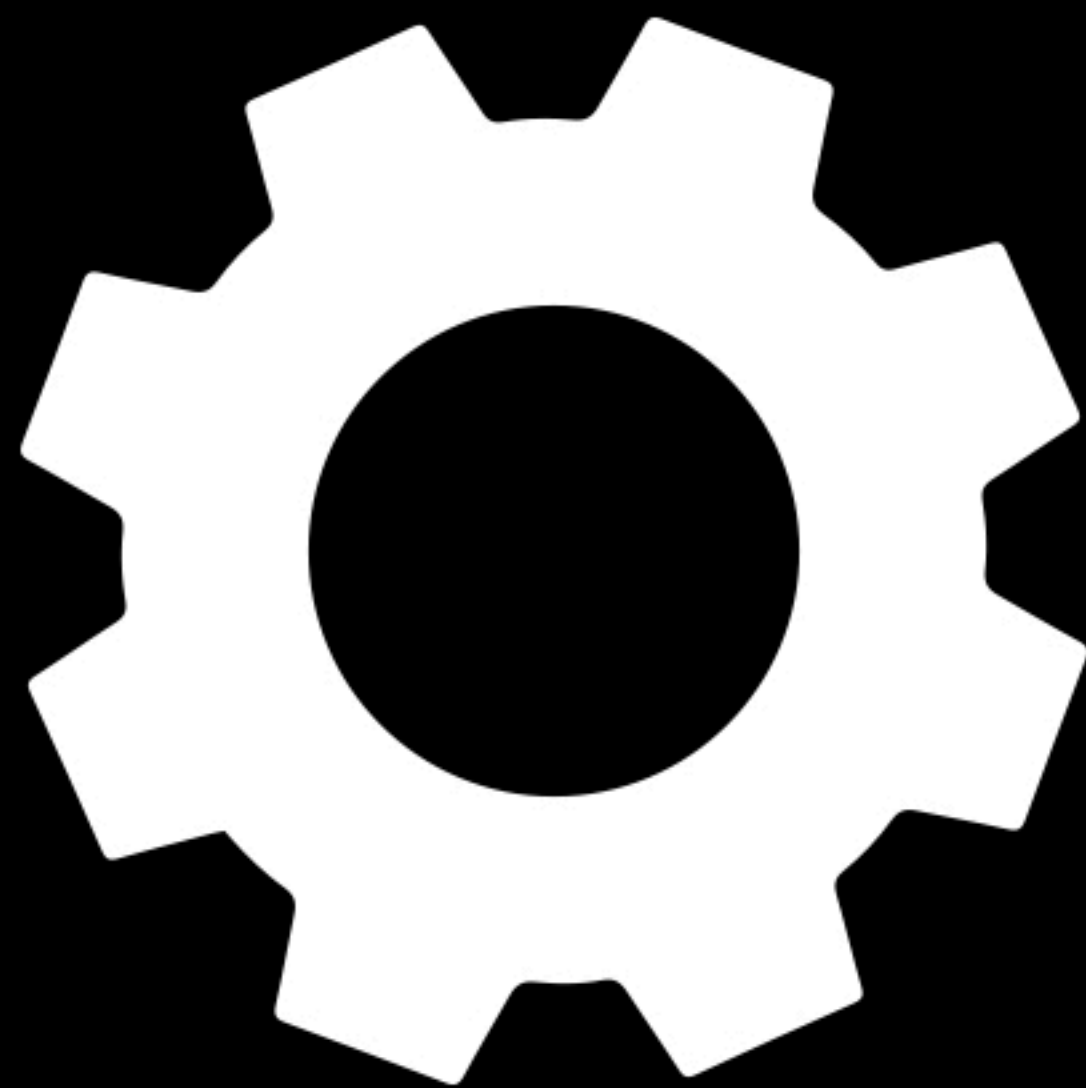


2008

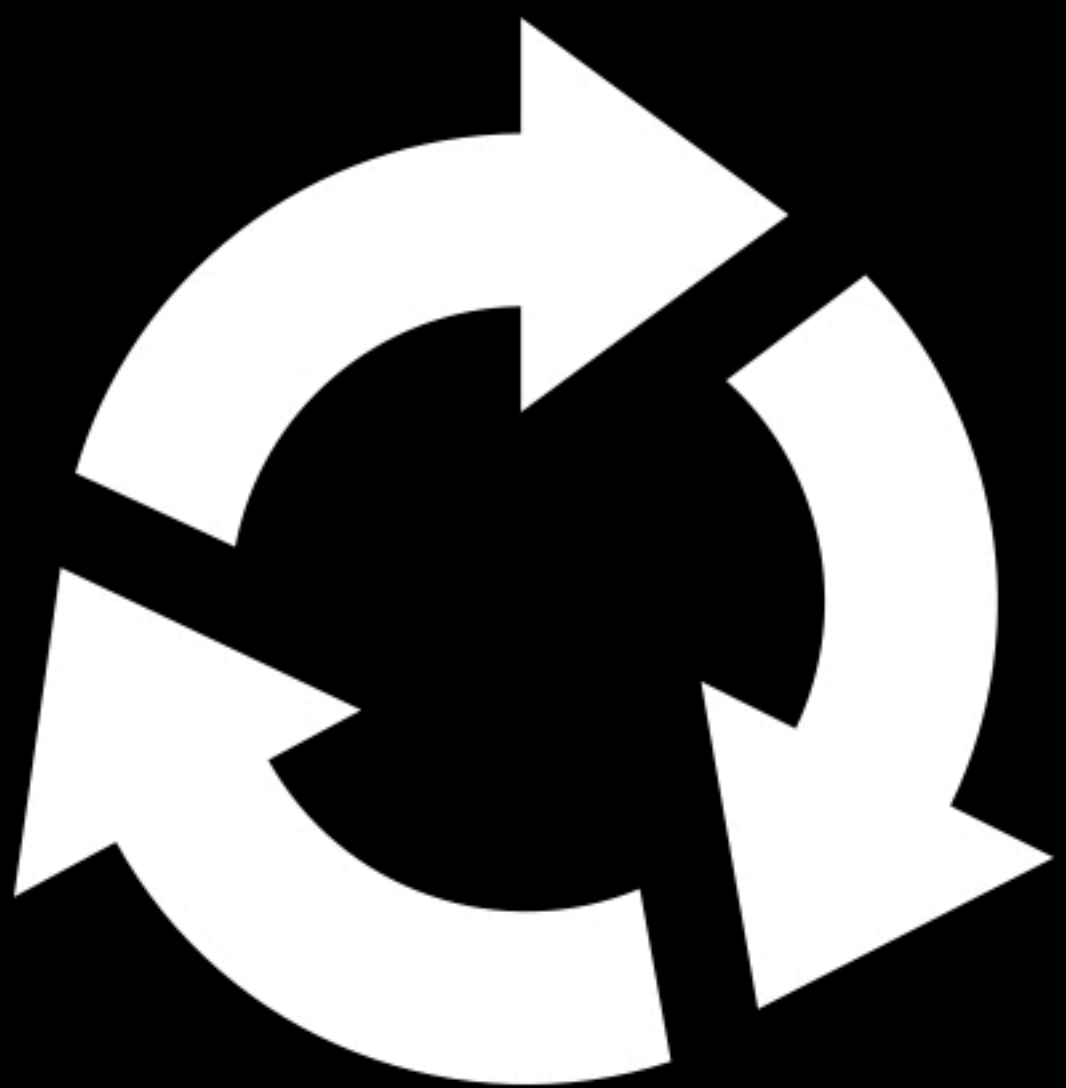
- Mental performance
- Physical performance
- Quality of life



Lack of problem solving
in the medical system



What works for me



The method is general

Outsized effect for
an *individual* 



~~**Average** effect in
some *population*~~ 

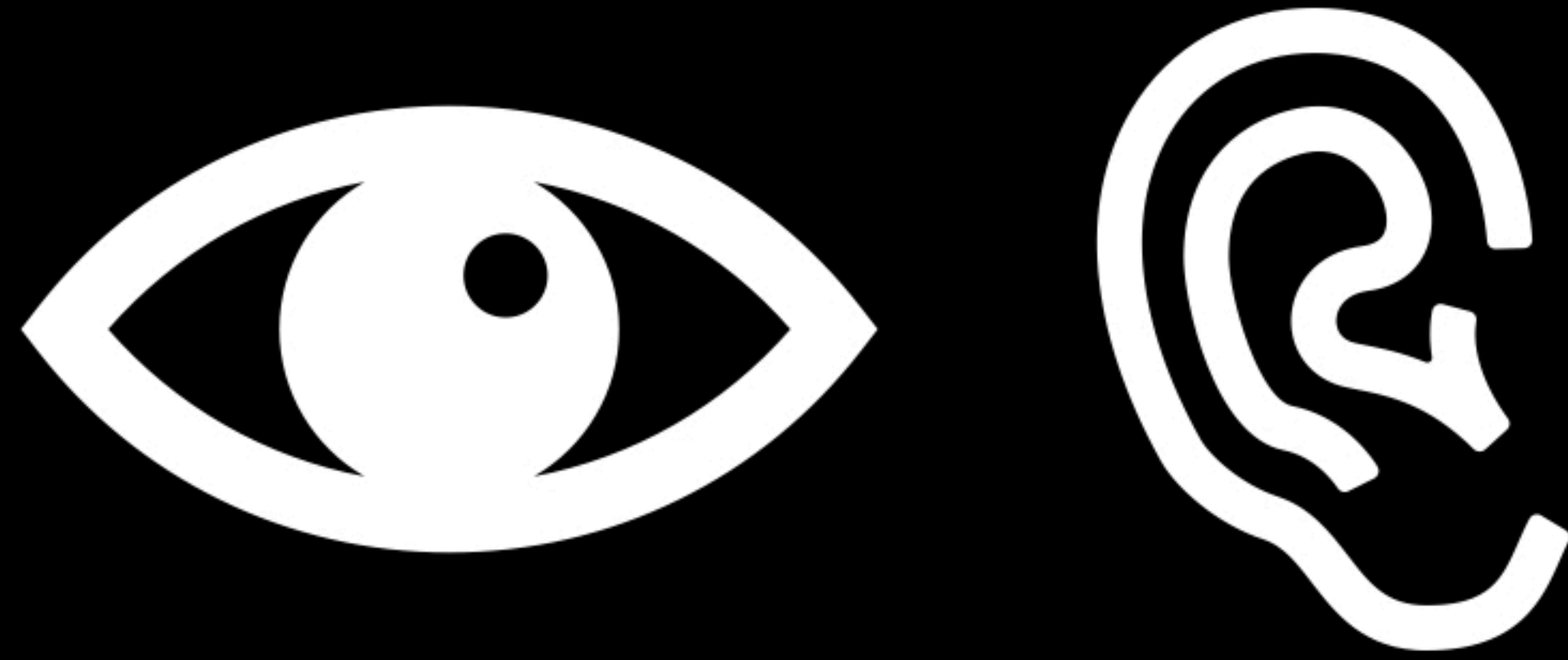
Looking at my body as a
decision-making system



No (allergy) medication
since 2010



Not a medical doctor

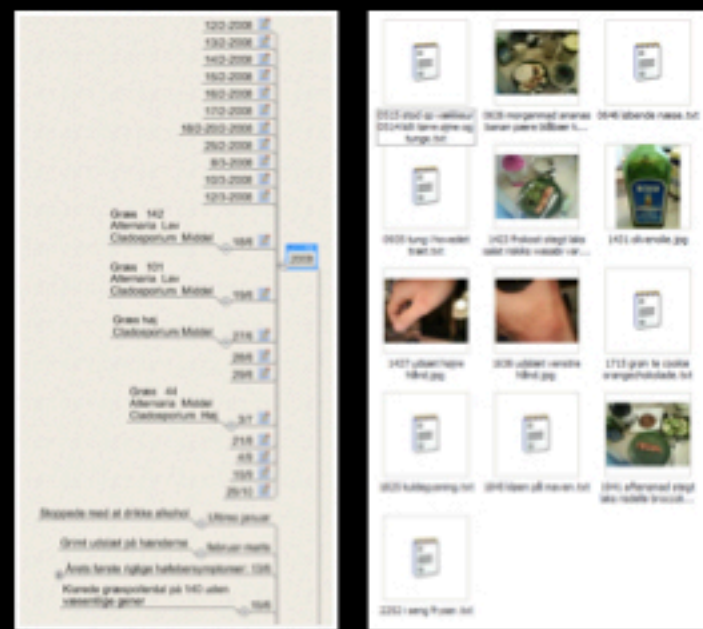


Phenomena that I may
observe myself

How did I do it?

Collecting data

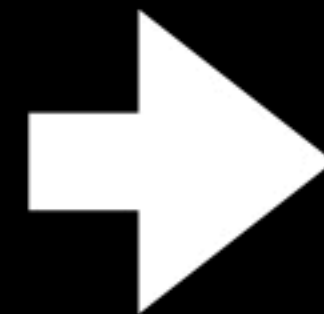
- 120000+ actively made observations (timestamps + locations) \approx 500-600 hours of making observations
- Passively sensed data e.g. activity, exercise, sleep, heart rate, posture etc.
- Building own instrumentation (at 3rd generation now)



First attempts
(2008-2009)



Mymee app
(2009-2015)



TOTTI Labs
instruments (2015-)

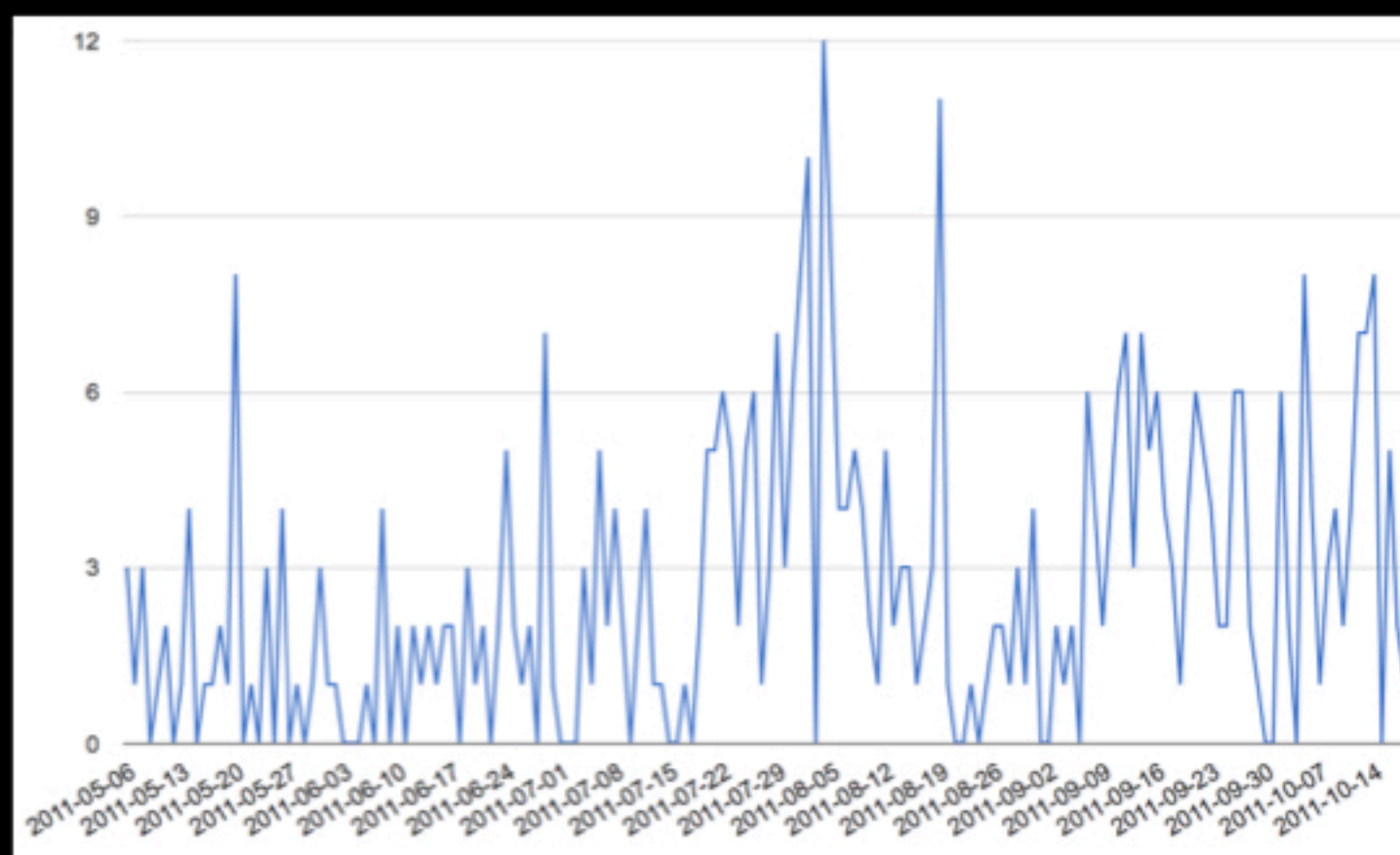
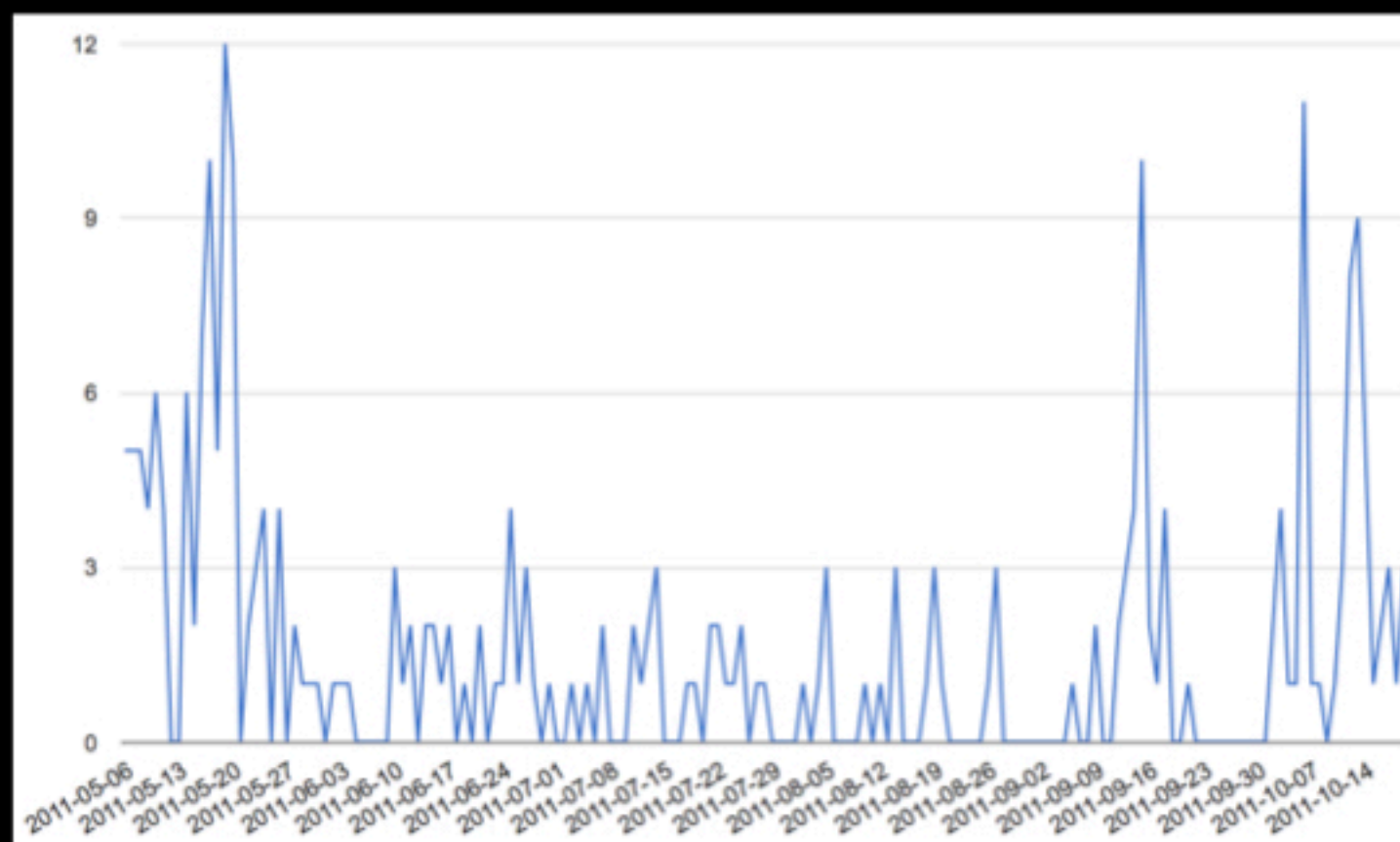


Intake

Food	9978
Water	8368 (2564 liter)
Beverages	5156 (1541 liter)
Supplements	5690

Symptoms

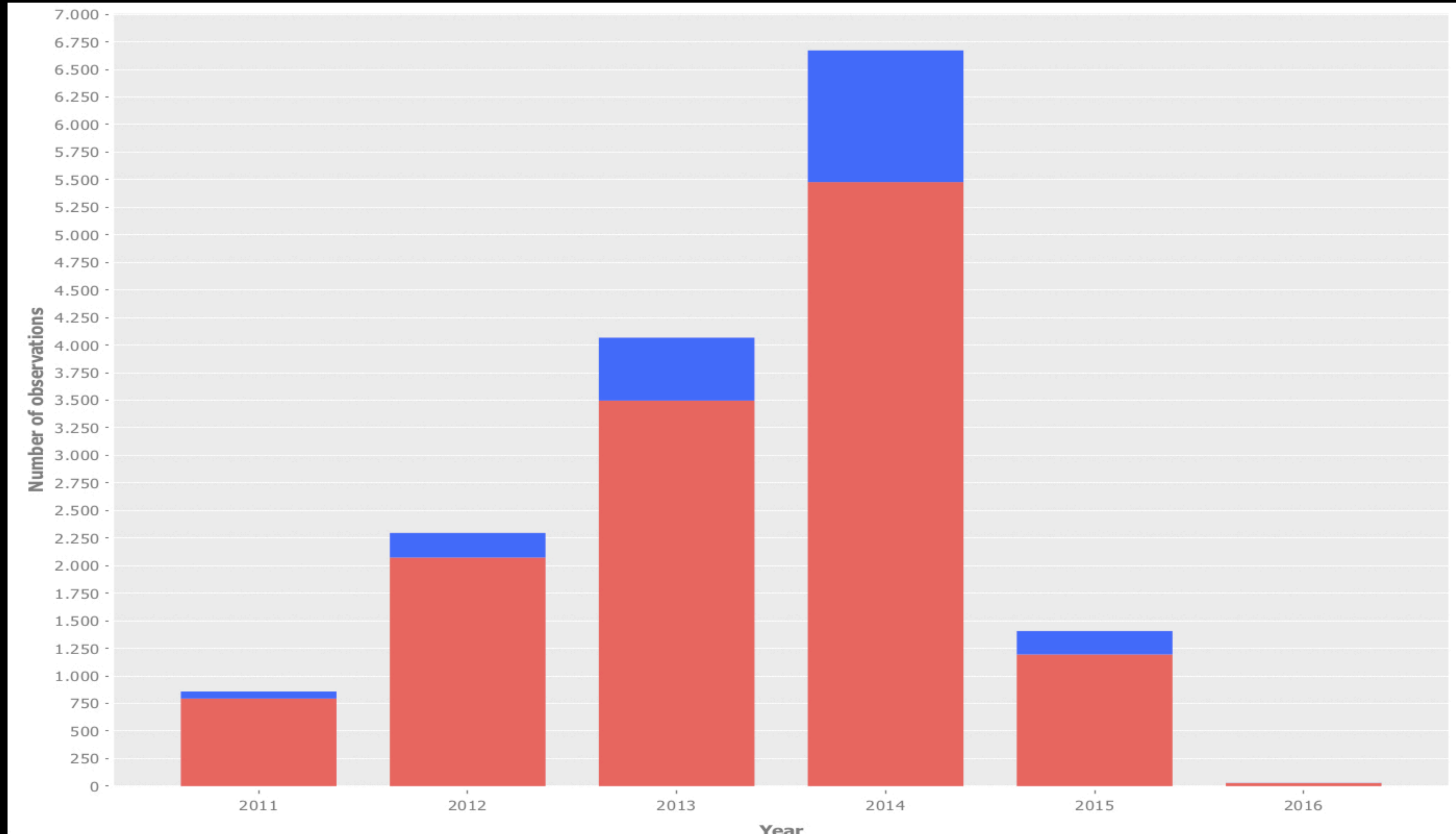
- Chills (1892)
- Fatigue (7642)

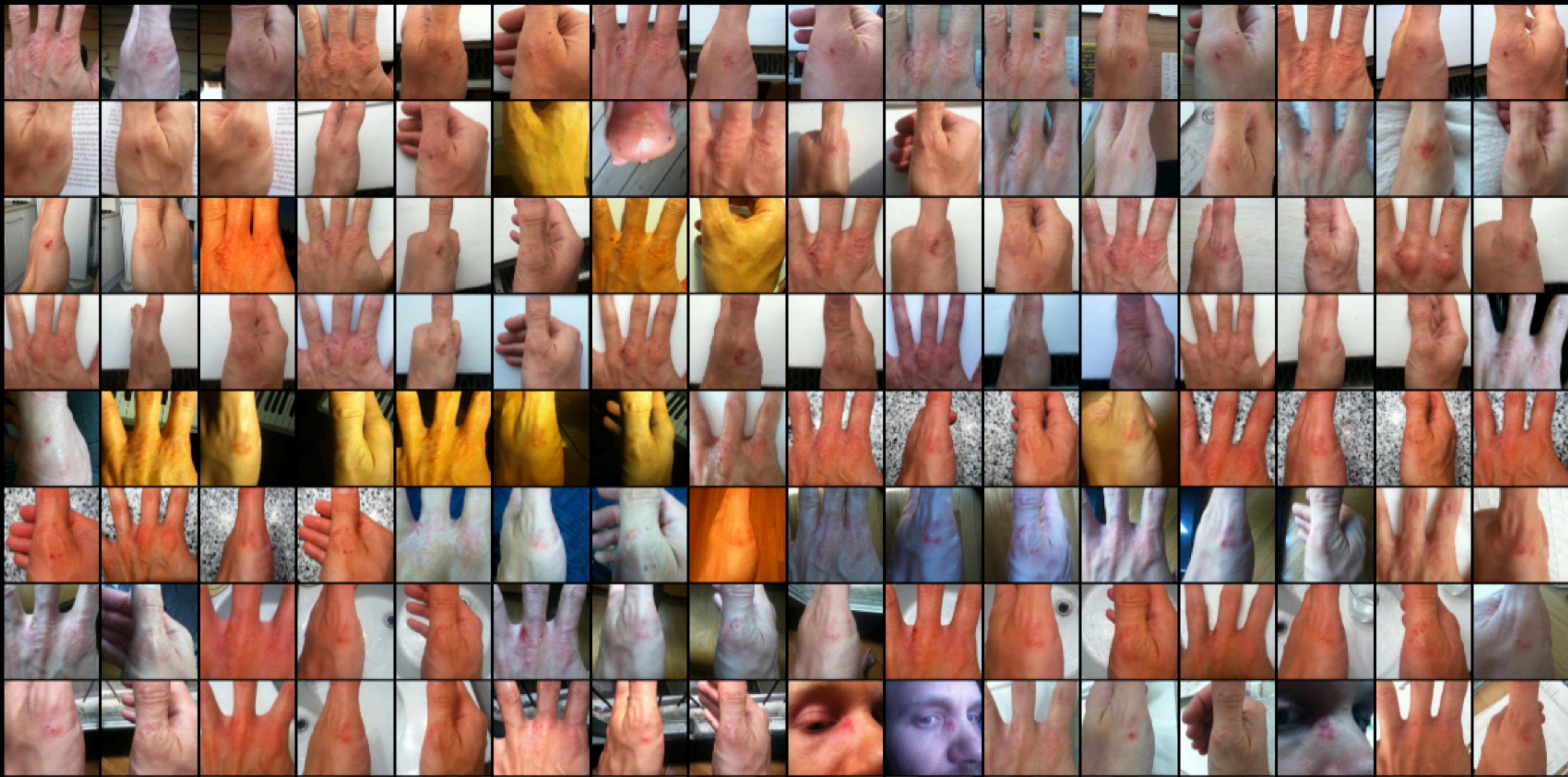


Eczema observations

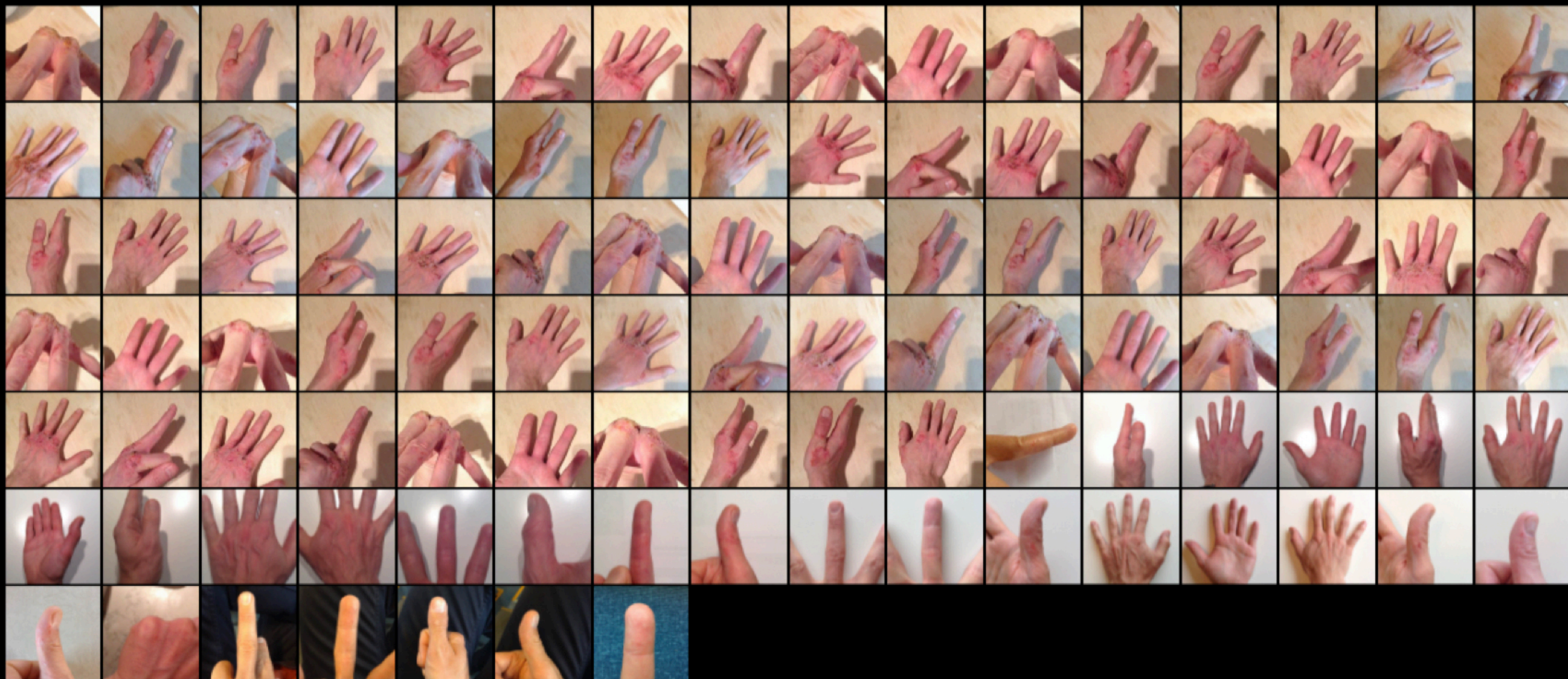
Eczema (total)	15328
Eczema (with photo)	13063

Eczema observations





80 slides later...



Gone...



May 19 2013



July 31 2013



Mar 30 2016



Mar 30 2016

...bad!



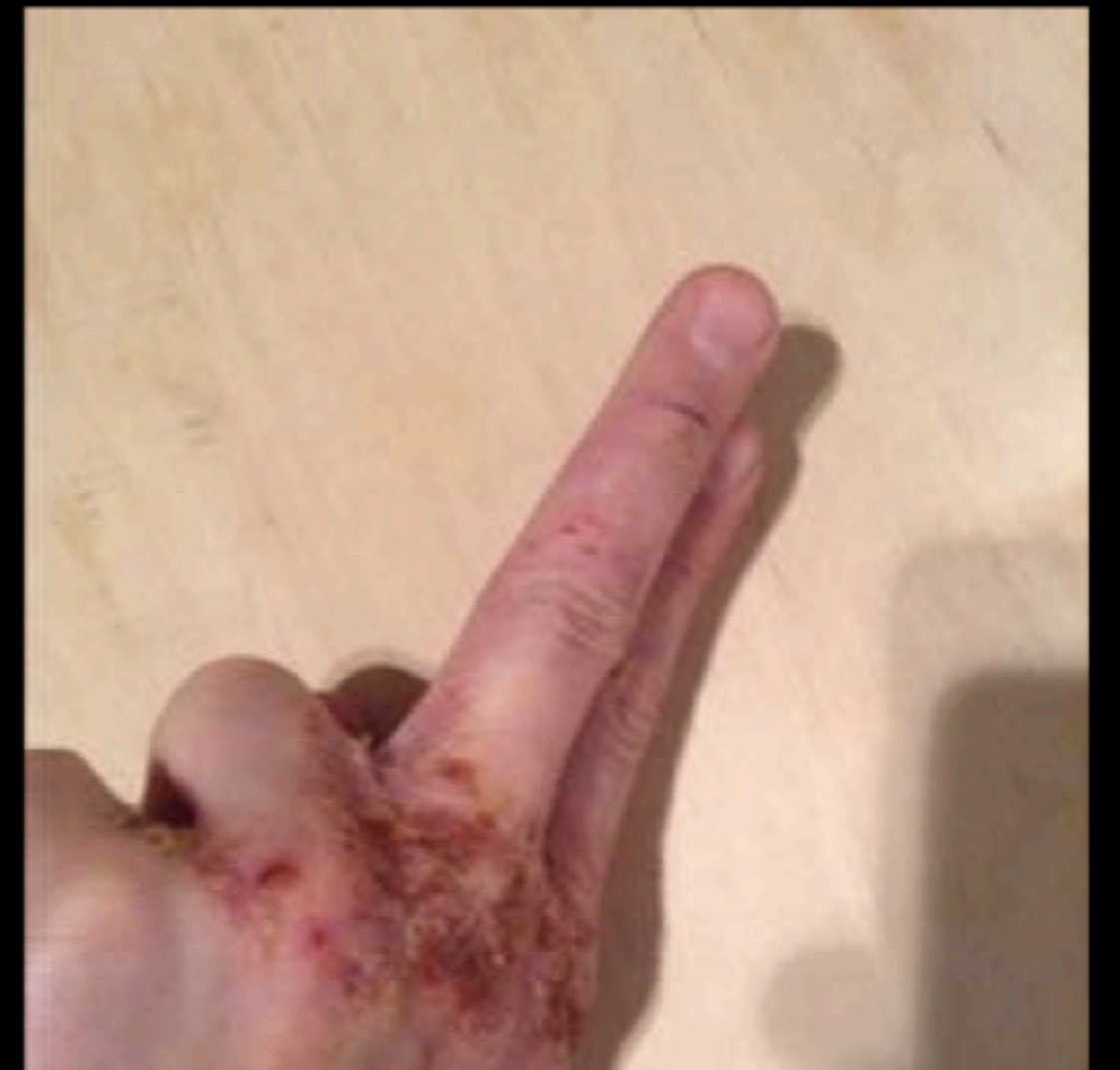
Jan 7 2013



Feb 12 2014



Feb 2 2015



Feb 26 2015

Bodily functions

Sleep	3937
Toilet visits (urine)	11000
Toilet visits (elimination)	3630

Other phenomena of interest

Bodily phenomena	25627
Environment or activity	1841
Reflections	2005
Pomodoros	6102

Sneezes, sneezes, sneezes

OUR PICKS LATEST POPULAR QUARTZ OBSESSIONS 🔍 ...

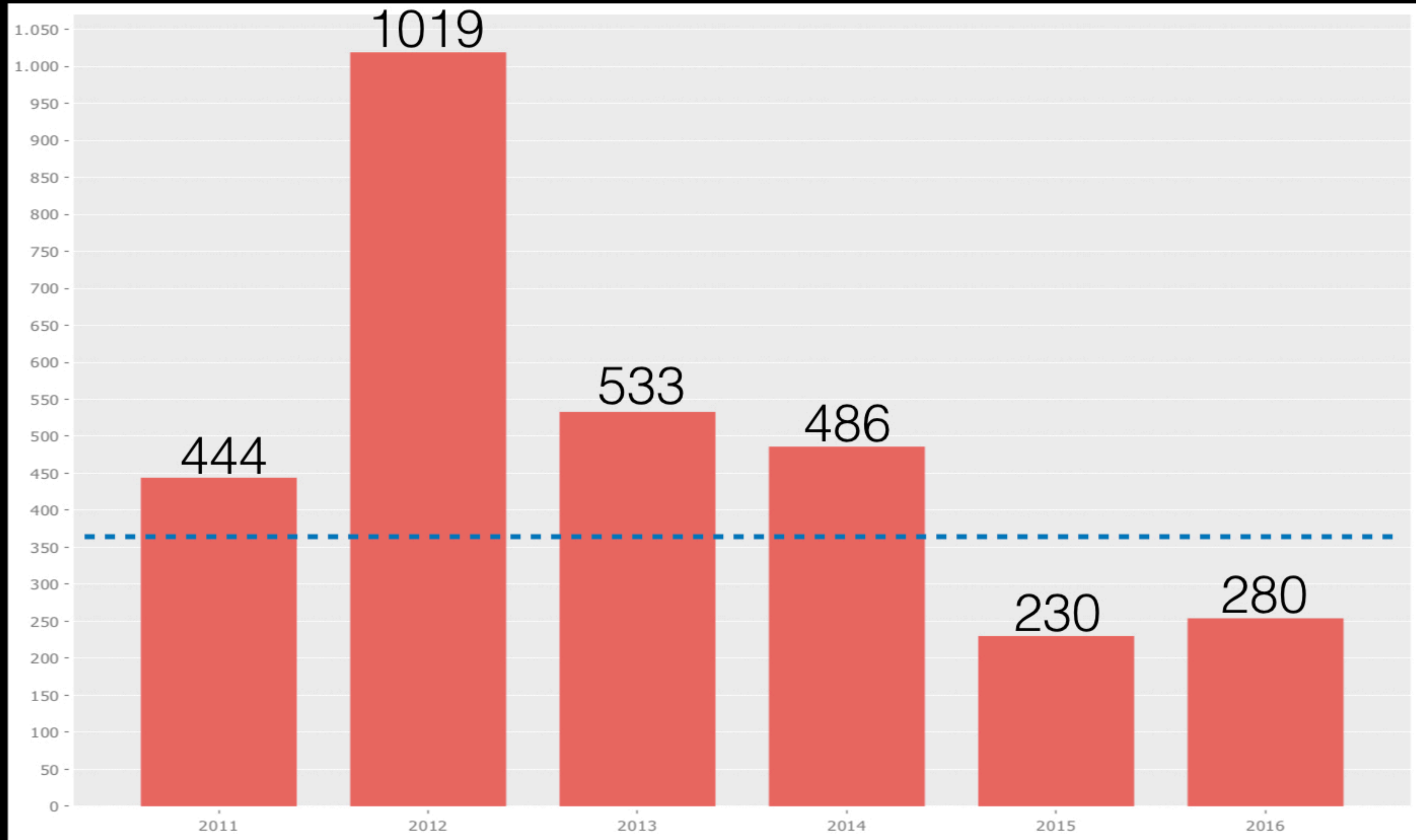
ACHOO

A man who tracked five years of sneezes might have a fix for your pollen allergy

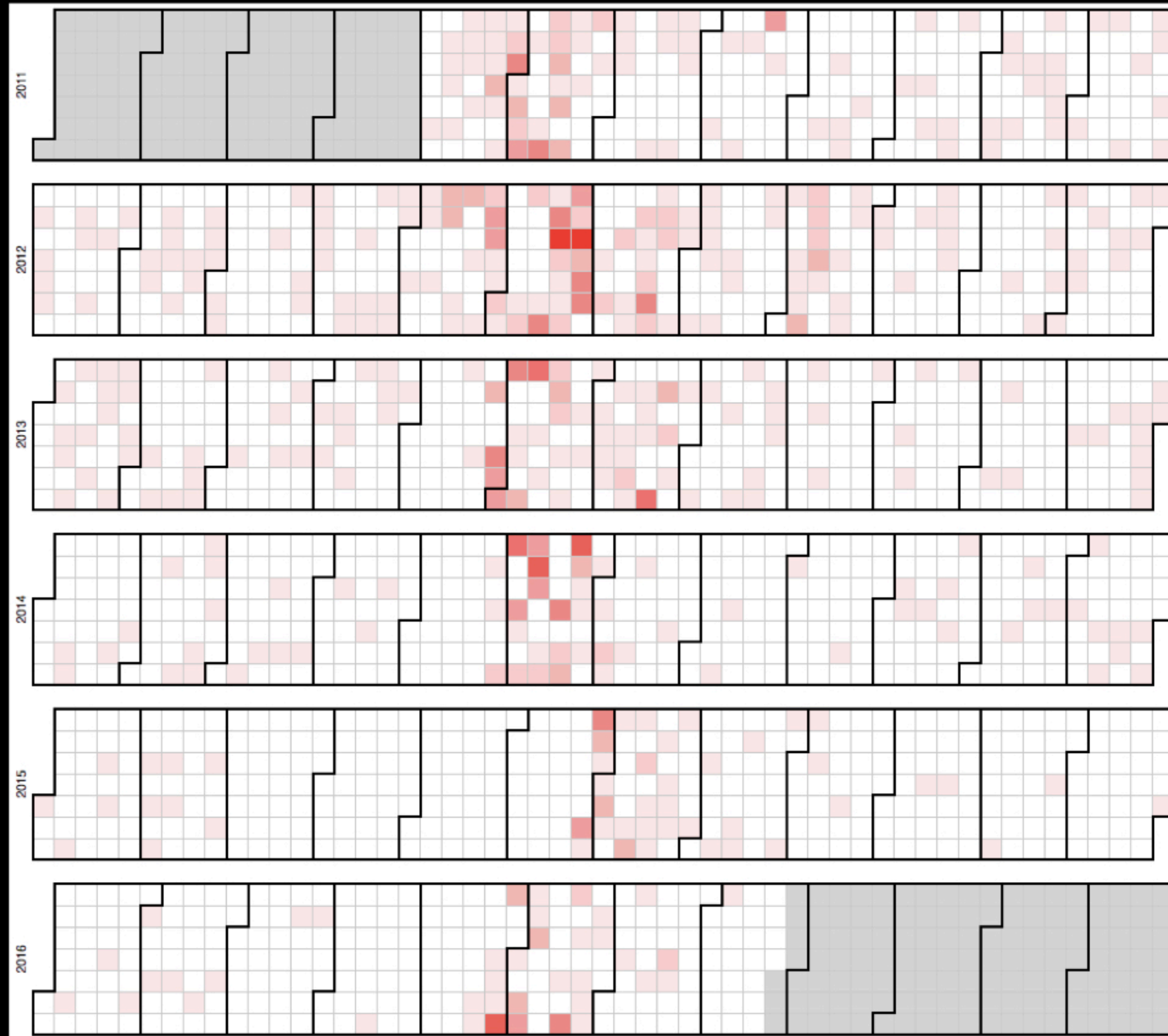


The image is a 3x4 grid of 12 frames showing a man with glasses and a black t-shirt sneezing. He is holding a small orange flower in his right hand. The frames capture the progression of the sneeze: from him looking at the flower, to his mouth opening, to him covering his nose and mouth with his hand, and finally to him looking down with his hand still covering his face.

Sneezes 2011-2016



Sneezes 2011-2016



Sneezes 2011-2016

2011

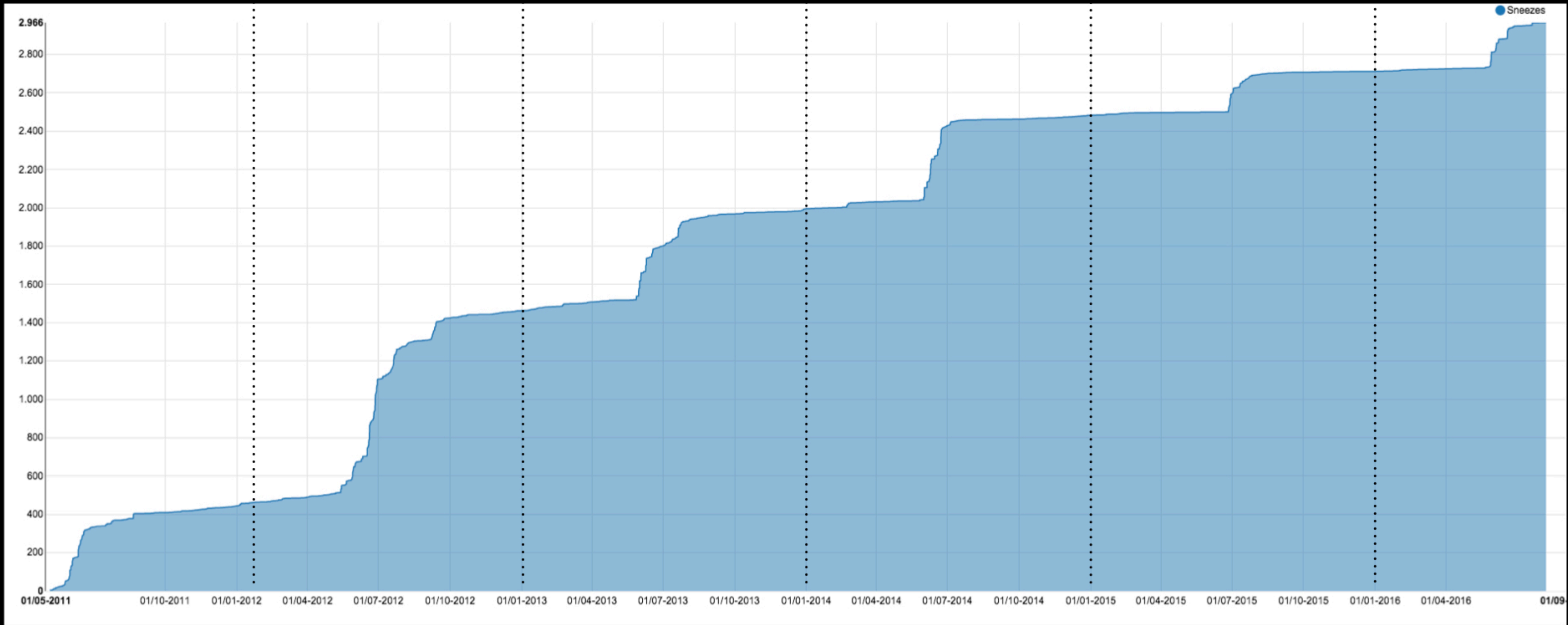
2012

2013

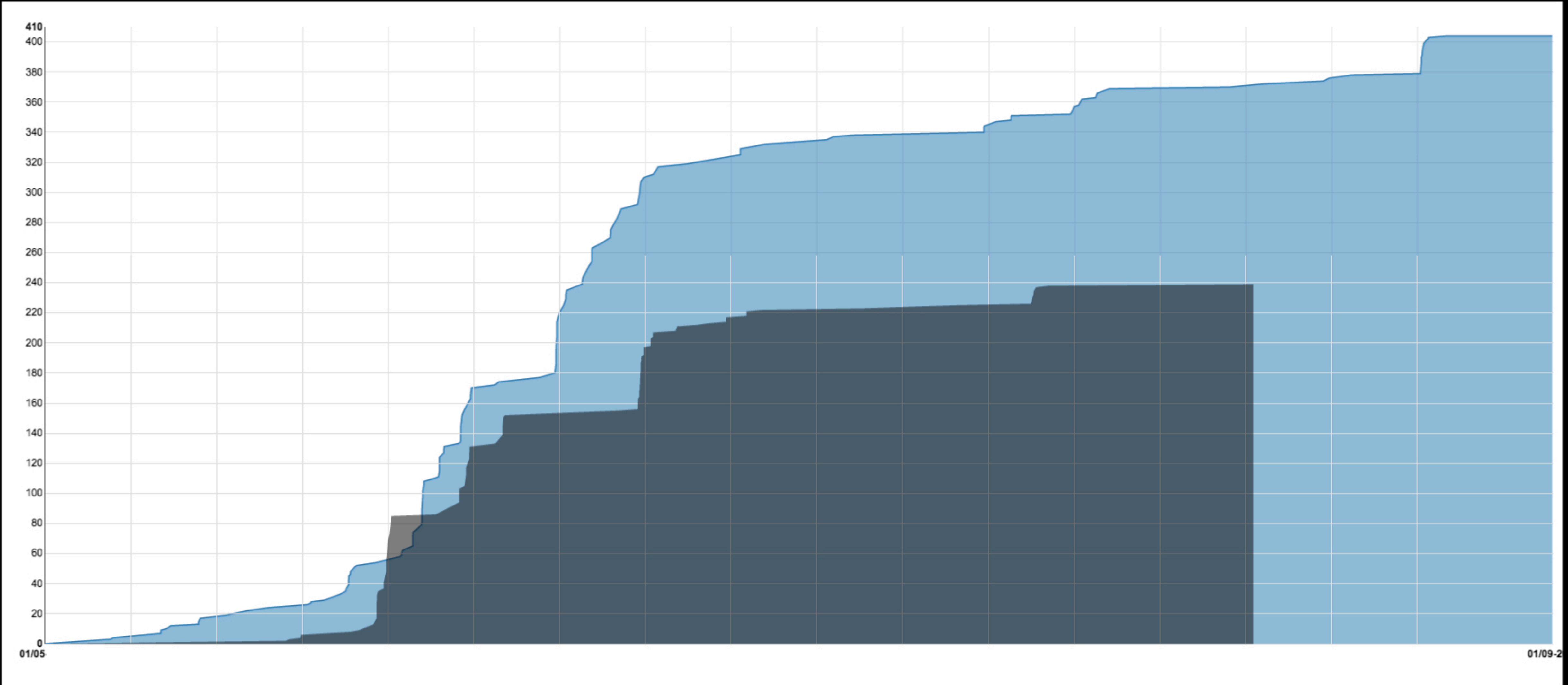
2014

2015

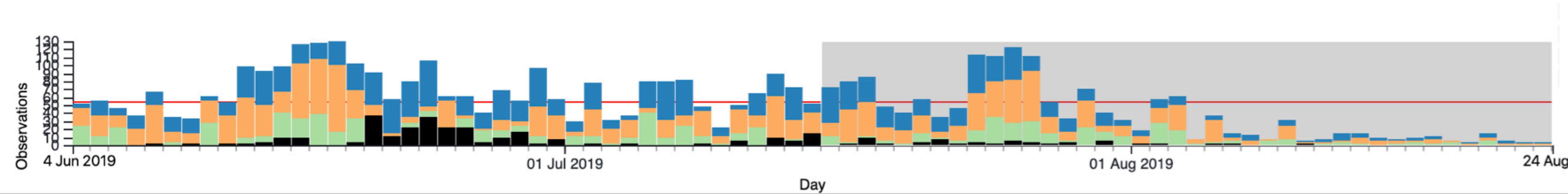
2016



Sneezes 2011 vs. 2016



Itching in nose summer of 2019



Working with data

```
78 (def sneezes-per-year-bar-chart
79   (i/with-data
80     (->> (map (fn [[k v]] {:year (name k) :count v}) sneezes-per-year)
81           ;;(i/$group-by :cap-shape)
82           ;;(map (fn [[k v]] (assoc k :count (i/nrow v))))
83           (sort-by :year)
84           i/to-dataset
85         )
86     (c/bar-chart :year :count)))
87
88
89 (i/view sneezes-per-year-bar-chart)
90
91 (defn calculate-distances [sneezes]
92   (mapv (fn [prev curr following]
93         (do {:timestamp curr :delta-t-prev (- curr prev) :delta-t-following (- following curr)}))
94         sneezes, (drop 1 (pop sneezes)), (drop 2 sneezes)))
95
96 (p/pprint (calculate-distances sneezes))
97
98 (i/with-data
99   (i/col-names
100    (i/to-dataset (dj/read-json (slurp "../tbc-sneezes-20150914.json"))
101    [:timestamp :amount]))
102
103 (def sneeze-prev-distance-histogram
104   (c/histogram (i/sel (i/to-dataset (calculate-distances sneezes)) :cols :delta-t-prev)
105               :nbins 50
106               :title "Distance to previous"
107               :x-label "Distance in time to previous"))
108
109 (i/view sneeze-prev-distance-histogram)
110
111 (def sneeze-prev-distance-histogram-one-day-limit
112   (c/histogram (i/sel (i/to-dataset (filter #(< (:delta-t-prev %) 86400) (calculate-distances sneezes))) :cols :del
113               :nbins 96
114               :title "Distance to previous"
115               :x-label "Distance in time to previous"))
116
117 (i/view sneeze-prev-distance-histogram-one-day-limit)
118
119 (def sneeze-following-distance-histogram
120   (c/histogram (i/sel (i/to-dataset (calculate-distances sneezes)) :cols :delta-t-following)
121               :nbins 100
```

What did I learn?

Latest clinical data on me

- Primary care: \approx 2008
- Hospital: \approx 1980

My resting heart rate

60 BPM



In general, for adults, a resting heart rate of **fewer than 60 beats per minute (BPM)** qualifies as bradycardia.

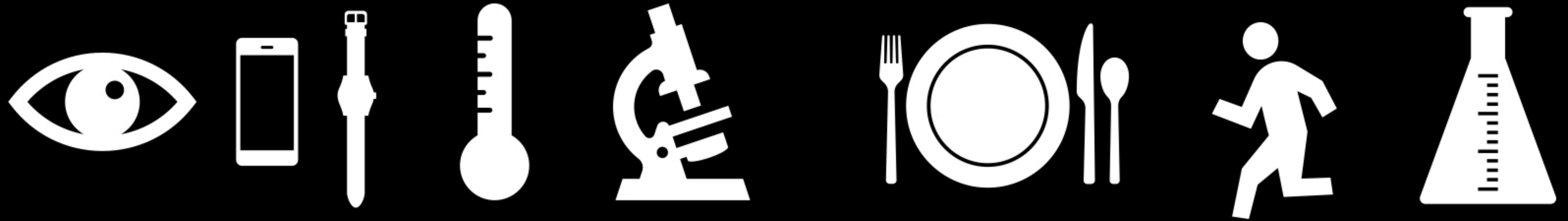
But there are exceptions. Your heart rate may fall below 60 BPM during deep sleep. And physically active adults (and athletes) often have a resting heart rate slower than 60 BPM.

—American Heart Association (heart.org)

@tblomseth

From *clinical* **guidelines**
to *personal* **baselines**

Observation \leftrightarrow Intervention

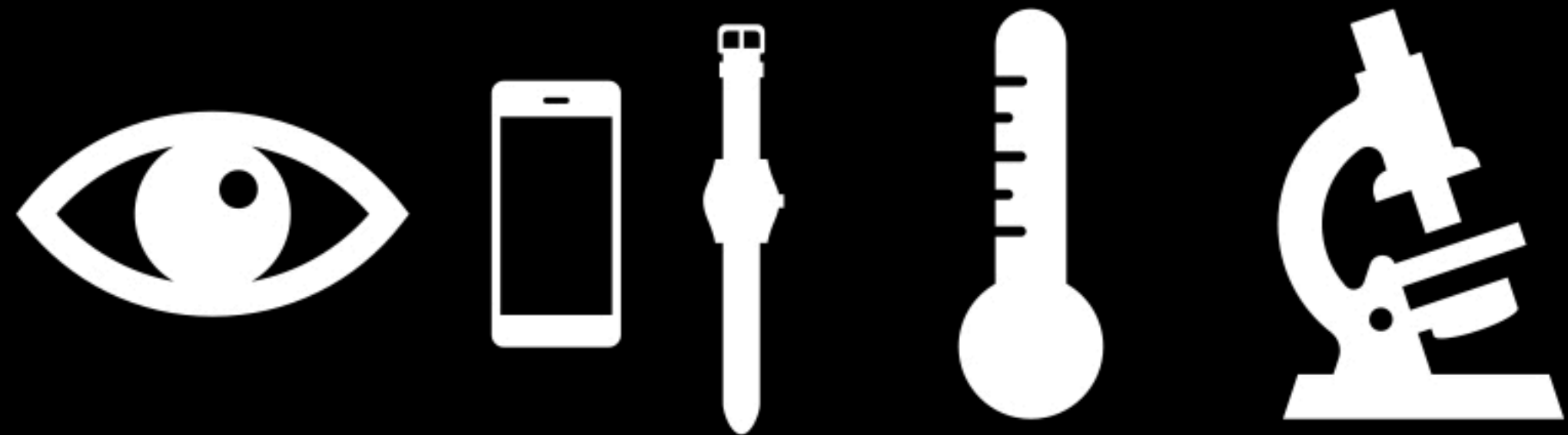


- Tracking things

- Changing things

Observation ↔ Intervention

①



- Tracking things

②



- Changing things

Self-tracking

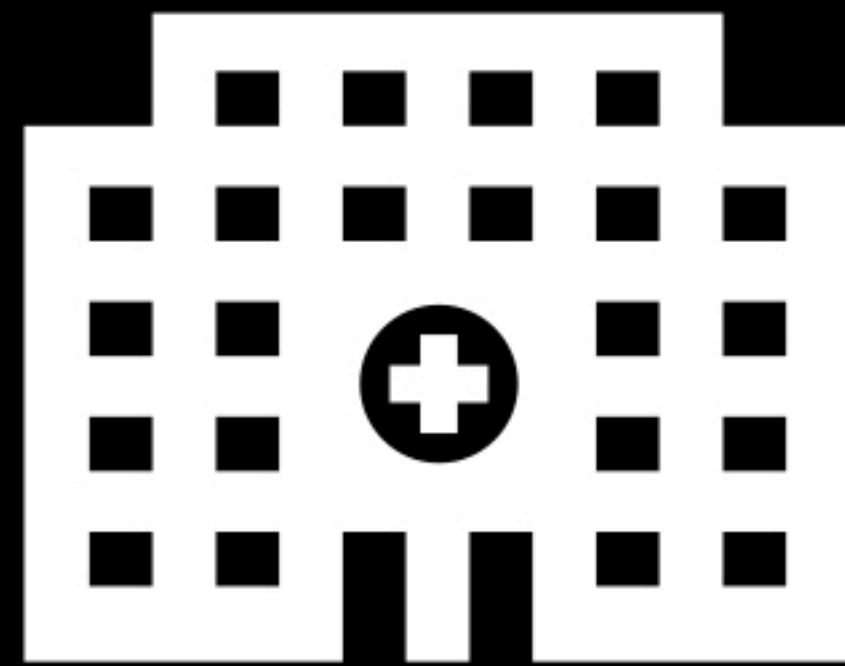
≠

Telemedicine

—the technology might look similar but the difference in intention matters

Telemedicine

- Bringing clinical processes out into people's everyday life



Self-tracking

- Using self-collected data to answer questions that matter to you



Common interests?

Clinically
relevant



Matters to
the individual



Number of immunologists
interested in my data and
methods (so far):

0

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