



UNIVERSITY of
STIRLING



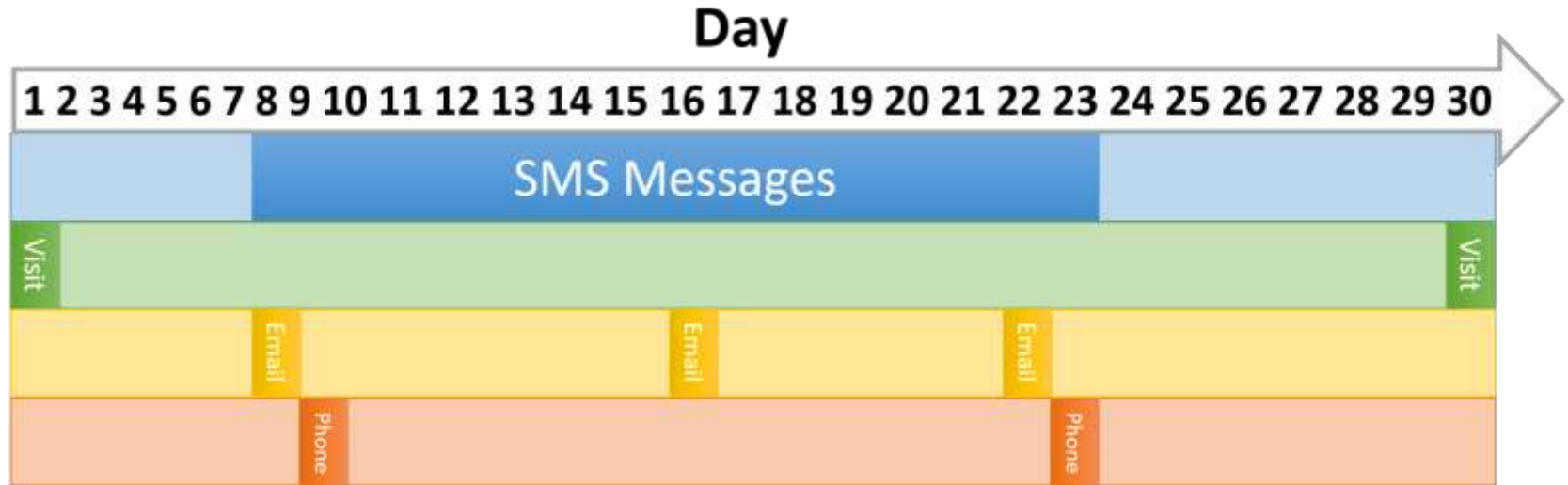
The future of air quality feedback

Dr Sean Semple
Dr Rachel O'Donnell
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**Smoke-free Homes Network
Meeting, 21 January 2019**

BE THE DIFFERENCE

TackSHS WP4: Measuring for Change



- Measurements for 30 days
- Two household visits (day 1 and 30)
- Daily text messages from day 8-23
- 3 emails (days 8, 16 and 22)
- 2 phone calls (day 9 and 23)

Outcome measures



Primary outcome measure is mean PM_{2.5} concentration day 1 - 7 vs mean concentration day 24 – 30



Secondarily, we will look at change in participants' self-reported smoking rules and attitudes to smoking in the home



In Scotland we have conducted eight qualitative interviews with intervention participants to be analysed

RAPID: real-time monitoring

- Paired Dylos with Raspberry Pi mini-computer to send data to the internet
- Provides ability to provide study participants with near real-time feedback
- Also allows remote monitoring in other settings



Participant SMS feedback

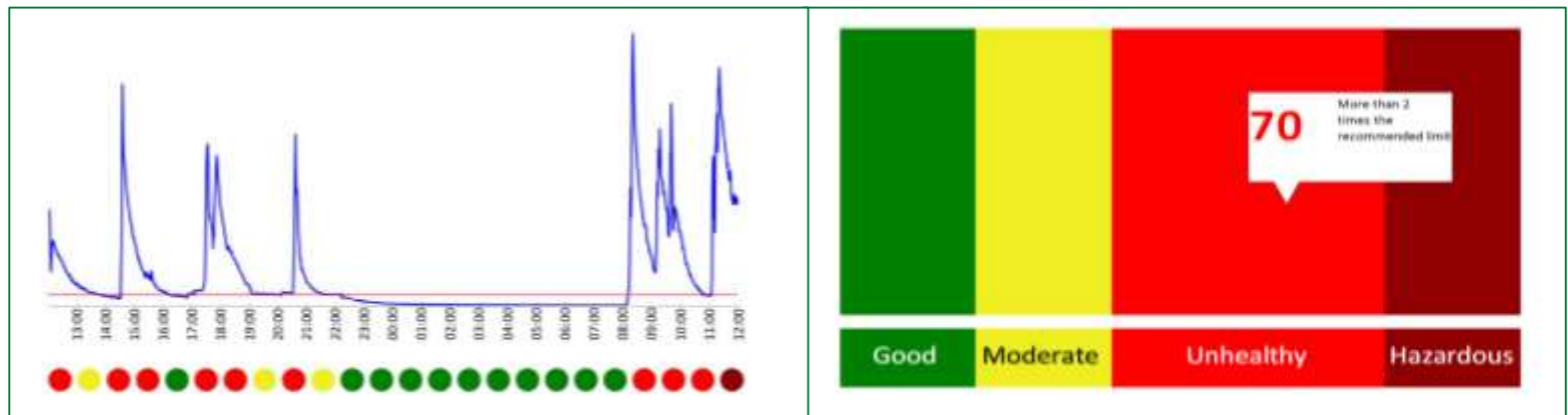
The second-hand smoke level in your home was 121 over the last 24 hours. This is lower than the average over the previous seven days, well done! This is higher than a smoke-free home in Edinburgh. Why not text visitors in advance to let them know your home is smoke-free?

Daily SMS to participant providing

- Average levels from previous 24h
- How does that compare to last 7 days
- Is it higher or about the same as a typical smoke-free home in their area
- Plus some follow-up advice/information

Feedback generation

- Partially automated text feedback with texts generated by computer, approved/altered by a researcher, then sent by software
- Email feedback is generated automatically using visualisations below



- Records of this feedback are stored on a secure network drive and displayed when a researcher is contacting a participant

Measuring PM_{2.5} with the new Purple Air PA-II-SD

Real-time personal PM monitoring for £200

Dr Sean Semple

Purple Air-II-SD



Low-cost laser particle counter (\$250)

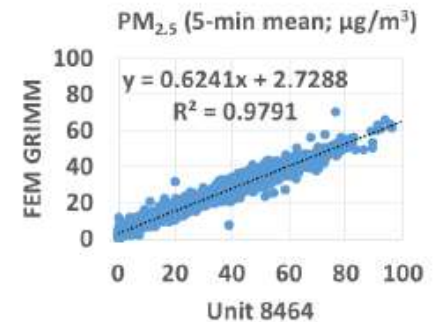
Small (7cm x 7cm x 6cm), wearable, makes no noise

Can operate from a powerbank (5000mAh >9h; 20000mAh >36h) or fixed from mains electric power

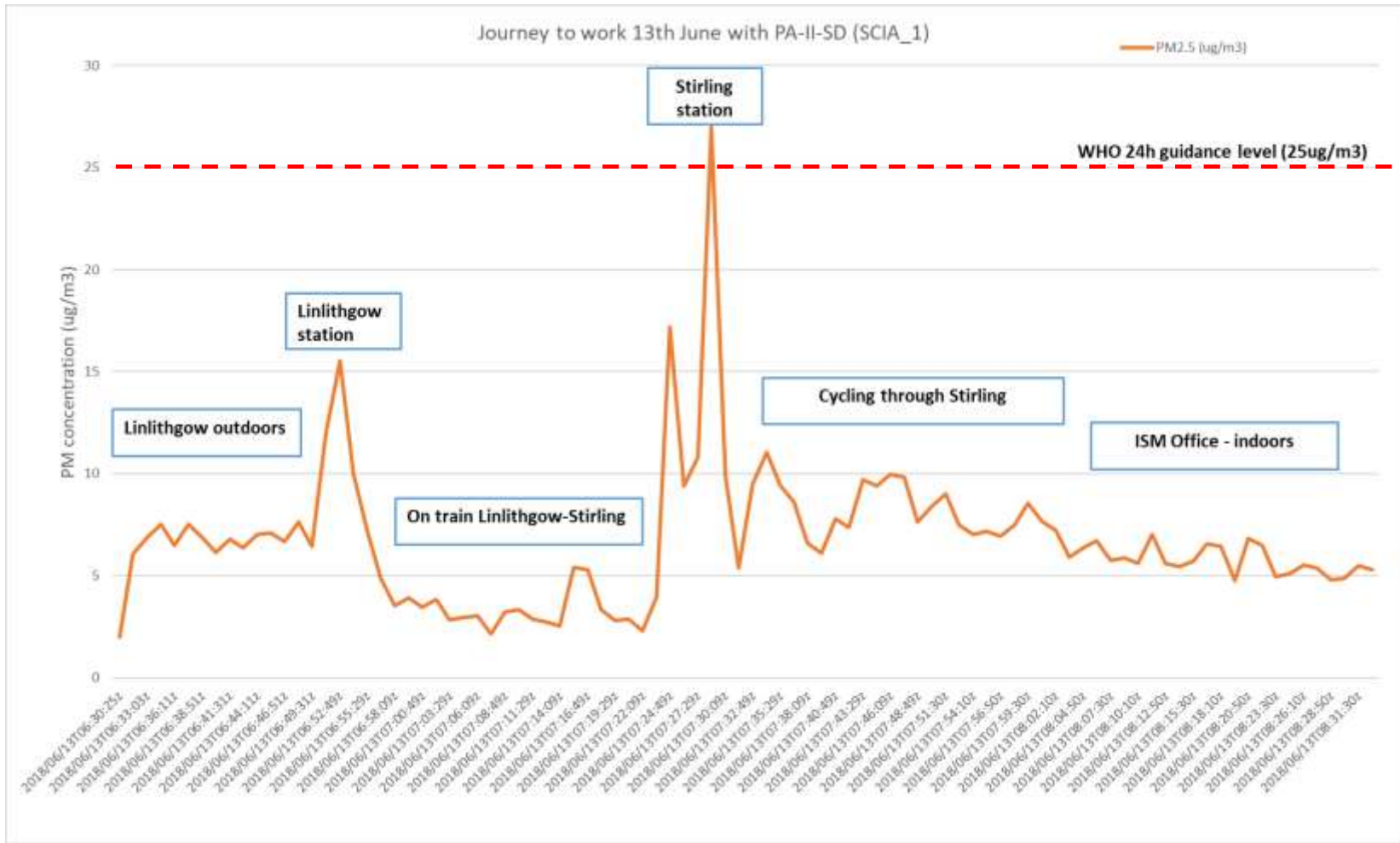
Uploads in real-time to server via wifi (or mobile phone hotspot)

Logs to SD card – so data always recoverable if wifi signal lost

Independent evaluation data shows very good agreement ($R^2 > 0.95$) with gold standard instruments



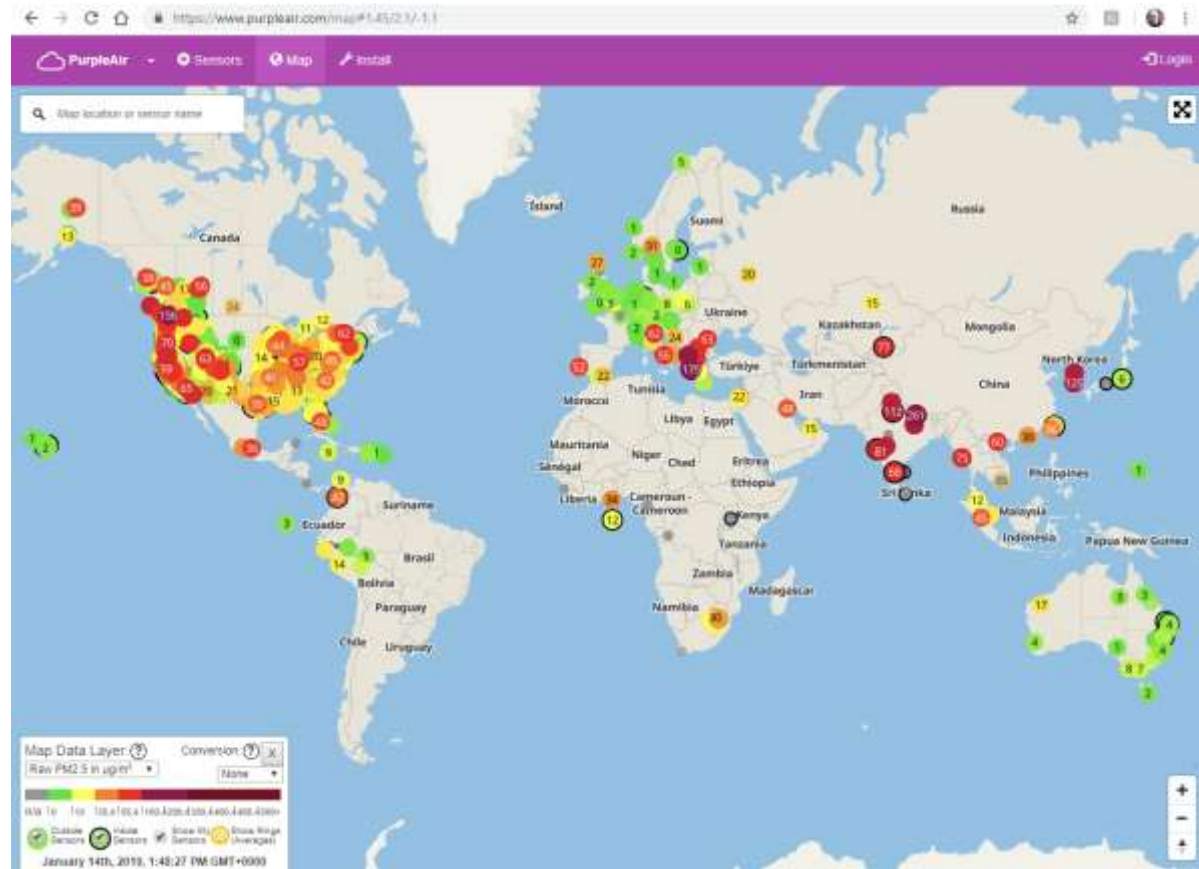
<http://www.aqmd.gov/aq-spec/evaluations/field>



Follow in real-time

Go to www.purpleair.com/maps

Click on the circle to access real-time data from each instrument...

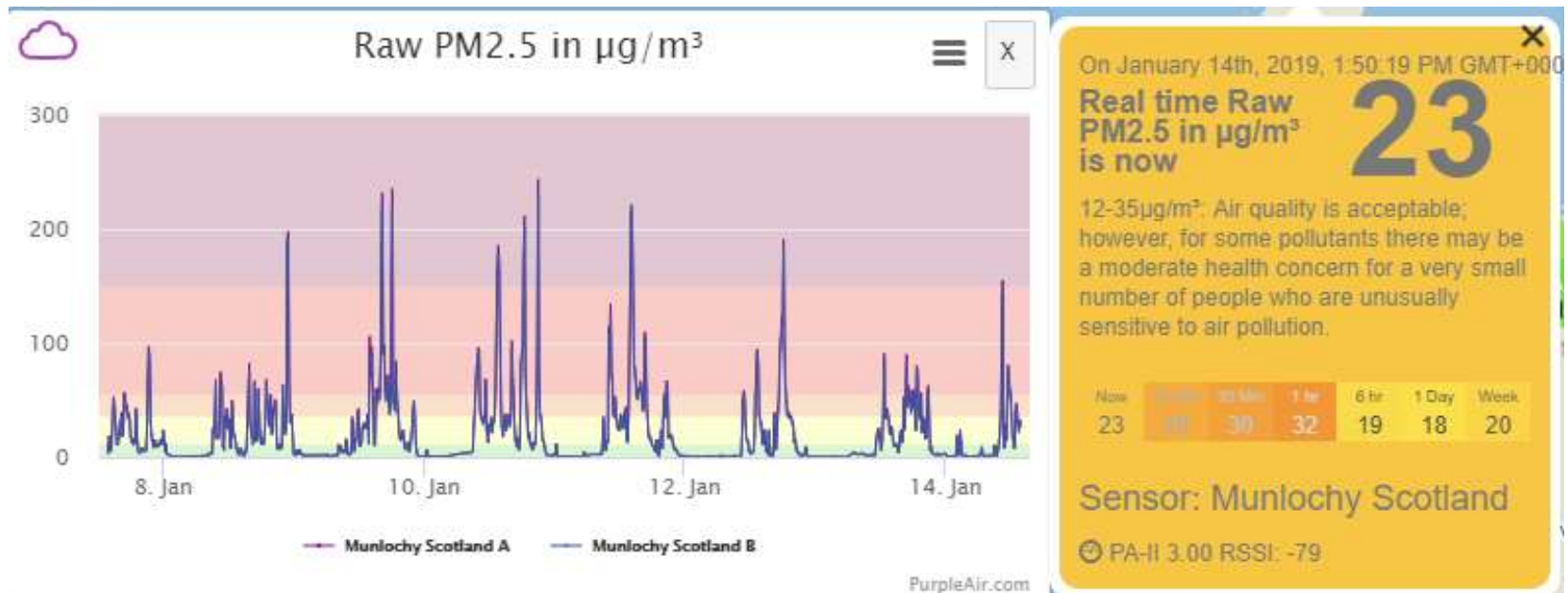


Real-time data

Provides average data

And real-time graphs

Can also display temperature and humidity



Potential applications

5 years ago this type of capability cost >\$3,000 per unit

Real-time measurement of air pollution

Real-time measurement of personal exposure to air pollution

Measurement of SHS in homes at low cost

Measurement of personal exposure to SHS for workers who visit various homes during a shift

And we can now do this for £194 per device...

Smoke-free homes workshop Malaysia 2018

The Kuala Lumpur Charter on Smoke-Free Homes:

<https://blogs.bmj.com/tc/2018/06/25/the-kuala-lumpur-charter-on-smoke-free-homes/>

There is potential to use air quality feedback and/or biological monitoring methods such as salivary cotinine levels as motivating tools to encourage households to move towards smoke-free rules.

Smoke-free home interventions should be delivered at a household level rather than specifically targeting women.



Smoking in the home report

ASH – November 2018

<http://ash.org.uk/information-and-resources/reports-submissions/reports/smoking-in-the-home-new-solutions-for-a-smokefree-generation/>

13 recommendations around reducing smoking in the home

