

Environmental health surveillance to assess intervention adequacy: case studies from the BCCDC

25 February 2013

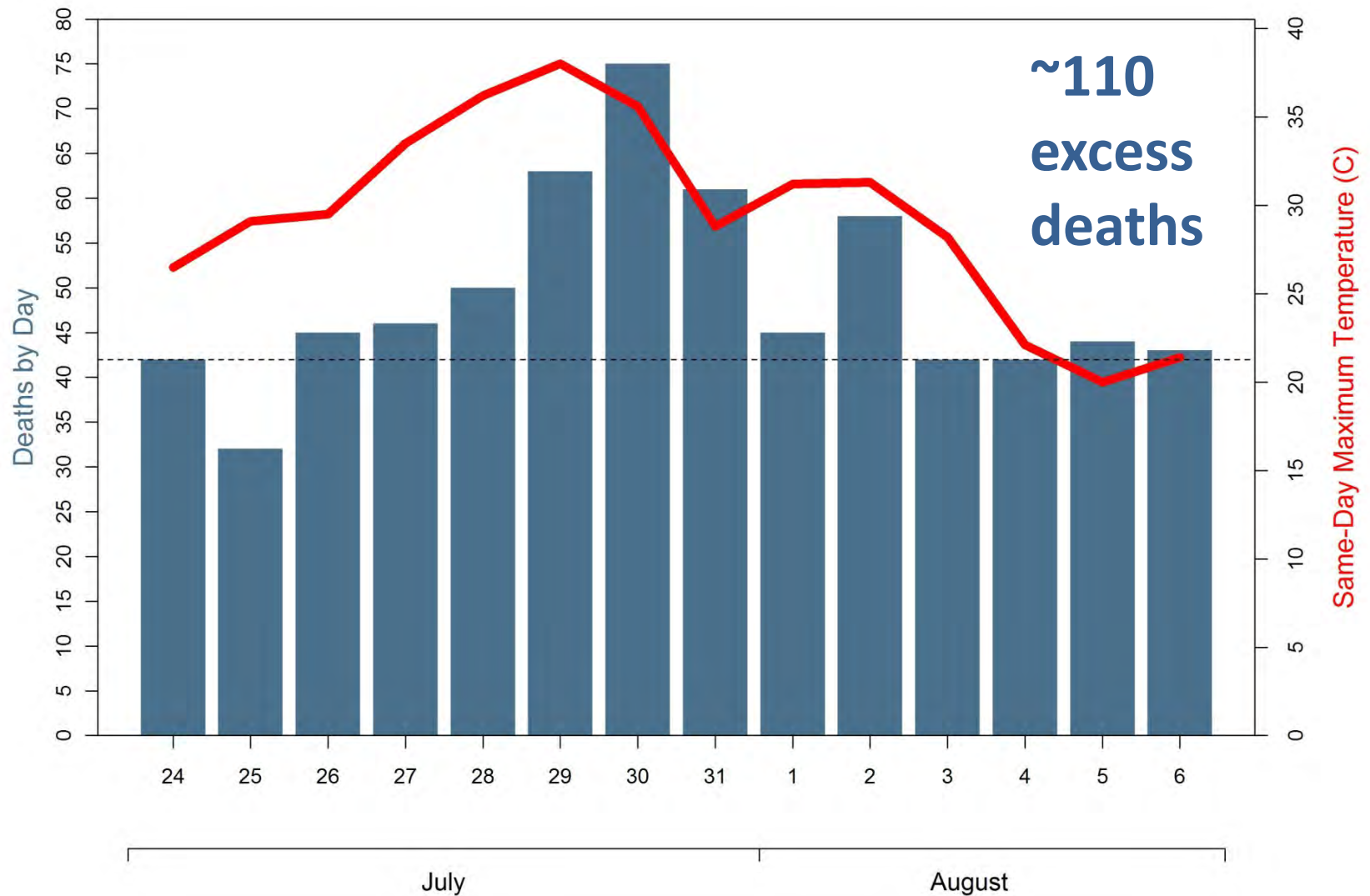
Sarah Henderson

Environmental Health Services

BC Centre for Disease Control

Heat health emergencies in Greater Vancouver

Lower Mainland 2009



2-day average:

31°C at Vancouver Airport

36°C at Abbotsford Airport

Emergency
responders need
advance warning

False positives =
minimal

True positives =
required

Can we reliably
predict historical
dangerously hot
days?

Recommendation

A heat health emergency should be called 21-hours in advance for the entire Lower Mainland when the average of today's 14:00 *measured temperature* and tomorrow's *forecast* high equals or exceeds:

34°C at **Abbotsford airport**

OR

29°C at **Vancouver airport**

The emergency should be sustained for as long as either criterion persists.

Is the heat health
emergency warning
system working?

Vital statistics data

death_date	reg_date	AgeCat	UCOD	LHA_code	LOC
2013-01-14	20130114	85+ years	INC	47	<NA>
2013-01-14	20130114	70-74 years	INC	201	<NA>
2013-01-13	20130114	80-84 years	INC	42	<NA>
2013-01-13	20130114	80-84 years	INC	41	<NA>
2013-01-12	20130114	85+ years	INC	40	<NA>
2013-01-07	20130110	65-69 years	INC	201	<NA>
2013-01-01	20130104	85+ years	INC	43	<NA>
2012-12-31	20130107	85+ years	INC	41	<NA>
2012-12-26	20121229	85+ years	I449	37	<NA>
2012-12-21	20121227	80-84 years	I629	202	<NA>
2012-12-21	20121224	65-69 years	INC	37	<NA>
2012-12-20	20121221	75-79 years	I639	43	<NA>
2012-11-29	20121207	60-64 years	W19	40	<NA>
2012-11-15	20121119	85+ years	F03	201	RESIDENTIAL INSTITUTION
2012-11-11	20121114	75-79 years	C509	37	RESIDENTIAL INSTITUTION
2012-11-02	20121106	80-84 years	F03	201	RESIDENTIAL INSTITUTION
2012-10-29	20121101	80-84 years	I48	38	HOSPITAL
2012-10-29	20121031	85+ years	I48	33	HOSPITAL
2012-10-19	20121023	75-79 years	I690	35	RESIDENTIAL INSTITUTION
2012-10-18	20121020	80-84 years	E146	166	HOSPITAL

Data completion

N deaths registered									
Death Date	Day 1	Day2	Day3	Day 4	Day 6	Day 8	Day 10	Day 12	Day 14
25-07-2012	1	11	23	37	43	44	44	44	44
26-07-2012	0	8	15	25	34	35	35	35	39
29-07-2012	0	4	15	24	30	31	31	33	33
30-07-2012	1	6	19	26	35	35	35	42	42
31-07-2012	0	5	11	21	22	22	28	32	
01-08-2012	0	5	13	16	16	16	35	35	
02-08-2012	2	10	13	13	13	32	39		
05-08-2012	0	0	25	38	41	41	41		
06-08-2012	0	16	36	36	40	44			
07-08-2012	0	7	32	32	36	42			
08-08-2012	0	2	15	15	23				
09-08-2012	0	10	10	26	37				
12-08-2012	1	13	37	37					
13-08-2012	0	2	25	25					
14-08-2012	0	1	19						
15-08-2012	0	8							
16-08-2012	3								

Nowcasting

What will **today** look like on **day 14**?

$$\begin{aligned}\text{Day14}_{\text{est.today}} &= \text{Day1}_{\text{obs.today}} \\ &+ \text{Day1}_{\text{obs.lastday}} \\ &+ \text{Day2}_{\text{obs.lastday}} \\ &+ \text{DOW}_{\text{today}} \\ &+ \text{DOW}_{\text{lastday}}\end{aligned}$$

Model coefficients updated
daily on **summer** days

Internal alerts triggered when

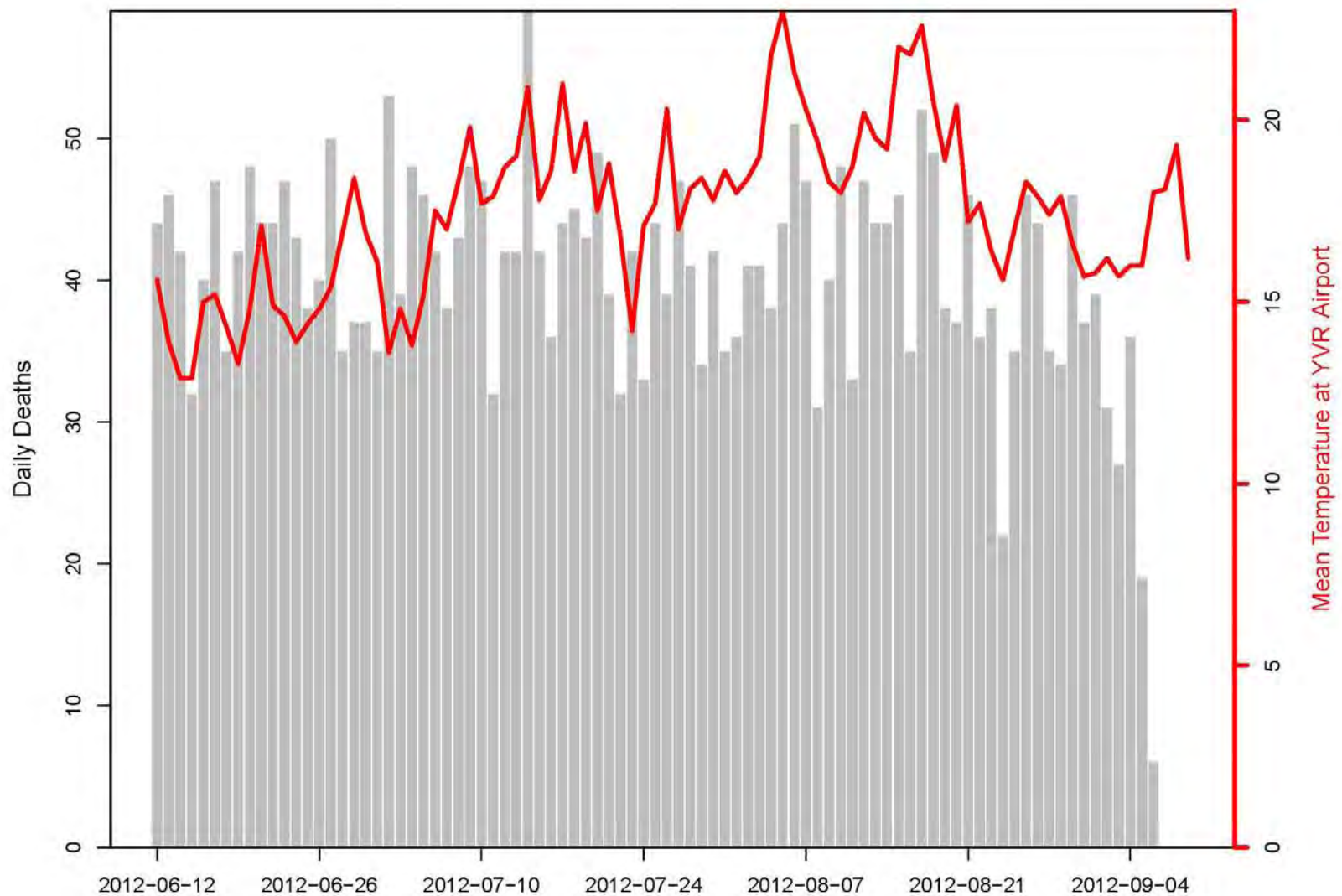
$\text{Day14}_{\text{est.today}} \geq 54$ (never)
98th percentile of Day14 observations

$\text{Day1}_{\text{obs.today}} \geq 3$ (once)
98th percentile of Day1 observations

August 16, 2012

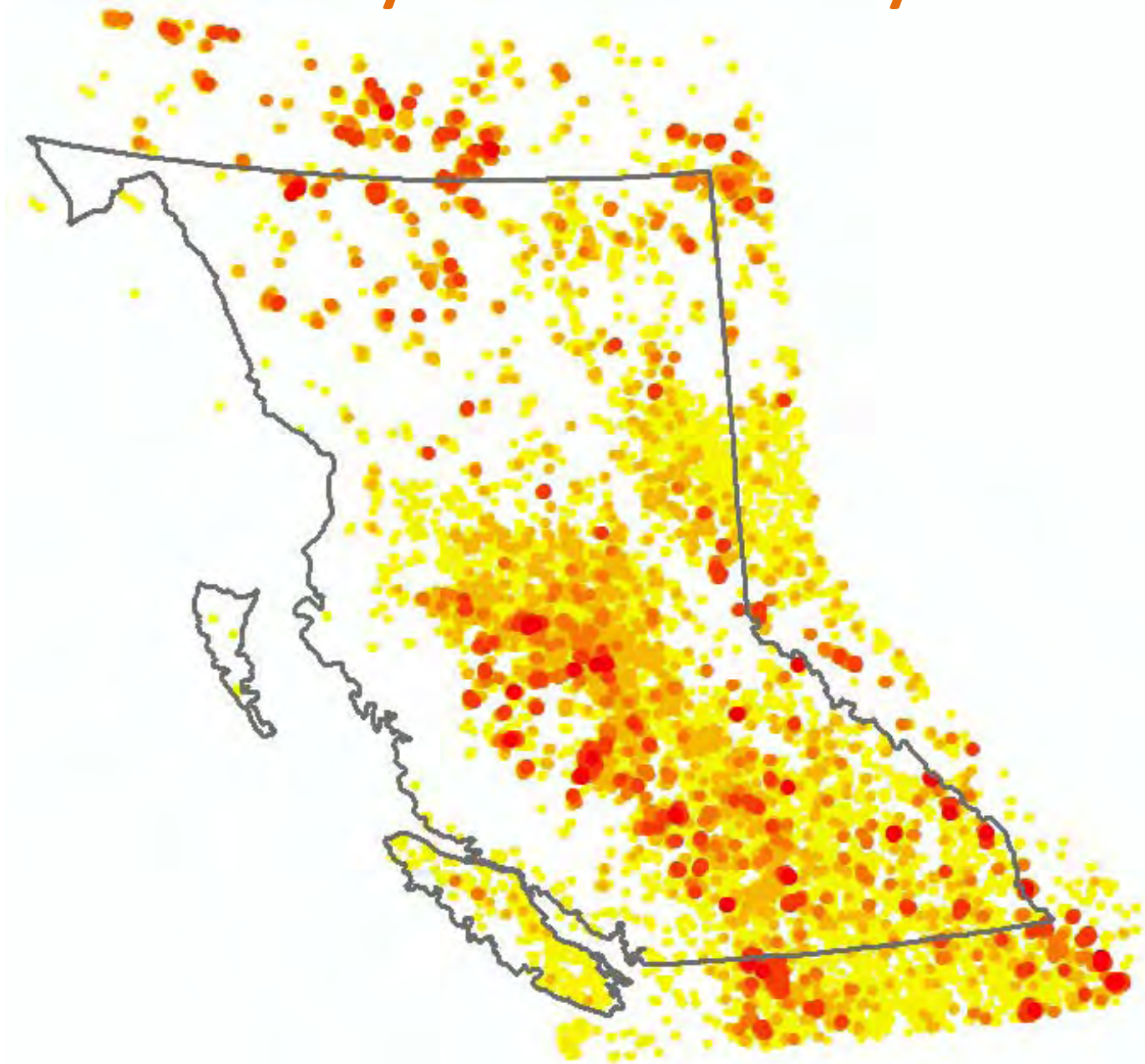
Day1_{obs.today} ≥ 3

Temperature checks = **28.4 / 33.2°C**

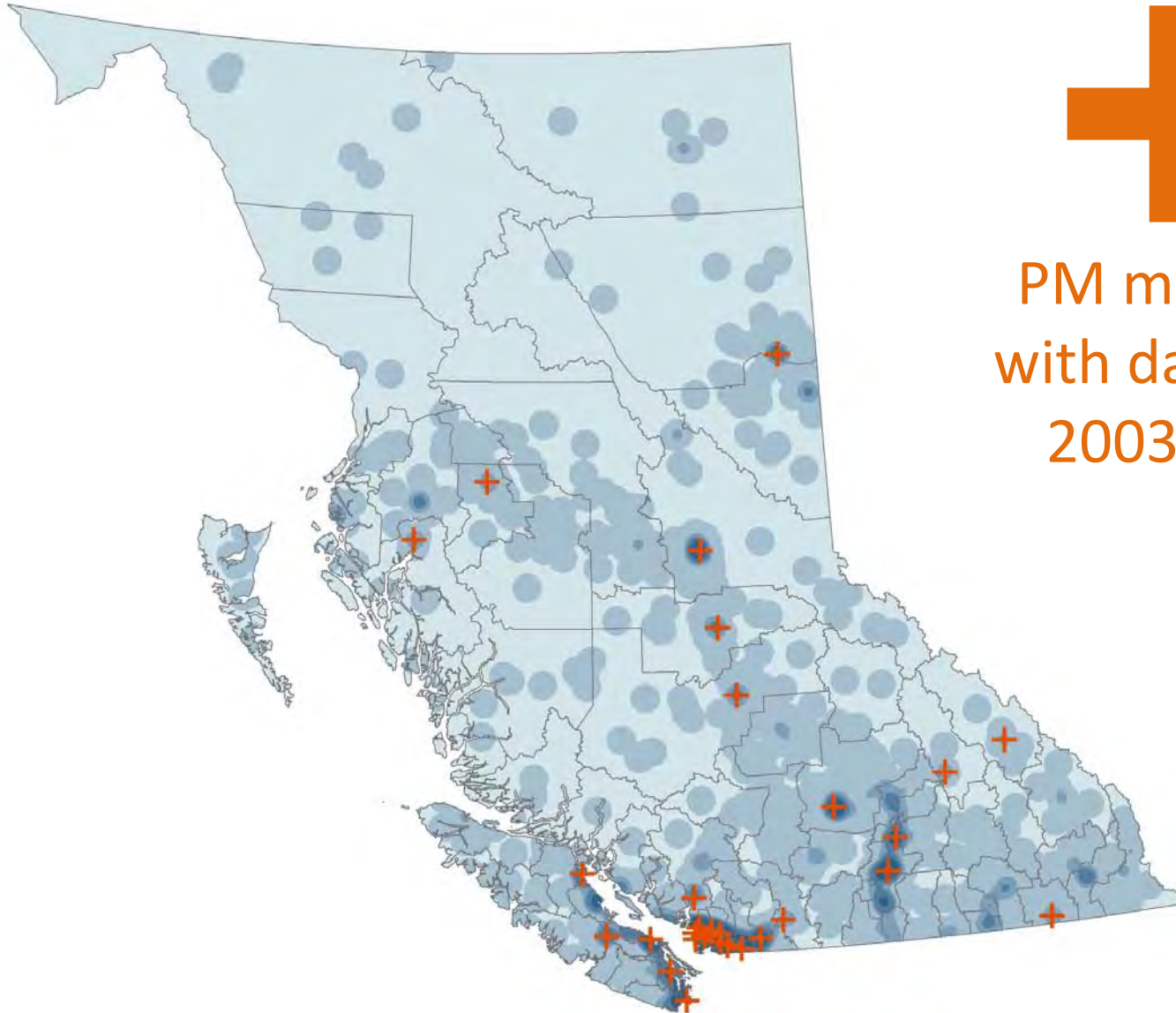


Forest fire smoke
across the entire
province

BC is annually affected by fires

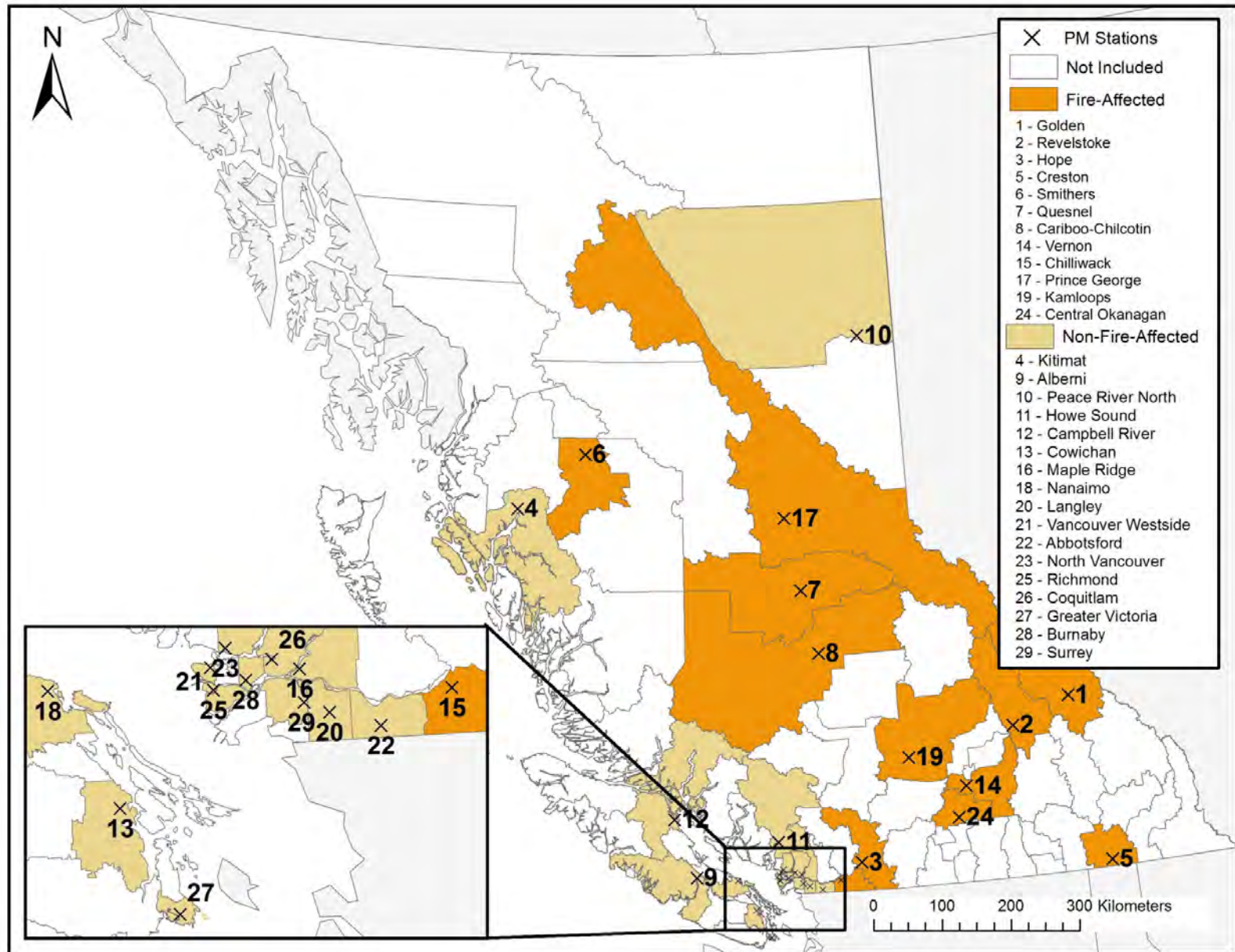


Some populations unmonitored

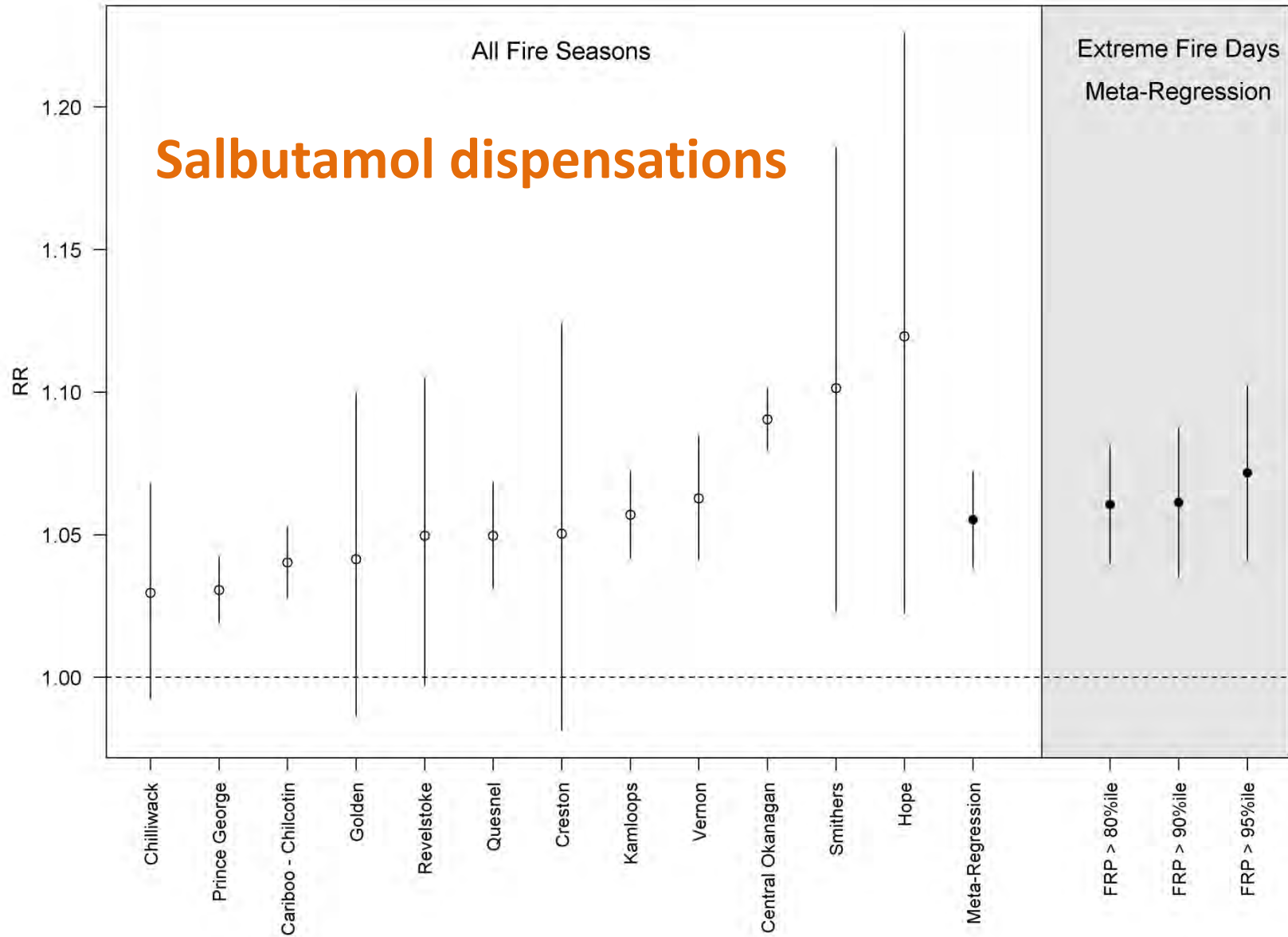


PM monitors
with daily data
2003-2010

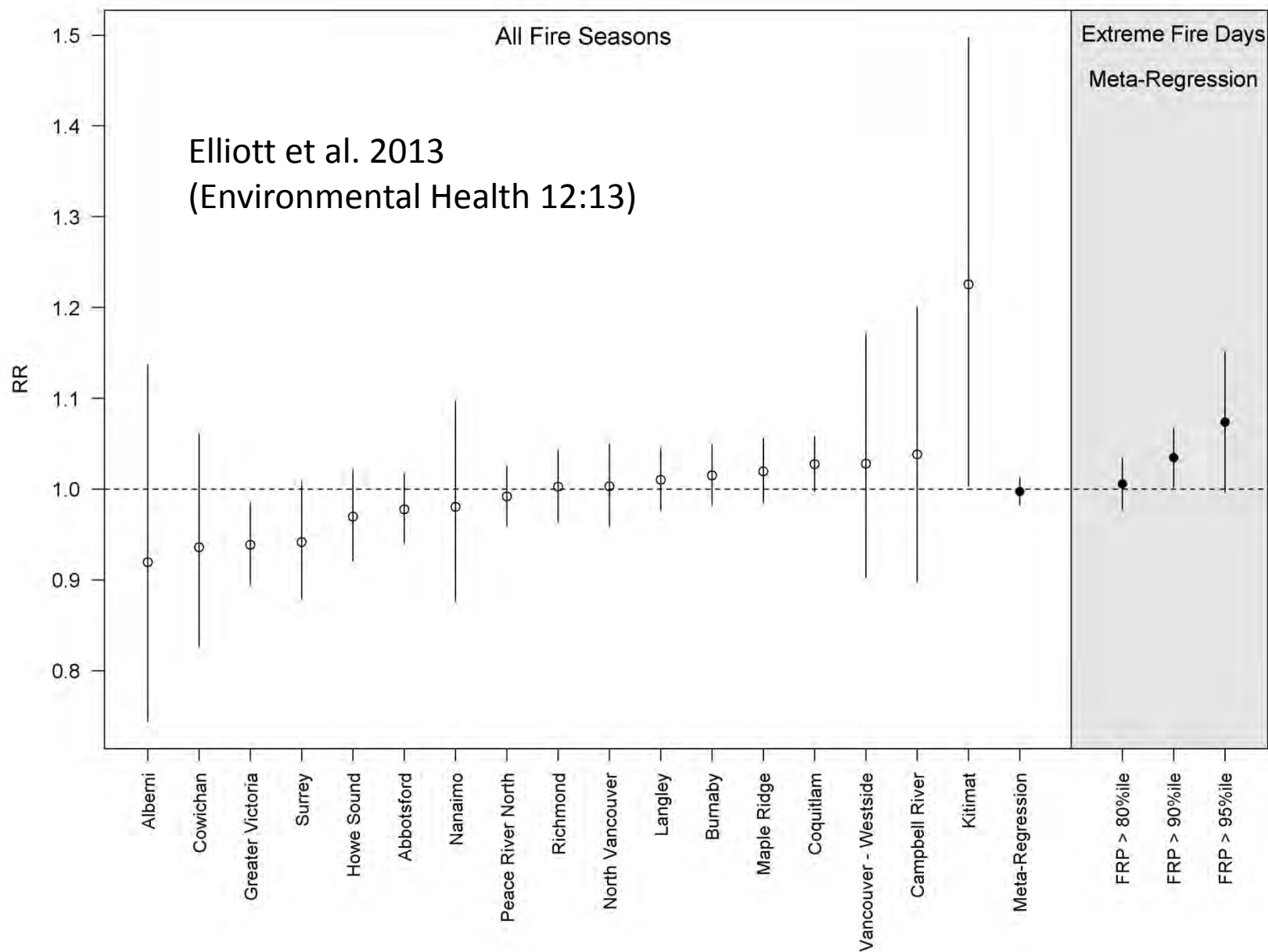
29 of 89 health areas 2003-2010



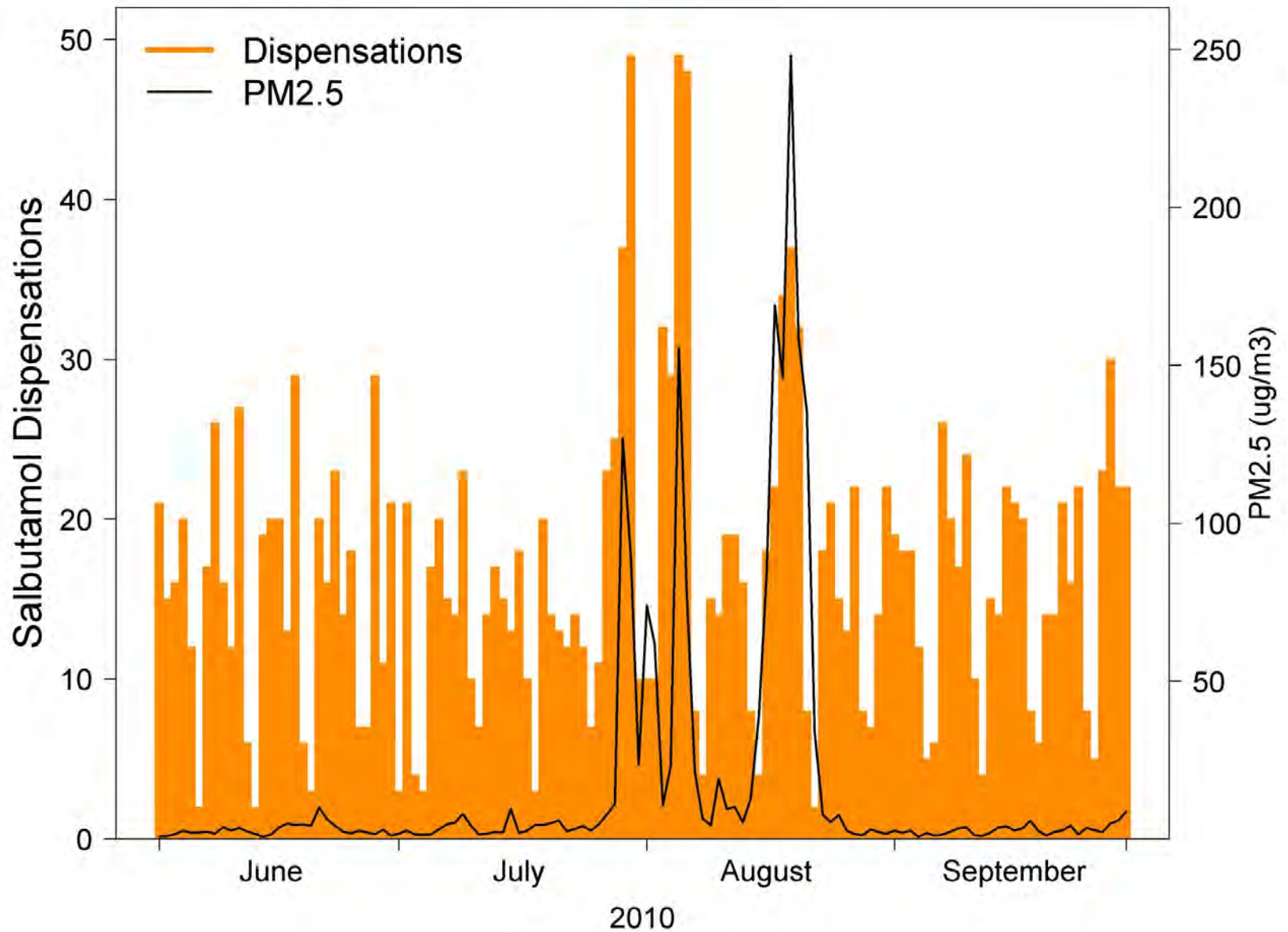
Fire-affected populations



Non-fire-affected populations

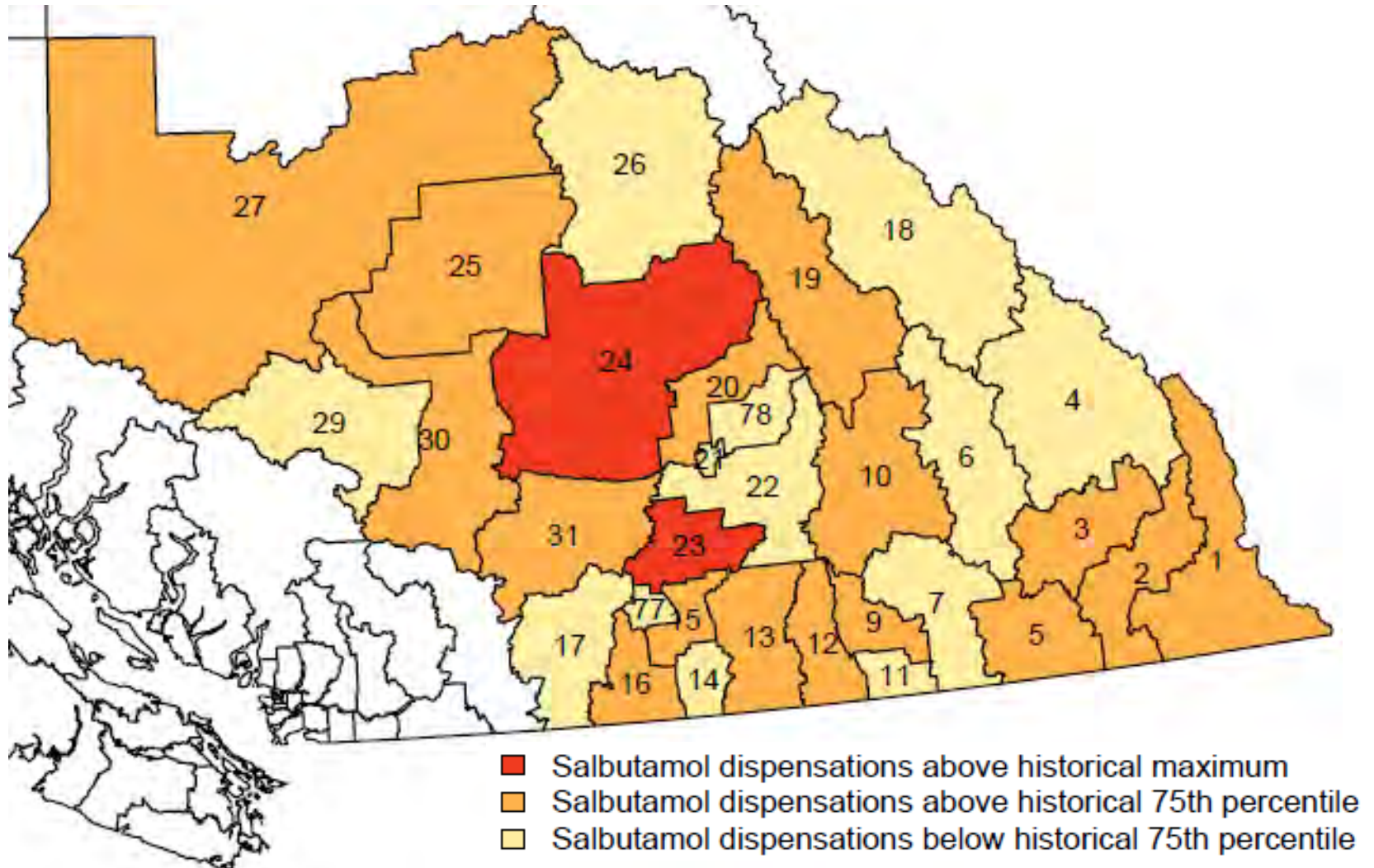


Acute response



BC Asthma Medication Surveillance

BC Asthma Medication Surveillance (BCAMS) is the first iteration of a surveillance system that is under development. We will be seeking feedback from both users and surveillance experts to improve this product over the coming years. We welcome your feedback.

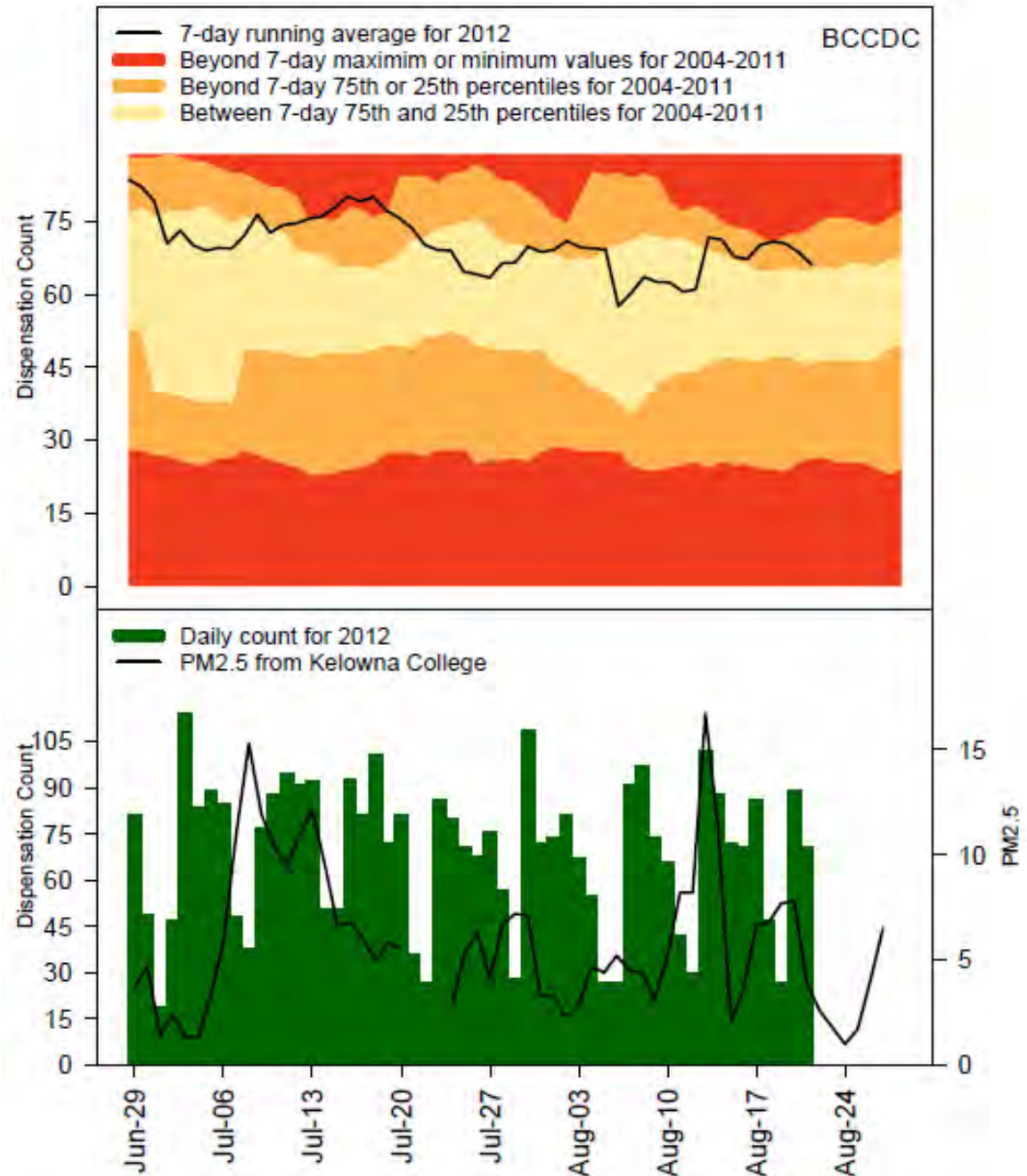


2012 Pilot

- Pushed weekly to MHOs
- Always 1 week behind
- Showed impact, despite quiet season

Salbutamol Dispensations for Central Okanagan (#23)**

Update for week of Aug 14 to Aug 21, 2012

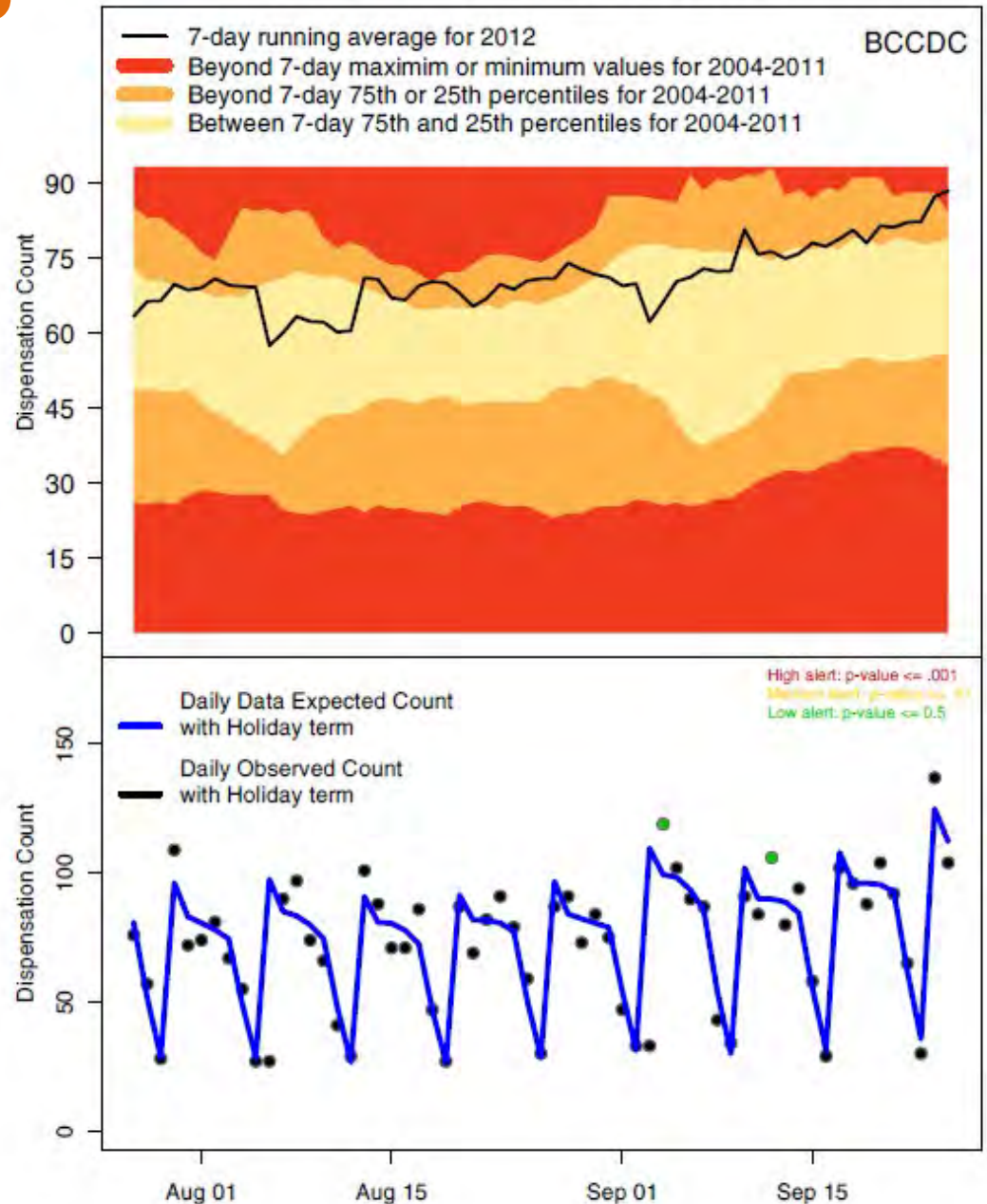


Upgrade 2013

- Replace ad-hoc alerting with BCCDC PHIDO
- Better control for population-specific factors
- Daily data during fire season
- Ability to advise MHOs in near-real-time
- New smoke estimates?

Salbutamol Dispensations for Central Okanagan (#23)**

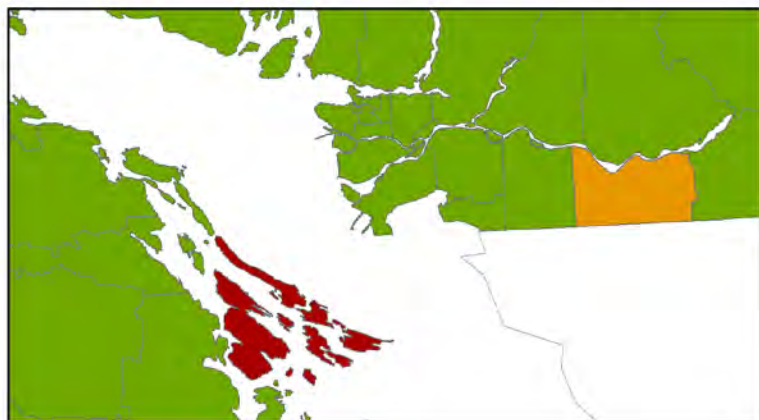
Update for week of Sep 18 to Sep 25, 2012



Lung cancer
mortality by radon
risk areas of BC



Local Health Areas



0 125 250 500 Kilometers

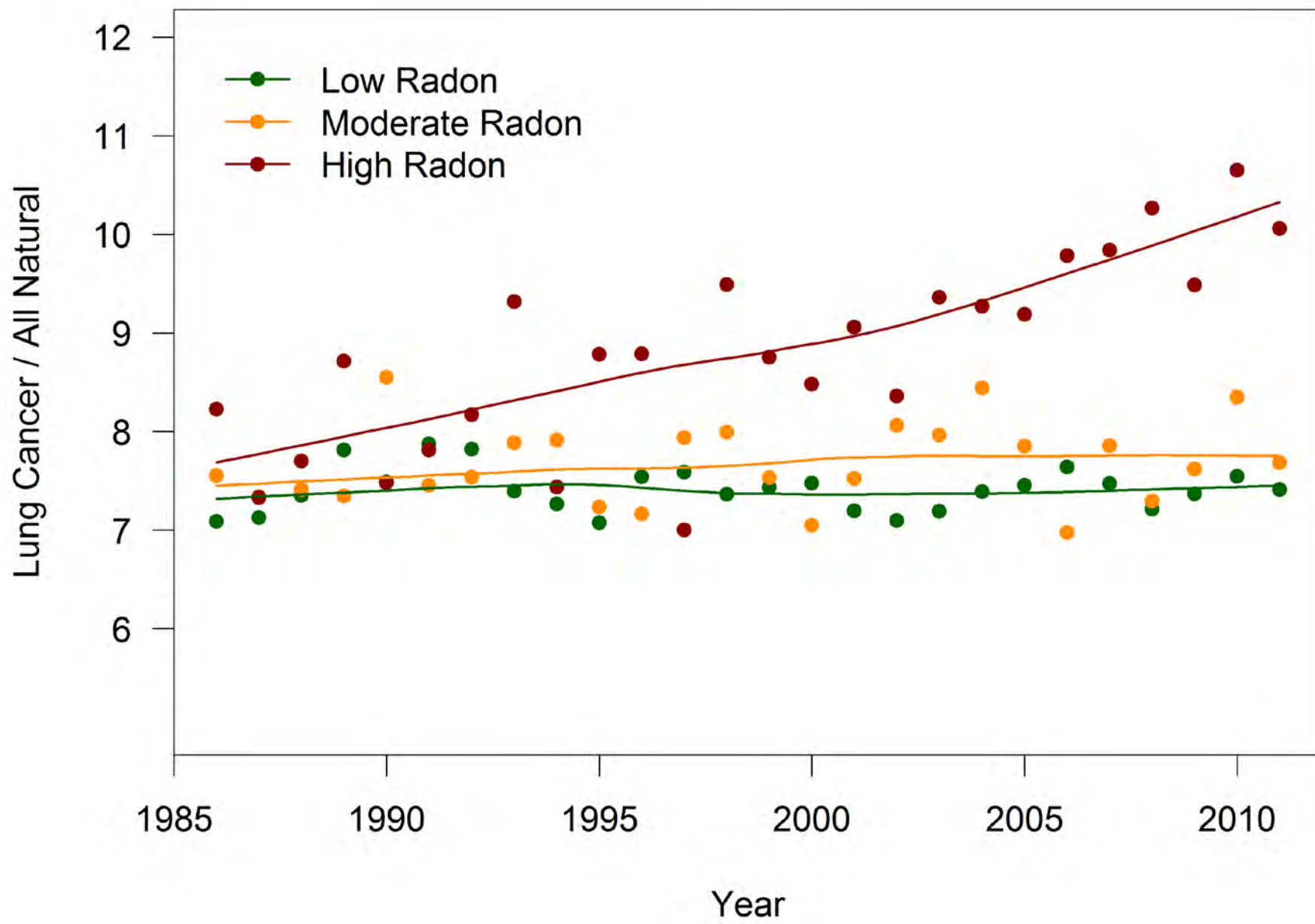
1986 – 2011 Trends

Number of annual
deaths from lung cancer

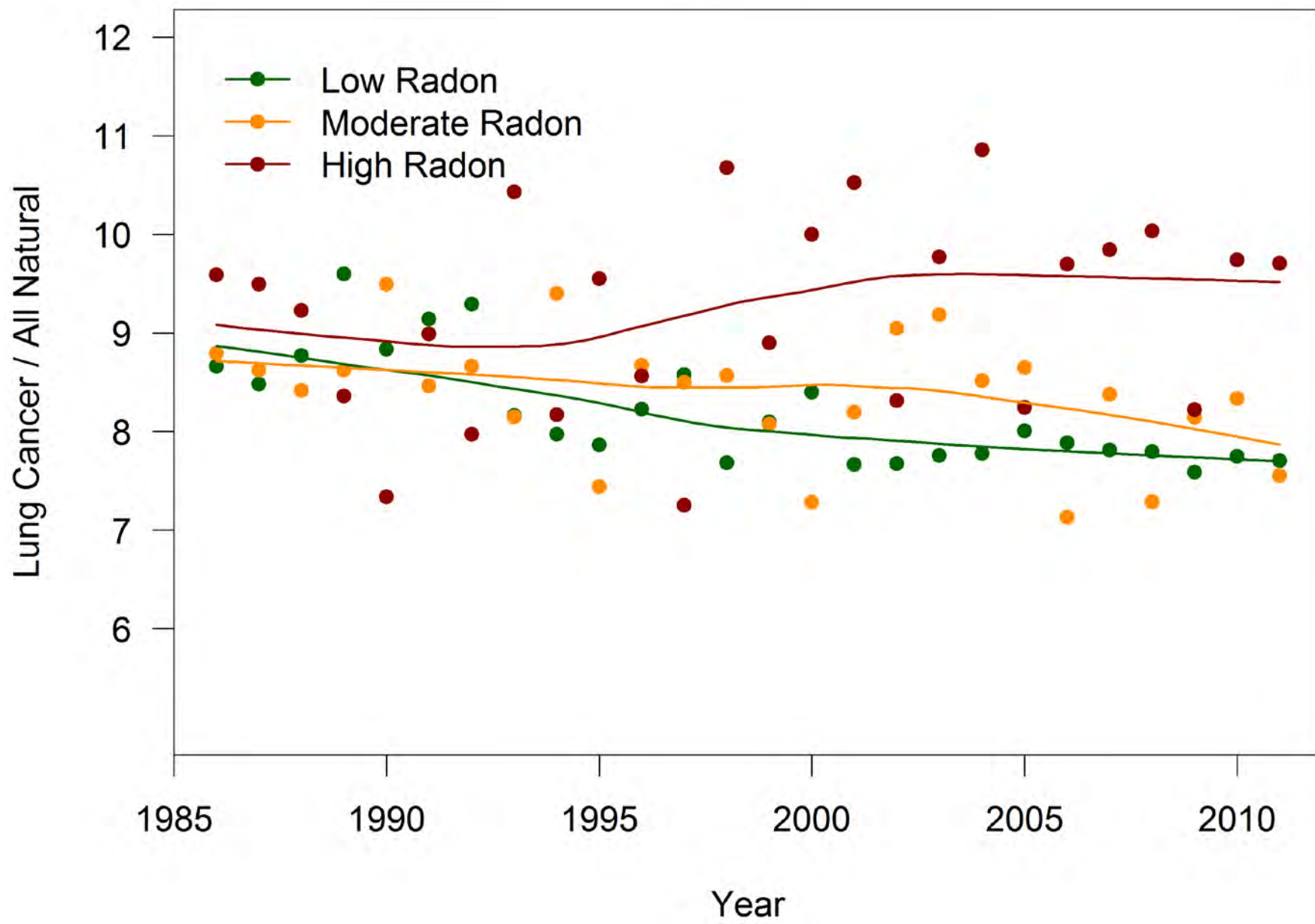


Number of annual deaths
from all natural causes

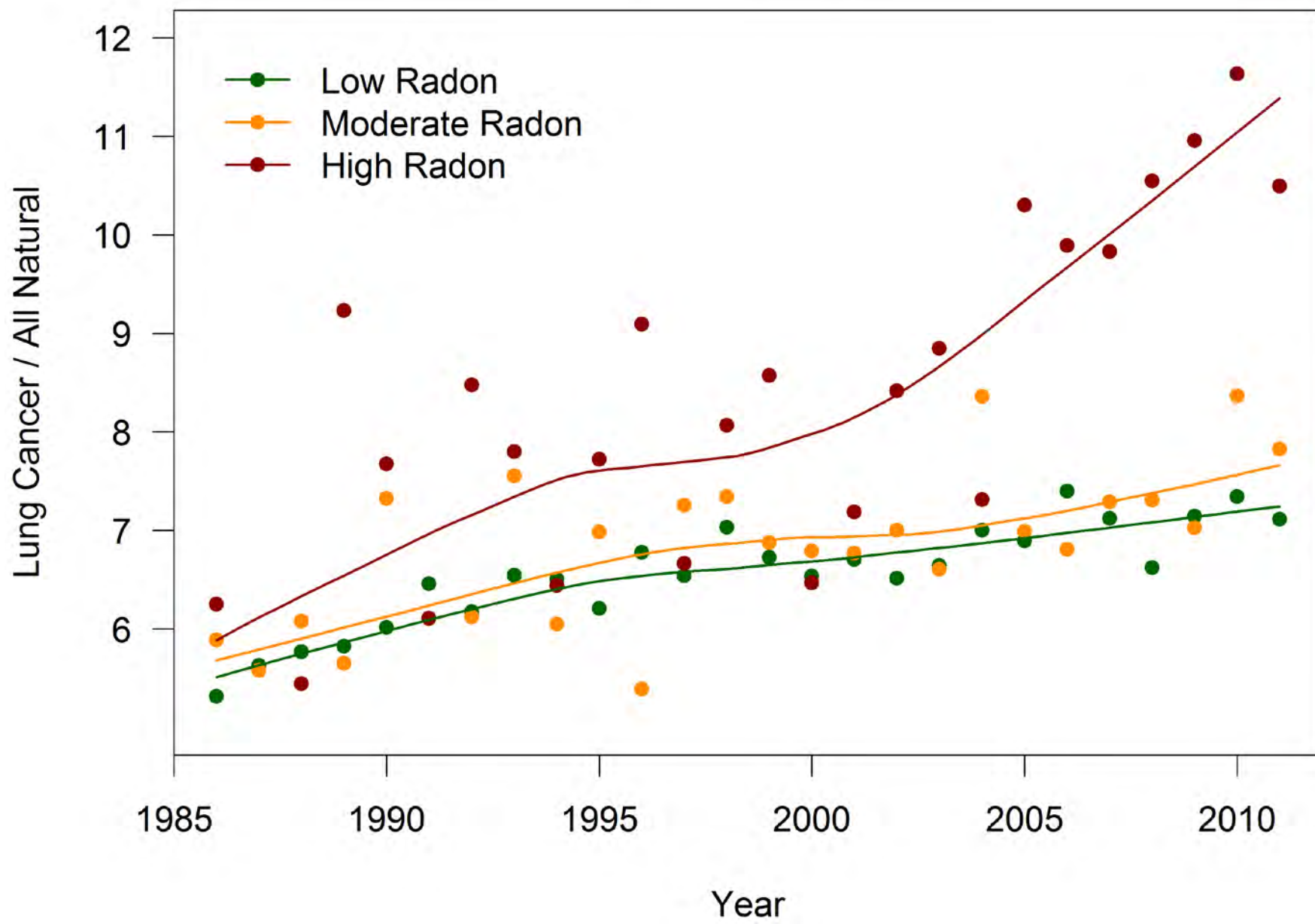
All



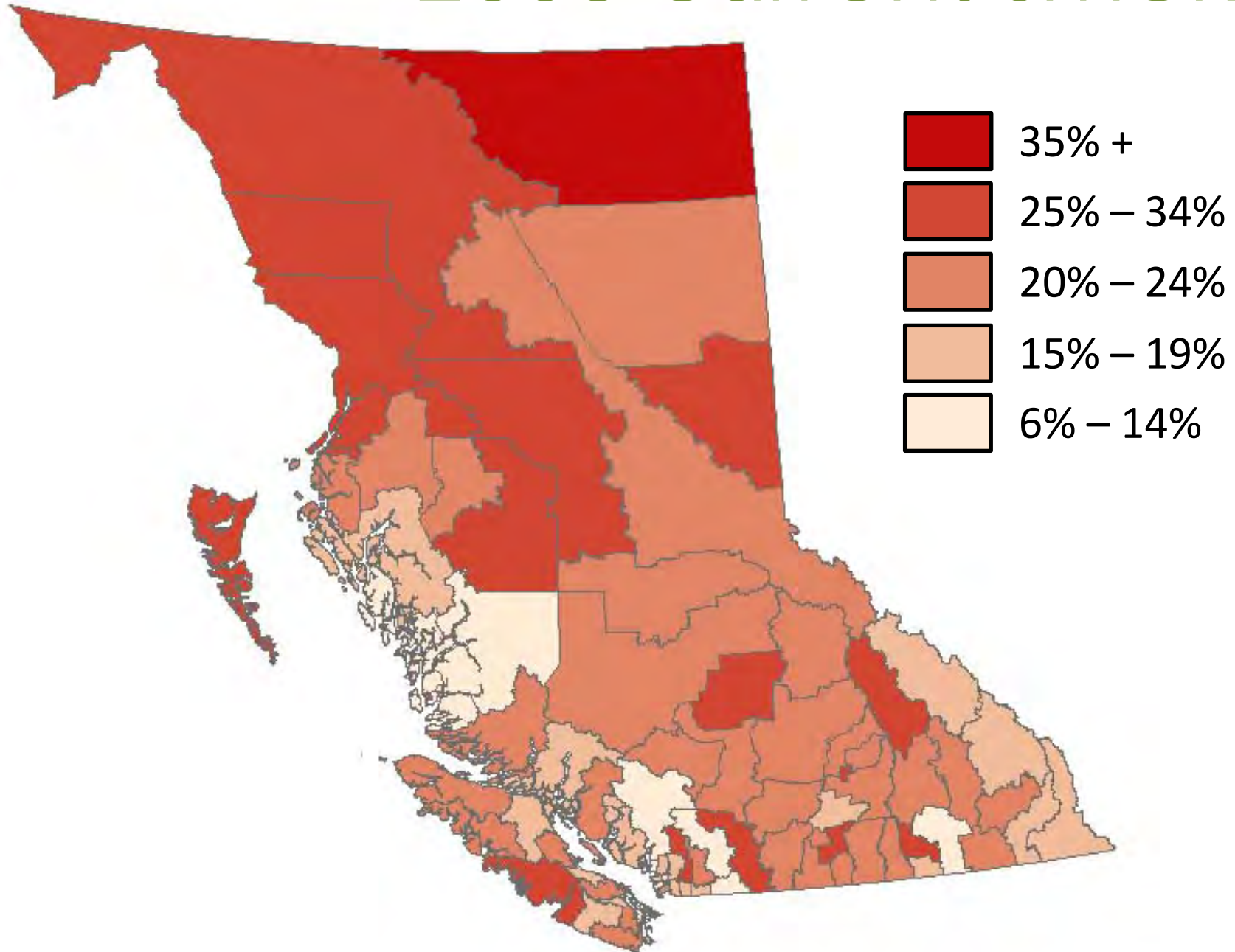
Male



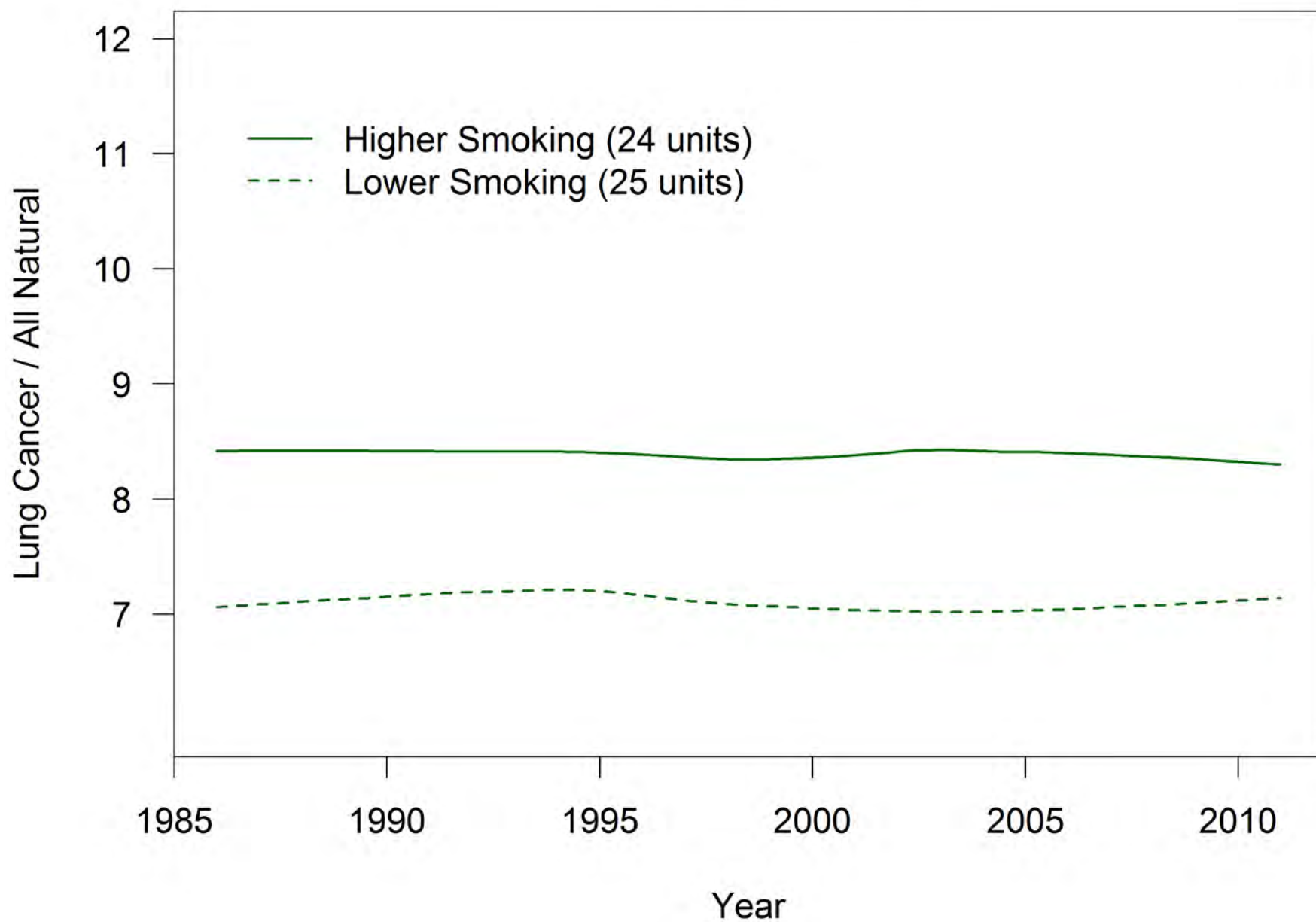
Female



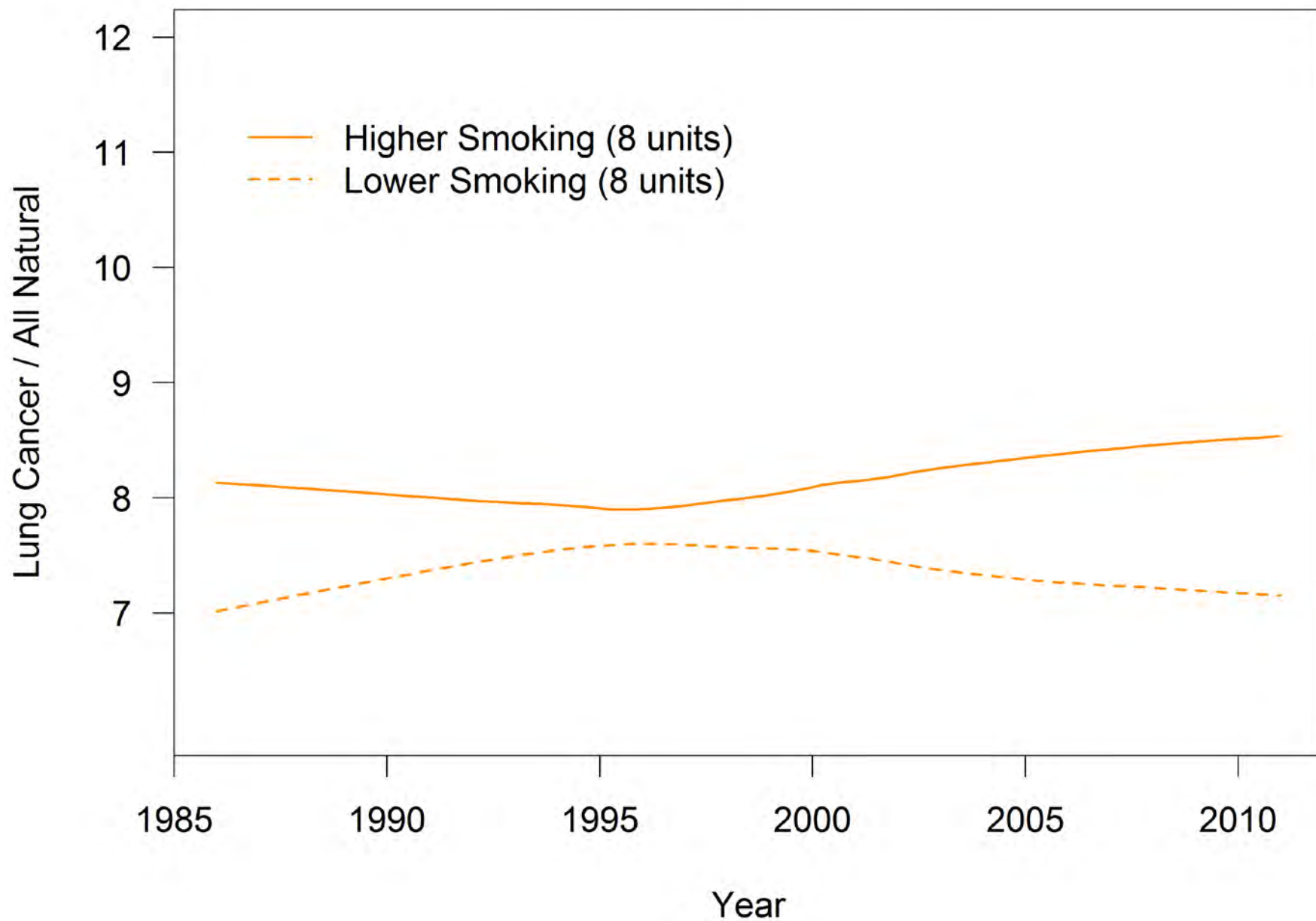
2008 current smokers



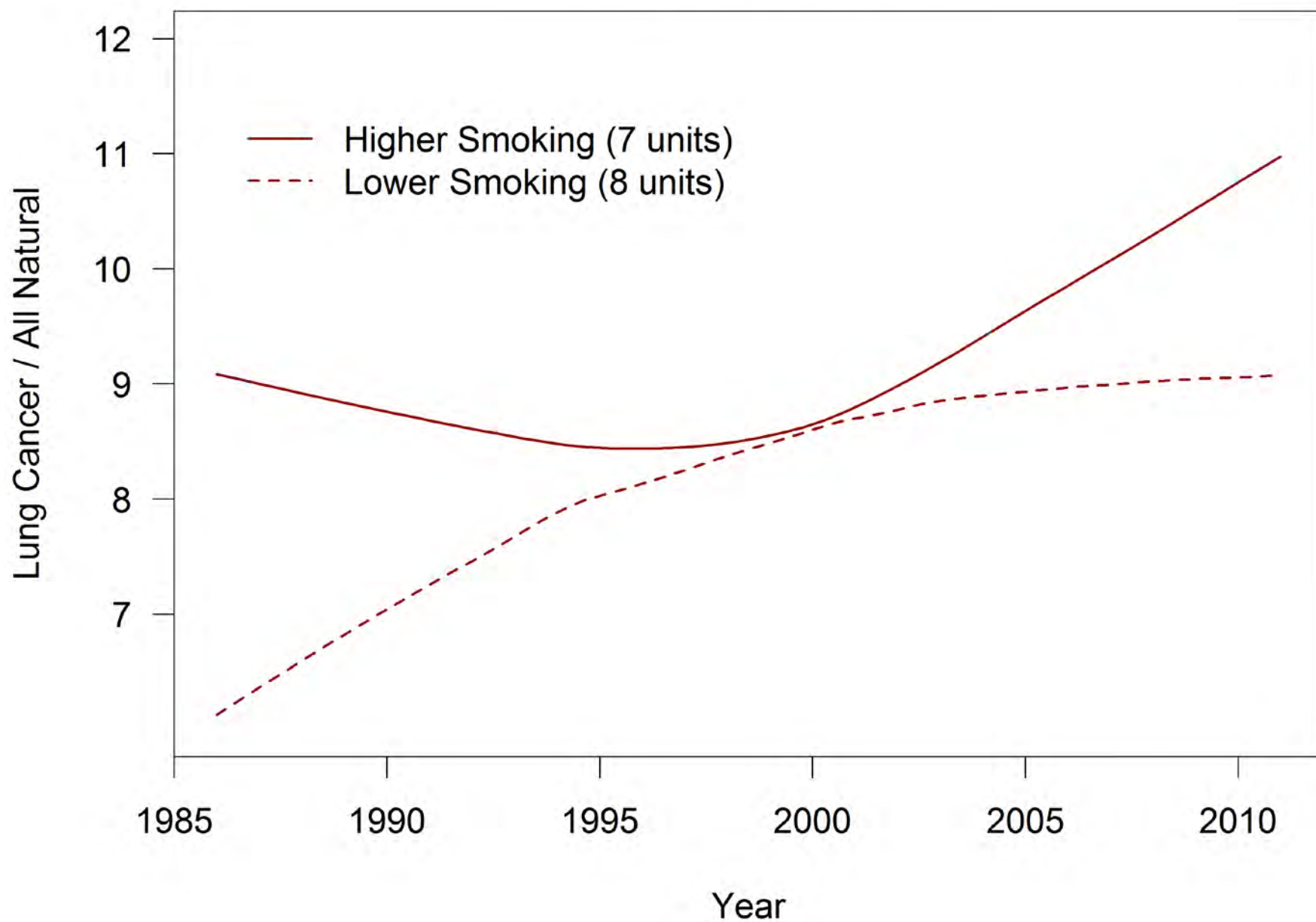
Low Radon



Moderate Radon



High Radon



Questions?

sarah.henderson@bccdc.ca