

An aerial photograph showing a large wildfire with thick, billowing white and grey smoke rising from a forested area. The smoke drifts over a town and a valley. In the background, there are rolling green mountains under a clear sky. The foreground shows a road and more forest.

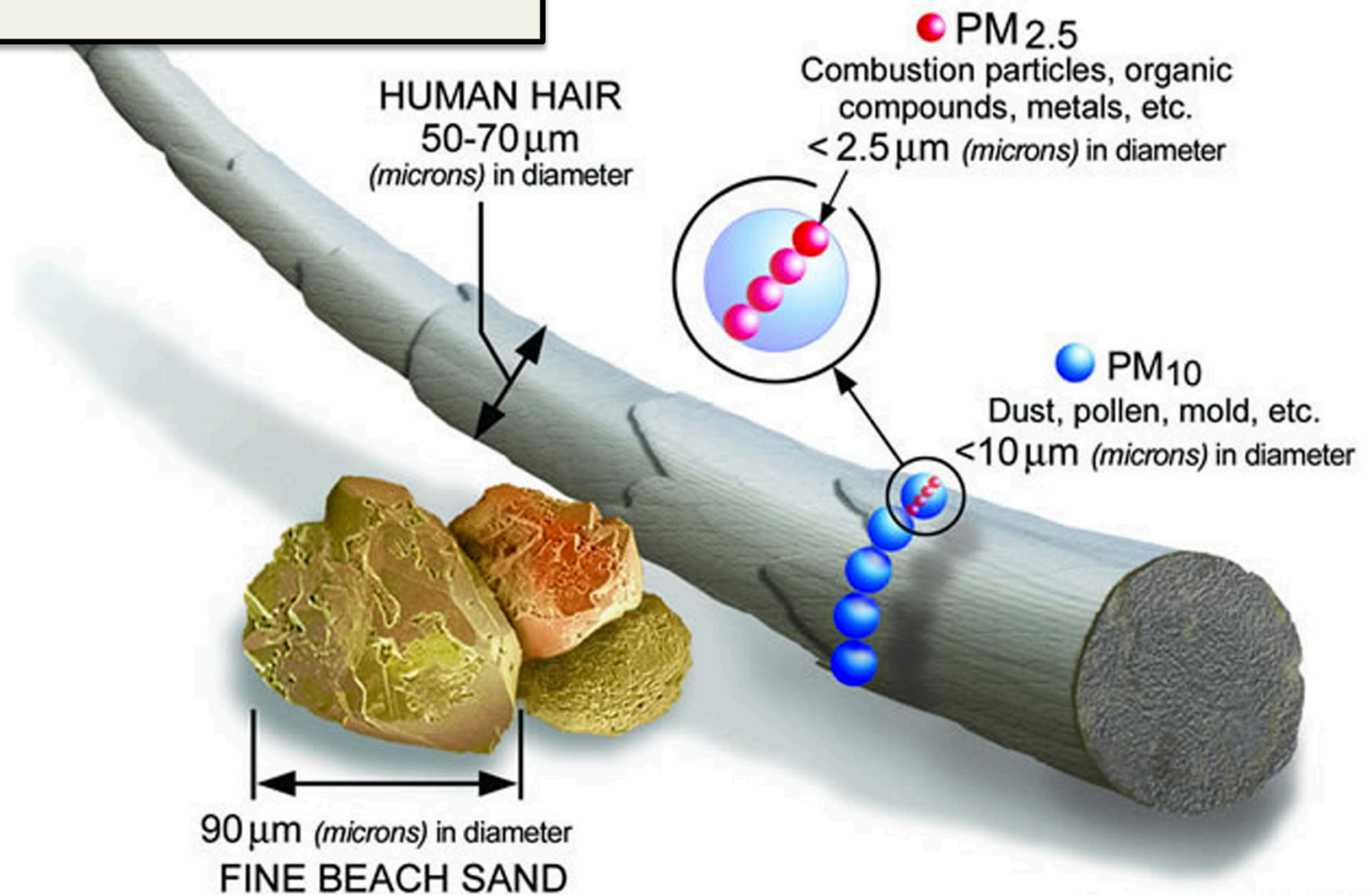
Wildfire Smoke and Health Evidence

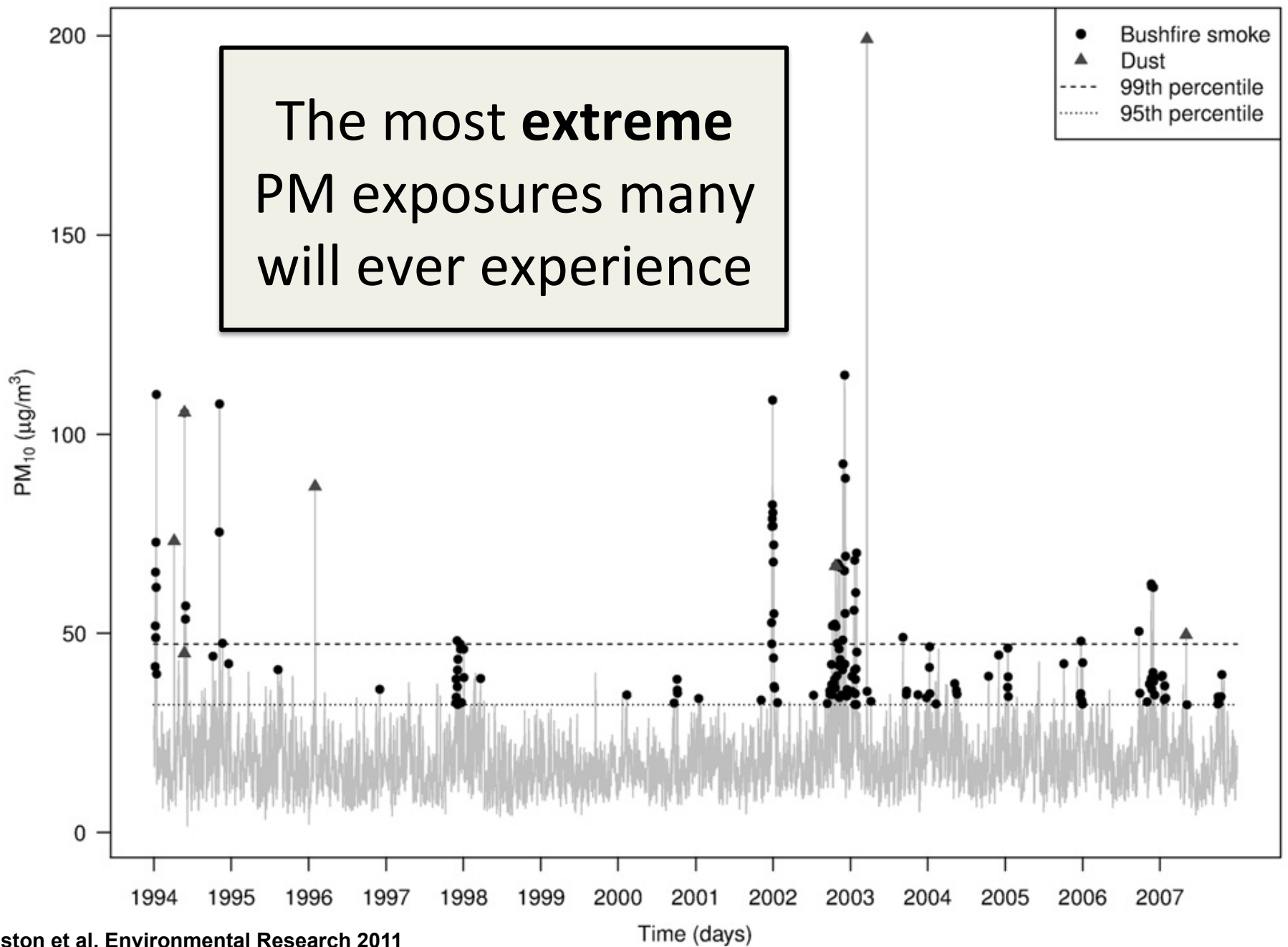
October 10, 2014

Sarah Henderson

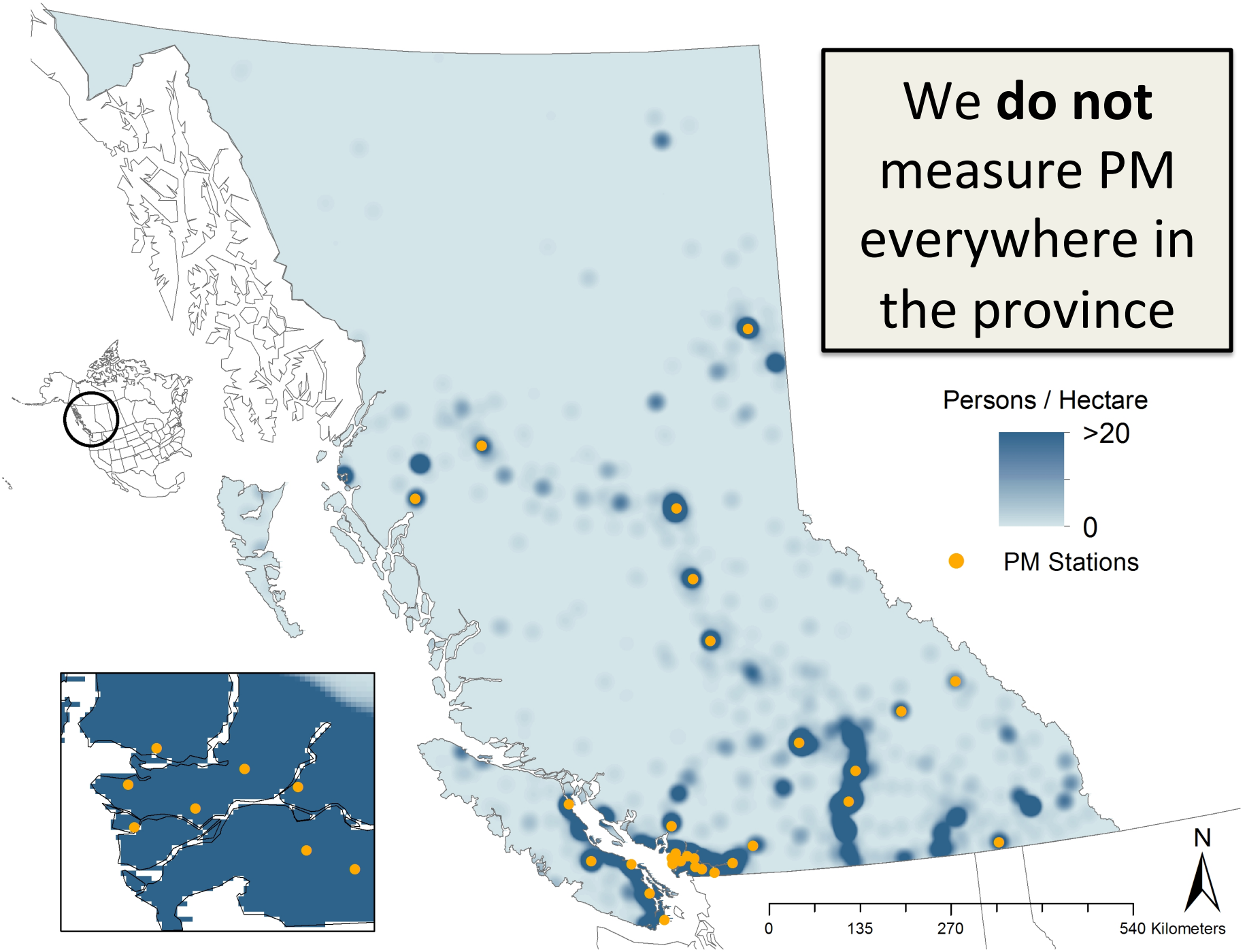
BC Centre for Disease Control

Forest fire smoke is **complex**, but we study the health effects of **PM**

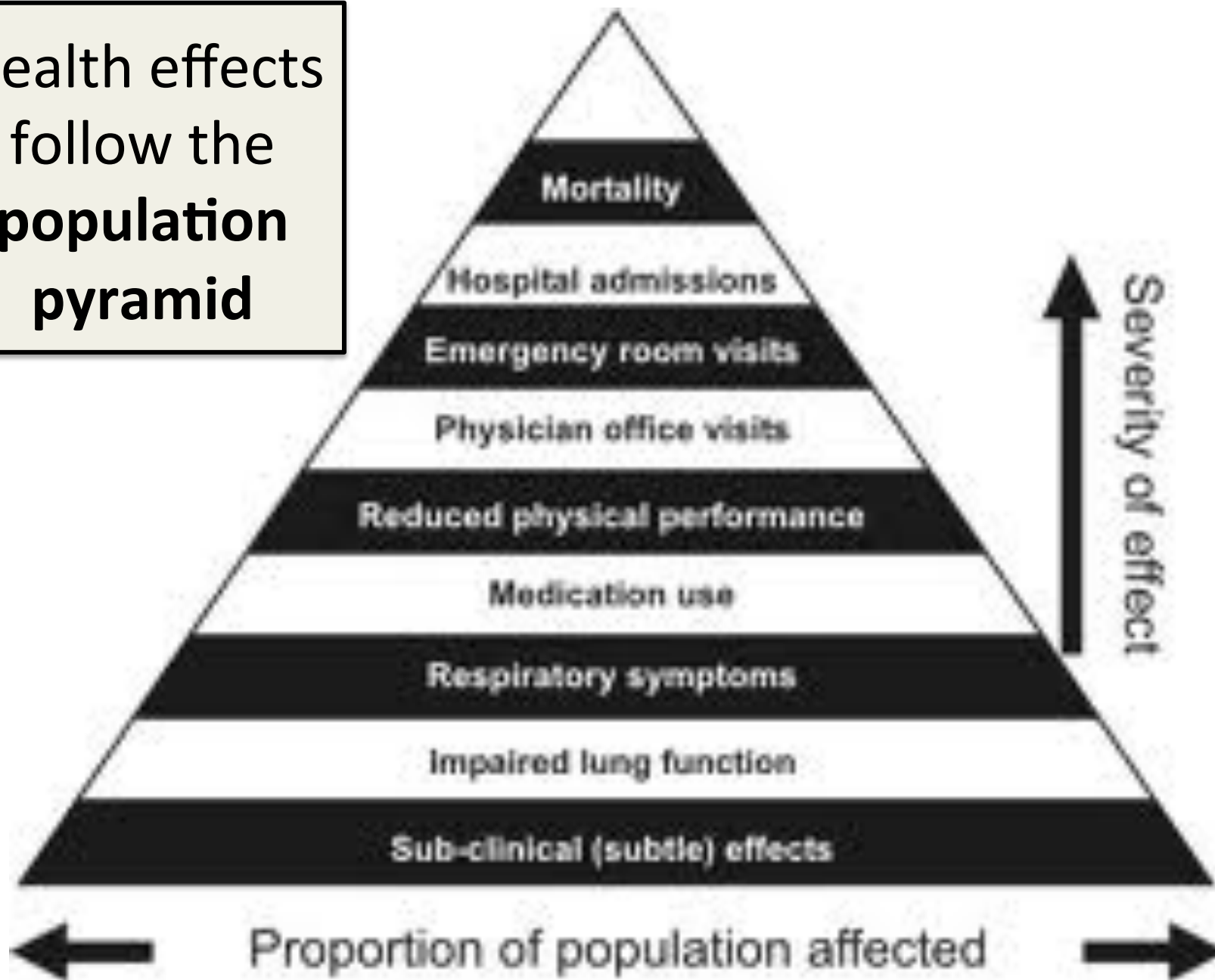


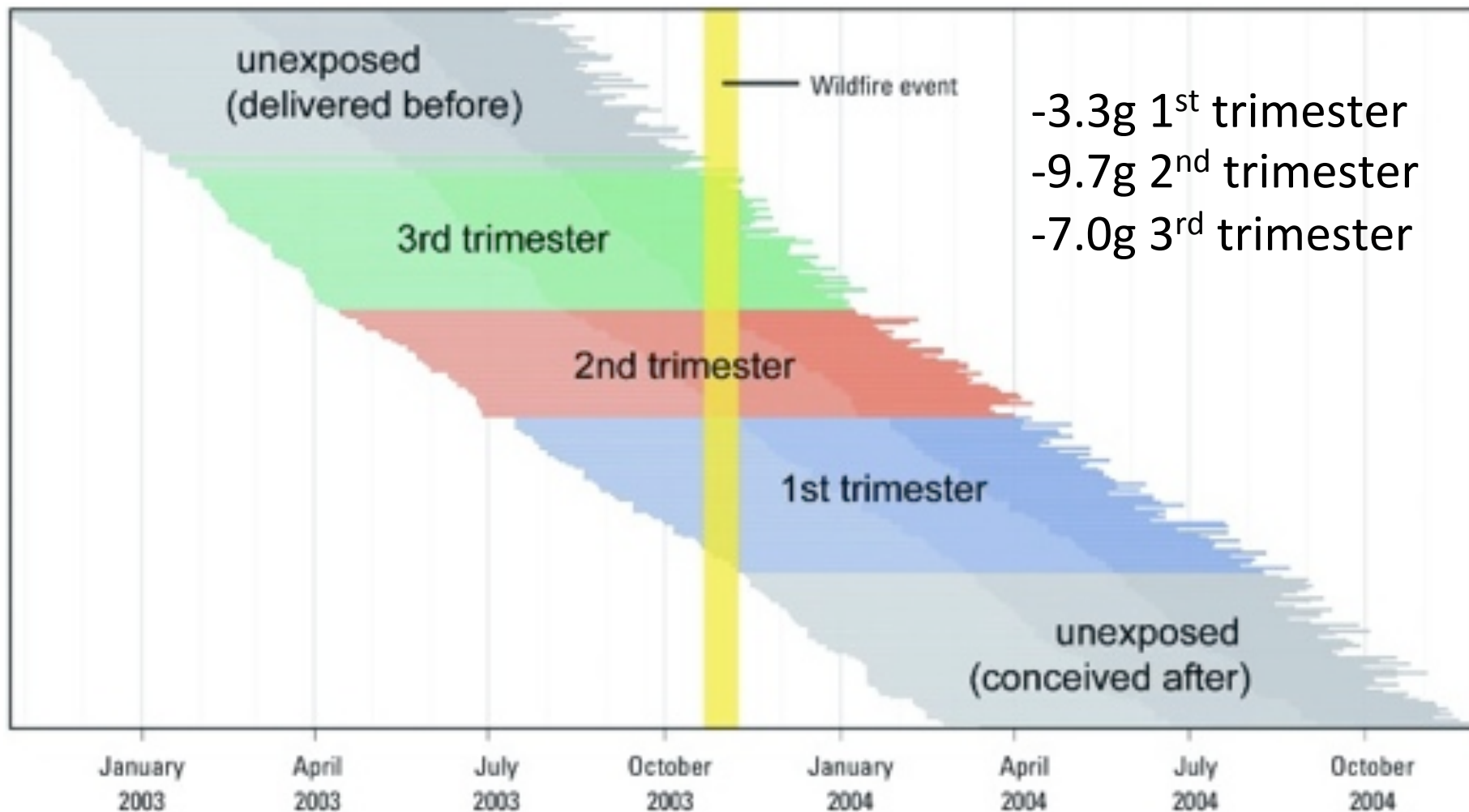


**We do not
measure PM
everywhere in
the province**



Health effects follow the **population pyramid**

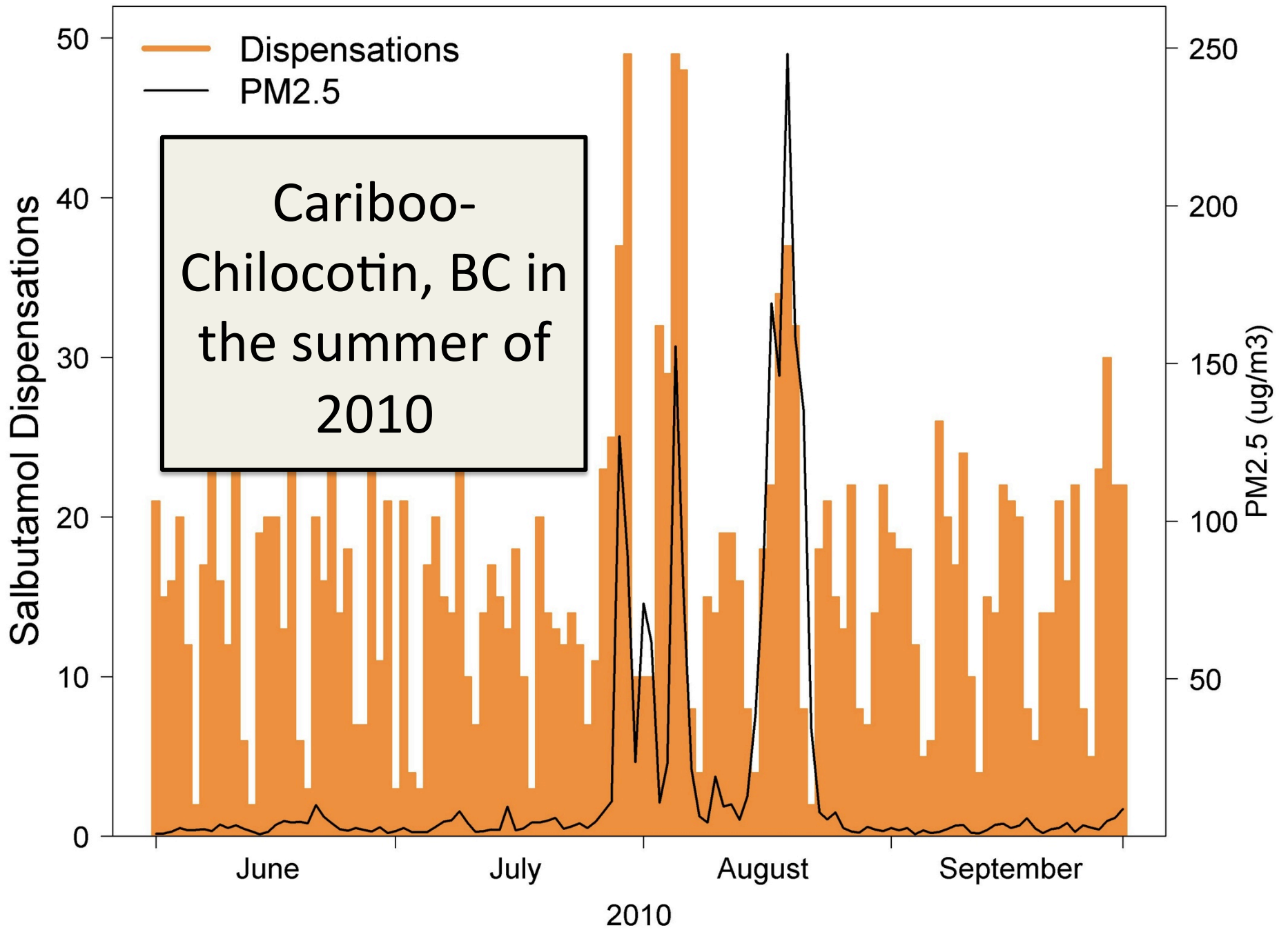


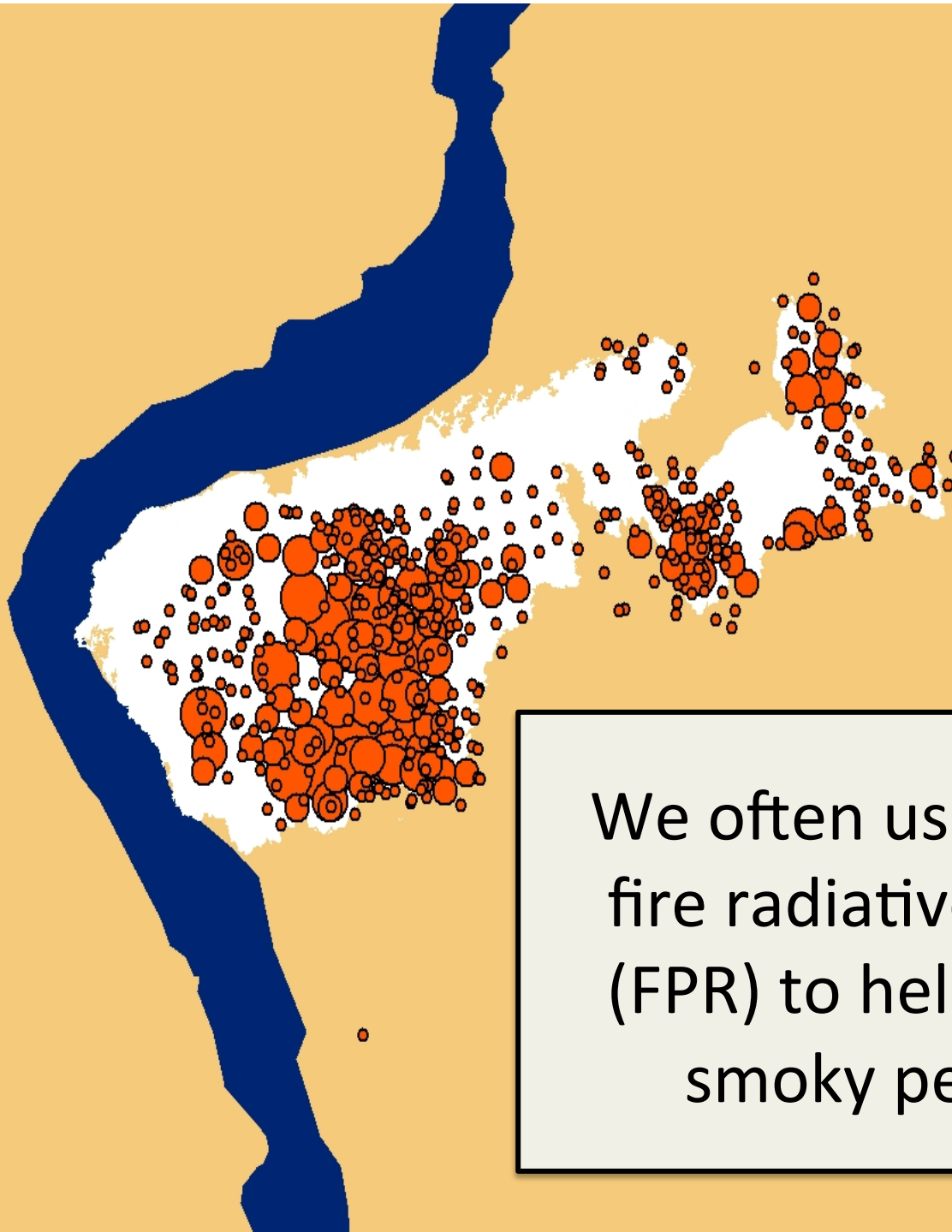


Emerging evidence for **birth effects** consistent with those for urban particulate mater



**Health
Canada**



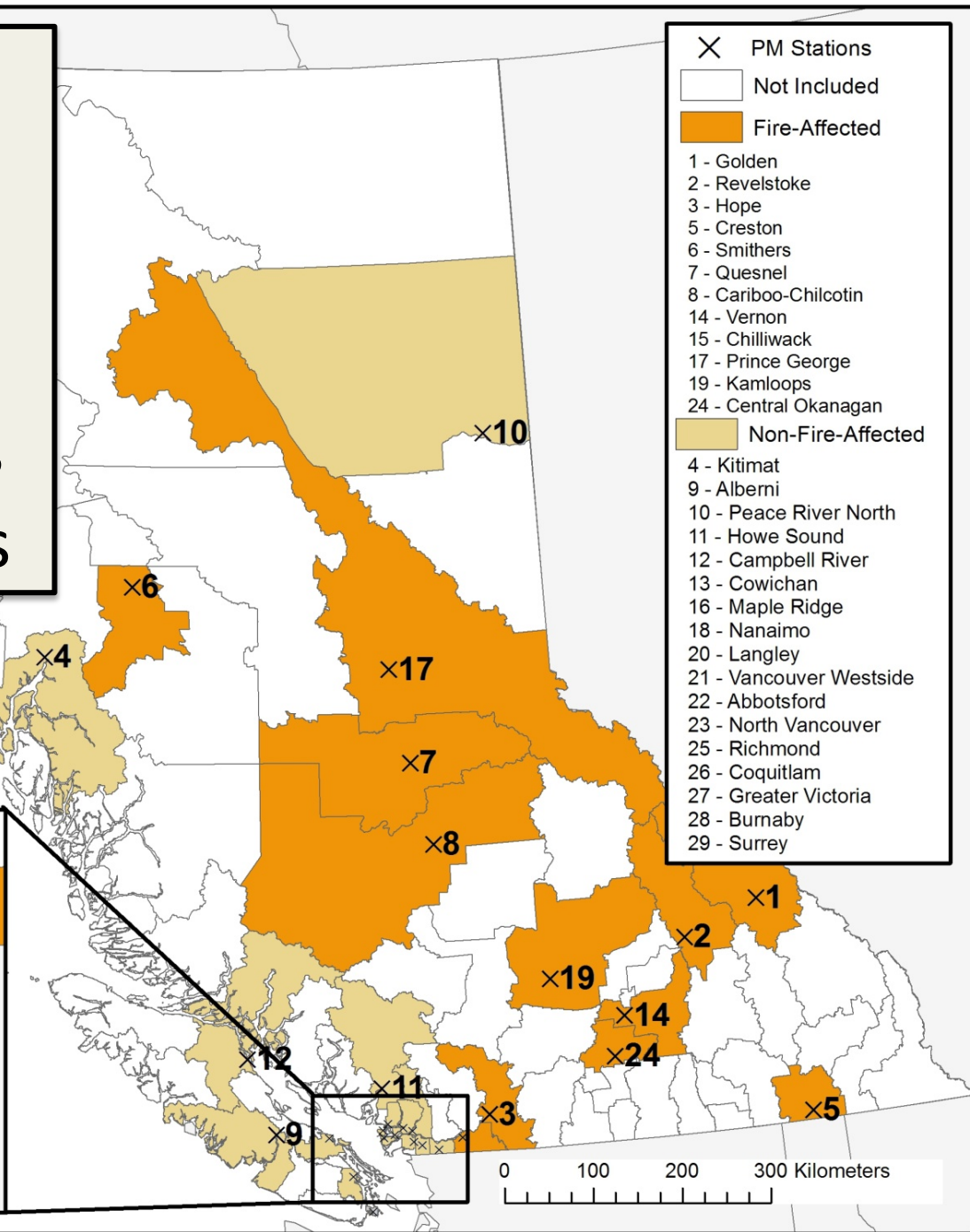
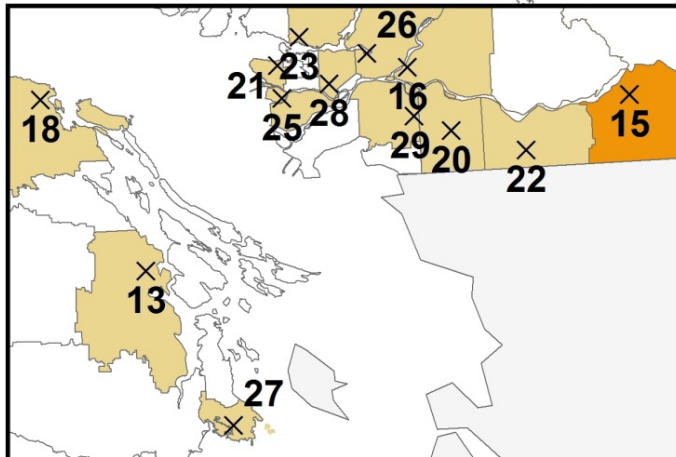


We often use MODIS
fire radiative power
(FPR) to help define
smoky periods

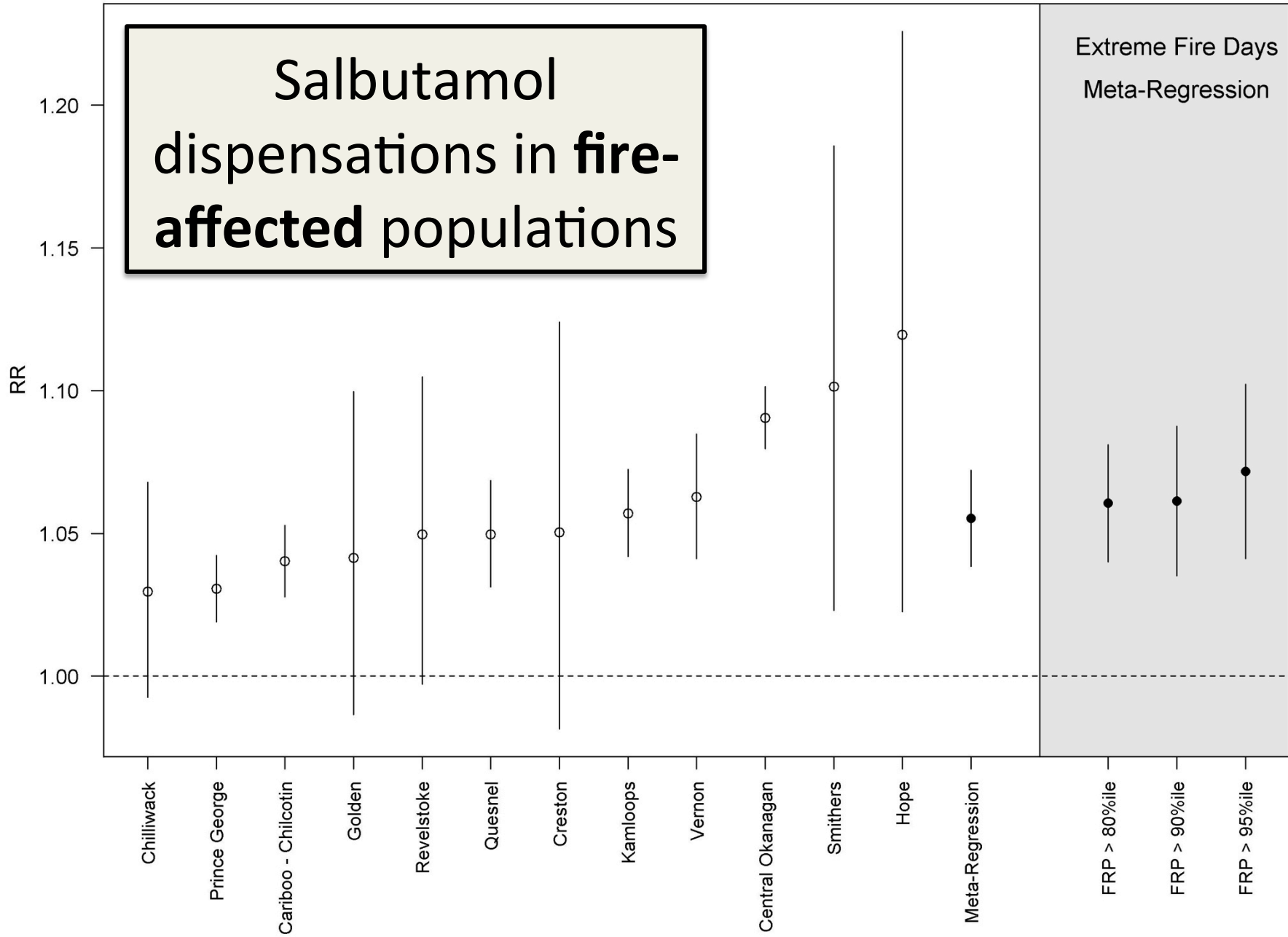
Historical FRP to separate
 fire-affected and
fire-affected and
non-fire-affected
 local health areas
 with PM monitors

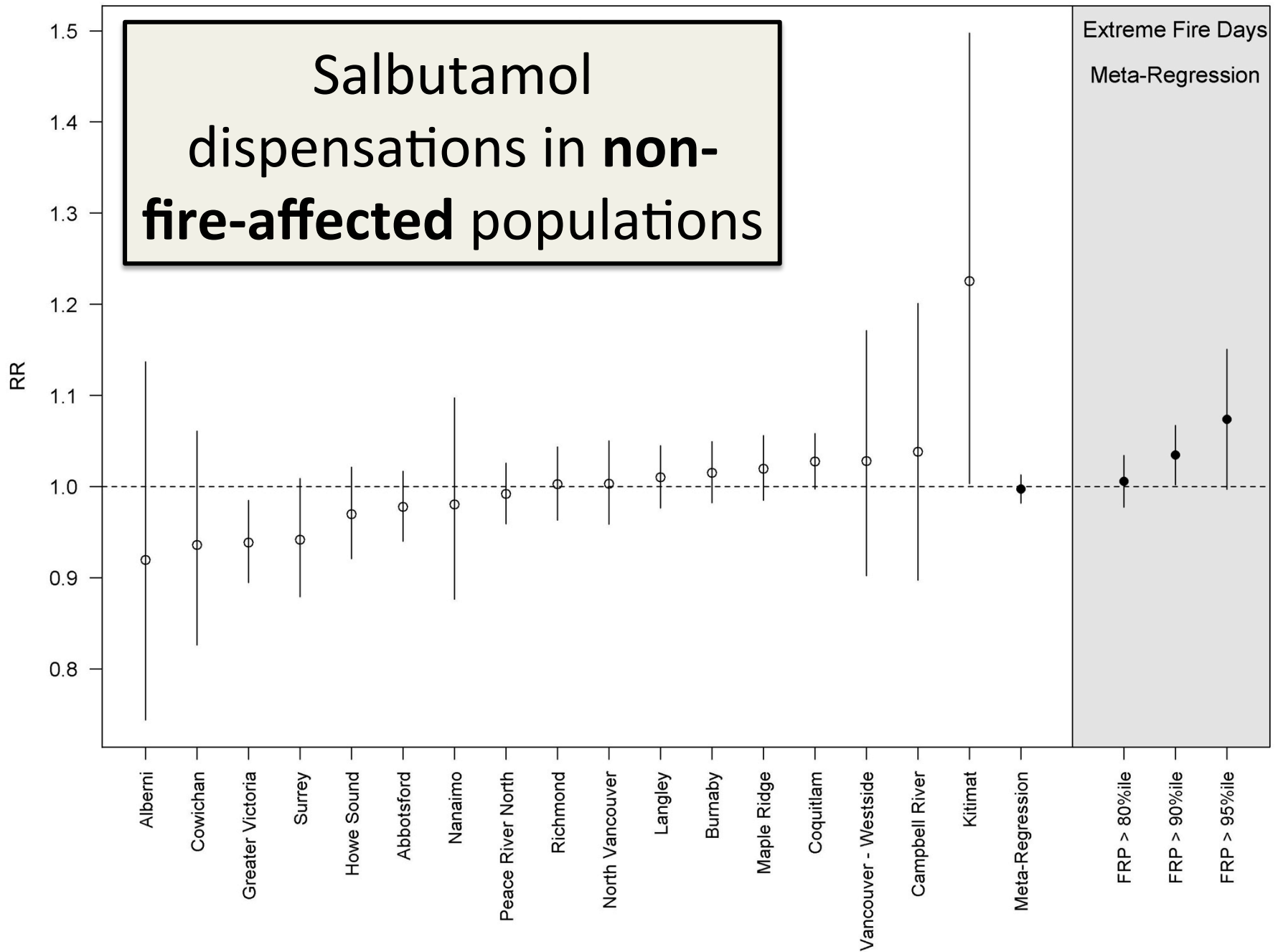
X PM Stations
 Not Included
 Fire-Affected
 Non-Fire-Affected

- 1 - Golden
- 2 - Revelstoke
- 3 - Hope
- 5 - Creston
- 6 - Smithers
- 7 - Quesnel
- 8 - Cariboo-Chilcotin
- 14 - Vernon
- 15 - Chilliwack
- 17 - Prince George
- 19 - Kamloops
- 24 - Central Okanagan
- 4 - Kitimat
- 9 - Alberni
- 10 - Peace River North
- 11 - Howe Sound
- 12 - Campbell River
- 13 - Cowichan
- 16 - Maple Ridge
- 18 - Nanaimo
- 20 - Langley
- 21 - Vancouver Westside
- 22 - Abbotsford
- 23 - North Vancouver
- 25 - Richmond
- 26 - Coquitlam
- 27 - Greater Victoria
- 28 - Burnaby
- 29 - Surrey

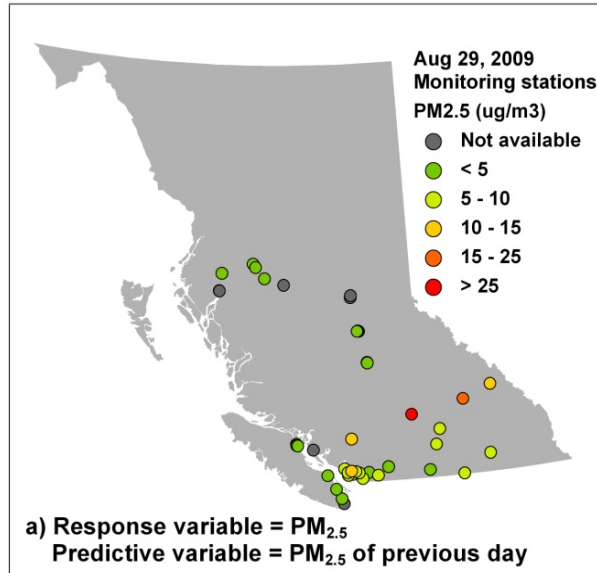


Salbutamol dispensations in **fire-affected** populations

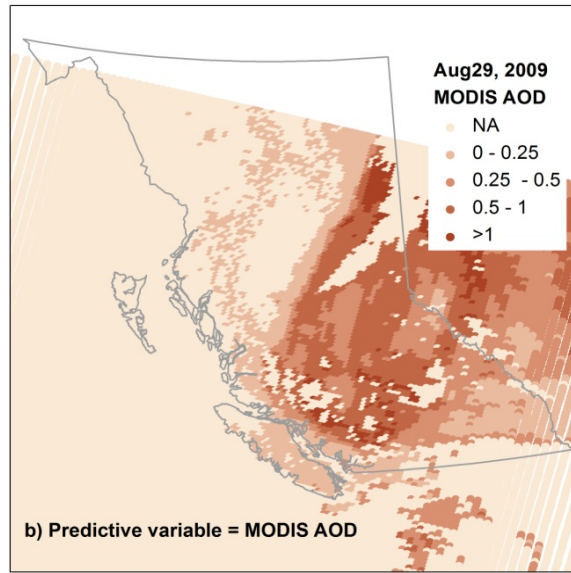




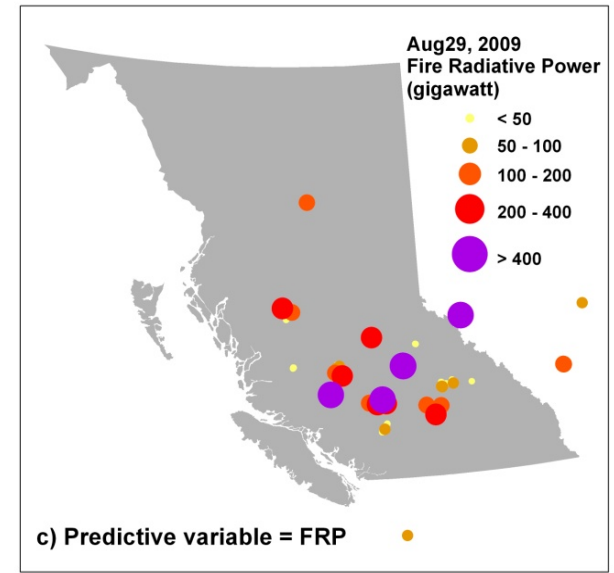
Monitor PM



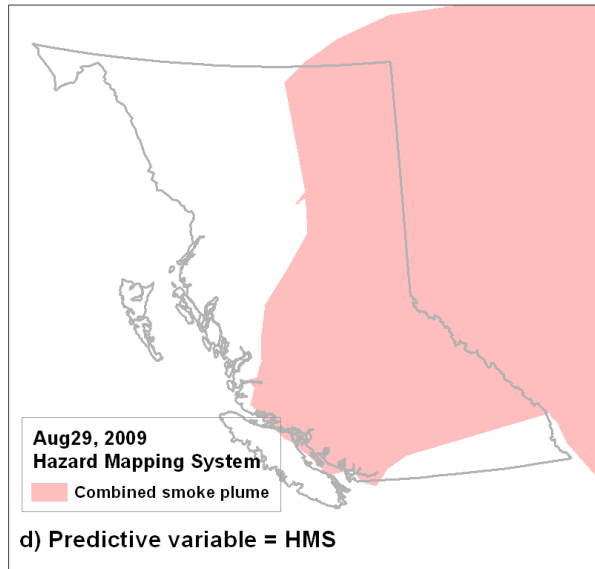
Remote sensing aerosol



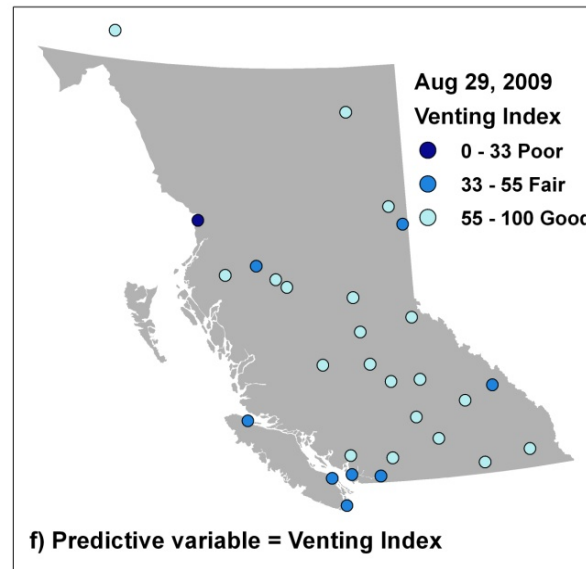
Remote sensing fire



Remote sensing smoke



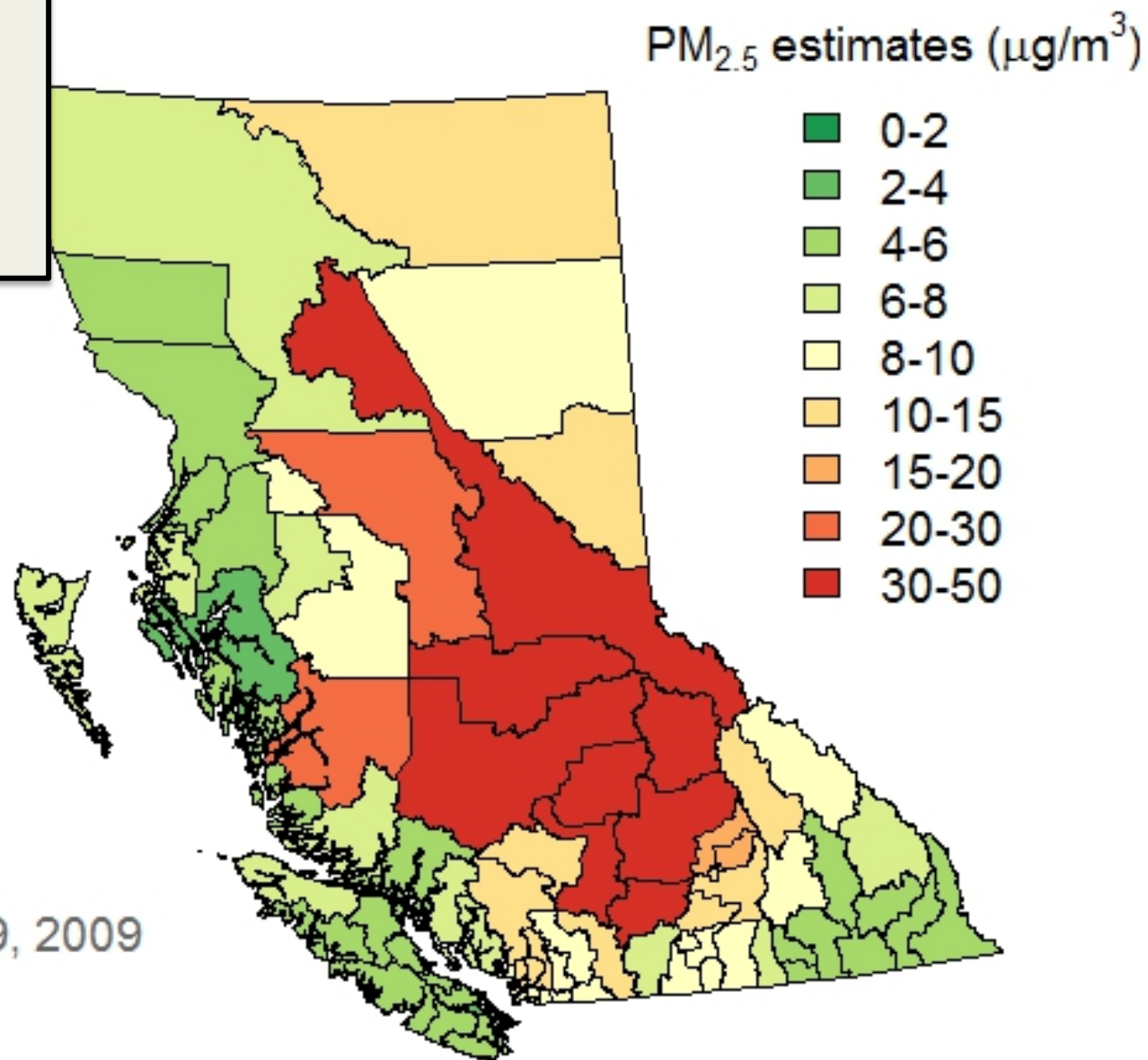
Venting index



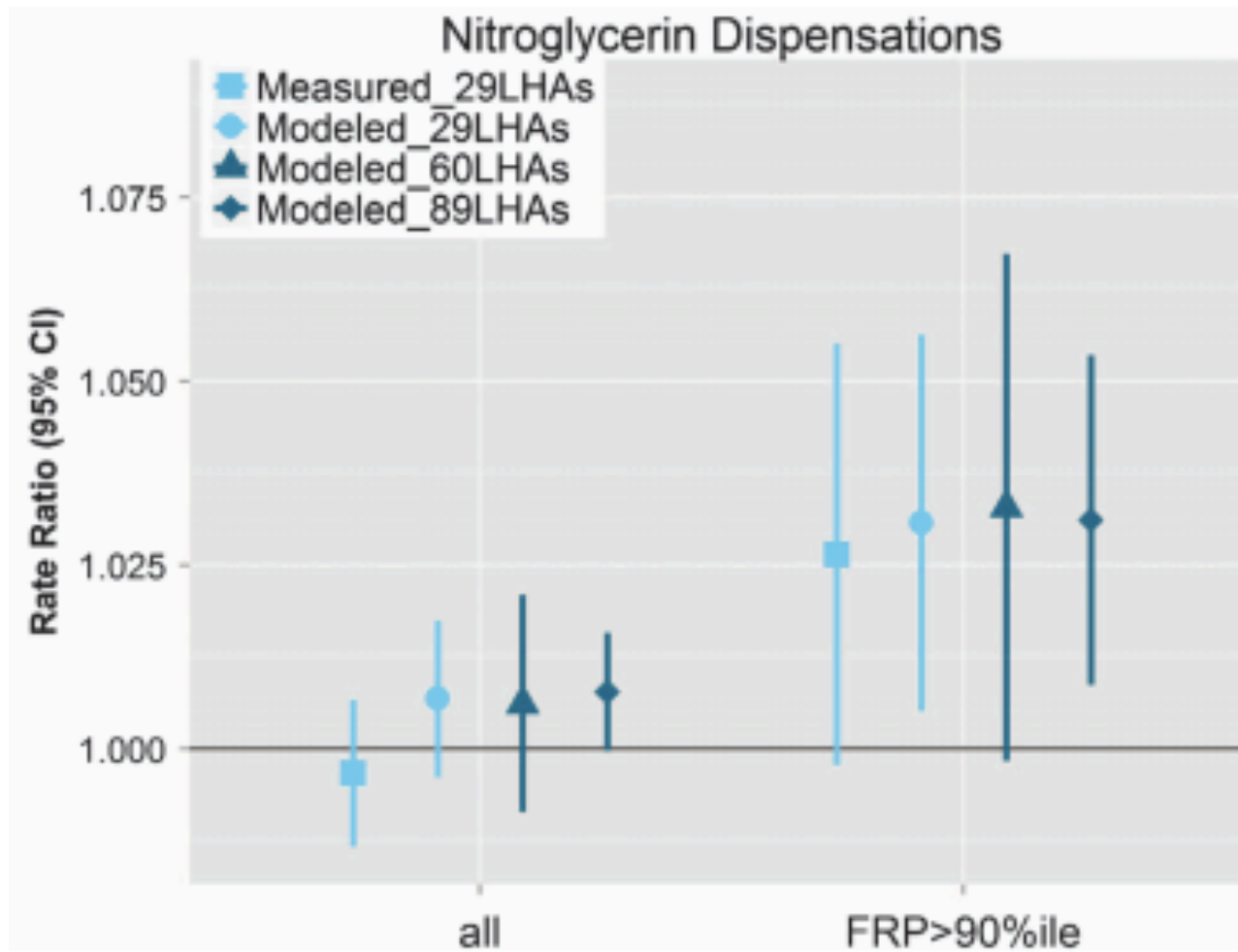
Remote sensing data can help!



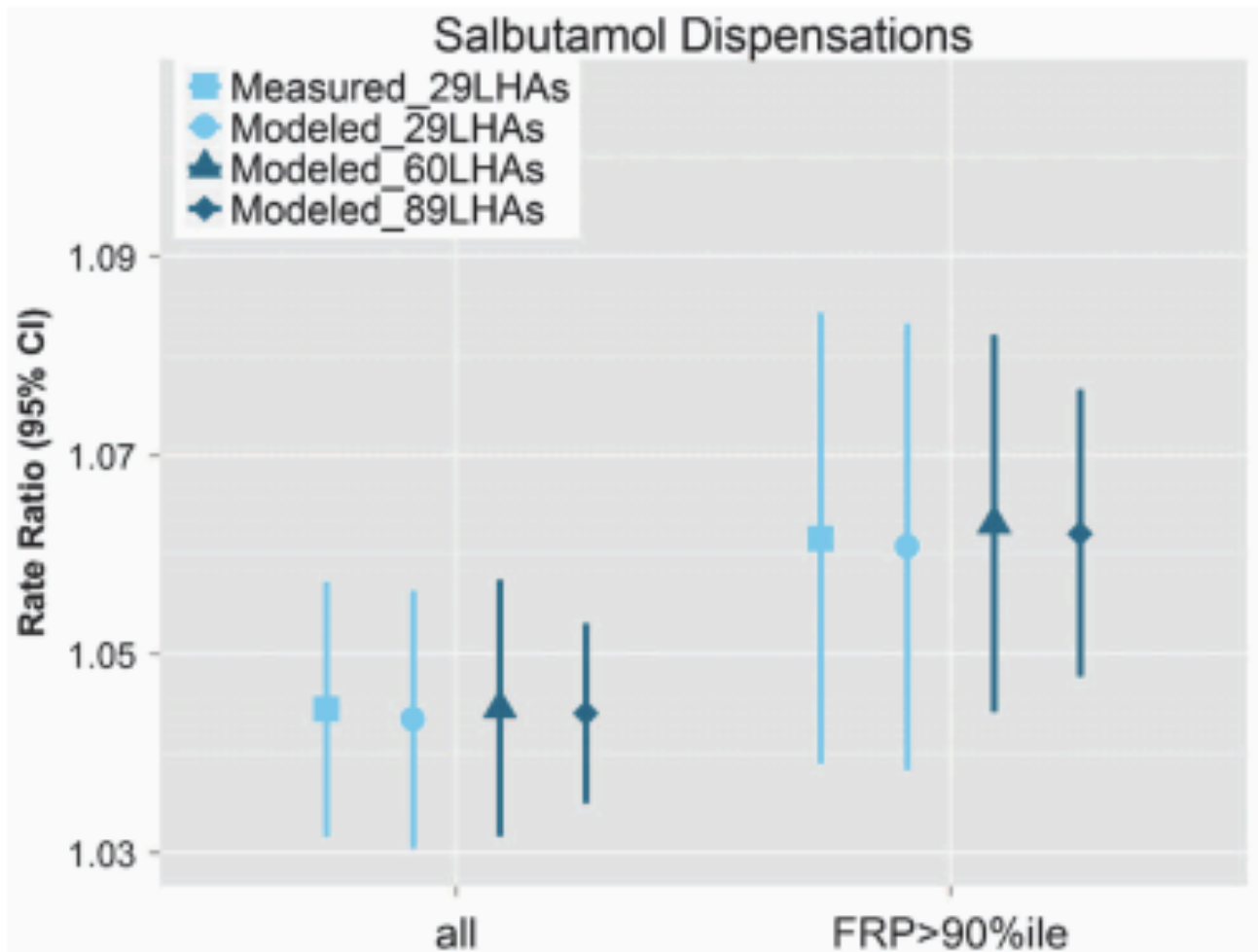
Population-weighted estimates for all LHAs



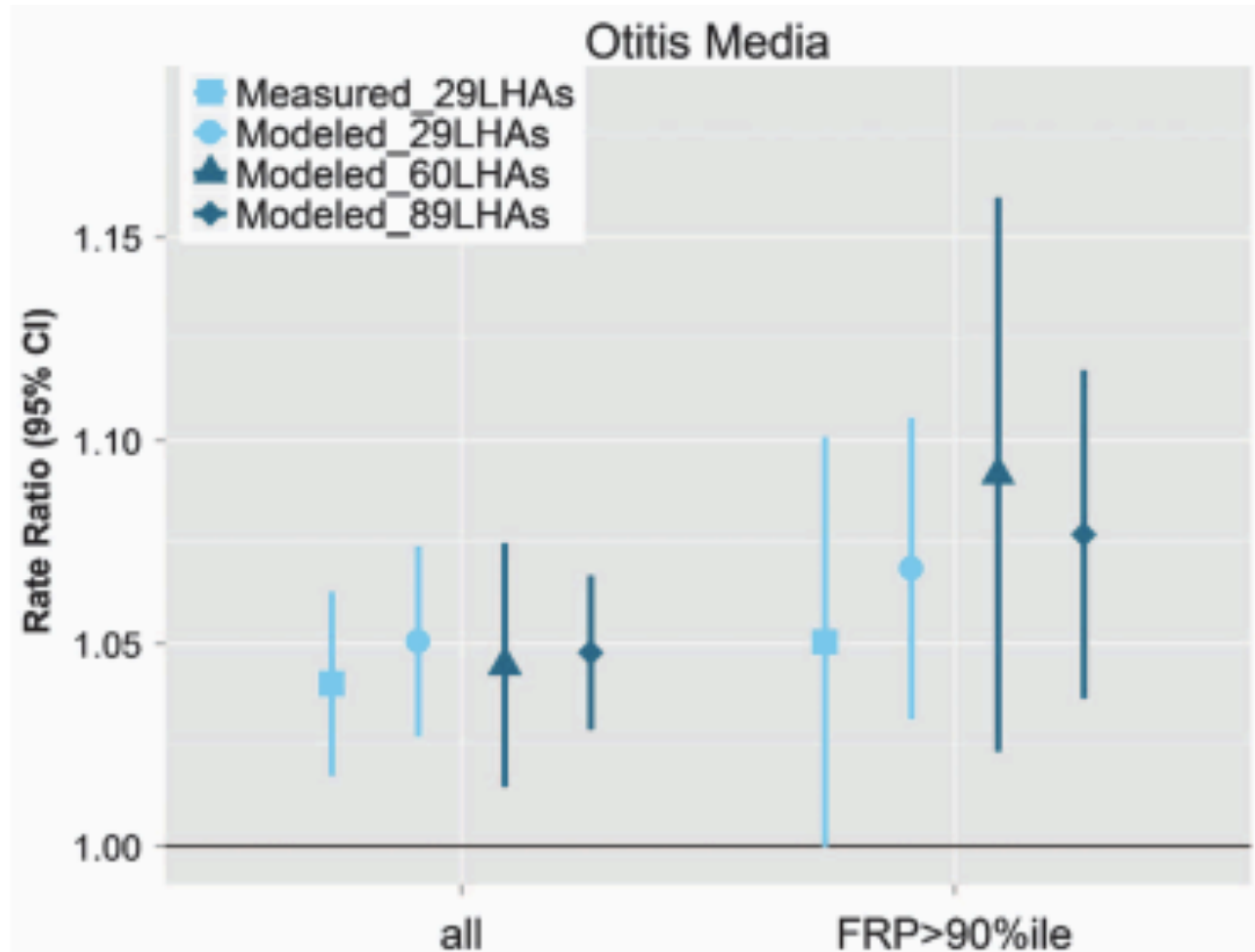
August 29, 2009



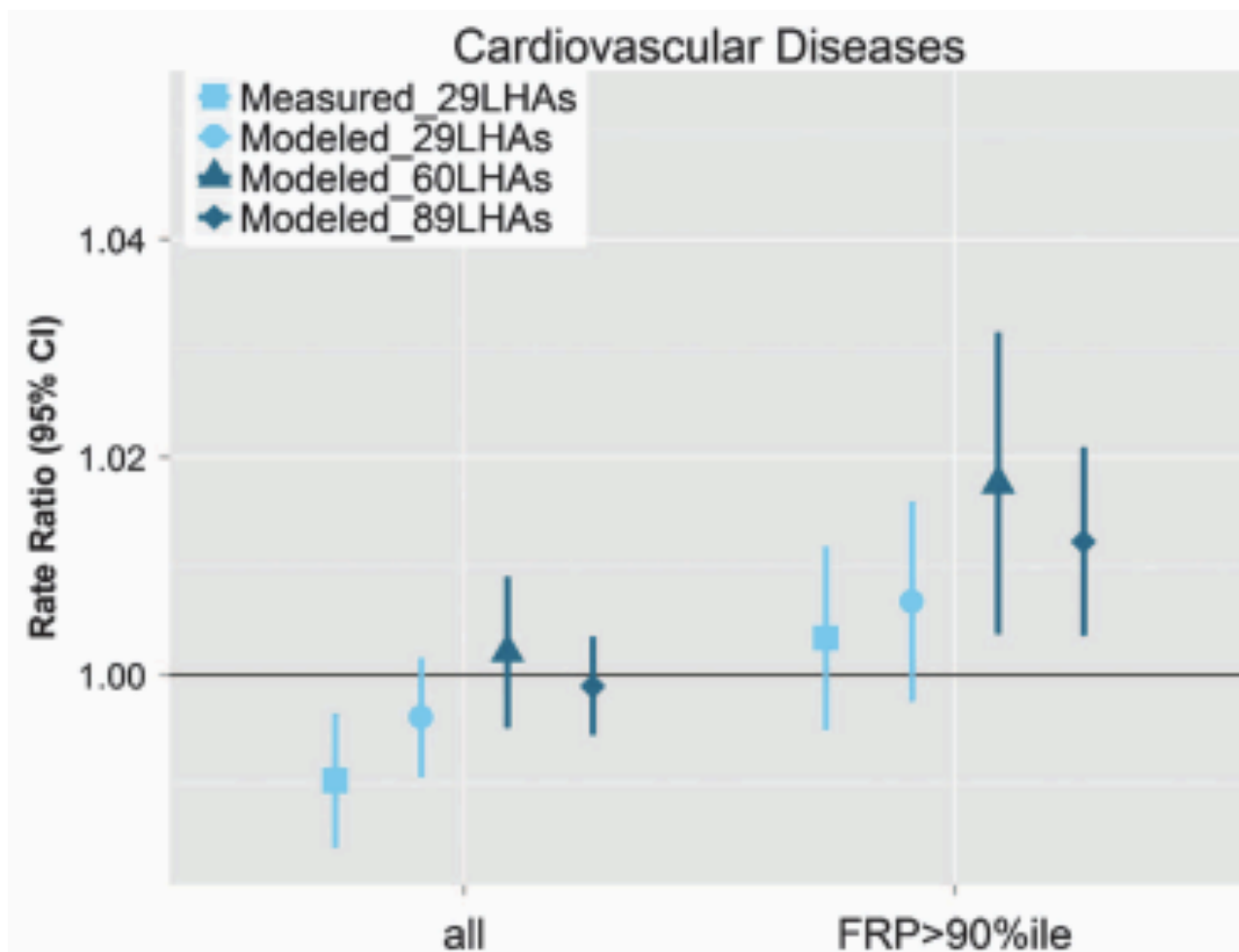
Model validation using
pharmaceutical data



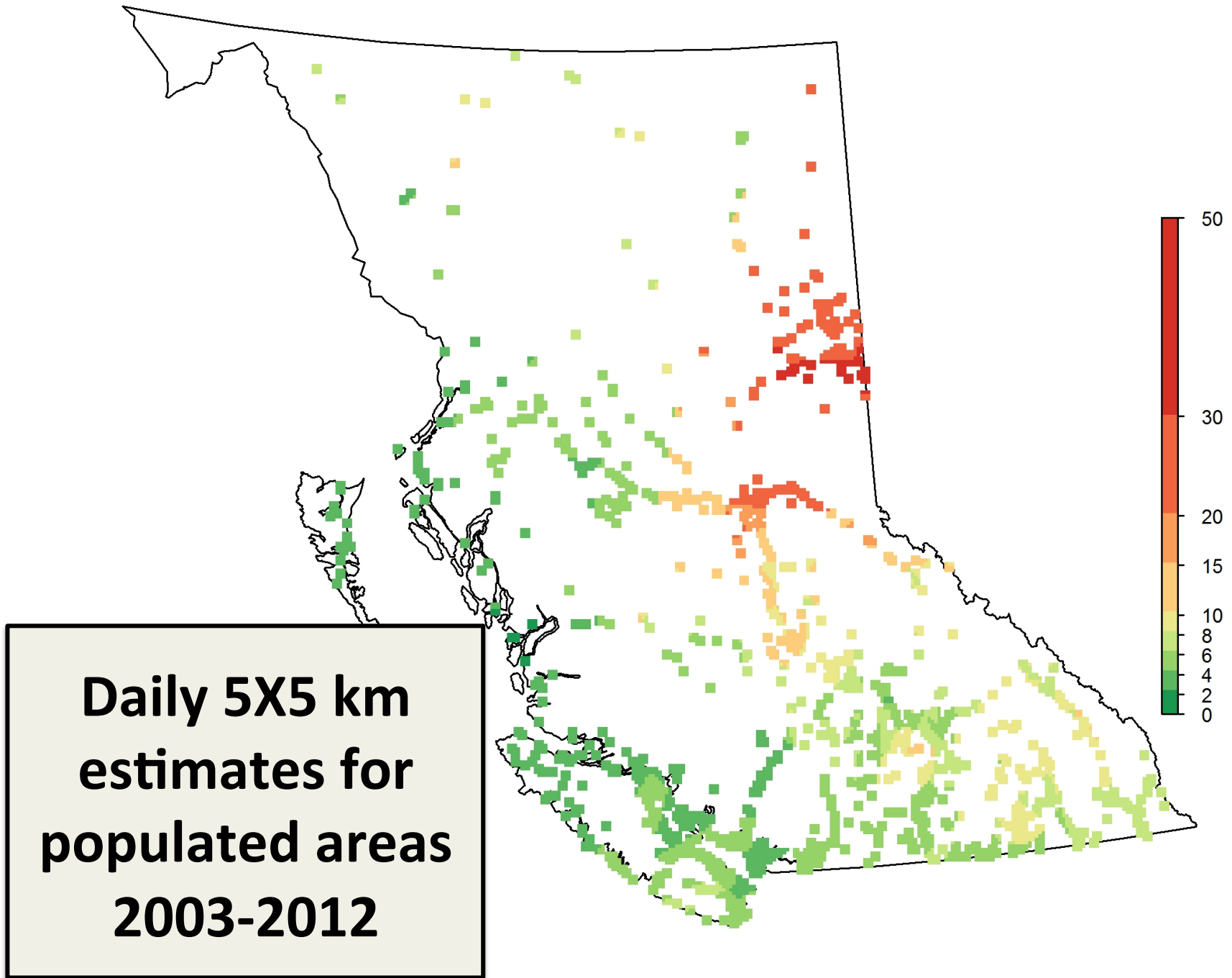
Model validation using pharmaceutical data



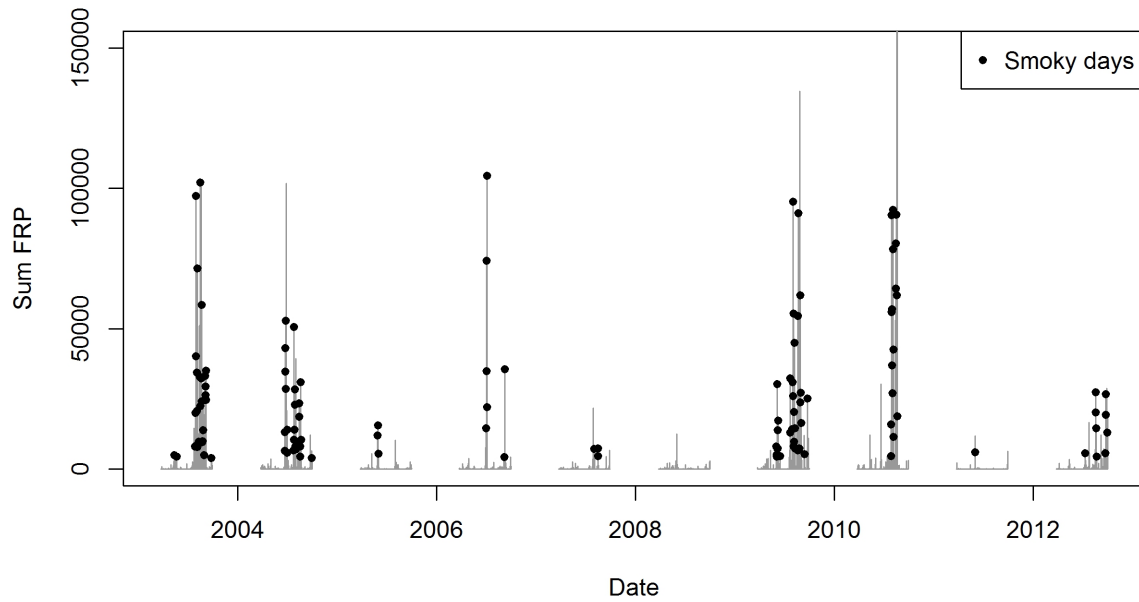
Model validation using
physician visits



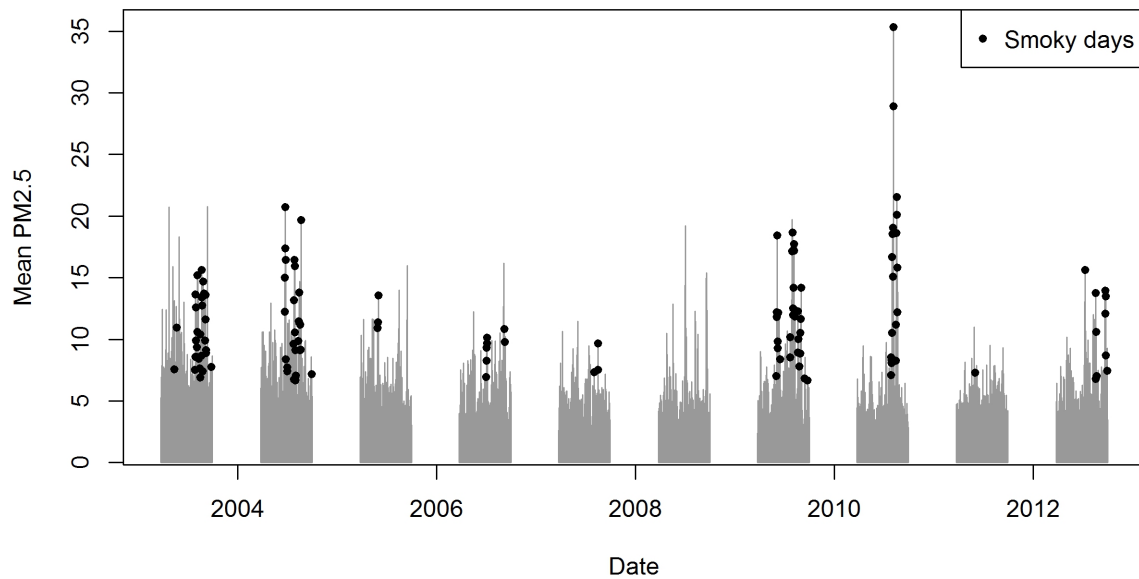
Model validation using
physician visits



Province-Wide FRP



Province-Wide PM



**128 smoky
days in 90th
percentile of
FRP and 70th
percentile of
population-
weighted
PM_{2.5}**

Underlying Cause	ICD-10	Deaths	Smoky Days	Other Days
All non-accidental	Excluding V-Y	137,841	1.02 (1.00-1.04)	1.00 (0.98-1.03)
All cardiovascular	I00 - I99	44,648	1.04 (1.00-1.07)	1.03 (0.99-1.07)
IHD	I20 - I25	20,162	1.01 (0.96-1.06)	1.01 (0.96-1.07)
Stroke	I69	10,764	1.08 (1.01-1.15)	1.02 (0.94-1.11)
MI	I21 - I23	9,208	1.01 (0.93-1.09)	1.03 (0.95-1.12)
All respiratory	J00 - J99	14,287	1.09 (1.03-1.15)	1.04 (0.97-1.12)
COPD	J44	5,618	1.03 (0.94-1.13)	1.02 (0.92-1.14)
LRI	J13 - J22	5,130	1.11 (1.00-1.21)	1.05 (0.93-1.19)

Conclusions:

1. Respiratory and cardiovascular effects consistent with urban PM
2. Cover the entire pyramid from subclinical to mortality
3. Small effects may not be detected when unmonitored populations not included
4. Continued improvements to exposure assessment are necessary