

Testing the MEM R- Shiny Interface

Canada Data

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Surveillance Indicators – ILI, % Positive, Pediatric Hospitalizations

MEM Template SARInet_Canada_19May2017 extras deleted - Microsoft Excel

Week No	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	12.52	33.46	18.38	2.94	4.22	10.42	3.57	1.34	23.59	3.01	32.36	28.29	26.30	5.85	24.14
2	10.37	24.61	19.29	2.86	6.46	6.07	5.46	0.59	21.65	3.45	30.77	28.16	29.43	7.06	27.13
3	8.70	18.94	20.72	3.76	6.68	8.16	7.41	0.33	20.51	3.54	26.52	27.17	28.14	12.24	23.29
4	5.94	18.95	21.47	8.03	8.27	9.04	9.77	0.60	17.84	4.86	22.68	23.50	23.47	15.89	22.91
5	8.55	18.73	24.48	7.99	11.13	12.43	11.68	0.40	18.60	6.50	23.86	21.61	21.08	20.57	24.24
6	9.39	14.61	18.83	10.21	12.85	10.35	14.11	0.23	20.32	7.58	17.59	19.40	20.50	24.83	24.13
7	6.77	14.83	16.54	11.48	16.71	13.10	17.03	0.24	19.58	9.86	15.02	16.84	18.40	28.71	24.90
8	9.50	12.13	16.46	12.00	17.56	16.71	17.05	0.32	17.79	13.67	12.12	14.01	16.80	32.87	24.04
9	11.94	10.15	16.79	14.59	19.99	16.93	18.58	0.12	16.11	17.79	14.60	12.92	16.05	34.28	21.74
10	11.73	7.01	13.87	16.88	21.32	17.97	16.20	0.29	15.19	21.16	13.09	12.33	16.57	35.99	20.45
11	12.79	6.45	15.26	20.40	17.60	16.01	17.91	0.38	13.41	23.44	11.72	12.94	17.03	31.41	16.19
12	10.36	3.94	13.77	19.99	13.93	18.59	14.36	0.31	11.79	24.43	12.32	12.21	17.22	30.03	15.03
13	9.64	3.25	12.16	20.26	13.69	16.12	12.16	0.32	11.62	20.29	11.80	13.92	16.51	28.25	14.50
14	6.65	2.12	11.67	18.82	10.78	17.50	10.52	0.32	11.12	18.97	11.38	11.68	14.56	23.16	12.66
15	5.98	1.84	8.25	16.90	8.45	18.25	9.14	0.00	10.63	19.08	11.98	15.28	14.07	20.73	11.95
16	4.98	1.42	7.19	14.28	7.23	16.78	5.21	0.11	7.58	17.46	11.20	15.55	12.59	18.52	11.64
17	5.04	1.31	4.44	13.89	5.82	13.09	4.02	0.26	7.64	14.69	11.16	13.40	10.11	17.30	9.76
18	4.57	1.09	3.94	9.36	4.95	10.47	4.76	0.14	5.61	13.42	9.99	11.28	8.61	13.02	9.44
19	3.98	0.71	2.40	6.13	3.48	8.50	4.49	0.07	4.20	9.76	8.41	10.83	7.75	11.95	8.27
20	3.88	0.72	2.38	6.99	2.70	4.77	13.21	0.24	2.80	9.23	6.34	9.39	5.55	9.13	
21	1.80	0.82	1.09	3.15	2.02	2.54	8.35	0.36	2.65	7.04	3.94	7.76	3.80	6.02	
22	1.55	0.98	0.48	1.71	0.35	2.93	24.91	0.00	1.19	6.42	3.44	5.62	3.25	4.18	
23	0.38	0.46	0.95	1.15	1.02	1.31	29.74	0.10	0.35	3.09	2.01	2.94	2.75	2.19	
24	1.32	0.43	0.45	0.59	0.93	2.03	19.15	0.00	0.41	1.96	1.23	2.70	1.73	1.08	
25	0.68	0.99	0.15	0.37	0.74	0.90	19.92	0.00	0.20	1.81	0.79	1.95	2.67	1.20	
26	0.58	0.35	0.77	0.44	0.12	0.42	14.35	0.77	0.31	1.51	0.72	1.70	1.03	0.69	
27	2.39	0.19	0.36	0.32	0.00	0.52	12.52	0.19	0.42	0.60	0.74	1.34	0.41	0.68	
28	0.53	0.47	0.19	0.57	0.14	0.26	11.27	0.45	0.32	0.63	0.62	0.79	0.91	0.54	
29	0.61	0.00	0.56	0.00	0.48	0.26	9.39	0.00	0.11	0.88	0.79	1.20	0.68	1.02	
30	0.18	0.00	0.19	0.00	0.00	0.12	9.93	0.40	0.35	0.44	0.18	0.56	0.96	0.46	
31	0.66	0.23	0.00	0.00	0.00	0.00	5.41	0.00	0.12	0.54	0.08	0.55	1.10	0.58	

Ready | ILI rate | ILI % | SARI | SARI positives for influenza | % of samples positives | ARI | pediatric hosp | Sheet1 | 100%

ILI - Overview

The Moving Epidemics Method Shiny Web Application

Check & describe

Model

Surveillance

Visualize

MEM

Summary, graphs, goodness and optimization of the MEM model

Data

Seasons

Series

Timing

MEM

Goodness

Optimize

Estimators

Detailed

Graphs

11

Seasons in the model



48

Average epidemic start week



19.0

Average epidemic length



61.2%

Epidemic percentage



31.8

Epidemic threshold



43.2

Medium threshold



69.2

High threshold

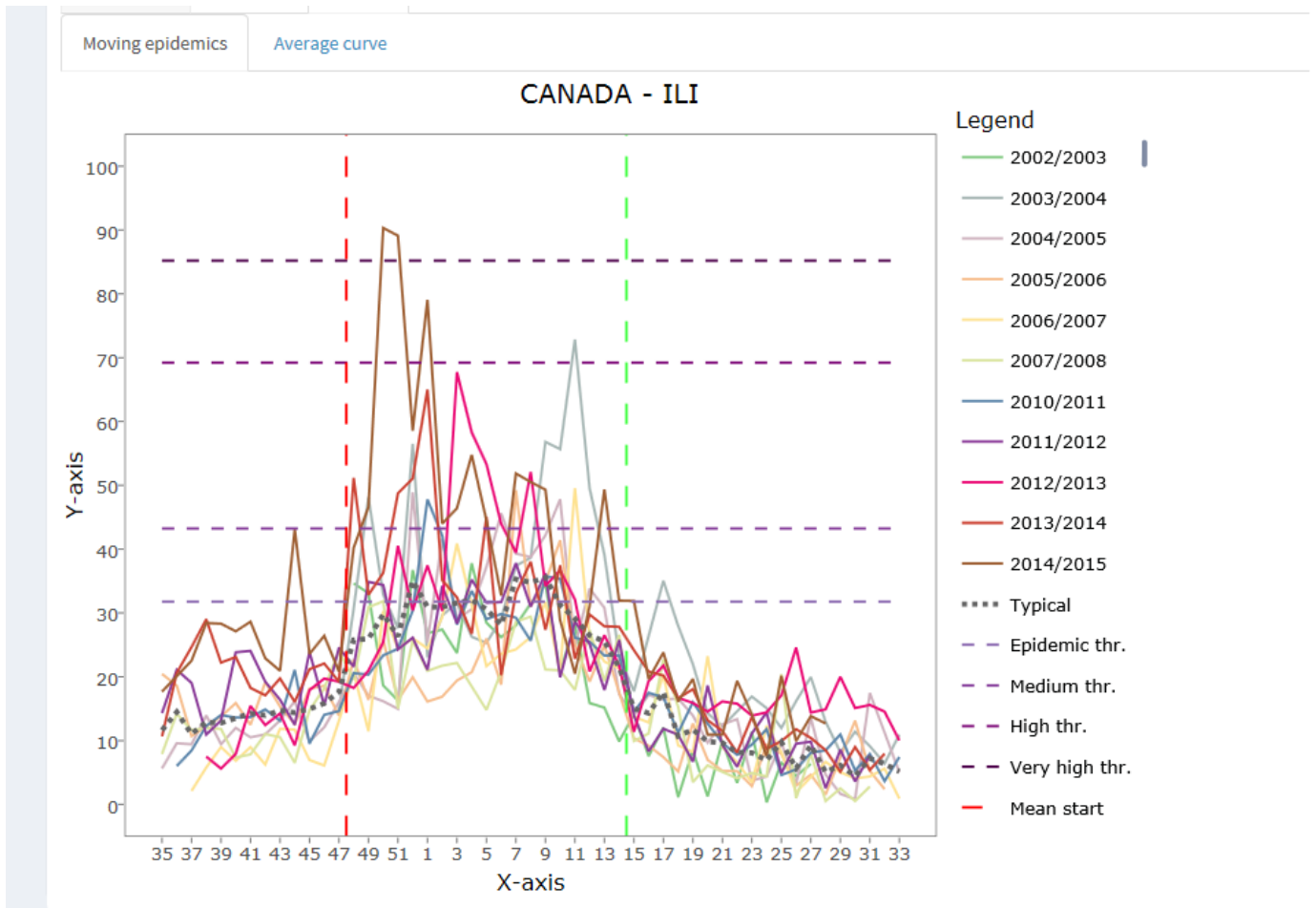


85.2

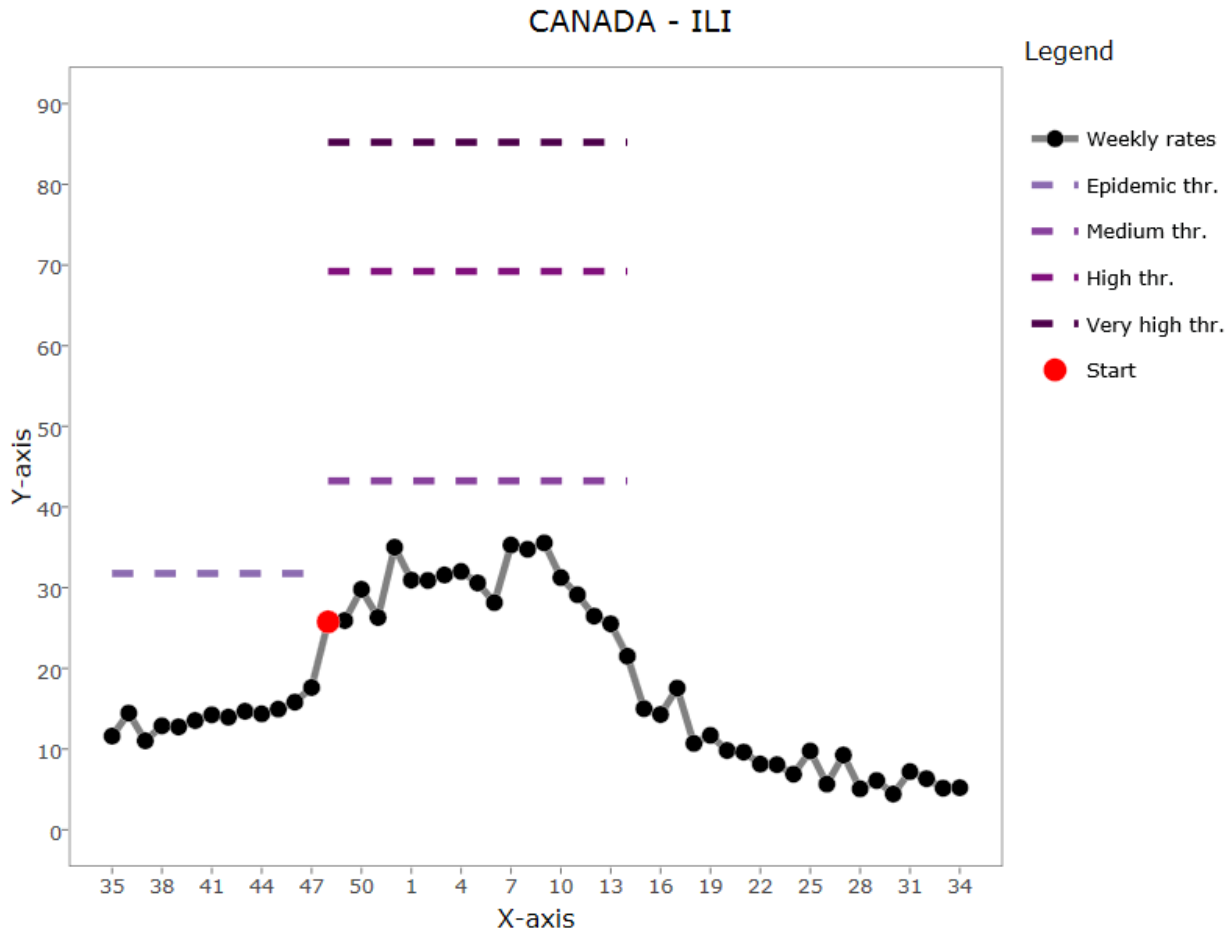
Very high threshold



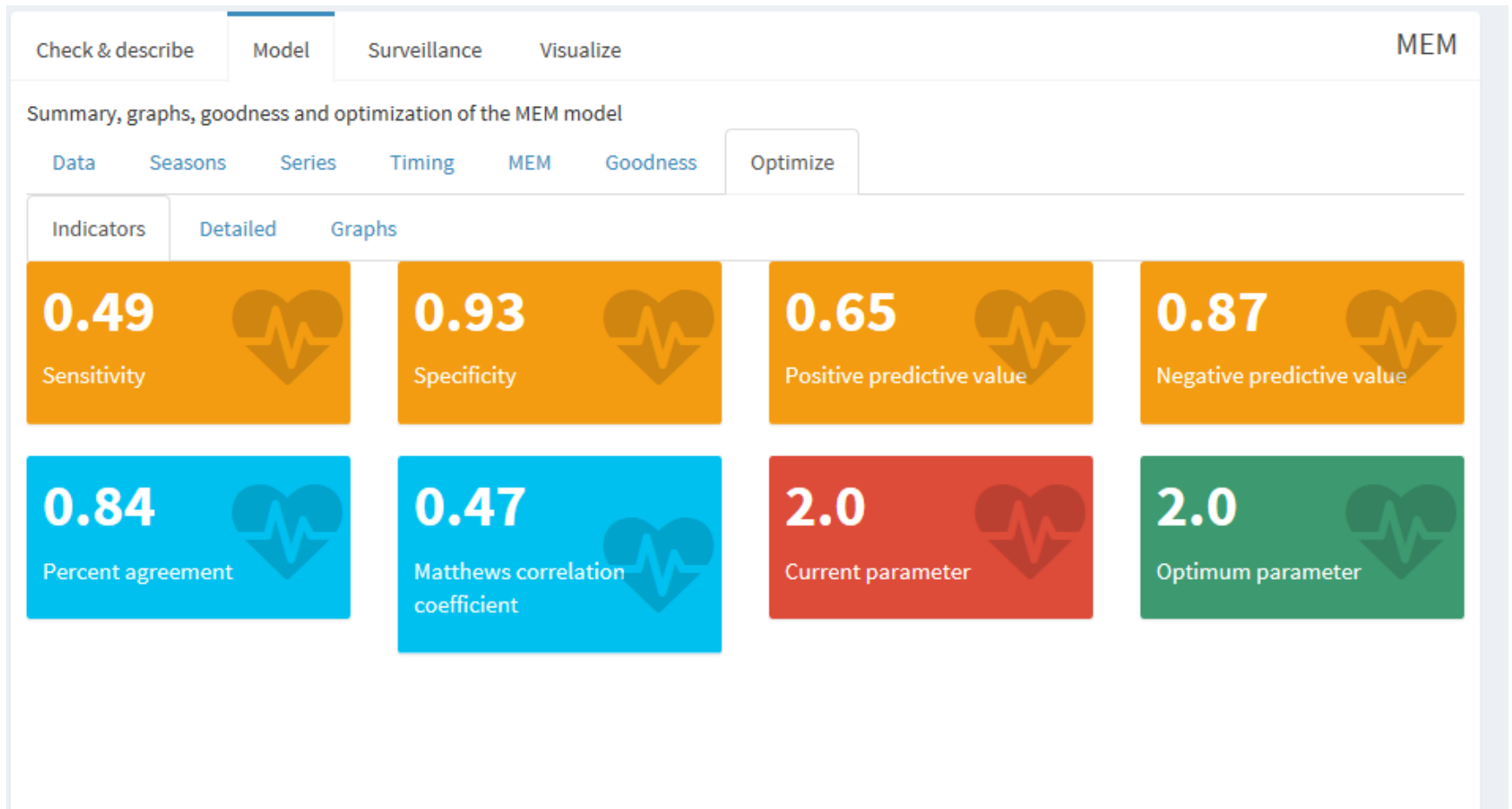
ILI - MEM



ILI – Average Curve



ILI - Optimization



Percent Positive - Overview

The screenshot displays the MEM dashboard web application. The browser address bar shows `http://127.0.0.1:4871/`. The page title is "MEM dashboard". The main content area is titled "The Moving Epidemics Method Shiny Web Application" and includes a navigation menu with "Check & describe", "Model", "Surveillance", and "Visualize". The "Model" tab is active, showing a summary of the MEM model with various parameters:

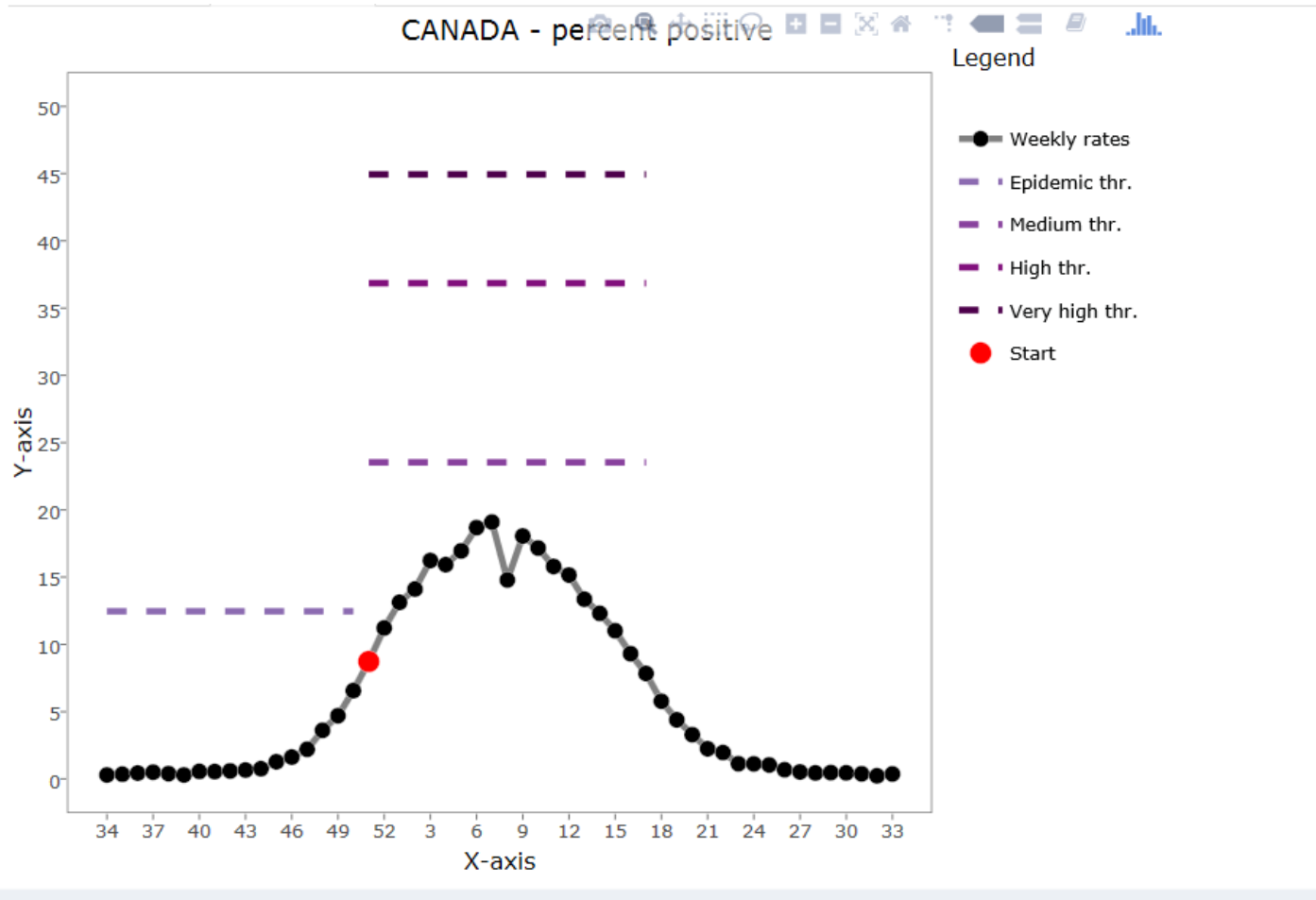
Parameter	Value
Seasons in the model	15
Average epidemic start week	51
Average epidemic length	19.0
Epidemic percentage	87.1%
Epidemic threshold	12.5
Medium threshold	23.5
High threshold	36.9
Very high threshold	44.9

The right sidebar contains a "Graph text" panel with the following configuration:

- Main title: CANADA - percent positive
- Y-axis: (empty)
- X-axis: (empty)

The left sidebar shows a "Load file" section with "MEM Template SARI" and "Upload complete". Below it is a "Dataset" section with a plus sign. The "Model" section includes "From" (2002/2003), "To" (2016/2017), and "Exclude" (empty) fields.

Percent Positive – Average Curve



Percent Positive - Validation

The Moving Epidemics Method Shiny Web Application

Check & describe

Model

Surveillance

Visualize

MEM

Summary, graphs, goodness and optimization of the MEM model

Data

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Indicators

Detailed

0.84

Sensitivity



0.91

Specificity



0.78

Positive predictive value



0.94

Negative predictive value



0.89

Percent agreement



0.73

Matthews correlation coefficient



Pediatric Hospitalizations - Overview

Estimators

Detailed

Graphs

6

Seasons in the model



49

Average epidemic start week



17.5

Average epidemic length



85.5%

Epidemic percentage



15.1

Epidemic threshold



36.3

Medium threshold



85.8

High threshold

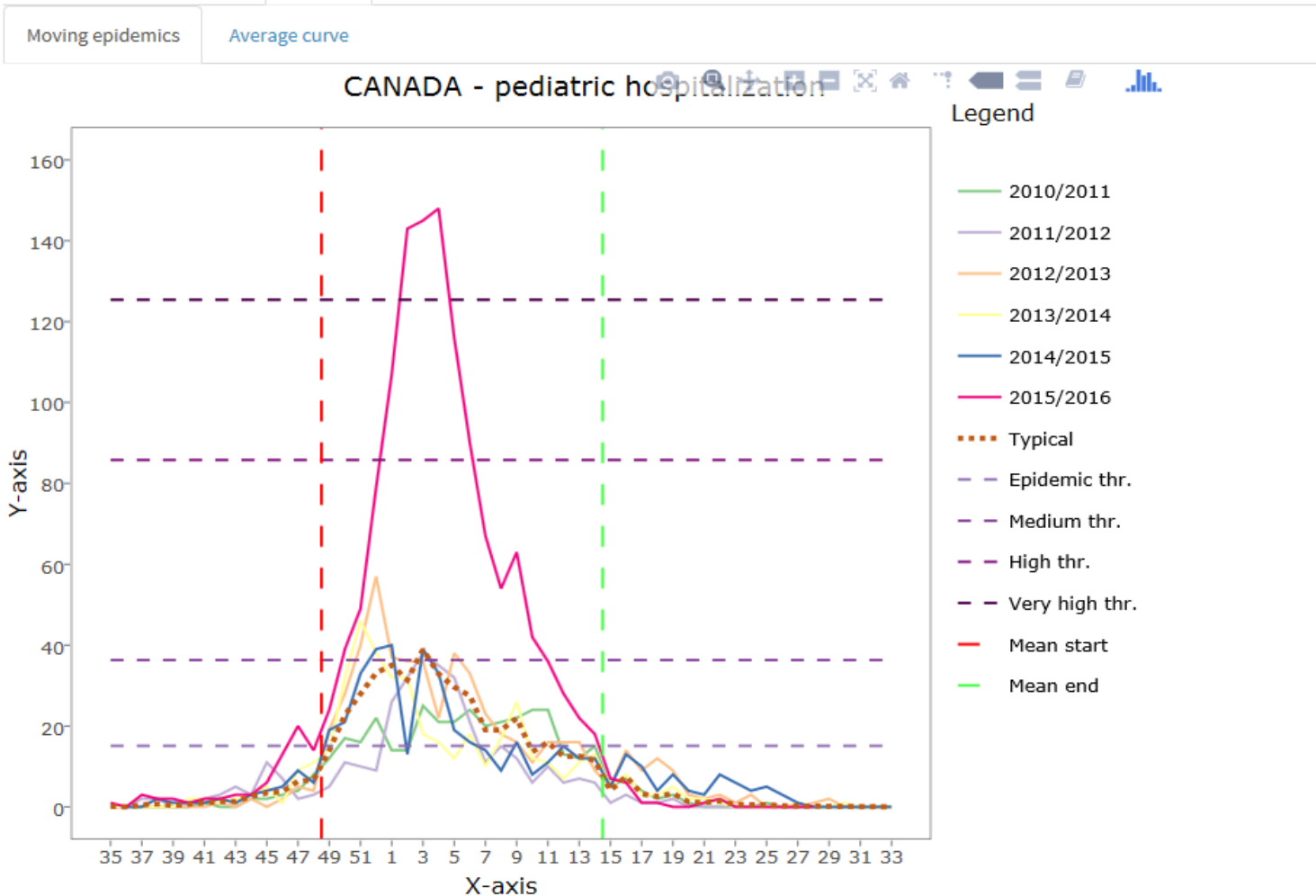


125.4

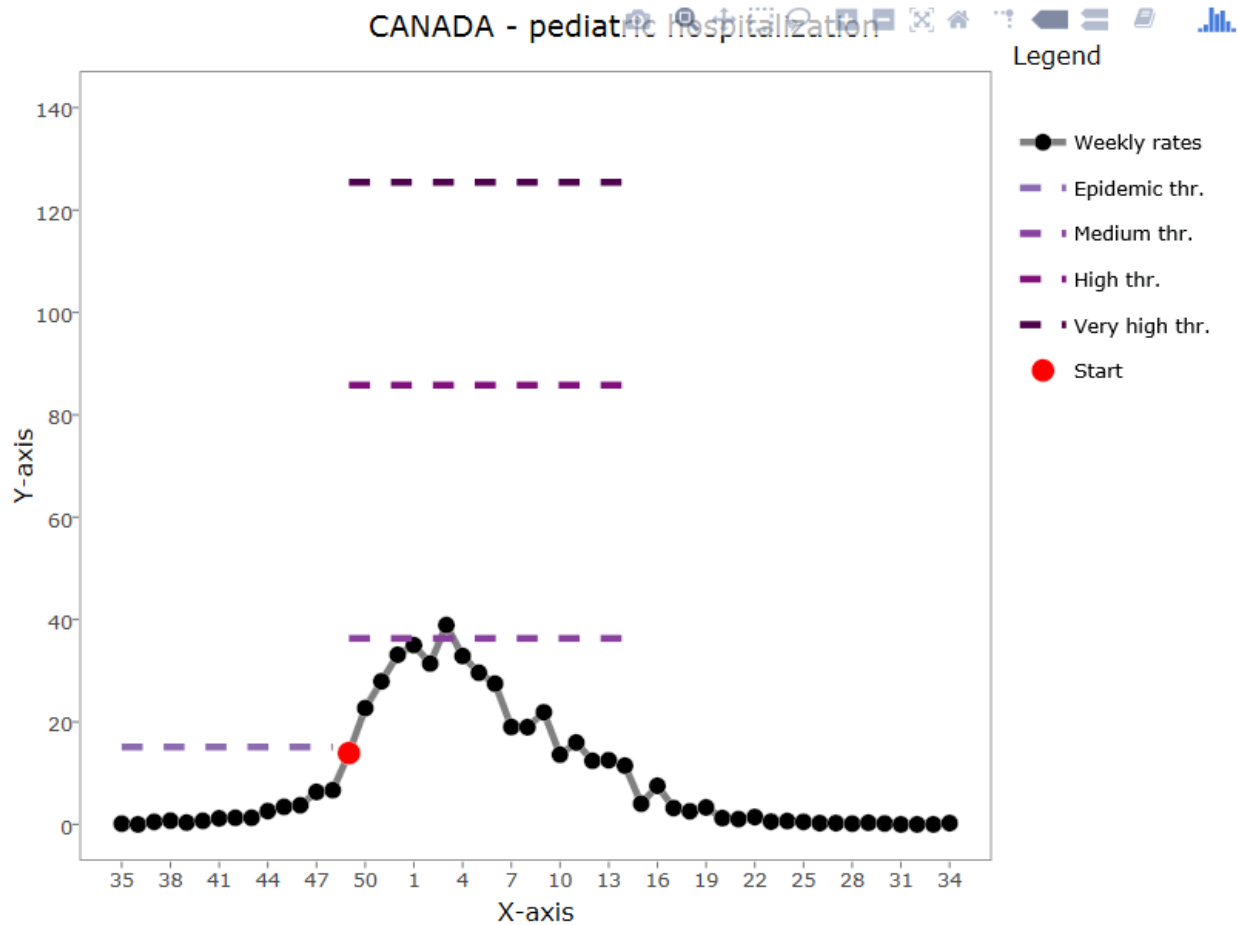
Very high threshold



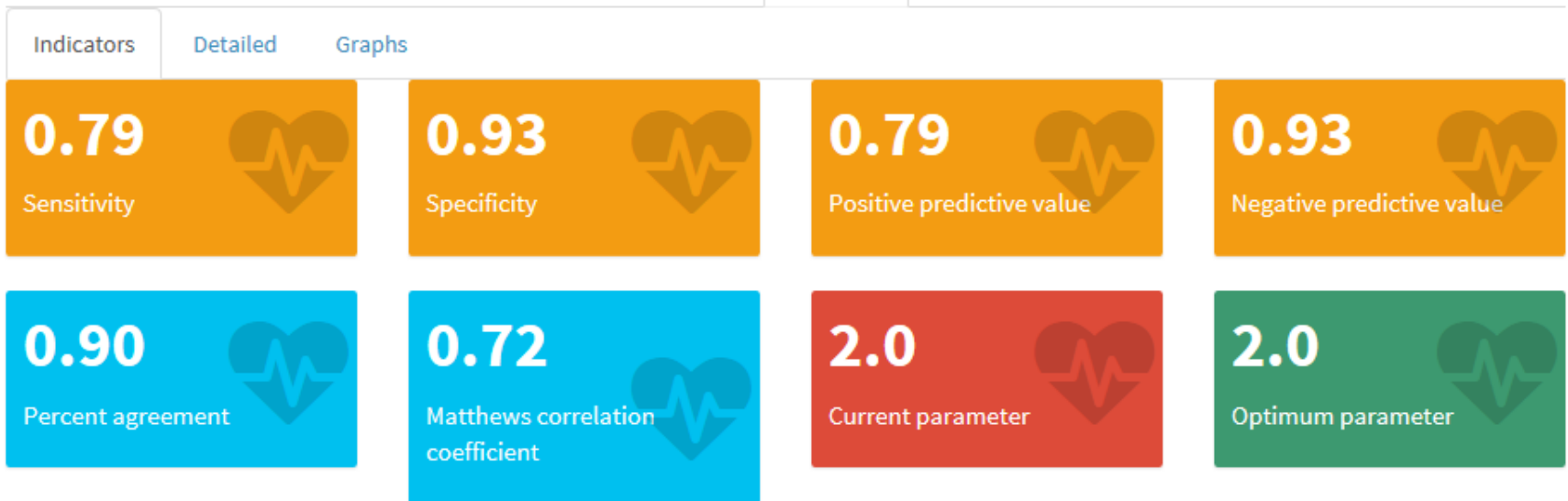
Pediatric Hospitalizations - MEM



Pediatric Hospitalizations – Average Curve



Pediatric Hospitalizations - Validation



Conclusions

- User-friendly interface, intuitive, easy to use - FUN
- Ideal indicators (ILI, % pos, hospitalizations) will differ between jurisdictions
- Optimal slope parameter lower for Canada 2.0 – 2.1
- Consistent with other modelling methods Canada has used to established seasonal threshold
- Has face validity with accepted/understood seasonal patterns in Canada – start/end and duration of season
- Confirms signal for extra-ordinary season seen in 2015/16 pediatric population
- Useful to develop curves across multiple populations (e.g., strain specific, age-specific, region-specific).