

The Question:

What approaches can assist in identifying the actionable information that exists within all of these data/signals?

Previous Approach

- Look across “independent” data sources/ statistics to corroborate signals
- Problems with this approach:
 - Each data source may represent different underlying populations
 - Difficult to align signals if data sources on different time tables
 - Signals may not agree and that may not be good reason to ignore the alert

Proposed Approach:

Decision Support System

Decision Support System

- Incorporated into existing information systems
- Organizes data to inform clinical or public health responses
- Enables providers to target clinical management of medical conditions
 - Reminders for vaccines (flu vaccine prompts if > 65 yo)
 - Screening recommendations (mammograms)
 - Chronic disease management (asthma, diabetes)
- Associated with improved outcomes
 - Immunizations: Up-to-date rates
 - Decreased emergency room visits for asthma

How Might We Use A Decision Support System for Surveillance?

- It is not uncommon to have many visits that fall into a general GI category
- Able to parse category into more useful subcategories:
 - GI (common) → “bloody diarrhea” (moderately common)
 - young people with “bloody diarrhea” (rare)
- With a little extra effort, we now may propose *Shigella* or *E. coli* as a possible differential diagnosis – thereby framing decisions for the public health practitioner
- Different public health actions are warranted for a possible *Shigella* or *E. coli* problem vs. a general GI flag

Decision Support Needs

- Prompts for action
 - Event detection (**ALF example to follow**)
 - Event management
 - Situation awareness, hurricane management, influenza onset, disaster management, large public events (inauguration), etc.
- Decision-making may be affected by level of responsible domain
 - Federal
 - State
 - Local
- How could this work as integrated electronic solution?

Links	Date	Data Source	Region	Age	Sex	Syndrome	Detector	Level	Count	Expected	RareColor	RareLevel	NonZero
Time Series	11Sep08	ER by Patient	New River	All	All	Bot_Like	Regression/EWMA 1.2	0.039	1	0.036	1	1	4.384
Time Series	11Sep08	ER by Patient	New River	45-64	All	Fever	Regression/EWMA 1.2	0.011	2	0.25	26	11	27.671
Time Series	11Sep08	ER by Patient	West Piedmont	5-17	All	Fever	Regression/EWMA 1.2	0.013	1	0.214	17	9	42.74
Time Series	11Sep08	ER by Patient	Crater	18-44	All	GI	Regression/EWMA 1.2	0.009	7	4.407	39	18	98.082
Time Series	11Sep08	ER by Patient	Piedmont	45-64	All	GI	Regression/EWMA 1.2	0.012	6	3.407	24	9	94.521
Time Series	11Sep08	ER by Patient	Piedmont	All	All	GI	Regression/EWMA 1.2	0.007	22	13.75	41	12	100
Time Series	11Sep08	ER by Patient	West Piedmont	5-17	All	GI	Regression/EWMA 1.2	0.018	3	1.042	22	7	67.397
Time Series	11Sep08	ER by Patient	Piedmont	0-4	All	Loc_Les	Regression/EWMA 1.2	0.019	1	0.143	6	4	9.041
Time Series	11Sep08	ER by Patient	Rappahannock	All	All	Lymph	Regression/EWMA 1.2	0.036	2	0.607	31	20	44.11
Time Series	11Sep08	ER by Patient	Crater	0-4	All	Rash	Regression/EWMA 1.2	0.035	1	0.107	19	17	18.904
Time Series	11Sep08	ER by Patient	New River	5-17	All	Resp	Regression/EWMA 1.2	0.006	2	0.607	28	13	74.795
Time Series	11Sep08	ER by Patient	Piedmont	18-44	All	Resp	Regression/EWMA 1.2	0.023	7	4.846	37	24	98.63
Time Series	11Sep08	ER by Patient	Piedmont	All	All	Resp	Regression/EWMA 1.2	0.041	13	11.393	46	39	100
Time Series	11Sep08	ER by Patient	Three Rivers	18-44	All	Resp	Regression/EWMA 1.2	0.035	9	6.786	43	33	100
Time Series	11Sep08	ER by Patient	West Piedmont	5-17	All	Resp	Regression/EWMA 1.2	0.014	3	0.96	26	11	64.11
Time Series	10Sep08	ER by Patient	Chesapeake	18-44	All	Fever	Regression/EWMA 1.2	0.011	5	2.269	34	14	92.603
Time Series	10Sep08	ER by Patient	Chickahominy	65+	All	Fever	Regression/EWMA 1.2	0.047	3	0.821	31	30	58.63
Time Series	10Sep08	ER by Patient	Crater	All	All	Fever	Regression/EWMA 1.2	0.037	6	2.214	47	37	90.411
Time Series	10Sep08	ER by Patient	Crater	18-44	All	Fever	Regression/EWMA 1.2	0.005	3	0.5	41	12	44.11
Time Series	10Sep08	ER by Patient	Fairfax	45-64	All	Fever	Regression/EWMA 1.2	0.036	6	2.815	29	26	91.781
Time Series	10Sep08	Over-the-Counter Chain 2	Henrico	All	All	Fever	Regression/EWMA 1.2	0.017	4	1.5	28	19	60.548
Time Series	10Sep08	Over-the-Counter Chain 2	New River	All	All	Fever	Regression/EWMA 1.2	0.026	3	0.821	29	24	44.11
Time Series	10Sep08	ER by Patient	Peninsula	5-17	All	Fever	Regression/EWMA 1.2	0.014	7	2.429	36	14	95.616
Time Series	10Sep08	ER by Patient	Piedmont	0-4	All	Fever	Regression/EWMA 1.2	0.027	5	1.87	28	21	74.247
Time Series	10Sep08	Over-the-Counter Chain 2	Rappahannock	All	All	Fever	Regression/EWMA 1.2	0.019	6	3.346	24	18	67.123
Time Series	10Sep08	ER by Patient	Roanoke	65+	All	Fever	Regression/EWMA 1.2	0.001	2	0.107	13	2	14.795
Time Series	10Sep08	ER by Patient	West Piedmont	5-17	All	Fever	Regression/EWMA 1.2	0.003	2	0.214	17	4	42.74
Time Series	10Sep08	ER by Patient	West Piedmont	All	All	Fever	Regression/EWMA 1.2	0.019	5	2.042	19	8	89.315
Time Series	10Sep08	ER by Patient	Western Tidewater	All	All	Fever	Regression/EWMA 1.2	0.039	5	2.519	31	27	95.342
Time Series	10Sep08	ER by Patient	Central Virginia	0-4	All	GI	Regression/EWMA 1.2	0.049	3	1.174	28	27	95.616
Time Series	10Sep08	Over-the-Counter Chain 2	Chesterfield	All	All	GI	Regression/EWMA 1.2	0.028	17	13.036	24	15	69.589
Time Series	10Sep08	ER by Patient	Chesterfield	5-17	All	GI	Regression/EWMA 1.2	0.04	8	4.407	35	29	99.178
Time Series	10Sep08	ER by Patient	Chickahominy	5-17	All	GI	Regression/EWMA 1.2	0.008	4	2.111	23	7	92.329
Time Series	10Sep08	ER by Patient	Chickahominy	65+	All	GI	Regression/EWMA 1.2	0.039	6	3.481	38	31	96.712

Time Series	10Sep08	ER by Patient	Chickahominy	65+	All	GI	Regression/EWMA 1.2	0.039	6	3.481	38	31	96.712
Time Series	10Sep08	ER by Patient	Chickahominy	All	All	GI	Regression/EWMA 1.2	0.03	30	21.893	38	26	100
Time Series	10Sep08	ER by Patient	Crater	18-44	All	GI	Regression/EWMA 1.2	0.022	7	4.37	39	28	98.082
Time Series	10Sep08	ER by Patient	Hampton	5-17	All	GI	Regression/EWMA 1.2	0.042	3	1.821	26	23	86.027
Time Series	10Sep08	ER by Patient	Henrico	5-17	All	GI	Regression/EWMA 1.2	0.005	7	3.786	20	4	99.452
Time Series	10Sep08	ER by Patient	Loudoun	65+	All	GI	Regression/EWMA 1.2	0.01	4	2.538	25	12	93.151
Time Series	10Sep08	ER by Patient	Peninsula	5-17	All	GI	Regression/EWMA 1.2	0.035	9	5.423	28	21	98.356
Time Series	10Sep08	ER by Patient	Piedmont	All	All	GI	Regression/EWMA 1.2	0.015	17	13.429	40	21	100
Time Series	10Sep08	ER by Patient	Piedmont	45-64	All	GI	Regression/EWMA 1.2	0.013	7	3.259	23	9	94.521
Time Series	10Sep08	ER by Patient	Richmond	All	All	GI	Regression/EWMA 1.2	0.044	31	23	38	36	100
Time Series	10Sep08	ER by Patient	Roanoke	0-4	All	GI	Regression/EWMA 1.2	0.006	5	1.5	23	6	82.74
Time Series	10Sep08	ER by Patient	Three Rivers	0-4	All	GI	Regression/EWMA 1.2	0.007	3	0.833	15	8	69.863
Time Series	10Sep08	ER by Patient	Virginia Beach	0-4	All	GI	Regression/EWMA 1.2	0.008	8	3.679	22	6	98.63
Time Series	10Sep08	ER by Patient	West Piedmont	5-17	All	GI	Regression/EWMA 1.2	0.04	3	1.083	21	18	67.397
Time Series	10Sep08	ER by Patient	Western Tidewater	65+	All	GI	Regression/EWMA 1.2	0.034	2	0.393	25	19	47.397
Time Series	10Sep08	ER by Patient	Central Virginia	5-17	All	Loc_Les	Regression/EWMA 1.2	0.008	2	0.357	22	10	25.205
Time Series	10Sep08	ER by Patient	Crater	18-44	All	Loc_Les	Regression/EWMA 1.2	0.023	4	1.579	26	16	61.096
Time Series	10Sep08	ER by Patient	Piedmont	All	All	Loc_Les	Regression/EWMA 1.2	0.01	5	1.792	26	13	64.658
Time Series	10Sep08	ER by Patient	Piedmont	5-17	All	Loc_Les	Regression/EWMA 1.2	0.005	2	0.179	10	5	10.137
Time Series	10Sep08	ER by Patient	Richmond	5-17	All	Loc_Les	Regression/EWMA 1.2	0.038	2	0.429	31	29	31.781
Time Series	10Sep08	ER by Patient	Western Tidewater	0-4	All	Loc_Les	Regression/EWMA 1.2	0.001	2	0.107	9	1	11.781
Time Series	10Sep08	ER by Patient	Western Tidewater	45-64	All	Loc_Les	Regression/EWMA 1.2	0.04	1	0.25	22	18	19.726
Time Series	10Sep08	ER by Patient	Western Tidewater	All	All	Loc_Les	Regression/EWMA 1.2	0.014	3	1.167	17	7	65.479
Time Series	10Sep08	ER by Patient	Fairfax	45-64	All	Lymph	Regression/EWMA 1.2	0.038	2	0.429	22	21	37.26
Time Series	10Sep08	ER by Patient	Rappahannock	45-64	All	Lymph	Regression/EWMA 1.2	0.001	2	0.036	8	2	12.055
Time Series	10Sep08	ER by Patient	Rappahannock Rapidan	18-44	All	Lymph	Regression/EWMA 1.2	0.007	2	0.286	19	11	15.068
Time Series	10Sep08	ER by Patient	Rappahannock Rapidan	All	All	Lymph	Regression/EWMA 1.2	0.001	3	0.393	24	4	28.219
Time Series	10Sep08	ER by Patient	Chickahominy	All	All	Neuro	Regression/EWMA 1.2	0.042	3	1.04	17	13	70.137
Time Series	10Sep08	ER by Patient	Henrico	45-64	All	Neuro	Regression/EWMA 1.2	0.014	3	0.679	21	9	59.178
Time Series	10Sep08	ER by Patient	New River	45-64	All	Neuro	Regression/EWMA 1.2	0.007	2	0.286	20	10	30.137
Time Series	10Sep08	ER by Patient	New River	All	All	Neuro	Regression/EWMA 1.2	0.003	4	1.263	21	6	66.301
Time Series	10Sep08	ER by Patient	New River	65+	All	Neuro	Regression/EWMA 1.2	0.005	2	0.321	26	6	37.808
Time Series	10Sep08	ER by Patient	Rappahannock	45-64	All	Neuro	Regression/EWMA 1.2	0	4	0.321	23	1	46.301
Time Series	10Sep08	ER by Patient	Rappahannock	All	All	Neuro	Regression/EWMA 1.2	0.034	4	1.357	23	17	79.452
Time Series	10Sep08	ER by Patient	Rappahannock Rapidan	45-64	All	Neuro	Regression/EWMA 1.2	0	3	0.357	26	4	23.014

Time Series	Date	ER by Patient	Supplies	Age	Sex	System	Regression/EWMA 1.2	Value	Count	Rate	Count	Rate	
Time Series	10Sep08	ER by Patient	Rappahannock Rapidan	45-64	All	Neuro	Regression/EWMA 1.2	0	3	0.357	26	4	23.014
Time Series	10Sep08	ER by Patient	Roanoke	18-44	All	Neuro	Regression/EWMA 1.2	0.032	1	0.107	13	11	13.973
Time Series	10Sep08	ER by Patient	Thomas Jefferson	18-44	All	Neuro	Regression/EWMA 1.2	0.002	2	0.107	18	6	20.822
Time Series	10Sep08	ER by Patient	Alexandria	0-4	All	Rash	Regression/EWMA 1.2	0.019	1	0.179	17	11	28.493
Time Series	10Sep08	ER by Patient	OTHER_REGION	18-44	All	Rash	Regression/EWMA 1.2	0.012	9	3.593	28	9	95.89
Time Series	10Sep08	Over-the-Counter Chain 2	Alexandria	All	All	Resp	Regression/EWMA 1.2	0.033	37	25.286	23	17	69.589
Time Series	10Sep08	ER by Patient	Arlington	0-4	All	Resp	Regression/EWMA 1.2	0.03	3	0.88	33	17	76.712
Time Series	10Sep08	ER by Patient	Arlington	5-17	All	Resp	Regression/EWMA 1.2	0.005	2	0.357	29	8	46.301
Time Series	10Sep08	ER by Patient	Central Virginia	5-17	All	Resp	Regression/EWMA 1.2	0.036	5	2.464	33	29	90.411
Time Series	10Sep08	ER by Patient	Central Virginia	0-4	All	Resp	Regression/EWMA 1.2	0.045	5	3.593	34	33	97.26
Time Series	10Sep08	Over-the-Counter Chain 2	Chesapeake	All	All	Resp	Regression/EWMA 1.2	0.02	170	121.536	26	16	69.589
Time Series	10Sep08	Over-the-Counter Chain 2	Chesterfield	All	All	Resp	Regression/EWMA 1.2	0.001	82	54.286	17	5	69.589
Time Series	10Sep08	ER by Patient	Chesterfield	5-17	All	Resp	Regression/EWMA 1.2	0	10	3.259	45	13	98.63
Time Series	10Sep08	ER by Patient	Chesterfield	45-64	All	Resp	Regression/EWMA 1.2	0.038	16	10	41	36	100
Time Series	10Sep08	ER by Patient	Chesterfield	65+	All	Resp	Regression/EWMA 1.2	0.016	9	5.464	52	26	100
Time Series	10Sep08	ER by Patient	Chesterfield	All	All	Resp	Regression/EWMA 1.2	0.002	55	40.036	50	27	100
Time Series	10Sep08	ER by Patient	Chickahominy	45-64	All	Resp	Regression/EWMA 1.2	0.005	9	4.036	37	11	99.452
Time Series	10Sep08	Over-the-Counter Chain 2	Chickahominy	All	All	Resp	Regression/EWMA 1.2	0.024	51	35.786	28	19	69.589
Time Series	10Sep08	ER by Patient	Chickahominy	0-4	All	Resp	Regression/EWMA 1.2	0.049	3	0.821	50	50	77.808
Time Series	10Sep08	Over-the-Counter Chain 2	Crater	All	All	Resp	Regression/EWMA 1.2	0.02	46	31.071	20	10	69.589
Time Series	10Sep08	ER by Patient	Crater	5-17	All	Resp	Regression/EWMA 1.2	0.001	2	0.321	32	5	52.603
Time Series	10Sep08	ER by Patient	Eastern Shore	5-17	All	Resp	Regression/EWMA 1.2	0.004	2	0.214	30	6	34.795
Time Series	10Sep08	ER by Patient	Eastern Shore	All	All	Resp	Regression/EWMA 1.2	0.001	12	4.111	21	3	97.808
Time Series	10Sep08	ER by Patient	Eastern Shore	18-44	All	Resp	Regression/EWMA 1.2	0.001	5	1.143	29	1	82.74
Time Series	10Sep08	ER by Patient	Fairfax	5-17	All	Resp	Regression/EWMA 1.2	0.041	8	5.593	45	38	98.904
Time Series	10Sep08	Over-the-Counter Chain 2	Fairfax	All	All	Resp	Regression/EWMA 1.2	0.003	229	182.429	39	6	69.589
Time Series	10Sep08	Over-the-Counter Chain 2	Hampton	All	All	Resp	Regression/EWMA 1.2	0.003	83	63.929	35	14	69.589
Time Series	10Sep08	ER by Patient	Henrico	5-17	All	Resp	Regression/EWMA 1.2	0.037	5	3.037	40	35	98.904
Time Series	10Sep08	ER by Patient	Henrico	0-4	All	Resp	Regression/EWMA 1.2	0.018	8	3.32	41	22	96.164
Time Series	10Sep08	Over-the-Counter Chain 2	Lord Fairfax	All	All	Resp	Regression/EWMA 1.2	0.038	40	31.964	31	27	69.589
Time Series	10Sep08	Over-the-Counter Chain 2	Loudoun	All	All	Resp	Regression/EWMA 1.2	0.001	84	50.393	32	5	69.589
Time Series	10Sep08	Over-the-Counter Chain 2	New River	All	All	Resp	Regression/EWMA 1.2	0.007	23	14.25	34	14	69.589
Time Series	10Sep08	ER by Patient	New River	0-4	All	Resp	Regression/EWMA 1.2	0.003	4	1.04	43	8	80.274
Time Series	10Sep08	ER by Patient	New River	18-44	All	Resp	Regression/EWMA 1.2	0.002	13	6.429	30	11	99.452
Time Series	10Sep08	ER by Patient	New River	5-17	All	Resp	Regression/EWMA 1.2	0.008	2	0.607	27	16	74.795

Time Series	Date	ER by Patient	Geography	Age	Sex	Resp	Regression/EWMA 1.2	P-Value	CI	CI	CI	CI	CI
Time Series	10Sep08	ER by Patient	New River	5-17	All	Resp	Regression/EWMA 1.2	0.008	2	0.607	27	16	74.795
Time Series	10Sep08	ER by Patient	New River	All	All	Resp	Regression/EWMA 1.2	0	30	15.143	44	7	100
Time Series	10Sep08	Over-the-Counter Chain 2	Norfolk	All	All	Resp	Regression/EWMA 1.2	0.003	102	71	36	13	69.589
Time Series	10Sep08	Over-the-Counter Chain 2	Peninsula	All	All	Resp	Regression/EWMA 1.2	0.01	114	90.107	40	17	69.589
Time Series	10Sep08	ER by Patient	Peninsula	5-17	All	Resp	Regression/EWMA 1.2	0.005	10	4.536	63	23	98.904
Time Series	10Sep08	ER by Patient	Piedmont	18-44	All	Resp	Regression/EWMA 1.2	0.004	10	4.769	37	9	98.63
Time Series	10Sep08	ER by Patient	Piedmont	All	All	Resp	Regression/EWMA 1.2	0.008	18	11.357	46	17	100
Time Series	10Sep08	Over-the-Counter Chain 2	Portsmouth	All	All	Resp	Regression/EWMA 1.2	0	72	32.036	33	2	69.589
Time Series	10Sep08	Over-the-Counter Chain 2	Prince William	All	All	Resp	Regression/EWMA 1.2	0.009	25	16.036	17	5	69.589
Time Series	10Sep08	ER by Patient	Prince William	0-4	All	Resp	Regression/EWMA 1.2	0.014	8	3.481	43	16	98.356
Time Series	10Sep08	ER by Patient	Rappahannock	5-17	All	Resp	Regression/EWMA 1.2	0.002	6	2.179	37	5	93.425
Time Series	10Sep08	Over-the-Counter Chain 2	Rappahannock	All	All	Resp	Regression/EWMA 1.2	0.001	102	61	34	7	69.589
Time Series	10Sep08	ER by Patient	Rappahannock	All	All	Resp	Regression/EWMA 1.2	0.003	36	22.071	38	5	100
Time Series	10Sep08	ER by Patient	Rappahannock Rapidan	All	All	Resp	Regression/EWMA 1.2	0.006	16	9.786	31	7	100
Time Series	10Sep08	Over-the-Counter Chain 2	Rappahannock Rapidan	All	All	Resp	Regression/EWMA 1.2	0.002	49	26.786	30	3	69.589
Time Series	10Sep08	ER by Patient	Rappahannock Rapidan	5-17	All	Resp	Regression/EWMA 1.2	0	6	0.788	21	3	69.315
Time Series	10Sep08	ER by Patient	Richmond	5-17	All	Resp	Regression/EWMA 1.2	0.036	4	1.522	41	34	84.932
Time Series	10Sep08	ER by Patient	Richmond	18-44	All	Resp	Regression/EWMA 1.2	0.028	10	8.321	41	34	100
Time Series	10Sep08	ER by Patient	Richmond	45-64	All	Resp	Regression/EWMA 1.2	0.01	9	4.5	35	18	99.726
Time Series	10Sep08	Over-the-Counter Chain 2	Richmond	All	All	Resp	Regression/EWMA 1.2	0.031	26	21.893	35	30	69.589
Time Series	10Sep08	ER by Patient	Richmond	All	All	Resp	Regression/EWMA 1.2	0.002	26	18.964	43	15	100
Time Series	10Sep08	ER by Patient	Roanoke	All	All	Resp	Regression/EWMA 1.2	0.009	22	12.25	39	17	100
Time Series	10Sep08	ER by Patient	Roanoke	5-17	All	Resp	Regression/EWMA 1.2	0	6	1.036	34	1	79.726
Time Series	10Sep08	ER by Patient	Thomas Jefferson	5-17	All	Resp	Regression/EWMA 1.2	0.047	3	1.231	24	23	70.411
Time Series	10Sep08	ER by Patient	Three Rivers	5-17	All	Resp	Regression/EWMA 1.2	0.008	3	1.214	45	21	87.945
Time Series	10Sep08	ER by Patient	Three Rivers	18-44	All	Resp	Regression/EWMA 1.2	0.014	13	6.75	42	13	100
Time Series	10Sep08	Over-the-Counter Chain 2	Three Rivers	All	All	Resp	Regression/EWMA 1.2	0.021	73	50.321	29	14	69.589
Time Series	10Sep08	Over-the-Counter Chain 2	Virginia Beach	All	All	Resp	Regression/EWMA 1.2	0.041	310	267.968	39	38	69.589
Time Series	10Sep08	ER by Patient	Virginia Beach	All	All	Resp	Regression/EWMA 1.2	0.031	65	55.571	60	45	100
Time Series	10Sep08	ER by Patient	Virginia Beach	0-4	All	Resp	Regression/EWMA 1.2	0.02	11	5.036	42	23	99.726
Time Series	10Sep08	ER by Patient	West Piedmont	0-4	All	Resp	Regression/EWMA 1.2	0.013	4	1.321	36	12	72.329
Time Series	10Sep08	ER by Patient	Alexandria	45-64	All	SI_Death	Regression/EWMA 1.2	0.003	2	0.179	17	4	18.356
Time Series	10Sep08	ER by Patient	Fairfax	65+	All	SI_Death	Regression/EWMA 1.2	0.038	4	1.529	25	18	56.438
Time Series	10Sep08	ER by Patient	Fairfax	All	All	SI_Death	Regression/EWMA 1.2	0.008	6	2.074	25	9	81.644
Time Series	10Sep08	ER by Patient	New River	All	All	SI_Death	Regression/EWMA 1.2	0.005	1	0.214	34	12	27.945

Time Series	Date	ER by Patient	County	Age	Sex	ICD-9	Model	P-Value	Count	Rate	Rate	Rate	Rate
Time Series	10Sep08	ER by Patient	New River	All	All	SI_Death	Regression/EWMA 1.2	0.005	1	0.214	34	12	27.945
Time Series	10Sep08	ER by Patient	Norfolk	65+	All	SI_Death	Regression/EWMA 1.2	0.024	2	0.393	28	17	39.178
Time Series	10Sep08	ER by Patient	Prince William	45-64	All	SI_Death	Regression/EWMA 1.2	0.034	1	0.214	21	19	32.603
Time Series	09Sep08	ER by Patient	Rappahannock	18-44	All	Bot_Like	Regression/EWMA 1.2	0.001	1	0.033	1	1	2.192
Time Series	09Sep08	ER by Patient	Rappahannock	All	All	Bot_Like	Regression/EWMA 1.2	0.043	1	0.143	2	2	6.575
Time Series	09Sep08	Over-the-Counter Chain 2	Crater	All	All	Fever	Regression/EWMA 1.2	0.016	3	1.036	29	18	57.26
Time Series	09Sep08	ER by Patient	Fairfax	65+	All	Fever	Regression/EWMA 1.2	0.007	8	2.607	18	4	91.233
Time Series	09Sep08	Over-the-Counter Chain 2	Henrico	All	All	Fever	Regression/EWMA 1.2	0.04	4	1.5	27	24	60.274
Time Series	09Sep08	Over-the-Counter Chain 2	Piedmont	All	All	Fever	Regression/EWMA 1.2	0.002	5	0.821	29	12	41.096
Time Series	09Sep08	ER by Patient	Piedmont	5-17	All	Fever	Regression/EWMA 1.2	0.031	1	0.536	34	28	54.521
Time Series	09Sep08	Over-the-Counter Chain 2	Portsmouth	All	All	Fever	Regression/EWMA 1.2	0.005	5	1.5	22	8	55.342
Time Series	09Sep08	ER by Patient	Richmond	65+	All	Fever	Regression/EWMA 1.2	0.005	2	0.571	27	8	49.041
Time Series	09Sep08	Over-the-Counter Chain 3	Southside	All	All	Fever	Regression/EWMA 1.2	0.037	3	1.893	28	25	54.795
Time Series	09Sep08	ER by Patient	Three Rivers	65+	All	Fever	Regression/EWMA 1.2	0.031	2	1	21	16	55.068
Time Series	09Sep08	ER by Patient	Virginia Beach	65+	All	Fever	Regression/EWMA 1.2	0.018	4	1.107	26	14	62.192
Time Series	09Sep08	ER by Patient	Western Tidewater	18-44	All	Fever	Regression/EWMA 1.2	0.021	1	0.321	26	14	41.37
Time Series	09Sep08	ER by Patient	Chesapeake	18-44	All	GI	Regression/EWMA 1.2	0.032	22	14.464	33	25	100
Time Series	09Sep08	ER by Patient	Chesterfield	65+	All	GI	Regression/EWMA 1.2	0.004	11	4.75	45	16	99.452
Time Series	09Sep08	Over-the-Counter Chain 2	Chesterfield	All	All	GI	Regression/EWMA 1.2	0.018	23	13.143	23	14	69.315
Time Series	09Sep08	ER by Patient	Chickahominy	5-17	All	GI	Regression/EWMA 1.2	0.002	6	2.074	22	2	92.329
Time Series	09Sep08	ER by Patient	Danville	5-17	All	GI	Regression/EWMA 1.2	0.001	1	0.033	13	2	21.37
Time Series	09Sep08	ER by Patient	Hampton	5-17	All	GI	Regression/EWMA 1.2	0.017	4	1.786	25	10	85.753
Time Series	09Sep08	ER by Patient	Hampton	All	All	GI	Regression/EWMA 1.2	0.042	28	19.429	26	25	100
Time Series	09Sep08	ER by Patient	Henrico	5-17	All	GI	Regression/EWMA 1.2	0.006	7	3.821	20	7	99.452
Time Series	09Sep08	ER by Patient	Loudoun	65+	All	GI	Regression/EWMA 1.2	0.008	6	2.286	24	9	93.151
Time Series	09Sep08	ER by Patient	New River	65+	All	GI	Regression/EWMA 1.2	0.004	8	3.407	35	12	95.89
Time Series	09Sep08	ER by Patient	Peninsula	45-64	All	GI	Regression/EWMA 1.2	0.034	14	8.357	33	20	100
Time Series	09Sep08	ER by Patient	Piedmont	5-17	All	GI	Regression/EWMA 1.2	0.017	4	1.2	26	16	75.616
Time Series	09Sep08	ER by Patient	Piedmont	All	All	GI	Regression/EWMA 1.2	0.004	21	13.5	39	5	100
Time Series	09Sep08	ER by Patient	Portsmouth	18-44	All	GI	Regression/EWMA 1.2	0.024	14	8.571	27	14	99.726
Time Series	09Sep08	ER by Patient	Prince William	5-17	All	GI	Regression/EWMA 1.2	0.032	10	4.889	31	19	99.726
Time Series	09Sep08	ER by Patient	Rappahannock Rapidan	0-4	All	GI	Regression/EWMA 1.2	0	6	1.095	26	1	72.329
Time Series	09Sep08	ER by Patient	Richmond	65+	All	GI	Regression/EWMA 1.2	0.028	5	2.357	35	21	89.589
Time Series	09Sep08	ER by Patient	West Piedmont	5-17	All	GI	Regression/EWMA 1.2	0.03	4	1.083	20	12	67.397
Time Series	09Sep08	ER by Patient	Alexandria	45-64	All	Loc Les	Regression/EWMA 1.2	0.024	1	0.357	21	14	21.37

Time Series	Date	ER by Patient	Location	Age	Sex	Category	Regression/EWMA 1.2	Value 1	Value 2	Value 3	Value 4	Value 5	
Time Series	09Sep08	ER by Patient	Alexandria	45-64	All	Loc_Les	Regression/EWMA 1.2	0.024	1	0.357	21	14	21.37
Time Series	09Sep08	ER by Patient	Alleghany	5-17	All	Loc_Les	Regression/EWMA 1.2	0.023	1	0.429	17	11	17.808
Time Series	09Sep08	ER by Patient	Central Virginia	18-44	All	Loc_Les	Regression/EWMA 1.2	0.013	5	1.821	26	14	78.904
Time Series	09Sep08	ER by Patient	Central Virginia	All	All	Loc_Les	Regression/EWMA 1.2	0.042	6	3.643	30	29	91.233
Time Series	09Sep08	ER by Patient	Chesterfield	All	All	Loc_Les	Regression/EWMA 1.2	0.018	13	8	38	23	98.904
Time Series	09Sep08	ER by Patient	Chesterfield	18-44	All	Loc_Les	Regression/EWMA 1.2	0.001	10	4.536	39	3	93.973
Time Series	09Sep08	ER by Patient	Chickahominy	65+	All	Loc_Les	Regression/EWMA 1.2	0.032	1	0.214	13	10	17.534
Time Series	09Sep08	ER by Patient	OTHER_REGION	45-64	All	Loc_Les	Regression/EWMA 1.2	0.014	4	1.308	22	7	64.932
Time Series	09Sep08	ER by Patient	Portsmouth	65+	All	Loc_Les	Regression/EWMA 1.2	0.019	1	0.036	13	5	13.973
Time Series	09Sep08	ER by Patient	West Piedmont	18-44	All	Loc_Les	Regression/EWMA 1.2	0.008	4	1.231	21	7	55.342
Time Series	09Sep08	ER by Patient	Western Tidewater	45-64	All	Loc_Les	Regression/EWMA 1.2	0.017	2	0.25	21	11	19.452
Time Series	09Sep08	ER by Patient	Western Tidewater	All	All	Loc_Les	Regression/EWMA 1.2	0.01	4	1.125	16	6	65.205
Time Series	09Sep08	ER by Patient	Alexandria	18-44	All	Lymph	Regression/EWMA 1.2	0.046	1	0.071	13	12	16.164
Time Series	09Sep08	ER by Patient	Alexandria	All	All	Lymph	Regression/EWMA 1.2	0.029	1	0.179	24	16	23.836
Time Series	09Sep08	ER by Patient	Chickahominy	0-4	All	Lymph	Regression/EWMA 1.2	0.025	1	0.071	1	1	1.918
Time Series	09Sep08	ER by Patient	Henrico	5-17	All	Lymph	Regression/EWMA 1.2	0.017	1	0.036	17	13	16.986
Time Series	09Sep08	ER by Patient	Peninsula	18-44	All	Lymph	Regression/EWMA 1.2	0.012	2	0.96	22	9	65.753
Time Series	09Sep08	ER by Patient	Prince William	5-17	All	Lymph	Regression/EWMA 1.2	0.002	2	0.071	7	2	10.685
Time Series	09Sep08	ER by Patient	Prince William	All	All	Lymph	Regression/EWMA 1.2	0.003	3	0.857	26	4	56.438
Time Series	09Sep08	ER by Patient	Henrico	65+	All	Neuro	Regression/EWMA 1.2	0.001	4	0.893	20	2	60.274
Time Series	09Sep08	ER by Patient	Portsmouth	All	All	Neuro	Regression/EWMA 1.2	0.003	3	0.5	17	3	61.37
Time Series	09Sep08	ER by Patient	Portsmouth	45-64	All	Neuro	Regression/EWMA 1.2	0.003	2	0.179	26	4	38.63
Time Series	09Sep08	ER by Patient	Alleghany	5-17	All	Rash	Regression/EWMA 1.2	0.008	2	0.5	33	7	40.548
Time Series	09Sep08	ER by Patient	Central Virginia	18-44	All	Rash	Regression/EWMA 1.2	0	9	2.13	30	1	77.26
Time Series	09Sep08	ER by Patient	Central Virginia	All	All	Rash	Regression/EWMA 1.2	0	14	4.821	32	2	96.438
Time Series	09Sep08	ER by Patient	Central Virginia	0-4	All	Rash	Regression/EWMA 1.2	0.039	3	1.25	23	21	65.205
Time Series	09Sep08	ER by Patient	Chickahominy	45-64	All	Rash	Regression/EWMA 1.2	0.005	4	1.269	26	4	64.384
Time Series	09Sep08	ER by Patient	Crater	0-4	All	Rash	Regression/EWMA 1.2	0.016	1	0.036	18	11	18.63
Time Series	09Sep08	ER by Patient	Hampton	18-44	All	Rash	Regression/EWMA 1.2	0.003	3	1.115	19	6	71.233
Time Series	09Sep08	ER by Patient	Henrico	All	All	Rash	Regression/EWMA 1.2	0.036	24	14.179	34	22	100
Time Series	09Sep08	ER by Patient	Henrico	65+	All	Rash	Regression/EWMA 1.2	0.001	3	0.792	29	1	63.288
Time Series	09Sep08	ER by Patient	Loudoun	45-64	All	Rash	Regression/EWMA 1.2	0.037	2	0.5	23	20	27.671
Time Series	09Sep08	ER by Patient	Thomas Jefferson	5-17	All	Rash	Regression/EWMA 1.2	0.014	2	0.393	23	9	32.877
Time Series	09Sep08	ER by Patient	Thomas Jefferson	65+	All	Rash	Regression/EWMA 1.2	0.045	1	0.143	8	8	7.397
Time Series	09Sep08	ER by Patient	Thomas Jefferson	All	All	Rash	Regression/EWMA 1.2	0.01	5	2	29	10	84.11

Time Series	Date	Category	Region	Age Group	Gender	Response	Model	P-Value	Count	Mean	SD	Min	Max
Time Series	09Sep08	ER by Patient	Alleghany	0-4	All	Resp	Regression/EWMA 1.2	0.007	4	0.821	26	13	74.795
Time Series	09Sep08	ER by Patient	Arlington	65+	All	Resp	Regression/EWMA 1.2	0.012	5	1.571	18	10	91.233
Time Series	09Sep08	ER by Patient	Arlington	5-17	All	Resp	Regression/EWMA 1.2	0.01	2	0.321	28	11	46.027
Time Series	09Sep08	ER by Patient	Central Shenandoah	18-44	All	Resp	Regression/EWMA 1.2	0.011	2	0.5	29	8	47.945
Time Series	09Sep08	ER by Patient	Central Shenandoah	0-4	All	Resp	Regression/EWMA 1.2	0.025	1	0.071	12	9	12.055
Time Series	09Sep08	ER by Patient	Central Virginia	0-4	All	Resp	Regression/EWMA 1.2	0.001	10	3.333	33	1	97.26
Time Series	09Sep08	ER by Patient	Central Virginia	18-44	All	Resp	Regression/EWMA 1.2	0.026	22	12	34	17	100
Time Series	09Sep08	ER by Patient	Central Virginia	65+	All	Resp	Regression/EWMA 1.2	0.003	11	5.929	33	9	99.726
Time Series	09Sep08	ER by Patient	Central Virginia	All	All	Resp	Regression/EWMA 1.2	0	56	30.929	41	1	100
Time Series	09Sep08	ER by Patient	Chesapeake	All	All	Resp	Regression/EWMA 1.2	0.038	42	33.107	52	42	100
Time Series	09Sep08	ER by Patient	Chesapeake	5-17	All	Resp	Regression/EWMA 1.2	0.007	6	3.25	39	20	98.63
Time Series	09Sep08	Over-the-Counter Chain 2	Chesapeake	All	All	Resp	Regression/EWMA 1.2	0.047	158	121.75	25	24	69.315
Time Series	09Sep08	Over-the-Counter Chain 2	Chesterfield	All	All	Resp	Regression/EWMA 1.2	0.012	78	53.5	16	12	69.315
Time Series	09Sep08	ER by Patient	Chesterfield	All	All	Resp	Regression/EWMA 1.2	0.003	50	39.643	49	28	100
Time Series	09Sep08	ER by Patient	Chesterfield	65+	All	Resp	Regression/EWMA 1.2	0.015	11	5.357	51	25	100
Time Series	09Sep08	ER by Patient	Chickahominy	All	All	Resp	Regression/EWMA 1.2	0.043	22	18.107	44	40	100
Time Series	09Sep08	ER by Patient	Chickahominy	45-64	All	Resp	Regression/EWMA 1.2	0.027	9	4.071	36	29	99.452
Time Series	09Sep08	ER by Patient	Crater	All	All	Resp	Regression/EWMA 1.2	0.031	12	6.679	39	31	100
Time Series	09Sep08	ER by Patient	Crater	5-17	All	Resp	Regression/EWMA 1.2	0.024	1	0.321	32	22	52.603
Time Series	09Sep08	ER by Patient	Fairfax	65+	All	Resp	Regression/EWMA 1.2	0.027	17	10.464	32	18	100
Time Series	09Sep08	ER by Patient	Fairfax	All	All	Resp	Regression/EWMA 1.2	0	79	57.893	46	3	100
Time Series	09Sep08	ER by Patient	Fairfax	18-44	All	Resp	Regression/EWMA 1.2	0	37	22.5	40	2	100
Time Series	09Sep08	Over-the-Counter Chain 2	Fairfax	All	All	Resp	Regression/EWMA 1.2	0.003	256	181.893	38	4	69.315
Time Series	09Sep08	Over-the-Counter Chain 2	Hampton	All	All	Resp	Regression/EWMA 1.2	0	96	63.214	34	5	69.315
Time Series	09Sep08	ER by Patient	Hampton	18-44	All	Resp	Regression/EWMA 1.2	0.008	17	8.25	46	15	100
Time Series	09Sep08	ER by Patient	Henrico	18-44	All	Resp	Regression/EWMA 1.2	0.017	33	20.786	44	30	100
Time Series	09Sep08	ER by Patient	Henrico	All	All	Resp	Regression/EWMA 1.2	0.019	63	46.286	41	30	100
Time Series	09Sep08	ER by Patient	Henrico	5-17	All	Resp	Regression/EWMA 1.2	0.043	6	3.037	39	37	98.904
Time Series	09Sep08	Over-the-Counter Chain 2	Henrico	All	All	Resp	Regression/EWMA 1.2	0.016	51	36.5	33	21	69.315
Time Series	09Sep08	Over-the-Counter Chain 2	Lenowisco	All	All	Resp	Regression/EWMA 1.2	0.009	15	9.607	31	12	69.041
Time Series	09Sep08	Over-the-Counter Chain 3	Lenowisco	All	All	Resp	Regression/EWMA 1.2	0.018	42	22.321	25	15	68.219
Time Series	09Sep08	Over-the-Counter Chain 2	Lord Fairfax	All	All	Resp	Regression/EWMA 1.2	0.024	45	31.607	30	18	69.315
Time Series	09Sep08	Over-the-Counter Chain 2	Loudoun	All	All	Resp	Regression/EWMA 1.2	0.035	57	50.5	31	24	69.315
Time Series	09Sep08	ER by Patient	Loudoun	5-17	All	Resp	Regression/EWMA 1.2	0.011	3	0.536	25	12	64.658
Time Series	09Sep08	ER by Patient	New River	5-17	All	Resp	Regression/EWMA 1.2	0	5	0.536	26	1	74.521

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Time Series	04Sep08	ER by Patient	Rappahannock	5-17	All	Loc_Les	Regression/EWMA 1.2	0.012	2	0.357	19	15	26.575
Time Series	04Sep08	ER by Patient	Roanoke	0-4	All	Loc_Les	Regression/EWMA 1.2	0.014	2	0.286	15	12	17.534
Time Series	04Sep08	ER by Patient	Thomas Jefferson	45-64	All	Loc_Les	Regression/EWMA 1.2	0.012	1	0.179	19	9	24.932
Time Series	04Sep08	ER by Patient	Western Tidewater	45-64	All	Loc_Les	Regression/EWMA 1.2	0.007	1	0.143	20	7	19.178
Time Series	04Sep08	ER by Patient	Piedmont	18-44	All	Lymph	Regression/EWMA 1.2	0.031	1	0.107	16	15	19.726
Time Series	04Sep08	ER by Patient	Piedmont	All	All	Lymph	Regression/EWMA 1.2	0.018	1	0.179	22	13	35.89
Time Series	04Sep08	ER by Patient	Rappahannock	18-44	All	Lymph	Regression/EWMA 1.2	0.034	2	0.393	27	24	26.575
Time Series	04Sep08	ER by Patient	Rappahannock	All	All	Lymph	Regression/EWMA 1.2	0.036	2	0.571	30	20	44.11
Time Series	04Sep08	ER by Patient	Alleghany	65+	All	Neuro	Regression/EWMA 1.2	0.002	2	0.107	20	7	27.397
Time Series	04Sep08	ER by Patient	Norfolk	All	All	Neuro	Regression/EWMA 1.2	0.02	4	2.25	28	15	86.027
Time Series	04Sep08	ER by Patient	Prince William	65+	All	Neuro	Regression/EWMA 1.2	0.031	1	0.357	32	26	30.959
Time Series	04Sep08	ER by Patient	Rappahannock	45-64	All	Neuro	Regression/EWMA 1.2	0	3	0.286	21	2	46.575
Time Series	04Sep08	ER by Patient	Western Tidewater	18-44	All	Neuro	Regression/EWMA 1.2	0.002	2	0.143	4	3	6.301
Time Series	04Sep08	ER by Patient	Western Tidewater	All	All	Neuro	Regression/EWMA 1.2	0	2	0.214	20	1	21.918
Time Series	04Sep08	ER by Patient	Central Virginia	45-64	All	Rash	Regression/EWMA 1.2	0.002	2	0.5	26	3	43.014
Time Series	04Sep08	ER by Patient	Chesapeake	18-44	All	Rash	Regression/EWMA 1.2	0.046	8	4.222	27	27	93.425
Time Series	04Sep08	ER by Patient	Chesterfield	18-44	All	Rash	Regression/EWMA 1.2	0.04	8	5.259	28	25	97.534
Time Series	04Sep08	ER by Patient	Henrico	18-44	All	Rash	Regression/EWMA 1.2	0.044	11	6.179	31	28	98.356
Time Series	04Sep08	ER by Patient	Roanoke	18-44	All	Rash	Regression/EWMA 1.2	0.027	2	1.036	30	20	68.493
Time Series	04Sep08	ER by Patient	Virginia Beach	45-64	All	Rash	Regression/EWMA 1.2	0.014	7	3.429	24	10	95.89
Time Series	04Sep08	ER by Patient	Western Tidewater	0-4	All	Rash	Regression/EWMA 1.2	0.003	2	0.214	20	7	25.753
Time Series	04Sep08	Over-the-Counter Chain 2	Arlington	All	All	Resp	Regression/EWMA 1.2	0.002	130	91.119	23	5	67.945
Time Series	04Sep08	Over-the-Counter Chain 2	Central Shenandoah	All	All	Resp	Regression/EWMA 1.2	0.003	85	59.25	36	12	67.945
Time Series	04Sep08	ER by Patient	Central Virginia	18-44	All	Resp	Regression/EWMA 1.2	0.038	21	11.929	33	27	100
Time Series	04Sep08	ER by Patient	Central Virginia	5-17	All	Resp	Regression/EWMA 1.2	0.004	6	2.154	33	8	89.863
Time Series	04Sep08	ER by Patient	Central Virginia	All	All	Resp	Regression/EWMA 1.2	0.008	38	30.071	40	8	100
Time Series	04Sep08	Over-the-Counter Chain 2	Chickahominy	All	All	Resp	Regression/EWMA 1.2	0.001	52	32.357	26	7	67.945
Time Series	04Sep08	Over-the-Counter Chain 2	Cumberland Plateau	All	All	Resp	Regression/EWMA 1.2	0.001	26	11.929	35	3	67.945
Time Series	04Sep08	ER by Patient	Fairfax	5-17	All	Resp	Regression/EWMA 1.2	0.019	8	5.185	46	20	98.904
Time Series	04Sep08	ER by Patient	Hampton	5-17	All	Resp	Regression/EWMA 1.2	0.034	3	1.577	35	29	88.219
Time Series	04Sep08	ER by Patient	Hampton	0-4	All	Resp	Regression/EWMA 1.2	0.001	6	1.75	38	3	88.493
Time Series	04Sep08	Over-the-Counter Chain 2	Hampton	All	All	Resp	Regression/EWMA 1.2	0.004	73	58.429	29	11	67.945
Time Series	04Sep08	Over-the-Counter Chain 2	Henrico	All	All	Resp	Regression/EWMA 1.2	0.017	42	34.25	31	21	67.945
Time Series	04Sep08	Over-the-Counter Chain 2	Lord Fairfax	All	All	Resp	Regression/EWMA 1.2	0.043	35	28.536	26	25	67.945
Time Series	04Sep08	Over-the-Counter Chain 2	Loudoun	All	All	Resp	Regression/EWMA 1.2	0.023	61	47.821	27	18	67.945
Time Series	04Sep08	Over-the-Counter Chain 2	Mount Rogers	All	All	Resp	Regression/EWMA 1.2	0.008	21	20.107	25	10	67.945

Time Series	04Sep08	Over-the-Counter Chain 2	Loudoun	All	All	Resp	Regression/EWMA 1.2	0.025	61	47.821	27	18	67.945
Time Series	04Sep08	Over-the-Counter Chain 2	Mount Rogers	All	All	Resp	Regression/EWMA 1.2	0.008	31	20.107	35	18	67.945
Time Series	04Sep08	ER by Patient	Mount Rogers	45-64	All	Resp	Regression/EWMA 1.2	0.003	1	0.25	24	6	27.397
Time Series	04Sep08	Over-the-Counter Chain 2	New River	All	All	Resp	Regression/EWMA 1.2	0.004	26	12.393	29	7	67.945
Time Series	04Sep08	Over-the-Counter Chain 2	Norfolk	All	All	Resp	Regression/EWMA 1.2	0.027	93	68.857	32	26	67.945
Time Series	04Sep08	ER by Patient	Norfolk	45-64	All	Resp	Regression/EWMA 1.2	0.038	11	8	54	39	99.452
Time Series	04Sep08	ER by Patient	Norfolk	All	All	Resp	Regression/EWMA 1.2	0.025	42	34.857	54	40	100
Time Series	04Sep08	ER by Patient	Peninsula	All	All	Resp	Regression/EWMA 1.2	0.011	63	46.75	68	38	100
Time Series	04Sep08	ER by Patient	Peninsula	5-17	All	Resp	Regression/EWMA 1.2	0.01	6	3.679	61	32	98.904
Time Series	04Sep08	ER by Patient	Peninsula	0-4	All	Resp	Regression/EWMA 1.2	0.002	8	3.714	58	8	98.356
Time Series	04Sep08	Over-the-Counter Chain 2	Peninsula	All	All	Resp	Regression/EWMA 1.2	0.047	113	86.964	37	36	67.945
Time Series	04Sep08	Over-the-Counter Chain 2	Piedmont	All	All	Resp	Regression/EWMA 1.2	0.005	22	13.536	27	8	67.945
Time Series	04Sep08	Over-the-Counter Chain 2	Portsmouth	All	All	Resp	Regression/EWMA 1.2	0.004	50	31.25	29	9	67.945
Time Series	04Sep08	Over-the-Counter Chain 2	Rappahannock	All	All	Resp	Regression/EWMA 1.2	0	82	54	30	6	67.945
Time Series	04Sep08	ER by Patient	Rappahannock	All	All	Resp	Regression/EWMA 1.2	0.026	32	21.107	33	22	100
Time Series	04Sep08	ER by Patient	Rappahannock	0-4	All	Resp	Regression/EWMA 1.2	0.003	5	1.56	32	8	95.342
Time Series	04Sep08	ER by Patient	Rappahannock Rapidan	45-64	All	Resp	Regression/EWMA 1.2	0.027	5	1.929	32	21	88.767
Time Series	04Sep08	ER by Patient	Rappahannock Rapidan	5-17	All	Resp	Regression/EWMA 1.2	0	8	0.75	21	1	69.589
Time Series	04Sep08	ER by Patient	Rappahannock Rapidan	All	All	Resp	Regression/EWMA 1.2	0.023	16	9.286	31	23	100
Time Series	04Sep08	Over-the-Counter Chain 2	Rappahannock Rapidan	All	All	Resp	Regression/EWMA 1.2	0.026	29	24.571	26	18	67.945
Time Series	04Sep08	Over-the-Counter Chain 2	Richmond	All	All	Resp	Regression/EWMA 1.2	0.001	31	19.143	31	8	67.945
Time Series	04Sep08	ER by Patient	Southside	18-44	All	Resp	Regression/EWMA 1.2	0.005	2	0.286	22	6	27.123
Time Series	04Sep08	ER by Patient	Thomas Jefferson	18-44	All	Resp	Regression/EWMA 1.2	0.027	8	5.893	38	27	100
Time Series	04Sep08	ER by Patient	Virginia Beach	0-4	All	Resp	Regression/EWMA 1.2	0.003	12	4.643	38	8	99.452
Time Series	04Sep08	ER by Patient	Virginia Beach	45-64	All	Resp	Regression/EWMA 1.2	0.046	19	12.357	37	35	100
Time Series	04Sep08	ER by Patient	Virginia Beach	All	All	Resp	Regression/EWMA 1.2	0.043	75	54.179	56	54	100
Time Series	04Sep08	ER by Patient	West Piedmont	5-17	All	Resp	Regression/EWMA 1.2	0.04	2	0.85	27	24	64.384
Time Series	04Sep08	Over-the-Counter Chain 2	Western Tidewater	All	All	Resp	Regression/EWMA 1.2	0.011	39	28.607	26	10	67.945
Time Series	04Sep08	ER by Patient	Arlington	45-64	All	SI_Death	Regression/EWMA 1.2	0.048	1	0.071	6	5	7.945
Time Series	04Sep08	ER by Patient	Central Virginia	65+	All	SI_Death	Regression/EWMA 1.2	0.047	1	0.214	18	18	28.219
Time Series	04Sep08	ER by Patient	Central Virginia	All	All	SI_Death	Regression/EWMA 1.2	0.038	1	0.357	26	22	45.753
Time Series	04Sep08	ER by Patient	Henrico	All	All	SI_Death	Regression/EWMA 1.2	0.024	3	0.75	37	24	57.534
Time Series	04Sep08	ER by Patient	Henrico	65+	All	SI_Death	Regression/EWMA 1.2	0	3	0.25	30	2	32.603
Time Series	04Sep08	ER by Patient	Portsmouth	All	All	SI_Death	Regression/EWMA 1.2	0.031	2	0.464	22	13	49.041
Time Series	04Sep08	ER by Patient	Portsmouth	45-64	All	SI_Death	Regression/EWMA 1.2	0.002	2	0.071	11	1	18.63

Our Usual Way to Focus on Statistical Flags

ESSENCE - Virginia Alert List

https://169.134.198.74/virginia_5/servlet/RS_AlertList?medicalGroupingSystem=ESSENCEsyndromes&startDate=04Sep08&geographySystem=region& Certificate Error

ESSENCE - Virginia Alert List

Region/Syndrome Based Temporal Alerts

Links	Date	Data Source	Region	Age	Sex	Syndrome	Detector	Level	Count	Expected	RareColor	RareLevel	NonZero
Time Series	11Sep08	ER by Patient	New River	All	All	Bot_Like	Regression/EWMA 1.2	0.039	1	0.036	1	1	4.384
Time Series	11Sep08	ER by Patient	New River	45-64	All	Fever	Regression/EWMA 1.2	0.011	2	0.25	26	11	27.671
Time Series	11Sep08	ER by Patient	West Piedmont	5-17	All	Fever	Regression/EWMA 1.2	0.013	1	0.214	17	9	42.74
Time Series	11Sep08	ER by Patient	Crater	18-44	All	GI	Regression/EWMA 1.2	0.009	7	4.407	39	18	98.082
Time Series	11Sep08	ER by Patient	Piedmont	45-64	All	GI	Regression/EWMA 1.2	0.012	6	3.407	24	9	94.521
Time Series	11Sep08	ER by Patient	Piedmont	All	All	GI	Regression/EWMA 1.2	0.007	22	13.75	41	12	100
Time Series	11Sep08	ER by Patient	West Piedmont	5-17	All	GI	Regression/EWMA 1.2	0.018	3	1.042	22	7	67.397
Time Series	11Sep08	ER by Patient	Piedmont	0-4	All	Loc_Les	Regression/EWMA 1.2	0.019	1	0.143	6	4	9.041
Time Series	11Sep08	ER by Patient	Rappahannock	All	All	Lymph	Regression/EWMA 1.2	0.036	2	0.607	31	20	44.11
Time Series	11Sep08	ER by Patient	Crater	0-4	All	Rash	Regression/EWMA 1.2	0.035	1	0.107	19	17	18.904
Time Series	11Sep08	ER by Patient	New River	5-17	All	Resp	Regression/EWMA 1.2	0.006	2	0.607	28	13	74.795
Time Series	11Sep08	ER by Patient	Piedmont	18-44	All	Resp	Regression/EWMA 1.2	0.023	7	4.846	37	24	98.63
Time Series	11Sep08	ER by Patient	Piedmont	All	All	Resp	Regression/EWMA 1.2	0.041	13	11.393	46	39	100
Time Series	11Sep08	ER by Patient	Three Rivers	18-44	All	Resp	Regression/EWMA 1.2	0.035	9	6.786	43	33	100
Time Series	11Sep08	ER by Patient	West Piedmont	5-17	All	Resp	Regression/EWMA 1.2	0.014	3	0.96	26	11	64.11
Time Series	10Sep08	ER by Patient	Chesapeake	18-44	All	Fever	Regression/EWMA 1.2	0.011	5	2.269	34	14	92.603
Time Series	10Sep08	ER by Patient	Chickahominy	65+	All	Fever	Regression/EWMA 1.2	0.047	3	0.821	31	30	58.63
Time Series	10Sep08	ER by Patient	Crater	All	All	Fever	Regression/EWMA 1.2	0.037	6	2.214	47	37	90.411
Time Series	10Sep08	ER by Patient	Crater	18-44	All	Fever	Regression/EWMA 1.2	0.005	3	0.5	41	12	44.11
Time Series	10Sep08	ER by Patient	Fairfax	45-64	All	Fever	Regression/EWMA 1.2	0.036	6	2.815	29	26	91.781
Time Series	10Sep08	Over-the-Counter Chain 2	Henrico	All	All	Fever	Regression/EWMA 1.2	0.017	4	1.5	28	19	60.548
Time Series	10Sep08	Over-the-Counter Chain 2	New River	All	All	Fever	Regression/EWMA 1.2	0.026	3	0.821	29	24	44.11
Time Series	10Sep08	ER by Patient	Peninsula	5-17	All	Fever	Regression/EWMA 1.2	0.014	7	2.429	36	14	95.616
Time Series	10Sep08	ER by Patient	Piedmont	0-4	All	Fever	Regression/EWMA 1.2	0.027	5	1.87	28	21	74.247
Time Series	10Sep08	Over-the-Counter Chain 2	Rappahannock	All	All	Fever	Regression/EWMA 1.2	0.019	6	3.346	24	18	67.123
Time Series	10Sep08	ER by Patient	Roanoke	65+	All	Fever	Regression/EWMA 1.2	0.001	2	0.107	13	2	14.795
Time Series	10Sep08	ER by Patient	West Piedmont	5-17	All	Fever	Regression/EWMA 1.2	0.003	2	0.214	17	4	42.74
Time Series	10Sep08	ER by Patient	West Piedmont	All	All	Fever	Regression/EWMA 1.2	0.019	5	2.042	19	8	89.315
Time Series	10Sep08	ER by Patient	Western Tidewater	All	All	Fever	Regression/EWMA 1.2	0.039	5	2.519	31	27	95.342
Time Series	10Sep08	ER by Patient	Central Virginia	0-4	All	GI	Regression/EWMA 1.2	0.049	3	1.174	28	27	95.616
Time Series	10Sep08	Over-the-Counter Chain 2	Chesterfield	All	All	GI	Regression/EWMA 1.2	0.028	17	13.036	24	15	69.589
Time Series	10Sep08	ER by Patient	Chesterfield	5-17	All	GI	Regression/EWMA 1.2	0.04	8	4.407	35	29	99.178
Time Series	10Sep08	ER by Patient	Chickahominy	5-17	All	GI	Regression/EWMA 1.2	0.008	4	2.111	23	7	92.329
Time Series	10Sep08	ER by Patient	Chickahominy	65+	All	GI	Regression/EWMA 1.2	0.039	6	3.481	38	31	96.712

Internet 100%

Rudimentary Example: Alert List Filter (ALF)

- Automated way to “digest” many red and yellow statistical flags
- Scores each alert based on several criteria (number of visits, “density”, and “recency”)
- Ranks top 20 flags with highest scores and presents them to the user in a table
- Allows user to visualize the last 7-8 days of syndromic flags with some inferred importance

Alert List Filter (ALF) Example (Cont' d)

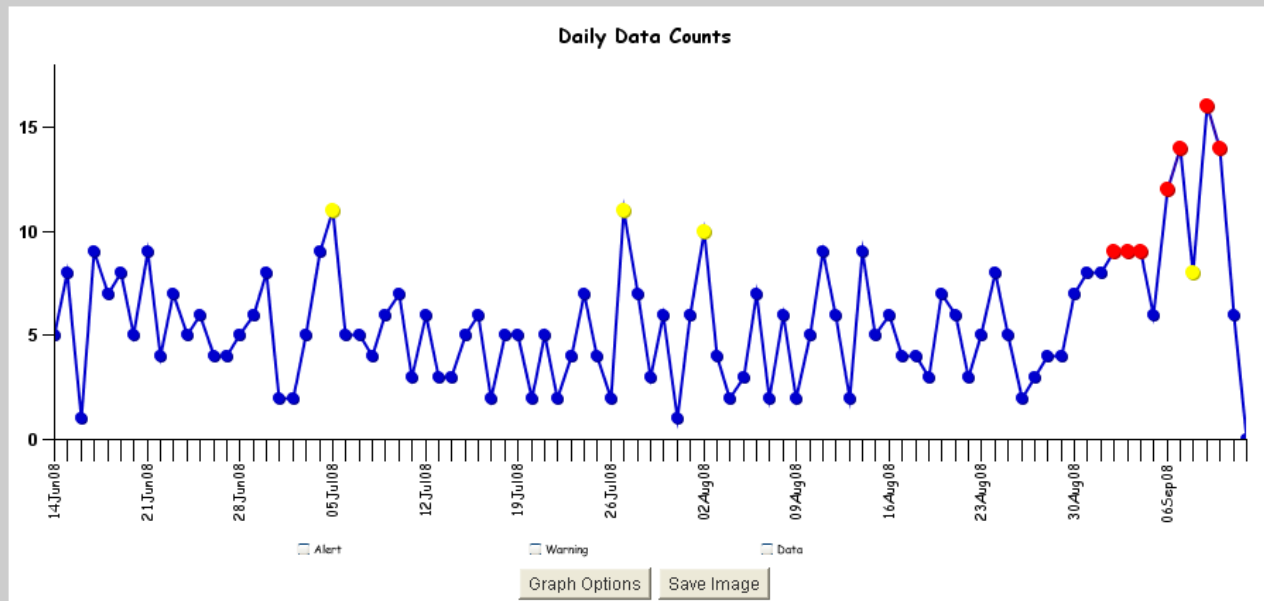
- Instead of focusing solely on the red flag with the greatest number of visits, ALF directed the analyst's attention to an otherwise buried potential cluster of respiratory illness in kids
- The analyst was then able to visualize this “lost” potential cluster by querying the system using elements proposed by the filter

Description

Data Source	ER by Patient
Geography System	Region
Region	All
Medical Grouping System	Syndrome
Syndrome	Resp
Medical Subgrouping	Influenza, LowerRespiratoryInfection, Pneumonia
Age	0-4, 5-17
Sex	All
Detector	Regression/EWMA 1.2
Start Date	14Jun08
End Date	12Sep08

Configuration Options

Graph



Graph Options Save Image

[\[Enhanced Graph \(requires java 1.4.x plug-in\) \]](#) [Basic Graph](#)

Popup Options

Decision Support Challenges

- Each level of complexity is a potential barrier to the practitioner's ability to find the actionable event
- Robust logic must be discovered that will propose useful response paths thereby limiting complexity for the surveillance system user

Decision Support Challenges (Cont' d)

- In order to accomplish this, work needs to be done to discover:
 - the **likely events** in different data sources
 - how information can be harvested **from every available element** of the data
 - how **meaningful differences** (not just statistically significant) are detected
 - the suggested **response protocols**
- This information needs to inform systems so they can assist practitioners in quickly making sense of masses of data