



Behavioral Health Surveillance:

Using Automated ICD9 Codes and Pharmacy Transactions to Monitor the Mental Health of Populations

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What is ESSENCE?



- **Began receiving Ambulatory Data System (ADS) information from military treatment facilities (MTFs) in Dec 99 for the National Capital Area (NCA)**
- **7 syndrome groups for potential infectious diseases based on ICD-9-CM codes**
- **Expanded to all MTFs that submit data to ADS in September 2001**
 - **121 Army, 110 Navy, 80 AF and 2 CG installations monitored – grouped into 179 geographic clusters**
- **Information available via secure website**

- **Requests from other medical groups to use outpatient data for surveillance**
 - Injury rates
 - Chronic diseases
 - Mental health
- **Many don't require real-time access, probably better to have more accurate data**
 - Although still useful for a warning to investigate rising cases
- **Mental health could benefit from real-time information**
 - Outbreaks of mental illness could be mitigated by community outreach

- **Was there a significant increase in the number of outpatient behavioral health clinic visits for children or adults that were coded according to the identified diagnostic syndrome groups?**
 - Diagnostic groups created using ICD9 codes
 - Determine weekly number of outpatient visits to behavioral health clinics in Washington, DC area from 11 Sep 01 to 9 Feb 02
 - Compared weekly visits for specific diagnostic groups with previous 2 years visits during the same time period using Wilcoxon Rank Sum Test ($p < .01$)

ICD9 Syndrome Groups

Syndrome Group	# Codes
Depression	18
Anxiety	8
Acute Stress Reactions	2
Substance Abuse (ETOH and Drugs)	98
Adjustment Reactions	6
Family Problems, Abuse	25
Sleep Disorders	10
Screening BH and SA	13
Counseling BH and SA	4
Other V Codes (Life Circumstance)	10

Queried

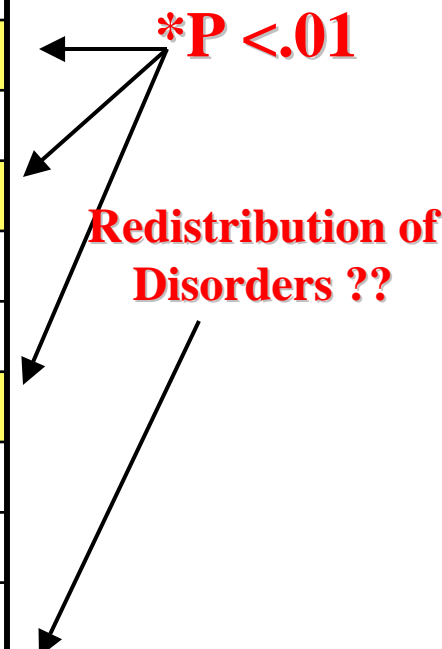
Not Queried

Query Methods

Syndrome Group	Patient Category	Median Weekly Visits	% Change
Depressive DO	Adult	456	-10%
	Children	82	-7%
Anxiety DO	Adult	130	+12%
	Children	35	+46%*
Acute Stress/PTSD	Adult	46	+6%
	Children	6	+50%*
ETOH/SA	Adult	272	-13%
	Children	10	-43%
Adjustment Reaction	Adult	72	+18%*
	Children	29	+29%
Marital/Family	Adult	224	-16%
	Children	32	-32%
Total Outpatient Visits	Adult	2238	0%
	Children	482	-2%

***P <.01**

Redistribution of Disorders??



- No significant increase in total visits to behavioral health clinics, but increase in visits for anxiety disorders and acute stress reactions in children and adjustment reactions in adults
- With underreporting of mental health conditions, is there a better way to do surveillance?

Hypothesis



- **Many mental health visits to providers occur outside of standard behavioral health clinics**
 - **Routinely seen in ERs, family practice clinics, etc.**
- **Visit may initially be scheduled for other medical conditions and may not get recorded with appropriate ICD9 codes**
- **These visits may still result in the prescription of behavioral modifying medications**
- **Therefore, it may be possible to more accurately track psychiatric illness in a population by monitoring mental health drug prescriptions**

Query Methods

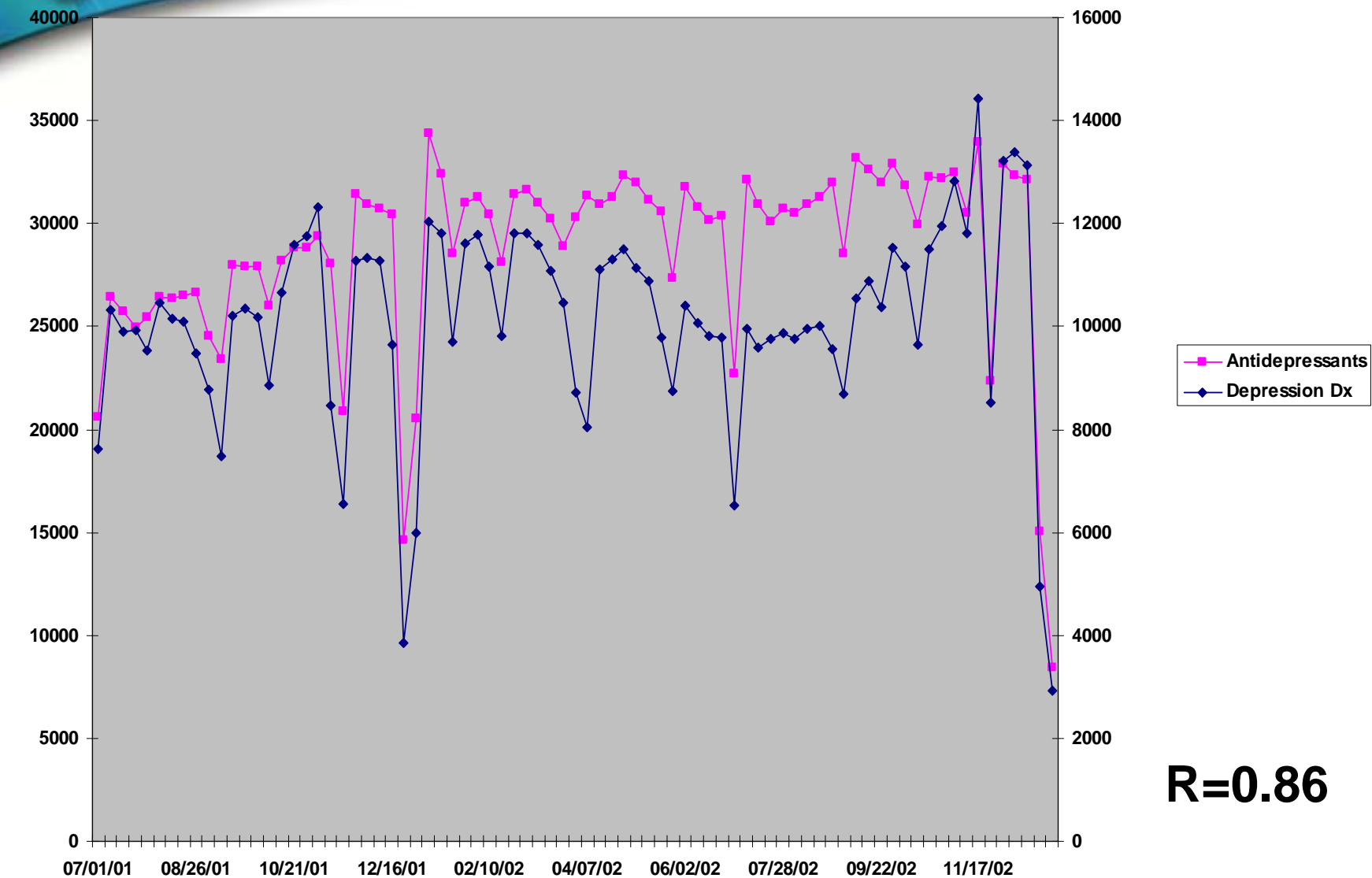
Category	#GCN3	# Drugs
Anxiolytics	68	13
Antidepressants	166	23
Sedative-Hypnotics	27	9
Combination	3	1
OTC Sleep Aids	17	4

Queried

Not Queried

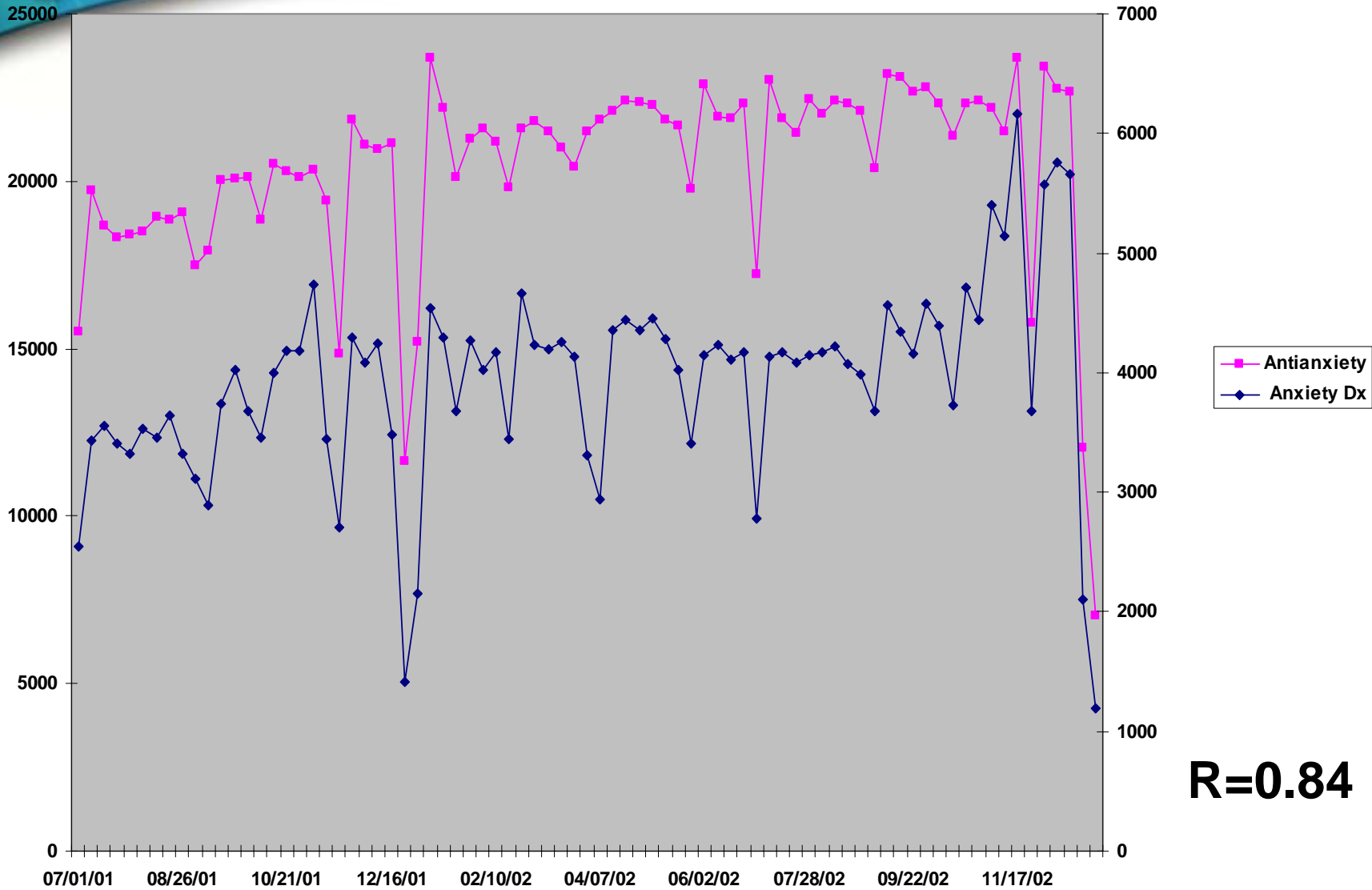
- **Data is available for all US military beneficiaries worldwide**
 - **Starting from Jul 01 for pharmacy data**
- **Determine trend for depression and anxiety diagnoses**
- **Correlate mental health diagnoses and prescription drug use**
- **Determine frequency of patients prescribed psychiatric drugs but not diagnosed with a mental health condition**

Results - Depression



R=0.86

Results - Anxiety



R=0.84

Correlation Between Clinics



- Total number of patients from Jul 01 through May 03 with a prescription for depression medications who had an outpatient visit the same day or the day before

Clinic	# patients	# (%) with depression dx	# (%) with other MH dx	# (%) with other dx
BH	179,500	86,500 (48.1)	70,005 (39.0)	22,995 (12.9)
PC	632,575	143,666 (22.7)	66,432 (10.5)	422,477 (66.8)
Other	99,808	3,042 (3.0)	1,998 (2.0)	99,808 (95.0)

Correlation Between Clinics



- Total number of patients from Jul 01 through May 03 with a prescription for antianxiety medications who had an outpatient visit the same day or the day before

Clinic	# patients	# (%) with anxiety dx	# (%) with other MH dx	# (%) with other dx
BH	46,710	13,177 (28.2)	26,502 (56.7)	7,031 (15.1)
PC	407,392	40,224 (9.9)	25,283 (6.2)	341,865 (83.9)
Other	58,280	248 (0.4)	746 (1.3)	57,286 (98.3)

Top 10 Regular ICD9 Codes

- **For patients prescribed anti-depressants but without a diagnosis of depression**

ICD9	Diagnosis	Count (%)
401.9/401.1	Essential Hypertension	27,769 (6.5)
784.0	Headache	12,465 (2.9)
250.00/250.02	Type II Diabetes	12,314 (2.9)
724.2	Lumbago	11,342 (2.7)
272.4	Hyperlipidemia	9,568 (2.3)
346.90	Migraine	7,680 (1.8)
729.1	Myalgia/myositis	7,123 (1.7)
530.81	Esophageal Reflux	6,144 (1.4)
477.9	Allergic Rhinitis	6,048 (1.4)
780.52	Insomnia	5,503 (1.3)

Top 10 V ICD9 Codes



- **For patients prescribed anti-depressants but without a diagnosis of depression**

ICD9	Diagnosis	Count (%)
V65.49/V65.40	Counseling	42,829 (10.1)
V68.1	Issue Repeat Prescription	38,289 (4.2)
V72.3	Gynecologic Exam	15,156 (3.6)
V70.0	Routine Medical Exam	10,675 (2.5)
V67.59/V67.9	Follow-up Exam	9,369 (2.2)
V68.9/V68.89	Administrative Encounter	8,531 (2.0)
V26.4	Procreative Management Counseling	5,327 (1.3)
V70.5	Subpopulation Health Exam	3,743 (0.9)
V15.82	History of Tobacco Use	3,604 (0.8)
V57.1	Physical Therapy	3,091 (0.7)

Top 10 ICD9 Codes

- **For patients prescribed anti-anxiety medication but without a diagnosis of anxiety**

ICD9	Diagnosis	Count (%)
692.9/691.8	Dermatitis –Atopic and Not Specified	31,718 (8.3)
724.2/724.5	Lumbago and Backache	21,621 (5.6)
401.9/401.1	Essential Hypertension	14,326 (3.7)
782.1	Rash	13,228 (3.4)
465.9	Upper Respiratory Infection	6,165 (1.6)
708.9	Urticaria	5,941(1.5)
784.0	Headache	5,732 (1.5)
367.1	Myopia	4,923 (1.3)
477.9	Allergic Rhinitis	4,892 (1.3)
272.4	Hyperlipidemia	4,245 (1.1%)

Top 10 V ICD9 Codes

- **For patients prescribed anti-anxiety medication but without a diagnosis of anxiety**

ICD9	Diagnosis	Count (%)
V65.49/V65.40	Counseling	24,060 (6.3)
V68.1	Issue Repeat Prescription	17,392 (4.2)
V67.59/V67.9	Follow-up Exam	6,909 (1.8)
V70.0	Routine Medical Exam	6,683 (1.7)
V68.89/V68.9	Administrative Encounter	5,782 (1.5)
V72.3	Gynecological Exam	4,534 (1.2)
V26.4	Procreative Management Counseling	4,404 (1.1)
V25.2	Sterilization	3,655 (1.0)
V57.1	Physical Therapy	2,896 (0.8)
V70.5	Subpopulation Health Exam	2,404 (0.6)

Conclusions



- **Prescriptions of anti-depressants and anti-anxiety medications can be used as a surrogate to track the mental health of a community**
- **May be more sensitive since many psychiatric patients are seen outside of behavioral health clinics and may not get an accurate diagnosis recorded, but still have medication prescribed**
- **Limitations include dual use of many medications**

Does It Work?



- **Recent stressors in military beneficiary populations**
- **Cannot survey deployed forces, but can monitor beneficiaries at fixed installations**
- **Look at changes before and after Operation Iraqi Freedom (OIF) in diagnoses and prescriptions**

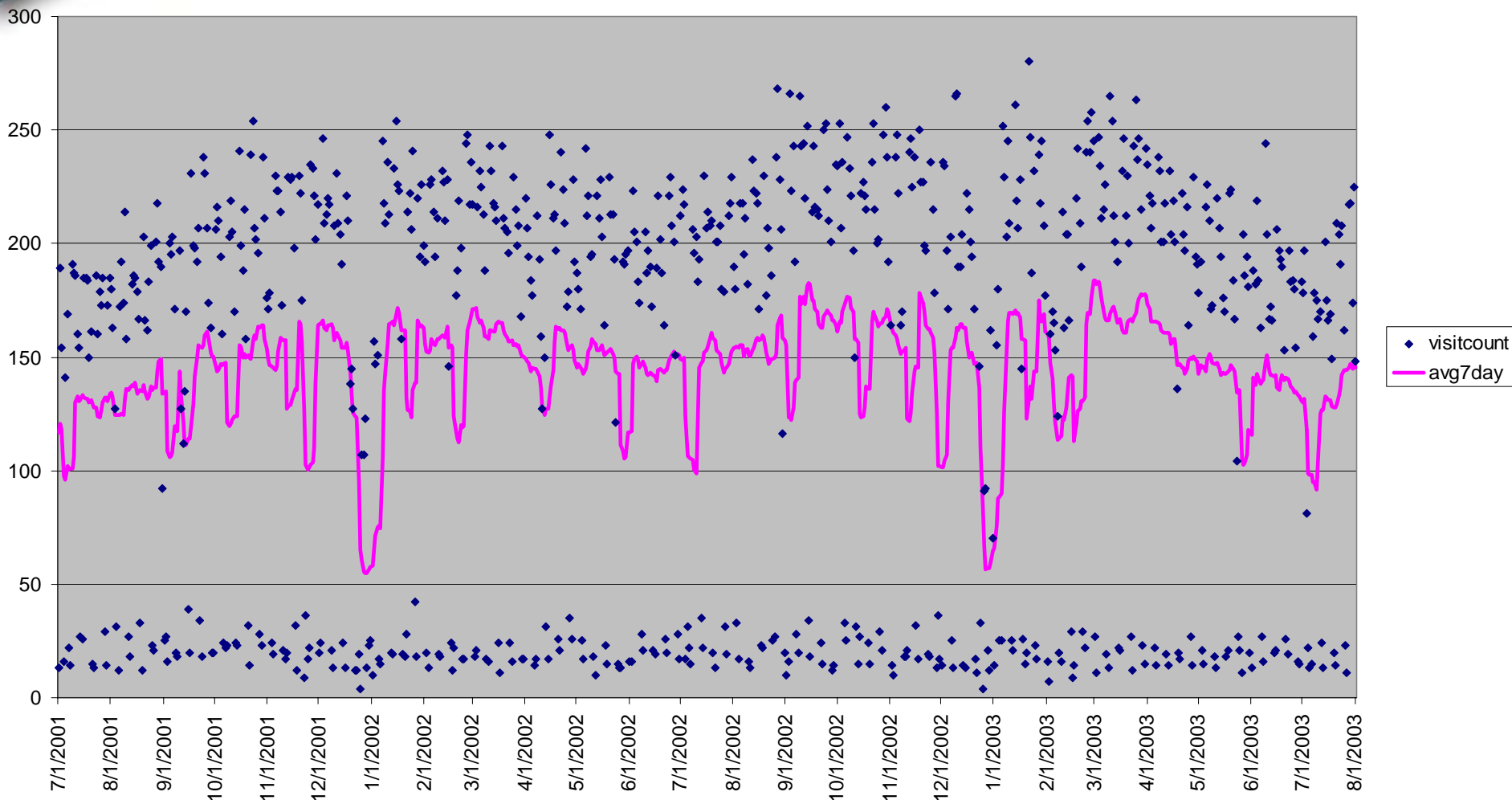
- Study population: Tricare enrollees
 - ADS: A person seeking care from a military treatment Tricare facility diagnosed with depression or anxiety
 - PDTS: A person filling a prescription at a Tricare pharmacy for anti-anxiety or anti-depression drugs
- Study period: Jul. 1, 2001 to Aug. 31, 2003
- Analyzed all visits/prescriptions as well as first time for this diagnoses or prescription

OIF Timeline

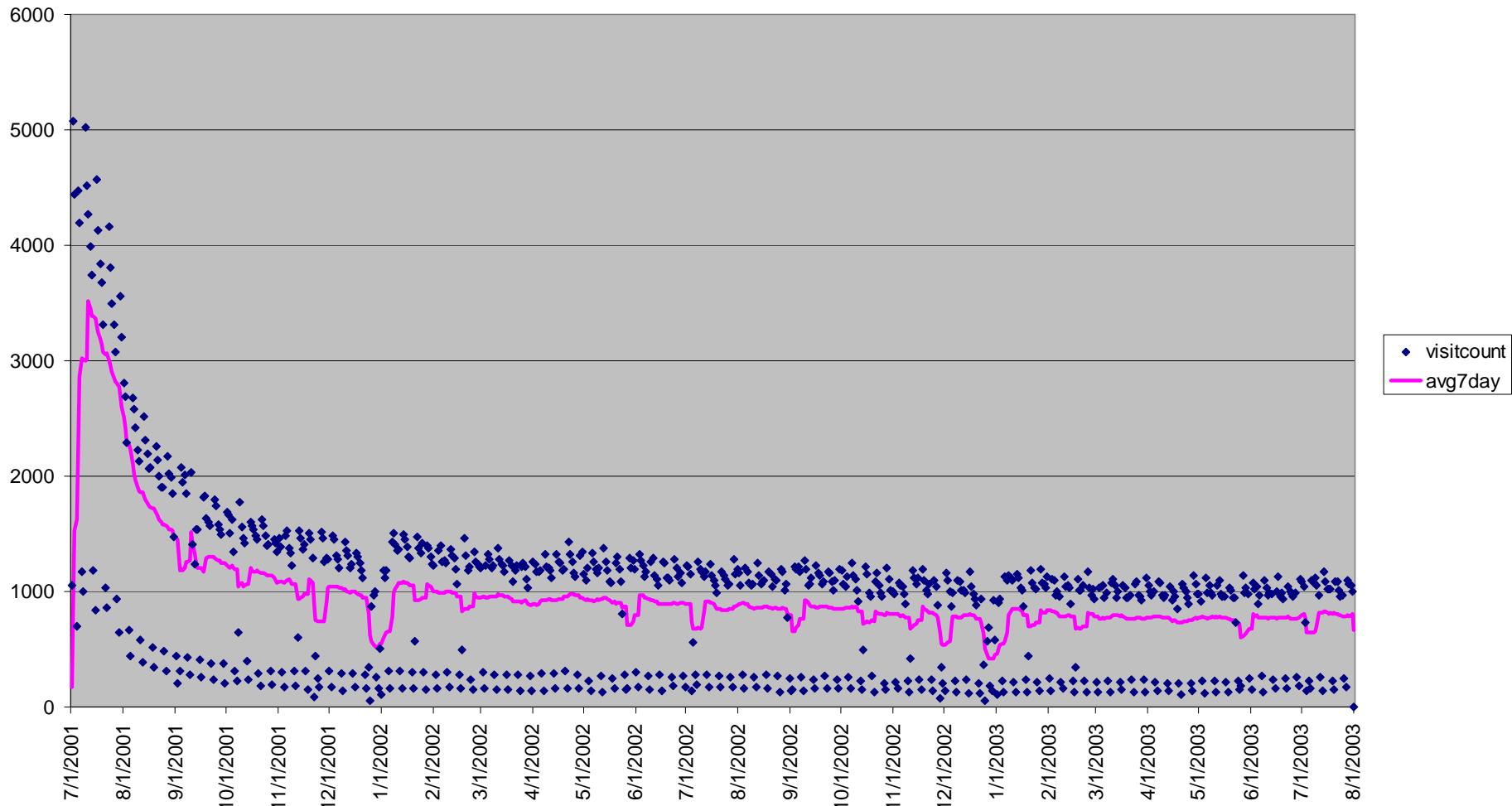


- Oct. 16, 2002: President Bush signs resolution authorizing US Force against Hussein
 - http://www.defenselink.mil/news/Oct2002/n10162002_200210163.html
- Jan. 7, 2003: US increasing troops in Gulf
 - http://www.defenselink.mil/news/Jan2003/n01072003_200301072.html
- Jan. 9, 2003: DoD announced that thousands of American service members are deploying to the USCENTCOM. Army's 16,500 soldiers of 3rd Infantry Division largest unit to deploy (from Ft. Stewart and Ft. Benning, GA).
 - <http://www.transcom.mil/pa/body.cfm?relnumber=030108-1>
- Feb. 8, 2003: Civil reserve air fleet Stage I activation announced
 - http://www.defenselink.mil/news/Feb2003/b02082003_bt064-03.html
- Mar. 17, 2003: President Bush gives S. Hussein 48 hours to leave (arms inspectors evacuate)
- Mar. 19, 2003: Operation Shock and Awe – missiles hit Baghdad targets
 - http://www.washingtonpost.com/wp-srv/world/iraq/maps/review/reviewMap_031903.htm
- May 1, 2003: President Bush declared end to major combat operations
- Jul. 15, 2003: Marine soldiers will be home by September, DoD Official says
 - http://www.defenselink.mil/news/Jul2003/n07152003_200307154.html
- Jul. 24, 2003: Officials announce plan for Iraq troop rotations into 2004
 - http://www.defenselink.mil/news/Jul2003/n07242003_200307241.html

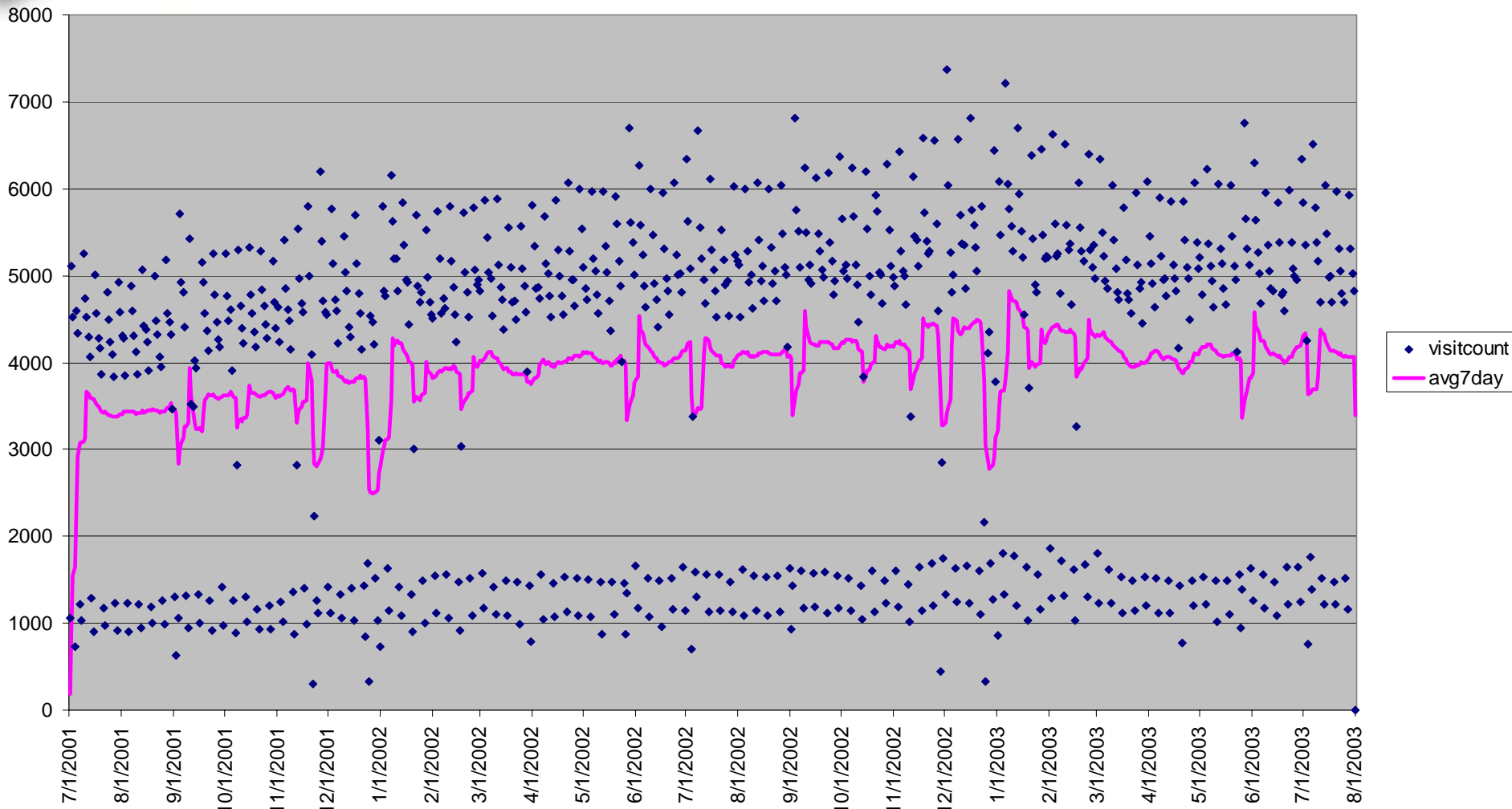
New Anxiety Visits



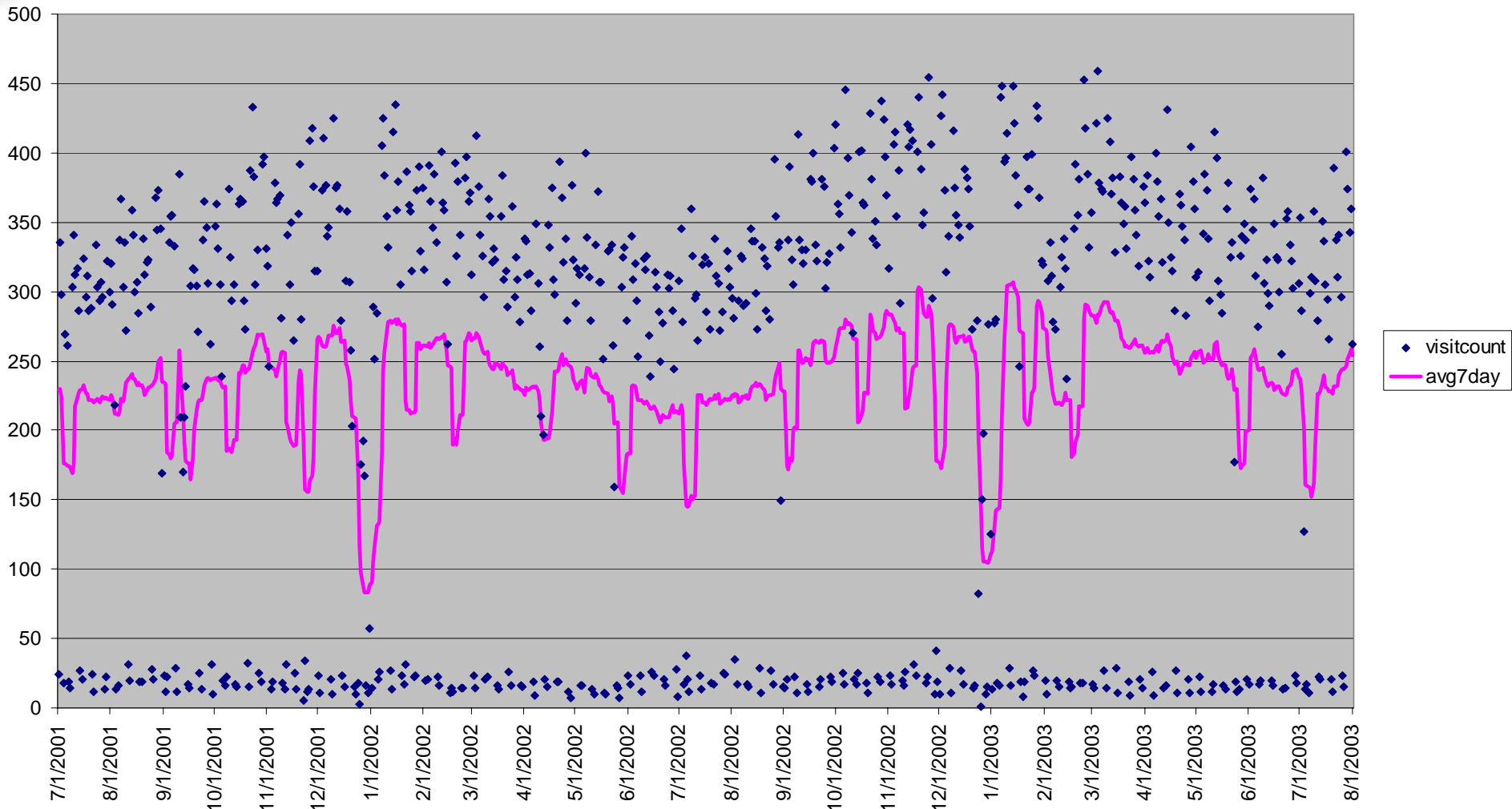
New Anxiolytic Prescriptions



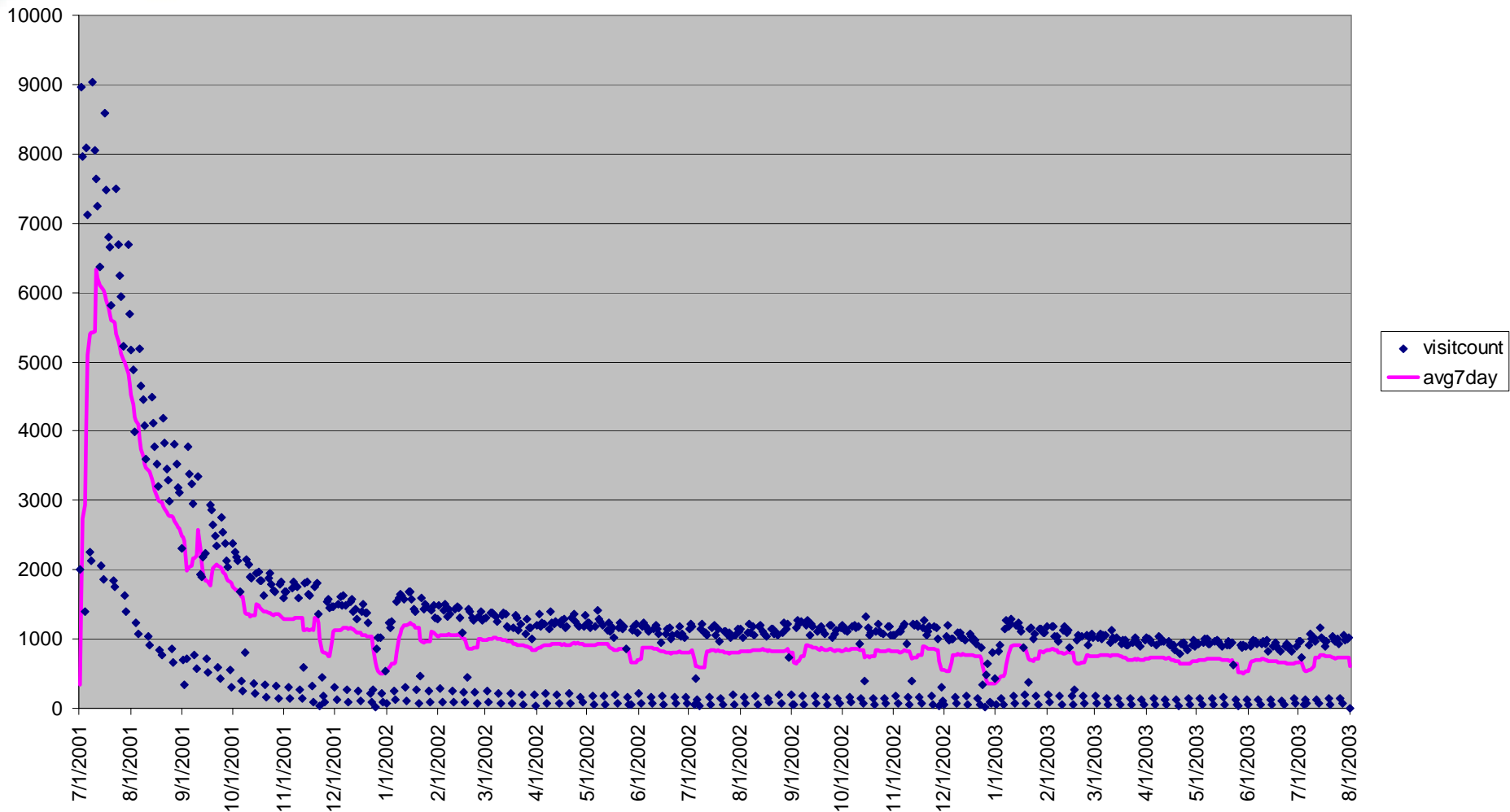
All Anxiolytic Prescriptions



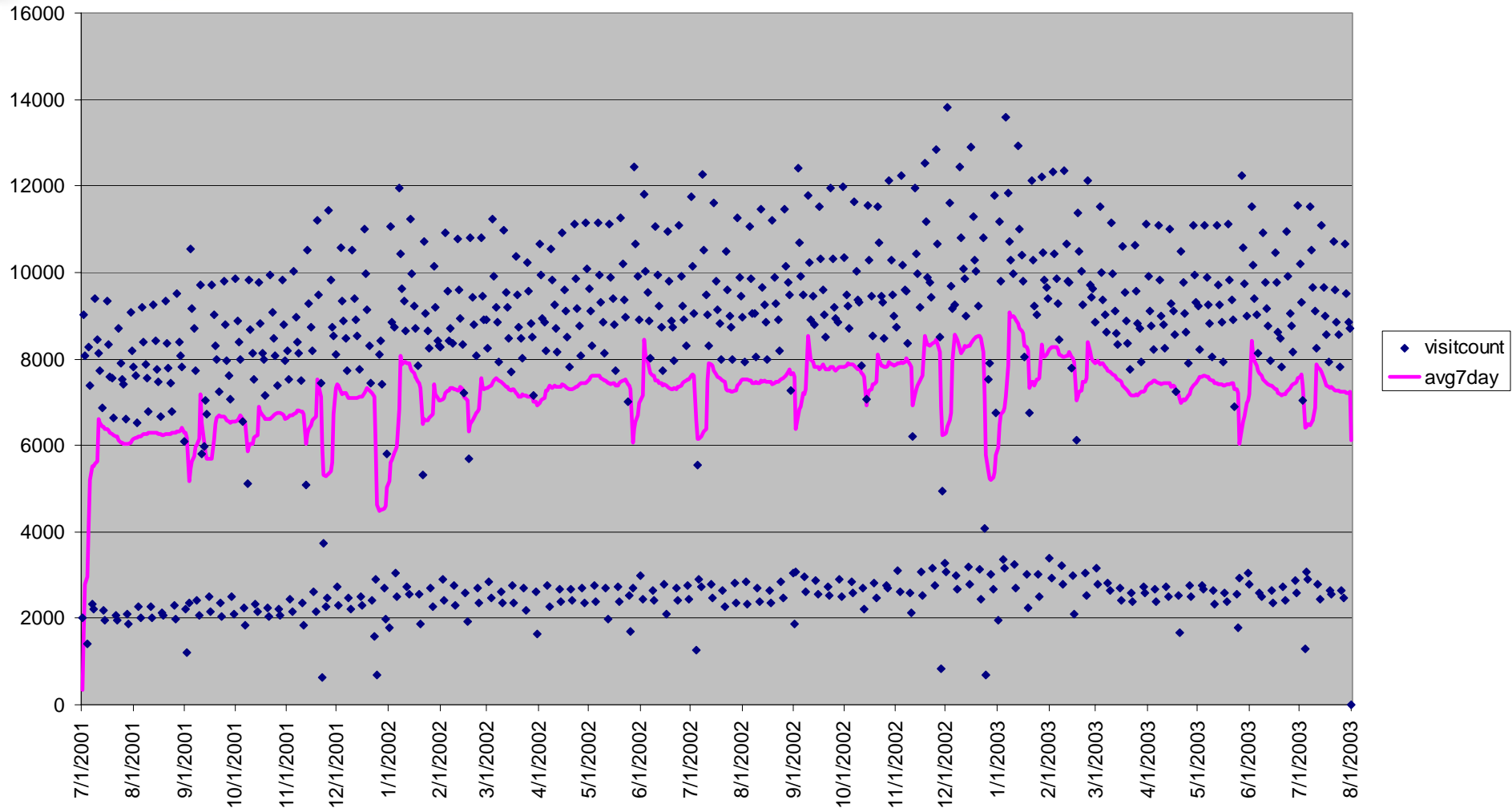
New Depression Visits



New Depression Prescriptions

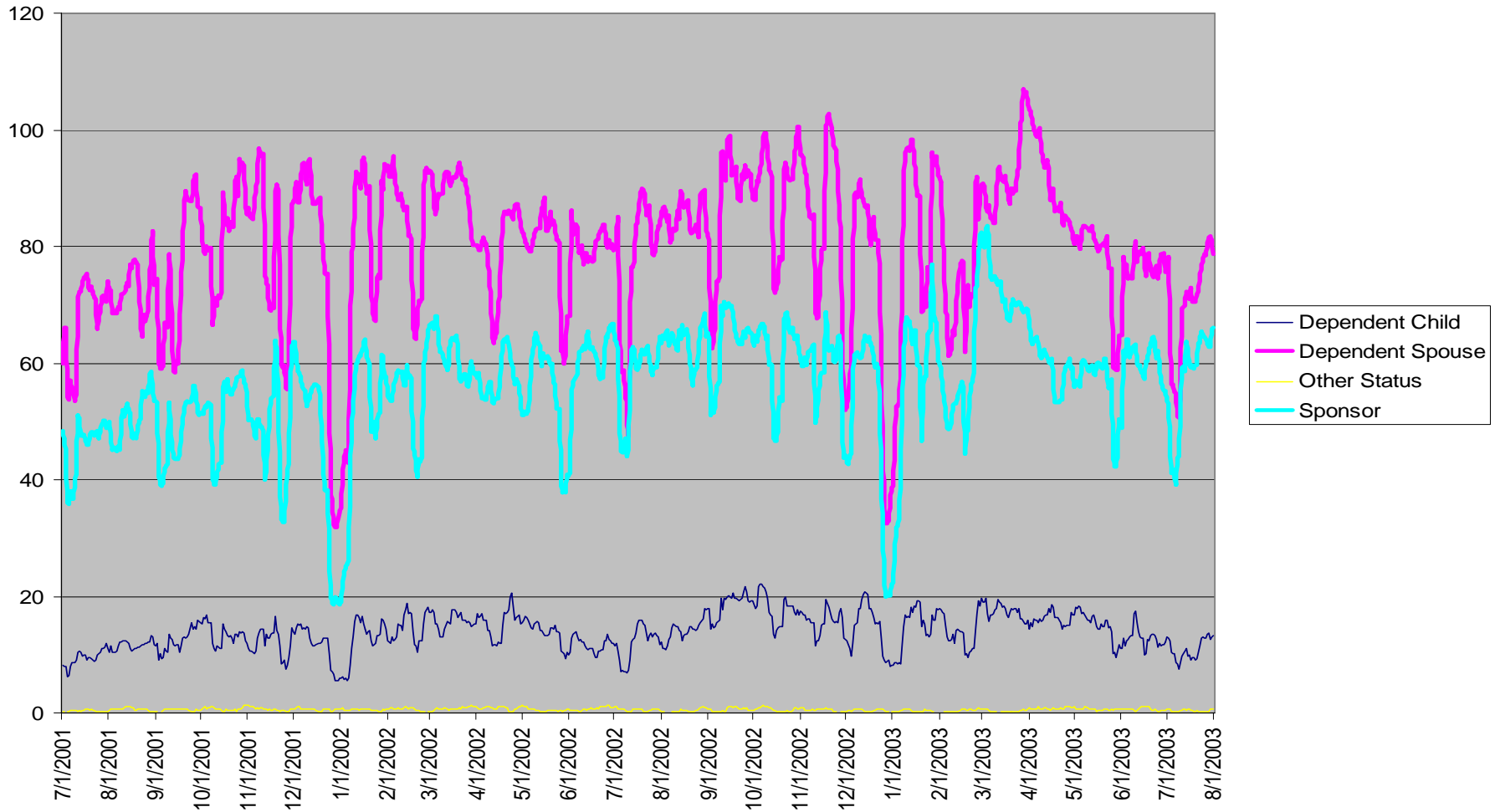


All Depression Prescriptions

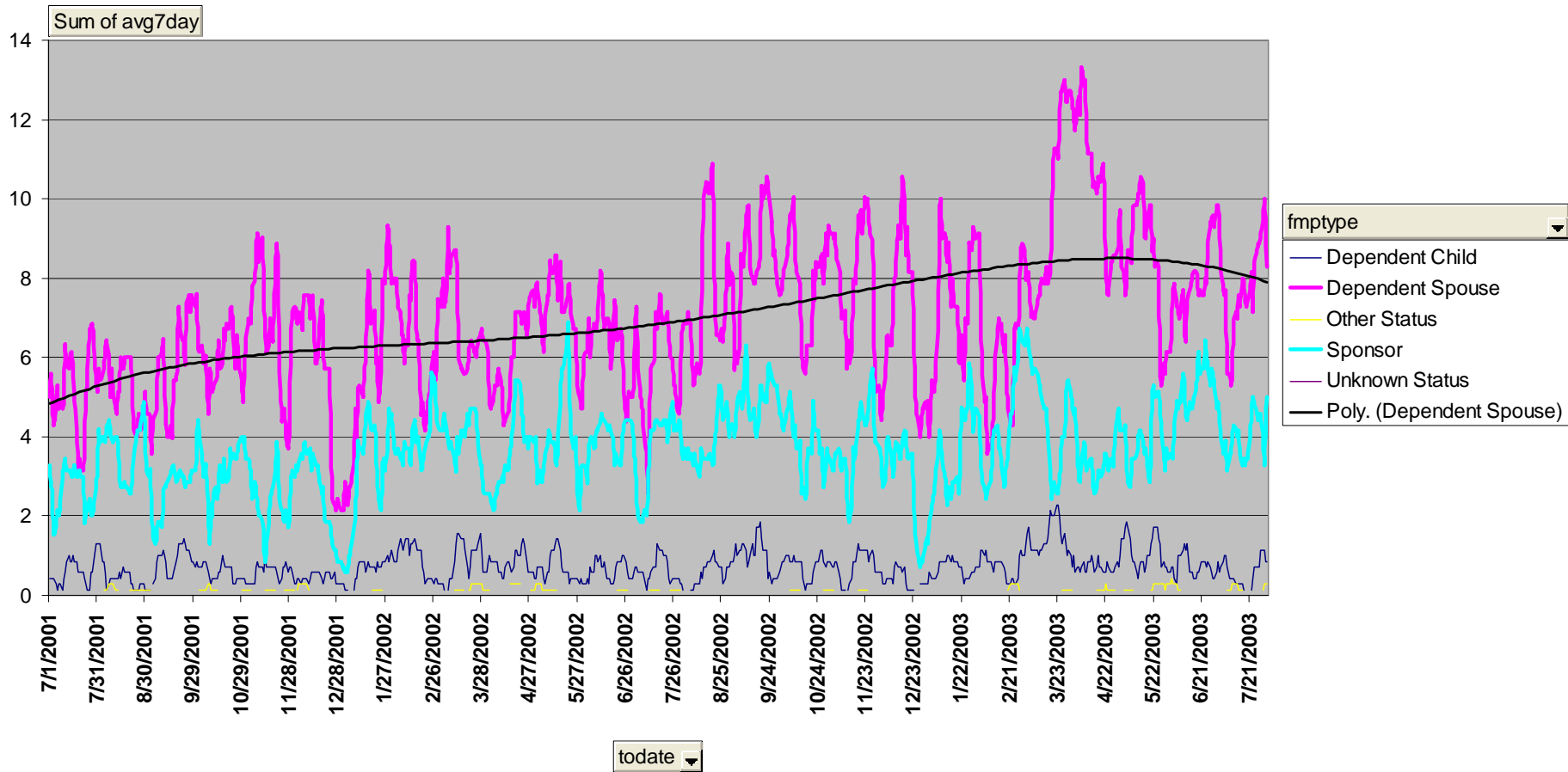




New Anxiety Visits by Population

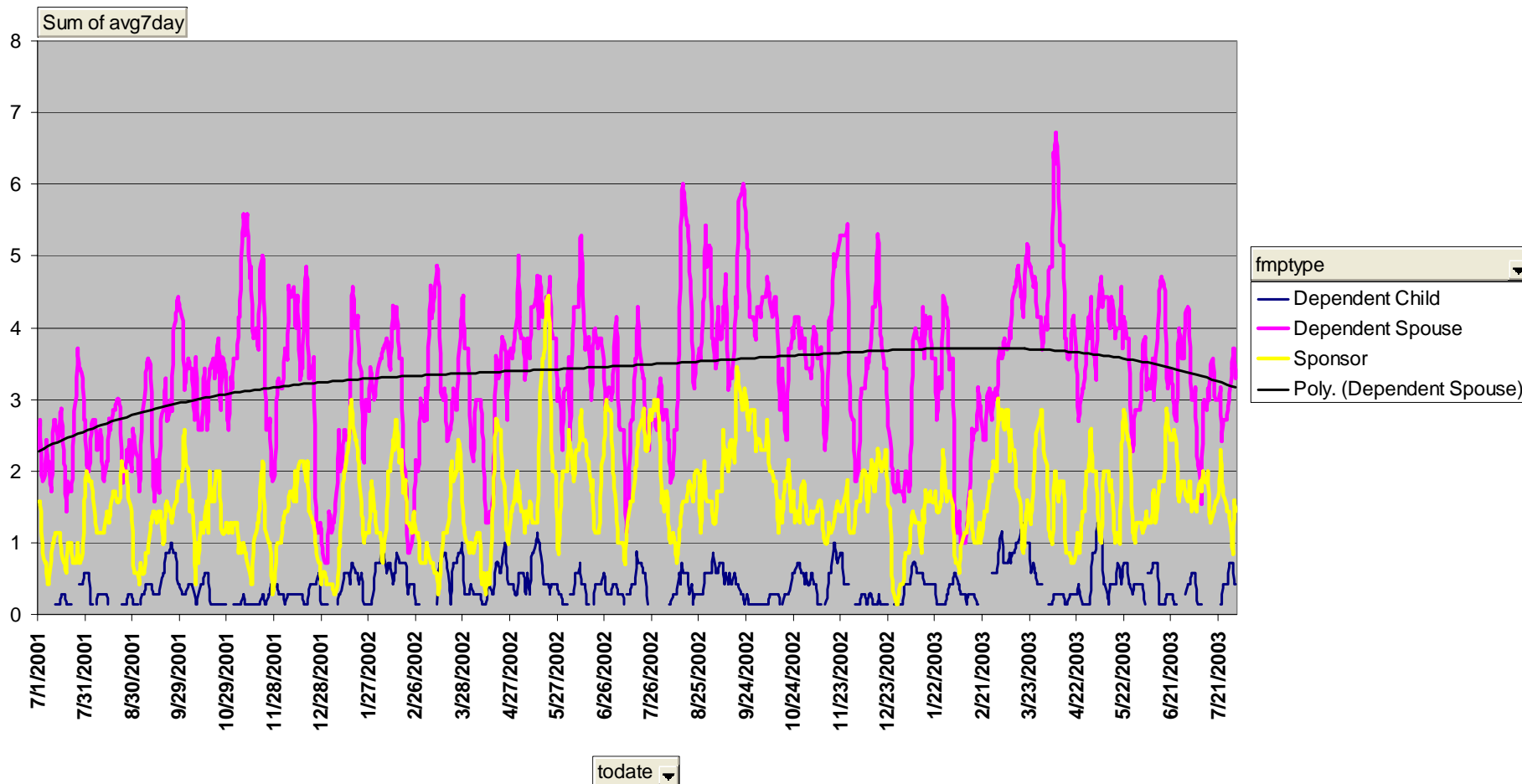


New Anxiety Visits at 4 Installations

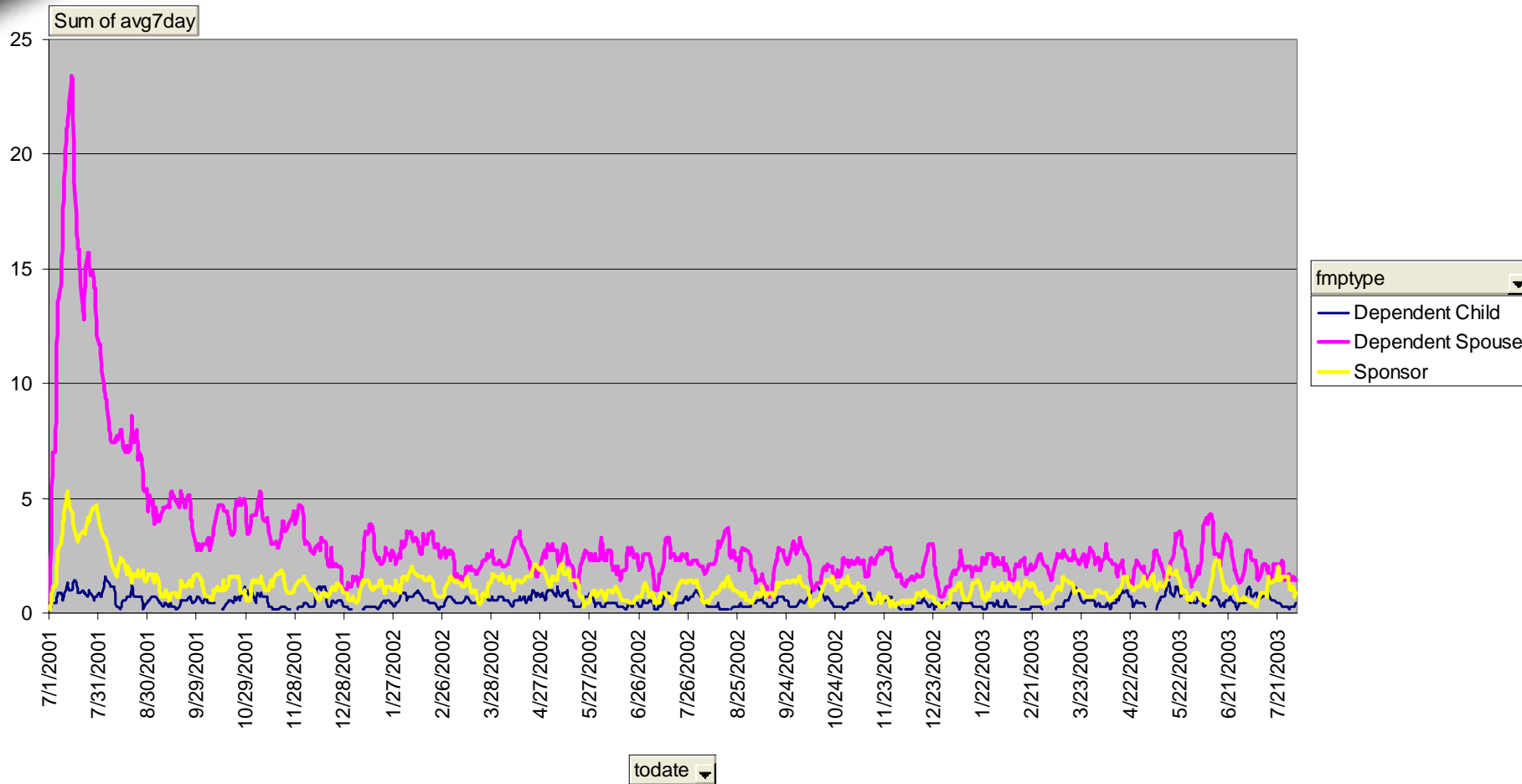




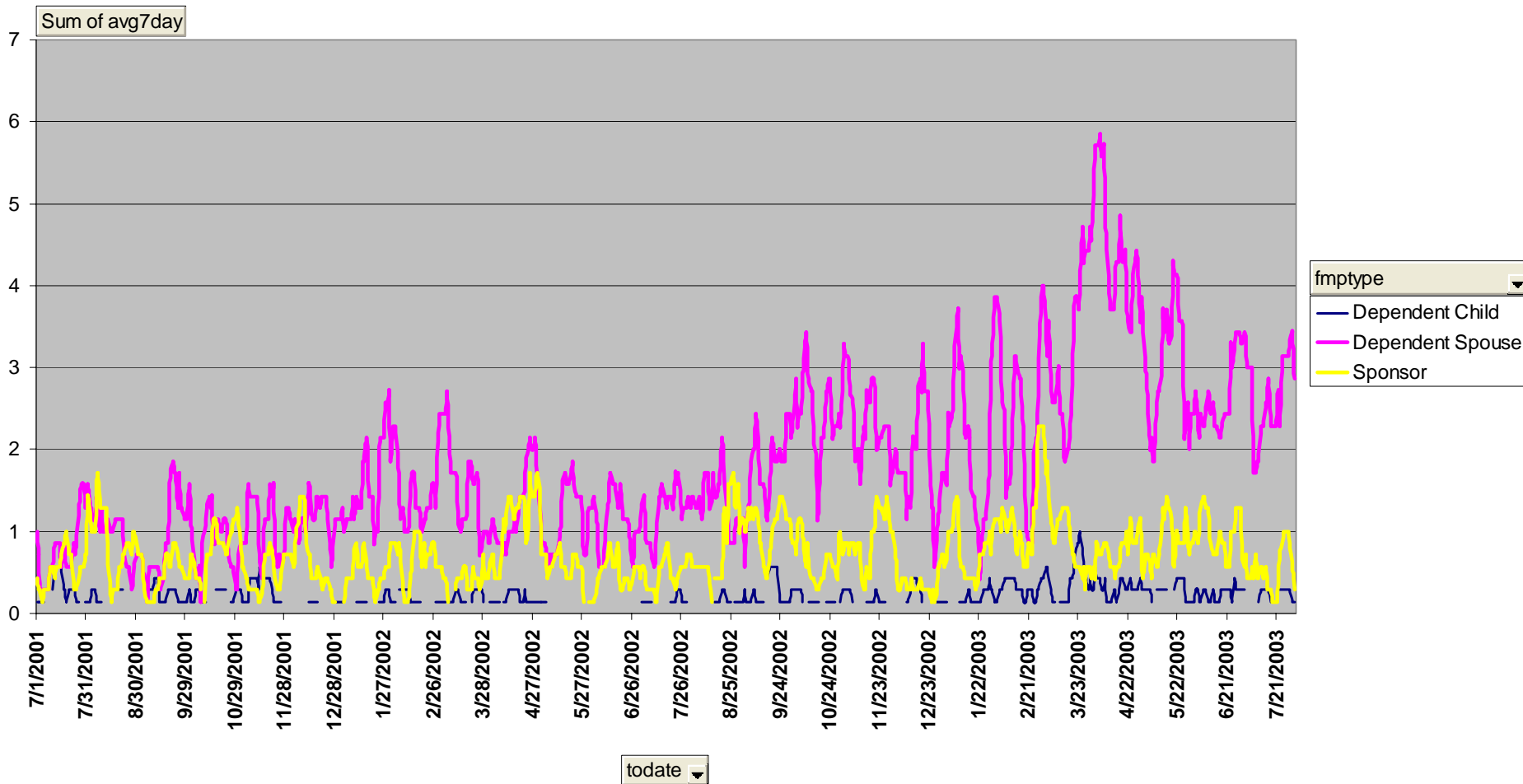
New Anxiety Visits at Base 1



New Anxiety Rx at Base 1

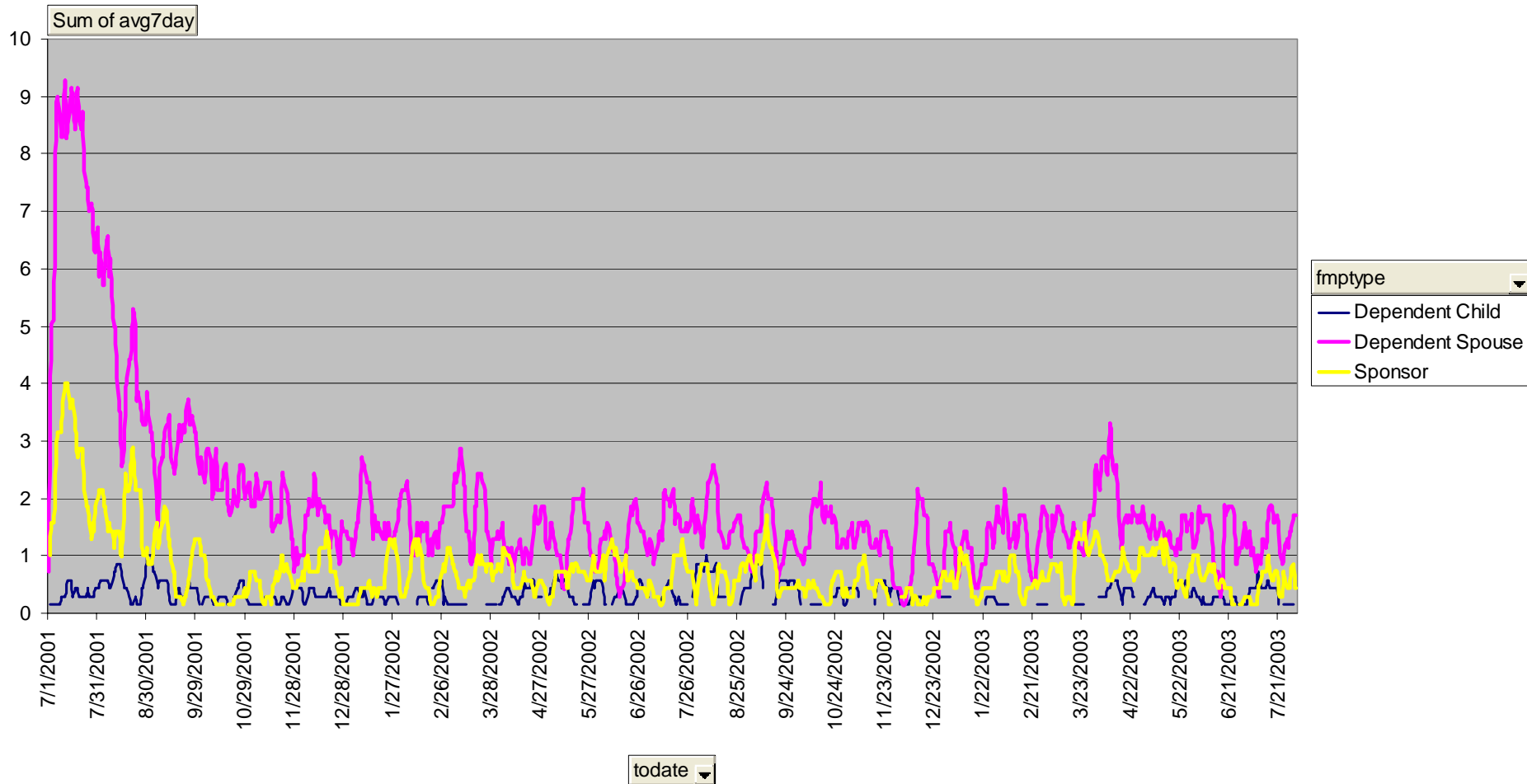


New Anxiety Visits at Base 2



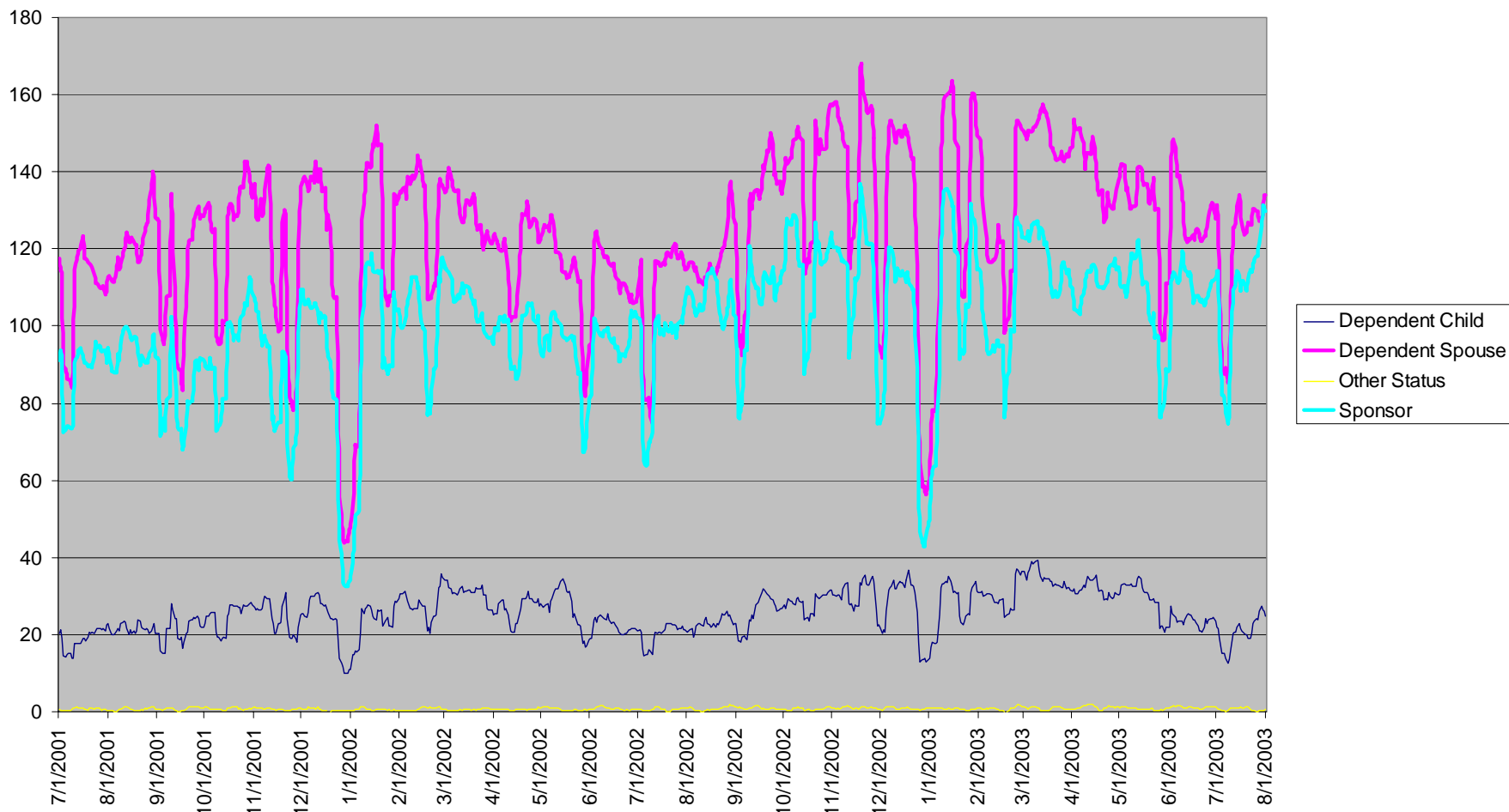


New Anxiety Rx at Base 2

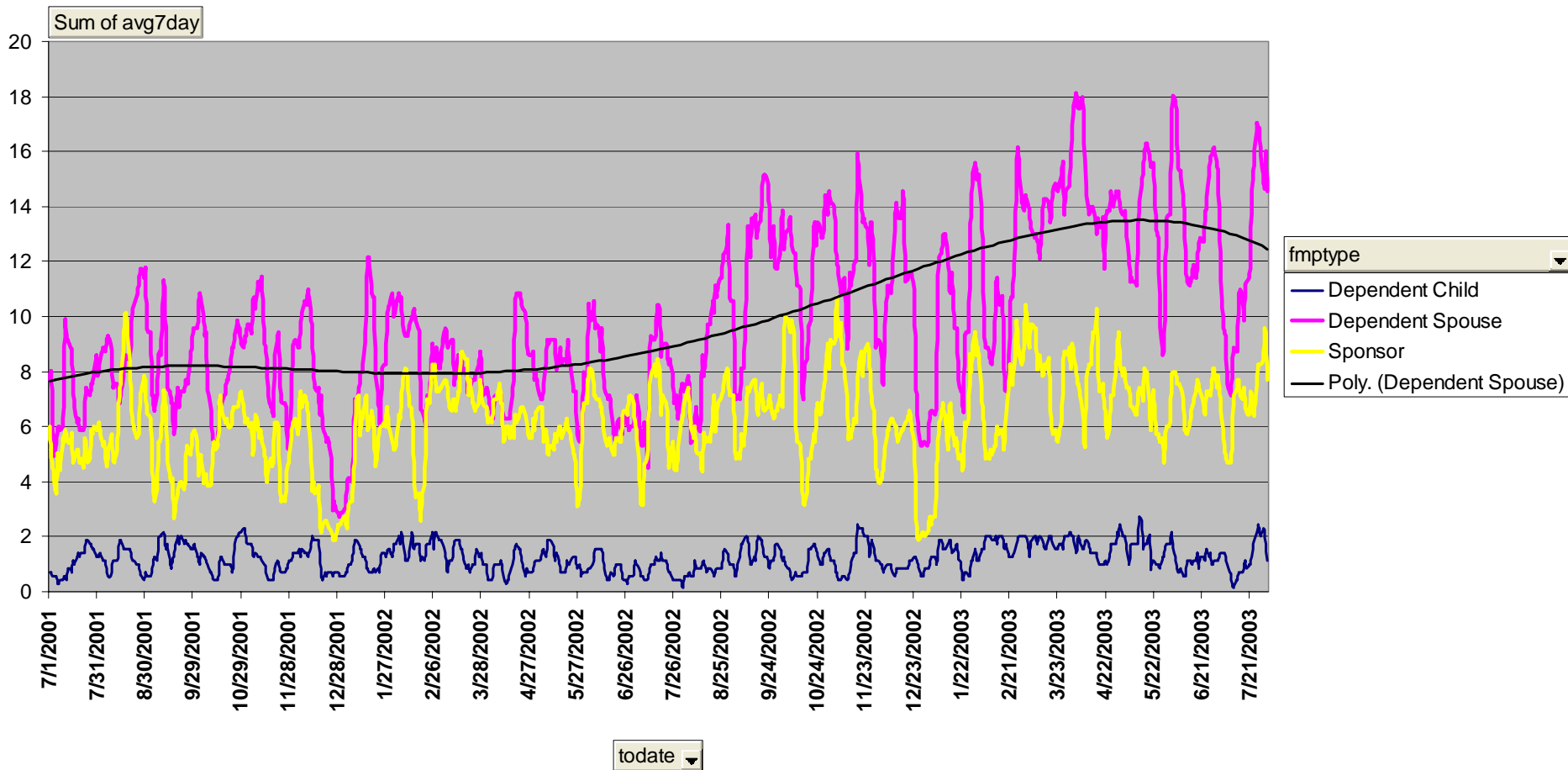




New Depression Visits by Population

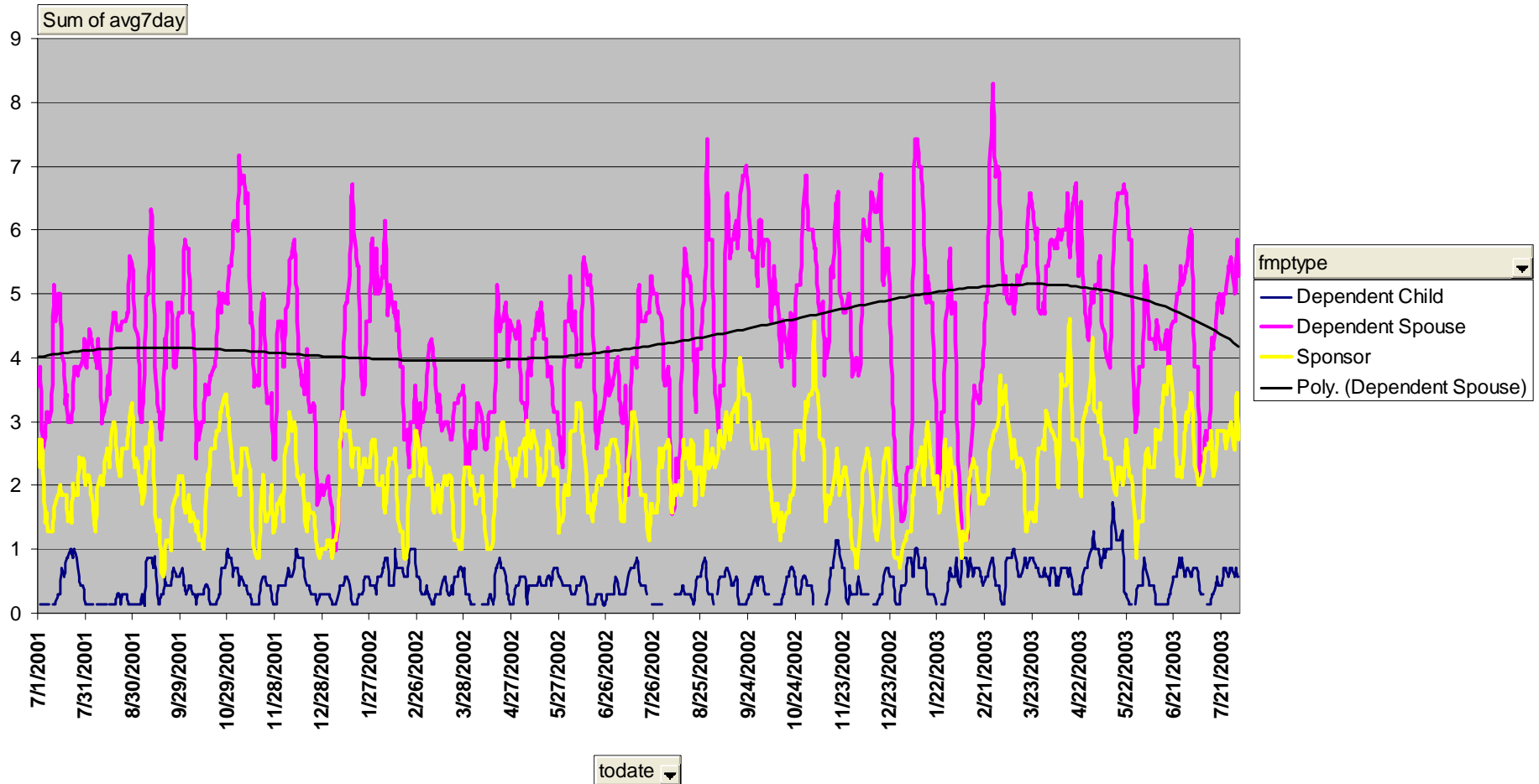


New Depression Visits at 4 Installations



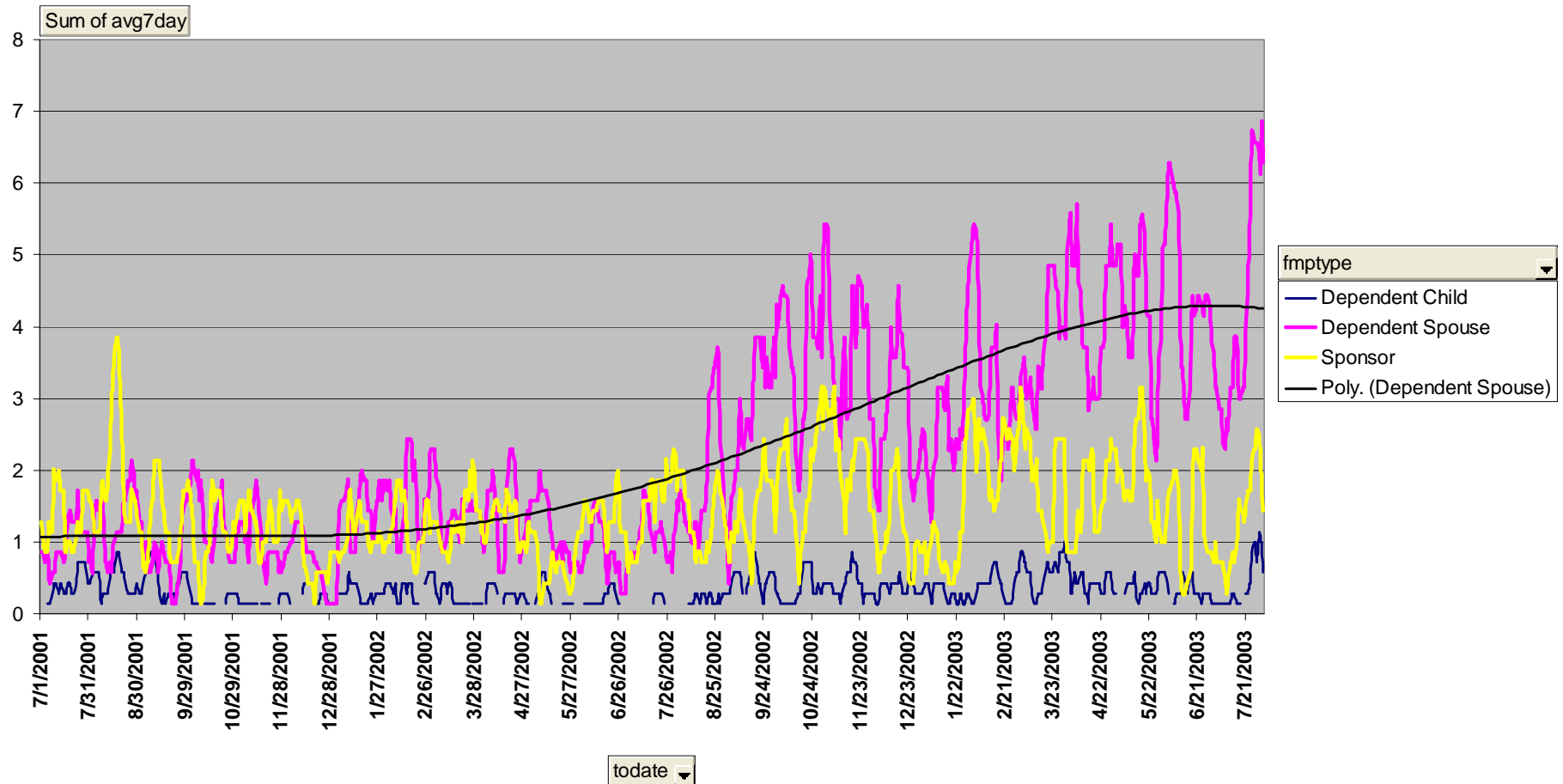


New Depression Visits at Base 1



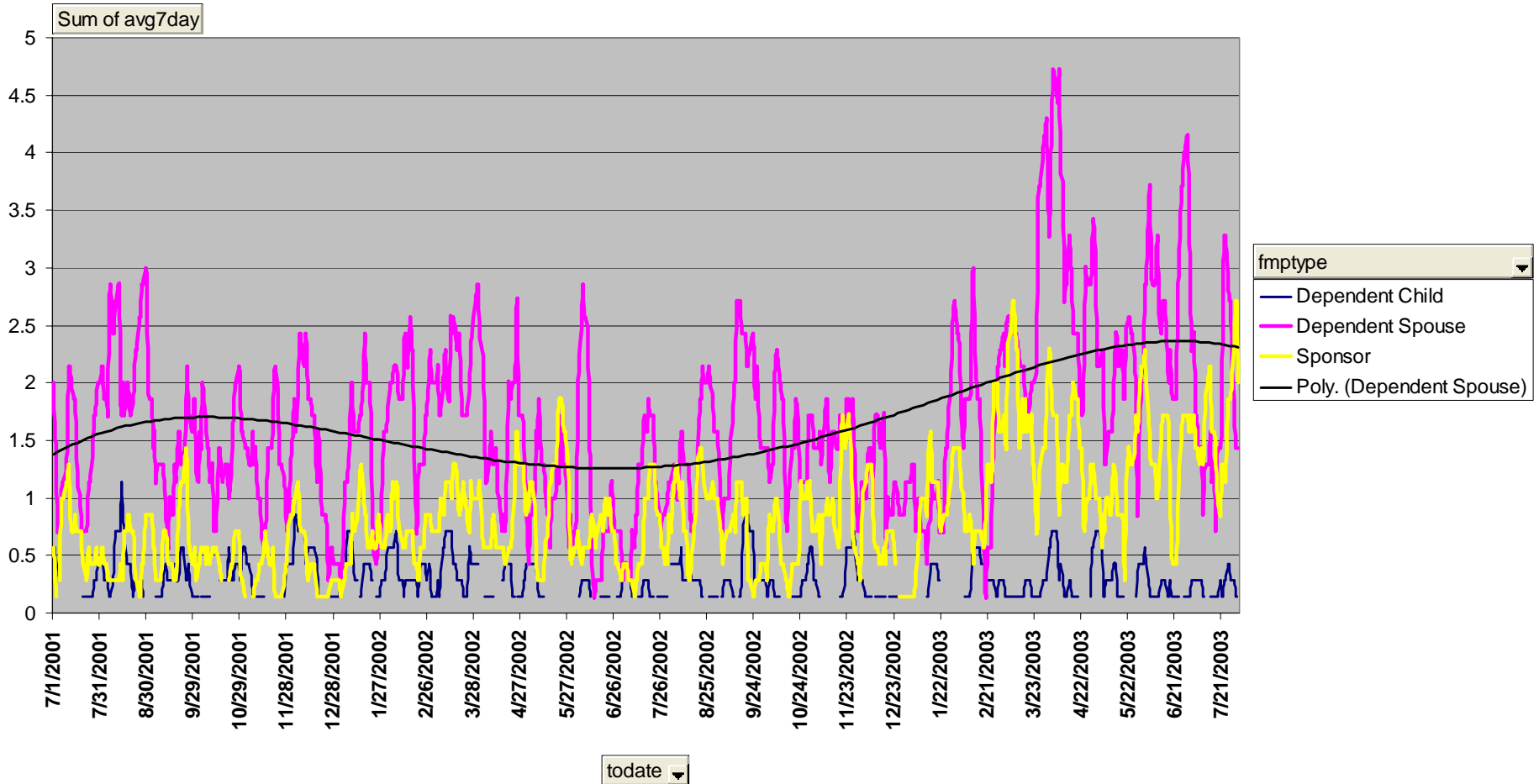


New Depression Visits at Base 2





New Depression Visits at Base 3



Conclusions



- **Possible to use syndromic data for tracking the mental health of a community**
- **Further research needed to determine accuracy of ICD-9 codes vs. prescriptions**
- **Can it be useful in real-time?**