```
1 . sem (cumdose1 -> cumdose2) (cumdose1 -> cumdose3) (cumdose2 -> cumdose3) (cr
  > hrw1 -> crhrw2) (crhrw1 -> crhrw3) (crhrw1 -> icdxcnt) (crhrw2 -> crhrw3) (c
  > rhrw2 -> icdxcnt) (crhrw3 -> whppa) (icdxcnt -> whppa) (icdxcnt -> whpel) (f
  > dferw1 -> crhrw2) (fdferw1 -> icdxcnt) (fdferw2 -> whpsleep) (fdferw2 -> whp
  > el) (whppa -> whpsleep) (whppa -> whpel) (whpsleep -> whppa) (whpsleep -> wh
  > pel) if gender==1, cov( e.whpel*e.crhrw3) nocapslatent

  Endogenous variables

  Observed:  cumdose2 cumdose3 crhrw2 crhrw3 icdxcnt whppa whpel whpsleep

  Exogenous variables

  Observed:  cumdose1 crhrw1 fdferw1 fdferw2

  Fitting target model:

  Iteration 0:   log likelihood = -10251.747
  Iteration 1:   log likelihood = -10205.966
  Iteration 2:   log likelihood = -10170.944
  Iteration 3:   log likelihood = -10166.418
  Iteration 4:   log likelihood = -10165.882
  Iteration 5:   log likelihood = -10165.858
  Iteration 6:   log likelihood = -10165.858

  Structural equation model                       Number of obs      =       339
  Estimation method  = ml
  Log likelihood     = -10165.858
```

	OIM Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Structural						
cumdo~2 <-						
cumdose1	1.339597	.0366997	36.50	0.000	1.267667	1.411527
_cons	.3879549	.0632438	6.13	0.000	.2639992	.5119105
cumdo~3 <-						
cumdose2	1.087217	.0123079	88.34	0.000	1.063094	1.11134
cumdose1	-.0439337	.0184663	-2.38	0.017	-.080127	-.0077403
_cons	.1920846	.0151063	12.72	0.000	.1624768	.2216924
crhrw2 <-						
crhrw1	.7626206	.0336466	22.67	0.000	.6966744	.8285668
fdferw1	.0026616	.0008018	3.32	0.001	.0010902	.004233
_cons	-.1613313	.040014	-4.03	0.000	-.2397573	-.0829053

crhrw3 <-						
crhrw2	1.054107	.0257392	40.95	0.000	1.003659	1.104555
crhrw1	-.1182453	.0254922	-4.64	0.000	-.1682091	-.0682815
_cons	-.0071048	.0140523	-0.51	0.613	-.0346468	.0204372
icdxcnt <-						
crhrw2	.97066	.1579687	6.14	0.000	.6610471	1.280273
crhrw1	-.5677784	.1552095	-3.66	0.000	-.8719833	-.2635734
fdferw1	.0078295	.0023695	3.30	0.001	.0031854	.0124737
_cons	1.981495	.119139	16.63	0.000	1.747987	2.215003
whppa <-						
crhrw3	8.227339	1.550325	5.31	0.000	5.188758	11.26592
icdxcnt	2.408256	.6665593	3.61	0.000	1.101824	3.714689
whpsleep	-.4070212	.1155534	-3.52	0.000	-.6335017	-.1805406
_cons	12.94629	2.404281	5.38	0.000	8.233988	17.6586
whpel <-						
icdxcnt	2.642648	.8067994	3.28	0.001	1.06135	4.223945
whppa	.8017152	.0961697	8.34	0.000	.613226	.9902044
whpsleep	.294676	.0581963	5.06	0.000	.1806134	.4087387
fdferw2	.1409182	.0480765	2.93	0.003	.04669	.2351463
_cons	2.500899	2.15607	1.16	0.246	-1.72492	6.726718
whpsl~p <-						
whppa	1.335573	.1994908	6.69	0.000	.9445779	1.726567
fdferw2	.260614	.0472841	5.51	0.000	.1679388	.3532892
_cons	.3802579	2.409739	0.16	0.875	-4.342744	5.10326
Variance						
e.cumdose2	1.271465	.0976606			1.093765	1.478035
e.cumdose3	.0652934	.0050152			.056168	.0759014
e.crhrw2	.274573	.0210898			.2361986	.3191818
e.crhrw3	.0643692	.0049442			.0553729	.0748272
e.icdxcnt	2.322734	.1784082			1.998109	2.700101
e.whppa	321.0013	68.76013			210.9479	488.4707
e.whpel	550.1565	42.26281			473.2573	639.5511
e.whpsleep	599.4561	78.08508			464.3869	773.8109
Covariance						
e.crhrw3						
e.whpel	-.6904974	.3271351	-2.11	0.035	-1.33167	-.0493245

LR test of model vs. saturated: chi2(40) = 50.45, Prob > chi2 = 0.1246

```
2 .
3 . sem (cumdose1 -> cumdose2) (cumdose1 -> cumdose3) (cumdose2 -> cumdose3) (cr
  > hrw1 -> crhrw2) (crhrw1 -> crhrw3) (crhrw1 -> icdxcnt) (crhrw2 -> crhrw3) (c
  > rhrw2 -> icdxcnt) (crhrw3 -> whppa) (icdxcnt -> whppa) (icdxcnt -> whpel) (f
  > derw1 -> crhrw2) (fdferw1 -> icdxcnt) (fdferw2 -> whpsleep) (fdferw2 -> whp
  > el) (whppa -> whpsleep) (whppa -> whpel) (whpsleep -> whppa) (whpsleep -> wh
  > pel) if gender==1, vce(cluster id) cov( e.whpel*e.crhrw3) nocapslatent

  Endogenous variables

  Observed:  cumdose2 cumdose3 crhrw2 crhrw3 icdxcnt whppa whpel whpsleep

  Exogenous variables

  Observed:  cumdose1 crhrw1 fdferw1 fdferw2

  Fitting target model:

  Iteration 0:   log pseudolikelihood = -10251.747
  Iteration 1:   log pseudolikelihood = -10205.966
  Iteration 2:   log pseudolikelihood = -10170.944
  Iteration 3:   log pseudolikelihood = -10166.418
  Iteration 4:   log pseudolikelihood = -10165.882
  Iteration 5:   log pseudolikelihood = -10165.858
  Iteration 6:   log pseudolikelihood = -10165.858

  Structural equation model                       Number of obs      =       339
  Estimation method  = ml
  Log pseudolikelihood= -10165.858

                                        (Std. Err. adjusted for 339 clusters in id)
```

	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
Structural						
cumdo~2 <-						
cumdose1	1.339597	.2873117	4.66	0.000	.7764767	1.902718
_cons	.3879549	.0833225	4.66	0.000	.2246458	.5512639
cumdo~3 <-						
cumdose2	1.087217	.0775735	14.02	0.000	.9351758	1.239258
cumdose1	-.0439337	.0846185	-0.52	0.604	-.2097829	.1219155
_cons	.1920846	.0309996	6.20	0.000	.1313266	.2528426
crhrw2 <-						
crhrw1	.7626206	.0387286	19.69	0.000	.686714	.8385272
fdferw1	.0026616	.0008316	3.20	0.001	.0010318	.0042915
_cons	-.1613313	.0407374	-3.96	0.000	-.2411751	-.0814875

crhrw3 <-						
crhrw2	1.054107	.0324707	32.46	0.000	.9904657	1.117749
crhrw1	-.1182453	.0374477	-3.16	0.002	-.1916415	-.0448491
_cons	-.0071048	.0143512	-0.50	0.621	-.0352326	.0210229
icdxcnt <-						
crhrw2	.97066	.182801	5.31	0.000	.6123767	1.328943
crhrw1	-.5677784	.1802555	-3.15	0.002	-.9210727	-.214484
fdferw1	.0078295	.0024314	3.22	0.001	.003064	.012595
_cons	1.981495	.1154448	17.16	0.000	1.755227	2.207763
whppa <-						
crhrw3	8.227339	1.644491	5.00	0.000	5.004196	11.45048
icdxcnt	2.408256	.7160838	3.36	0.001	1.004758	3.811755
whpsleep	-.4070212	.1235379	-3.29	0.001	-.649151	-.1648913
_cons	12.94629	2.606814	4.97	0.000	7.83703	18.05555
whpel <-						
icdxcnt	2.642648	.8492332	3.11	0.002	.9781812	4.307114
whppa	.8017152	.108379	7.40	0.000	.5892963	1.014134
whpsleep	.294676	.0644274	4.57	0.000	.1684007	.4209514
fdferw2	.1409182	.0547194	2.58	0.010	.0336701	.2481662
_cons	2.500899	1.707353	1.46	0.143	-.8454515	5.84725
whpsl~p <-						
whppa	1.335573	.2129425	6.27	0.000	.918213	1.752932
fdferw2	.260614	.0534904	4.87	0.000	.1557748	.3654533
_cons	.3802579	1.880482	0.20	0.840	-3.30542	4.065935
Variance						
e.cumdose2	1.271465	.8062854			.3668804	4.406405
e.cumdose3	.0652934	.0299735			.0265533	.1605537
e.crhrw2	.274573	.0375325			.2100407	.3589319
e.crhrw3	.0643692	.0182932			.0368785	.1123526
e.icdxcnt	2.322734	.2464874			1.886559	2.859754
e.whppa	321.0013	82.21301			194.3131	530.2878
e.whpel	550.1565	51.00484			458.7453	659.7827
e.whpsleep	599.4561	103.5428			427.2983	840.9761
Covariance						
e.crhrw3						
e.whpel	-.6904974	.4191208	-1.65	0.099	-1.511959	.1309642

```
4 .
5 . estat stable
```

Stability analysis of simultaneous equation systems

Eigenvalue stability condition

Eigenvalue	Modulus
2.637e-16 + .7372966*i*	**.737297**
2.637e-16 - .7372966*i*	**.737297**
5.516e-17 + 1.373e-08*i*	**1.4e-08**
5.516e-17 - 1.373e-08*i*	**1.4e-08**
-2.872e-15	**2.9e-15**
2.351e-15	**2.4e-15**
0	**0**
0	**0**

stability index = **.7372966**
All the eigenvalues lie inside the unit circle.
SEM satisfies stability condition.

```
6 . estat gof
Note: model was fit with vce(cluster); only stats(residuals) valid.

7 . estat teffects, standardized
```

Direct effects

(Std. Err. adjusted for **339** clusters in id)

	Coef.	Robust Std. Err.	z	P>|z|	Std. Coef.
Structural					
cumdo~2 <-					
cumdose1	**1.339597**	**.2873117**	**4.66**	**0.000**	**.8928449**
cumdo~3 <-					
cumdose2	**1.087217**	**.0775735**	**14.02**	**0.000**	**1.019854**
cumdose1	**-.0439337**	**.0846185**	**-0.52**	**0.604**	**-.0274676**
crhrw2 <-					
crhrw1	**.7626206**	**.0387286**	**19.69**	**0.000**	**.7692442**
fdferw1	**.0026616**	**.0008316**	**3.20**	**0.001**	**.1126696**
crhrw3 <-					
crhrw2	**1.054107**	**.0324707**	**32.46**	**0.000**	**1.056094**
crhrw1	**-.1182453**	**.0374477**	**-3.16**	**0.002**	**-.1194971**

fdferw1	0	(no path)			0
icdxcnt <-					
crhrw2	.97066	.182801	5.31	0.000	.5315287
crhrw1	-.5677784	.1802555	-3.15	0.002	-.313613
fdferw1	.0078295	.0024314	3.22	0.001	.1814898
whppa <-					
crhrw2	0	(no path)			0
crhrw3	8.227339	1.644491	5.00	0.000	.5203729
icdxcnt	2.408256	.7160838	3.36	0.001	.2786868
whppa	0	(no path)			0
whpsleep	-.4070212	.1235379	-3.29	0.001	-.6950346
crhrw1	0	(no path)			0
fdferw1	0	(no path)			0
fdferw2	0	(no path)			0
whpel <-					
crhrw2	0	(no path)			0
crhrw3	0	(no path)			0
icdxcnt	2.642648	.8492332	3.11	0.002	.1480955
whppa	.8017152	.108379	7.40	0.000	.3882478
whpsleep	.294676	.0644274	4.57	0.000	.2436818
crhrw1	0	(no path)			0
fdferw1	0	(no path)			0
fdferw2	.1409182	.0547194	2.58	0.010	.1323298
whpsl~p <-					
crhrw2	0	(no path)			0
crhrw3	0	(no path)			0
icdxcnt	0	(no path)			0
whppa	1.335573	.2129425	6.27	0.000	.7821284
whpsleep	0	(no path)			0
crhrw1	0	(no path)			0
fdferw1	0	(no path)			0
fdferw2	.260614	.0534904	4.87	0.000	.2959445

Indirect effects

(Std. Err. adjusted for **339** clusters in id)

	Coef.	Robust Std. Err.	z	P>|z|	Std. Coef.
Structural					
cumdo~2 <-					
cumdose1	**0**	(no path)			**0**
cumdo~3 <-					
cumdose2	**0**	(no path)			**0**
cumdose1	**1.456433**	**.2682484**	**5.43**	**0.000**	**.9105718**
crhrw2 <-					
crhrw1	**0**	(no path)			**0**
fdferw1	**0**	(no path)			**0**
crhrw3 <-					
crhrw2	**0**	(no path)			**0**
crhrw1	**.8038839**	**.0536151**	**14.99**	**0.000**	**.8123944**
fdferw1	**.0028057**	**.0008712**	**3.22**	**0.001**	**.1189897**
icdxcnt <-					
crhrw2	**0**	(no path)			**0**
crhrw1	**.7402454**	**.1517554**	**4.88**	**0.000**	**.4088754**
fdferw1	**.0025835**	**.0009167**	**2.82**	**0.005**	**.0598871**
whppa <-					
crhrw2	**7.13271**	**.3409613**	**20.92**	**0.000**	**.4519889**
crhrw3	**-2.897393**	**.5791345**	**-5.00**	**0.000**	**-.1832579**
icdxcnt	**-.8481071**	**.2521807**	**-3.36**	**0.001**	**-.0981441**
whppa	**-.3521664**	**.0561491**	**-6.27**	**0.000**	**-.3521664**
whpsleep	**.1433392**	**.0435059**	**3.29**	**0.001**	**.2447679**
crhrw1	**3.923491**	**.5634407**	**6.96**	**0.000**	**.250785**
fdferw1	**.0311999**	**.0088711**	**3.52**	**0.000**	**.0836921**
fdferw2	**-.0687192**	**.0171306**	**-4.01**	**0.000**	**-.133254**
whpel <-					
crhrw2	**11.09067**	**.8595701**	**12.90**	**0.000**	**.3403454**
crhrw3	**6.370759**	**1.273395**	**5.00**	**0.000**	**.1951351**
icdxcnt	**1.86481**	**.5544925**	**3.36**	**0.001**	**.104505**
whppa	**-.027375**	**.0043646**	**-6.27**	**0.000**	**-.0132569**
whpsleep	**-.3151728**	**.0956604**	**-3.29**	**0.001**	**-.2606316**
crhrw1	**5.145426**	**.878942**	**5.85**	**0.000**	**.1592719**
fdferw1	**.0648106**	**.0176083**	**3.68**	**0.000**	**.084191**
fdferw2	**-.0053418**	**.0244548**	**-0.22**	**0.827**	**-.0050162**
whpsl~p <-					

crhrw2	9.526252	.4553785	20.92	0.000	.3535133
crhrw3	7.118531	1.422861	5.00	0.000	.2636672
icdxcnt	2.083693	.6195763	3.36	0.001	.1412075
whppa	-.4703439	.0749912	-6.27	0.000	-.2754394
whpsleep	-.3521664	.1068886	-3.29	0.001	-.3521664
crhrw1	5.240108	.9937312	5.27	0.000	.1961461
fdferw1	.0416698	.0128454	3.24	0.001	.0654579
fdferw2	-.0917795	.0283992	-3.23	0.001	-.1042217

Total effects

(Std. Err. adjusted for **339** clusters in id)

	Coef.	Robust Std. Err.	z	P>|z|	Std. Coef.
Structural					
cumdo~2 <-					
cumdose1	1.339597	.2873117	4.66	0.000	.8928449
cumdo~3 <-					
cumdose2	1.087217	.0775735	14.02	0.000	1.019854
cumdose1	1.412499	.3182587	4.44	0.000	.8831041
crhrw2 <-					
crhrw1	.7626206	.0387286	19.69	0.000	.7692442
fdferw1	.0026616	.0008316	3.20	0.001	.1126696
crhrw3 <-					
crhrw2	1.054107	.0324707	32.46	0.000	1.056094
crhrw1	.6856386	.0433822	15.80	0.000	.6928973
fdferw1	.0028057	.0008712	3.22	0.001	.1189897
icdxcnt <-					
crhrw2	.97066	.182801	5.31	0.000	.5315287
crhrw1	.172467	.100654	1.71	0.087	.0952623
fdferw1	.0104131	.0024516	4.25	0.000	.2413769
whppa <-					
crhrw2	7.13271	.3409613	20.92	0.000	.4519889
crhrw3	5.329946	1.065356	5.00	0.000	.337115
icdxcnt	1.560149	.4639031	3.36	0.001	.1805426
whppa	-.3521664	.0561491	-6.27	0.000	-.3521664
whpsleep	-.263682	.080032	-3.29	0.001	-.4502668
crhrw1	3.923491	.5634407	6.96	0.000	.250785
fdferw1	.0311999	.0088711	3.52	0.000	.0836921
fdferw2	-.0687192	.0171306	-4.01	0.000	-.133254

whpel <-					
crhrw2	11.09067	.8595701	12.90	0.000	.3403454
crhrw3	6.370759	1.273395	5.00	0.000	.1951351
icdxcnt	4.507457	.9863189	4.57	0.000	.2526004
whppa	.7743402	.1084818	7.14	0.000	.3749908
whpsleep	-.0204968	.1258989	-0.16	0.871	-.0169498
crhrw1	5.145426	.878942	5.85	0.000	.1592719
fdferw1	.0648106	.0176083	3.68	0.000	.084191
fdferw2	.1355764	.0562948	2.41	0.016	.1273136
whpsl~p <-					
crhrw2	9.526252	.4553785	20.92	0.000	.3535133
crhrw3	7.118531	1.422861	5.00	0.000	.2636672
icdxcnt	2.083693	.6195763	3.36	0.001	.1412075
whppa	.8652288	.1379513	6.27	0.000	.506689
whpsleep	-.3521664	.1068886	-3.29	0.001	-.3521664
crhrw1	5.240108	.9937312	5.27	0.000	.1961461
fdferw1	.0416698	.0128454	3.24	0.001	.0654579
fdferw2	.1688345	.047305	3.57	0.000	.1917228

```
8 . set more off

9 . estat framework
  (model contains no latent variables)
```

Endogenous variables on endogenous variables

	observed				
Beta	cumdose2	cumdose3	crhrw2	crhrw3	icdxcnt
observed					
cumdose2	0	0	0	0	0
cumdose3	1.087217	0	0	0	0
crhrw2	0	0	0	0	0
crhrw3	0	0	1.054107	0	0
icdxcnt	0	0	.97066	0	0
whppa	0	0	0	8.227339	2.408256
whpel	0	0	0	0	2.642648
whpsleep	0	0	0	0	0

Beta	observed whppa	whpel	whpsleep
observed			
cumdose2	**0**	**0**	**0**
cumdose3	**0**	**0**	**0**
crhrw2	**0**	**0**	**0**
crhrw3	**0**	**0**	**0**
icdxcnt	**0**	**0**	**0**
whppa	**0**	**0**	**-.4070212**
whpel	**.8017152**	**0**	**.294676**
whpsleep	**1.335573**	**0**	**0**

Exogenous variables on endogenous variables

Gamma	observed cumdose1	crhrw1	fdferw1	fdferw2
observed				
cumdose2	**1.339597**	**0**	**0**	**0**
cumdose3	**-.0439337**	**0**	**0**	**0**
crhrw2	**0**	**.7626206**	**.0026616**	**0**
crhrw3	**0**	**-.1182453**	**0**	**0**
icdxcnt	**0**	**-.5677784**	**.0078295**	**0**
whppa	**0**	**0**	**0**	**0**
whpel	**0**	**0**	**0**	**.1409182**
whpsleep	**0**	**0**	**0**	**.260614**

Covariances of error variables

Psi	observed e.cumdo~2	e.cumdo~3	e.crhrw2	e.crhrw3	e.icdxcnt
observed					
e.cumdose2	**1.271465**				
e.cumdose3	**0**	**.0652934**			
e.crhrw2	**0**	**0**	**.274573**		
e.crhrw3	**0**	**0**	**0**	**.0643692**	
e.icdxcnt	**0**	**0**	**0**	**0**	**2.322734**
e.whppa	**0**	**0**	**0**	**0**	**0**
e.whpel	**0**	**0**	**0**	**-.6904974**	**0**
e.whpsleep	**0**	**0**	**0**	**0**	**0**

Psi	observed e.whppa	e.whpel	e.whpsl~p
observed			
e.whppa	**321.0013**		
e.whpel	**0**	**550.1565**	
e.whpsleep	**0**	**0**	**599.4561**

Intercepts of endogenous variables

alpha	observed cumdose2	cumdose3	crhrw2	crhrw3	icdxcnt
_cons	**.3879549**	**.1920846**	**-.1613313**	**-.0071048**	**1.981495**

alpha	observed whppa	whpel	whpsleep
_cons	**12.94629**	**2.500899**	**.3802579**

Covariances of exogenous variables

Phi	observed cumdose1	crhrw1	fdferw1	fdferw2
observed				
cumdose1	**2.78471**			
crhrw1	**.1344321**	**.861959**		
fdferw1	**5.08249**	**14.91383**	**1518.066**	
fdferw2	**2.297825**	**10.74343**	**752.7219**	**793.2915**

Means of exogenous variables

kappa	observed cumdose1	crhrw1	fdferw1	fdferw2
mean	**.4300973**	**-.1421184**	**32.20059**	**16.35693**