

Staging and stratified approach in addiction disease and treatment: Work in progress

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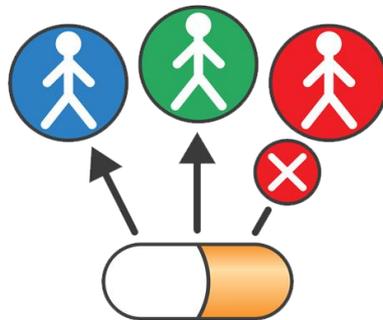
The speakers have no disclosures



**Mount
Sinai**

Staging in medicine

Definition: Determination of the stage to which a disease, has progressed. Staging is important as an indication of the likely outcome (prognosis) and in deciding on the best form of treatment, as this may differ markedly at different stages.

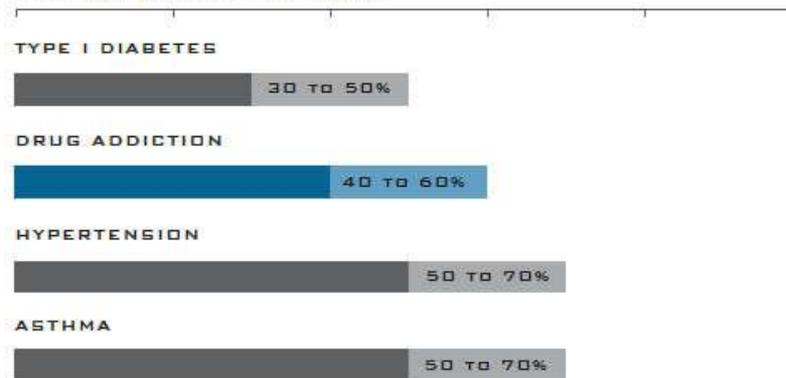


Outline:

- Staging in medicine
- Staging in chronic disease
- Staging in psychiatric disease
- Staging in addiction: Barriers and current state

Addiction vs. other chronic disease

Percentage of Patients Who Relapse

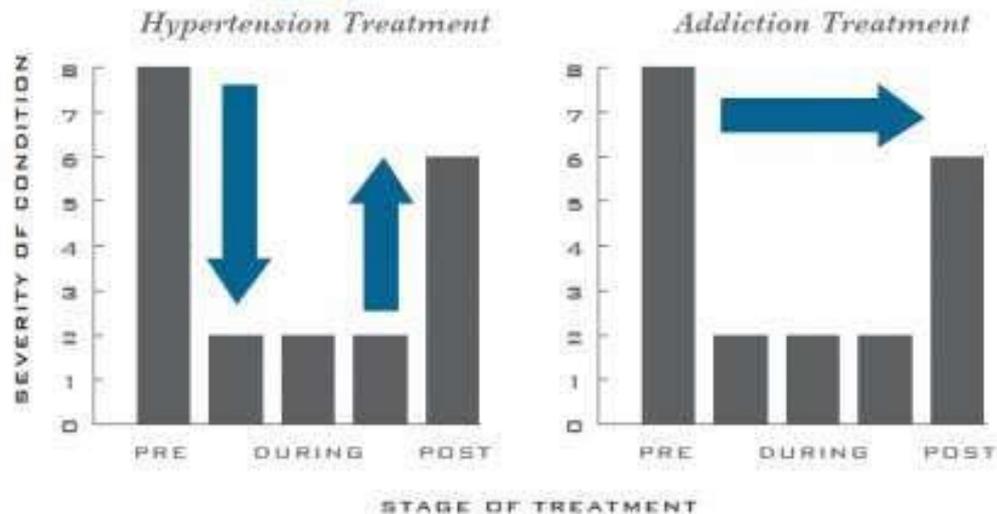


WHY IS ADDICTION TREATMENT EVALUATED DIFFERENTLY?

BOTH REQUIRE ONGOING CARE

YES!!!

NO???

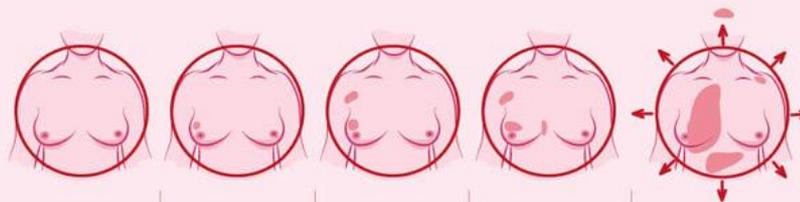


Staging in cancer

What are the Stages of Breast cancer?

BREAST CANCER STAGES

BREAST CANCER STAGING MEASURES THE SPREAD OF THE DISEASE UPON DIAGNOSIS. IN ORDER TO DETERMINE THE CHOICE OF TREATMENT, IT IS VERY IMPORTANT TO STAGE THE CANCER



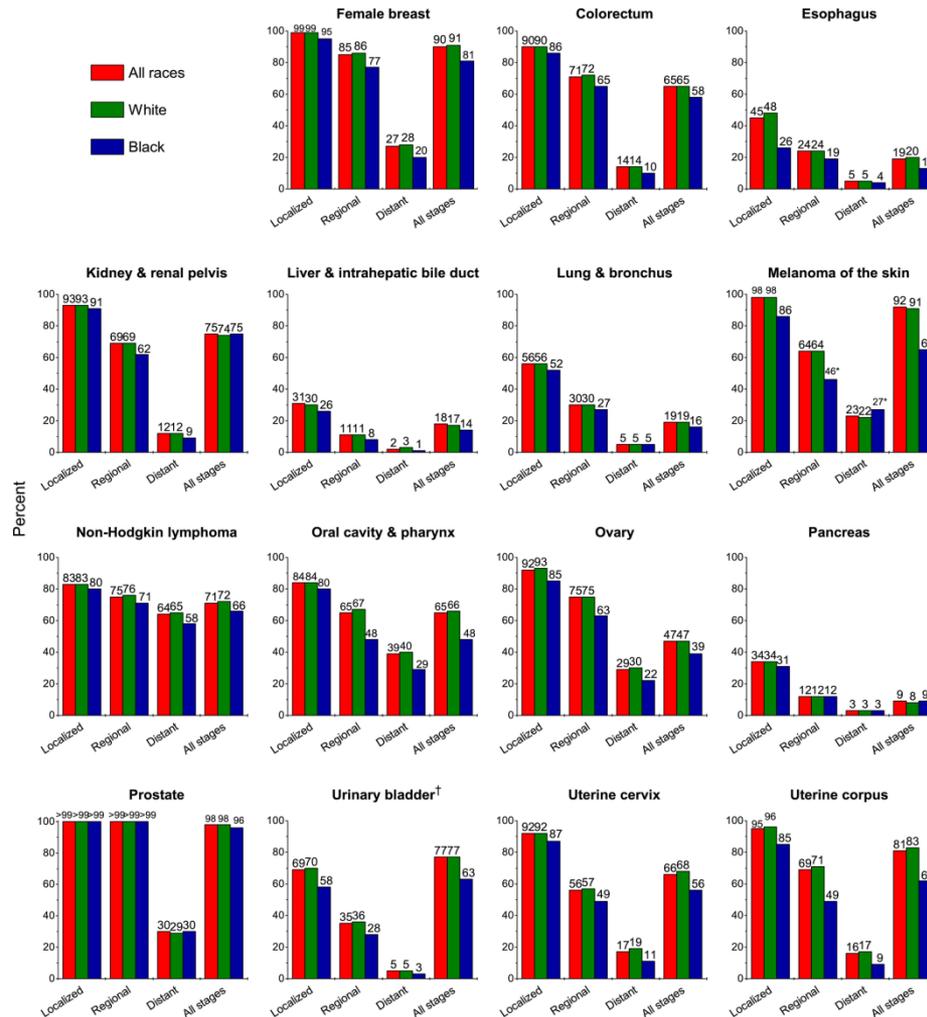
STAGE	0	1	2	3	4
TUMOR SIZE	VERY SMALL, INSIDE THE GLANDS	LESS THAN 2 CM	5-2 CM	5 CM AND LARGER	ANY SIZE
LYMPH NODES	NO CANCER	NO CANCER	AFFECTED BY CANCER	AFFECTED BY CANCER; CANCER HAS REACHED THE MUSCLES AND SKIN	AFFECTED BY CANCER
SPREADING	CONFINED TO THE BREAST AREA, NOT OUTSIDE	CANCER HAS SPREAD OUTSIDE THE BREAST AREA TO ANY PART OF THE BODY			
EV	-EV	-EV	-EV	-EV	+++EV
5 YEAR SURVIVAL RATE	100%	100%	87%	61%	20%

+962 6 5530800 +962 6 5530870 JBCP Jordan Jordan Breast Cancer Program www.jbcp.jo

Survival rate?

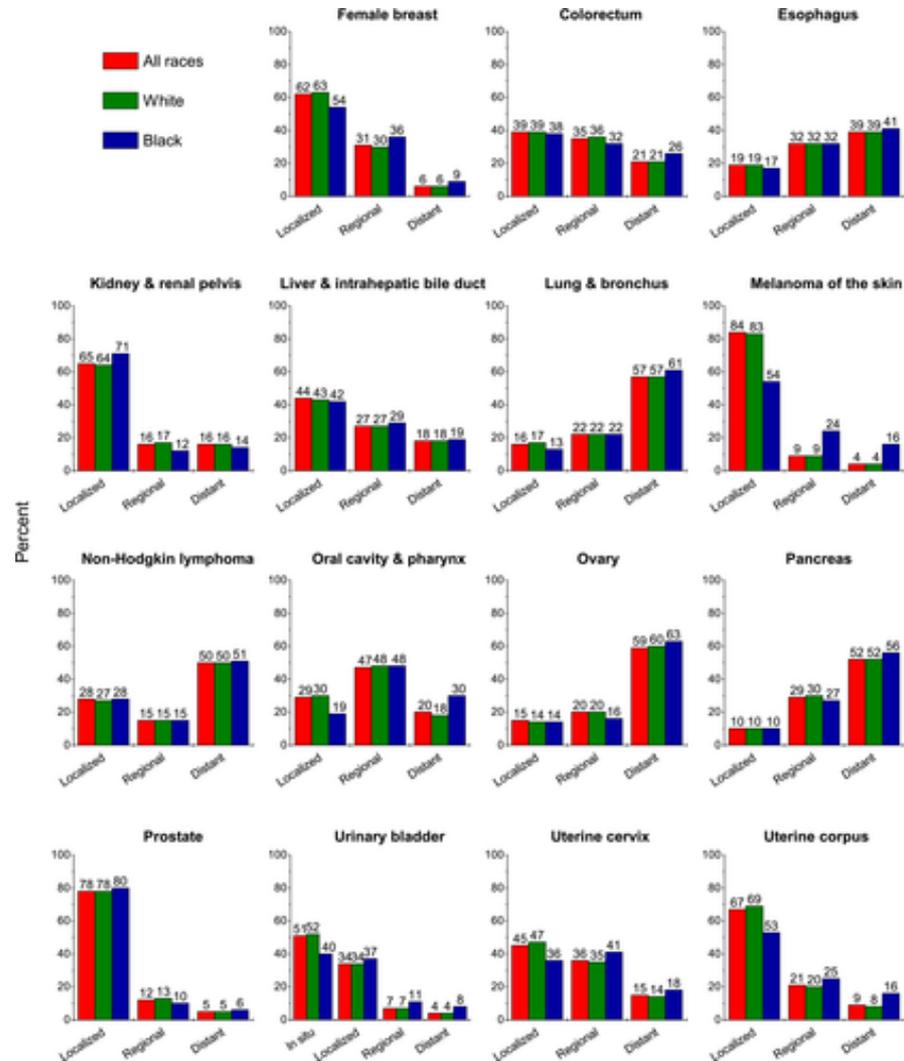
Staging in cancer: Five-year relative survival rates for selected cancers by race and stage at diagnosis, united states, 2008-2014

Survival rate by stage and race?

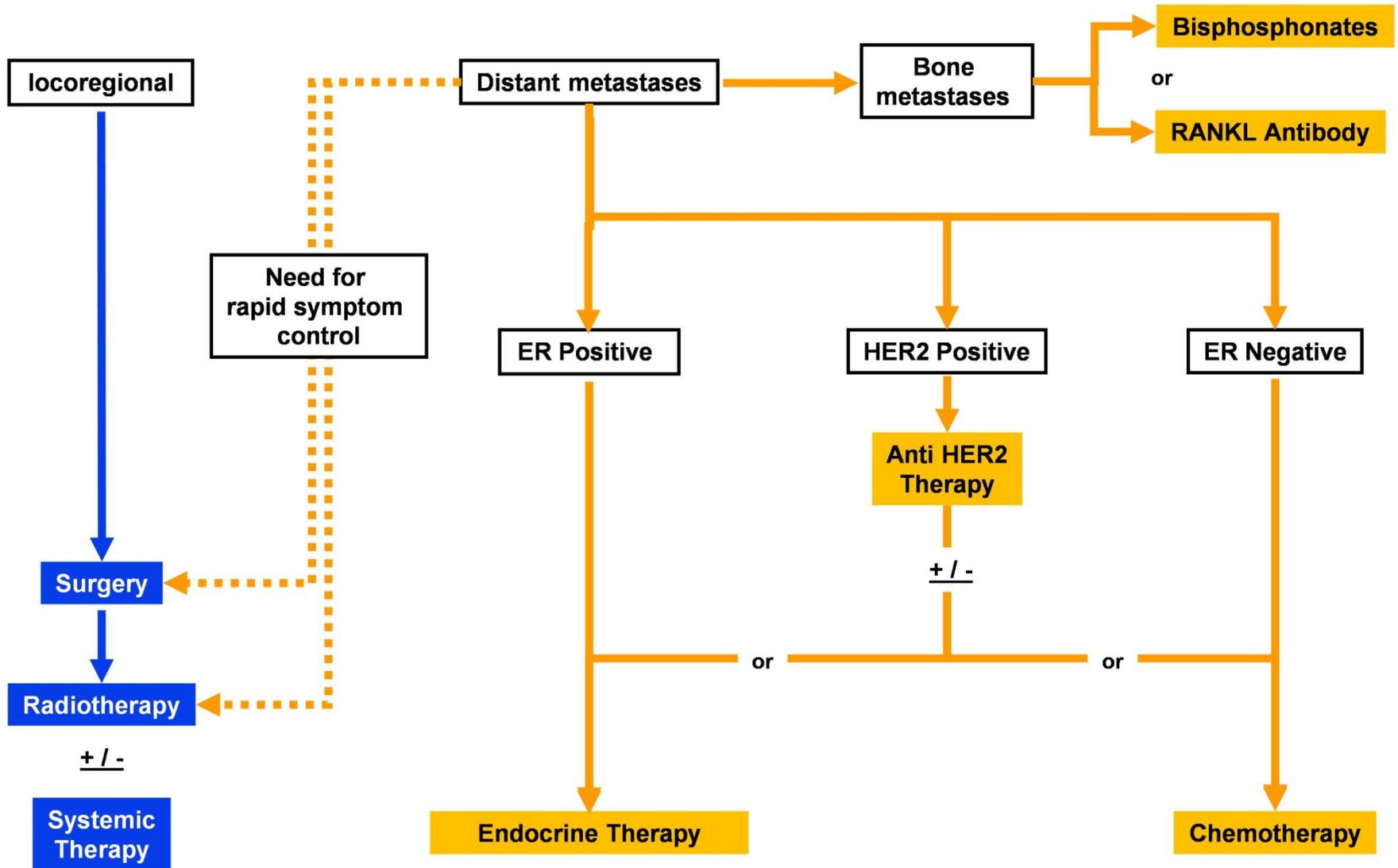


Staging in cancer: Stage Distribution for Selected Cancers by Race, United States, 2008 to 2014

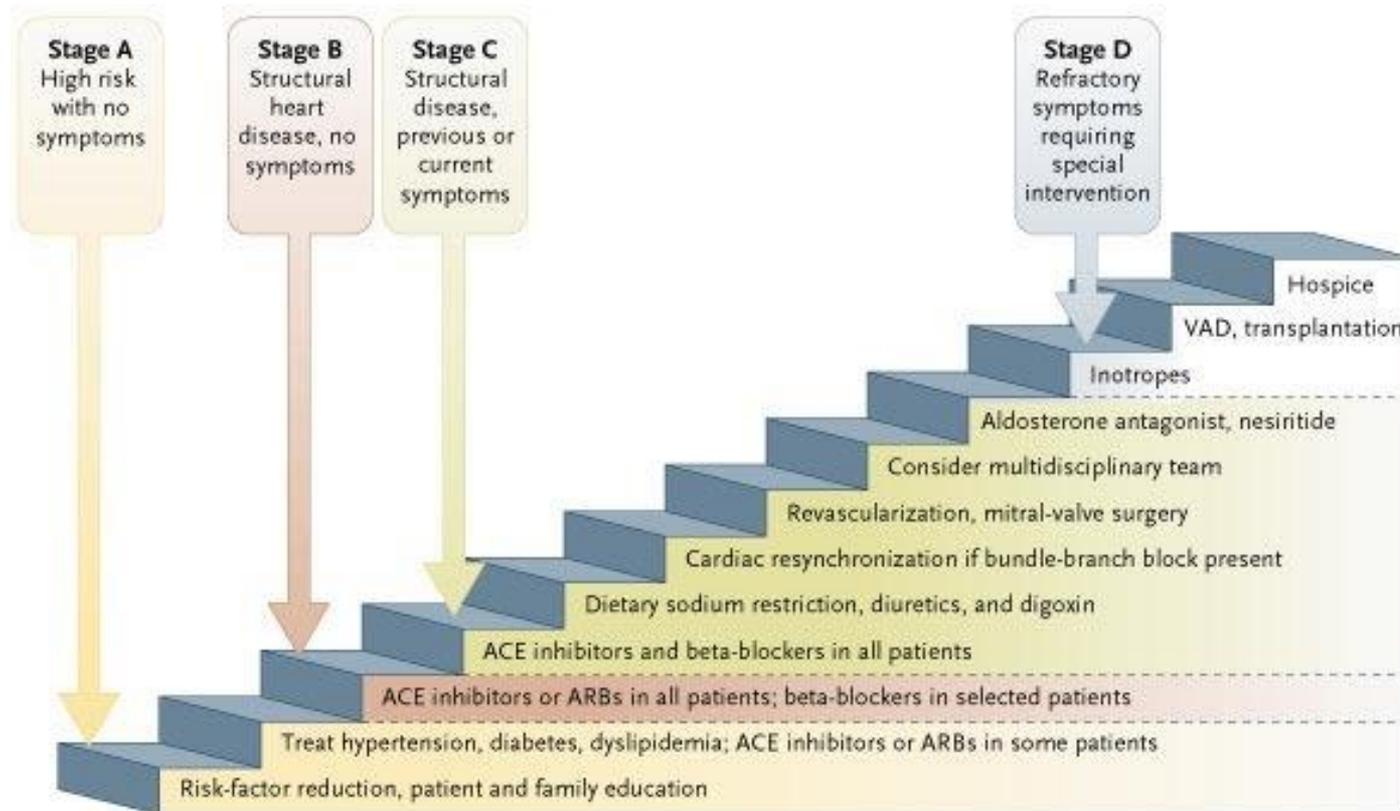
Presentation for treatment at different stages



Staging in cancer: Treatment flow by stage



Staging and treatment: Heart Failure (CHF)



Staging in chronic disease: Chronic Obstructive Pulmonary Disease (COPD)

From staging
to treatment

Therapy Based on Symptoms and Staging of COPD

Symptoms	Asymptomatic	Mild	Moderate	Severe	Very Severe
Staging	0 At Risk	I Mild	II Moderate	III Severe	IV Very Severe
Avoidance of risk factor(s); influenza vaccination					
			Add short-acting bronchodilators when needed		
			Add regular Rx with ≥1 long-acting bronchodilator. Add rehabilitation		
				Add ICS if repeated exacerbations	
					Add O ₂ ; consider surgery

ICS=inhaled corticosteroid.
 Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease (GOLD) Recommendations. Updated 2004. Available at: www.goldcopd.com. Accessed November 9, 2004.

Staging in chronic disease

What are the Stages of Chronic Kidney Disease (CKD)?

Biomarkers ?

STAGES OF CHRONIC KIDNEY DISEASE		GFR*	% OF KIDNEY FUNCTION
Stage 1	Kidney damage with normal kidney function	90 or higher	90-100%
Stage 2	Kidney damage with mild loss of kidney function	89 to 60	89-60%
Stage 3a	Mild to moderate loss of kidney function	59 to 45	59-45%
Stage 3b	Moderate to severe loss of kidney function	44 to 30	44-30%
Stage 4	Severe loss of kidney function	29 to 15	29-15%
Stage 5	Kidney failure	Less than 15	Less than 15%

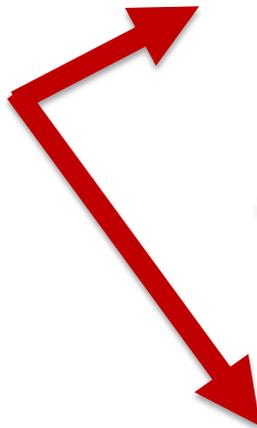
* Your GFR number tells you how much kidney function you have. As kidney disease gets worse, the GFR number goes down.

Staging in neurodegenerative disease: Parkinson disease

The Hoehn and Yahr Scale is the most commonly-used scale to measure the severity of Parkinson's symptoms, and classifies patients in the following stages:^[Goetz 2004]

Stage 1	Stage 1.5	Stage 2	Stage 2.5	Stage 3	Stage 4	Stage 5
Unilateral involvement only	Unilateral and axial involvement	Bilateral symptoms No impairment of balance	Mild bilateral disease with recovery on pull test	Mild to moderate disease Physically independent	Severe disability, still able to walk or stand unassisted	Wheelchair-bound or bedridden unless assisted

Function ?

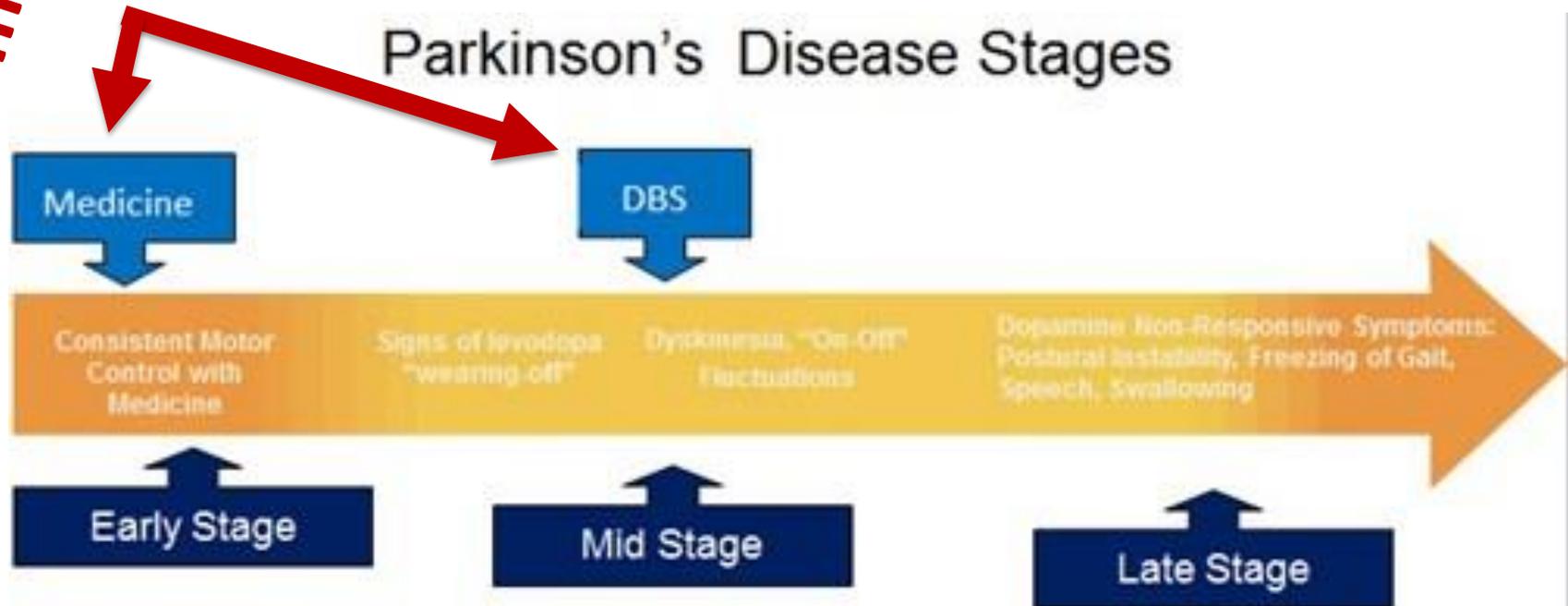


STAGES IN PARKINSON'S DISEASE

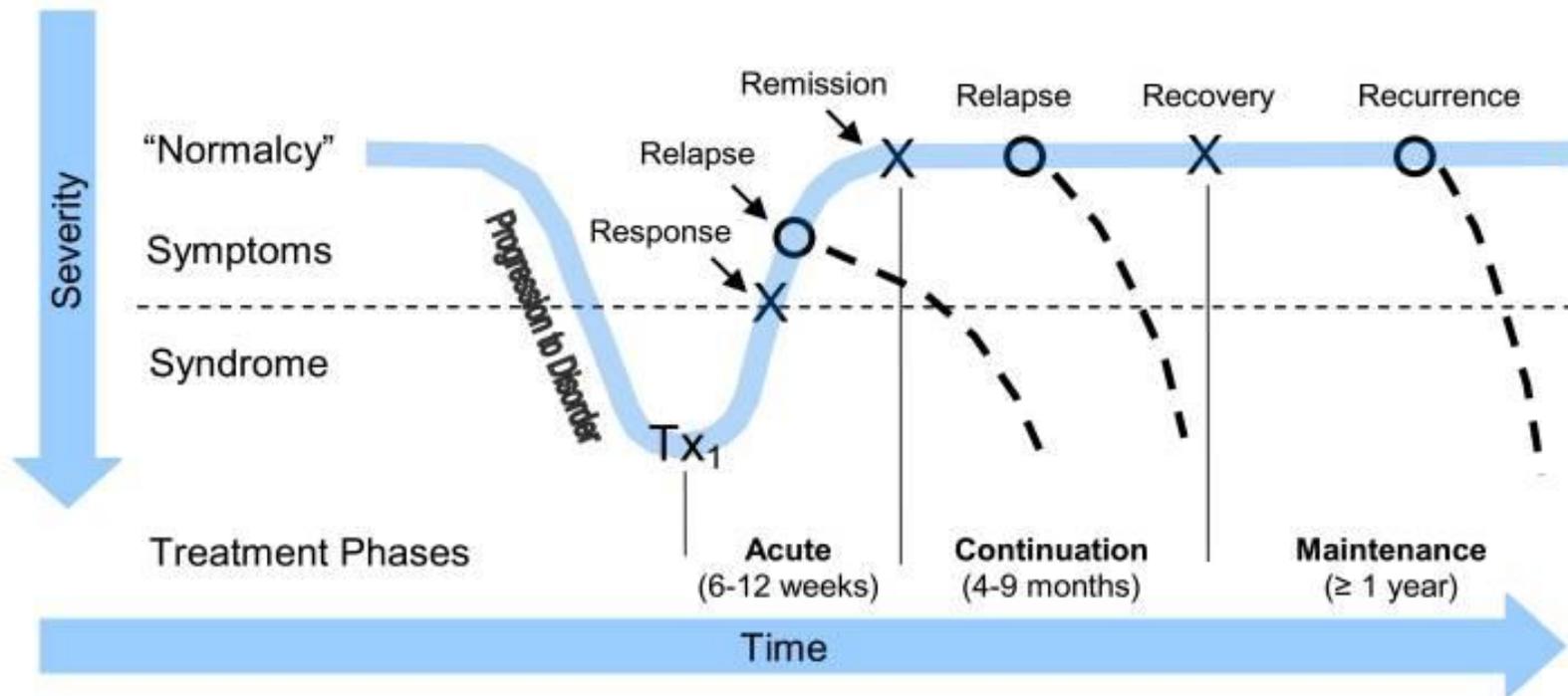
STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
Mild unsevere symptoms	Moderate symptoms with facial modifications	Progression of disease is occurred.	Drastic change is observed.	Advanced stage with aggressive symptoms
Tremors on one side and postural changes are observed.	Tremors on both sides of the body is observed.	Imbalance of body and improper reflexes are observed.	Personal assistance is required even in simple tasks.	Hallucination and spasm occurs in this stage.

Staging in neurodegenerative disease: Parkinson disease

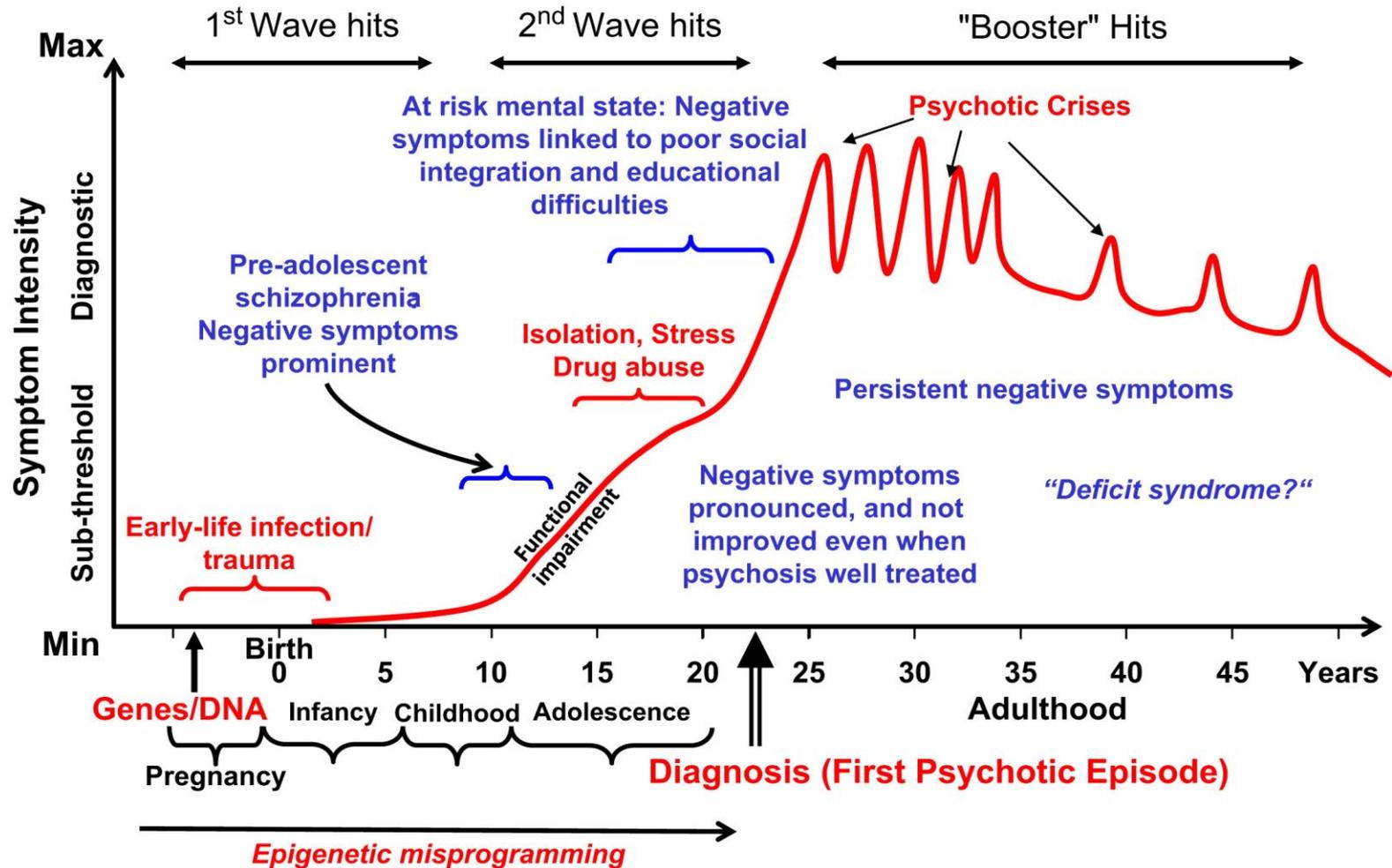
Treatments ?



Staging in psychiatric disease: Phases of treatment for major depression



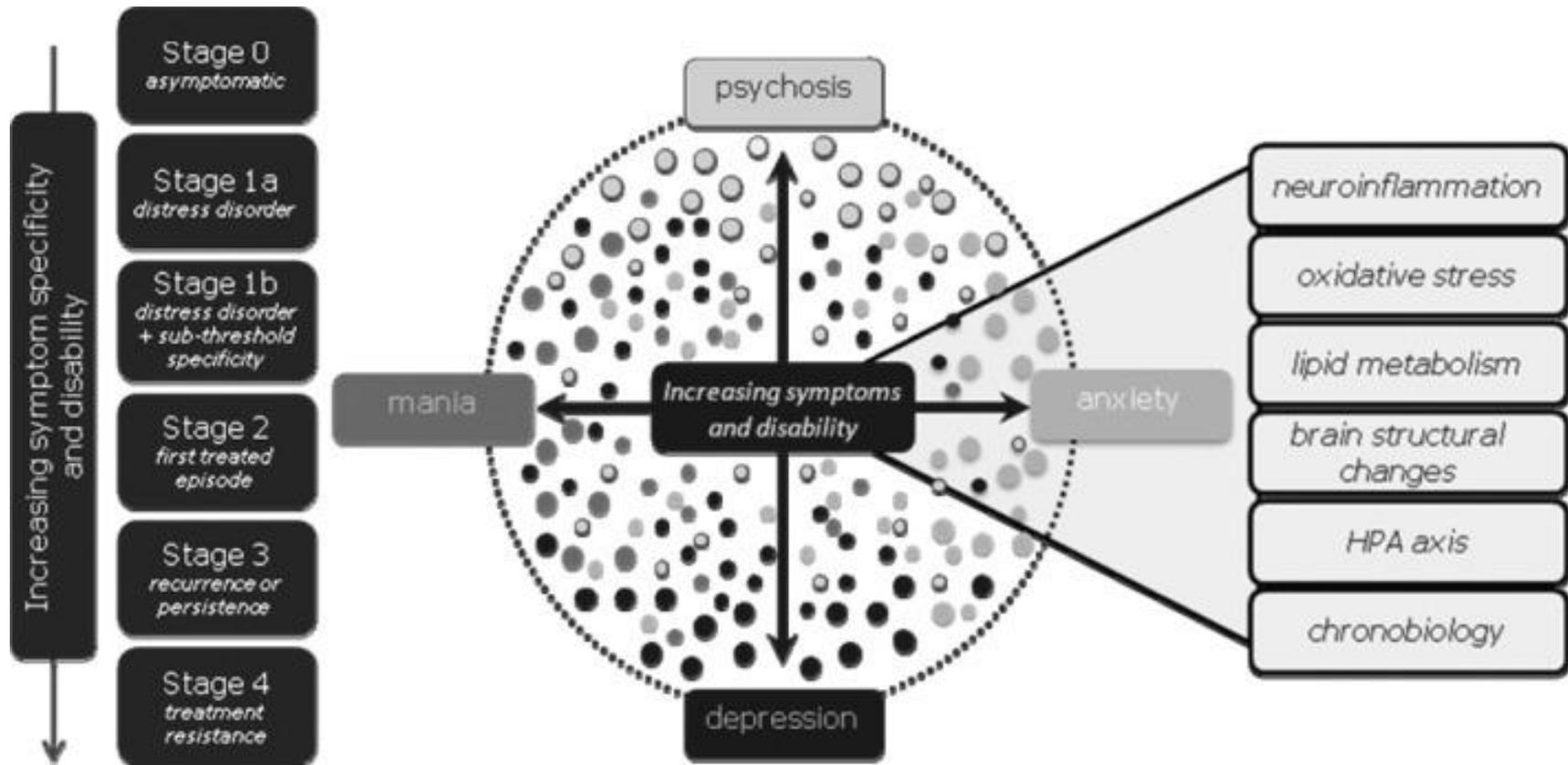
Staging in psychiatric disease: Phases of treatment for schizophrenia



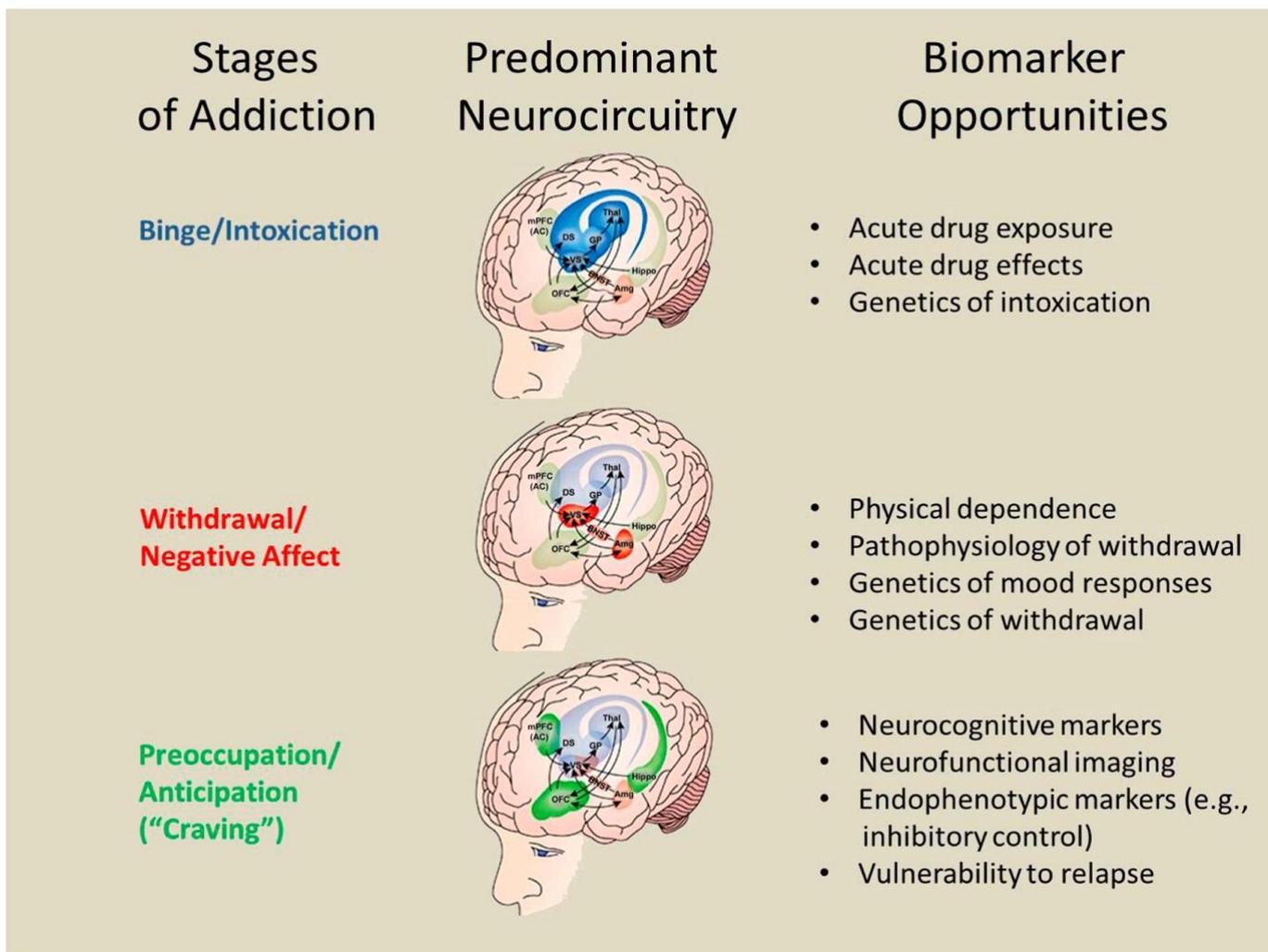
Staging in psychiatric disease: Proposed staging model for psychotic and severe mood disorders

Stage	Definition of stage (psychosis or severe mood disorder)
0	Increased risk of psychotic or severe mood disorder. No symptoms currently.
Ia	Mild or non-specific symptoms (including subtle neurocognitive deficits) of psychosis or severe mood disorder. Mild functional change or decline.
Ib	Ultra-high risk: moderate but subthreshold symptoms, with neurocognitive changes and functional decline to caseness (GAF < 70)
II	First episode of psychotic or severe mood disorder. Full threshold disorder with moderate to severe symptoms, neurocognitive deficits and functional decline (GAF 30–50).
IIIa	Incomplete remission from first episode of care. (Patient's management could be linked or fast-tracked to Stage IV.)
IIIb	Recurrence or relapse of psychotic or mood disorder which stabilises with treatment at a GAF level ≤ 30 , or with residual symptoms or neurocognition below the best level achieved after remission from the first episode.
IIIc	Multiple relapses with worsening in clinical extent and impact of illness objectively present.
IV	Severe, persistent or unremitting illness as judged by symptoms, neurocognition and disability criteria.

Clinical staging model for mental disorders and putative biomarkers



Staging in addiction: Schematic model of the three stages of the neural circuitry implicated in addiction

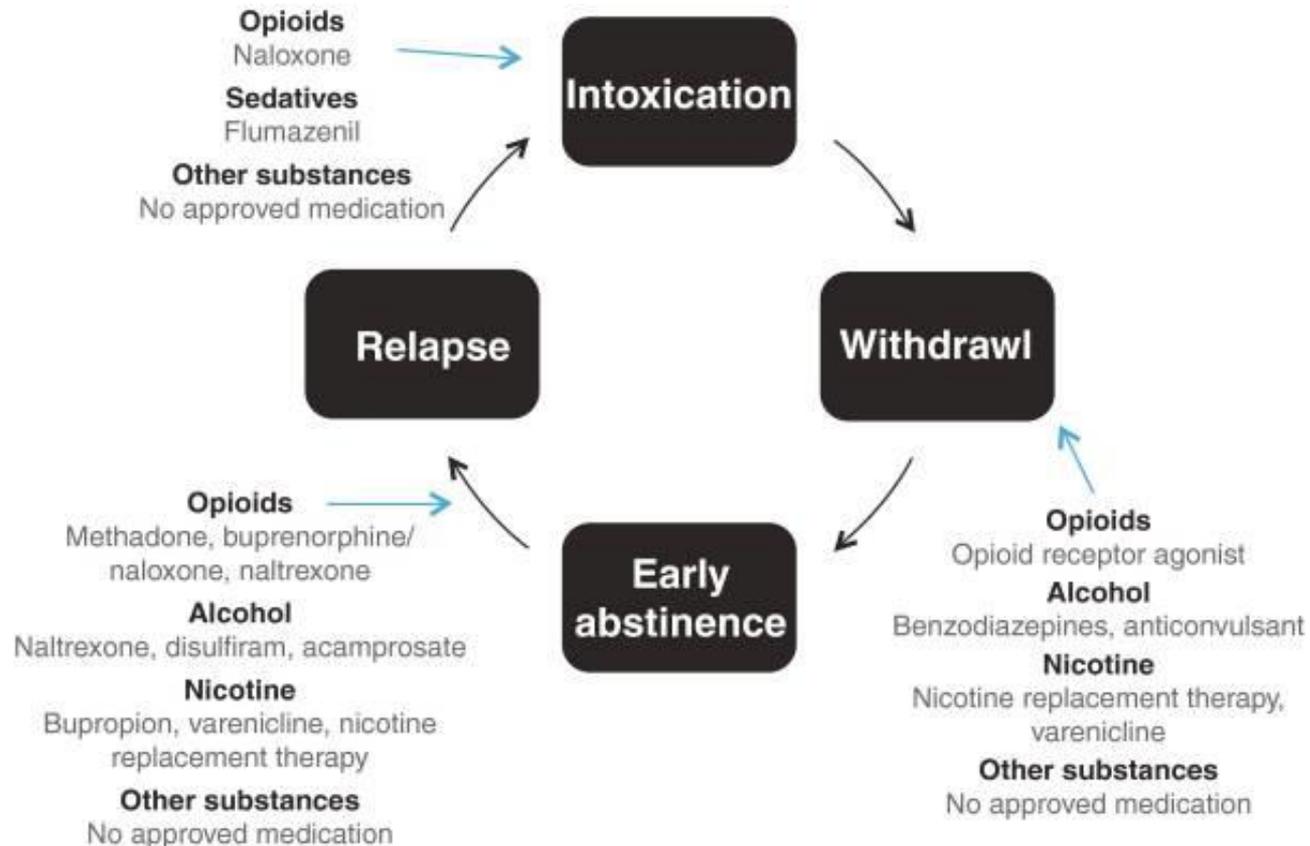


Published in: Nora D Volkow; George Koob; Ruben Baler; *ACS Chem. Neurosci.* **2015**, 6, 522-525.

DOI: 10.1021/acscemneuro.5b00067

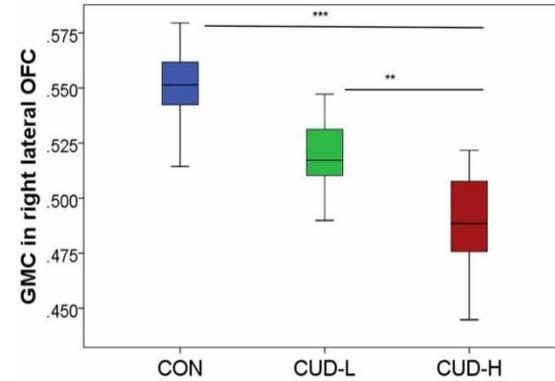
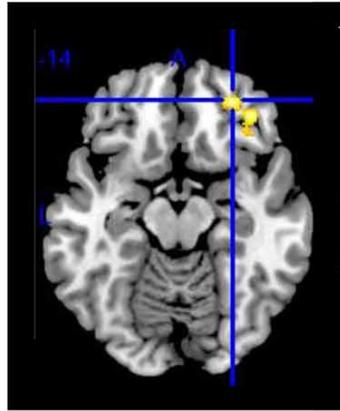
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Staging in addiction: Cycle of addiction and currently available medications for substance use disorders at each stage of the cycle



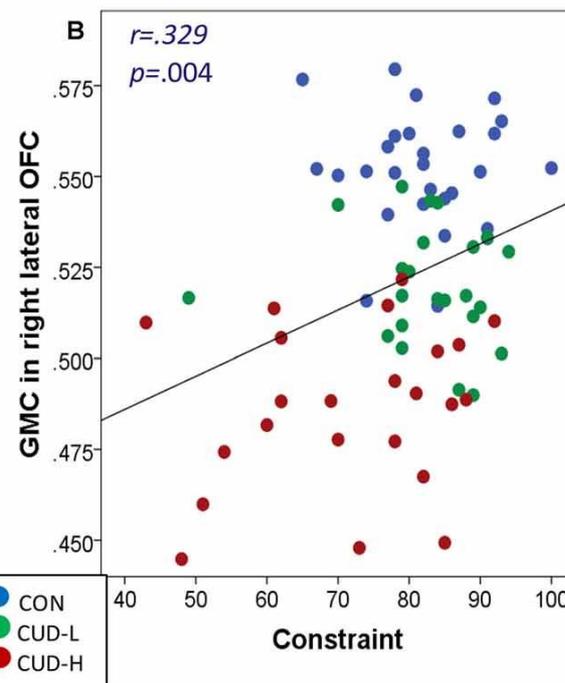
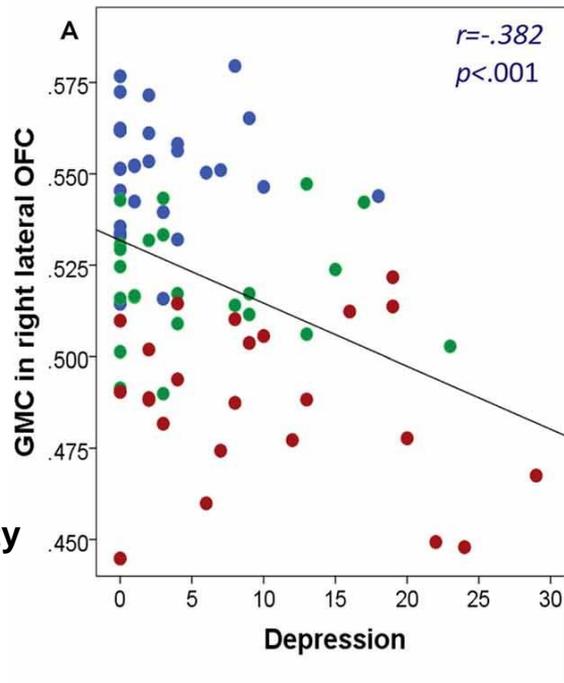
Stratified approach in addiction: Childhood trauma & brain structure in addiction

Cocaine users with high childhood trauma have least gray matter in right lateral orbitofrontal cortex



** $p_{\text{FWE-cor}} < .05$
*** $p_{\text{FWE-cor}} < .001$

The greater the depression the lower the structural integrity



The lower the constraint the lower the structural integrity

Stratified approach in addiction: Childhood trauma & brain structure in addiction

Multiple regression Variable	Block 1			Block 2			Block 3		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Age	-0.001	0.001	-0.212	-0.001	0.001	-0.192	-0.001	0.000	-0.291*
Education	0.000	0.002	0.010	-0.002	0.002	-0.131	-0.001	0.002	-0.099
TIV	-2.172E-5	0.000	-0.119	-2.047E-5	0.000	-0.112	-1.364E-5	0.000	-0.075
Drug use lifetime									
Cocaine	0.001	0.000	0.190	0.000	0.000	0.161	0.000	0.000	0.124
Alcohol	9.441E-6	0.000	0.004	2.132E-5	0.000	0.009	0.000	0.000	0.080
Cannabis	1.816E-5	0.000	0.007	0.000	0.000	0.096	0.000	0.000	0.163
Constraint				0.001	0.000	0.367*	0.000	0.000	0.101
Depression				-0.001	0.000	-0.287	0.000	0.000	-0.123
Childhood trauma [†]							-0.001	0.000	-0.607
Adjusted R^2		-0.082			0.102			0.377	
<i>F</i> for change in R^2		0.431			5.007*			17.301**	

* $p=.055$; ** $p<.001$

Childhood trauma accounted for 37.7% of variance in gray matter in the right lateral OFC, while constraint and depression explained 10.2%, above and beyond the effects of age, education, TIV and lifetime drug use variables

Stratified approach in addiction: Psychosocial phenotype

50 yo Male AUD no more “rehab”

Admission History								
Item #	Pat Type	Admission Date	Admission Time	Discharge Date	Discharge Time	Serial#	Fac	Chief Complaint
1	I	2-May2019	11:31			3101062135	BIPD	DRUG DEPENDENCY
2	I	12Apr2019	09:52	17Apr2019	10:37	3101061154	BIPD	Alcohol dependence, uncomplicated
3	I	13Dec2018	15:51	18Dec2018	10:44	3101055233	BIPD	Alcohol dependence with withdrawal, unco
4	I	8-Aug2018	13:30	12Aug2018	13:05	3101048592	BIPD	Alcohol dependence with withdrawal, unco
5	I	8-Jul2018	11:56	14Jul2018	10:35	3101046907	BIPD	Alcohol dependence, uncomplicated
6	I	5-Jul2018	10:33	8-Jul2018	11:49	3101046738	BIPD	Alcohol dependence, uncomplicated
7	I	2-Apr2018	16:32	30Apr2018	10:29	3101041607	BIPD	Alcohol dependence, uncomplicated
8	I	30Mar2018	10:07	2-Apr2018	16:30	3101041455	BIPD	Alcohol dependence with intoxication, un
9	I	6-Mar2018	10:32	8-Mar2018	18:02	3101040120	BIPD	Alcohol dependence with withdrawal, unco
10	I	21Jan2018	09:36	23Jan2018	10:49	3101036929	BIPD	Alcohol dependence, uncomplicated
11	I	28Dec2017	14:41	30Dec2017	14:08	3101034944	BIPD	Alcohol dependence, uncomplicated
12	I	29Nov2017	09:34	1-Dec2017	17:18	3101032496	BIPD	Alcohol dependence, uncomplicated
13	I	17Nov2017	11:07	22Nov2017	10:45	1106339034	RVTH	Pain in left knee
14	V	18Oct2017	00:01	18Oct2017	18:30	3501651559	BIPD	Chest pain, unspecified
15	I	12Oct2017	14:00	15Oct2017	11:00	3101028352	BIPD	Alcohol dependence with withdrawal, unco
16	I	3-Aug2017	12:56	4-Sep2017	10:23	3101022362	BIPD	Alcohol dependence, uncomplicated
17	I	7-Aug2016	15:41	4-Sep2016	12:21	3100983808	BIPD	Alcohol dependence, uncomplicated
18	I	10Dec2015	11:42	14Dec2015	11:26	3100952079	BIPD	Alcohol dependence, uncomplicated

Admission History								
Item #	Pat Type	Admission Date	Admission Time	Discharge Date	Discharge Time	Serial#	Fac	Chief Complaint
1	I	10Dec2015	11:42	14Dec2015	11:26	3100952079	BIPD	Alcohol dependence, uncomplicated
2	I	12Oct2014	15:45	13Nov2014	10:13	3100891774	BIPD	ALCOH DEP NEC/NOS-CONTIN
3	I	7-Aug2014	16:29	9-Aug2014	11:41	3100882065	BIPD	ALCOH DEP NEC/NOS-CONTIN
4	I	18Jul2013	03:35	19Jul2013	20:07	3100818356	BIPD	SHORTNESS OF BREATH
5	I	30May2012	10:18	4-Jun2012	13:43	3100745159	BIPD	ALCOH DEP NEC/NOS-CONTIN
6	I	16Apr2012	14:43	20Apr2012	17:00	3100737359	BIPD	ALCOH DEP NEC/NOS-CONTIN
7	I	11Mar2012	14:53	15Mar2012	12:38	3100730801	BIPD	ALCOH DEP NEC/NOS-CONTIN
8	I	28Sep2011	14:39	3-Oct2011	11:20	3100701248	BIPD	ALCOH DEP NEC/NOS-CONTIN
9	I	15Aug2011	15:46	19Aug2011	11:00	3100693061	BIPD	ALCOH DEP NEC/NOS-CONTIN
10	I	24May2011	14:51	28May2011	13:51	3100678152	BIPD	ALCOHOL WITHDRAWAL
11	I	5-Apr2011	11:55	5-Apr2011	17:47	3100669053	BIPD	ALCOHOL WITHDRAWAL
12	I	22Jun2007	08:05	25Jun2007	13:48	3100438977	BIPD	CHEST PAIN NOS
13	I	1-May2007	10:14	30May2007	16:07	3100425569	BIPD	CHEMICAL DEPENDENCY(REHAB)
14	I	18Apr2007	08:39	21Apr2007	11:12	3100423430	BIPD	CHEST PAIN NOS
15	I	14Nov2006	04:01	15Nov2006	13:44	3100399362	BIPD	CHEST PAIN NEC
16	I	22Sep2006	14:10	17Oct2006	09:47	3100390851	BIPD	CHEMICAL DEPENDENCY(REHAB)
17	I	19Sep2006	07:29	22Sep2006	13:58	3100390232	BIPD	CHEST PAIN NOS
18	I	16Jul2006	12:15	16Jul2006	21:00	3100379806	BIPD	CHEST PAIN NOS

Stratified approach in addiction: Psychosocial phenotype

75 yo male MMTP 140mg Benzos, Lives with Cousin OUD

Admission History								
Itm #	Pat Type	Admission Date	Admission Time	Discharge Date	Discharge Time	Serial#	Fac	Chief Complaint
1	I	28Apr2019	09:04			3101061930	BIPD	DRUG DEPENDENCE(REHAB)
2	I	23Apr2019	08:47	28Apr2019	09:00	3101061677	BIPD	DRUG DEPENDENCY
3	I	1-Oct2018	13:29	15Oct2018	05:38	3101051345	BIPD	Sedative, hypnotic or anxiolytic depende
4	I	24Sep2018	15:43	1-Oct2018	13:27	3101051004	BIPD	Sedativ/hyp/anxiolytc dependence w withdr
5	I	13Feb2017	13:28	21Feb2017	12:52	3101005511	BIPD	Sedative, hypnotic or anxiolytic depende
6	I	5-Oct2016	10:04	26Oct2016	09:46	3100990684	BIPD	Sedative, hypnotic or anxiolytic abuse,
7	I	30Sep2016	14:37	5-Oct2016	10:03	3100990207	BIPD	Sedative, hypnotic or anxiolytic depende
8	I	3-Feb2016	13:42	8-Feb2016	11:01	3100959401	BIPD	Sedative, hypnotic or anxiolytic depende
9	I	17Dec2014	12:34	22Dec2014	10:08	3100901515	BIPD	SED,HYP,ANXIOLYT DEP-CON
10	I	20Oct2014	11:15	27Oct2014	10:43	3100892868	BIPD	SED,HYP,ANXIOLYT DEP-CON
11	I	3-Jun2014	12:17	10Jun2014	12:15	3100871709	BIPD	SED,HYP,ANXIOLYT DEP-CON
12	I	24Mar2014	13:22	31Mar2014	13:51	3100859982	BIPD	SED,HYP,ANXIOLYT DEP-CON
13	I	16Dec2013	14:32	23Dec2013	10:05	3100843931	BIPD	SED,HYP,ANXIOLYT DEP-CON
14	I	14Sep2013	14:18	11Oct2013	10:21	3100828214	BIPD	SED,HYP,ANXIOLYT DEP-CON
15	I	8-Sep2013	10:47	14Sep2013	14:13	3100827068	BIPD	DRUG ABUSE NEC-CONTIN
16	I	24Jun2013	10:52	22Jul2013	10:28	3100814029	BIPD	SED,HYP,ANXIOLYT DEP-CON
17	I	16Jun2013	11:08	24Jun2013	10:50	3100812742	BIPD	DRUG DEPENDENCE
18	I	1-Apr2013	13:51	6-Apr2013	14:54	3100799513	BIPD	SED,HYP,ANXIOLYT DEP-CON

Admission History								
Itm #	Pat Type	Admission Date	Admission Time	Discharge Date	Discharge Time	Serial#	Fac	Chief Complaint
1	I	1-Apr2013	13:51	6-Apr2013	14:54	3100799513	BIPD	SED,HYP,ANXIOLYT DEP-CON
2	I	29Aug2011	15:08	26Sep2011	14:11	3100695582	BIPD	SED,HYP,ANXIOLYT DEP-CON
3	I	22Aug2011	12:50	29Aug2011	15:08	3100694213	BIPD	SED,HYP,ANXIOLYT DEP-CON
4	I	5-Jul2011	12:58	7-Jul2011	23:18	1106029504	RVTH	CALCULUS OF KIDNEY

Stratified approach in addiction: Palliative Care

Palliative care is specialized medical care for people living with a serious illness, where treatments directed at recovery have not been effective. This type of supportive care is focused on relief from the symptoms and stress of a serious illness. The goal is to reduce harm and improve quality of life for both the patient and the family.

Stratified approach in addiction: Psychosocial phenotype



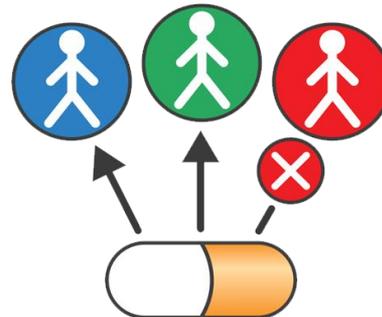
SAME CARE PLAN?

Staging and stratified care in addiction: Methadone Quotes

Dr. Dole: “Secondary goals present more of a problem in definition and evaluation. Alcoholism, non-opioid drug abuse, psychopathic behavior, and delinquency are not stopped by methadone or any other medicine, nor can any medicine provide a patient with a job, stable home, self-respect, or happiness. Even with the best of supportive services, achievements in these areas may be limited by factors beyond the program’s control.”

Staging and stratified care in addiction: Barriers and current state

- Defining standardized stages in addiction
- What is recovery? What is the ultimate goal of treatment per stage?
aims for subpopulations (e.g., Palliative rehab)
- Research to facilitate/ ground staging and personalized treatment



Proposed staging model in Substance Use Disorder

	Early stage		Mid-stage	Advanced stage	
Stage	1	2	3	4	5
Severity	Mild	Mild	Moderate	Severe	Severe
Symptoms					
Biomarkers					
Psychosocial					
Treatments and actions					

An aerial photograph of New York City, showing the dense skyline of Manhattan in the background and Central Park in the foreground. The image is overlaid with a semi-transparent blue banner containing text.

Research Support: NIDA K23-DA045928-02 (KB)
The Addiction Institute of Mount Sinai
Department of Psychiatry
Department of Environmental Medicine & Public Health

