

Applying the BMC Youth Model: three case studies

Presented by

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Acknowledgements

- Of country
- Of lived experience

BMC Youth Model of Care – Seminar Series

1. A highly personalised and measurement-based model of care to manage youth mental health
2. Combining clinical stage and pathophysiological mechanisms to understand illness trajectories in young people
3. A comprehensive assessment framework for youth mental health care
4. Using the BMC Youth Model to personalise care options – best care, first time!
5. A youth mental health service delivery model to support highly personalised and measurement-based care
6. Maximising the use of digiHealth solutions in youth mental health care

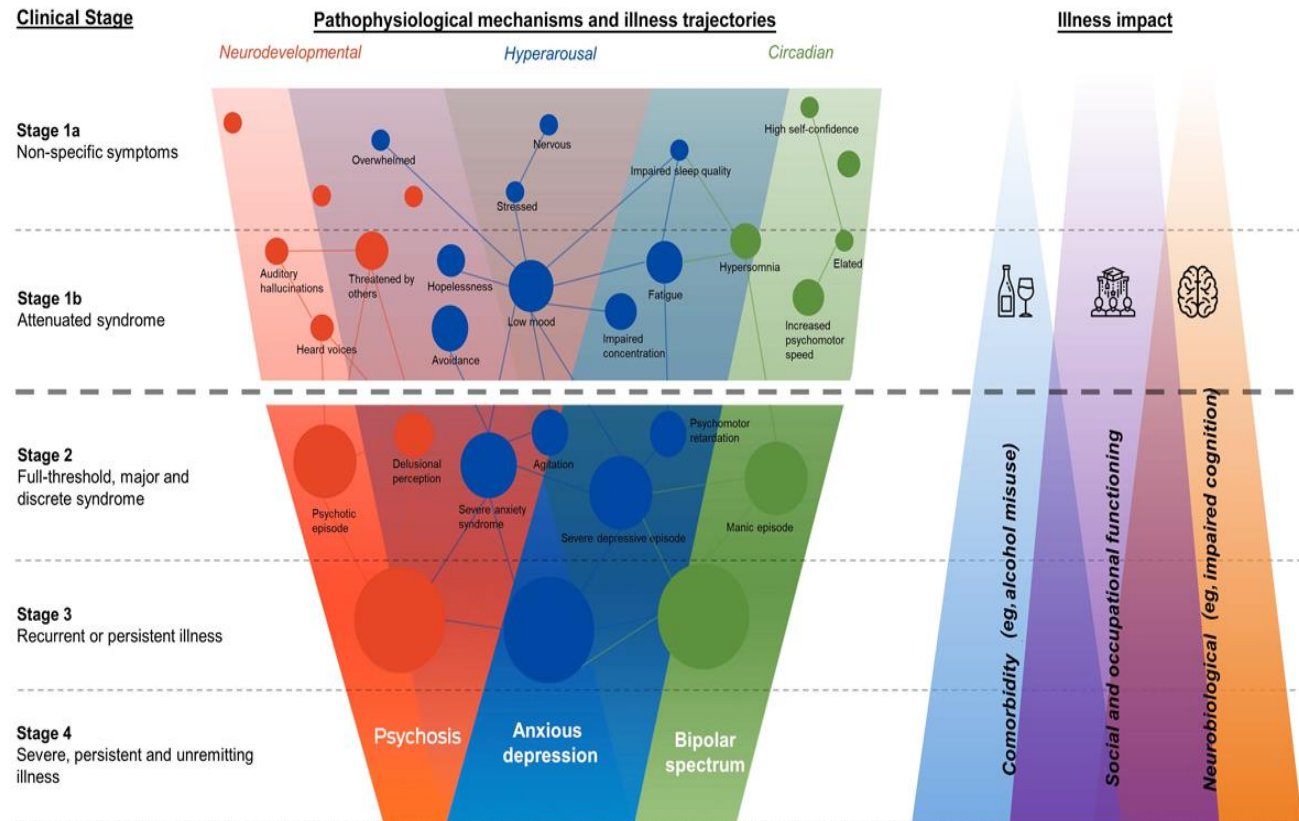
Recap of Seminar #1

- BMC Youth Model aims to **prevent progression to more complex and severe forms of illness**
- First core concept is **a multidimensional assessment and outcomes framework** to address the holistic needs of young people presenting for care



Recap of Seminar #2

- BMC Youth Model's **transdiagnostic framework** is supported by clinical, neuropsychological, neuroimaging, sleep-wake behavior and circadian rhythm evidence
- **Pathophysiological mechanisms and illness trajectories** attempt to describe the processes underlying development of common adolescent-onset mood and psychotic syndromes



Recap of Seminar #3

- Use of **self-report, clinical and objective measures** allows unprecedented opportunity to refine our understanding of important clinical features in youth mental health care
- Once validated, it will be a major step towards **enabling highly personalised and measurement-based care**

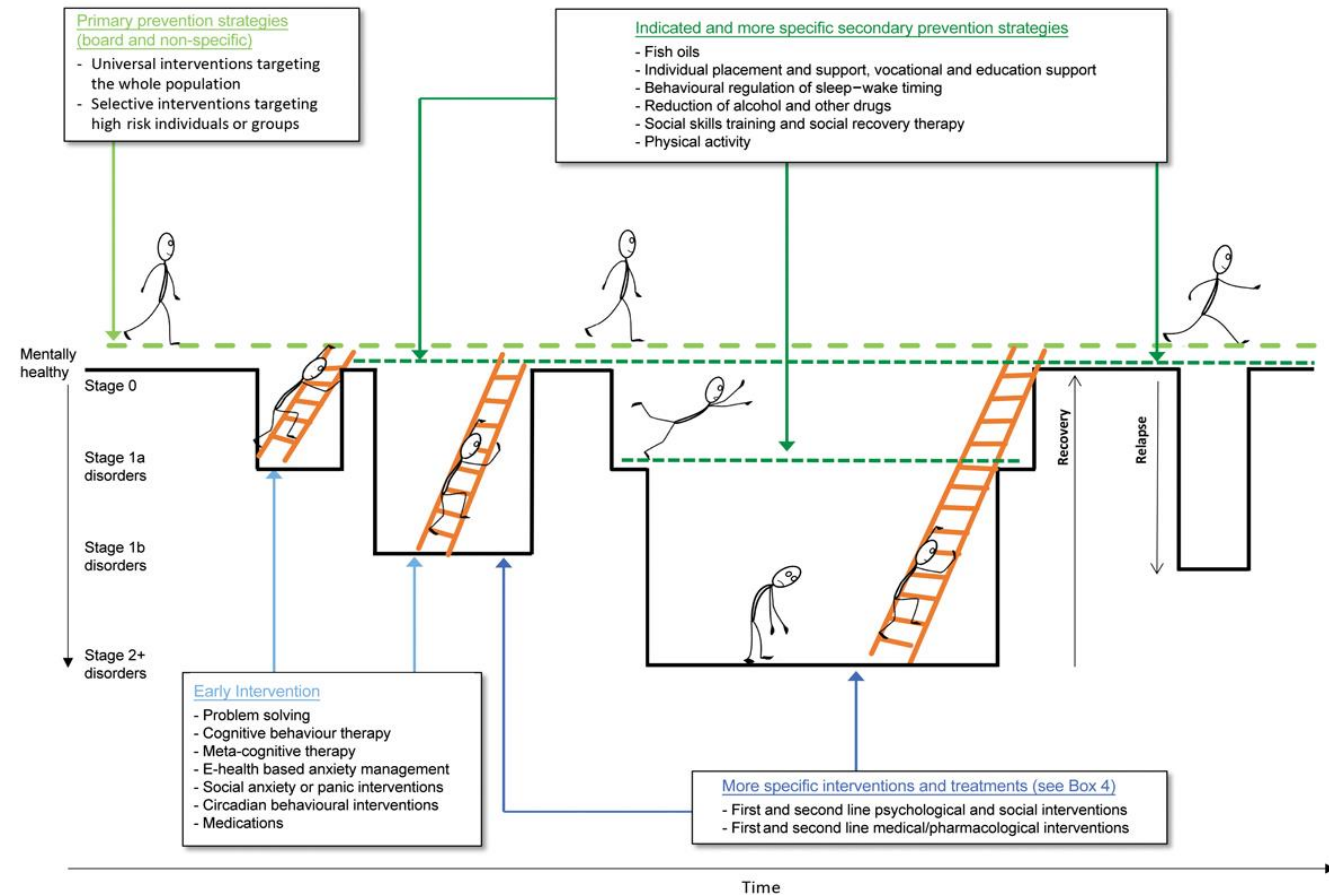


	Standard assessments	Further assessments
Neuropsychological function	- Online neuropsychological testing (eg, Cambridge Neuropsychological Test Automated Battery): ▶ attention ▶ psychomotor speed ▶ memory ▶ executive function ▶ emotion and social cognition	- Comprehensive neuropsychological and social cognitive testing: ▶ immediate and delayed visual and verbal memory ▶ verbal fluency ▶ working memory ▶ attentional switching ▶ impulsivity ▶ theory of mind ▶ facial emotion recognition
Sleep-wake behaviours and circadian rhythms	- Sleep diary - Timing of sleep onset, sleep offset, time in bed (eg, Pittsburgh Sleep Quality Index) 24-hour actigraphy measurements with standard devices (over at least a 2-week period)	- Overnight melatonin and cortisol assays - Nocturnal core body temperature
Metabolic and immune markers	- Anthropometric measurement: ▶ height, weight, waist circumference, body mass index - Blood pathology analysis: ▶ full blood count ▶ urea, electrolytes and creatinine ▶ thyroid function ▶ non-specific inflammatory markers: C-reactive protein ▶ fasting blood glucose ▶ insulin resistance (eg, homeostasis model assessment)	- Autoantibody screening (eg, N-methyl-D-aspartate receptor, glycine receptor, metabotropic glutamate receptor 5) - More extensive inflammatory marker screening (eg, tumour necrosis factor, interleukin)
Brain structure and function	<i>Recommended for all stage 2+ patients and stage 1b patients with a psychotic or circadian-bipolar spectrum phenotype</i> - Magnetic resonance imaging: ▶ cortical and subcortical grey matter volume ▶ cortical thickness	- Diffusion magnetic resonance imaging: ▶ white matter tractography - In vivo magnetic resonance spectroscopy: ▶ metabolite concentrations (eg, glutathione, creatine, N-acetyl-aspartate)

Recap of Seminar #4

- BMC Youth Model outlines a **treatment selection guide for early intervention** incorporating three core concepts:

1. Multidimensional assessment and outcomes framework
2. Clinical staging
3. Three common illness subtypes (psychosis, anxious depression, bipolar spectrum) based on three underlying pathophysiological mechanisms (neurodevelopmental, hyperarousal, circadian)



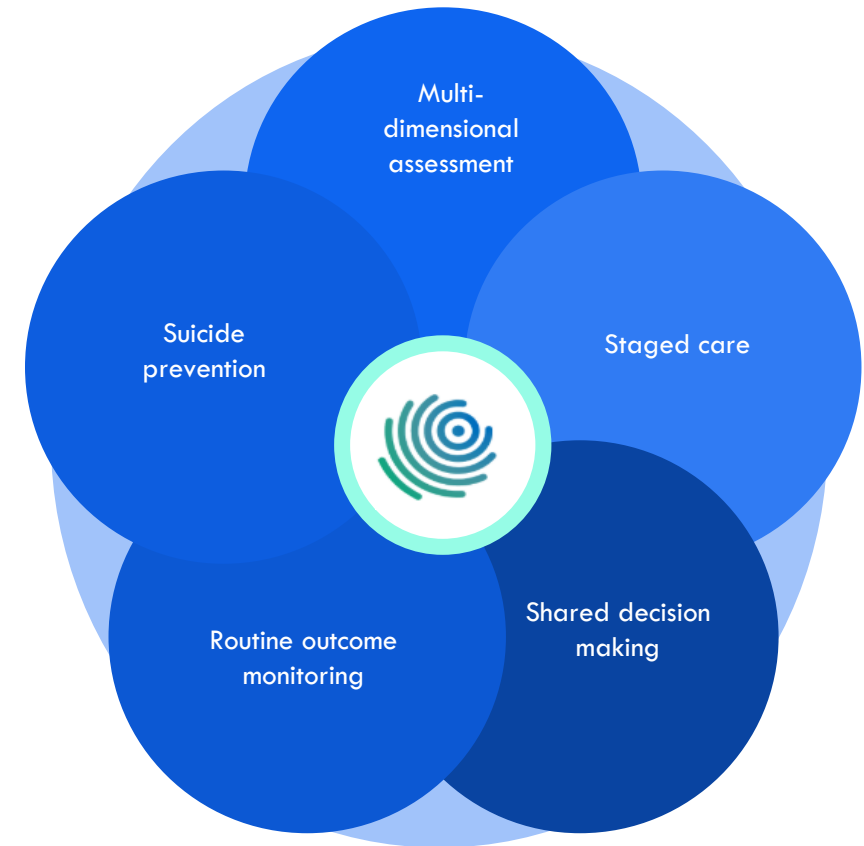
Recap of Seminar #5

- **BMC Youth Model** explicitly aims to **prevent progression to more complex and severe forms of illness** - made possible through appropriate health service structures
- BMC Youth Model **incorporates** other **evidence-based processes**, including:
 1. Real-time measurement-based care
 2. Use of multidisciplinary teams of clinicians
- Data-driven local **simulation modelling** and personalised **health information technologies** provide crucial infrastructure support to these processes for better access to, and higher quality, mental health care!

		1. CURRENT CLINICAL STAGE			
		Stage 1a Minimum 3-monthly review and length of care	Stage 1b Minimum monthly review and 12 months of care	Stage 2 3-monthly review and 2-5 years of care	Stages 3 and 4 6-monthly review and ongoing care
2. CURRENT CLINICAL NEED (symptoms, functional impairment, risk severity)	Very mild	Self- and carer-directed monitoring and management			
	Mild	Low intensity services			
	Moderate	Moderate intensity services			
	Severe			High intensity services	
	Very severe			Acute and specialist community services	

Recap of Seminar #6

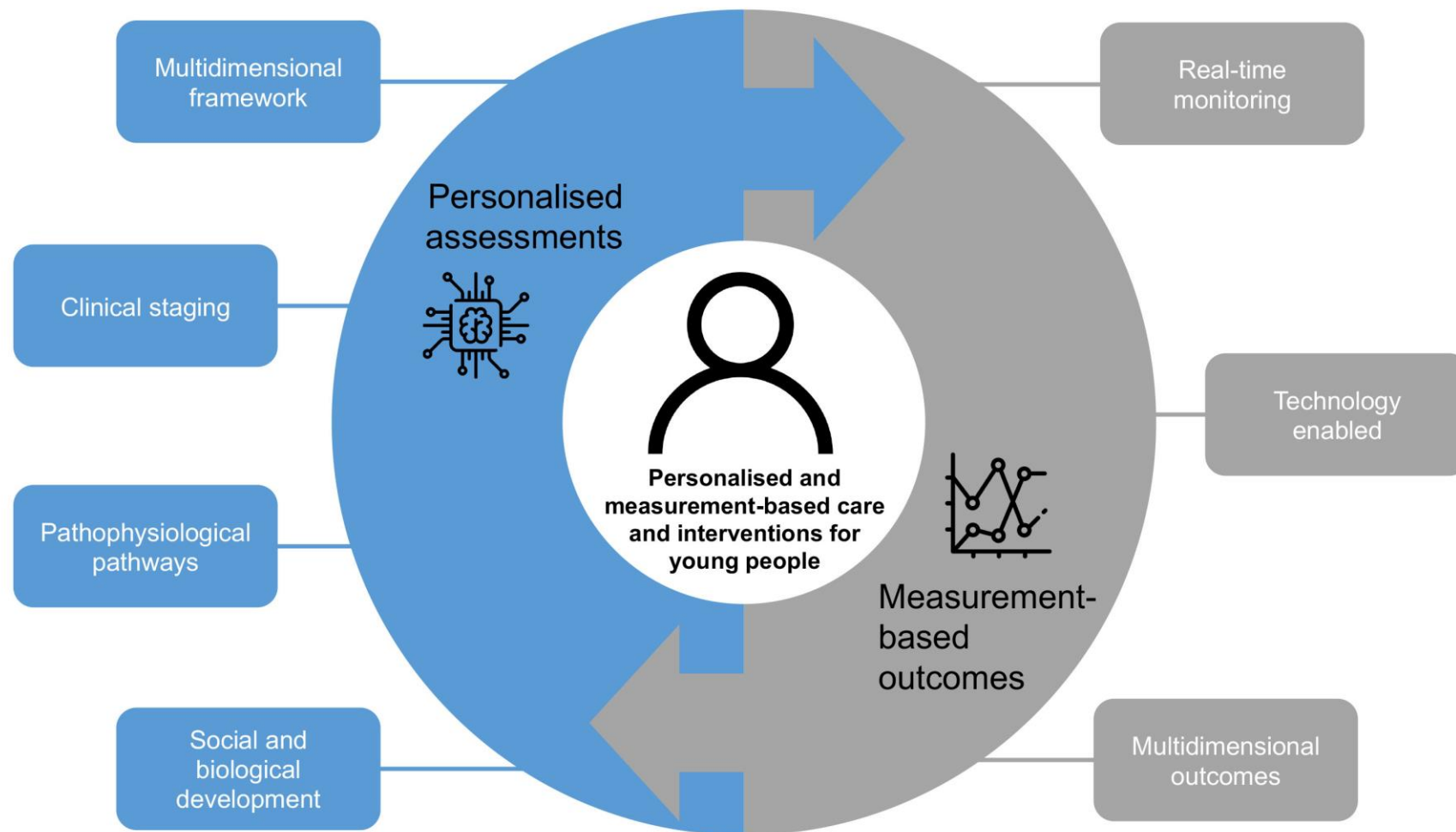
- Implementation of the **BMC Youth Model** is made possible through **health information technology** (HIT) infrastructure = **digiHealth**
- HITs improve access, efficiency, outcomes and care continuity by enabling real-time and comprehensive online assessment, self-monitoring and routine outcoming monitoring, facilitation of immediate access to high quality online psychological interventions
- To enable **digiHealth**, there are various digital clinical tools that can be implemented; we use the **InnoWell Platform** as one example



Conflict of interest declaration: The University of Sydney and PwC each have a 45% shareholding in InnoWell. The remaining 10% shareholding is evenly shared between Professor Jane Burns and Professor Ian Hickie



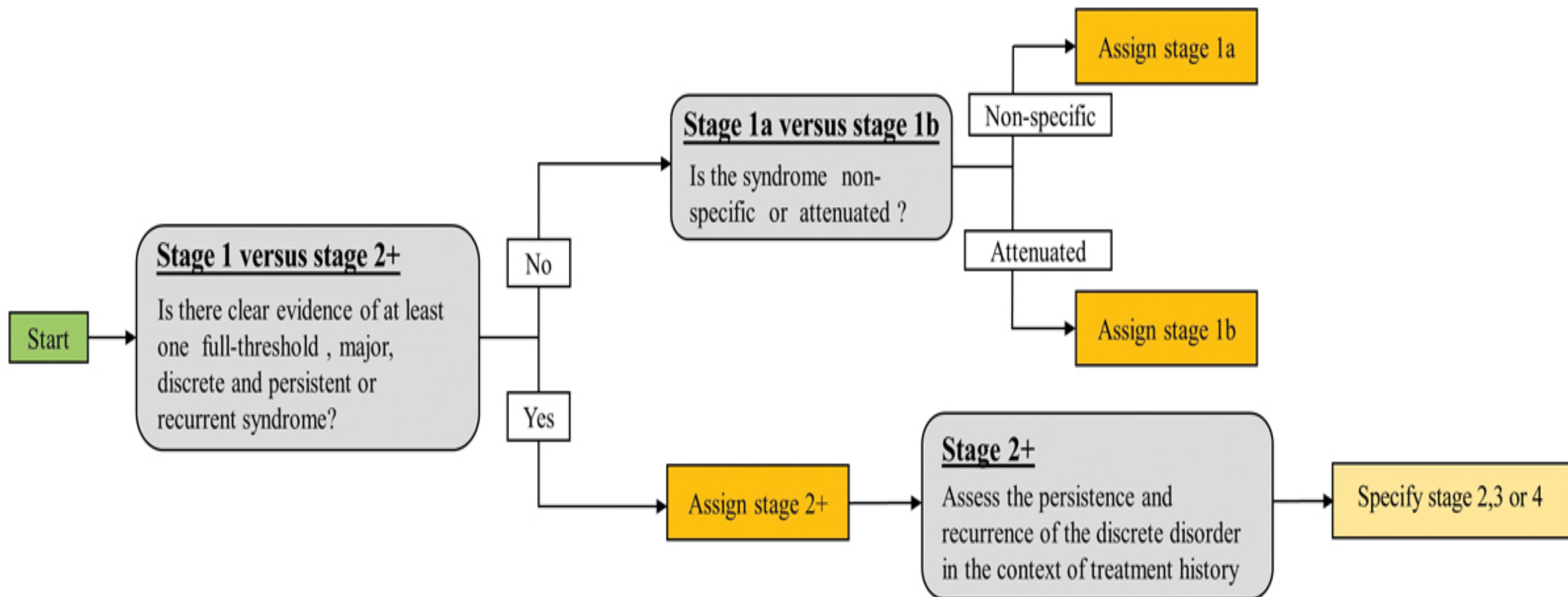
Med J Aust 2019; 211 (9): S1-S46. || doi: 10.5694/mja2.50383



Outline for Case Studies webinar

- Applicability of the BMC Youth Model using three case studies:
 - Case study 1: JANE (17 years old)
 - Case study 2: ANNE (22 years old)
 - Case study 3: SIMON (19 years old)
- Key concepts that will be highlighted:
 - Multidimensional assessment
 - Pathophysiological mechanisms and illness trajectory
 - Staged care decisions and recommended treatment options
 - Routine outcome monitoring
 - Use of HITs in clinical practice (e.g. the InnoWell Platform)

Conflict of interest declaration: The University of Sydney and PwC each have a 45% shareholding in InnoWell. The remaining 10% shareholding is evenly shared between Professor Jane Burns and Professor Ian Hickie



Clinical decision-making principle: *Assign highest achieved in lifetime, and when in doubt, rate down and re-assess in 4–6 weeks.*

Case study 1: JANE (17 years old) is in her final year of high school. She presented to *headspace* at the request of her parents who were worried about her “increasing anxiety” in the lead up to final school exams. Jane is also having trouble sleeping and experiencing daytime fatigue which is getting in the way of her ability to complete school-work. Following a poor performance in trial examinations, she feels a sense of failure and now a reluctance to go to school and has started to talk about leaving before sitting final exams.

Function/ symptoms on presentation	Medical/ psychological history	Family history
- Jane denies sustained low mood but is anxious and pessimistic about her future <u>Mental State Examination:</u> - At her <i>headspace</i> in-clinic appointment she appeared of normal weight and neatly dressed in her school uniform - Jane reported feeling nervous, her eye contact was intermittent, and she shifted around in the chair - While she expressed normal cognitive functioning and her thought processes appeared logical, she did show some evidence of catastrophising	- Since the beginning of Year 10, Jane has been isolating herself more and more – turning down invitations with her friends to hang out and often ignoring her mobile phone when it rings - Recently, her parents have observed some disturbed eating behaviours such as bingeing and recurrent dieting	As a young man, Jane’s father was diagnosed with social anxiety and has often used alcohol to cope

jdJane Doe

Preferred name: Jane

Date of birth: 2003-03-08T00:00:00

Suburb: Sydney

State: NSW

Primary language: English

Indigenous status: No

Gender identity: Female

Gender at Birth: Female

Number of Children: No Children

Level of Education: Year 12 or equivalent

Disability: No

Government Benefits: No

Living Circumstances: Living with family (including partners and dependents), friends, or flatmates

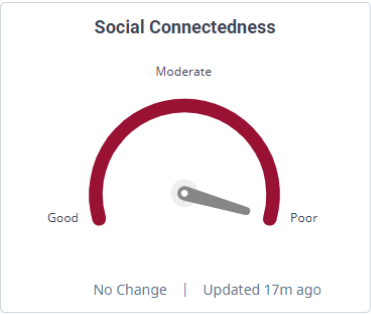
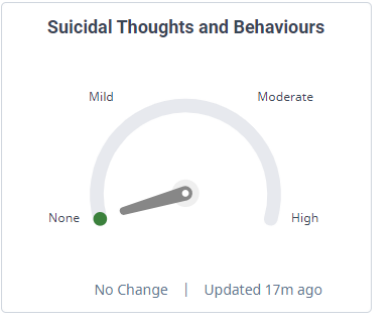
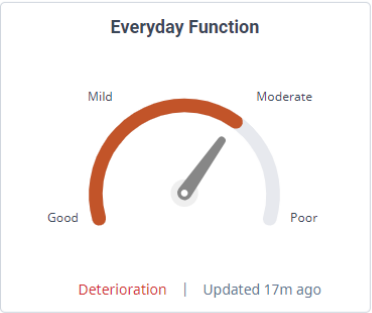
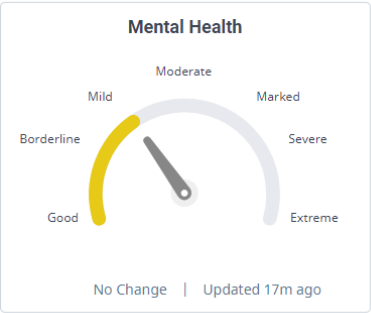
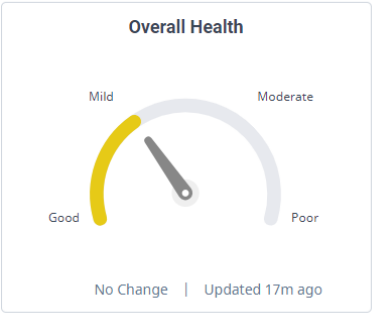
Support Circumstances: Dependent on services, relatives, or the people with whom you live

Relationship Status: Single (and have never been married)

Sexual Identity: Straight

[Set up video calls](#)[I need help now](#)

Dashboard

[Download your results \(PDF\)](#)[Health Cards](#)[Health History](#)[Profile](#)

Updating your questionnaires
By keeping up-to-date you can track your health and well-being over time.

A Support Person
You can invite a support person to answer some questions about your overall health and wellbeing

Jane's profile and dashboard of results

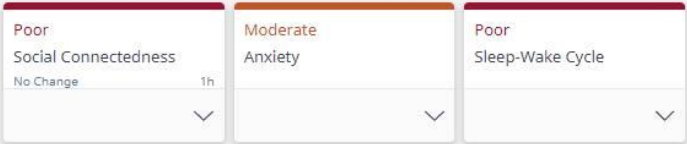
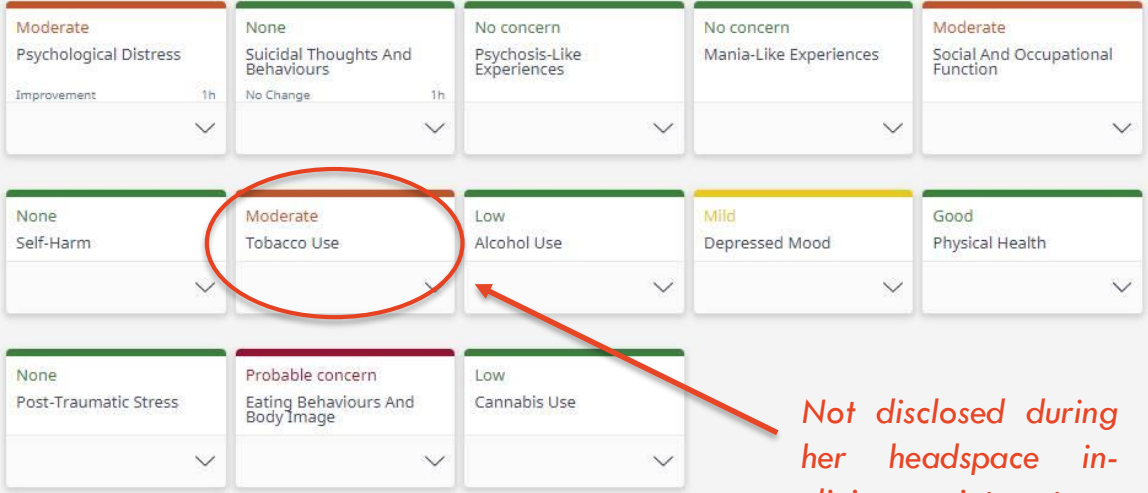
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Your Health Cards

Click on a health card to find fact sheets, browse a number of care options and review your results.

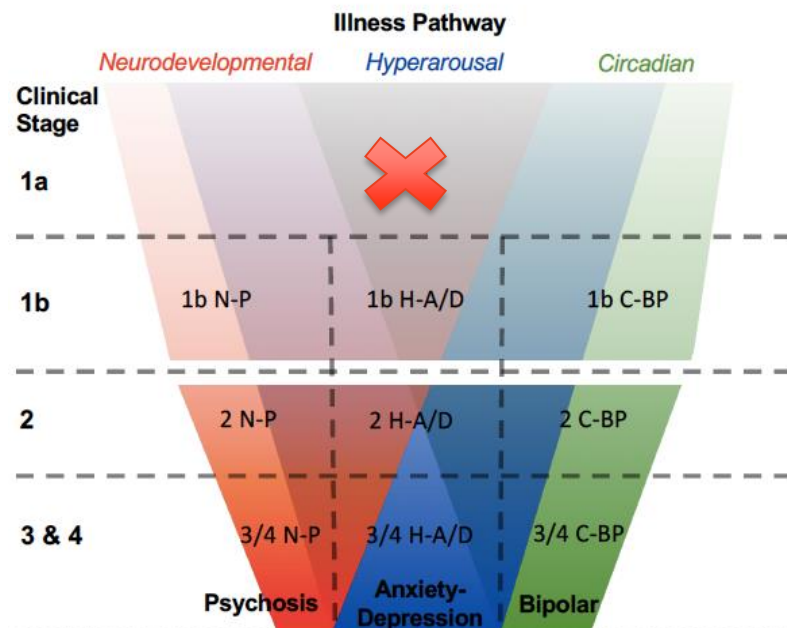
[Connect to my fitbit](#)

Your health priorities

[Update](#)

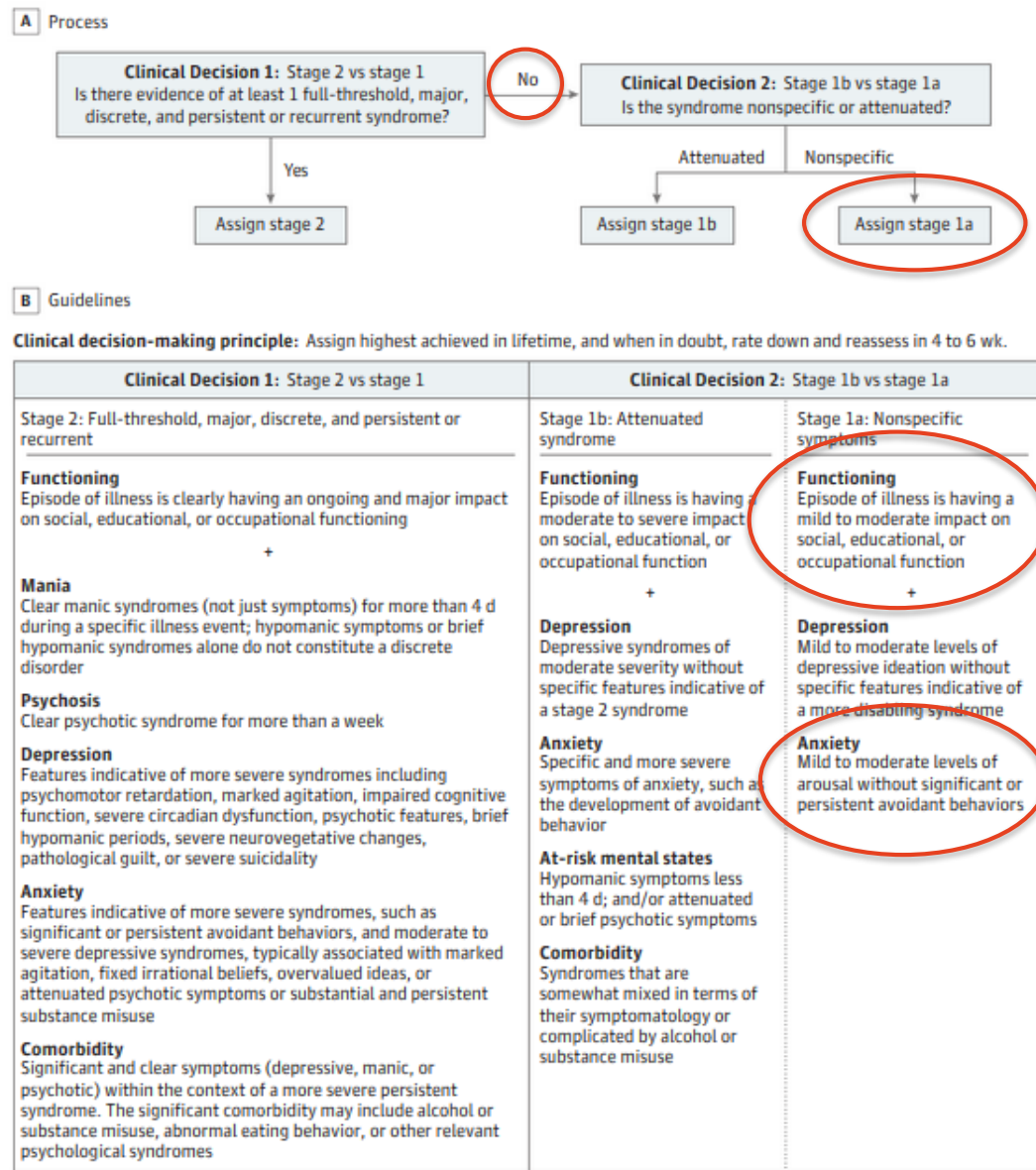
Not disclosed during her headspace in-clinic appointment

Staged care decisions for Jane?



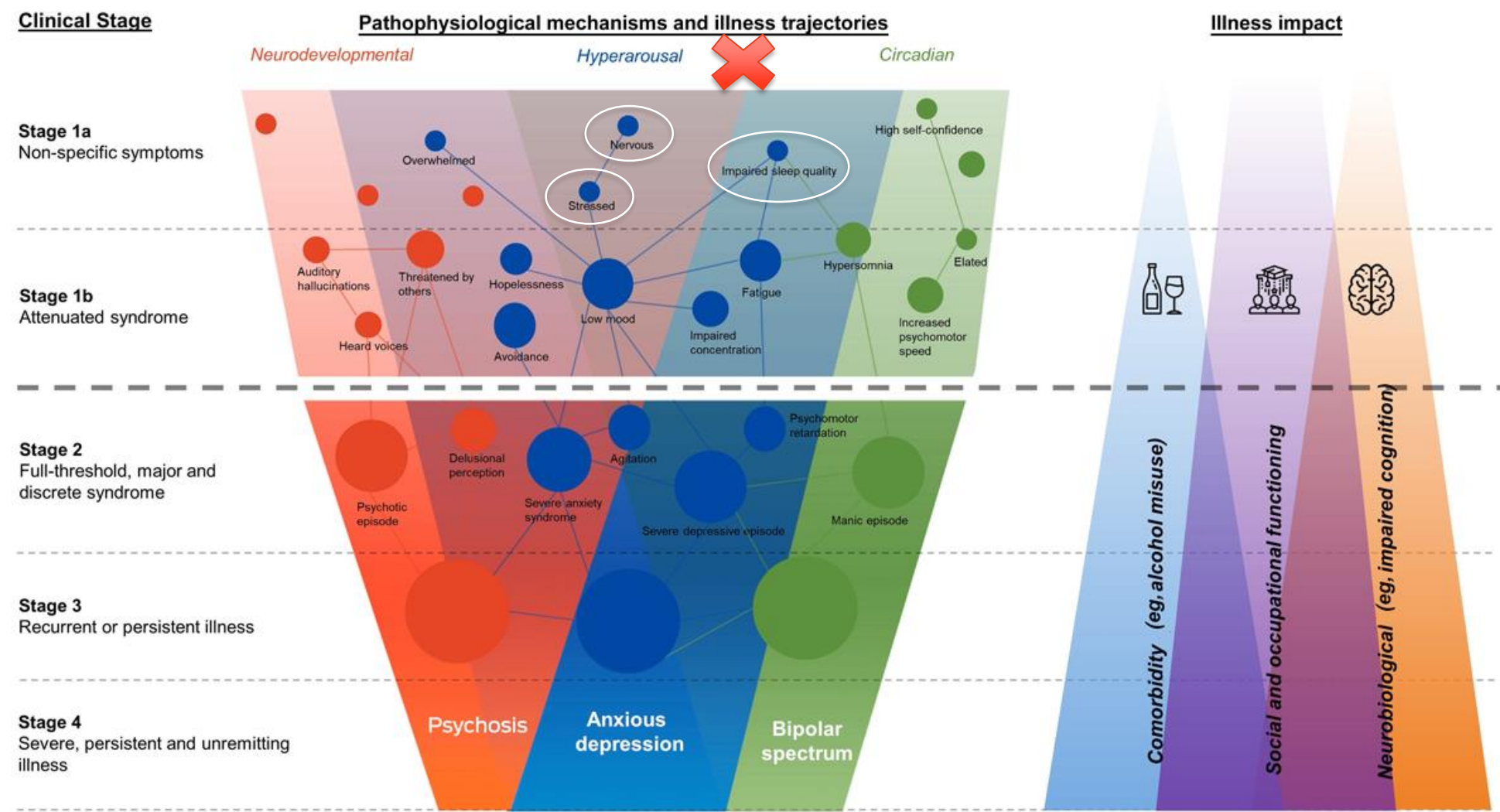
Reference: Iorfino F, Scott E, Carpenter J, Cross S, McGorry P, Hickie I. JAMA Psychiatry. 10.1001/jamapsychiatry.2019.2360

Figure 1. Two-Step Decision-Making Process Used to Assign Those Presenting to Care to the Appropriate Stage



A, Process used to assign clinical stage. B, Guidelines used to make these decisions.

Jane's pathophysiological mechanisms and illness trajectory?



Recommended care options for Jane?

- Jane's multidimensional assessment, illness trajectory and clinical stage suggests she has a **mild-moderate need for care** and a reason to **track over time** (at least 3 months)
- This could be done **online** (apps and etools, including CBT) in association with a **digital navigator** using **video-visits**

Some recommended care options may include:



Smiling Mind



Recharge



My Study Life



Habit-Bull



Butterfly Foundation

INNELL

Dashboard

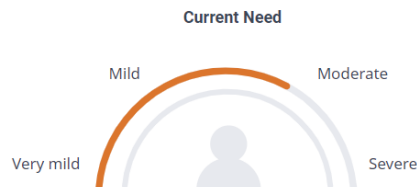
Health Cards Health History Profile Suggested Care

Jane Doe's clinical stage and care



What does Stage 1A, in clinical stage mean?

Non-specific symptoms: The individual may be experiencing the early signs of mental ill-health. These signs may include an indistinct mixture of different symptoms (such as low mood, frequent nervousness, and/or difficulty concentrating). These symptoms are mostly mild to moderate in severity, and may have a mild to moderate impact on their general functioning (such as their ability to socialise and engage in work/education).



What does the descriptor for clinical need mean?

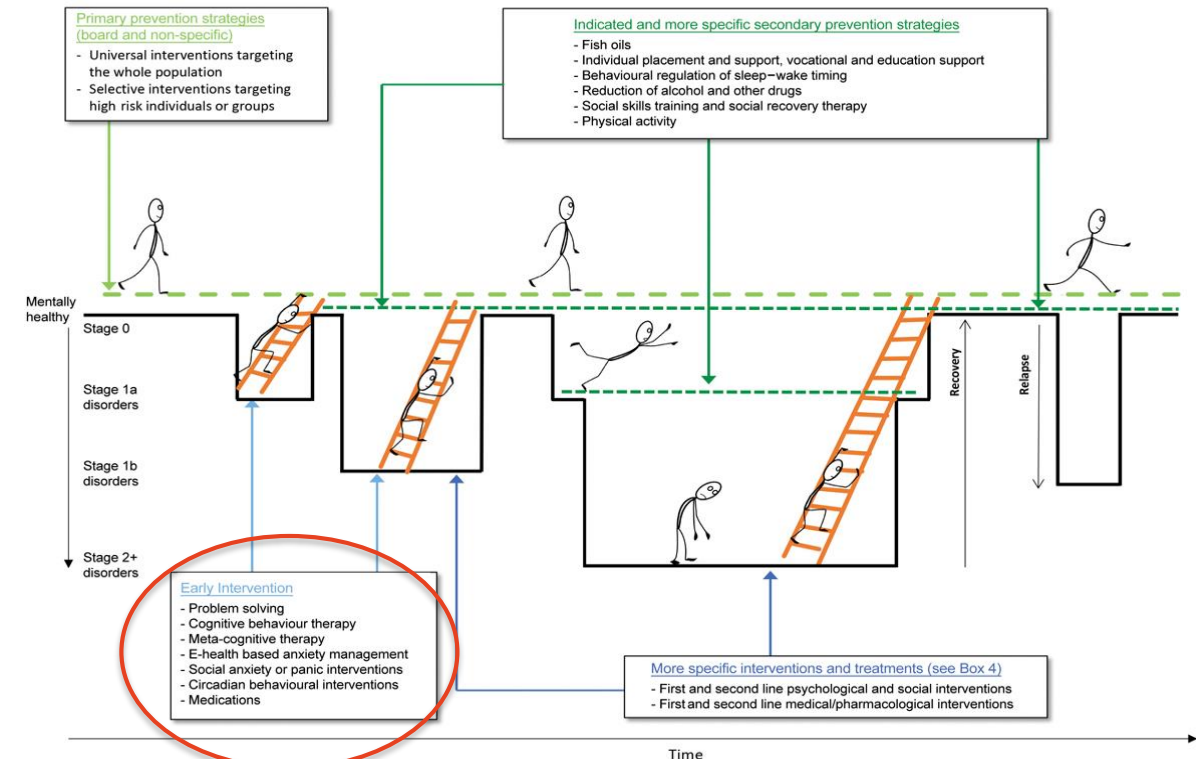
Moderate: Based on their level of psychological distress, risk of suicide, and functioning, this individual is in moderate need of clinical intervention.

Clinical Stage: clinician rating

Rating	Date	Update
Unanswered	09/06/2020	

Current Need: clinician rating

Rating	Date	Update
Unanswered	09/06/2020	



Case study 2: ANNE (22 years old) is in her third year of studies at university. She presented to the university's student counselling service on the suggestion of one of her tutors who noticed that Anne was teary when asked why she didn't submit her assessment on time. Anne currently lives in a share-house, but over the past couple of months has almost completely withdrawn from social activities because she believes her friends (and others) are talking about her "ugly" Eurasian appearance. She is also drinking heavily, self-harming and experiencing some suicidal thoughts.

Function/ symptoms on presentation	Medical/ psychological history	Family history
- Anne presents with low mood and a general loss of pleasure in her usual activities <u>Mental State Examination:</u> - At her in-clinic appointment with the university's counsellor, Anne appeared to be of slight stature, wearing loose-fitting clothing and hair grown out to cover her face - While her cognitive function appeared to be above-average, she seemed distracted and asked many questions to be repeated - Anne reported some 'odd ideas' about her Eurasian appearance and paranoia that her friends think she's "ugly" (no hallucinations) - She was tearful but responsive to interpersonal cues	- Anne was treated for a major depressive episode at 18 years old - She also has a prior two-year history of increasing social anxiety and panic attacks - As a result of her mental ill-health, Anne has called in sick to her part-time job nearly every shift in the past two weeks	- Anne is of mixed European and Asian heritage - Her father passed away suddenly from late-detection pancreatic cancer when she was 14 years old

AS Anne Shirley

Preferred name: Anne

Date of birth: 1998-01-05T00:00:00

Suburb: Ryde

State: NSW

Primary language: English

Indigenous status: No

Gender identity: Female

Gender at Birth: Female

Number of Children: No Children

Level of Education: Year 12 or equivalent

Disability: No

Government Benefits: No

Living Circumstances: Living with family (including partners and dependents), friends, or flatmates)

Support Circumstances: Partially supported by services, relatives, or the people with whom you live

Relationship Status: Single (and have never been married)

Sexual Identity: Gay or Lesbian

Not disclosed during
her in-clinic
appointment

INNOWELL

Set up video calls

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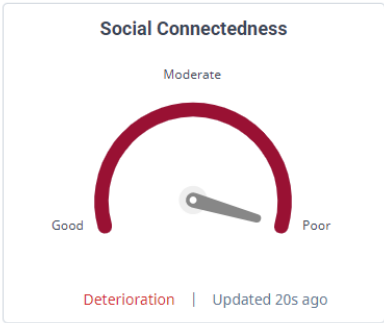
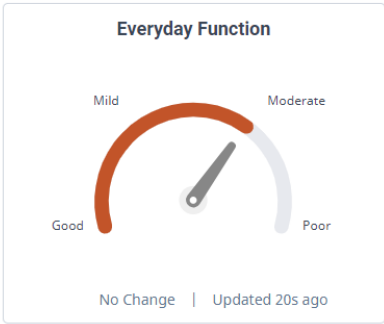
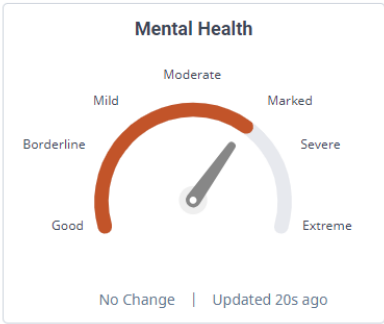
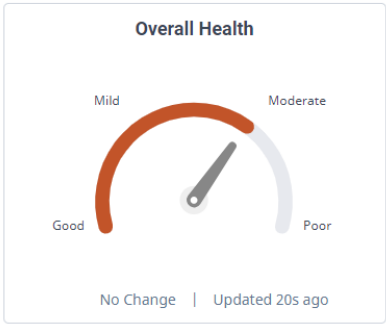
Dashboard

Download your results (PDF)

Health Cards

Health History

Profile



Updating your questionnaires

By keeping up-to-date you can track your health and well-being over time.

A Support Person

You can invite a support person to answer some questions about your overall health and wellbeing

Anne's profile and dashboard of results

INNOWELL



Set up video calls

I need help now

Your Health Cards

Click on a health card to find fact sheets, browse a number of care options and review your results.

fitbit

Connect to my fitbit

Your health priorities

Moderate

Suicidal Thoughts And Behaviours

No Change

14m

Moderate

Self-Harm

Improvement

25m

High

Depressed Mood

Update

High

Psychological Distress

Possible concern

Psychosis-Like Experiences

Deterioration

4m

No concern

Mania-Like Experiences

Moderate

Social And Occupational Function

Improvement

27m

Low

Tobacco Use

Moderate

Alcohol Use

Improvement

24m

Poor

Social Connectedness

Deterioration

14m

Moderate

Anxiety

Moderate

Physical Health

Deterioration

19m

Poor

Sleep-Wake Cycle

None

Post-Traumatic Stress

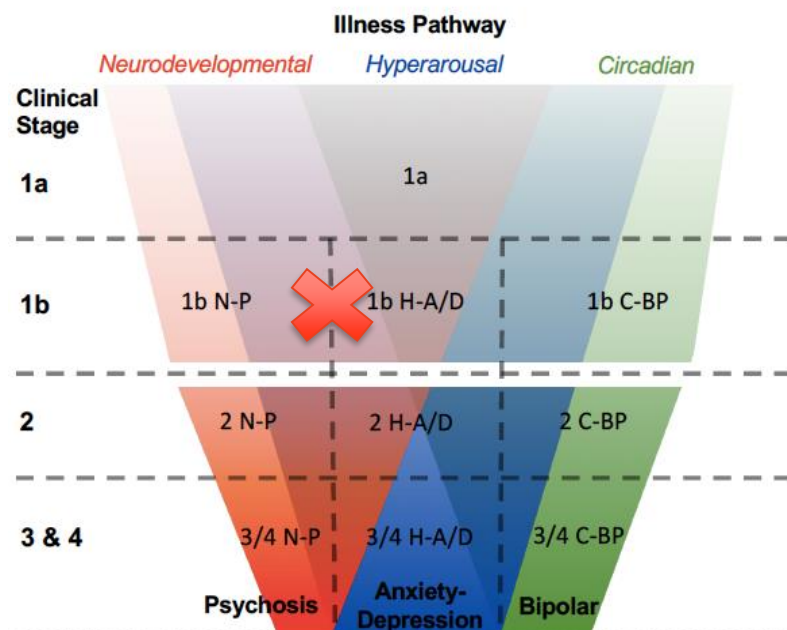
No concern

Eating Behaviours And Body Image

Low

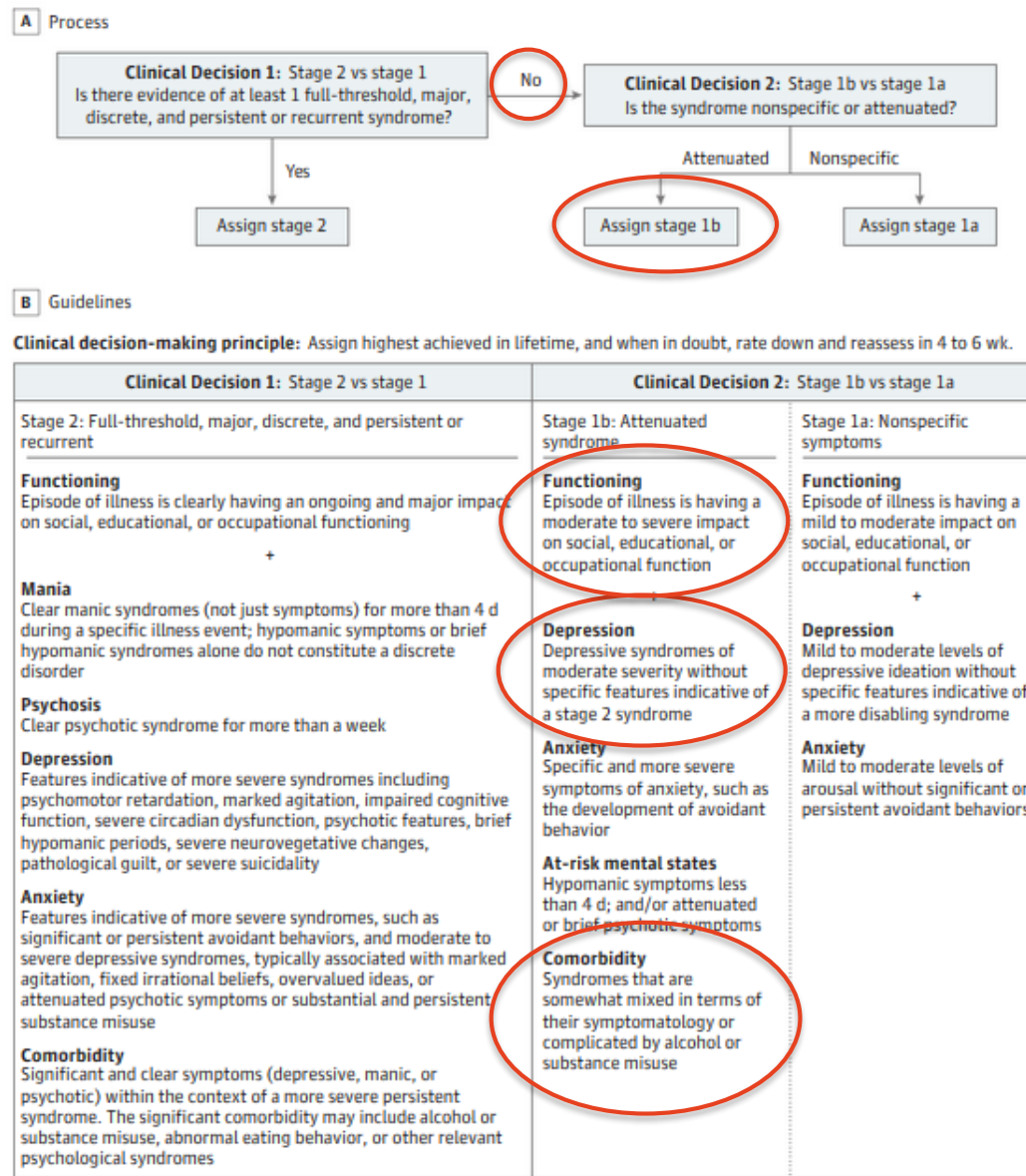
Cannabis Use

Staged care decisions for Anne?



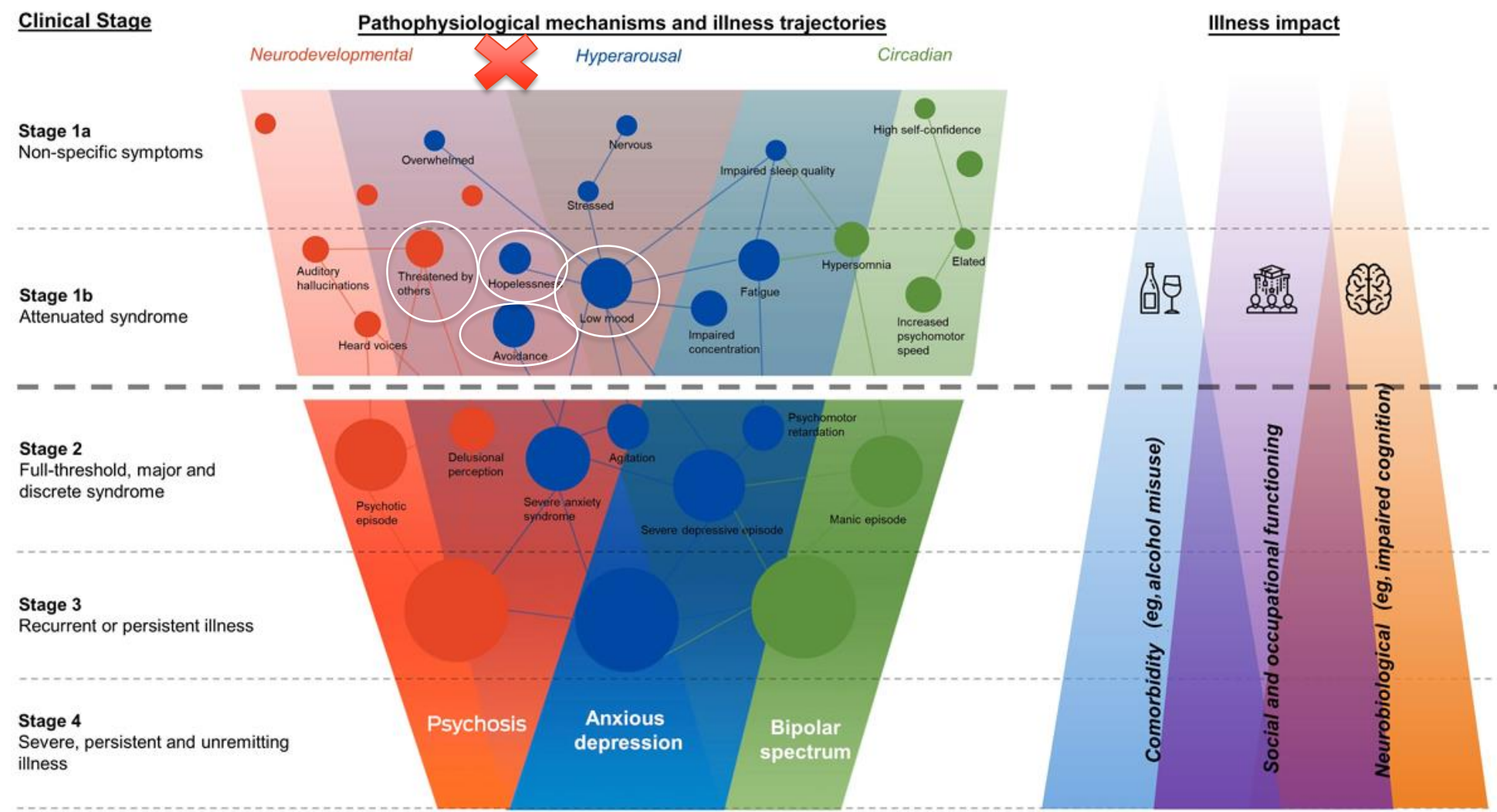
Reference: Iorfino F, Scott E, Carpenter J, Cross S, McGorry P, Hickie I. JAMA Psychiatry. 10.1001/jamapsychiatry.2019.2360

Figure 1. Two-Step Decision-Making Process Used to Assign Those Presenting to Care to the Appropriate Stage



A, Process used to assign clinical stage. B, Guidelines used to make these decisions.

Anne's pathophysiological mechanisms and illness trajectory?



Recommended care options for Anne?

- Anne’s multidimensional assessment, illness trajectory and clinical stage suggests she has a **moderate-severe need for care** and a reason to **track over time** (up to 12 months).
- This could be done predominantly **online (video-visits)** and supplemented with in-clinic appointments if required.

INNOCWELL

Dashboard

Health CardsHealth HistoryProfileSuggested Care

Anne Shirley’s clinical stage and care

Clinical Stage

Stage 1AStage 1BStage 2+

Current Need

MildModerateSevere

What does Stage 1B, in clinical stage mean?

Attenuated syndrome: The individual may be experiencing the early signs of mental ill-health. This may include a clearer set of symptoms (such as depression or anxiety). These symptoms are of at least moderate severity, characterised by greater levels of complexity (such as hypomanic symptoms) or comorbidity (such as alcohol and/or other substance misuse), and have moderate or greater impact on their general functioning (such as their ability to socialise and engage in work/education).

What does the descriptor for clinical need mean?

Severe: Based on their level of psychological distress, risk of suicide, and functioning, this individual is in severe need of clinical intervention.

Clinical Stage: clinician rating

RatingDateUpdate

Unanswered09/06/2020

Current Need: clinician rating

RatingDateUpdate

Unanswered09/06/2020

Some recommended care options may include:

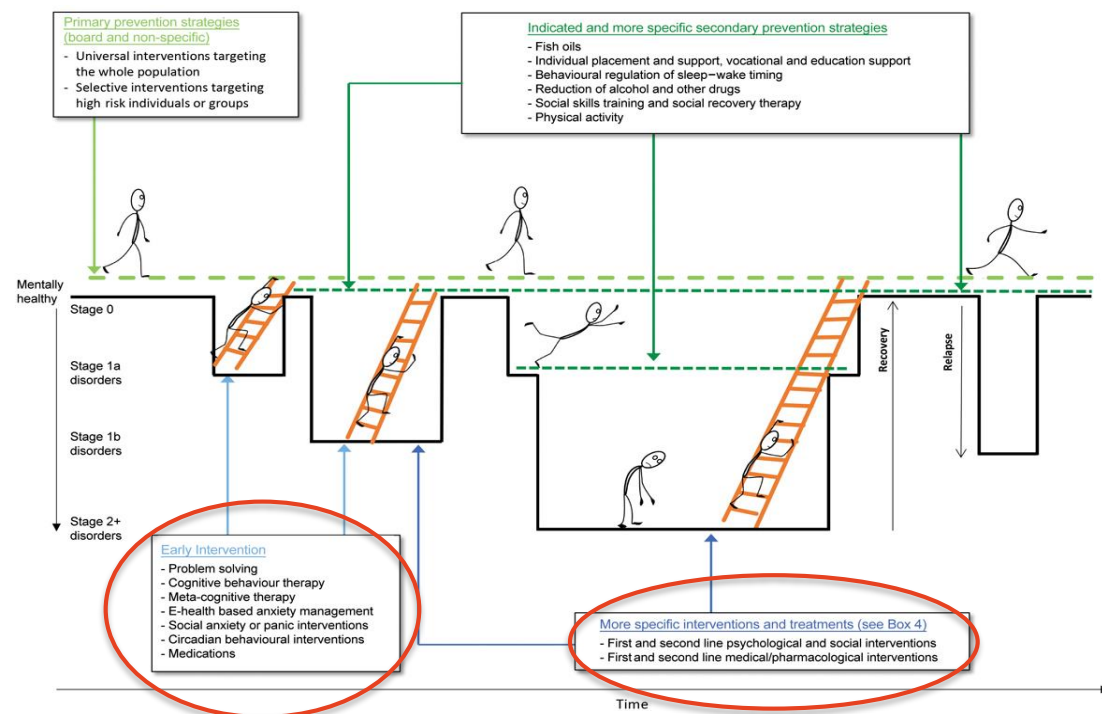
BeyondNow suicide safety plan

Psychological therapies for depression, anxiety, psychosis-like experiences

MoodGYM TRAINING PROGRAM

Smiling Mind

Daybreak – alcohol support



Case study 3: SIMON (19 years old) presented to his local Aboriginal Health Service with symptoms of severe depression. He is the father of a one-year old boy and lives with his girlfriend in a small public housing unit. Simon has recently withdrawn from both his TAFE studies and job. His dream was to become a Hollywood actor, but he is now unmotivated to go to any auditions for fear of even more rejection. Until recently, Simon was working full-time at a local Gloria Jean's café but as he struggled to get to work on time (if at all), he was recently fired. As a result of COVID-19, he has decided not to look for any other work.

Function/ symptoms on presentation	Medical/ psychological history	Family history
- Simon is severely depressed and often does not get out of bed for days at a time. He has insomnia and likes to binge drink most nights as this helps him fall asleep. He also smokes cannabis daily - Simon describes his motivation and energy levels as “scarily low” and frequently thinks how easy it would be to just “disappear” <u>Mental State Examination:</u> - Simon appeared to slump in the chair and avoided all eye contact with his health practitioner - His thoughts and movements were noticeably slow, and he had minimal reaction to any social or emotional cues - His health practitioner also noted that Simon spoke very slowly, had little intonation and flat effect	- Simon reported a history of depressive symptoms throughout adolescence - this included mood swings from depressive lows to manic highs (such as increased sex drive and risk taking behaviours) - He had previously sought help for his depressive symptoms and was prescribed an SSRI (Fluoxetine). He also attended 10 sessions of CBT with a psychologist. Simon attributes this care to getting him through high school	10 years ago, Simon's mum was diagnosed with Bipolar Disorder. Simon notes that he always suspected his mum had Bipolar Disorder and has often wondered about his own symptoms - Simon's mum has also attempted to take her life on at least three occasions

SB

Simon Bindi

Preferred name: Si

Date of birth: 2000-10-23T00:00:00

Postcode: 2222

Suburb: Moodliu

State: QLD

Primary language: English

Indigenous status: Aboriginal

Gender identity: Male

Gender at Birth: Male

Number of Children: 1 Child

Level of Education: Year 10 or equivalent

Disability: No

Government Benefits: Yes: Unemployment benefit (eg. Youth Allowance or Newstart Allowance)

Living Circumstances: Living with family (including partners and dependents), friends, or flatmates

Support Circumstances: Independent

Relationship Status: Married or living with partner

Sexual Identity: Straight

INN

WELL

Set up video calls

I need help now

Dashboard

Download your results (PDF)

Health Cards

Health History

Profile

Overall Health

Mild

Moderate

Good

Poor

No Change

Updated 1m ago

Mental Health

Mild

Moderate

Borderline

Severe

Good

Extreme

Improvement

Updated 1m ago

Everyday Function

Mild

Moderate

Good

Poor

No Change

Updated 1m ago

Suicidal Thoughts and Behaviours

Mild

Moderate

None

High

No Change

Updated 1m ago

Social Connectedness

Moderate

Good

Poor

No Change

Updated 1m ago

Updating your questionnaires

By keeping up-to-date you can track your health and well-being over time.

A Support Person

You can invite a support person to answer some questions about your overall health and wellbeing

Simon's profile and dashboard of results

INN

WELL

Set up video calls

I need help now

Click on a health card to find fact sheets, browse a number of care options and review your results.

fitbit

Connect to my fitbit

Your health priorities

Update answers

Poor

Social And Occupational Function

Deterioration

1y

SB

Very high

Depressed Mood

No Change

1y

SE

Moderate

Suicidal Thoughts And Behaviours

No Change

1m

ET SB

Update

No concern

Mania-Like Experiences

Improvement

15h

Moderate

Self-Harm

Deterioration

15h

Low

Tobacco Use

Improvement

1y

High

Alcohol Use

Deterioration

15h

Poor

Social Connectedness

No Change

1m

Poor

Physical Health

Deterioration

15h

Poor

Sleep-Wake Cycle

Deterioration

15h

None

Post-Traumatic Stress

Improvement

15h

High

Cannabis Use

Deterioration

15h

Moderate

Psychological Distress

Improvement

15h

No concern

Psychosis-Like Experiences

Improvement

15h

Moderate

Anxiety

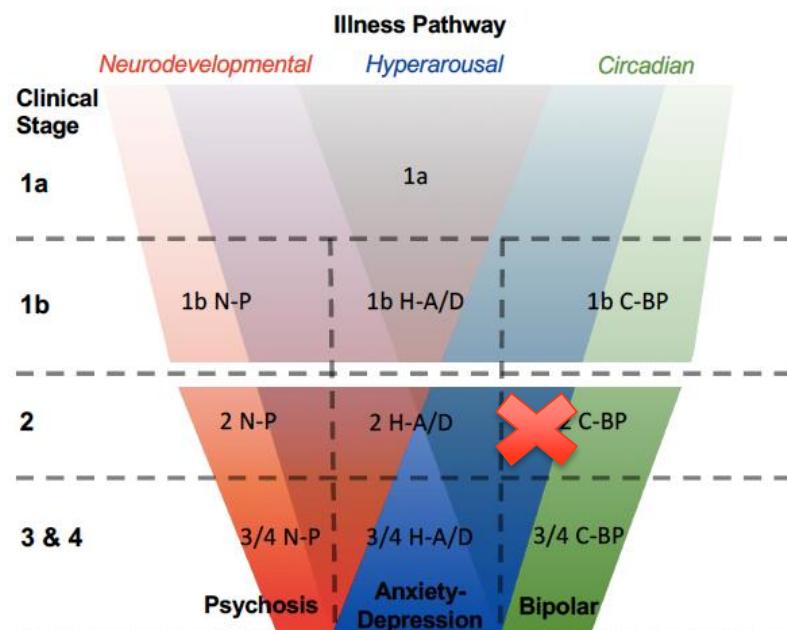
Deterioration

15h

No concern

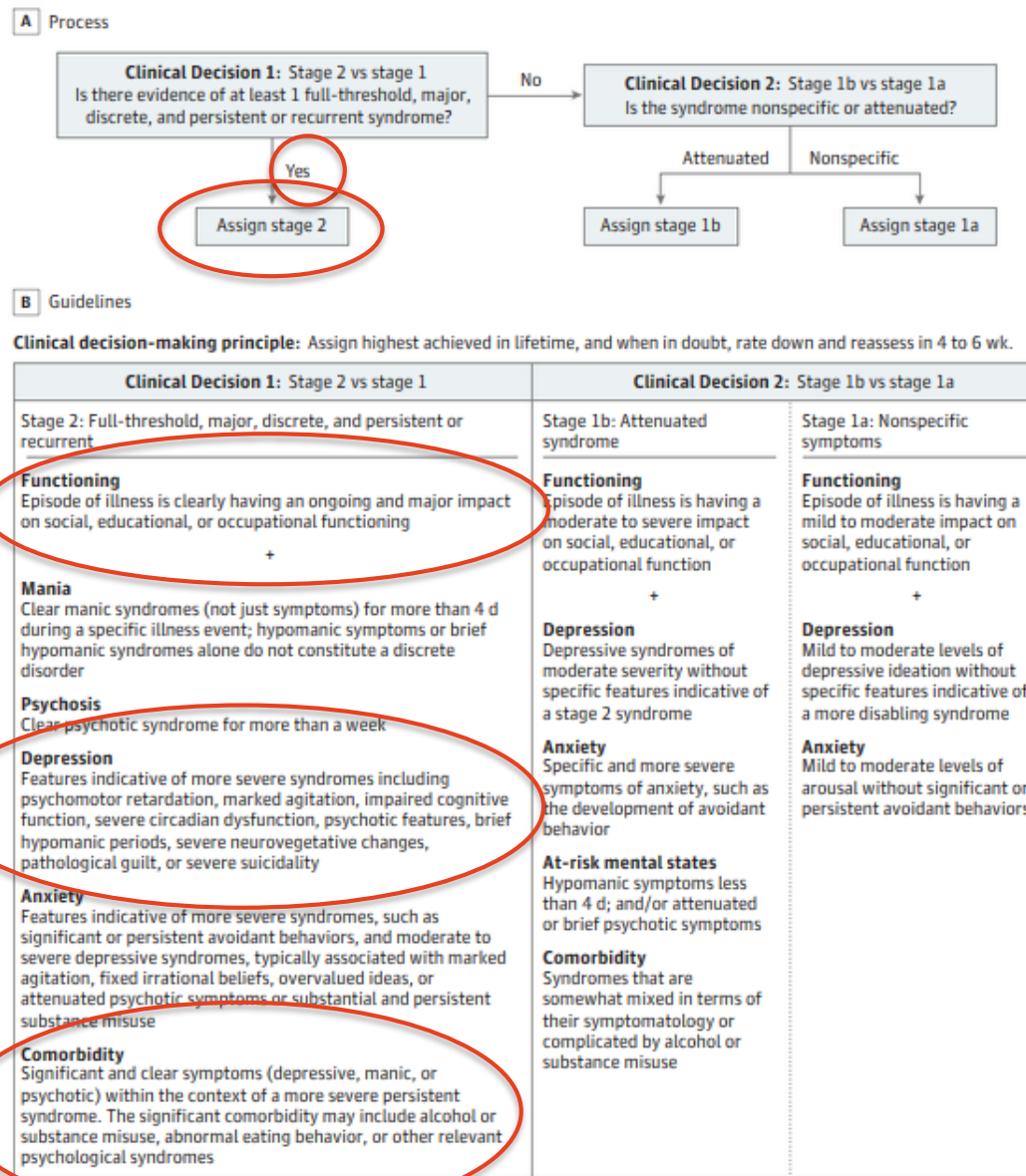
Eating Behaviours And Body Image

Staged care decisions for Simon?



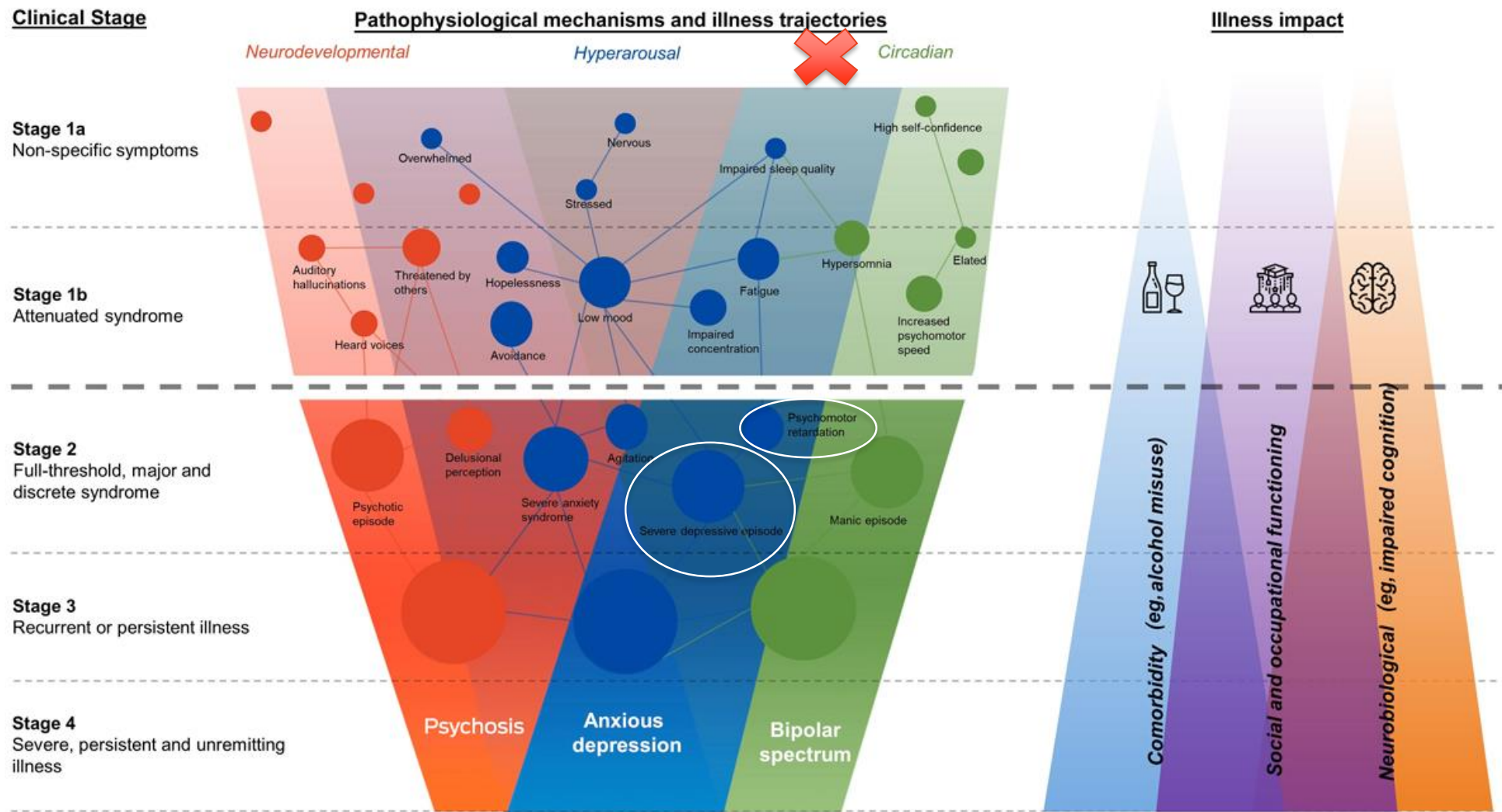
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A, Process used to assign clinical stage. B, Guidelines used to make these decisions.

Simon's pathophysiological mechanisms and illness trajectory?



Recommended care options for Simon?

- Simon’s multidimensional assessment, illness trajectory and clinical stage suggests he has a **severe need for care** and a reason to **track over time** (for 2 to 5 years)
- This might be done by in-clinic appointments and supplemented with more frequent **online video-visits** to monitor change real-time



Dashboard

Health Cards

Health History

Profile

Suggested Care

Simon Bindi's clinical stage and care

Clinical Stage

Stage 1A

Stage 1B

Stage 2+

What does Stage 2+, in clinical stage mean?

Distinct syndrome: The individual may have been living with mental ill-health for some time, but have now experienced a very clear episode of mental illness. This may include a group of symptoms that are more discernible as a specific disorder and are more persistent. These symptoms are most likely quite severe and have an ongoing and major impact on their general functioning (such as their ability to socialise and engage in work/education).

Current Need

Mild

Moderate

Severe

What does the descriptor for clinical need mean?

Severe: Based on their level of psychological distress, risk of suicide, and functioning, this individual is in severe need of clinical intervention.

Clinical Stage: clinician rating

Rating	Date	Update
Unanswered	09/06/2020	

Current Need: clinician rating

Rating	Date	Update
Unanswered	09/06/2020	

Some recommended care options may include:



BeyondNow suicide safety plan

Psychological therapies for depression, functioning, alcohol misuse & cannabis use

Individual placement and support



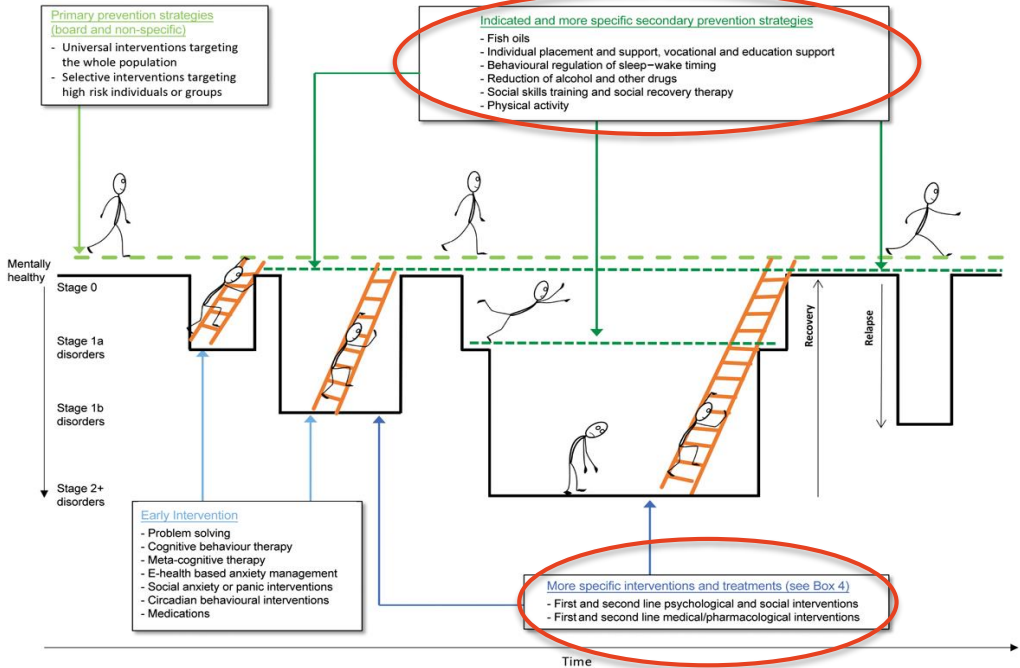
Daylio Journal – mood tracker



Managing insomnia course



Positive choices – alcohol & drug information



Summary...

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- BMC Youth Model can be easily adopted into clinical practice if health professionals are well guided
 - Use of HITs support health professionals in providing highly personalised and measurement-based care, as exemplified by the three case studies presented
 - Training in use of the BMC Youth Model can also be delivered specific to a service by one of the BMC's clinician-researchers (such as A/Professor Elizabeth Scott). If you are interested, please contact grace.lee@sydney.edu.au



BMC Youth Model of Care – Seminar Series

What	Additional Resources (including video recording)
1. A highly personalised and measurement-based model of care to manage youth mental health	https://bmc-research.engagementhub.com.au/page/educational-webinars
2. Combining clinical stage and pathophysiological mechanisms to understand illness trajectories in young people	
3. A comprehensive assessment framework for youth mental health care	
4. Using the BMC Youth Model to personalise care options – best care, first time!	
5. A youth mental health service delivery model to support highly personalised and measurement-based care	
6. Maximising the use of diGiHealth solutions in youth mental health care	

Thank you!

A recording will be uploaded on
bmc-research.engagementhub.com.au

The Brain and Mind Centre would like to thank our research partners, such as

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