

## ***The intersection of traffic medicine and bipolar disorder - a patient-centred approach.***

### ***Introduction***

*“My mind is like a highway full of speeding cars, all of which are travelling faster than one can possibly imagine, it’s out of my control now, I’m merely a passenger on what feels like a joyride.”<sup>1</sup>*

When reading first-person accounts of mania, like the quote above, the paintings of Giacomo Balla always come to mind. Part of the Futurist movement in Italy, he disregarded detail and realism, instead seeking only to capture movement in his works.<sup>2</sup> In the painting shown, “*Velocity of Cars and Light, 1913*”<sup>3</sup> we see the kaleidoscoping headlights, and we feel the urgency, the speed. Balla puts us, first-person, in the speeding car. This essay seeks to explore the intersection between traffic medicine and bipolar disorder, and this author hopes that by underpinning a thorough review of the literature with a patient-centred approach, the reader will be put in the driver’s seat.



*Velocity of Cars and Light, 1913, Giacomo Balla.*<sup>3</sup>

### ***Bipolar Disorder***

Bipolar disorder is a chronic affective disorder, characterised by episodes of elevated mood (mania or hypomania), that may be interspersed or intertwined with episodes of depression.<sup>4</sup> The Diagnostic and Statistics Manual of Mental Disorders V (DSM V) sets forth four main

types of bipolar disorder; Bipolar I, Bipolar II, Cyclothymia, and Otherwise Specified Bipolar Disorder.<sup>5</sup> Bipolar disorder affects at least 1% of the world's population,<sup>6</sup> and estimates of prevalence within Ireland vary from 1 in 50 to 1 in 100 adults.<sup>6, 7</sup> Though the exact prevalence of bipolar disorder in Ireland is not known, Ireland generally has high rates of mental illness - in 2018, we ranked third out of 36 EU countries in having the highest rates of mental illness.<sup>8</sup>

## **Road Safety**

In terms of road safety, Ireland fares well in EU rankings, having finished 2020 as the second safest country in the EU when it comes to road safety.<sup>9</sup> However, this fact lays in stark contrast to the other figures surrounding our road safety statistics in 2020 - an additional nine deaths occurred on our roads than in the previous year.<sup>10</sup> To put that figure into context, environmental scientists reported that in March 2020, due to the national government mandated lockdown, private car traffic volumes plummeted by over 85%.<sup>11</sup> In a year with unprecedented low levels of vehicles on the road, our road deaths increased - this is clearly an area that warrants further attention and research.

The Road Safety Authority in Ireland, in conjunction with the National Programme Office for Traffic Medicine, publish guidelines for assessing fitness to drive, which help to ensure that those behind the wheel of a car are not putting themselves or others in danger by driving. Initially published in 2013<sup>12</sup>, and updated regularly since, the *Sláinte agus Tiomáint Guidelines* set out clear minimum medical requirements for licensing drivers.<sup>13</sup> In the most recent iteration of these guidelines, people affected by mania or hypomania are not entitled to drive a car during the acute illness and are permitted to drive thereafter - provided they are stable, with insight into their fitness to drive, and not suffering the adverse effects of any medications that may impair driving.<sup>13</sup> A specialist opinion from a psychiatrist is recommended for cases of repeated mood changes, however what exactly constitutes repeated changes of mood, in this chronic illness that is marked by repeated changes of mood, is not made explicit. In comparison to this, the British fitness to drive guidelines, published by the Driver and Vehicle Licensing Agency, set out specific timeframes for people affected by mania. Someone affected by a manic episode must remain well and stable for at least 3 months, and obtain a report from a psychiatrist, before being considered fit to drive.<sup>14</sup> In the case of someone who experiences 4 or more episodes of significant mood swing in a 12 month period, they must remain well for at least 6 months before being considered fit to drive.<sup>14</sup>

This juxtaposition highlights two very different approaches to assessing fitness to drive in people with bipolar disorder, yet raises an important question - what is the evidence behind these guidelines?

### ***Bipolar disorder and driving***

We must first consider the two mood states associated with bipolar disorder - depression and mania - and what effect they may have on one's ability to drive. When someone is experiencing a manic episode, it may seem reasonable to assume that their symptoms would naturally dovetail with driving recklessly<sup>15</sup>, but there simply is not sufficient evidence to support this assumption. The literature does demonstrate that patients with a mental illness are involved in traffic accidents at a higher rate<sup>16, 17</sup> than the general population. It is also well documented that bipolar disorder is associated with a higher rate of driving under the influence of alcohol or drugs (DUI)<sup>18</sup>, as well as a higher rate of recidivism in this regard.<sup>19</sup> There exists a distinct paucity of high quality, modern research into mania and its effects on driving - something highlighted in a 2017 systematic review, whereby the urgent need for large-scale longitudinal studies with controls was emphasised.<sup>20</sup> The first study of this kind was published in 2018 - a 16 year longitudinal cohort study of over 4000 people with bipolar disorder in Taiwan, compared to a control group.<sup>21</sup> They found a 1.66 fold increase in risk of road injury in patients with bipolar disorder<sup>21</sup>. This is a significant finding, and underscores the need for further research in this area.

Regarding depression in bipolar disorder, again there is a dearth of research specific to depression in bipolar disorder. However, a wealth of studies on major depressive disorder demonstrate the increased risk posed by both antidepressants and depression itself.<sup>22</sup> Psychomotor retardation, in particular, is a symptom of depression that can hinder one's ability to drive safely.<sup>23</sup> However, an issue repeatedly raised in the literature surrounding this topic is the inextricable nature of the effect of a psychotropic medication, and the effect of the illness itself, on driving.<sup>24</sup> Oftentimes this inability to differentiate what exactly it is that is causing increased risk complicates research in this field. The deleterious effects of benzodiazepines on driving ability are well established,<sup>25-28</sup> and chronic SSRI use has also been associated with increased risk of motor vehicle collision.<sup>29</sup> The literature on mood stabilisers, a mainstay of treatment for bipolar disorder, and driving, has yet to reach any consensus - one study reports an increased risk of collision in those on lithium<sup>30</sup>, and meta analysis shows lithium has negligible long term effects on cognition, but is associated with impairment in psychomotor performance<sup>31</sup>. A German study demonstrated that only 45% of

euthymic bipolar patients treated with mood stabilisers passed the threshold criteria of the German road safety board for car drivers.<sup>32</sup> In 17% of the cases psychomotor performance was considered impaired to the point where they were not fit to drive.<sup>32</sup> This study also showed that patients being treated with lamotrigine displayed better results in visual perception and stress-tolerance tests when compared to those on lithium. Previous investigations have indicated that lamotrigine has a more favourable neurocognitive profile when compared to other mood stabilising drugs.<sup>33, 34</sup> Once again, further study is needed into this area.

Interestingly, neurocognitive disturbances in bipolar disorder are not always associated with a mood episode. There is a growing body of research that illustrates that neurocognitive disturbances are also associated with euthymia.<sup>35,36</sup> This challenges the earlier concepts of bipolar disorder as consisting of discrete mood episodes with full recovery between episodes<sup>37</sup>. Contemporary research consistently demonstrates the chronicity of bipolar disorder regardless of remission of mood - in a study of patients with type I bipolar disorder, 98% achieved syndromal recovery but only 43% reached functional recovery<sup>38,39</sup>. Syndromal recovery describes resolution of the symptoms of the disorder, with functional recovery describing the ability to return to an adequate level of occupational and social functioning.<sup>39</sup> A larger scale observational study with a cohort of 1656 patients demonstrated similar findings, with 64% of patients reaching syndromal recover, and 34% achieved functional recovery during the 2 years of follow-up after an acute episode.<sup>39</sup> Meta-analytic findings consistently demonstrate a broad range of neuropsychological deficits involving attention and processing speed, as well as deficits in memory and executive function, in euthymic patients with bipolar disorder.<sup>40</sup> Driving a car is a complex task and requires cognitive and motor skills to work in tandem. Evidence about how these specific deficits affect driving abilities in bipolar disorder is sorely lacking, however it has been expansively written about in the context of neurocognitive decline associated with dementia, and visuospatial skills have been shown to be a strong indicator of driving abilities in this context.<sup>41</sup> Furthermore, these neurocognitive deficits are strongly associated with poorer occupational functioning in bipolar disorder.<sup>42</sup> The modern psychiatric armamentarium has made euthymia an achievable goal for many patients, yet the ongoing neurocognitive impairment and its effect on occupational status and possibly driving ability needs to be explored. There are emerging therapies to address this, such as functional remediation. Functional remediation is a novel psychosocial therapy with a neuroscientific basis that has potential to prevent progression of cognitive impairment in patients with bipolar disorder over a course of 21 sessions.<sup>43</sup> Cost-effectiveness is noted as a significant limiting factor.

### ***The experience of a patient with bipolar disorder***

A meta-synthesis of qualitative data regarding stressors for people with bipolar disorder identified common themes across the literature, and the largest theme found was that of loss.<sup>44</sup> This includes loss of purpose, loss of control, and loss of identity. Across data from interviews with patients with bipolar disorder a common theme is a sense of loss of autonomy<sup>45</sup> - feeling out of control of one's life appears pervasive in this cohort. This means that effective interventions must foster a sense of independence. The stigma associated with a bipolar disorder diagnosis has been well documented.<sup>47</sup> It is further theorised that a patient's own internalised stigma, and anticipation of rejection as a result, may lead to further secrecy surrounding their illness<sup>46</sup>, with internalised stigma shown to act as a possible predictor of poorer social adjustment<sup>47</sup>. How can we put this stigmatised group's needs first whilst also remaining cognisant of the fact that they may, at times, lack insight<sup>48</sup>, and be unfit to drive without being aware of this? We must ask those who are experts in this field - the patients.

Published in 2015, McNamara and Buckley conducted a phenomenologically informed qualitative study in an Irish day hospital, utilising focus groups to gather data from patients on driving and bipolar disorder.<sup>49</sup> Four themes emerged - the meaning of driving as an independent activity of daily living, the impact of bipolar disorder on driving, effective management of driving when ill, and the discriminatory nature of the RSA guidelines.<sup>49</sup> The majority of the group felt that bipolar disorder could affect driving, and some recalled instances of driving in a hypomanic or manic state, speeding and making poor decisions on the road<sup>49</sup> Many participants voiced a desire for self-management of their illness, and independence when it came to their driving status. Several participants gave their opinion that the RSA guidelines may deter people from seeking help for their mental health;

*“people could be more reluctant to seek and accept a diagnosis”<sup>49</sup>*

*“it is almost like you are being penalised for being responsible for your illness”<sup>49</sup>*

Anything that holds potential to deter someone from seeking help must be carefully considered, particularly in relation to bipolar disorder - with the highest rate of suicide of all psychiatric conditions at approximately 20-30 times that of the general population<sup>50</sup>, early intervention and treatment is recognised as an important step to mitigate suicide in patients with bipolar disorder.<sup>50</sup> Any possible barrier to care warrants thorough contemplation.

## **Conclusion**

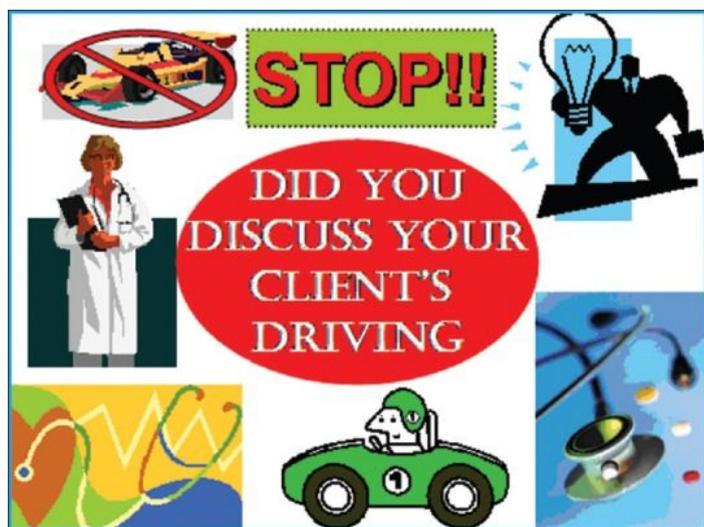
### *Empower healthcare providers, in order to empower the patients*

A 2006 survey of Canadian psychiatrists<sup>51</sup> concluded that over a third of the surveyed psychiatrists had not assessed any of their patients about their driving in the previous year. Three separate clinical audits<sup>52-54</sup> of psychiatrists' awareness and documentation of fitness to drive in Ireland corroborate this finding, with a consistent under-documentation of a patient's driving status or whether they'd been counselled on fitness to drive. Education provision on the RSA Guidelines between audit cycles evinces marginal improvement – with one hospital's documentation about driving rising by 7% following an educational campaign<sup>53</sup>, and another's rising by 16% following an educational campaign and the introduction of a tick box on the discharge summary to query whether driving was discussed<sup>54</sup>. These are small gains – but they are gains nonetheless.

Below are some images and materials that I feel make the concept of fitness to drive very accessible, both to the healthcare provider and the patient. Making this information easily digestible to all involved in the fitness to drive process allows for an open dialogue between health care provider and patient. Given the stigmatised and oft-distressing nature of treatment for bipolar disorder, it is our duty as healthcare providers to involve the patient throughout the fitness to drive process as much as possible.

Furthermore, as medical students we emerge from our placements, Psychiatry in particular, inculcated (and rightly so) with the need for constant vigilance regarding potential risk. Assessing someone's risk to themselves or others is a concept we as medical students become comfortable with throughout our clinical education - why does our teaching on assessment of risk not seem to extend to behind the wheel of a car? If we want to inform healthcare providers about risk, we have to inform the students, and include traffic medicine on undergraduate curricula.

### Accessible fitness to drive information



An eye-catching poster hung in a mental health service. A re-audit after their educational and poster campaign showed a 15.5% increase in medical practitioners finding out if a patient is driving.<sup>55</sup>

#### BOX 1 Checklist to guide fitness to drive of people with eating disorders

1. Is the patient suicidal or insufficiently caring of whether they live or die?
2. What medication is prescribed and taken? Might it interfere with driving?
3. Does the patient use alcohol, other over-the-counter, online-purchased or street drugs (including painkillers, diuretics, laxatives, etc.)?
4. Are there comorbid physical or psychiatric conditions that may be inadequately managed, e.g. diabetes, epilepsy.
5. Has the patient had any episodes of collapse, faints, falls?
6. On examination of heart and brain, is there risk of collapse?
7. Is the patient stable at their current weight or have there been fluctuations (in both directions)?
8. In particular, has the patient had a recent increase in their weight so that there will be increased metabolism without corresponding replenishment of glycogen stores?
9. Does the patient have adequate physical strength to do an emergency stop etc. if necessary?
10. Has the patient ever had a recorded low blood glucose? If so, has there been normal blood glucose (above 4) in the last four blood glucose tests (>4 using venous blood, >5 on blood glucose test strips)?
11. Does the patient induce vomiting on the same days as driving? If so, how long elapses after vomiting before driving, and does the patient eat/drink again before driving? Frequent vomiting is likely to result in unstable electrolytes and fluctuating concentration.
12. Is the patient so preoccupied by obsessional thoughts, ruminations and calculations that they cannot prioritise road safety? Sometimes their behaviour in therapy will reveal preoccupations.
13. What about impulsivity and rage? Patients who have to satisfy their binges at all costs (e.g. shoplifting) may not be able to show the patience needed e.g. at traffic or pedestrian lights.
14. Does the patient eat while driving or engage in compensatory behaviours such as purging while driving?
15. Do 'checking behaviours' occur in the car, such as using mirrors to check appearance rather than for traffic, or using phones or calculators to add up calories while at the wheel?

A very accessible checklist for clinicians to go through when assessing someone with an eating disorders fitness to drive<sup>56</sup> - this could work really well in app form, a healthcare worker would type in what they're assessing someone for and a checklist is pulled up.

## APPENDIX B

### CONSUMER DRIVER CHECKLIST: AM I A SAFE DRIVER?

Driving is often a very important part of a person's life. When you drive it is also important that you feel safe, and that the safety of other road users and pedestrians is maintained. If any of the following statements apply to you, please discuss them with your key clinician or doctor.

STATEMENT (PLEASE CIRCLE THE APPROPRIATE RESPONSE)	FREQUENCY OF OCCURRENCE RATING				
	NEVER	RARELY	SOMETIMES	OFTEN	ALWAYS
	N	R	S	O	A
I get lost while driving	N	R	S	O	A
My friends/family members say they are worried about my driving	N	R	S	O	A
Other cars seem to appear out of nowhere	N	R	S	O	A
I have trouble seeing signs in time to respond to them	N	R	S	O	A
Other drivers drive too fast	N	R	S	O	A
Other drivers honk their horns at me	N	R	S	O	A
Driving stresses me out	N	R	S	O	A
After driving, I feel tired	N	R	S	O	A
I have 'near misses'	N	R	S	O	A
Busy intersections bother me	N	R	S	O	A
Right-hand turns make me nervous	N	R	S	O	A
The glare from oncoming headlights bothers me	N	R	S	O	A
My medication makes me dizzy or drowsy	N	R	S	O	A
I have trouble turning the steering wheel	N	R	S	O	A
I have trouble pushing down on the accelerator or brakes	N	R	S	O	A
I have trouble looking over my shoulder when I reverse	N	R	S	O	A
I have been stopped by the police for my driving	N	R	S	O	A
People do not want to be a passenger when I drive	N	R	S	O	A
I don't like to drive at night	N	R	S	O	A
I have trouble parking	N	R	S	O	A
I don't feel up to date with the road rules	N	R	S	O	A
I have received fines relating to driving or parking	N	R	S	O	A
I have trouble changing lanes in traffic	N	R	S	O	A
In the past year, I have had accidents (minor or major)	N	R	S	O	A
I drive when I am very angry, upset or emotional	N	R	S	O	A
I have trouble concentrating when driving	N	R	S	O	A
I am distracted when a conversation or listening to the radio	N	R	S	O	A

Further information can be obtained from your key clinician, doctor, occupational therapist or chief occupational therapist. Adapted from Palumbo JM (2006).

*An Australian self-survey entitled "Am I a Safe Driver?"<sup>57</sup> This involves and empowers the patient in the fitness to drive process. - With sleep patterns being reliable indicators of whether a patient with bipolar disorder is likely to relapse in the short term,<sup>58</sup> a question on sleep could be included.*

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