

# The Astronomy for Mental Health Guidelines: A live document for the community

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Astronomy, with its vast array of tools and resources, can greatly benefit society. One area in need of new approaches and interventions is mental health and well-being. Diminished mental health can have a profound effect on society, from financial to loss of human potential. The International Astronomical Union (IAU) Office of Astronomy for Development (OAD) is exploring how astronomy can play a role in improving mental health and well-being.

As part of its project on astronomy for mental health, the OAD is creating and publishing resources for astronomers, educators, science communicators, and others who may benefit from using astronomy in their activities. One of the key resources being developed is the Astronomy for Mental Health Guidelines. This open-access document provides practical steps, tools, resources, and examples for planning, adapting or reviewing programmes or interventions targeting mental health and well-being.

This article will provide the background and context to the problem of mental health, motivations for using astronomy such as the shortfall in global mental healthcare services, a brief summary of the Guidelines and access to the Guidelines online.

## Introduction

The International Astronomical Union Office of Astronomy for Development (OAD) aims to use the resources and skills of astronomy to promote sustainable development worldwide. Astronomy is a multidisciplinary topic with strong links to culture and heritage, making it suitable for addressing a wide range of societal issues. Examples include the use of astronomy topics to improve educational outcomes and teach critical thinking and skills, such as coding (OAD, 2023a).

In recent years, astronomy has been used to boost tourism, especially to benefit communities in rural areas that have excellent dark skies (OAD, 2023b). An emerging area in astronomy for development is the use of astronomy to improve mental health outcomes (OAD, 2022a).

Astronomy is an exciting field that induces awe<sup>1</sup> and grabs attention. An astronomy-oriented activity, such as star-gazing, has the potential to change perspectives and reframe one's problems (e.g., OAD, 2021). It also provides opportunities to engage in a shared activity and thereby experience social integration, connectedness and belonging. It invokes curiosity and leads to new questions, interests, and ideas. Through careful design and by working in

conjunction with mental health experts, it is possible to introduce an astronomy-based activity (or integrate astronomy into an existing activity) to promote mental health benefits.

As a starting point for discussion and to collect user feedback, the OAD has created the Astronomy for Mental Health Guidelines (OAD, 2022b). This open-access online document offers guidance for setting up astronomy-related interventions, events, or mental health and well-being activities targeted at individuals and organisations. To contextualise these guidelines, this article looks at mental health, the shortfall in global mental healthcare services, and how astronomy can be used to help. We conclude this article with a brief summary of the Guidelines.

## The mental healthcare shortfall

Worldwide, nearly one billion people have mental disorders (World Health Organization, 2022). The Covid-19 pandemic further compounded the situation, with a 25.6% increase in reported cases of anxiety and a 27.6% increase in reported cases of depression<sup>2</sup> in 2020 (e.g., Santomauro et al., 2021).

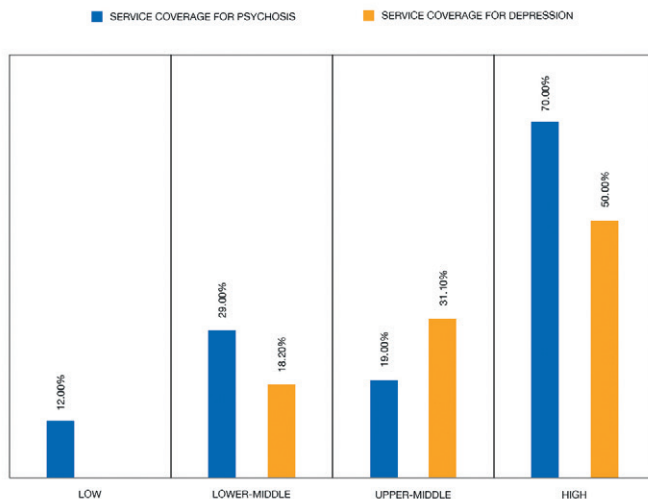
Despite the urgency of the problem, not all people have equal access to the mental

health care they might require due to the treatment gaps experienced globally (World Health Organization, 2021). Here, the term "treatment gap" refers to the difference between the number of people with mental health disorders and the number of individuals who can receive suitable treatment. This gap is affected by various factors such as service coverage, individual behaviours, and societal factors (e.g., Jansen et al., 2015; Priester et al., 2016).

Figure 1 shows the variation in service coverage for psychosis<sup>3</sup> and depression between high and low-income countries.

Individuals in high-income countries might have greater service coverage than low-income countries. However, service coverage does not equate to access and uptake of services, as access to mental health services is also influenced by other factors (e.g., Rathod et al., 2017).

Factors include the lack of official endorsement of mental health care policy, under-resourcing, a lack of awareness, stigma, and a heavy reliance on psychiatric hospitals. Despite mental health care being integrated into public health care, the focus is often on managing medication for severe disorders. In contrast, the detection and treatment of other mental disorders, such as depression and anxiety, are not given the



**Figure 1:** Service Coverage for Psychosis and Depression (depression, n=21 countries; psychosis, n=47 countries; data from World Health Organization, 2021)

same level of attention (e.g., *South African Department of Health, 2012*).

South Africa is a clear example: the mental health service gap is 91% despite being designated by the World Health Organization (WHO) as an upper-middle-income country. Only 1.2% of those uninsured and 7.5% of those insured who require mental health care receive some form of inpatient or outpatient care in the country (*Docrat et al., 2019; World Health Organization, 2021*).

Considering the breadth of issues that impact and surround mental health, it is clear that mental health is central to development. Proper access to mental health services allows people to realise their potential, live and work effectively, and contribute to society. Given the number of people needing mental health treatment, care, and interventions, mental health should be seen not as a healthcare issue but as a fundamental human right (e.g., *Oliveros et al., 2022*).

### Astronomy and mental health

Though not a typical avenue to improve mental health and well-being, a growing body of literature supports using astronomy and nature to improve mental health (e.g., *Bell et al., 2014; Piff et al., 2015*). A review of nature-oriented mental health programmes based on horticulture and gardening showed increased positive emotions, relationships, physical activity, involvement, and feelings of inclusion within the community (*Berto, 2014*). These findings

align with Kaplan's Attention Restoration Theory (ART), which posits that nature can serve as an effective "distraction" from the stress people experience (e.g., *Kaplan, 1995; Ackerman, 2018*).

Nature, whether real or virtual (e.g., potted plants, nature pictures, films, and slides), can help restore mental energy, improve mood, and provide a break to tackle challenges with renewed focus (e.g., *Berto, 2014; Ackerman, 2018*). It enables people to experience awe, which has been shown in various studies to have a positive impact on emotions and relaxation (e.g., *Berto, 2014; Piff et al., 2015*).

Awe has also been shown to promote ethical decision-making, generosity, and prosocial behaviour because it leads people to feel a sense of self-diminishment and to encounter something they perceive as superior to themselves (e.g., *Piff et al., 2015*). Through experiencing "distraction" and awe, individuals can separate themselves from their emotions or situation and experience relief from the challenges they face.

While a significant amount of research supports the benefits of spending time in nature, only a limited number of studies have explored the potential positive effects of astronomy on mental health (e.g., *Bell et al., 2014; Piff et al., 2015*). Astronomy, through activities such as stargazing, education and storytelling, allows individuals to engage with nature. In particular, in our pilot interventions, astronomy activities like stargazing were found to positively benefit mental health and empower individuals and

communities affected by trauma or psychological symptoms (*OAD, 2021*).

Astronomy-based interventions equip participants with a range of mechanisms to support their mental health: learning new ideas, developing skills, strengthening cultural identity, promoting social inclusion, fostering a sense of belonging, and offering opportunities for artistic and recreational activities (*OAD, 2021*).

Through the Astronomy for Mental Health project, the OAD team is exploring ways to use astronomy as a viable and cost-effective tool for improving mental health and well-being. In doing so, the team quickly realised the need to develop and share resources and engage with the broader astronomy and mental health communities. The Astronomy for Mental Health Guidelines is an open resource to share findings, learn from other experiences, and nurture a community of practitioners who can apply astronomy to promote mental health.

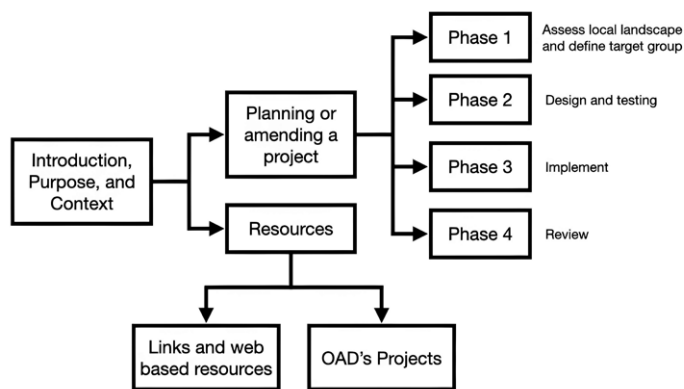
### The Astronomy for Mental Health Guidelines

The Astronomy for Mental Health Guidelines is a planning tool (*OAD, 2022b*). It offers a straightforward and practical approach to designing and implementing programs, interventions, and events that integrate astronomy with mental health and well-being. The document is aimed primarily at astronomers and mental health care practitioners and is based on the work and experience of the OAD team.

As illustrated in Figure 2, the Guidelines are structured in a way that helps to identify, plan, and establish these initiatives.

Initially, the Guidelines were released during the International Astronomical Union (IAU) General Assembly in August 2022. The OAD team sought input from a diverse group of people to help develop the Guidelines, including students, astronomers, psychologists, and the general public.

The document contains recommendations to plan an activity, describes how to integrate astronomy and mental health, and provides various resources such as tools, activities, and websites. It also showcases examples of pilot mental health projects that the OAD team ran in various countries. We discuss the pilot projects below.



**Figure 2:** Astronomy for Mental Health Guidelines Overview (OAD, 2022b).

### Activities in Armenia

In Armenia, the team organised a four-day educational project using astronomy resources for children at a local support centre.

Following an evaluation consisting of questionnaires and individual interviews, the team showed that the programme had a positive impact on the children's behaviour and mood. Notably, they saw an increase in emphasis on the value of interpersonal relationships, motivation, openness, positivity, and a change in value system<sup>4</sup>.

### Activities in Spain

The OAD team has been working with the Fundación Alicia y Guillermo, an association for senior citizens (aged 57 to 93) in Madrid, Spain, to offer astronomy talks<sup>5</sup>.

The goal of these talks was twofold: to provide this group, who are often limited in options for activities, with access to different types of activities and to assess whether astronomy can have positive effects on their mental well-being, especially after the pandemic when this group suffered greatly from fear and isolation.

The pilot activities were held in a hybrid format: some participants physically attended the talks while others connected remotely. Evaluation questionnaires showed an increase in participants' motivation, self-esteem, community engagement, and feelings of mental activity, as summarised in Table 1.

### Activities in South Africa

The OAD team hosted an astronomy and mental health workshop for the Cape Town Community Mental Health and Psychiatry Foundation (CMHPF). The CMHPF serves around 300 long-term residents, mostly

Item	Average Numeric Value
Personal growth and enrichment	8.7
Improve my self-esteem thanks to the acquisition of new knowledge	7.7
Enjoy and develop a hobby that has allowed me to use my time in a positive way	8.9
Discover a new hobby	7.5
Meet other people with similar interests, expanding my social circle	6.5
Acquire knowledge that, in turn, I will be able to transmit to other people in my environment	6.9
Stay active	8.2
Feel active	8.3
Satisfaction I felt with the initiative	8.7

**Table 1:** Likert scale (1 to 10, where 1 is the lowest and 10 is the highest) results in response to the question, "What do you consider that the series of talks 'Introduction to Astronomy' has provided you?". The Introduction to Astronomy talks were organised for senior citizens in Spain. Scores are averages from 22 participants, aged 57 to 93 (OAD, 2023c).

suffering from schizophrenia and bipolar disorder.

The goals of the workshop were to demonstrate the potential of astronomy to improve mental health and well-being, identify the needs and challenges that the OAD could help with, and improve the mental health and well-being of the participants.

We gathered feedback through qualitative face-to-face interviews<sup>6</sup> held after the workshops, revealing that our goals were all achieved.

### Conclusion

The use of astronomy in mental health is a relatively new field, and more research is needed to establish best practices. This includes gathering more data, collaborating on the development of guidelines, testing different activities to determine their impact on mental health, and conducting both qualitative and quantitative research to better inform practice.

In order to encourage projects and research by astronomers, healthcare practitioners, and the public, the OAD has published the Astronomy for Mental Health Guidelines (OAD, 2022b).

As an open-source reference and toolkit, the Guidelines help ease the process of planning, running, and reviewing projects and interventions. The Astronomy for Mental Health Guidelines continues to grow and develop as the general public, astronomers, and mental healthcare practitioners contribute their personal resources and experience.

If you would like to get involved, find out more, or contribute your own experiences, reach out to the team at: [mentalhealth@astro4dev.org](mailto:mentalhealth@astro4dev.org)

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- <sup>3</sup> Psychosis: A condition affecting how one processes information, resulting in a disconnect from reality. This can result in a person seeing, hearing, or believing things that are not real. Psychosis is a symptom that can be triggered by a mental illness. There are two major forms of psychosis, namely Schizophrenia and Schizoaffective disorder.
- <sup>4</sup> Quantifying a change in value system involves assessing and measuring subjective beliefs and attitudes. We gathered this data with the assistance of a psychologist using questionnaires, surveys, and interviews. It is important to note that quantifying a change in value system is not an exact science, and different methods may produce different results. There is also a fair degree of bias present in quantifying a change in value systems.
- <sup>5</sup> Astronomy talks: We delivered four talks on the topics: "A Voyage Through the Cosmos", "Exploring the Solar System with ESA missions", "Impacts and How to Avoid Them", and "The Red Planet".
- <sup>6</sup> Interviews: The qualitative face-to-face interviews were held after the workshop with randomly selected participants. The interview posed a series of open-ended questions: (1) "Having been to the workshop, how do you think astronomy can be used to improve the mental health and well-being of the patients you work with?"; (2) "What challenges do you see in implementing [x](the participant's recommendation from question 1)?"; (3) "How can the OAD assist you in overcoming these challenges?".

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## Biographies

**Dominic Vertue** joined the OAD in June 2022. Dominic has a master's in medical social work and several years of experience in public health and community-based programs to empower vulnerable groups. Within the OAD, Dominic forms part of the Astronomy for Mental Health Flagship, exploring the role astronomy can play in mental well-being.

**Sandra Benítez** holds a PhD in astrophysics and a specialisation in Science communication. She was an OAD remote fellow from August 2021 to August 2022, working within the Astronomy for Mental Health project.