Appendix

eTable 1: Categories of Psychiatric Diagnosis

Category	Description
Anxiety	Agoraphobia, Anxiety disorder, unspecified, Elective mutism, Generalized anxiety disorder, Hypochondriacal disorder, Organic anxiety disorder, Other phobic anxiety disorders, Other specified anxiety disorders, Panic disorder [episodic paroxysmal anxiety], Social anxiety disorder of childhood, Social phobias
Bipolar	Bipolar affective disorder, current episode hypomanic, Bipolar affective disorder, current episode manic with psychotic symptoms, Bipolar affective disorder, current episode manic without psychotic symptoms, Bipolar affective disorder, current episode mild or moderate depression, Bipolar affective disorder, current episode mixed, Bipolar affective disorder, current episode severe depression with psychotic symptoms, Bipolar affective disorder, current episode severe depression without psychotic symptoms, Bipolar affective disorder, currently in remission, Bipolar affective disorder, unspecified, Cyclothymia, Hypomania, Mania with psychotic symptoms, Mania without psychotic symptoms, Manic episode, unspecified, Other bipolar affective disorders, Other manic episodes
Conduct	Conduct disorder, unspecified, Habit and impulse disorder, unspecified, Oppositional defiant disorder, Other conduct disorders, Other habit and impulse disorders, Other mixed disorders of conduct and emotions, Pathological fire-setting [pyromania]
Depression	Depressive conduct disorder, Depressive episode, unspecified, Dysthymia, Mixed anxiety and depressive disorder, Moderate depressive episode, Organic mood [affective] disorders, Other depressive episodes, Other recurrent depressive disorders, Other recurrent mood [affective] disorders, Persistent mood [affective] disorder, unspecified, Recurrent depressive disorder, current episode mild, Recurrent depressive disorder, current episode moderate, Recurrent depressive disorder, current episode severe with psychotic symptoms, Recurrent depressive disorder, current episode severe without psychotic symptoms, Recurrent depressive disorder, currently in remission, Recurrent depressive disorder, unspecified, Severe depressive episode with psychotic symptoms, Severe depressive episode without psychotic symptoms, Unspecified mood [affective] disorder

Category	Description
Dissociative	Depersonalization-derealization syndrome, Dissociative [conversion] disorder, unspecified, Dissociative amnesia, Dissociative convulsions, Dissociative motor disorders, Mixed dissociative [conversion] disorders, Organic amnesic syndrome, not induced by alcohol and other psychoactive substances, Other dissociative [conversion] disorders
Eating	Anorexia nervosa, Atypical anorexia nervosa, Bulimia nervosa, Eating disorder, unspecified, Other eating disorders
Neurocognitive	Delirium not superimposed on dementia, so described, Delirium superimposed on dementia, Delirium, unspecified, Mild cognitive disorder, Mixed cortical and subcortical vascular dementia, Multi-infarct dementia, Other delirium, Other vascular dementia, Subcortical vascular dementia, Unspecified dementia, Vascular dementia, unspecified
Neurodevelopmental	Asperger's syndrome, Atypical autism, Childhood autism, Combined vocal and multiple motor tic disorder [de la tourette], Developmental disorder of scholastic skills, unspecified, Disturbance of activity and attention, Mild mental retardation with the statement of no, or minimal, impairment of behaviour, Mild mental retardation without mention of impairment of behaviour, Mild mental retardation, other impairments of behaviour, Mixed disorder of scholastic skills, Other developmental disorders of scholastic skills, Other disorders of psychological development, Other pervasive developmental disorders, Other specified behavioural and emotional disorders with onset usually occurring in childhood and adolescence, Pervasive developmental disorder, unspecified, Receptive language disorder, Stuttering [stammering], Tic disorder, unspecified, Unspecified disorder of psychological development, Unspecified mental retardation without mention of impairment of behaviour
Obsessive	Obsessive-compulsive disorder, unspecified, Other obsessive-compulsive disorders, Other specified neurotic disorders, Predominantly compulsive acts [obsessional rituals], Predominantly obsessional thoughts or ruminations
Other	OTHER identity disorder, unspecified, Mental disorder, not otherwise specified, Mild mental and behavioural disorders associated with the puerperium, not elsewhere classified, Nightmares, Nonorganic insomnia, Other OTHER identity disorders, Other mental and behavioural disorders associated with the puerperium, not elsewhere classified, Other specified mental disorders due to brain damage and

Category	Description
	dysfunction and to physical disease, Postconcussional syndrome, Sadomasochism, Severe mental and behavioural disorders associated with the puerperium, not elsewhere classified, Transsexualism, Unspecified behavioural syndromes associated with physiological disturbances and physical factors, Unspecified mental disorder due to brain damage and dysfunction and to physical disease, Unspecified organic or symptomatic mental disorder, Unspecified organic personality and behavioural disorder due to brain disease, damage and dysfunction, Vomiting associated with other psychological disturbances
Personality	Anankastic personality disorder, Anxious [avoidant] personality disorder, Dependent personality disorder, Dissocial personality disorder, Emotionally unstable personality disorder, Histrionic personality disorder, Mixed and other personality disorders, Organic personality disorder, Other organic personality and behavioural disorders due to brain disease, damage and dysfunction, Other specific personality disorders, Other specified disorders of adult personality and behaviour, Paranoid personality disorder, Personality disorder, unspecified, Unspecified disorder of adult personality and behaviour
Psychosis	Acute and transient psychotic disorder, unspecified, Acute schizophrenia-like psychotic disorder, Catatonic schizophrenia, Delusional disorder, Hebephrenic schizophrenia, Induced delusional disorder, Organic delusional [schizophrenia-like] disorder, Other acute and transient psychotic disorders, Other acute predominantly delusional psychotic disorders, Other nonorganic psychotic disorders, Other persistent delusional disorders, Other schizoaffective disorders, Other schizophrenia, Paranoid schizophrenia, Residual schizophrenia, Schizoaffective disorder, depressive type, Schizoaffective disorder, manic type, Schizoaffective disorder, mixed type, Schizoaffective disorder, unspecified, Schizoid personality disorder, Schizophrenia, unspecified, Schizotypal disorder, Undifferentiated schizophrenia, Unspecified nonorganic psychosis
Somatic	Intentional production or feigning of symptoms or disabilities, either physical or psychological [factitious disorder], Other somatoform disorders, Persistent somatoform pain disorder, Somatization disorder, Somatoform autonomic dysfunction, Somatoform disorder, unspecified
Substance	Abuse of non-dependence-producing substances, Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, acute intoxication, Mental and behavioural disorders due

Category	Description
	to multiple drug use and use of psychoactive substances, dependence syndrome, Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, harmful use, Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, other mental and behavioural disorders, Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, psychotic disorder, Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, residual and late-onset psychotic disorder, Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, unspecified mental and behavioural disorder, Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, withdrawal state, Mental and behavioural disorders due to multiple drug use and use of psychoactive substances, withdrawal state with delirium, Mental and behavioural disorders due to use of alcohol, acute intoxication, Mental and behavioural disorders due to use of alcohol, amnesic syndrome, Mental and behavioural disorders due to use of alcohol, dependence syndrome, Mental and behavioural disorders due to use of alcohol, harmful use, Mental and behavioural disorders due to use of alcohol, other mental and behavioural disorders, Mental and behavioural disorders due to use of alcohol, psychotic disorder, Mental and behavioural disorders due to use of alcohol, residual and late-onset psychotic disorder, Mental and behavioural disorders due to use of alcohol, unspecified mental and behavioural disorder, Mental and behavioural disorders due to use of alcohol, withdrawal state, Mental and behavioural disorders due to use of alcohol, withdrawal state with delirium, Mental and behavioural disorders due to use of cannabinoids, acute intoxication, Mental and behavioural disorders due to use of cannabinoids, dependence syndrome, Mental and behavioural disorders due to use of cannabinoids, harmful use, Mental and behavioural disorders due to use of cannabinoids, other mental and behavioural disorders, Mental and behavioural disorders due to use of cannabinoids, psychotic disorder, Mental and behavioural disorders due to use of cannabinoids, unspecified mental and behavioural disorder, Mental and behavioural disorders due to use of cannabinoids, withdrawal state, Mental and behavioural disorders due to use of cocaine, acute intoxication, Mental and behavioural disorders due to use of cocaine, dependence syndrome, Mental and behavioural disorders due to use of cocaine, harmful use, Mental and behavioural disorders due to use of cocaine, other mental and behavioural disorders, Mental and behavioural disorders due to use of cocaine, psychotic disorder, Mental and behavioural disorders due to use of cocaine, unspecified mental and behavioural disorder, Mental and behavioural disorders due to use of cocaine, withdrawal state, Mental

Category	Description
	and behavioural disorders due to use of cocaine, withdrawal state with delirium, Mental and behavioural disorders due to use of hallucinogens, acute intoxication, Mental and behavioural disorders due to use of hallucinogens, dependence syndrome, Mental and behavioural disorders due to use of hallucinogens, harmful use, Mental and behavioural disorders due to use of hallucinogens, psychotic disorder, Mental and behavioural disorders due to use of opioids, acute intoxication, Mental and behavioural disorders due to use of opioids, dependence syndrome, Mental and behavioural disorders due to use of opioids, harmful use, Mental and behavioural disorders due to use of opioids, other mental and behavioural disorders, Mental and behavioural disorders due to use of opioids, psychotic disorder, Mental and behavioural disorders due to use of opioids, unspecified mental and behavioural disorder, Mental and behavioural disorders due to use of opioids, withdrawal state, Mental and behavioural disorders due to use of opioids, withdrawal state with delirium, Mental and behavioural disorders due to use of other stimulants including caffeine, acute intoxication, Mental and behavioural disorders due to use of other stimulants including caffeine, dependence syndrome, Mental and behavioural disorders due to use of other stimulants including caffeine, harmful use, Mental and behavioural disorders due to use of other stimulants including caffeine, other mental and behavioural disorders, Mental and behavioural disorders due to use of other stimulants including caffeine, psychotic disorder, Mental and behavioural disorders due to use of other stimulants including caffeine, residual and late-onset psychotic disorder, Mental and behavioural disorders due to use of other stimulants including caffeine, unspecified mental and behavioural disorder, Mental and behavioural disorders due to use of other stimulants including caffeine, withdrawal state, Mental and behavioural disorders due to use of other stimulants including caffeine, withdrawal state with delirium, Mental and behavioural disorders due to use of sedatives or hypnotics, acute intoxication, Mental and behavioural disorders due to use of sedatives or hypnotics, dependence syndrome, Mental and behavioural disorders due to use of sedatives or hypnotics, harmful use, Mental and behavioural disorders due to use of sedatives or hypnotics, other mental and behavioural disorders, Mental and behavioural disorders due to use of sedatives or hypnotics, psychotic disorder, Mental and behavioural disorders due to use of sedatives or hypnotics, unspecified mental and behavioural disorder, Mental and behavioural disorders due to use of sedatives or hypnotics, withdrawal state, Mental and behavioural disorders due to use of sedatives or hypnotics, withdrawal state with delirium, Mental and behavioural disorders due to use of volatile solvents, dependence syndrome, Pathological gambling

Category	Description
Trauma	Acute stress reaction, Adjustment disorders, Other reactions to severe stress, Post-traumatic stress disorder, Reaction to severe stress, unspecified

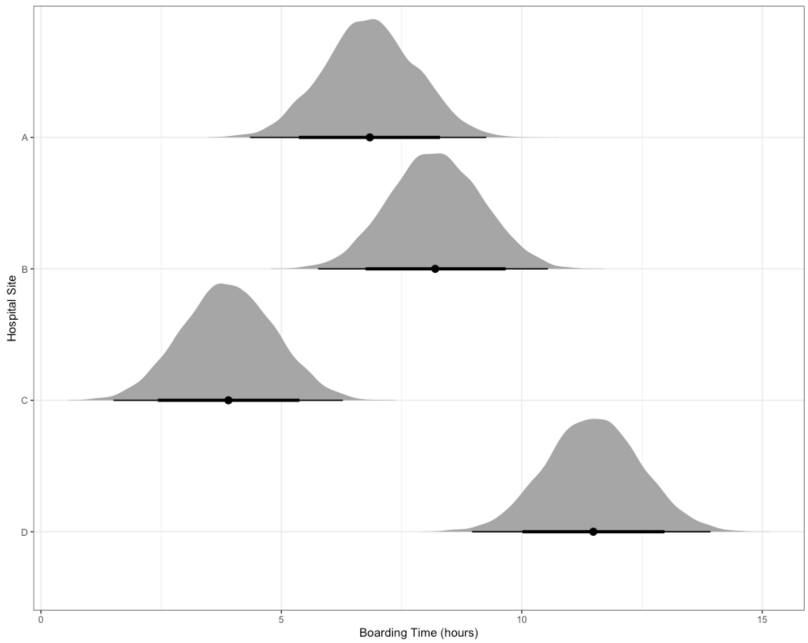
Bayesian regression requires specification of distributions representing the possible range of effect for each parameter prior to incorporating the data. These "prior distributions" for each of the parameters were defined following prior predictive simulations. All prior values are described in eTable 2. Convergence of models was assessed using trace-plots, the number of effective-samples (i.e. an assessment of correlation between iterations), and the Gelman-Rubin convergence diagnostic for each parameter.

eTable 2: Prior distributions defined for each parameter

Linear model			Poisson model		
Parameter	**Distribution**	**Values**	**Parameter**	**Distribution**	**Values**
Intercept	Normal	Mean: 0, SD: 10	Intercept	Normal	Mean: 0, SD: 2
Coefficients	Normal	Mean: 0, SD: 5	Coefficients	Normal	Mean: 0, SD: 1
Hyperprior	Cauchy	Location: 0, Scale: 1	Hyperprior	Cauchy	Location: 0, Scale: 1
Spline	Student T	Df: 3, Mu: 0, Sigma: 10	Spline	Student T	Df: 3, Mu: 0, Sigma: 10

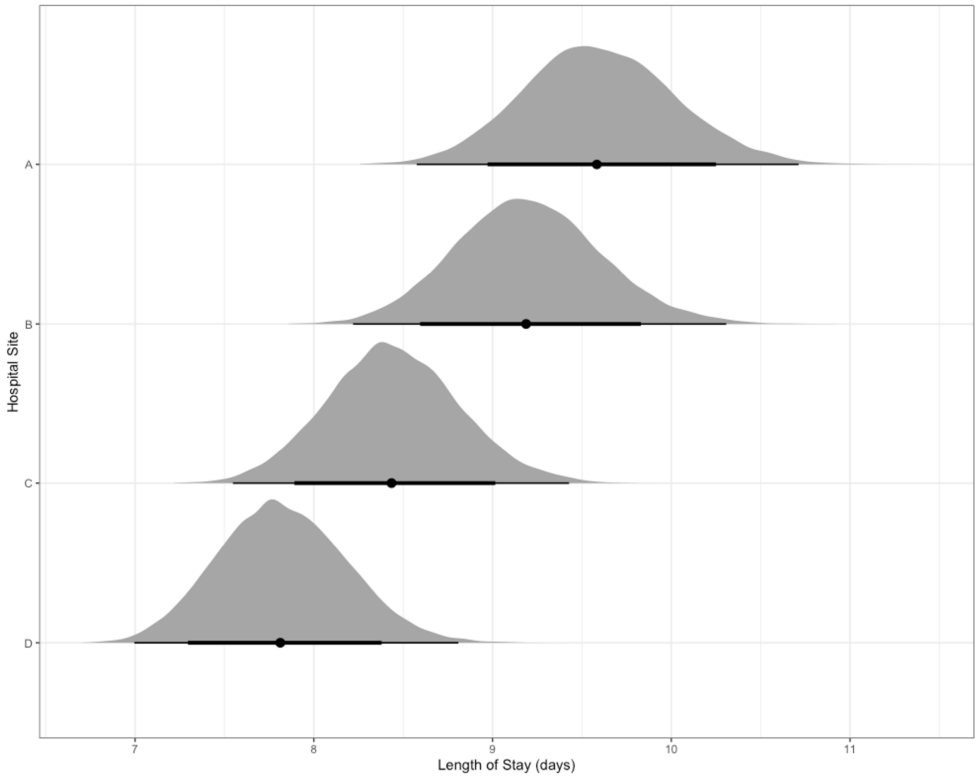
Note: Poisson model priors are defined on the log scale, therefore narrower prior distributions are appropriate. SD, standard deviation; Df, degrees of freedom

eFigure 1: Variation in average boarding time per site



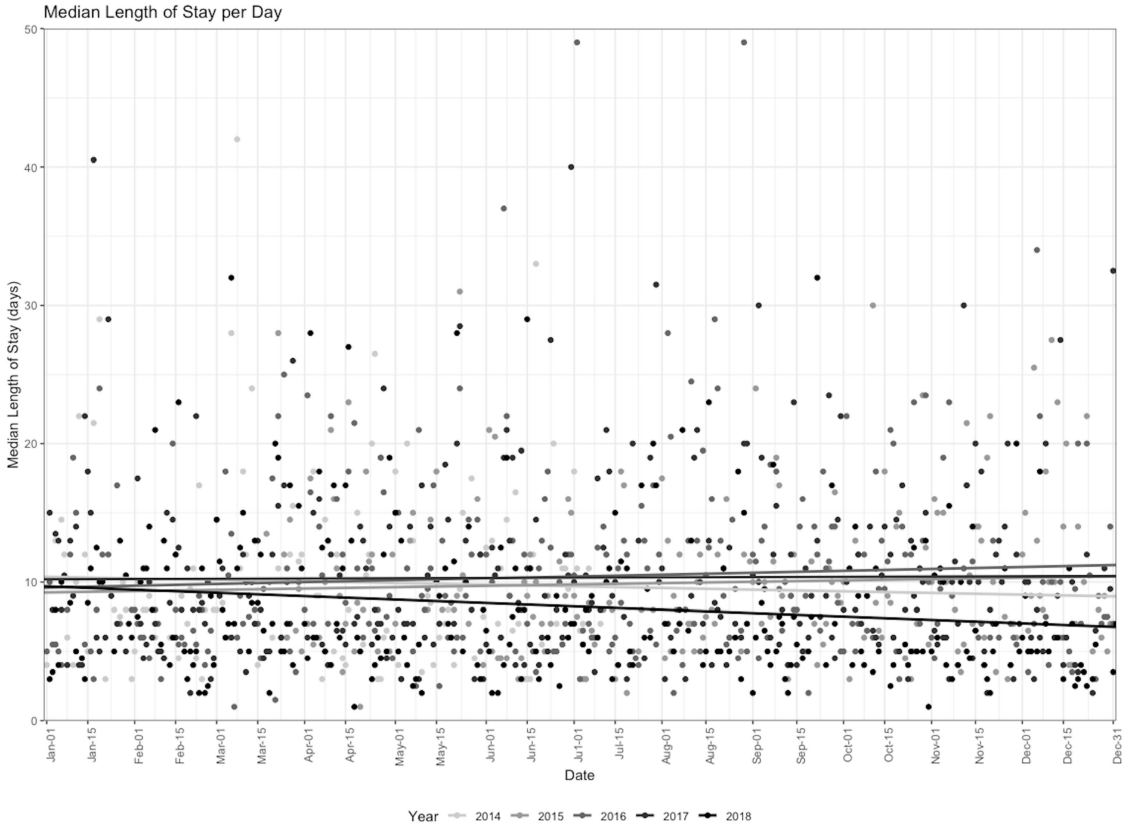
Note: Area of distribution represents probability. Point indicates median, thick line indicates 87% posterior interval, thin line indicates 99% posterior interval.

eFigure 2: Variation in length of stay per site

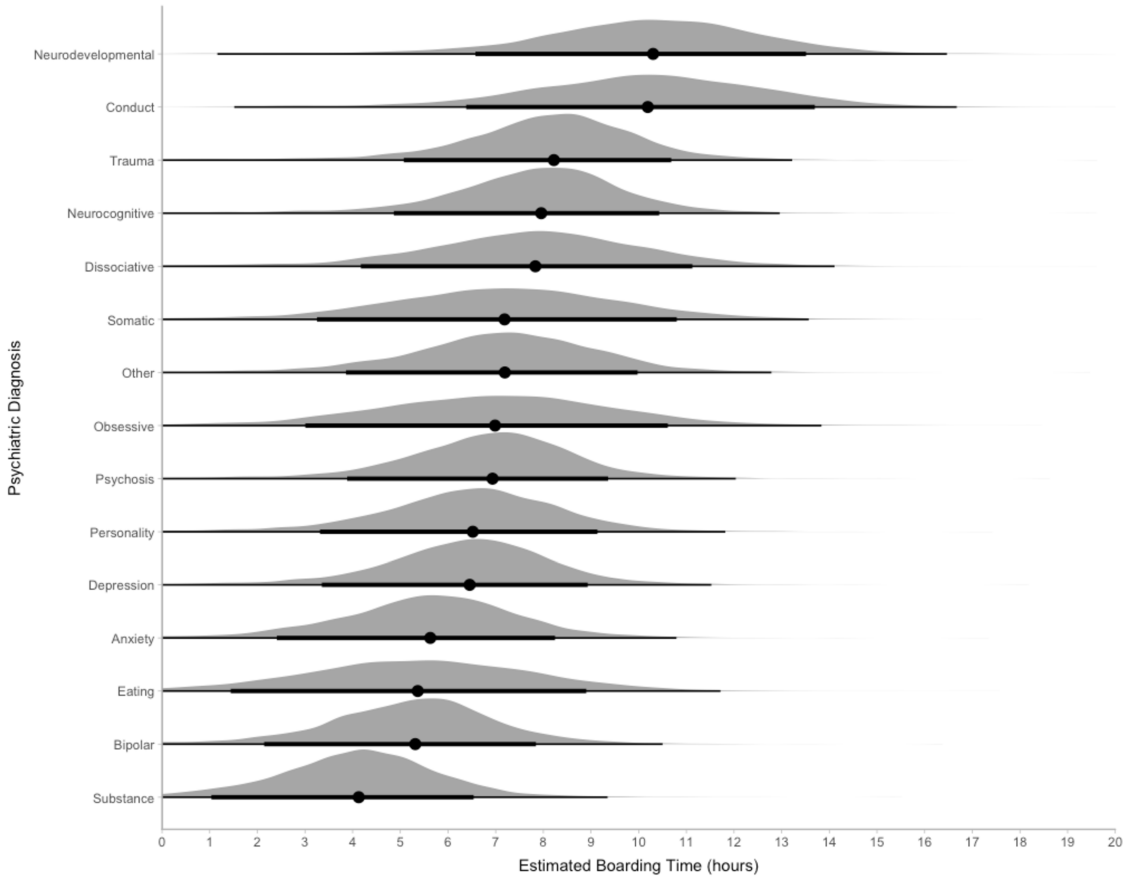


Note: Area of distribution represents probability. Point indicates median, thick line indicates 87% posterior interval, thin line indicates 99% posterior interval.

eFigure 3: Change in median length of stay over study period

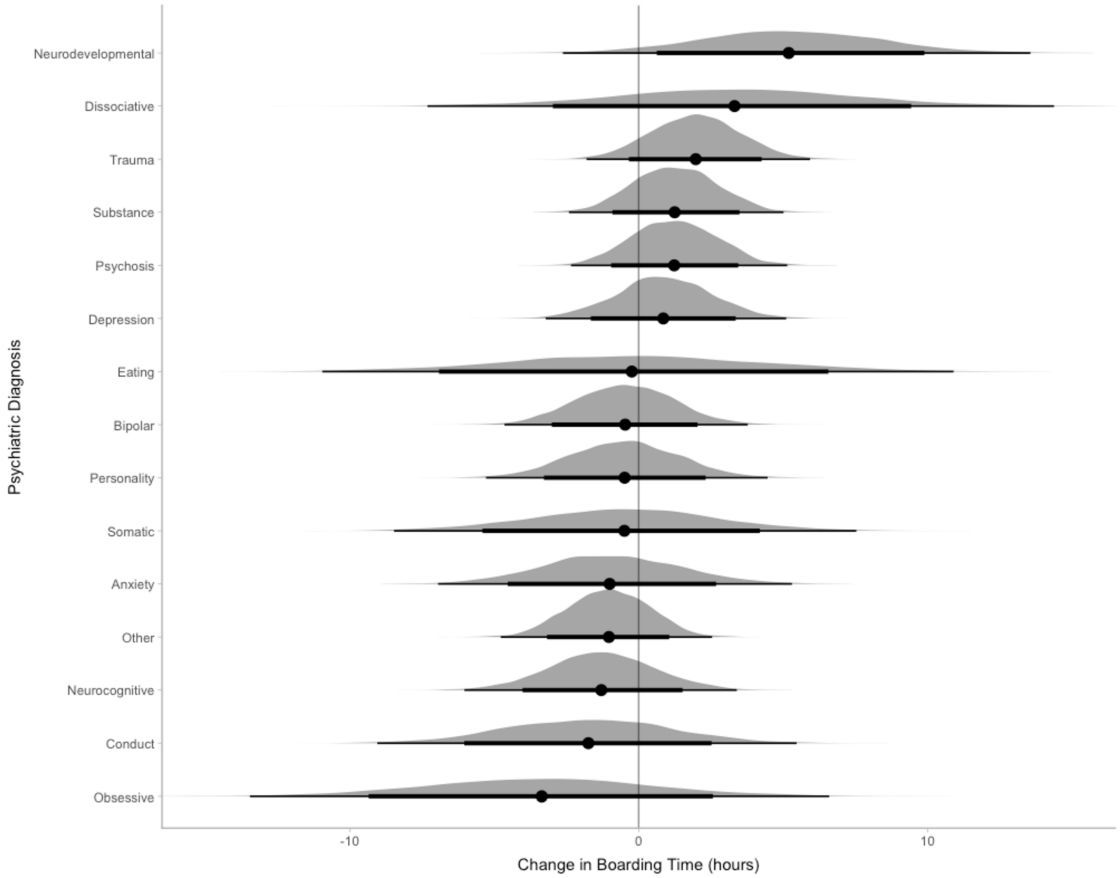


eFigure 4: Estimated boarding time specific to a patient's psychiatric diagnosis



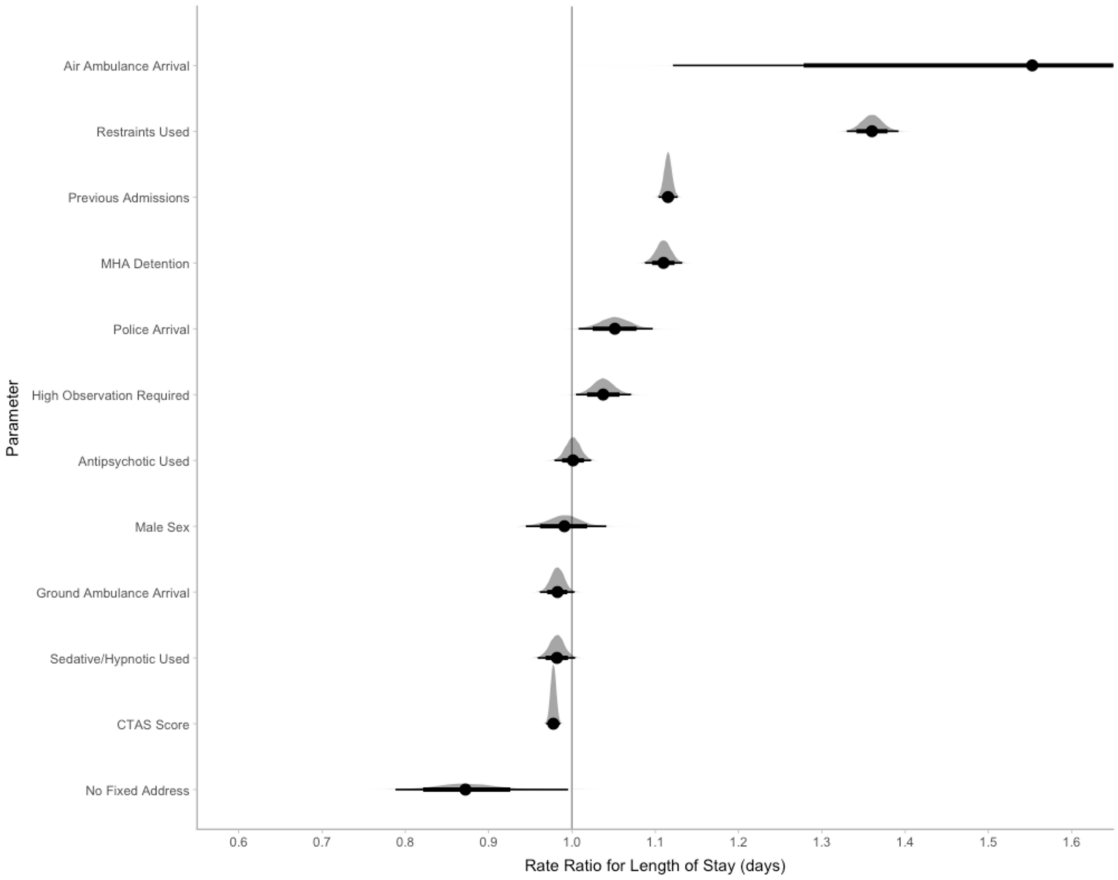
Note: Area of distribution represents probability. Point indicates median, thick line indicates 87% posterior interval, thin line indicates 99% posterior interval.

eFigure 5: Change in boarding time for each psychiatric diagnosis when patient also had secondary substance use disorder



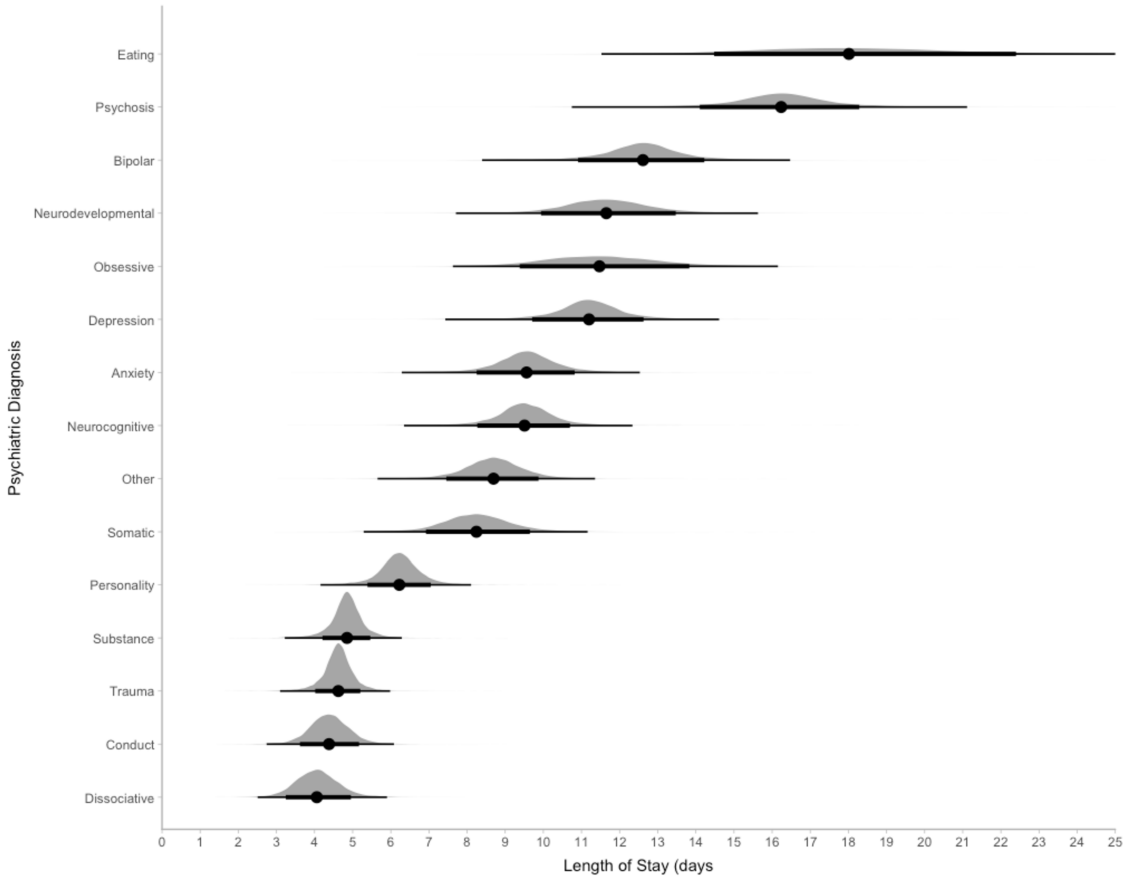
Note: Area of distribution represents probability. Point indicates median, thick line indicates 87% posterior interval, thin line indicates 99% posterior interval.

eFigure 6: Rate ratios representing a patient's change in hospital length of stay



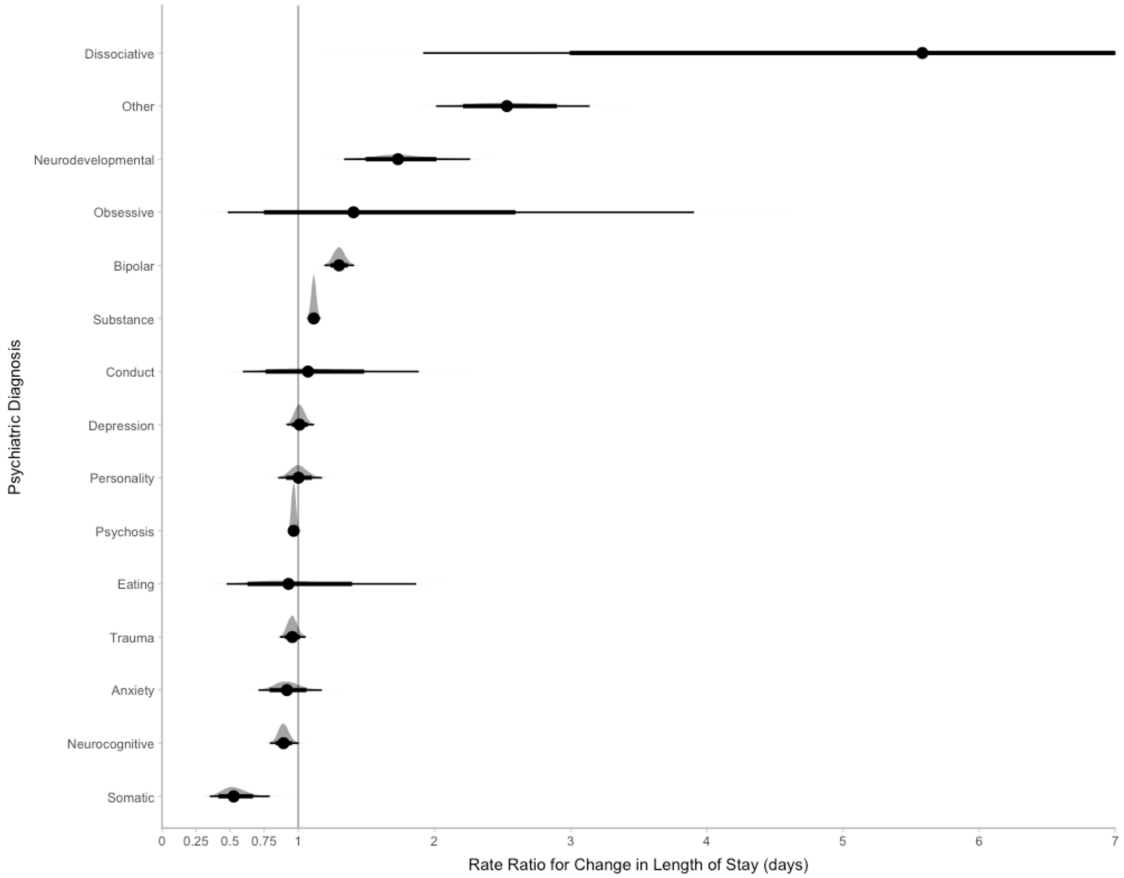
Note: Area of distribution represents probability. Point indicates median, thick line indicates 87% posterior interval, thin line indicates 99% posterior interval.
Area to the right of 1.0 represent and increased length of stay, area to the left represent a decrease.
MHA = mental health act, CTAS = Canadian Triage Acuity Scale

eFigure 7: Estimated hospital length of stay specific to a patient's psychiatric diagnosis



Note: Area of distribution represents probability. Point indicates median, thick line indicates 87% posterior interval, thin line indicates 99% posterior interval.

eFigure 8: Change in hospital length of stay for each psychiatric diagnosis when patient also had secondary substance use disorder



Note: Area of distribution represents probability. Point indicates median, thick line indicates 87% posterior interval, thin line indicates 99% posterior interval.
Area to the right of 1.0 represent and increased length of stay, area to the left represent a decrease.