

# **Relationship between national mental health expenditure and quality of care in longer term psychiatric and social care facilities in Europe: cross-sectional study**

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## **Online Supplement DS1**

### **Ethics Committee Approval**

Ethical approval for the original study (DEMoBinc) was obtained from the relevant ethics committees in each of the ten participating countries (Bulgaria – Ethics Committee, Alexandrovska University Hospital; Czech Republic – General University Hospital, Prague, Ethics Committee; Germany – Ethik Kommission der Medizinischen Fakultät Carl Gustav Carus an der Technischen Universität Dresden; Greece – University Mental Health Research Institutes Medical; Italy – Comitato Etico Indipendente; the Netherlands – Medical Ethical Committee of the University Medical Centre; Poland – Commission of Bioethics, Wrocław Medical University; Portugal – Ethical Committee of the New University of Lisbon Medical School; Spain – Comisión Ética de la Universidad de Granada; UK – City and East London Multi Region Ethics Committee).

Figure DS1. Multilevel models of the association between mental health expenditure and quality of longer term care.

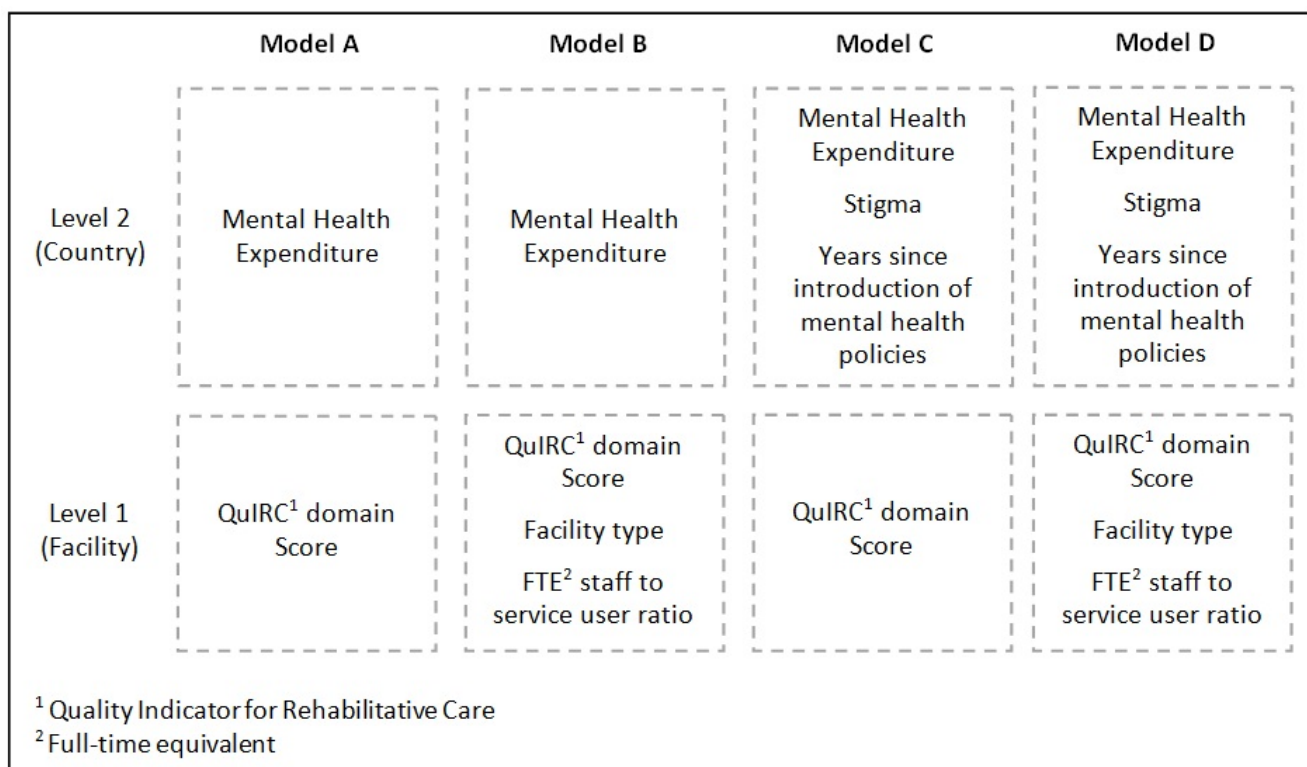


Figure DS2. Multilevel models of the association between mental health expenditure and service user ratings of care.

	Model E	Model F	Model G	Model H
<b>Level 3 (Country)</b>	Mental Health Expenditure	Mental Health Expenditure	Mental Health Expenditure Stigma Years since introduction of mental health policies	Mental Health Expenditure Stigma Years since introduction of mental health policies
<b>Level 2 (Facility)</b>		Facility type FTE <sup>1</sup> staff to service user ratio		Facility type FTE <sup>1</sup> staff to service user ratio
<b>Level 1 (Service User)</b>	Ratings of care	Ratings of care	Ratings of care	Ratings of care

<sup>1</sup> Full-time equivalent

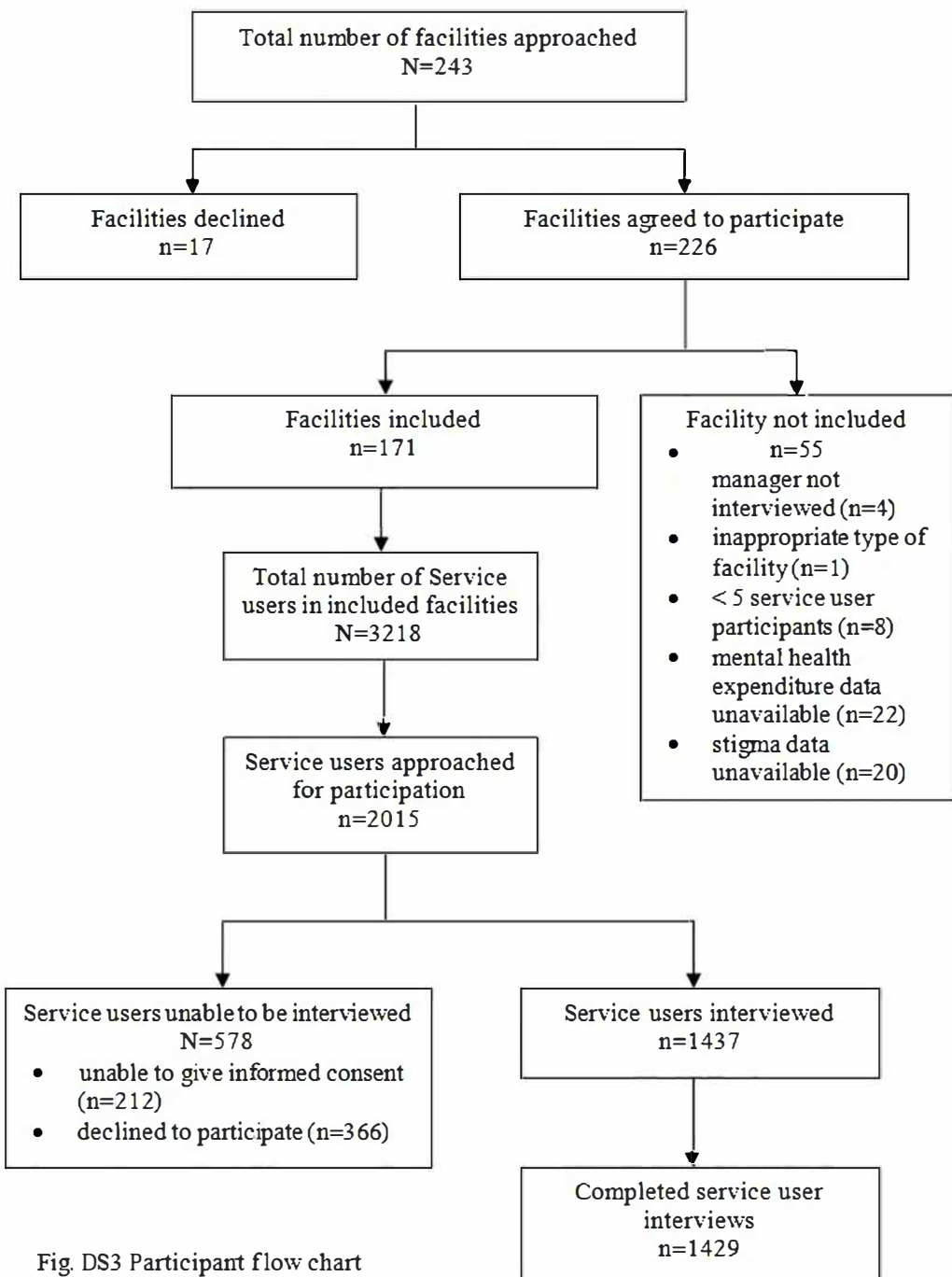


Fig. DS3 Participant flow chart

Table DS1: Description of measures

<b>Outcome</b>	<b>Measure (domain)</b>	<b>Description of Measure/Domain</b>	<b>Scale</b>
Quality of care: Living Environment	QUIRC <sup>1</sup> (Living Environment)	Includes items relating to the amenities, maintenance and home-like feeling of facility	0-100%
Quality of care: Therapeutic Environment	QUIRC <sup>1</sup> (Therapeutic Environment)	Includes items relating to the relationships between staff and service users	0-100%
Quality of care: Treatments and Interventions	QUIRC <sup>1</sup> (Treatments and Interventions)	Includes items relating to the availability, training and use of evidence-based treatments and interventions	0-100%
Quality of care: Self-management and Autonomy	QUIRC <sup>1</sup> (Self-management and Autonomy)	Includes items relating to service user control over daily activities and treatment and the degree to which the service promotes their self-management	0-100%
Quality of care: Social Interface	QUIRC <sup>1</sup> (Social Interface)	Includes items relating to the promotion of service users' participation in activities within the facility and the wider community, and the strength of their social networks	0-100%
Quality of care: Human rights	QUIRC <sup>1</sup> (Human Rights)	Includes items relating to how well a facility upholds service user rights such as voting, access to advocacy, and privacy	0-100%
Quality of care: Recovery-based Practice	QUIRC <sup>1</sup> (Recovery-based Practice)	Includes items relating to the incorporation of service user goals and objectives in care	0-100%
Autonomy	Resident Choice Scale	Includes items relating to service user choice regarding daily activities	22-88
Quality of life	Manchester Short Assessment of Quality of Life	Includes items relating to satisfaction with daily activities and relationships	1-7
Experiences of care	Your Treatment and Care	Includes items relating to service user knowledge of and involvement in treatment and care	0-25
Therapeutic milieu	Good Milieu Index	Includes items relating to satisfaction with staff, service users, and care received	5-25

<sup>1</sup> QUIRC: Quality Indicator for Rehabilitative Care

Table DS2. Main effects of mental health expenditure on living environment

Model	Null model	Model A	Model B	Model C	Model D
Living Environment, mean (s.e.)	60.59*** (3.53)	48.13*** (6.38)	43.01*** (5.66)	-6.68 (12.08)	-2.12 (13.15)
Fixed effects parameter estimate (s.e.)					
Percentage mental health expenditure		2.15 * (0.99)	1.71 (0.88)	2.17*** (0.53)	1.85*** (0.57)
Unit type					
hospital			reference		reference
community			13.34*** (2.28)		12.79*** (2.12)
Staff/service user ratio					
< 0.52			reference		reference
≥ 0.52			-3.17 (2.83)		-1.72 (2.75)
Mental Health legislation <sup>a</sup>				0.32 (0.21)	0.16 (0.22)
Stigma				9.95*** (2.03)	8.38*** (2.20)
Random parameters variance (s.e.)					
Level 1 (country)	91.36 (53.52)	56.38 (37.56)	42.63 (29.64)	4.83 (9.10)	5.68 (9.39)
Level 2 (facility)	179.56 (19.89)	179.56 (19.89)	148.31 (16.54)	179.48 (19.87)	148.21 (16.52)
Model Fit					
AICc <sup>b</sup>		1389.41	1351.26	1380.17	1343.54

<sup>a</sup> Years since introduction of legislation<sup>b</sup> corrected Akaike Information Criterion\*  $p < 0.05$ ; \*\*  $p \leq 0.01$ ; \*\*\*  $p \leq 0.001$

Table DS3. Main effects of mental health expenditure on therapeutic environment

Model	Null model	Model A	Model B	Model C	Model D
Therapeutic Environment, mean (s.e.)	52.13*** (2.10)	43.76*** (3.37)	45.11*** (2.94)	57.81*** (14.12)	52.29*** (13.95)
Fixed effects parameter estimate (s.e.)					
Percentage mental health expenditure		1.45** (0.52)	1.46** (0.46)	1.82** (0.062)	1.76** (0.60)
Unit type					
hospital			reference		reference
community			-3.67* (1.50)		-3.70* (1.50)
Staff/service user ratio					
< 0.52			reference		reference
≥ 0.52			3.06 (1.81)		2.50 (1.93)
Mental Health legislation <sup>a</sup>				-0.32 (0.24)	-0.22 (0.24)
Stigma				-2.12 (2.38)	-0.98 (2.34)
Random parameters variance (s.e.)					
Level 1 (country)	32.22 (19.04)	14.82 (10.47)	10.05 (7.85)	15.37 (13.19)	13.45 (11.79)
Level 2 (facility)	67.92 (7.53)	67.92 (7.52)	65.43 (7.29)	67.92 (7.53)	65.41 (7.29)
Model Fit					
AICc <sup>b</sup>		1223.26	1211.63	1223.17	1212.77

<sup>a</sup> Years since introduction of legislation<sup>b</sup> corrected Akaike Information Criterion\*  $p < 0.05$ ; \*\*  $p \leq 0.01$ ; \*\*\*  $p \leq 0.001$

Table DS4. Main effects of mental health expenditure on treatments and interventions

Model	Null model	Model A	Model B	Model C	Model D
Treatments and Interventions, mean (s.e.)	51.19*** (1.53)	44.66*** (2.20)	45.64*** (2.00)	54.51*** (7.88)	50.68*** (8.84)
Fixed effects parameter estimate (s.e.)					
Percentage mental health expenditure		1.13** (0.34)	1.12*** (0.32)	1.46*** (0.34)	1.42*** (0.38)
Unit type					
hospital			reference		reference
community			-2.54 (1.56)		-2.49 (1.56)
Staff/service user ratio					
< 0.52			reference		reference
≥ 0.52			2.42 (1.71)		1.70 (1.92)
Mental Health legislation <sup>a</sup>				-0.27* (0.13)	-0.19 (0.14)
Stigma				-1.40 (1.33)	-0.61 (1.48)
Random parameters variance (s.e.)					
Level 1 (country)	15.18 (10.12)	4.12 (4.52)	2.14 (3.44)	2.14 (4.15)	2.10 (4.04)
Level 2 (facility)	74.70 (8.28)	74.73 (8.28)	73.86 (8.22)	74.76 (8.29)	73.82 (8.22)
Model Fit					
AICc <sup>b</sup>		1233.68	1226.35	1234.01	1228.08

<sup>a</sup> Years since introduction of legislation

<sup>b</sup> corrected Akaike Information Criterion

\*  $p < 0.05$ ; \*\*  $p \leq 0.01$ ; \*\*\*  $p \leq 0.001$



Table DS5. Main effects of mental health expenditure on self-management and autonomy

Model	Null model	Model A	Model B	Model C	Model D
Self-management and Autonomy, mean (s.e.)	55.65*** (4.02)	36.48*** (4.23)	34.49*** (4.43)	1.57 (8.75)	-0.74 (11.90)
Fixed effects parameter estimate (s.e.)					
Percentage mental health expenditure		3.31*** (0.65)	3.10*** (0.69)	3.42*** (0.38)	3.17*** (0.51)
Unit type					
hospital			reference		reference
community			5.08* (2.22)		4.42* (2.16)
Staff/service user ratio					
< 0.52			reference		reference
≥ 0.52			-0.42 (2.69)		1.20 (2.66)
Mental Health legislation <sup>a</sup>				0.15 (0.15)	0.15 (0.19)
Stigma				6.40*** (1.47)	6.50** (1.99)
Random parameters variance (s.e.)					
Level 1 (country)	122.29 (69.20)	21.41 (16.56)	23.09 (18.11)	1.05e-14 (1.79e-13)	3.23 (7.26)
Level 2 (facility)	146.33 (16.21)	146.39 (16.22)	143.05 (15.95)	145.66 (15.94)	142.84 (15.90)
Model Fit					
AICc <sup>b</sup>		1351.13	1342.47	1343.45	1336.68

<sup>a</sup> Years since introduction of legislation

<sup>b</sup> corrected Akaike Information Criterion

\*  $p < 0.05$ ; \*\*  $p \leq 0.01$ ; \*\*\*  $p \leq 0.001$

Table DS6. Main effects of mental health expenditure on social interface

Model	Null model	Model A	Model B	Model C	Model D
Social Interface, mean (s.e.)	48.58*** (2.34)	48.47*** (5.68)	50.68*** (5.13)	61.65* (27.84)	54.54* (26.44)
Fixed effects parameter estimate (s.e.)					
Percentage mental health expenditure		0.02 (0.88)	0.09 (0.81)	0.22 (1.21)	0.20 (1.15)
Unit type					
hospital			reference		reference
community			-5.89* (2.63)		-5.94* (2.64)
Staff/service user ratio					
< 0.52			reference		reference
≥ 0.52			3.83 (3.17)		3.20 (3.40)
Mental Health legislation <sup>a</sup>				-0.21 (0.48)	-0.07 (0.45)
Stigma				-2.16 (4.69)	-0.62 (4.44)
Random parameters variance (s.e.)					
Level 1 (country)	34.24 (23.74)	41.65 (29.90)	30.55 (23.99)	62.67 (51.49)	50.85 (43.68)
Level 2 (facility)	204.63 (22.68)	204.61 (22.68)	199.88 (22.28)	204.60 (22.66)	199.87 (22.28)
Model Fit					
AICc <sup>b</sup>		1409.29	1398.09	1408.35	1397.77

<sup>a</sup> Years since introduction of legislation

<sup>b</sup> corrected Akaike Information Criterion

\*  $p < 0.05$ ; \*\*  $p \leq 0.01$ ; \*\*\*  $p \leq 0.001$

Table DS7. Main effects of mental health expenditure on human rights

Model	Null model	Model A	Model B	Model C	Model D
Human Rights, mean (s.e.)	57.73*** (3.32)	43.18*** (4.58)	42.86*** (4.70)	43.35* (18.34)	36.95 (19.47)
Fixed effects parameter estimate (s.e.)					
Percentage mental health expenditure		2.51*** (0.71)	2.33** (0.73)	3.10*** (0.80)	2.85** (0.84)
Unit type					
hospital			reference		reference
community			0.57 (1.85)		0.59 (1.85)
Staff/service user ratio					
< 0.52			reference		reference
≥ 0.52			2.99 (2.30)		3.01 (2.38)
Mental Health legislation <sup>a</sup>				-0.38 (0.31)	-0.30 (0.33)
Stigma				0.64 (3.08)	1.65 (3.27)
Random parameters variance (s.e.)					
Level 1 (country)	83.54 (47.09)	28.72 (19.05)	29.63 (19.80)	26.78 (21.79)	28.35 (23.20)
Level 2 (facility)	97.52 (10.80)	97.49 (10.80)	97.57 (10.87)	97.49 (10.79)	97.60 (10.87)
Model Fit					
AICc <sup>b</sup>		1285.86	1281.60	1284.18	1279.94

<sup>a</sup> Years since introduction of legislation

<sup>b</sup> corrected Akaike Information Criterion

\*  $p < 0.05$ ; \*\*  $p \leq 0.01$ ; \*\*\*  $p \leq 0.001$

Table DS8. Main effects of mental health expenditure on recovery-based practice

Model	Null model	Model A	Model B	Model C	Model D
Recovery-based Practice, mean (s.e.)	52.44*** (2.87)	37.71*** (2.00)	37.70*** (2.02)	45.36*** (9.25)	40.43*** (9.95)
Fixed effects parameter estimate (s.e.)					
Percentage mental health expenditure		2.53*** (0.31)	2.40*** (0.32)	2.56*** (0.40)	2.39*** (0.43)
Unit type					
hospital			reference		reference
community			-0.17 (1.88)		-0.21 (1.91)
Staff/service user ratio					
< 0.52			reference		reference
≥ 0.52			2.73 (1.93)		2.29 (2.34)
Mental Health legislation <sup>a</sup>				-0.07 (0.16)	0.00 (0.16)
Stigma				-1.33 (1.56)	-0.51 (1.66)
Random parameters variance (s.e.)					
Level 1 (country)	60.57 (35.33)	0.95 (3.62)	1.71e-13 (2.56e-12)	2.46 (5.54)	1.33 (5.02)
Level 2 (facility)	112.76 (12.49)	112.74 (12.49)	113.29 (12.40)	112.81 (12.50)	113.91 (12.69)
Model Fit					
AICc <sup>b</sup>		1299.50	1295.15	1302.33	1298.69

<sup>a</sup> Years since introduction of legislation<sup>b</sup> corrected Akaike Information Criterion\*  $p < 0.05$ ; \*\*  $p \leq 0.01$ ; \*\*\*  $p \leq 0.001$

Table DS9. Main effects of mental health expenditure on service user autonomy

Model	Null model	Model E	Model F	Model G	Model H
Autonomy, mean (s.e.)		47.74*** (4.86)	46.57*** (4.92)	32.14 (20.71)	30.72 (21.03)
Fixed effects parameter estimate (s.e.)					
Percentage mental health expenditure		2.12** (0.75)	1.95* (0.76)	2.43** (0.90)	2.27* (0.92)
Unit type					
hospital			reference		reference
community			2.99* (1.16)		3.01* (1.16)
Staff/service user ratio					
< 0.52			reference		reference
≥ 0.52			0.56 (1.51)		0.71 (1.53)
Mental Health legislation <sup>a</sup>				-0.11 (0.36)	-0.11 (0.36)
Stigma				3.17 (3.48)	3.23 (3.54)
Random parameters variance (s.e.)					
Level 1 (country)		35.82 (21.72)	36.55 (22.17)	38.38 (28.40)	38.67 (28.60)
Level 2 (facility)		32.14 (4.33)	31.23 (4.24)	32.15 (4.34)	31.24 (4.24)
Level 3 (service user)		51.38 (2.05)	51.34 (2.05)	51.78 (2.05)	51.34 (2.05)
Model Fit					
AICc <sup>b</sup>		10018.25	10010.86	10016.85	10009.36

<sup>a</sup> Years since introduction of legislation<sup>b</sup> corrected Akaike Information Criterion\*  $p < 0.05$ ; \*\*  $p \leq 0.01$ ; \*\*\*  $p \leq 0.001$

Table DS10. Main effects of mental health expenditure on service user quality of life

Model	Null model	Model E	Model F	Model G	Model H
Quality of Life, mean (s.e.)		4.40*** (0.15)	4.39*** (0.15)	3.94*** (0.58)	4.04*** (0.65)
Fixed effects parameter estimate (s.e.)					
Percentage mental health expenditure		0.04 (0.02)	0.04 (0.02)	0.01 (0.03)	0.02 (0.03)
Unit type					
hospital			reference		reference
community			0.05 (0.07)		0.05 (0.07)
Staff/service user ratio					
< 0.52			reference		reference
≥ 0.52			-0.07 (0.09)		-0.05 (0.09)
Mental Health legislation <sup>a</sup>				0.02 (0.01)	0.01 (0.01)
Stigma				0.06 (0.10)	0.04 (0.11)
Random parameters variance (s.e.)					
Level 1 (country)		0.03 (0.02)	0.03 (0.02)	0.03 (0.02)	0.03 (0.03)
Level 2 (facility)		0.05 (0.02)	0.05 (0.02)	0.05 (0.02)	0.05 (0.02)
Level 3 (service user)		0.71 (0.03)	0.71 (0.03)	0.71 (0.03)	0.71 (0.03)
Model Fit					
AICc <sup>b</sup>		3679.29	3688.49	3691.13	3700.72

<sup>a</sup> Years since introduction of legislation<sup>b</sup> corrected Akaike Information Criterion\*  $p < 0.05$ ; \*\*  $p \leq 0.01$ ; \*\*\*  $p \leq 0.001$

Table DS11. Main effects of mental health expenditure on service user experiences of care

Model	Null model	Model E	Model F	Model G	Model H
Experiences of Care, mean (s.e.)		15.88*** (0.71)	15.57*** (0.71)	15.87*** (3.02)	16.02*** (3.01)
Fixed effects parameter estimate (s.e.)					
Percentage mental health expenditure		0.29** (0.11)	0.25* (0.11)	0.37** (0.13)	0.34** (0.13)
Unit type					
hospital			reference		reference
community			0.83* (0.42)		0.84* (0.42)
Staff/service user ratio					
< 0.52			reference		reference
≥ 0.52			0.02 (0.50)		-0.05 (0.54)
Mental Health legislation <sup>a</sup>				-0.05 (0.05)	-0.06 (0.05)
Stigma				0.09 (0.51)	0.02 (0.50)
Random parameters variance (s.e.)					
Level 1 (country)		0.54 (0.45)	0.51 (0.44)	0.61 (0.60)	0.48 (0.52)
Level 2 (facility)		2.70 (0.59)	2.66 (0.59)	2.69 (0.59)	2.66 (0.59)
Level 3 (service user)		20.07 (0.80)	20.06 (0.80)	20.07 (0.80)	20.06 (0.80)
Model Fit					
AICc <sup>b</sup>		8487.84	8487.31	8494.27	8493.34

<sup>a</sup> Years since introduction of legislation<sup>b</sup> corrected Akaike Information Criterion\*  $p < 0.05$ ; \*\*  $p \leq 0.01$ ; \*\*\*  $p \leq 0.001$

Table DS12. Main effects of mental health expenditure on service user ratings of therapeutic milieu

Model	Null model	Model E	Model F	Model G	Model H
Therapeutic Milieu, mean (s.e.)		17.69*** (0.39)	17.42*** (3.52)	16.72*** (1.84)	16.80*** (1.88)
Fixed effects parameter estimate (s.e.)					
Percentage mental health expenditure		-0.05 (0.06)	-0.08 (0.06)	-0.07 (0.08)	-0.09 (0.08)
Unit type					
hospital			reference		reference
community			0.74* (0.32)		0.73* (0.32)
Staff/service user ratio					
< 0.52			reference		reference
≥ 0.52			-0.15 (0.33)		-0.02 (0.41)
Mental Health legislation <sup>a</sup>				0.02 (0.03)	0.01 (0.03)
Stigma				0.15 (0.30)	0.10 (0.31)
Random parameters variance (s.e.)					
Level 1 (country)		0.08 (0.13)	0.02 (0.10)	0.16 (0.22)	0.10 (0.18)
Level 2 (facility)		1.31 (0.37)	1.28 (0.37)	1.32 (0.38)	1.28 (0.37)
Level 3 (service user)		16.29 (0.65)	16.28 (0.65)	16.29 (0.65)	16.28 (0.65)
Model Fit					
AICc <sup>b</sup>		8146.39	8144.97	8156.13	8155.25

<sup>a</sup> Years since introduction of legislation

<sup>b</sup> corrected Akaike Information Criterion

\*  $p < 0.05$ ; \*\*  $p \leq 0.01$ ; \*\*\*  $p \leq 0.001$