

Online supplemental file 7. Characteristics of the population lost to follow-up for the derivation cohort: ED evaluation

Characteristics	Enrolled patients n=563		Derivation cohort n=471		Lost to follow-up n=92	
	n	(%)	n	(%)	n	(%)
Sociodemographic variables						
Age, median (Q1-Q3)	37	(22-55)	37	(23-57)	36	(21-51)
14-24	172	(30.6)	142	(30.1)	30	(32.6)
25-34	97	(17.2)	81	(17.2)	16	(17.4)
35-44	63	(11.2)	49	(10.4)	14	(15.2)
45-54	86	(15.3)	67	(14.2)	19	(20.7)
55-64	83	(14.7)	76	(16.1)	7	(7.6)
65-74	45	(8.0)	39	(8.3)	6	(6.5)
75-84	15	(2.7)	15	(3.2)	0	(0.0)
85+	2	(0.4)	2	(0.4)	0	(0.0)
Sex (M)	369	(65.4)	306	(65.0)	63	(68.5)
Past medical/injury history						
History of TBI	201	(36.0)	166	(35.4)	35	(38.9)
Prior TBI < 1 year	30	(5.8)	23	(5.0)	7	(12.7)
Prior multiple TBI	60	(11.7)	49	(10.7)	11	(20.4)
Prior moderate / severe TBI	22	(4.6)	19	(4.5)	3	(6.1)
History of mental health disorder†	146	(26.1)	131	(28.0)	15	(16.5)
At least 3 different prescribed medications	114	(22.0)	104	(22.4)	10	(18.5)
Evaluation in ED						
Mechanism of injury						
Sport	120	(23.1)	109	(23.5)	11	(20.0)
Fall from their own height	105	(20.2)	97	(20.9)	8	(14.6)
Motor vehicle accident	87	(16.8)	76	(16.4)	11	(20.0)
Bicycle accident	81	(15.6)	73	(15.7)	8	(14.6)
Fall more than own height	41	(7.9)	34	(7.3)	7	(12.7)
Others	85	(16.4)	75	(16.2)	10	(18.2)
Loss of consciousness						
Unknown duration	274	(49.0)	228	(48.7)	46	(50.5)
< 5 minutes	97	(17.4)	78	(38.5)	19	(20.9)
≥ 5 minutes	144	(25.8)	124	(26.5)	20	(22.0)
≥ 5 minutes	33	(5.9)	26	(5.6)	7	(7.7)
Unknown information	139	(24.9)	115	(24.6)	24	26.4
Documented post-traumatic amnesia						
< 30 minutes	220	(39.1)	189	(40.1)	31	(33.7)
≥ 30 minutes and < 3 hours	43	(7.6)	37	(7.9)	6	(6.5)
≥ 3 hours	14	(2.5)	12	(2.5)	2	(2.2)
Post-traumatic confusion	312	(57.7)	261	(57.9)	51	(56.7)
Documented headache in ED‡						
< 3	201	(35.7)	166	(35.2)	35	(38.0)
4-7	121	(21.5)	104	(22.1)	17	(18.5)
8-10	59	(10.5)	43	(9.1)	16	(17.4)
GCS* at ED arrival						
15	484	(86.0)	409	(86.8)	75	(81.5)
14	73	(13.0)	56	(11.9)	17	(18.5)
13	6	(1.0)	6	(1.3)	0	(0.0)
Concomitant injuries						
Cervical sprain	316	(61.1)	278	(60.2)	38	(69.1)
Haemorrhage on CT	155	(31.8)	130	(31.9)	25	(31.6)
Haemorrhage on CT	43	(7.7)	31	(6.6)	12	(13.2)

† Any pre-injury mental health disorder, including depression, anxiety, bipolar disorder, schizophrenia, attention-deficit/hyperactivity disorder (ADHD), personality disorders, obsessive-compulsive disorder, post-traumatic stress disorder (PTSD), and other psychiatric disorders.

‡ Verbal rating scale, 0-10 * Glasgow Coma Scale

Online supplemental file 8. Characteristics of the population lost to follow-up for the validation cohort: ED evaluation

<i>Characteristics</i>	<i>Enrolled patients n=770</i>		<i>Validation cohort n=612</i>		<i>Lost to follow-up n=158</i>	
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>
Sociodemographic variables						
Age, median (Q1-Q3)	41	(24-59)	43	(25-60)	37	(23-52)
14-24	198	(25.7)	151	(24.7)	47	(29.7)
25-34	124	(16.1)	95	(15.5)	29	(18.4)
35-44	98	(12.7)	73	(11.9)	25	(15.8)
45-54	110	(14.3)	89	(14.5)	21	(13.3)
55-64	103	(13.4)	81	(13.2)	22	(13.9)
65-74	82	(10.7)	77	(12.6)	5	(3.2)
75-84	38	(4.9)	32	(5.2)	6	(3.8)
85+	17	(2.2)	14	(2.3)	3	(1.9)
Sex (M)	446	(57.9)	346	(56.5)	100	(63.3)
Past medical/injury history						
History of TBI	306	(40.1)	249	(40.7)	57	(37.7)
Prior TBI < 1 year	45	(6.4)	36	(5.9)	9	(10.0)
Prior multiple TBI	88	(12.5)	71	(11.6)	17	(18.9)
Prior moderate / severe TBI	42	(6.2)	38	(6.4)	4	(4.5)
History of mental health disorder†	150	(21.3)	126	(20.6)	24	(26.4)
At least 3 different prescribed medications	157	(22.3)	136	(22.2)	21	(23.1)
Evaluation in ED						
Mechanism of injury						
Sport	114	(16.2)	101	(16.5)	13	(14.3)
Fall from their own height	132	(18.8)	114	(18.6)	18	(19.8)
Motor vehicle accident	101	(14.4)	87	(14.2)	14	(15.4)
Bicycle accident	88	(12.5)	76	(12.4)	12	(13.2)
Fall more than own height	53	(7.5)	46	(7.5)	7	(7.7)
Others	215	(30.6)	188	(30.7)	27	(29.7)
Documented Loss of consciousness						
Unknown duration	366	(47.6)	289	(47.3)	77	(49.0)
< 5 minutes	142	(18.5)	111	(18.2)	31	(19.7)
≥ 5 minutes	187	(24.4)	150	(24.6)	37	(23.6)
Unknown information	37	(4.8)	28	(4.6)	9	(5.7)
Documented post-traumatic amnesia						
< 30 minutes	127	(16.5)	100	(16.4)	27	(17.2)
≥ 30 minutes and < 3 hours	212	(27.8)	167	(27.6)	45	(28.5)
≥ 3 hours	51	(6.7)	47	(7.8)	4	(2.5)
≥ 3 hours	14	(1.8)	11	(1.8)	3	(1.9)
Post-traumatic confusion	402	(53.2)	320	(53.2)	82	(52.9)
Documented headache in ED‡						
< 3	199	(25.8)	154	(25.2)	45	(28.5)
4-7	252	(32.7)	202	(33.0)	50	(31.7)
8-10	99	(12.9)	77	(12.6)	22	(13.9)
Glasgow Coma Scale score at ED arrival						
15	681	(88.4)	545	(89.1)	136	(86.1)
14	80	(10.4)	61	(10.0)	19	(12.0)
13	9	(1.2)	6	(1.0)	3	(1.9)
Concomitant injuries						
Cervical sprain	430	(61.2)	374	(61.1)	56	(61.5)
Haemorrhage on CT	197	(26.9)	158	(25.8)	39	(32.5)
Haemorrhage on CT	54	(7.0)	46	(7.5)	8	(5.1)

† Any pre-injury mental health disorder, including depression, anxiety, bipolar disorder, schizophrenia, attention-deficit/hyperactivity disorder (ADHD), personality disorders, obsessive-compulsive disorder, post-traumatic stress disorder (PTSD), and other psychiatric disorders.

‡ Verbal rating scale, 0-10

**Online supplemental file 9. Characteristics of the population lost to follow-up for the derivation cohort:
assessment of patients at 7-days follow-up evaluation**

<i>Rivermead Post-concussion Questionnaire items</i>	<i>Enrolled patients n=489</i>		<i>Derivation cohort n=447</i>		<i>Lost to follow-up n=42</i>	
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>
<i>At least 2 points</i>						
Headaches	245	(50.1)	215	(48.1)	30	(71.4)
Feelings of Dizziness	181	(37.0)	158	(35.3)	23	(54.8)
Nausea and/or Vomiting	66	(13.5)	54	(12.1)	12	(28.6)
Noise Sensitivity, easily upset by loud noise	130	(26.6)	113	(25.3)	17	(40.5)
Sleep Disturbance	154	(31.5)	133	(29.8)	21	(50.0)
Fatigue, tiring more easily	294	(60.1)	262	(58.6)	32	(76.2)
Being Irritable, easily angered	139	(28.4)	124	(27.7)	15	(35.7)
Feeling Depressed or Tearful	113	(23.1)	98	(21.9)	15	(35.7)
Feeling Frustrated or Impatient	154	(31.5)	133	(29.8)	21	(50.0)
Forgetfulness, poor memory	182	(37.2)	155	(34.7)	27	(64.3)
Poor Concentration	192	(39.3)	172	(38.5)	20	(47.6)
Taking Longer to Think	181	(37.0)	156	(34.9)	25	(59.5)
Blurred Vision	78	(16.0)	68	(15.2)	10	(23.8)
Light Sensitivity, easily upset by bright light	112	(22.9)	98	(21.9)	14	(33.3)
Double Vision	22	(4.5)	18	(4.0)	4	(9.5)
Restlessness	47	(9.6)	42	(9.4)	5	(11.9)
<i>At least 3 points</i>						
Headaches	133	(27.2)	110	(24.6)	23	(54.8)
Feelings of Dizziness	80	(16.4)	70	(15.7)	10	(23.8)
Nausea and/or Vomiting	20	(4.1)	15	(3.4)	5	(11.9)
Noise Sensitivity, easily upset by loud noise	69	(14.1)	57	(12.8)	12	(28.6)
Sleep Disturbance	91	(18.6)	73	(16.3)	18	(42.9)
Fatigue, tiring more easily	178	(36.4)	154	(34.5)	24	(57.1)
Being Irritable, easily angered	83	(17.0)	70	(15.7)	13	(31.0)
Feeling Depressed or Tearful	56	(11.5)	47	(10.5)	9	(21.4)
Feeling Frustrated or Impatient	87	(17.8)	73	(16.3)	14	(33.3)
Forgetfulness, poor memory	87	(17.8)	74	(16.6)	13	(31.0)
Poor Concentration	103	(21.1)	88	(19.7)	15	(35.7)
Taking Longer to Think	80	(16.4)	68	(15.2)	12	(28.6)
Blurred Vision	34	(7.0)	27	(6.0)	7	(16.7)
Light Sensitivity, easily upset by bright light	58	(11.9)	50	(11.2)	8	(19.0)
Double Vision	12	(2.5)	11	(2.5)	1	(2.4)
Restlessness	28	(5.7)	26	(5.8)	2	(4.8)

**Online supplemental file 10. Characteristics of the population lost to follow-up for the validation cohort:
assessment of patients at 7-days follow-up evaluation**

<i>Rivermead Post-concussion Questionnaire items</i>	<i>Enrolled patients n=708</i>		<i>Validation cohort n=600</i>		<i>Lost to follow-up n=108</i>	
	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>	<i>n</i>	<i>(%)</i>
<i>At least 2 points</i>						
Headaches	425	(60.0)	353	(58.8)	72	(66.7)
Feelings of Dizziness	325	(45.9)	276	(46.0)	49	(45.4)
Nausea and/or Vomiting	149	(21.0)	119	(19.8)	30	(27.8)
Noise Sensitivity, easily upset by loud noise	240	(33.9)	204	(34.0)	36	(33.3)
Sleep Disturbance	202	(28.5)	175	(29.2)	27	(25.0)
Fatigue, tiring more easily	474	(66.9)	404	(67.3)	70	(64.8)
Being Irritable, easily angered	225	(31.8)	187	(31.2)	38	(35.2)
Feeling Depressed or Tearful	163	(23.0)	132	(22.0)	31	(28.7)
Feeling Frustrated or Impatient	260	(36.7)	211	(35.2)	49	(45.4)
Forgetfulness, poor memory	281	(39.7)	234	(39.0)	47	(43.5)
Poor Concentration	345	(48.7)	288	(48.0)	57	(52.8)
Taking Longer to Think	307	(43.4)	262	(43.7)	45	(41.7)
Blurred Vision	127	(17.9)	102	(17.0)	25	(23.1)
Light Sensitivity, easily upset by bright light	246	(34.7)	207	(34.5)	39	(36.1)
Double Vision	32	(4.5)	25	(4.2)	7	(6.5)
Restlessness	78	(11.0)	56	(9.3)	22	(20.4)
<i>At least 3 points</i>						
Headaches	253	(35.7)	207	(34.5)	46	(42.6)
Feelings of Dizziness	143	(20.2)	118	(19.7)	25	(23.1)
Nausea and/or Vomiting	56	(7.9)	43	(7.2)	13	(12.0)
Noise Sensitivity, easily upset by loud noise	139	(19.6)	114	(19.0)	25	(23.1)
Sleep Disturbance	128	(18.1)	105	(17.5)	23	(21.3)
Fatigue, tiring more easily	303	(42.8)	256	(42.7)	47	(43.5)
Being Irritable, easily angered	123	(17.4)	97	(16.2)	26	(24.1)
Feeling Depressed or Tearful	81	(11.4)	65	(10.8)	16	(14.8)
Feeling Frustrated or Impatient	135	(19.1)	104	(17.3)	31	(28.7)
Forgetfulness, poor memory	120	(16.9)	94	(15.7)	26	(24.1)
Poor Concentration	183	(25.8)	153	(25.5)	30	(27.8)
Taking Longer to Think	139	(19.6)	110	(18.3)	29	(26.9)
Blurred Vision	51	(7.2)	42	(7.0)	9	(8.3)
Light Sensitivity, easily upset by bright light	132	(18.6)	106	(17.7)	26	(24.1)
Double Vision	17	(2.4)	13	(2.2)	4	(3.7)
Restlessness	36	(5.1)	25	(4.2)	11	(10.2)