Michael Burke, Samantha Bureau, PhD, Chris Nowinski, PhD, and Robert Cantu, MD

Alaska Medical Providers Concussion & Chronic Traumatic Encephalopathy Knowledge Survey

Concussion Legacy Foundation (CLF) & Alaska Mental Health Trust Authority (AMHTA)

March 2022 – June 2022

N= 127

Executive Summary

The *Alaska Medical Providers Concussion & Chronic Traumatic Encephalopathy Knowledge Survey* was commissioned by AMHTA to assess the current standard of care in Alaska for mild traumatic brain injury (mTBI) and neurodegeneration caused by brain trauma. Focus was given to screening, diagnosis, and treatment or symptom management options for concussion (mTBI), post-concussion syndrome (PCS), and the neurodegenerative disease chronic traumatic encephalopathy (CTE). Physicians and nurses were the primary respondent targets.

Key Findings

The data offer insight into a subset of Alaskan healthcare providers. Respondents were predominantly among the target physician and nurse audience (68%), working in a dense population zone (71%), serving both pediatric and adult patients (63%). Most respondents diagnose or manage concussion patients in their practice (72%) and see more than five patients per year (68.5%). Providers who do not diagnose or manage concussion patients were screened out of questions 7-37.

Providers showed generally strong responses in questions targeting concussion care and knowledge with a few notable exceptions. Of three questions about basic return-to-play protocols, only a slight majority (60%) answered correctly on average. Interestingly, more providers responded correctly (80%) when loss of consciousness (LOC) was introduced in the case description. This suggests a possible misunderstanding among providers regarding return-to-play protocols when concussions occur without LOC. Also, over 60% of providers consistently chose the outdated recommendation to rest in a dark, quiet environment for the first 48-hours following an injury.

Additionally, a vast majority of providers (90%) indicated they do not use computerized concussion tools to aid testing. The Sports Concussion Assessment Tool (SCAT) was the most frequently used grading or testing scale for concussion diagnosis. Lastly, respondents indicated some hesitance to referring patients to a concussion specialist with more than a third (35%) saying they rarely or never refer out to providers who specialize in concussion care.

Provider responses about CTE knowledge and care showed greater room for improvement. While a strong majority of providers (90%) correctly identified a patient as presenting classic CTE symptoms, a slimmer majority (57%) responded correctly to assessing future CTE risk based on head trauma exposure. This

indicates possible confusion among providers when screening for possible CTE patients about the role of concussion vs. repetitive head trauma in assessing CTE risk. In line with this finding, few providers rated themselves as familiar or very familiar with CTE (18%) and some (10%) had not heard of CTE before the survey. The remainder felt moderately (41%) or somewhat (32%) familiar.

Finally, respondent understanding of updated NINDS criteria for diagnosing the presentation of CTE in clinical research, known as Traumatic Encephalopathy Syndrome (TES), was limited. Only a slight majority (57%) had heard of the TES criteria before the survey despite its use in CTE research for nearly a decade. Of the remaining respondents who were familiar, a majority (69%) were unaware the criteria had been updated since 2014. Importantly, none (0%) of the survey respondents demonstrated correct application of the TES criteria as appropriate only in a research setting.

These findings illuminate focus areas for healthcare provider continued education and suggest opportunities for continued data gathering and analysis beyond the limitations of this sample size.

Acknowledgements

CLF & AMHTA would like to acknowledge the following Alaskan organizations as being instrumental to the distribution and completion of this survey:

Alaska Traumatic and Acquired Brain Injury Advisory Council
University of Alaska Anchorage Center for Human Development
Brain Injury Association of Alaska
Alaska Native Tribal Health Consortium
Alaska DHSS Governor's Council on Disabilities & Special Education
Alaska State Medical Association
Alaska Academy of Family Physicians
Alaska School Nurses Association
Alaska Psychological Association
American Physical Therapy Association Alaska
Alaska Hospital and Healthcare Association
Alaska Medical Group Management Association
Maniilaq Association
Southeast Alaska Independent Living, Inc.
Access Alaska
Southcentral Foundation
Katmai Eye & Vision Center
Head to toe Holistic Healthcare
Neurobehavior North, Inc.

Contact Info and Roles

Michael Burke served as the project lead under the guidance of Samantha Bureau, PhD. Chris Nowinski, PhD, and Robert Cantu, MD contributed to the development of the survey. All authors of the survey are affiliated with the Concussion Legacy Foundation.

For information or questions about the survey, please contact CLF Patient Programs Manager Michael Burke or AMHTA Program Officer Kelda Barstad, LMSW.

1. What is your training?

A – Provider primary training	#	%
MD/DO	60	47.2
Registered Nurse	17	13.4
Nurse Practitioner	10	7.9
Physician Assistant	9	7.1
Physical Therapy	9	7.1
Psychology	7	5.5
Mental Health Counseling	3	2.4
Occupational Therapy	3	2.4
Naturopathy	2	1.6
Optometry	2	1.6
Speech Language Pathology	2	1.6
Certified Brain Injury Specialist	1	0.8
Social Work	1	0.8
Student	1	0.8
N	127	

B – All provider selections (allowed multiple selections per respondent)	#	%
MD/DO	57	28.5
Registered Nurse	21	10.5
Family Medicine	17	8.5
Pediatrics	14	7.0
Physical Therapy	10	5.0
Other*	10	5.0
Nurse Practitioner	10	5.0
Physician Assistant	9	4.5
Psychology	9	4.5
Mental Health Counseling	7	3.5
Certified Brain Injury Specialist	6	3.0
Brain Injury Fundamentals	4	2.0
Psychiatry	4	2.0
Emergency Medicine	3	1.5
Occupational Therapy	3	1.5
Naturopathy	2	1.0
Optometry	2	1.0
Speech-Language Pathology*	2	1.0
LENS practitioner*	1	0.5
Surgery/ Trauma*	1	0.5
Medical Student*	1	0.5
Pediatric Emergency Medicine*	1	0.5
Functional and Integrative Medicine*	1	0.5
Clinical Neuropsychology*	1	0.5
Social Work*	1	0.5
Neurology*	1	0.5
Sports Medicine*	1	0.5
Internal Medicine*	1	0.5
Community Health Aide Program	0	

2. In what region of Alaska do you primarily work?

Response	#	%
Anchorage	77	62.1
Mat-Su	15	12.1
Southeast	12	9.7
Interior	10	8.1
Gulf Coast	7	5.6
Southwest	2	1.6
Northern	1	0.8
Total	124	

3. What is the population of the area in which you work?

Response	#	%
> 100,000	74	58.7
50,000 - 100,000	16	12.7
10,000 - 50,000	21	16.7
1,000 - 10,000	11	8.7
< 1,000	4	3.2
Total	126	

4. What is your primary work setting? Please be specific (ex. Urban emergency department, rural primary care clinic)

Response	#	%
Outpatient Clinic	43	33.9
Primary Care Clinic	22	17.3
Solo Practice	18	14.2
School Nurse	16	12.6
Hospital	14	11.0
Emergency Department	9	7.1
Home Care	2	1.6
Urgent Care Clinic	2	1.6
Student	1	0.8
Total	127	

5a. Are you the Chair/Chief of an Emergency division?

Response	#	%
Yes	1	0.8
No	124	99.2
Total	125	

5a.1. [If yes] Do you have a concussion handout for patients in your Emergency Department?

Response	#	%
Yes	1	100

5a.2. Has your division held any educational sessions on concussion management in the past 3 years?

Response	#	%
No	1	100

5a.3. Are there concussion specialists in your region available for patient referrals?

Response	#	%
No	1	100

6. Do you diagnose and/or manage patients with concussions in your work setting?

Response	Yes	No	Total	% yes
MD/DO	43	17	60	71.7
Registered Nurse	13	4	17	76.5
Nurse Practitioner	8	2	10	80.0
Physician Assistant	7	2	9	77.8
Psychology	6	1	7	85.7
Physical Therapy	5	4	9	55.6
Occupational Therapy	3		3	100.0
Optometry	2		2	100.0
Certified Brain Injury Specialist	1		1	100.0
Mental Health Counseling	1	2	3	33.3
Naturopathy	1	1	2	50.0
Speech Language Pathology	1	1	2	50.0
Student	1		1	100.0
Social Work		1	1	0.0
Total	92	35	127	72.4

*Remaining data presents responses from respondents who answered ***Yes***.

7. If yes, please specify what population(s) you work with:

Response	#	%
Adult	12	13
Pediatric	22	24
Both	58	63
Total	92	

8. Approximately how many patients do you see with a concussion per year?

Response	#	%
< 5	29	31.5
5-10	29	31.5
11-15	11	12.0
16 - 20	7	7.6
> 20	16	17.4
Total	92	

9. Do you prescribe medication for concussion management?

Response	#	%
Yes	20	21.7
No	72	78.3
Total	92	

9.a. [If Yes] How often do you prescribe medication for concussion patients?

Response	#	%
Very rarely	5	25
Rarely	4	20
Sometimes	9	45
Often	1	5
Very often	1	5
Total	20	

10. Have you received training on return-to-learn protocols for youth concussion patients?

Response	#	%
Yes	59	64.1
No	29	31.5
I don't know	4	4.3
Total	92	

11. How many years have you been practicing?

Response	#	%
> 20	31	33.7
16 - 20	13	14.1
11-15	15	16.3
5-10	20	21.7
< 5	13	14.1
Total	92	

Case #1: **Correct responses for case questions are marked in bold font**

A 9-year-old boy, with no prior history of head injury, has an accidental collision with an opponent during a hockey game receiving a blow to his chest, but there is no direct hit to his head. He does not have a loss of consciousness. Upon returning to the bench, he states that he has a headache, he is "seeing stars", and he is complaining of dizziness. He is also slow to answer questions. He denies amnesia, nausea or vomiting.

12. Based on the information provided, would you diagnose this boy with a concussion?

Response	#	%
Yes	**79**	**85.9**
No	4	4.3
I don't know	9	9.8
Total	92	

13. After 20 minutes, he states that he is less dizzy, and his headache is not as painful. Is he able to return to the game?

Response	#	%
Yes, definitely	0	0
Possibly, if his symptoms fully resolve before the end of the game	3	3.3
No, definitely not	**86**	**94.5**
I don't know	2	2.2
Total	91	

14. There is a state hockey tournament in 4 days. Is this boy able to participate in the tournament?

Response	#	%
Yes, definitely	0	0
Possibly, if his symptoms improve within the next 24 hours	0	0
Possibly, if his symptoms fully resolve before the end of the game	35	38.0
No, definitely not	**43**	**46.7**
I don't know	14	15.2
Total	92	

15. Beyond return-to-sport advice, what further recommendations for how to manage the next 48 hours, if any, would you offer? [Select all that apply.]

Response	#	%
Stay home from school	47	51.1
Avoid computer screens	74	80.4
Avoid text messaging	72	78.3
Avoid video games	77	83.7
Limit television	76	82.6
Decrease schoolwork	64	69.6
Rest in a dark quiet environment	56	60.9
None of the above	3	3.3
I don't know	8	8.7

Case #2:

A 16-year-old girl with one prior concussion slips on the stairwell at school, hitting her head against the wall. She does not have a loss of consciousness, but she cannot recall the event. She does not have a headache, but she complains of dizziness and nausea.

16. Based on the information provided, would you diagnose this girl with a concussion?

Response	#	%
Yes	**90**	**97.8**
No	0	0
I don't know	2	2.2
Total	92	

17. She is scheduled to have cross-country running practice after school. Is she able to participate in practice?

Response	#	%
Yes, definitely	0	0
Possibly, if her symptoms fully resolve before practice	7	7.6
No, definitely not	**83**	**90.2**
I don't know	2	2.2
Total	92	

18. There is a 3-mile cross-country race in 2 days. Is this girl able to participate?

Response	#	%
Yes, definitely	0	0
Possibly, if her symptoms improve within the next 24 hours	13	14.1
Possibly, if her symptoms fully resolve before the race	24	26.1
No, definitely not	**48**	**52.2**
I don't know	7	7.6
Total	92	

19. Beyond return-to-sport advice, what further recommendations for how to manage the next 48 hours, if any, would you offer? [Select all that apply.]

Response	#	%
Stay home from school	46	50.0
Avoid computer screens	75	81.5
Avoid text messaging	75	81.5
Avoid video games	78	84.8
Limit television	77	83.7
Decrease schoolwork	66	71.7
Rest in a dark quiet environment	57	62.0
None of the above	3	3.3
I don't know	8	8.7

Case #3:

A 32-year-old male has a collision while snowmobiling with his friends. He has a 1-minute loss of consciousness. Following the incident, he has 10 minutes of amnesia, he complains of headache, vision changes, dizziness, and he has nausea.

20. Based on the information provided, would you diagnose this man with a concussion?

Response	#	%
Yes	**89**	**97.8**
No	0	0
I don't know	2	2.2
Total	91	

21. There is a scheduled pick-up league basketball game in 4 days. Is this man able to participate in the game?

Response	#	%
Yes, definitely	0	0
Possibly, if his symptoms improve within the next 24 hours	3	3.3
Possibly, if his symptoms fully resolve before the game	10	10.9
No, definitely not	**73**	**79.3**
I don't know	6	6.5
Total	92	

22. He wants to reduce the risk of another concussion. He asks if there are helmets that are better at reducing the risk of concussion than others. Are there helmets that are better at reducing risks of concussion than others?

Response	#	%
Yes	**54**	**58.7**
No	14	15.2
I don't know	24	26.1
Total	92	

23. Beyond return-to-sport advice, what further recommendations for how to manage the next 48 hours, if any, would you offer? [Select all that apply.]

Response	#	%
Stay home from work	64	69.6
Avoid computer screens	79	85.9
Avoid text messaging	76	82.6
Avoid video games	79	85.9
Limit television	77	83.7
Decrease workload	79	85.9
Rest in a dark quiet environment	63	68.5
None of the above	1	1.1
I don't know	4	4.3

24. How often do you utilize each of the following concussion grading scales or tools when making a concussion diagnosis?

Scoring System	Always	Frequently	Sometimes	Rarely	Never	n
Standardized Assessment of Concussion	3	4	7	15	59	88
Sport Concussion Assessment Tool	10	9	11	14	45	89
Post-concussion Symptom Scale	4	6	16	12	53	91
Graded Symptom Checklist/ Scale	1	1	6	10	71	89
McGill Abv. Concussion Evaluation	1	1	5	6	75	88
Head Injury Scale	1	3	4	8	75	91
Post-concussion Symptom Inventory	2	4	11	11	61	89
Rivermead PCS Questionnaire	1	2	4	8	75	90

Balance Testing	Always	Frequently	Sometimes	Rarely	Never	n
Balance Error Scoring System (BESS)	4	6	2	8	71	91
Sensory Organization Test (SOT)	5	5	1	6	74	91
Romberg	18	24	15	9	26	92
Heel-toe walking	17	28	15	8	23	91

Neuropsychological Testing	Always	Frequently	Sometimes	Rarely	Never	n
Clinical Psychometric Testing	1	8	12	13	57	91
Computerized Neurocognitive Testing		3	9	9	70	91

25. Do you use computerized testing tools?

Response	#	%
Yes	8	8.7
No	83	90.2
Total	91	

25a. [If yes] Which of the following computerized testing tools do you use? [Select all that apply.]

Response	#	%
ImPACT	4	50
CogState (Axon Sports)	1	12.5
HeadMinder	1	12.5
Automated Neuropsychological Assessment Metrics (US Army)	1	12.5
Other, please specify (*)	4	50
Conners Continuous Performance Test*	2	25
Cogmed*	1	12.5
Undefined neuropsychological measure*	1	12.5

26. How often do you rely on published guidelines to direct your clinical decisions?

Response	#	%
Never	7	7.7
Rarely	4	4.4
Sometimes	12	13.2
Frequently	45	49.5
Always	23	25.3
Total	91	

26a. [If anything other than never/blank] Which of the following published guidelines do you rely on to direct your clinical decisions? [Select all that apply.]

Response	#	%
Hospital/Practice policy	32	40
American Academy of Neurology	28	35
Cantu	4	5
CDC	36	45
Colorado Medical Society	0	0
5th International Conference on Concussion in Sport (Berlin)	10	13
4th International Conference on Concussion is Sport (Zurich)	4	5
3rd International Conference on Concussion in Sport (Zurich)	2	3
2nd International Conference on Concussion in Sport (Prague)	2	3
1st International Symposium on Concussion in Sport (Vienna)	2	3
Roberts	1	1
ThinkFirst Canada	1	1
Ontario Neurotrauma Foundation mTBI guidelines	4	5
Canadian Academy of Sports Medicine	8	10
Other (*)	16	20
UpToDate*	4	5
American Academy of Pediatrics*	3	4
DSM-5*	1	1
DSM-5TR*	1	1
American Academy of Family Physicians*	1	1
American College of Surgeons*	1	1
American College of Sports Medicine*	1	1
TBI Center of Excellence (Defense Health Agency)*	1	1
Canadian CT Head Rule*	1	1
VA/DOD*	1	1
National Association of Athletic Trainers*	1	1
American Speech-Language-Hearing Association*	1	1

26b. [If never] For what reason(s) do you choose not to use published guidelines to direct your clinical decisions? [Select all that apply.]

Response	#	%
I was unaware that guidelines exist	2	25.0
I don't know which guideline is the best	3	37.5
I feel that the current guidelines are out of date	0	0
I do not like to use guidelines in general	0	0
Other (please specify)	3	37.5
Total	8	

27. How often do you refer patients to care providers who specialize in concussion treatment?

Response	#	%
Never	10	11.0
Rarely	22	24.2
Sometimes	38	41.8
Frequently	17	18.7
Always	4	4.4
Total	91	

27a. [If anything other than never] To which of the following concussion specialists do you refer patients? [Select all that apply.]

Response	#	%
Neurologist	61	76.3
Physiatrist/Rehabilitation Medicine	14	17.5
Neuropsychologist	33	41.3
Psychologist	16	20.0
Sports Medicine	12	15.0
Neurosurgeon	5	6.3
Neuro-optometrist	11	13.8
Optometrist	8	10.0
Physical Therapist	35	43.8
Occupational Therapist	27	33.8
Speech Language Pathologist	28	35.0
Licensed Professional Counselor w/CBIS	6	7.5
Other (*)	8	10.0
Primary Care Provider*	3	3.8
Emergency Room*	2	2.5
Neuro-ophthalmologist*	1	1.3
School Nurse*	1	1.3

27b. [If never] For what reason(s) do you choose not to refer to concussion specialists? [Select all that apply.]

Response	#	%
There are no concussion specialists in my region	4	36.4
I am comfortable managing these patients without consultation	4	36.4
Other, please specify	3	27.3
Total	11	

28. What has been your best source for learning about concussions? [Select all that apply.]

Response	#	%
Consulting with colleagues	38	41.8
Consulting with specialists	30	33.0
Journal publications	38	41.8
CME Course	52	57.1
Websites (ThinkFirst/CDC/etc.)	45	49.5
Conferences	33	36.3
Training (Medical School/Residency/Nursing/PA)	39	42.9
Other (*)	5	5.5
NATA*	2	2.2
Alaska ECHO*	1	1.1

Case #4:

A woman in her mid-fifties has been experiencing difficulties with executive function that have gotten progressively worse in the past five years. She is also beginning to demonstrate explosive behavior. She has no history of concussions on her medical record, but she discloses to you that she was in a physically abusive relationship for 10-years beginning in her early twenties. She has no history of contact sports and has since been in safe relationships.

29. Based on her described history, is it possible that she has had exposure to head impacts despite having no diagnosed concussions on her medical record and no history of contact sports participation?

Response	#	%
Yes	**90**	**98.9**
No	1	1.1
Total	91	

30.Victims of domestic violence and/or intimate partner violence considered as a group at risk for chronic traumatic encephalopathy.

Response	#	%
True	**90**	**98.9**
False	1	1.1
Total	91	

31. Based on her described symptoms, can you provide her with a traumatic encephalopathy syndrome (TES) diagnosis?

Response	#	%
Yes - The primary criteria for diagnosis are met	17	19.1
Unsure - not enough information available	67	75.3
No - The primary criteria for diagnosis are not met	5	5.6
No – TES criteria are only applicable for research settings	**0**	**0**
Total	89	

Case #5

The wife of a former professional football player complains primarily of sudden changes in her husband's executive function and memory. She is also concerned about his changes in impulsivity and his explosive outbursts over issues that would not have bothered him before. He seems to be more withdrawn from their family life and shows signs of depression. He played football for 5 years at the professional level, 4 years at the college level, and 4 years in high school.

32. Based on his history and described symptoms, would you tell the patient and/or their family that CTE is a possibility?

Response	#	%
Yes - The symptoms and history are characteristic of CTE	**81**	**90.0**
Unsure - There is not enough information available to make a differential diagnosis	8	8.9
No - The symptoms and history are not characteristic of CTE	1	1.1
Total	90	

33. The literature has described a number of former professional football players with CTE diagnoses. Based on the evidence to date, repetitive head impacts are the primary risk factor for CTE.

Response	#	%
True	**89**	**97.8**
False	2	2.2
Total	91	

34. Which clinical features have been associated in the clinical histories of those diagnosed with CTE?

Response	#	%
A - Cognitive Features (episodic memory, attention, executive functioning, etc.)		
B - Behavioral Features (violent, impulsive, or explosive behavior, etc.)		
C - Mood/Affect and Other Psychiatric Features (depression, anxiety, apathy, etc.)		
D - Motor Features (gait and balance, Dysarthria, signs of parkinsonism, etc.)		
E - A & B	1	1.1
F - A, B, & C	14	15.2
G - **All of the Above**	**76**	**82.6**
Total	91	

Case #6:

A man and his son were in an ATV collision and brought to the emergency department. Following some diagnostic tests and a physical exam, the physician determined that neither had a brain bleed, any lacerations that required stitches, or any broken bones. However, the physician determined that the son had a concussion and advised the father of the return to learn protocol and an overview of what to expect during the recovery process.

35. As of today, published evidence suggests this singular concussion puts the son at greater risk of developing CTE later in life.

Response	#	%
True	38	42.7
False	**51**	**57.3**
Total	89	

36. Prior to this survey, have you heard of Chronic Traumatic Encephalopathy (CTE)?

Response	#	%
I have not heard of CTE before.	9	9.9
Somewhat familiar - I have heard about it in the news but have not seen the research.	29	31.9
Moderately familiar - I have seen some research but do not know how to support patients who may have or be at risk for CTE.	37	40.7
Familiar - I follow the issue regularly and review the research, but still believe there is more I could learn.	14	15.4
Very familiar - I regularly review the research as it is published and believe I am well prepared to assist patients who may be suffering.	2	2.2
Total	91	

37. Prior to this survey, have you heard of Traumatic Encephalopathy Syndrome (TES)?

Response	#	%
Yes	39	42.9
No	52	57.1
Total	91	

37.a. [If yes] Have you reviewed the most recent consensus diagnostic criteria (2021)?

Response	#	%
No - I didn't know the 2014 criteria had since been updated	27	69.2
No - I was aware the criteria had been updated but have not read it yet	8	20.5
Yes	4	10.3
Total	39	

References

Zemek R, Eady K, Moreau K, et al. Knowledge of paediatric concussion among front-line primary care providers. *Paediatr Child Health* 2014;19(9):475-480

Stern R, Seichepine D, Tschoe C, et al. Concussion Care Practices and Utilization of Evidence-Based Guidelines in the Evaluation and Management of Concussion: A Survey of New England Emergency Departments. *Journal of Neurotrauma* 2017;34:861-868