



D. ALAN SHEWMON, M.D.
Professor Emeritus of Neurology and Pediatrics
David Geffen School of Medicine at UCLA

OLIVE VIEW-UCLA MEDICAL CENTER
14445 Olive View Drive, Room 2C136
Sylmar, CA 91342-1437
TEL: (818) 364-3104
FAX: (818) 364-3286
ashewmon@mednet.ucla.edu

Declaration of D. Alan Shewmon, M.D.

I, Doctor D. Alan Shewmon, do hereby submit this declaration freely, and I have, unless otherwise stated, personal knowledge by review of MRI/MRA studies, records, and reports, as well as viewing two videos of Jahi McMath moving her body parts (foot and arm) following her mother's commands and having discussions with Dr. Calixto Machado, a world renowned expert on brain death, and Dr. Philip DeFina, a neuroscientist with the International Brain Research Foundation. I am competent and prepared to testify as to the below opinions and conclusions if called upon to do so.

Dear Mr. Dolan:

As you know, I am a pediatric neurologist with triple board certification: in Pediatrics, Neurology (with special competence in child neurology), and Electroencephalography. I have had a particular interest in brain death and have published and lectured extensively on the topic, nationally and internationally. I recently retired as Professor of Neurology and Pediatrics at the David Geffen School of Medicine at UCLA and Chief of the Neurology Department of Olive-UCLA Medical Center (a county hospital affiliated with UCLA), while remaining clinically active. My CV provides further details regarding my qualifications to comment on the case of Jahi McMath.

Based on the materials that you have provided to me so far, I can assert unequivocally that Jahi currently does not fulfill diagnostic criteria for brain death. The materials include extensive medical records from St. Peter's University Hospital, which I am still in the process of reviewing, videos of Jahi moving her hand and her foot in response to verbal requests by her mother, images from an EEG done in her apartment on 9/1/14, images of a brain MRI scan done at Rutgers on 9/26/2014, and heart rate variability analysis by my colleague Dr. Calixto Machado based on the EKG channel from the 9/1/14 EEG. I have also spoken by phone with Drs. Machado and DeFina regarding their recent observations of Jahi and the findings of a second EEG done at Rutgers on 9/26/14, which I have not yet received for review.

Jahi does not currently fulfill criteria for brain death on several grounds. First and foremost, the videos and the personal testimonies to me of several trustworthy witnesses of her motor

responsiveness (yourself, Drs. DeFina and Machado) leave no doubt that Jahi is conscious, and can not only hear but can even understand simple verbal requests (“move your hand,” “move your foot,” even “move your thumb”) and make appropriate motor responses. Thus, the very first of the “three cardinal findings in brain death,” according to the American Academy of Neurology’s Practice Parameters for Determining Brain Death in Adults (and all other diagnostic criteria for brain death that have ever been proposed, for that matter) – namely “coma or unresponsiveness” – is not fulfilled.

The recent video of her hand movement to command makes clear that the movement is not a spinal reflex that merely coincidentally happened shortly after the verbal command; the quality of the movement has the appearance of volition and is inconsistent with a spinal reflex. Moreover, the motor responsiveness is reliably reproducible; the movements do not merely occur at random, unrelated to the verbal commands, with some rare temporal coincidence serendipitously caught on video and selectively held up as evidence. I am convinced of this after having seen several videos taken on different occasions and heard the testimony of witnesses (yourself, Drs. Defina and Machado) of the same kind of responsiveness at other times when no video was being recorded. Finally, the movements are specific to the part of the body mentioned in the verbal request. Such motor responsiveness is extremely surprising, given Jahi’s history, but it has been documented so many times now that it cannot be denied. This alone, even if there were no additional evidence (which there is), proves that she is not brain dead, not even comatose, but very severely disabled.

The heart rate variability analysis by Dr. Machado provides objective corroborating evidence that Jahi not only has spontaneous modulation of heart rate by the autonomic nervous system (such variability should be completely absent in brain death), but even more impressively that her heart rate changes in response to her mother’s voice. This is hard evidence of auditory processing by the brain, if not also of registering of the emotional valence of those auditory signals and frank conscious awareness of them, and it is not a matter of interpretation.

The medical and nursing records document that some months after the formal diagnosis of brain death, Jahi underwent menarche; she recently had her second menstrual period approximately a month or so after the first. The female menstrual cycle involves hormonal interaction between the hypothalamus (part of the brain), the pituitary gland, and the ovaries. Corpses do not menstruate. Neither do corpses undergo sexual maturation. Neither is there any precedent in the medical literature of a brain-dead body beginning menarche and having regular menstrual periods. Hypothalamic function is a brain function, and California’s statutory definition of death by neurological criteria requires irreversible absence of *all* brain functions, so even apart from her responsiveness, she would not fulfill the statutory definition of death on the basis of hypothalamic function. (This is not to imply that her hypothalamus is functioning normally: it is not. The point is that there is some preserved hypothalamic function, and a rather remarkable one at that.)

Regarding Jahi’s EEG, I am at a disadvantage in not having received yet the EEG disk from Rutgers before you need this declaration. Dr. Machado was present while it was being run, and he assured me that it showed low voltage electrical activity (in contrast to EEGs in brain death,

which should be isoelectric (flat)). I have seen some images (screen shots) of the EEG done in her apartment by Elena Labkovsky, Ph.D., and concerning this I am also at a disadvantage in not having the full raw data to examine. Nevertheless, apart from some obviously artifactual waveforms, which are common in such recordings, there appears to be genuine electrocerebral activity, as described in greater detail in her report and in Dr. Machado's independent declaration. Although the AAN Practice Parameters do not require a flat EEG to make the diagnosis of brain death, Jahi's original diagnosis in Oakland was in fact reinforced by an EEG that was reported to be isoelectric. Thus, with the passage of time, her brain has recovered the ability to generate electrical activity, in parallel with its recovery of ability to respond to commands. A dead brain cannot spontaneously recover electrical function.

Jahi's recent MRI scan shows vast areas of structurally preserved brain, particularly the cerebral cortex, basal ganglia and cerebellum. There is major damage to the corpus callosum and the brainstem, particularly the pons, corresponding to the severe brainstem dysfunction that has been documented in her progress notes from St. Peter's. By contrast, the relative integrity of the cerebral cortex no doubt underlies her ability to understand language and to make voluntary motor responses. I have had personal experience with three chronic brain death cases with MRI or CT scans done after one or more years in that state. The scans showed the brains to be totally liquefied, after such a long time with no blood flow (two of the patients also had blood flow studies at the time, which confirmed persistent absence of intracranial blood flow). Jahi's MRI scan, nearly 10 months after her tragic anoxic-ischemic event and diagnosis of brain death, does not even vaguely resemble those chronic brain death scans. Her brain is not dead and necrotic, but much of it is structurally intact. Her MR angiogram also demonstrates intracranial blood flow, which could have been inferred anyway, since the intact brain tissue implies blood flow sufficient to keep it alive.

Clearly Jahi is not currently brain dead. Yet I have no doubt that at the time of her original diagnosis, she fulfilled the AAN diagnostic criteria, correctly and rigorously applied by the several doctors who independently made the diagnosis then. That diagnosis was even backed up by two ancillary tests: an EEG that was reportedly isoelectric and a radionuclide scan that reportedly showed no intracranial blood flow. A likely explanation for the discrepancy (in fact the only explanation I can think of) is that (1) the standard clinical diagnostic criteria are not as absolutely, 100% reliable as commonly believed, and (2) radionuclide blood flow studies are not sensitive enough to distinguish *no* flow from *low* flow – in technical terminology, from ischemic-penumbra-level flow, i.e., flow that is too low to support brain functioning but just enough to maintain tissue viability.

Over a decade ago the Brazilian neurologist Cicero Coimbra proposed the idea of "global ischemic penumbra" (extending a concept from the field of stroke to the whole brain) as a condition of marginal cerebral blood flow that in principle could mimic clinical brain death in every respect, yet the brain is not dead, and some of its suppressed functions are potentially recoverable. Up to now this has remained a plausible but unproved hypothesis. Jahi has now proved that it can occur in clinical reality. I believe that it is the only possible explanation for the discrepancy between her original fulfillment of the brain death criteria and her current lack of their fulfillment.

Regardless of the explanation, the fact remains that Jahi currently does not fulfill brain death diagnostic criteria. She is an extremely disabled but very much alive teenage girl.

Signed this 3rd day of October, 2014, in Los Angeles California under penalty of perjury,

A handwritten signature in cursive script, reading "D. Alan Shewmon".

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