

**IN THE SUPREME COURT OF THE STATE OF NEVADA**

\* \* \* \* \*

SIAOSI VANISI,

Appellant,

vs.

WILLIAM GITTERE, WARDEN,  
and  
AARON FORD, ATTORNEY  
GENERAL FOR THE  
STATE OF NEVADA.

Respondents.

Electronically Filed  
Sep 26 2019 04:08 p.m.  
Elizabeth A. Brown  
Clerk of Supreme Court

Supreme Court No. 78209  
District Court No. 98CR0516

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**APPELLANT'S APPENDIX**

Appeal from Order Denying Petition for Writ of  
Habeas Corpus (Post-Conviction)  
Second Judicial District Court, Washoe County  
The Honorable Connie J. Steinheimer

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28	146. 3 DVD's containing video footage of Siaosi Vanisi in custody on various dates (MANUALLY FILED).....	AA05867
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36	1. Response to Motion for a Protective Order, <i>Vanisi v. State of Nevada, et al.</i> , Second Judicial District Court
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35	Reply to Opposition to Motion for Reconsideration and Objection to Petitioner’s Waiver of Attendance at Evidentiary Hearing, <i>State of Nevada v. Vanisi</i> , Second Judicial District Court of Nevada, Case No. CR98-0516 April 16, 2018.....	AA07356 – AA07365

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36 Response to Vanisi’s Suggestion of Incompetency  
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35 State’s Opposition to Motion for Reconsideration  
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- 36 State’s Sur-Reply to Vanisi’s Motion to Disqualify the Washoe County District Attorney’s Office, *Vanisi v. State of Nevada, et al.*, Second Judicial District Court of Nevada, Case No. CR98-0516  
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- 36 1. Transcript of Proceedings – Status Hearing, *Vanisi v. State of Nevada*, Second Judicial District Court of Nevada, Case No. CR98-0516  
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- 36 Suggestion of Incompetency and Motion for Evaluation, *State of Nevada v. Vanisi*, Second Judicial District Court of Nevada, Case No. CR98-0516  
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- 37 Transcript of Proceedings – Competency for Petitioner to Waive Evidentiary Hearing, *State of Nevada v. Vanisi*, Second Judicial District Court of Nevada, Case No. CR98-0516  
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33	214. Memorandum to File from MP March 22, 2002.....	AA06993 – AA07002
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33	200. Declaration of Scott Edwards, Esq. November 8, 2013.....	AA07084 – AA07086
33	224. Letter to Scott Edwards, Esq. from Michael Pescetta, Esq. January 30, 2003.....	AA07087 – AA07088



12-13	Transcript of Proceedings – Post-Conviction, <i>State of Nevada v. Vanisi</i> , Second Judicial District Court of Nevada, Case No. CR98-0516 January 28, 2003.....	AA02576 – AA02582
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6-7	Transcript of Proceedings – Trial Volume 3, <i>State of Nevada v. Vanisi</i> , Second Judicial District Court of Nevada, Case No. CR98-0516 September 22, 1999.....	AA01113 – AA01299
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9	Transcript of Proceedings – Trial Volume 8, <i>State of Nevada v. Vanisi</i> , Second Judicial District Court of Nevada, Case No. CR98-0516 September 30, 1999.....	AA01707 – AA01753
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12	Transcript of Proceedings – Trial Volume 12, <i>State of Nevada v. Vanisi</i> , Second Judicial District Court of Nevada, Case No. CR98-0516 October 6, 1999.....	AA2414 – AA02522

## **CERTIFICATE OF SERVICE**

I hereby certify that this document was filed electronically with the Nevada Supreme Court on the 26th day of September, 2019.

Electronic Service of the foregoing Appellant's Appendix shall be made in accordance with the Master Service List as follows:

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Sara Jelenik  
An employee of the Federal  
Public Defender's Office

1 444. The Nevada Supreme Court's denial of this meritorious claim on the basis  
2 that it was procedurally defaulted was contrary to and an unreasonable  
3 application of clearly established federal law. See Vanisi v. Nevada, No. 50607,  
4 2010 WL 3270985, at \*2 (Nev. April 20, 2010).

5 445. The purported justifications for using the three-drug lethal injection method  
6 under any circumstances, which were relied upon to uphold the method in Baze,  
7 have been shown to be false. The use of a single drug, sodium thiopental, to  
8 produce death has been successfully adopted in Ohio, without any of the negative  
9 consequences predicted or considered in Baze. Under the Baze analysis, the use of  
10 the three-drug method violates the Eighth Amendment, because the only effect of  
11 that method is to impose a substantial risk of pain that is totally unnecessary.

12 446. Petitioner acknowledges that the Nevada Supreme court has held that an  
13 attack on the method of execution is not cognizable in habeas corpus proceedings.  
14 McConnell v. State, 125 Nev. \_\_\_, 212 P.3d 307, 310-11 (2009). Petitioner alleges  
15 this claim, however, because the McConnell ruling amounts to an unconstitutional  
16 suspension of the writ, Nev. Const. art. 1 § 1, based merely upon construction of a  
17 statute.

18 447. Petitioner also alleges this claim because it is not clear that he can litigate this  
19 claim in federal habeas corpus proceedings without first raising it in the state  
20 courts. The representatives of the state in federal habeas corpus proceedings have  
21 not conceded that exhaustion of this claim in state proceedings is not necessary to  
22 obtain federal review, 28 U.S.C. § 2254(b), and have continued, post-McConnell, to  
23 argue that federal courts cannot address a claim that lethal injection is  
24 unconstitutional if it is not raised in state proceedings first, (and that the claim can  
25 be procedurally defaulted if it has not been raised in state court). Ex. 195 at 8-9. To  
26 the extent, therefore, that this claim contains new facts not originally presented to  
27 the Nevada Supreme Court, Mr. Vanisi thereby re-alleges this claim.  
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1 448. Unless and until the state ceases to invoke the federal doctrines of exhaustion  
2 and procedural default the attempt to bar this claim because it has not been raised in  
3 state court, petitioner must raise this claim here.  
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1 **CLAIM TWELVE**

2 449. Mr. Vanisi's conviction and sentence violate the state and federal  
3 constitutional guarantees of due process, equal protection, a reliable sentence, and  
4 international law because Mr. Vanisi's capital trial, sentencing and review on direct  
5 appeal were conducted before state judicial officers whose tenure in office was not  
6 dependent on good behavior but was rather dependent on popular election, and who  
7 failed to conduct fair and adequate appellate review. U.S. Const. art. VI, amends.  
8 VIII & XIV; Nev. Const. art. 1 §§ 1, 3, 6 & 8, and art. 4 § 21; International  
9 Covenant on Civil and Political Rights, art. XIV.

10 **SUPPORTING FACTS:**

11 A. The Nevada Supreme Court's review of Mr.  
12 Vanisi's sentence was unconstitutional

13 450. Section 177.055(2) of the Nevada Revised Statutes requires the Nevada  
14 Supreme Court to review each death sentence to determine whether there was  
15 sufficient evidence to support the aggravating factors found by the sentencing body  
16 and whether Mr. Vanisi's death sentence was imposed under the influence of  
17 passion and prejudice. The Eighth Amendment requirement of reliability likewise  
18 mandates such a review. U. S. Const. amend. VIII; see Gregg v. Georgia, 428 U.S.  
19 153, 195 (1976). The Nevada Supreme Court has never enunciated the standards it  
20 applies in conducting its review under this statute. The complete absence of  
21 standards renders the purported review unconstitutional under state and federal due  
22 process standards.

23 451. Due to the complete absence of any standards that could rationally direct the  
24 conduct of the litigation or control the outcome, Mr. Vanisi could not possibly  
25 litigate the issue of the excessiveness of his sentence, or whether the sentence was  
26 imposed under the influence of passion and prejudice, to his prejudice. In fact, Mr.  
27 Vanisi's case is no more egregious than other cases in which Nevada juries did not  
28



1 impose the death penalty, or where the State did not even seek the death penalty or  
2 agreed to negotiate it away. Compare, Evans v. State, 28 P.3d 498, 117 Nev. 609  
3 (2001) (four murders where original jury found three aggravating factors, including  
4 torture or mutilation and sentenced Evans to death) with State v. Evans, Clark  
5 County Case No. C-116071, sentencing agreement, February 4, 2003 (state's  
6 agreement to sentences of life without possibility of parole for four murders,  
7 following reversal of the death sentence for new penalty hearing), Ex. 51, and State  
8 v. Powell, Clark County Case No. C-148936, verdicts, November 15, 2000 (jury  
9 verdicts for life without possibility of parole for same four murders as in Evans  
10 case, with three aggravating factors as to each murder and no mitigating factors  
11 cited), Ex. 54, and State v. Strohmeyer, No. C144577, Court Minutes, September 8,  
12 1998 (minutes of change of plea to guilty in return for withdrawal of notice of  
13 intent to seek death sentence and imposition of four consecutive sentences of life  
14 without possibility of parole, in case involving kidnaping, sexual assault and  
15 strangulation murder of seven-year-old girl), Ex. 52, and State v. Rodriguez, Clark  
16 County Case No. C-130763, verdicts, May 7, 1996 (jury verdicts of life without  
17 possibility of parole for two murders, each with four aggravating factors where the  
18 only mitigating factor cited by the jury was "mercy"), Ex. 55, and Ducksworth v.  
19 State, 942 P.2d 157, 113 Nev. 780 (1997) (jury verdicts of life without possibility of  
20 parole for two defendants, based on two murders with total of thirteen aggravating  
21 factors, including robbery, sexual assault, and torture or mutilation); and State v.  
22 Daniels, Clark County Case No. C-126201, verdicts, November 1, 1995 (jury  
23 verdicts of life without possibility of parole for two murders, each with four  
24 aggravating circumstances), Ex. 53.

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1           B.     Because Nevada judges are elected, they cannot  
2                 provide a fair trial before a fair tribunal as the due  
                process clause of the Constitution mandates.

3     452.   Nevada Supreme Court justices are popularly elected and thus face the  
4     possibility of removal if they make a controversial and unpopular decision. This  
5     situation renders the Nevada judiciary insufficiently impartial under the state and  
6     federal due process clause to preside over a capital case, compounding the  
7     constitutional inadequacy of the Nevada Supreme Court's review. At the time of the  
8     adoption of the Constitution, which is the benchmark for the protection afforded by  
9     the due process clause, see, e.g., Medina v. California, 505 U.S. 437, 445-46  
10    (1992), English judges qualified to preside in capital cases had tenure during good  
11    behavior.

12    453.   Almost a hundred years prior to the adoption of the Constitution, in 1700, a  
13    provision requiring that "Judges' Commissions be made quamdiu se bene gesserint .  
14    . . ." was considered sufficiently important to be included in the Act of Settlement,  
15    see W. Stubbs, Select Charters 531 (5th ed. 1884); and in 1760, a statute ensured  
16    judges' tenure despite the death of the sovereign, which had formerly voided their  
17    commissions. See W. Holdsworth, History of English Law 195 (7th ed., A.  
18    Goodhart and H. Hanbury rev. 1956). Blackstone quoted the view of King George  
19    III, in urging the adoption of this statute, that the independent tenure of the judges  
20    was "essential to the impartial administration of justice; as one of the best securities  
21    of the rights and liberties of his subjects; and as most conducive to the honor of the  
22    crown." W. Blackstone, Commentaries on the Laws of England \*258 (1765). The  
23    Framers of the Constitution, who included the protection of tenure during good  
24    behavior for federal judges under Article III of the Constitution, would not likely  
25    have taken a looser view of the importance of this

26         due process requirement than King George III. In fact, the Framers used the  
27         grievance that the king had made the colonial "judges dependent on his will alone,  
28

1 for the tenure of their offices" to partly justify the Revolution. The Declaration of  
2 Independence para. 11 (U.S. 1776); see Smith, An Independent Judiciary: The  
3 Colonial Background, 124 U. Pa. L. Rev. 1104, 1112-52 (1976). At the time of the  
4 Constitution's adoption, none of the states permitted judicial elections. Smith,  
5 supra, at 1153-55.

6 454. The absence of any such protection for Nevada judges results in a denial of  
7 federal due process in capital cases because the possibility of removal, and, at  
8 minimum, of a financially draining campaign for making an unpopular decision are  
9 threats that "offer a possible temptation to the average [person] as a judge . . . not to  
10 hold the balance nice, clear and true between the state and the [capitally] accused,"  
11 Tumey v. Ohio, 273 U.S. 510, 532 (1927). See Legislative Comm'n Subcomm. to  
12 Study the Death Penalty and Related DNA Testing Tr., Feb. 21, 2002 (Justice Rose  
13 noting that lesson of election campaign, involving allegation that justice of  
14 Supreme Court "wanted to give relief to a murderer and rapist," was "not lost on the  
15 judges in the State of Nevada, and I have often heard it said by judges, 'a judge  
16 never lost his job by being tough on crime.'").

17 455. The recent removal of a Nevada Supreme Court justice for participating in an  
18 unpopular decision establishes this point. See Sherman Fredrick, Voters Like R-J's  
19 Ideas - - Guess Who Hates That?, Las Vegas Rev. J., Nov. 12, 2006; Editorial,  
20 Brian Greenspun on Tuesday's Victories Amid a Judicial Warning, Las Vegas Sun,  
21 Nov. 9, 2006; Carri Geer Thevenot, Supreme Court's Becker Falls to Saitta - -  
22 Douglas Retains Seat - - Political Consultant Says Justice Hurt by Guinn v.  
23 Legislature Ruling in 2003, Las Vegas Rev. J., Nov. 8, 2006; Editorial, Nancy  
24 Becker Must be Removed - - Supreme Court Justice Backed Guinn v. Legislature  
25 Travesty, Las Vegas Rev. J., Nov. 5, 2006; Editorial, Nancy Becker has the Right  
26 Stuff - - State Supreme Court Justice has Faithfully and Honestly Interpreted the  
27 Constitution, Las Vegas Sun, Oct. 22, 2006; Jeff German, Far Right Targets Justice  
28

1 Becker - - Supreme Court Vote on Tax Increase was Right Thing to do, She Says,  
2 Las Vegas Sun, Oct. 15, 2006; Jon Ralston, Campaign Ad Reality Check, Las  
3 Vegas Sun, Oct. 3, 2006; Jon Ralston, Jon Ralston is Impressed at the Clarity and  
4 Brevity Displayed by Lawyer-Politicians, Las Vegas Sun, Sept. 22, 2006; Michael  
5 J. Mishak, Libertarian Lawyer has More Issues Up His Sleeve - - Waters' Next  
6 Targets: Campaign Funds, Real Estate Tax, Las Vegas Sun, Sept. 16, 2006; Sam  
7 Skolnik, Who Owns Whom is Supreme Theme - - Becker, Saitta Race is Rife with  
8 Accusations, Las Vegas Sun, Aug. 27, 2006.

9 456. Furthermore, the high media profile which Mr. Vanisi's case received and the  
10 emotional testimony from the State's witnesses unfairly prejudiced Mr. Vanisi in  
11 the eyes of the jury, causing the jury to base its decision upon these factors instead  
12 of the facts of the case. Accordingly, there is a strong indication that the death  
13 sentence was then imposed under the influence of passion, prejudice, or other  
14 arbitrary factors in violation of Godfrey v. Georgia, 466 U.S. 420, 100 S.Ct. 1759,  
15 64 L.Ed 398 (1980). Despite this fact, or perhaps because of it, popularly elected  
16 judges are unlikely to issue a reversal even where justice demands it.

17 457. Considering all of these factors, the death sentence imposed in Mr. Vanisi's  
18 case is not constitutionally reliable under the Eighth and Fourteenth Amendments.

19 458. The Nevada Supreme Court's denial of this meritorious claim on the basis  
20 that it was procedurally defaulted was contrary to and an unreasonable application  
21 of clearly established federal law. See Vanisi v. Nevada, No. 50607, 2010 WL  
22 3270985, at \*2 (Nev. April 20, 2010).  
23  
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1 **CLAIM THIRTEEN**

2 459. Mr. Vanisi was deprived of his state and federal constitutional right to  
3 adequate notice of the charges against him, a pretrial review of probable cause to  
4 support aggravating factors as elements of capital eligibility, due process of law and  
5 a reliable sentence by the failure to submit all the elements of capital eligibility to  
6 the grand jury or to the court for a probable cause determination. U.S. Const.  
7 amend. VI, VIII, & XIV; Nev. Const. art. 1 §§ 1, 6 & 8, and art. 4 § 21.

8 **SUPPORTING FACTS:**

9  
10 460. Under state and federal constitutional law, the statutory aggravating factors  
11 and the outweighing of the mitigation by the aggravating factors are elements of  
12 death eligibility. All elements of capital eligibility must be found by a unanimous  
13 jury beyond a reasonable doubt at trial, and as elements of capital eligibility must be  
14 subject to the filter of a pretrial determination by the grand jury before indictment,  
15 or by a court after the filing of an information, that there is probable cause to  
16 subject the defendant to a trial.

17 461. The statutory aggravating factors, and the outweighing of mitigation by the  
18 aggravating factors, which are elements of capital-eligible murder, were not  
19 submitted for a probable cause determination before trial in violation of clearly  
20 established federal law under Ring v. Arizona, 536 U.S. 584 (2002) and Apprendi  
21 v. New Jersey, 530 U.S. 466 (2000). Apprendi was decided before Mr. Vanisi's  
22 conviction and sentence were final on direct appeal.

23 462. The failure to submit these elements for a probable cause determination was  
24 prejudicial because there was no factual or constitutionally valid basis for one of the  
25 three aggravating factors presented at trial as to the homicide.

26 463. There was also no basis for finding probable cause to believe that the  
27 aggravating factors were not outweighed by the mitigation, and thus there was no  
28

1 basis for subjecting Mr. Vanisi to a trial in which, contrary to the process required  
2 under state law, character evidence not related to the statutory aggravating factors  
3 was considered in the capital eligibility calculus by the jury.

4 464. There was no reasonable or strategic basis for trial counsel, direct appeal  
5 counsel, and prior post-conviction counsel to fail to investigate, develop and  
6 present this claim.

7 465. This error made Mr. Vanisi's capital sentencing hearing and death sentence  
8 fundamentally unfair, and the state cannot show beyond a reasonable doubt that any  
9 constitutional error was harmless.

1 **CLAIM FOURTEEN**

2 466. Mr. Vanisi's conviction and death sentence are invalid under state and  
3 federal constitutional guarantees of due process, equal protection, confrontation,  
4 effective assistance of counsel and a reliable sentence due to the overreaching and  
5 misconduct of the prosecution which distorted the fact-finding process and rendered  
6 Mr. Vanisi's conviction and sentence fundamentally unfair. U.S. Const. amends. V,  
7 VI, VIII, & XIV; Nev. Const. art. 1 §§ 1, 6 & 8, and art. 4 § 21.

8 **SUPPORTING FACTS:**

9  
10 467. Mr. Vanisi's conviction and death sentence are invalid due to the pervasive  
11 misconduct of the trial prosecutors. Trial counsel were ineffective for failing to  
12 object to this misconduct, his appellate counsel was ineffective for failing to raise  
13 this issue on appeal, and post-conviction counsel were ineffective for failing to  
14 raise this issue in state post-conviction proceedings.

15 468. The prosecution committed misconduct in argument by improperly  
16 disparaging defense counsel; making references to personal beliefs during closing  
17 argument; instructing the jury to send a message to the community by giving Mr.  
18 Vanisi the death penalty; arguing that the jury should show Mr. Vanisi the same  
19 mercy that he showed the victim; and improperly commenting on mitigating factors  
20 not presented by the defense.

21 A. The State committed prosecutorial misconduct by  
22 repeatedly suggesting that the jury was aligned with  
23 the prosecution during its innocence/guilt phase  
deliberations.

24 469. Throughout his entire closing argument, the prosecution constantly used the  
25 words "we," "us" and "our" in a manner that suggested that the jury was aligned  
26 with the State in deliberating Mr. Vanisi's guilt. The prosecution repeatedly spoke  
27 to the jury as if the State were part of the deliberative process.

28 ///

1           What I would like to do now is to talk to you about how some of  
2 the evidence ties together and to talk to you about those issues that are  
not issues, and then we'll get down to what is the issue in this case.

3 9/27/99 TT 1023 (emphasis added).  
4

5           Can Sergeant Sullivan give us some information to help make  
6 your decisions that you need to make within the next few hours?  
Undoubtedly he talked to us.

7 9/27/99 TT 1023 (emphasis added).  
8

9           I submit to you as we're sitting here right now, Counts III, IV and V  
are proven.

10 9/27/99 TT 1025 (emphasis added).  
11

12           Now let's take a look at [who committed the crimes].

13 9/27/99 TT 1025 (emphasis added).  
14

15           Remembering and thinking about keeping these statements in  
mind, what else do we know in the way of the evidence?

16 9/27/99 TT 1026 (emphasis added).  
17

18           Monday night, about 10:30, we have defendant Siaosi Vanisi at  
19 the house on Sterling. You'll have ~~these~~ again so you can see them and  
look at them. Remember, we described this one, University of Nevada  
campus right here. The actual place where Sergeant George Sullivan  
was murdered.

20  
21 9/27/99 TT 1027 (emphasis added).  
22

23           How do we know he (the decedent) was doing paperwork? Not  
only did Vainga tell you that this morning, but we also have the field  
interview card that was not completed. . .

24 9/27/99 TT 1030 (emphasis added).  
25

26 ///

27 ///



1       We know from the extent of the injuries and the damage that he [the  
2       decendent] didn't get many shots in, if any. We also know that there  
3       weren't many defensive wounds.

4       9/27/99 TT 1030 (emphasis added).

5       We know the robbery was committed . . .

6       9/27/99 TT 1030 (emphasis added).

7               We talked about how he went along the canal and how he got rid  
8       of the beanie and the wig. Now you know what it meant when Mr.  
9       Moreira came in here, and we had the pictures of the canal, and how he  
      also talked about recovering the beanie and the wig in the canal after  
      the water was drained.

10       9/27/99 TT 1031 (emphasis added).

11  
12       470. The prosecution's use of "we," "us" and "our" throughout his innocence/guilt  
13       phase argument, was clearly not a rhetorical device, but a way to suggest to jurors  
14       that they were aligned with the State throughout the fact-finding and deliberating  
15       process. This suggestion of alignment improperly conveyed to the jury that the State  
16       and the jury were part of the same team, when in fact, the jury must remain  
17       impartial and neutral. Trial counsel's failure to object to the State's improper  
18       alignment of itself with the jury was objectively unreasonable and prejudiced Mr.  
19       Vanisi.

20               B. The State improperly argued the non-existence of a  
21       statutory aggravating factor.

22       471. During closing argument in the penalty phase of Mr. Vanisi's trial the State  
23       characterized the defense mitigation evidence by saying:

24               [W]e have a series of family witnesses that have said he was raised in a  
25       loving, caring environment. He wasn't abused. That's also offered as  
      mitigating evidence that someone was abused. Was it in this case? No.

26       10/06/99 TT 1827. It was improper for the State to highlight the absence of a  
27       potential mitigating factor. The State's only purpose could be to undermine Mr.  
28

1 Vanisi's mitigation presentation by highlighting evidence that was not presented.  
2 Trial counsel were ineffective for failing to object to the State's improper reference.  
3 Mr. Vanisi was prejudiced in that his mitigation presentation was improperly  
4 minimized in the eyes of the jury.

5 C. The State improperly argued to the jury that  
6 "justice" required the death penalty.

7 472. Twice during closing arguments in the penalty phase of Mr. Vanisi's trial the  
8 State argued that justice required that the jury impose a death sentence. The last  
9 sentence of the prosecution's rebuttal closing argument was "[j]ustice in this case  
10 demands death." 10/06/99 TT 1843. Earlier, in the State's opening statement, trial  
11 counsel objected to the State making the same argument, but was overruled.  
12 10/01/99 TT 1125-26. These arguments were improper and the trial court erred by  
13 failing to sustain trial counsel's objection. The argument left the impression with  
14 the jury that the authority of the State of Nevada required them to reach a death  
15 verdict. Mr. Vanisi was prejudiced by this argument.

16 D. Cumulative Error

17 473. Singly and cumulatively, the prosecutorial misconduct that occurred in Mr.  
18 Vanisi's case prejudiced Mr. Vanisi. Trial counsel were ineffective for failing to  
19 object to all instances of misconduct and the trial court erred by overruling trial  
20 counsel's objections when they were raised. Appellate counsel were ineffective for  
21 failing to raise this meritorious claim. The misconduct so infected Mr. Vanisi's trial  
22 as to render it fundamentally unfair, and the state cannot show beyond a reasonable  
23 doubt that any constitutional error was harmless.  
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1 **CLAIM FIFTEEN**

2 474. Mr. Vanisi was deprived of his state and federal constitutional rights to due  
3 process, equal protection and effective assistance of counsel due to his being forced  
4 to wear a stun belt restraining device during the guilt and penalty phases of his trial.  
5 U.S. Const. Amends. V, VI, VIII, & XIV; Nev. Const. art. 1 §§ 1, 6 & 8, and art. 4 §  
6 21.

7 **SUPPORTING FACTS:**

8  
9 475. Throughout Mr. Vanisi's trial he was required to wear a stun belt restraining  
10 device. Mr. Vanisi alleges that this requirement deprived him of his Sixth  
11 Amendment and due process rights to confer with counsel, be present at trial and  
12 participate in his defense. Mr. Vanisi further alleges that requiring him to wear a  
13 stun belt deprived him of due process and unduly prejudiced him in that it  
14 negatively affected his demeanor in front of the jury.

15 476. On December 16, 1998, the trial court informed trial counsel, without holding  
16 a hearing, that:

17 THE COURT: As I understand, there will be some sort of a  
18 waist restraint, electrical restraint, but it will be under his clothing. His  
19 arms will be free during the trial to write and pass notes back and forth.

20 MR. SPECCHIO: Well, I'm assuming, Judge that I'm supposed  
21 to be making some kind of complaint, but I don't think I can until I see  
22 what it will be, and then we will voice it at that time.

23 12/10/1998 TT 11. Mr. Vanisi's trial counsel were ineffective in failing to object to  
24 the use of a stun belt and for failing to demand a hearing on the necessity of  
25 employing such a device. Mr. Vanisi also alleges that the trial court erred in failing  
26 to conduct a hearing on the use of the stun belt and in failing to make specific  
27 factual findings on its necessity on the record.

28 ///

1           A.     The trial court erred in failing to conduct a hearing  
2                   to determine whether an essential State interest  
3                   necessitated the use of a stun belt

4     477.   The decision to use a stun belt must be subjected to close judicial scrutiny.  
5     See, e.g. Gonzalez v. Pliler, 341 F.3d 897, 901 (9th Cir. 2003); U.S. v. Durham, 287  
6     F.3d 1297, 1304 (11th Cir. 2002). It has been recognized by federal courts that the  
7     use of a stun belt on a defendant during trial interferes with the defendant's Sixth  
8     Amendment and due process rights to confer with his counsel, be present during  
9     trial and to follow the proceedings and actively participate in his defense. See, e.g.,  
10    Pliler, 341 F.3d 897, 900 (2003). The Nevada Supreme Court has also recognized  
11    the negative Sixth Amendment and due process implications of the use of stun belts  
12    during criminal proceedings. See Hymon v. State, 121 Nev. 200, 111 P.3d 1092  
13    (2005). Before a court may constitutionally allow the use of a stun belt, it must find  
14    on the record that there are compelling state interests that justify the derogation of  
15    the defendant's constitutional rights and that less restrictive means are not  
16    available. See, Pliler, 341 F.3d at 901; See also, Hymon, 121 Nev. at 209, 111 P.3d  
17    at 1099.

18    478.   The trial court was aware that the state intended to utilize a stun belt on Mr.  
19    Vanisi during the course of his trial. There was no hearing, however, on whether  
20    any unusual or compelling security concerns justified the use of the stun belt in his  
21    particular case. Under the circumstances of Mr. Vanisi's case, the trial court had a  
22    constitutional duty to conduct a hearing to make factual findings regarding: (1)  
23    whether there existed unusual and compelling security concerns in Mr. Vanisi's  
24    case; (2) the belt's operation; (3) the possibility of accidental discharge; (4) the  
25    potential adverse psychological effects on Mr. Vanisi; and (5) whether less  
26    restrictive alternatives could be utilized to accomplish the same purposes. Mr.  
27    Vanisi's Sixth Amendment and due process rights were violated by the trial court's  
28

1 allowance of the use of the stun belt without making specific factual findings on the  
2 record.

3 479. Furthermore, the presence of the stun belt affected Mr. Vanisi's demeanor  
4 due to the ever present anxiety that he might suddenly be shocked. This change in  
5 demeanor was prejudicial to Mr. Vanisi as several jurors perceived him to be  
6 unduly stoic and unemotional during the trial. Exs. 195 ¶ 5; 196 ¶ 5; 197 ¶ 3.

7 480. Several jurors who sat on Mr. Vanisi's jurors recall that Mr. Vanisi seemed  
8 emotionless and very detached throughout the trial proceedings. Juror Richard  
9 Tower believed that Mr. Vanisi's lack of emotion was a sign that Mr. Vanisi had no  
10 remorse for his crime. Ex. 195 ¶ 5. Juror Nettie Horner noticed that Mr. Vanisi had  
11 a flat and emotionless affect throughout the trial indicating to her that Mr. Vanisi  
12 was remorseless. Ex. 196 ¶ 5. Ms. Horner also noted that Mr. Vanisi had very little  
13 interaction with his attorneys. Ex. 196 ¶ 5.

14 481. Juror Bonnie James saw Mr. Vanisi in shackles at the beginning of the trial  
15 and recalls later seeing him wearing a stunbelt. Ex. 197 ¶ 4. Ms. James felt that the  
16 additional security measures must have been necessary because Mr. Vanisi was a  
17 very dangerous person. Ex. 197 ¶ 4. Ms. James also recalls that Mr. Vanisi had a  
18 blank and emotionless expression on his face throughout the trial and it did not  
19 matter what evidence was being presented or what witness was testifying. Ex. 197 ¶  
20 3. She wondered if it was part of Tongan culture not to display any emotion. Ex.  
21 197 ¶ 4.

22 482. Mr. Vanisi alleges that the outcome of his trial and sentencing hearing were  
23 negatively impacted by the jurors' perception of him and that there exists a  
24 reasonable probability that the outcome would have been different if the trial court  
25 had not erred.  
26

27 ///  
28

1           B.     Trial counsel were ineffective for failing to object  
2                 to the use of the stun belt and for failing to demand  
3                 a hearing on the issue.

4 483. Mr. Vanisi's trial counsel did not object to the use of a stun belt and never  
5 requested a hearing on the issue. Given the important Sixth Amendment and due  
6 process rights that are negatively impacted by the use of a stun belt, constitutionally  
7 effective trial counsel would have objected to its use in Mr. Vanisi's case and  
8 would have demanded a full hearing on the issue.

9 484. There is no trial strategy, reasonably designed to effectuate Mr. Vanisi's best  
10 interests, that would justify trial counsel's failure to object to the use of a stun belt  
11 and demand a hearing on the issue. Trial counsel's failure to object and demand a  
12 hearing was not strategic, but was instead an abdication of their obligation to Mr.  
13 Vanisi which constituted a deprivation of his state and federal constitutional rights  
14 to confer with counsel, actively participate in the conduct of his defense and be  
15 present during trial. Further, Mr. Vanisi was actually prejudiced because the jury  
16 perceived and were negatively impressed by his unemotional demeanor, caused in  
17 part by the use of the stun belt. Trial counsel could not have possessed any strategic  
18 justification for failing to ensure that Mr. Vanisi's Sixth Amendment and due  
19 process rights were protected. Even if counsel had such a strategic justification, any  
20 such justification was unreasonable, and Mr. Vanisi did not knowingly consent to  
21 that trial strategy.

22           C.     The errors by the trial court and counsel regarding  
23                 the use of a stun belt should be considered singly  
24                 and cumulatively.

25 485. The above listed trial court and trial counsel errors regarding the use of a stun  
26 belt should be considered singly and cumulatively as violations of Mr. Vanisi's  
27 Sixth Amendment and due process rights to communicate with counsel, be present  
28 during trial and actively participate in his defense. These constitutional violations  
led inevitably to equal protection violations as well, since the clear lack of

standards virtually insured that identically-situated defendants would be treated unequally. Reasonably competent trial counsel would have objected to the use of a stun belt and would have demanded a hearing on the issue of its use. The trial court was constitutionally bound to hold a hearing on the issue and to make specific findings of fact on the record.

D. Appellate counsel was ineffective in failing to raise this claim on direct appeal and post-conviction counsel was ineffective in failing to investigate, develop and present this claim.

486. This claim is of obvious merit. By the failure of appellate counsel to raise this issue on direct appeal, Mr. Vanisi was deprived of the due process and equal protection right to the effective assistance of counsel on appeal, as guaranteed by the Fifth, Sixth and Fourteenth Amendments to the Constitution. Competent counsel would have raised and litigated this meritorious issue on direct appeal and in state post-conviction proceedings. There is no strategy within the range of reasonable competence, that would justify appellate and post-conviction counsels' failure in this regard.

1 **CLAIM SIXTEEN**

2 487. Mr. Vanisi's conviction and death sentence are invalid under state and  
3 federal constitutional guarantees of due process, equal protection, a fair trial, a fair  
4 and impartial jury, and a reliable sentence because the trial court allowed improper  
5 victim impact testimony. U.S. Const. amends. V, VI, VIII, & XIV; Nev. Const. art.  
6 1 §§ 1, 6 & 8, and art. 4 § 2.

7 **SUPPORTING FACTS:**

8  
9 488. Victim impact testimony is limited to testimony informing the jury about the  
10 specific impact of the crime on the family and about the qualities of the victim. This  
11 type of testimony is admissible unless it is so unduly prejudicial that it renders the  
12 sentence fundamentally unfair. Comments about the crime or the defendant are  
13 irrelevant to a capital sentencing decision. Statements that serve no other purpose  
14 than to inflame the jury and divert it from deciding the case on the relevant  
15 evidence concerning the crime and the defendant are unconstitutional.

16 A. The trial court erroneously denied Mr. Vanisi's  
17 Motion to Limit Victim Impact Statements.

18 489. Trial counsel filed a Motion to Limit Victim Impact Statements, Ex. 139,  
19 which was denied in part on November 25, 1998, Ex. 141. In the motion, trial  
20 counsel requested that the court prohibit testimony expressing an opinion regarding  
21 the sentence, and limit the testimony to family members, thereby excluding friends,  
22 co-workers and law enforcement. Nevada Revised Statutes Section 176.015(3)  
23 affords victims an opportunity to express views concerning the crime, the  
24 responsible person, the impact of the crime on the victim and the need for  
25 restitution. (Emphasis added). The word "victim" is defined as a person against  
26 whom a crime has been committed, a person who has been injured or killed as a  
27 direct result of the commission of the crime, or their relative. Nev. Rev. Stat. §  
28 176.015(5)(b)(1-3). A "relative" is defined as a spouse, parent, grandparent,



1 stepparent, natural born child, stepchild, adopted child, grandchild, brother, sister,  
2 half brother, half sister or a parent of a spouse. Nev. Rev. Stat. § 176.015(f)(a)(1-4).  
3 Friends and coworkers are not included within the definition of victim. The court  
4 agreed to exclude testimony expressing an opinion about the sentence, but refused  
5 to limit victim impact testimony to family members. Ex. 141.

6 B. The trial court improperly allowed a friend and co-  
7 worker to testify.

8 490. Because of the trial court's erroneous denial of Mr. Vanisi's motion to limit  
9 victim impact testimony, the state called Stephen Sauter, a friend and co-worker of  
10 the victim, during the penalty phase of Mr. Vanisi's trial. 10/01/99 TT 1248-58. Mr.  
11 Sauter read a statement to the jury wherein he described the night he received the  
12 telephone call informing him that the victim was dead. He described in very  
13 emotional and vivid terms going to the police station and then going to comfort the  
14 decedent's wife. 10/01/99 TT 1252.

15 491. He talked about what a good man and police officer the decedent was.  
16 10/01/99 TT 1253-54. He described the decedent as having a great sense of humor  
17 and being a practical joker. 10/01/99 TT 1254-55. He described the deep emotional  
18 impact the decedent's death had on all police and rescue workers in the Reno area.  
19 10/01/99 TT1255-56. After his testimony, trial counsel made a record that the  
20 witness was crying during his testimony and that his voice was shaking and  
21 breaking at times. 10/01/99 TT 1259. Trial counsel also made a record that jurors  
22 were crying and some audience members were having difficulty listening to the  
23 testimony. 10/01/99 TT 1259. This inadmissable and gut-wrenching testimony  
24 prejudiced Mr. Vanisi.

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1 C. The trial court improperly allowed a holiday family  
2 video of the victim to be played during the  
3 testimony of the decedent's wife, and improperly  
4 allowed her to read a statement containing her  
5 opinions about Mr. Vanisi.

6 492. The trial court allowed the decedent's wife to read a statement that contained  
7 prejudicial improper personal opinion about Mr. Vanisi over trial counsel's  
8 objection. 10/01/99 TT 1269. The statement alleged that "Vanisi didn't care about  
9 the family and friends George would leave behind." 10/01/99 TT 1271. The  
10 statement also improperly requested a sentence from the jury that would make sure  
11 Mr. Vanisi "could never hurt another family like he has hurt ours." 10/01/99 TT  
12 1274. The statement contained the following improper commentary:

13 Siaosi Vanisi is a man who killed without remorse, and he  
14 continues to exhibit no regret for what he did. His hatred for people  
15 unknown to him is a frightening prospect. He is a violent criminal. We  
16 must keep him forever away from our community where he would have  
17 the opportunity to hurt another family. He has devastated ours. He  
18 must never be given that chance again.

19 10/01/99 TT 1298.

20 493. Over trial counsel's objection, the trial court allowed the State to show an  
21 emotionally charged video of the decedent during holidays and at family gatherings  
22 to the jury during the testimony of the decedent's wife. 10/01/99 TT 1268-69; Ex.  
23 154. The statement read by the decedent's wife improperly alluded to a "no more  
24 holidays" argument by saying "[w]e often thought how much fun holidays would be  
25 as our children grew up. . . ." 10/01/99 TT 1281, and "Christmas was his favorite  
26 time of year." 10/01/99 TT 1292.

27 494. This improper victim impact testimony affected the process to such an extent  
28 as to render Mr. Vanisi's conviction and sentence fundamentally unfair and  
unconstitutional, and the state cannot show beyond a reasonable doubt that any  
constitutional error was harmless.

1 495. There was no reasonable or strategic basis for prior counsel to fail to  
2 investigate, develop and present this claim.  
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1 **CLAIM SEVENTEEN.**

2 496. Mr. Vanisi's state and federal constitutional rights to due process, the right to  
3 the effective assistance of counsel, equal protection, a fair and impartial jury, a fair  
4 trial and a reliable sentence were violated due to trial counsel's failure to renew  
5 their motion for a change of venue at the conclusion of voir dire because the trial  
6 court's pretrial rulings prevented trial counsel from making the record necessary to  
7 establish cause for a change of venue. U.S. Const. amends. V, VI, X & XIV; Nev.  
8 Const. art. 1 §§ 1, 6 & 8, and art. 4 § 21.

9 **SUPPORTING FACTS:**

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11 497. It is clearly established state and federal law that a criminal trial that takes  
12 place in a highly prejudicial atmosphere within the community violates the Due  
13 Process Clauses of the Fifth and Fourteenth Amendments to the United States  
14 Constitution. After voir dire, if a court determines that the attitudes and opinions of  
15 the potential jurors have been influenced by excessive media coverage and  
16 community attitudes prejudicial to the defendant, a change of venue is  
17 constitutionally mandated. The appropriate time to move for a change of venue is at  
18 the conclusion of voir dire, for only then can a court determine if the jury holds pre-  
19 conceived views of the case that are prejudicial to the defendant.

20 498. In order to ensure their ability to question the venire persons in Mr. Vanisi's  
21 case adequately enough to uncover biases they may have obtained from exposure to  
22 the high publicity and general community outrage generated by Mr. Vanisi's case,  
23 trial counsel filed several pre-trial motions. Trial counsel filed a Motion for  
24 Additional Peremptory Challenges on June 1, 1998, in order to ensure that venire  
25 persons displaying excessive exposure to the case could be removed even if they  
26 did not rise to the level of removal for cause. Ex 170. After the first trial ended in a  
27 mistrial, trial counsel filed a Motion to Renew Request for Additional Peremptory  
28 Challenges. Ex. 171. In order to protect against juror contamination by exposure to

1 the knowledge and biases of other members of the venire, trial counsel moved for  
2 individually sequestered voir dire. Ex. 167. Trial counsel also moved for an  
3 expanded juror questionnaire to uncover more detail about the potential biases of  
4 the venire. Ex. 174. The trial court denied trial counsel's motions. Exs. 169, 142.  
5 499. On July 15, 1998, trial counsel filed a motion for change of venue. Ex 172.  
6 In that motion trial counsel argued that the massive amount of pre-trial publicity  
7 surrounding Mr. Vanisi's case, including the additional publicity generated by the  
8 public memorials for the decedent, would make it impossible for Mr. Vanisi to  
9 receive a fair trial in Washoe County. During the voir dire proceedings in Mr.  
10 Vanisi's case, the majority of the venire, including several venire persons who  
11 actually served as jurors, acknowledged being familiar with Mr. Vanisi's case from  
12 media reports, and/or harboring bias against Mr. Vanisi. Ex. 165 at 48-52. (seated  
13 juror Shaylene Grate answering that she could not be fair and stated "I heard that a  
14 UNR police Sergeant had been murdered and that the police had a suspect and were  
15 trying to find him. Later I heard that Siaosi Vanisi was the suspect and he was  
16 running from the police. I believe he ran to his relative's house and there was some  
17 sort of standoff with the police. They eventually arrested him. He was very resistive  
18 and upset."); Id. at 146-150 (seated juror Michael Sheahan (recalled details of the  
19 crime and stated "I truley [sic] believe this man is guilty of a terouble [sic] crime for  
20 killing of a person.")); Id. at 166-170 (seated juror Richard Tower stated "I work at  
21 the Reno Gazette Journal so I have read every article written about this matter from  
22 the initial investigation to his capture in Utah and subsequent actions to delay the  
23 trial."); see also id., at 61-65 (seated juror Bonnie James); 111-115 (seated juror  
24 James McMorran); 71-75 (seated juror Leslie Johnson); 121-125 (seated juror  
25 Jeannette Minassian); 1-5 (seated juror James Ayers); 58-60 (seated juror Nettie  
26 Horner); 126-130 (seated juror Larry Mullins); 6-10 (seated juror Alice Bell); 11-  
27 15(seated juror Robert Buck); 21-25 (seated juror Shaun Carmichael); 27-31(seated  
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1 juror Pete Costello); see generally Ex. 165. At the conclusion of voir dire trial  
2 counsel did not renew their written motion for a change of venue, and specifically  
3 informed the trial court “[w]e’re not going to raise a change of venue at this time.”  
4 09/22/99 TT 498. Trial counsel’s failure to pursue a change of venue, especially in  
5 light of the seated jurors who had expressed bias against Mr. Vanisi based on media  
6 reports and public opinion, fell below an objective level of reasonableness and  
7 prejudiced Mr. Vanisi.

8 500. In the alternative, the trial court’s error in failing to ensure an adequate voir  
9 dire that would allow a record to be created supporting or undercutting the necessity  
10 of a change of venue was a violation of due process and prevented trial counsel  
11 from protecting Mr. Vanisi’s constitutional rights. Mr. Vanisi hereby incorporates  
12 the allegations set forth in Claim Five as if the same were fully set forth herein.

13 501. Mr. Vanisi’s trial and sentencing hearing took place in an unfairly prejudicial  
14 atmosphere, which rendered a fair trial impossible. That prejudicial atmosphere was  
15 created by the fact that the victim was a University of Nevada, Reno police officer  
16 and a well-known and respected member of the Reno community. Massive and  
17 prejudicial publicity surrounded this case. See Ex. 26. In fact, before Mr. Vanisi’s  
18 trial, memorials had already been erected for the decedent. Ex. 157. A fair trial  
19 could not be rendered under these circumstances.

20 502. The failure to obtain a change of venue affected the process to such an extent  
21 as to render Mr. Vanisi’s conviction and sentence fundamentally unfair. The failure  
22 to be tried by an impartial jury constitutes structural error and is per se prejudicial.  
23 In the alternative, the state cannot demonstrate beyond a reasonable doubt that this  
24 error was harmless.  
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1 **CLAIM EIGHTEEN**

2 503. Mr. Vanisi was not competent during the crime. Mr. Vanisi's level of  
3 intoxication and psychosis amounted to legal insanity under the authority of Finger  
4 v. State. The Legislature's ban on a verdict of "Not Guilty by Reason of Insanity"  
5 prevented trial counsel from putting on evidence of Mr. Vanisi's state of mind, in  
6 violation of the Fifth, Sixth and Fourteenth Amendments to the United States  
7 Constitution. U.S. Const. amends. V, VI & XIV; Nev. Const. art. 1 §§ 1, 6 & 8, and  
8 art. 4 § 21.

9 **SUPPORTING FACTS:**

10 504. The authority of Finger v. State, 117 Nev.548, 27 P.3d 66 ( 2001), was not  
11 available to Mr. Vanisi at the time of the trial. His constitutional right to present  
12 relevant evidence regarding his mental health and intoxication during the alleged  
13 crime to the jury was denied. Mr. Vanisi hereby incorporates Claim Two as if fully  
14 pled herein. The Nevada Supreme Court could not have reviewed this issue on  
15 direct appeal. The record is clear that Mr. Vanisi suffered from a psychotic disorder  
16 at the time of his arrest, diagnosed first upon his incarceration. Moreover, it is also  
17 clear that Vanisi was under the influence of speed and marijuana and suffering from  
18 lack of sleep at the time of the crime. 10/05/99 TT 1720. The jury in the guilt phase  
19 was not presented with said information by counsel for Vanisi or the State. Nor was  
20 the jury instructed how it might consider such information in its determination of  
21 Vanisi's state of mind at the time of the offense.  
22

23 505. The state of mind of a defendant in a self-defense case is material and  
24 essential to the defense. In Finger, the Nevada Supreme Court held that evidence of  
25 a mental state that does not rise to the level of legal insanity may still be considered  
26 in evaluating whether the prosecution has proven each element of an offense  
27 beyond a reasonable doubt, for example, in determining whether a killing is first- or  
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1 second-degree murder or manslaughter or some other argument regarding  
2 diminished capacity.

3 506. Additionally, in Finger, the Nevada Supreme Court found the 1995 amended  
4 version of Nev. Rev. Stat. 174.035(4), abolishing the defense of legal insanity, to be  
5 unconstitutional and unenforceable. Id. 117 Nev. at 575, 27 P.3d at 84. The Court  
6 held the portion of Nev. Rev. Stat. 174.035(4) creating a plea of guilty but mentally  
7 ill unconstitutional and rejected the amended version of Nev. Rev. Stat. 174.035(3)  
8 "in its entirety." Id. at 576, 27 P.3d at 84. The Finger Court further determined that  
9 "legal insanity is a well-established and fundamental principal of the law of the  
10 United States" protected by the Due Process Clauses of the United States  
11 Constitution. Id. at 575, 27 P.3d at 84. The Court concluded that the pre-existing  
12 statutes that were amended or repealed by the 1995 statute should remain in full  
13 force and effect. Id. at 576, 27 P.3d at 84.

14 507. Under the Due Process Clause of the United States Constitution, therefore,  
15 Mr. Vanisi must be afforded the means and the permission to put on a defense of  
16 legal insanity. His conviction and sentence must therefore be reversed to  
17 accommodate this right.

18 508. Constitutionally-adequate review in a capital case, including the mandatory  
19 review required by Nev. Rev. Stat. 177.055(2), must take into account the entire  
20 record of the proceedings.

21 509. Any attempt to conduct the review of the capital sentence in this matter  
22 without consideration of Mr. Vanisi's mental state during the alleged crime would  
23 violate the state and federal right to due process, the right to a fundamentally fair  
24 review on an adequate record, the right to equal protection, and the Eighth  
25 Amendment right to a reliable sentence.

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1 510. The Nevada Supreme Court's refusal to revisit this claim for procedural  
2 reasons during the appeal of the denial of Mr. Vanisi's first post-conviction  
3 proceedings was contrary to and an unreasonable application of clearly established  
4 federal law. Vanisi v. State, No. 50607, 2010 WL 3270985, at \*2 (Nev. April 20,  
5 2010).

6 511. The state cannot demonstrate that this error was harmless beyond a  
7 reasonable doubt.  
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1 **CLAIM NINETEEN**

2 512. Mr. Vanisi's death sentence is invalid under the state and federal  
3 Constitutional guarantees of due process, equal protection, and a reliable sentence,  
4 as well as under international law, because the Nevada capital punishment system  
5 operates in an arbitrary and capricious manner. U.S. Const. art. VI, amends. V, VI,  
6 VIII & XIV; Nev. Const. art. 1 §§ 1, 6 & 8, and art. 4 § 21; International Covenant  
7 on Civil and Political Rights, art. VI.

8 **SUPPORTING FACTS:**

9  
10 513. Mr. Vanisi hereby incorporates each and every allegation contained in this  
11 petition as if fully set forth herein.

12 514. The Nevada capital sentencing process permits the imposition of the death  
13 penalty for any first-degree murder that is accompanied by an aggravating  
14 circumstance. Nev. Rev. Stat. § 200.030(4)(a). The statutory aggravating  
15 circumstances are so numerous and so vague that they arguably exist in every first-  
16 degree murder case. See Nev. Rev. Stat. § 200.033. Nevada permits the imposition  
17 of the death penalty for all first-degree murders that are "at random and without  
18 apparent motive." Nev. Rev. Stat. § 200.033(9). Nevada statutes also permit the  
19 death penalty for murders involving virtually every conceivable kind of motive:  
20 robbery, sexual assault, arson, burglary, kidnapping, to receive money, torture, to  
21 prevent lawful arrest, and escape. See Nev. Rev. Stat. § 200.033. The scope of the  
22 Nevada death penalty statute makes the death penalty an option for all first-degree  
23 murders that involve a motive, and for first-degree murders that involve no motive  
24 at all. The administration of the death penalty statute by the Nevada Supreme Court  
25 also routinely validates constructions of and findings of aggravating circumstances  
26 which are not based upon any evidence.

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1 515. The death penalty is in practice permitted in Nevada for all first-degree  
2 murders, and first-degree murders are not restricted in Nevada to those cases  
3 traditionally defined as first-degree murders. As the result of the use of  
4 unconstitutional definitions of reasonable doubt, premeditation and deliberation,  
5 and implied malice, first-degree murder convictions occur in the absence of proof  
6 beyond a reasonable doubt, in the absence of any rational showing of premeditation  
7 and deliberation, and as a result of the presumption of malice aforethought. A death  
8 sentence is in practice permitted under Nevada law in every case where the  
9 prosecution can present evidence that an accused committed an unlawful killing.

10 516. As a result of plea bargaining practices, and imposition of sentences by juries  
11 and three-judge panels, sentences of less than death have been imposed in situations  
12 where the amount of mitigating evidence was significantly and qualitatively less  
13 than the mitigation evidence that existed in the present case. The untrammelled  
14 power of the sentencer under Nevada law to decline to impose the death penalty,  
15 even when no mitigating evidence exists at all, or when the aggravating factors far  
16 outweigh the mitigating evidence, means that the imposition of the death penalty is  
17 necessarily arbitrary and capricious.

18 517. Nevada law provides sentencing bodies with no rational method for  
19 separating those few cases that warrant the imposition of the ultimate punishment  
20 from the many that do not. The narrowing function required by the Eighth  
21 Amendment is accordingly non-existent under Nevada's sentencing scheme.

22 518. Because the Nevada capital punishment system provides no rational method  
23 for distinguishing between who lives and who dies, such determinations are made  
24 on the basis of illegitimate considerations. In Nevada capital punishment is imposed  
25 disproportionately on racial minorities: Nevada's death row population is  
26 approximately 50% minority even though Nevada's general minority population is  
27 approximately 17%. All of the people on Nevada's death row are indigent and have  
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1 had to defend with the meager resources afforded to indigent defendants and their  
2 counsel. As this case illustrates, the lack of resources provided to capital defendants  
3 virtually ensures that compelling mitigating evidence will not be presented to, or  
4 considered by, the sentencing body. Nevada sentencers are accordingly unable to,  
5 and do not, provide the individualized, reliable sentencing determination that the  
6 constitution requires.

7 519. The defects in the Nevada system are aggravated by the inadequacy of the  
8 appellate review process.

9 520. These systemic problems are not unique to Nevada. The American Bar  
10 Association has recently called for a moratorium on capital punishment unless and  
11 until each jurisdiction attempting to impose such punishment “implements policies  
12 and procedures that are consistent with . . . longstanding American Bar Association  
13 policies intended to: (1) ensure that death penalty cases are administered fairly and  
14 impartially, in accordance with due process, and (2) minimize the risk that innocent  
15 persons may be executed . . . .” Ex. 4. As the ABA has observed in a report  
16 accompanying its resolution, “administration of the death penalty, far from being  
17 fair and consistent, is instead a haphazard maze of unfair practices with no internal  
18 consistency .” Id. The ABA concludes that these deficiencies have resulted from the  
19 lack of competent counsel in capital cases, the lack of a fair and adequate appellate  
20 review process, and the pervasive effects of race. Id.

21  
22 521. The Nevada capital punishment system suffers from all of the problems  
23 identified in the ABA Report -- the underfunding of defense counsel, the lack of a  
24 fair and adequate appellate review process and the pervasive effects of race. The  
25 problems with Nevada’s process are exacerbated by overly broad definitions of both  
26 first-degree murder and the accompanying aggravating circumstances, which  
27 permits the imposition of a death sentence for virtually every homicide. This  
28 arbitrary, capricious and irrational scheme violates the constitution and is

1 prejudicial per se. The scheme also violates petitioner's rights under international  
2 law. In the alternative, this error made Mr. Vanisi's guilty verdict and death  
3 sentence fundamentally unfair, and the state cannot show beyond a reasonable  
4 doubt that any constitutional error was harmless.

1 **CLAIM TWENTY**

2 522. The death qualification of jurors pretrial violated Mr. Vanisi's state and  
3 federal constitutional rights to an impartial jury, due process, a reliable sentence,  
4 and equal protection. U.S. Const. amends. VI, VIII, & XIV; Nev. Const. art. 1 §§ 1,  
5 6 & 8, and art. 4 § 21.

6 **SUPPORTING FACTS:**

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8 523. The pretrial death qualification of jurors results in a conviction-prone jury for  
9 the guilt phase and disproportionately and unlawfully excludes certain cognizable  
10 groups from the jury venire. Proof of prejudice is unnecessary, because the state's  
11 interests could have been fully reconciled with Mr. Vanisi's right to a fair and  
12 representative jury by death qualifying jurors after he was convicted of a capital  
13 offense. In the alternative, this error made Mr. Vanisi's capital guilt verdict and  
14 death sentence fundamentally unfair, and the state cannot show beyond a reasonable  
15 doubt that any constitutional error was harmless.

16 A. The constitution prohibits pretrial death  
17 qualification.

18 524. The pretrial death qualification of jurors undermines a capital defendant's  
19 right to a fair trial. First, the process conditions jurors toward rendering a guilt  
20 verdict because it requires them to assume the defendant's guilt. Protracted  
21 discussions with potential jurors regarding the potential penalties implicitly suggest  
22 the defendant's guilt, thereby undermining the presumption of innocence and  
23 impairing the impartiality of potential jurors.

24 525. Second, the surviving jury, when compared to a traditionally composed jury,  
25 is conviction-prone and possesses pro-prosecution attitudes. There is social  
26 science research from numerous researchers using diverse subjects and varied  
27 methodologies which demonstrate the conviction proneness of death-qualified  
28 juries. "The key to the studies' importance . . . is the remarkable consistency of

1 data. [A]ll reached the same monotonous conclusion: Death-qualified juries are  
2 prejudicial to the defendant.” Jurywork: Systematic Techniques at § 23.04[4][a].

3 526. The true impact of death qualification on the fairness of a trial is likely even  
4 more devastating than the studies show because prosecution use of peremptory  
5 challenges expands the class of scrupled jurors excluded as a result of the death-  
6 qualifying voir dire.

7 527. Life qualification, which seeks to identify those jurors whose views in favor  
8 of the death penalty preclude or substantially impair them from rendering an  
9 impartial sentence, does not mitigate this prejudice. All jurors — regardless of  
10 whether they are life- or death-oriented — fall prey to the conditioning effects of  
11 the pretrial process in which the defendant’s guilt is assumed. In fact, in life  
12 qualifying a jury, the defense may be drawn into the conditioning process,  
13 appearing to advocate — not a finding of innocence — but imposition of a lesser  
14 sentence.

15 528. Death qualification substantially reduces jury diversity. African Americans  
16 and other racial minorities, women, persons of certain religions, and members of  
17 other cognizable groups will be less likely to survive the process. See Acker et al.,  
18 The Empire State Strikes Back at 69 (“The death- and life-qualification process  
19 causes a greater than 50 percent reduction in the proportion of non-whites eligible  
20 for capital jury service.”); Samuel R. Gross, Update: American Public Opinion on  
21 the Death Penalty — It’s Getting Personal, 83 Cornell L. Rev. 1448, 1451 (1998)  
22 (“Race and sex, the two major demographic predictors of death penalty attitudes,  
23 continue to be influential on every survey.”); William J. Bowers et al., A New Look  
24 at Public Opinion on Capital Punishment: What Citizens and Legislators Prefer, 22  
25 Am. J. Crim. L. 77, 128-30 (1994) (1991 poll reveals that race and gender are  
26 “statistically significant predictors” for support for capital punishment in New York  
27 State); Fitzgerald & Ellsworth, Due Process vs. Crime Control at 46 (blacks and  
28

1 women disproportionately excluded). Indeed, a recent poll indicates that,  
2 nationwide, a mere 36% of African Americans continue to support the death  
3 penalty. See Zogby International, Zogby America June 21, 2000 Poll — Likely  
4 Voters, Question 8.

5 529. In addition to diminishing the representation of particular cognizable groups,  
6 death qualification in Nevada will, by all appearances, serve to disqualify a large  
7 percentage of the population from participating in the resolution of the State’s most  
8 serious criminal cases. This phenomenon will be particularly pronounced in some  
9 counties, making capital juries there peculiarly unrepresentative.

10 This Court should interpret the right to an impartial jury and other guarantees  
11 of the state and federal constitutions as forbidding pretrial death qualification.  
12 Numerous jurists have reached the same conclusion. See Griffin, 741 A.2d at 948  
13 (Berdon, J., dissenting) (“[P]utting the studies aside, anyone with any common  
14 sense and who has the experience of life, would be compelled to come to the  
15 conclusion that venire persons who favor the death penalty are more conviction  
16 prone than those who oppose it.”); id. at 953, 955 (Norcott & Katz, JJ., dissenting)  
17 (finding empirical evidence convincing but also expressing “intuitive agreement  
18 with the claim that death qualified juries are disposed to convict at the guilt phase;”  
19 while cognizant of state’s interest in conserving “cost, time and judicial resources,”  
20 “given the stakes involved, these concerns are [not] compelling enough” to justify  
21 death qualifying a jury before the guilt phase); State v. Bey, 548 A.2d 887, 923  
22 (N.J. 1998) (Handler, J., dissenting) (criticizing Lockhart and noting “in no other  
23 context has this Court accepted the proposition that mere prosecutorial convenience  
24 — or any state interest — justifies procedures that render the jury somewhat more  
25 conviction prone”) (citations and internal quotations omitted); State v. Ramseur,  
26 524 A.2d 188, 295-99, 344-48 (N.J. 1987) (O’Hern, J., concurring; Handler, J.,  
27 dissenting) (questioning Lockhart and urging that defendant had independent state  
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1 constitutional right to traditionally composed jury on ground that “pricing the  
2 expediency and efficiency of trials at the expense of a capital defendant’s right to be  
3 tried before an impartial jury conflicts with our traditional sense of fairness and  
4 justice”); Commonwealth v. Maxwell, 477 A.2d 1309, 1319-22 (Pa. 1984) (Nix,  
5 C.J., dissenting) (finding death qualification violates state constitution and noting  
6 “the time has come to acknowledge on the basis of the considerable reliable  
7 empirical data now available that which common sense has long suggested to be  
8 true, namely, that the death qualification process . . . produces juries that are both  
9 prosecution-prone and unrepresentative”); State v. Young, 853 P.2d 327, 394  
10 (Durham, J., dissenting) (criticizing Lockhart and arguing that “the dual forms of  
11 conviction-proneness that death qualification causes . . . violates a defendant’s right  
12 to ‘trial by an impartial jury,’ as guaranteed by [the State Constitution,] which  
13 requires that ‘in capital cases the right of trial by jury shall remain inviolate’”);  
14 State v. Irizarry, 763 P.2d 432, 435-36 (Wash. 1988) (Utter, J., concurring).

15           B.     Because Mr. Vanisi’s interest in a fair  
16                   determination of guilt or innocence by an impartial  
17                   and representative jury outweighs Nevada’s interest  
18                   in pretrial death qualification, the process violates  
19                   the federal constitution.

20 530. In Witherspoon v. Illinois, 391 U.S. 510 (1968), the Supreme Court first  
21 confronted the issue whether death qualification produces an unconstitutionally  
22 biased jury for the purpose of determining guilt. Although the Court held that the  
23 defendant had not substantiated his claim, it recognized that further proof might  
24 enable a petitioner to prevail. Id. at 517, 520-21 & n.18. The Court speculated that  
25 under the federal constitution:

26           [T]he question would then arise whether the State’s interest in [a  
27           neutral penalty-phase jury] may be vindicated at the expense of the  
28           defendant’s interest in a completely fair determination of guilt or  
             innocence — given the possibility of accommodating both interests by  
             means of [alternate procedures].

1 Id. at 520-21 & n.18. At a minimum, therefore, the Constitution requires “balancing  
2 of the harm to the individual . . . against the benefit sought by the government.”

3 Cooper v. Morin, 49 N.Y.2d 69, 79 (1979). Nevada’s interests simply do not  
4 outweigh a capital defendant’s state constitutional right to a determination of guilt  
5 or innocence by a wholly neutral and representative jury.

6 531. The Nevada Supreme Court’s denial of this meritorious claim on the basis  
7 that it was procedurally defaulted was contrary to and an unreasonable application  
8 of clearly established federal law. See Vanisi v. Nevada, No. 50607, 2010 WL  
9 3270985, at \*2 (Nev. April 20, 2010).

**CLAIM TWENTY-ONE**

532. Nevada’s death penalty scheme allows the district attorneys to select capital defendants arbitrarily, inconsistently, and discriminatorily, in violation of the Fifth, Sixth and Fourteenth Amendments to the United States Constitution. U.S. Const. amends. V, VI, & XIV; Nev. Const. art. 1 §§ 1, 6 & 8, and art. 4 § 21.

**SUPPORTING FACTS:**

533. Nevada’s capital punishment scheme empowers prosecutors to seek death, and secure death sentences, in an arbitrary, idiosyncratic, and discriminatory manner, in violation of the Fifth, Sixth, Eighth and Fourteenth Amendments to the United States Constitution.

534. Under Nevada’s scheme, prosecutors may seek a death sentence against virtually any defendant indicted for first-degree murder. Neither Nev. Rev. Stat. § 200.033, nor any other statutory provision sufficiently guides prosecutors in determining whether to seek the death penalty in a particular case; nor are district attorneys required either to promulgate their own guidelines or to explain their reasons for seeking or declining to seek death in a particular case. Such a scheme allows for the random and capricious selection of death-eligible defendants, and ensures that any discriminatory, bad faith, or otherwise improper decisions to seek death remain hidden: No procedural mechanisms ensure review of the rationales for death-notice decisions in individual cases, or even the factors generally taken into account by prosecutors in making such decisions. This deprives defendants of their right to be free from cruel and unusual punishment and their rights to due process and equal protection under the Constitution. The State’s capital punishment legislation is thus unconstitutional on its face and as administered.

535. There is an acknowledged difference between a “groundless prosecution” and an “arbitrary and capricious prosecution,” State v. Smith, 495 A.2d 507, 515-16

1 (N.J. Super. Ct. Law Div. 1985). It is the latter concern — as to the inherent  
2 arbitrariness and inconsistency of the method by which death penalty decisions are  
3 made in Nevada — that animates Mr. Vanisi’s arguments.

4 536. In Nevada, a district attorney’s decision to seek a death sentence is not a  
5 charging decision as such; rather, prosecutors have been granted an open-ended  
6 license to determine which first-degree murder defendants should be exposed to a  
7 qualitatively different punishment upon conviction of the same charge. Thus, the  
8 constitutional infirmities contained in the death-notice provision of Nev. Rev. Stat.  
9 § 200.033 cannot be dismissed by reliance on the doctrine of traditional  
10 prosecutorial discretion in charging decisions.

11 537. Absent appropriate channeling, the prosecution’s life and death decisions can  
12 be based upon a coin toss, a prosecutor’s political ambitions, racial consciousness,  
13 or on any or no reason at all. Even if every prosecutor tries to behave responsibly by  
14 the light of his or her individual judgments, there can be no consistency among the  
15 myriad assistants involved in capital cases across the state. Nothing requires that the  
16 factors driving Nev. Rev. Stat. § 200.033 decisions be articulated, vetted, shared, or  
17 reviewed.

18 538. Since Nevada’s statutory scheme does not provide guidance to prosecutors,  
19 or demand that factors governing death-notice determinations be established and  
20 subject to judicial oversight, the scheme authorizes arbitrariness in the ultimate  
21 imposition of capital sentences.

22 539. As Nevada’s death penalty legislation is currently drafted, the vesting of  
23 unlimited and unreviewable discretion in district attorneys to select capital  
24 defendants renders the State’s scheme unconstitutional. Given the acknowledged  
25 and undeniable fact that death is a different kind of punishment from any other . . .  
26 in both its severity and its finality, this Court should be especially vigilant in  
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1 ensuring fairness, rationality, and a modicum of uniformity in the determination of  
2 defendants' eligibility for this ultimate penalty.

3 540. This error made Mr. Vanisi's capital sentencing hearing and death sentence  
4 fundamentally unfair, and the state cannot show beyond a reasonable doubt that any  
5 constitutional error was harmless.

6 541. The Nevada Supreme Court's denial of this meritorious claim on the basis  
7 that it was procedurally defaulted was contrary to and an unreasonable application  
8 of clearly established federal law. See Vanisi v. Nevada, No. 50607, 2010 WL  
9 3270985, at \*2 (Nev. April 20, 2010).

1 **CLAIM TWENTY-TWO**

2 542. Mr. Vanisi's conviction and death sentence violate his state and federal  
3 constitutional rights under the Fifth, Sixth, Eighth and Fourteenth Amendments  
4 because the trial court arbitrarily admitted gruesome and prejudicial photographs of  
5 the autopsy and because the introduction of the photographs so prejudiced Mr.  
6 Vanisi that his trial was rendered fundamentally unfair. U.S. Const. amends. V, VI,  
7 VIII & XIV; Nev. Const. art. 1 §§ 1, 6 & 8, and art. 4 § 21.

8 **SUPPORTING FACTS:**

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10 543. While death or serious bodily injury is clearly an element of the charge  
11 alleged against Mr. Vanisi; he never contested these aspects of the case at trial. The  
12 only issue raised at trial was whether Mr. Vanisi was the perpetrator of the crime.  
13 Nevertheless, the prosecution presented several highly prejudicial photographs to  
14 inflame the jury against Mr. Vanisi. The cumulative effect of these photographs  
15 caused the jury to convict Mr. Vanisi of first-degree murder based strictly upon  
16 their inflamed passions.

17 544. Eleven photographs were admitted into evidence over trial counsel objection  
18 despite their highly prejudicial effect on the jury and their low probative value. See  
19 Ex. 126. The prosecution acknowledged the gruesome nature of the photographs  
20 when prosecutor Gammick told the jury they were "not pleasant to look at." TT Vol.  
21 6, 1023.

22 545. Trial counsel filed a motion to exclude the introduction of gruesome  
23 photographs on May 29, 1998. Ex. 158. On November 24, 1998, the trial court held  
24 a hearing on trial counsel's motion. At that hearing, after laying the foundation for  
25 the photographs through the testimony of the State's medical examiner, Ellen Clark,  
26 the following exchange occurred:

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1 MR. SPECCHIO: Judge, let me ask you a question here, does the State  
2 intend to blow up these gory eight-by-tens into three-feet-by-three-feet  
3 gory photographs at trial?

4 MR. STANTON: Yes, your Honor.

5 MR. SPECCHIO: We're going to object to that, Your Honor. We think  
6 its highly inflammable [sic]. We would object to these.

7 . . . .

8 MR. STANTON: The State would be requesting of the Court and it  
9 plans to use this [projection] system for purposes of Dr. Clark's  
10 testimony to the jury in its entirety. . . . The State would then actually  
11 offer the photographs prior to displaying them into evidence and then  
12 ultimately the photographs would be available for the jury for their  
13 review, the actual photographs themselves.

14 . . .

15 MR. SPECCHIO: We're going to object. I mean, those photographs are  
16 gruesome enough without plastering them on a board at three or four  
17 feet by three or four feet and then allowing them to relook at the  
18 photographs. We would object to that procedure.

19 . . . .

20 MR. SPECCHIO: And our continuing objection would be noted for the  
21 record Judge, so we don't have to keep saying it here in the trial?

22 THE COURT: Absolutely. It is noted. And we'll preserve the record  
23 for the appellate review.

24 Ex. 83 at 56-59. The Court denied trial counsel's motion to exclude the gruesome  
25 photographs and ruled that the state would be allowed to project the photographs  
26 onto a screen, and that the original photographs would be submitted to the jury as  
27 evidence. Ex. 83 at 59. Trial counsel raised a continuing objection to the trial  
28 court's order and the court noted it for the record. Ex. 83 at 60.

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1 546. The trial court erred by denying trial counsel's motion. The trial court  
2 compounded the error by allowing the state to project the photographs onto a large  
3 screen and then submit them to the jury. The photographs were clearly intended to  
4 inflame the jury, as is evidenced by the fact that Medical Examiner Ellen Clark,  
5 whose testimony was used to introduce the photographs, was the first witness called  
6 by the state at Mr. Vanisi's trial. See 9/22/99 TT 519-542.

7 547. State's Exhibit 4B was a frontal depiction of the decedent's face. The  
8 photograph showed several bloody gashes on all parts of the face, swollen, partially  
9 open eyes and a jagged broken tooth protruding from the decedent's open mouth.  
10 See, Ex.126. The photograph had no probative value whatsoever and was clearly  
11 intended to inflame the jury and prejudice Mr. Vanisi.

12 548. State's Exhibit 4E was a close up side view of the decedent's face with a  
13 medical examiner's hand pulling open a large, bloody gash. See, Ex. 126. It is  
14 cumulative of other photographs that display the same wounds in a much less  
15 inflammatory way.

16 549. State's Exhibit 4I depicted a close up view of the decedent's mouth being  
17 held open by a medical examiner's hand. The photograph shows several broken  
18 teeth and a close up of several bloody gashes. See, Ex. 126. It was completely  
19 unnecessary for the jury to be exposed to such excessive amounts of blood and the  
20 state's purpose for introducing this Exhibit was clearly to inflame the passions of  
21 the jury and to prejudice Mr. Vanisi. The photograph was also cumulative as other,  
22 less inflammatory photographs displayed the same wounds.

23 550. These photographs had little if any probative value and were undoubtedly  
24 inflammatory and highly prejudicial ensuring that the jury would be unable to purge  
25 that memory while deliberating on each and every element of the crimes charged.  
26 These pictures were introduced solely to inflame the passions of the jury with  
27 gruesome details to distract them from the actual legal issues before them. The  
28



1 admission of this evidence deprived Mr. Vanisi of his right to due process and a fair  
2 and impartial trial in violation of the United States Constitution.

3 551. This claim is of obvious merit. The failure of appellate counsel and state  
4 post-conviction counsel to raise this issue on direct appeal deprived Mr. Vanisi of  
5 his state and federal due process and equal protection right to effective assistance of  
6 counsel on appeal and in post-conviction, as guaranteed by the Fifth, Sixth, Eighth  
7 and Fourteenth Amendments to the Constitution. Competent counsel would have  
8 raised and litigated this meritorious issue on direct appeal and in state post-  
9 conviction. There is no reasonable appellate strategy, within the range of reasonable  
10 competence, that would justify appellate counsel's failure in this regard. The state  
11 cannot show beyond a reasonable doubt that the use of these gruesome photographs  
12 was harmless. They affected the fundamental fairness of Mr. Vanisi's proceedings  
13 and prejudiced Mr. Vanisi.

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**SUPPORTING FACTS:**

555. Direct appellate counsel were ineffective for failing to raise the constitutional claims of trial court error during the voir dire proceedings, as these claims were apparent on the face of the record. Because of erroneous rulings by the trial court,

1 trial counsel were unable to question the venire regarding their ability to consider  
2 specific mitigation evidence that trial counsel intended to introduce during the  
3 penalty phase of the trial. See Claim Three (A). The trial court also erroneously  
4 denied defense motions that would have allowed biased jurors to be discovered  
5 during voir dire and ferreted out, such as a motion for additional peremptory  
6 challenges, a motion for individually sequestered voir dire, and a motion for an  
7 expanded juror questionnaire. Id. At the conclusion of voir dire, trial counsel made  
8 a record of the trial court's erroneous rulings and the adverse effect they had on trial  
9 counsel's ability to conduct an adequate voir dire, especially with respect to trial  
10 counsel's motion for a change of venue (09/21/99 TT 482) , but appellate counsel  
11 nonetheless ineffectively failed to raise these issues on direct appeal. Appellate  
12 counsel were also ineffective for failing to raise the claim that the trial court refused  
13 to remove jurors for cause who were clearly biased from a review of the record. See  
14 Claim Five (B).

15 556. Direct appeal counsel were also ineffective for failing to raise the issue set  
16 forth in Claim Seven. This claim was apparent on the face of the record. The  
17 mutilation aggravating factor is clearly unconstitutionally vague and overbroad and  
18 appellate counsel could not have had a strategic reason for failing to raise it.

19 557. Direct appeal counsel were ineffective for failing to raise the constitutional  
20 challenges to the jury instructions given in Mr. Vanisi's trial. See Claim Eight. It  
21 was evident from a reading of the instructions that the instructions were  
22 unconstitutional. Specifically, appellate counsel unreasonably failed to challenge  
23 the guilt phase jury instructions that failed to require the jury to find all of the mens  
24 rea elements of first-degree murder; the jury instructions failed to require that  
25 mitigation be outweighed by statutory aggravation beyond a reasonable doubt; the  
26 instruction unconstitutionally defining "mutilation"; the jury instructions

27 ///  
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1 improperly forbidding the jury from considering sympathy; the malice instructions  
2 that were unconstitutionally vague; and that the instructions were cumulatively  
3 erroneous.

4 558. Direct appeal counsel were ineffective for failing to raise the claim that the  
5 state violated the Vienna Convention on Consular Relations by failing to advise Mr.  
6 Vanisi of his consular rights. See Claim Nine.

7 559. Direct appeal counsel were ineffective for failing to raise the claim that Mr.  
8 Vanisi was unconstitutionally denied his right to have each and every element of  
9 the capital offense found to be established by a probable cause hearing in violation  
10 of Ring v. Arizona, 536 U.S. 584 (2002) and Apprendi v. New Jersey, 530 U.S. 466  
11 (2000). See Claim Thirteen.

12 560. Direct appeal counsel were ineffective for failing to raise the various  
13 instances of prosecutorial misconduct that were apparent from the record. See  
14 Claim Fourteen. Specifically, appellate counsel were ineffective for failing to raise  
15 constitutional challenges to the state's committing prosecutorial misconduct by  
16 repeatedly suggesting that the jury was aligned with the prosecution during its  
17 innocence/guilt phase deliberation; the state improperly argued the non-existence of  
18 a statutory aggravating factor; the state improperly argued to the jury that justice  
19 required the death penalty; and cumulative error due to prosecutorial misconduct.  
20

21 561. Direct appeal counsel were ineffective for failing to raise the claim that Mr.  
22 Vanisi's constitutional rights were violated by the improper use of a stun belt  
23 restraining device without conducting a constitutionally required hearing to  
24 determine the necessity of taking such measures. See Claim Fifteen.

25 562. Direct appellate counsel were ineffective for failing to raise the claim  
26 contained in Claim Eighteen, that the Nevada legislature's abolition of the defense  
27 of not guilty by reason of insanity violated the Due Process clauses of the Fifth and  
28

1 Fourteenth Amendments to the United States Constitution. In its order affirming the  
2 state district court's denial of his state petition for writ of habeas corpus, the  
3 Nevada Supreme Court held that this claim was procedurally barred because it  
4 could have been raised on direct appeal. Vanisi v. State, 2010 WL 3270985, \*2  
5 (Nev. Apr. 20, 2010) (unpublished order). Mr. Vanisi's direct appeal was decided  
6 by the Nevada Supreme Court on May 17, 2001. See Vanisi v. State, 117 Nev. 330,  
7 22 P.3d 1164 (2001). On July 24, 2001, the Nevada Supreme Court issued its  
8 opinion in Finger v. State, 117 Nev. 548, 27 P.3d 66 (2001), holding that the  
9 legislature's abolition of the defense of not guilty by reason of insanity was a  
10 violation of the federal constitutional right to due process. The United States  
11 Supreme Court did not deny Mr. Vanisi's petition for a writ of certiorari from his  
12 direct appeal until November 13, 2001. See Vanisi v. Nevada, 534 U.S. 1024  
13 (2001).

14 563. Mr. Vanisi's judgment, therefore, was not yet final at the time of the Finger  
15 decision, and appellate counsel should have moved the Nevada Supreme Court to  
16 vacate its decision and re-open his direct appeal for the purposes of allowing him to  
17 raise this intervening change in the law. By failing to do so, appellate counsel  
18 deprived Mr. Vanisi of the right to litigate this meritorious constitutional claim in  
19 the Nevada Supreme Court. There could be no reasonable appellate strategy,  
20 reasonably calculated to protect Mr. Vanisi's best interests, for appellate counsel to  
21 fail to raise this meritorious claim.

22 564. Further, appellate counsel ineffectively failed to raise the claim that the  
23 highly inflammatory and prejudicial improper victim impact testimony was  
24 unconstitutional, see Claim Sixteen, that Mr. Vanisi was tried in a highly prejudicial  
25 venue and that venue should therefore have been changed, see Claim Seventeen,  
26 that Mr. Vanisi's jury was more likely to find him guilty due to their being death  
27 qualified, see Claim Nineteen, that inflammatory gruesome photographs were  
28

1 introduced at his trial, see Claim Twenty-One, and the cumulative effect of these  
2 trial errors. See Claim Twenty-Three.

3 565. All claims of error alleged herein were apparent on the face of the record and  
4 therefore could have been raised by appellate counsel. Appellate counsel only  
5 raised three issues: (1) the Faretta error; (2) the erroneous reasonable doubt  
6 instruction; and (3) the excessiveness of the death penalty that was unfairly  
7 influenced by passion and prejudice.

8 566. There was no strategic reason within the range of reasonable competence that  
9 justified appellate counsel's failure to thoroughly review the record, and to assert  
10 and litigate these clearly meritorious claims on Mr. Vanisi's behalf. Had appellate  
11 counsel raised these issues, it is reasonably likely that the Nevada Supreme Court  
12 would have reversed Mr. Vanisi's conviction and ordered a new trial or, at a  
13 minimum, refined his sentence to a sentence less than death. A reasonable  
14 likelihood exists that but for prior counsel's deficient and prejudicial performance,  
15 Mr. Vanisi would have received a more favorable outcome at trial.  
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**CLAIM TWENTY-FOUR**

567. Mr. Vanisi's conviction and death sentence are invalid under the state and federal constitutional guarantees of due process, confrontation, effective counsel, a grand jury proceeding, a reliable sentence, a fair trial, freedom from self incrimination, equal protection, a public trial, a fair and impartial jury, freedom from cruel and unusual punishment, meaningful appellate review, compliance with international law due to the cumulative errors in the admission of evidence and instructions, gross misconduct by state officials and witnesses, and the systematic deprivation of Mr. Vanisi's right to the effective assistance of counsel. U.S. Const. art. VI, amends. V, VI, VIII & XIV; Vienna Convention on Consular Relations, Art. 36; Nev. Const. art. 1 §§ 1, 6 & 8, and art. 4 § 21.

**SUPPORTING FACTS:**

568. Each claim specified in this petition requires vacation of Mr. Vanisi's conviction and death sentence. Mr. Vanisi hereby incorporates each and every factual allegation contained in this petition as if fully set forth herein.

569. The cumulative effect of errors demonstrated in this petition was to deprive the proceedings against Mr. Vanisi of fundamental fairness and to result in a constitutionally unreliable sentence. Whether or not any individual error requires vacation of Mr. Vanisi's judgment or sentence, the totality of these multiple errors and omissions prejudiced Mr. Vanisi.

570. The constitutional claims in the instant petition must also be considered cumulatively with all of the other federal and state constitutional errors that the Nevada Supreme Court found on direct appeal and on appeal from denial of post-conviction relief. Taken cumulatively with one another, and with the constitutional violations alleged in the instant petition, these errors prejudiced Mr. Vanisi during the guilt and penalty phases of trial.

1 571. The state cannot show that the cumulative effect of these numerous  
2 constitutional errors was harmless beyond a reasonable doubt.



1 **PRAYER FOR RELIEF**

2 Mr. Vanisi has demonstrated he is entitled to relief. For the reasons stated  
3 above, Mr. Vanisi prays this Court:

- 4 1) issue a Writ of Habeas Corpus;  
5  
6 2) grant an evidentiary hearing;  
7  
8 3) vacate Mr. Vanisi's conviction; and  
9  
10 4) enter an order granting Mr. Vanisi a new trial on all issues.

11 Respectfully submitted,

12 FRANNY A. FORSMAN  
13 Federal Public Defender

14 /s/ C. Benjamin Scroggins  
15 C. BENJAMIN SCROGGINS  
16 Assistant Public Defender

17 /s/ Tiffani D. Hurst  
18 TIFFANI D. HURST  
19 Assistant Federal Public Defender

20 Attorneys for Petitioner  
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1 **AFFIRMATION**

2 The undersigned does hereby affirm pursuant to Nev. Rev. Stat. 239B.030  
3 that the preceding document does not contain the social security number of any  
4 person.

5 Dated this 4th day of May, 2011.  
6  
7  
8

9 /s/ C. Benjamin Scroggins

10 C. BENJAMIN SCROGGINS

11 Assistant Federal Public Defender

12 State Bar No. 11027C

13 411 E. Bonneville, Ste. 250

14 Las Vegas, Nevada 89101

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# Exhibit 1

# Exhibit 1

SVan1s12JDC03208

DA #159523

RPD 019114-98

IN THE JUSTICE COURT OF RENO TOWNSHIP  
IN AND FOR THE COUNTY OF WASHOE, STATE OF NEVADA

\*\*\*  
FILED

THE STATE OF NEVADA,

Plaintiff, JAN 14 12:22

RJC: 89,820

DEPT: 2

v.

DONALD J. JENKINS, CLERK

RENO JUSTICE COURT

BY: T. Bradley, DEPUTY

SIAOSI VANISI,

also known as

"PE",

also known as

"GEORGE",

Defendant.

CRIMINAL COMPLAINT

DAVID P. JENKINS of the County of Washoe, State of Nevada, verifies and declares upon information and belief and under penalty of perjury, that SIAOSI VANISI, also known as "PE", also known as "GEORGE", the defendant above-named, has committed the crimes of:

COUNT I. MURDER IN THE FIRST DEGREE, a violation of NRS 200.010 and NRS 200.030 and NRS 193.165, a felony, in the manner following, to wit:

That the said defendant on or about the 13th day of January, 1998, at Reno Township, within the County of Washoe, State of Nevada, did willfully, unlawfully, and with malice aforethought, deliberation, and premeditation, kill and murder SERGEANT GEORGE SULLIVAN, a human being, by means of repeated blows to the head with a hatchet, thereby inflicting mortal

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1 injuries upon the said SERGEANT GEORGE SULLIVAN from which he  
2 died on January 13, 1998; or

3 That the said defendant during the course of, and in  
4 furtherance of an armed robbery, did willfully and unlawfully  
5 murder SERGEANT GEORGE SULLIVAN in that the said defendant on or  
6 about January 12, 1998, did kill and murder SERGEANT GEORGE  
7 SULLIVAN, a human being, in the perpetration and/or the  
8 furtherance of an armed robbery at the University of Nevada,  
9 Reno, at or near the information kiosk, with the use of a deadly  
10 weapon, to wit, a hatchet; or

11 That the said defendant on or about January 13, 1998,  
12 did kill and murder SERGEANT GEORGE SULLIVAN, a human being, by  
13 lying in wait, in that the said defendant did watch, wait and  
14 conceal himself from SERGEANT GEORGE SULLIVAN, with the intention  
15 of killing SERGEANT GEORGE SULLIVAN, in that he hid and waited  
16 until SERGEANT GEORGE SULLIVAN completed a traffic stop, then  
17 observed and followed SERGEANT GEORGE SULLIVAN to a location  
18 where he was alone and then ambushed SERGEANT GEORGE SULLIVAN  
19 inflicting mortal injuries to his person from which he died on  
20 January 12, 1998.

21 COUNT II. ROBBERY WITH THE USE OF A DEADLY WEAPON, a  
22 violation of NRS 200.380 and NRS 193.165, a felony, in the manner  
23 following, to wit:

24 That the said defendant on or about the 13th day of  
25 January, 1998, at Reno Township, within the County of Washoe,  
26 State of Nevada, did willfully and unlawfully take personal

1 property, to wit: a Glock .45 caliber handgun; Motorola cellular  
2 phone; Glock "magazines"; a flashlight; and handcuffs from the  
3 person of SERGEANT GEORGE SULLIVAN, at or near the information  
4 kiosk located at the University of Nevada, Reno campus, Washoe  
5 County, Nevada, against his will, and by means of force or  
6 violence to his person and with the use of a hatchet which the  
7 said defendant used to strike SERGEANT GEORGE SULLIVAN repeatedly  
8 in the head and face.

9 COUNT III. ROBBERY WITH THE USE OF A FIREARM, a  
10 violation of NRS 200.380 and NRS 193.165, a felony, in the manner  
11 following, to wit:

12 That the said defendant on or about the 13th day of  
13 January, 1998, at Reno Township, within the County of Washoe,  
14 State of Nevada, did willfully and unlawfully take personal  
15 property, to wit: U.S. currency from the person of the clerk at  
16 said establishment, at the 7-11 located at 710 Baring Boulevard,  
17 Washoe County, Nevada, against his will, and by means of force or  
18 violence or fear of immediate or future injury to his person and  
19 with the use of a large caliber handgun which the said defendant  
20 displayed to the victim and demanded money.

21 COUNT IV. ROBBERY WITH THE USE OF A FIREARM, a  
22 violation of NRS 200.380 and NRS 193.165, a felony, in the manner  
23 following, to wit:

24 That the said defendant on or about the 13th day of  
25 January, 1998, at Reno Township, within the County of Washoe,  
26 State of Nevada, did willfully and unlawfully take personal



1 property, to wit: U.S. currency from the person of the clerk at  
 2 said establishment, at the Jackson Food Mart located at 2595  
 3 Clearacre Lane, Washoe County, Nevada, against his will, and by  
 4 means of force or violence or fear of immediate or future injury  
 5 to his person and with the use of a large caliber handgun which  
 6 the said defendant displayed to the victim and demanded money.

7  
 8 DATED this 14<sup>th</sup> day of JANUARY, 1998.

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24 Restitution:  
 25 Custody:  
 26 Bailed:  
 Warrant: X  
 01145000

District Court Dept:  
 District Attorney:  
 Defense Attorney:  
 Bail NO BAIL

# Exhibit 2

# Exhibit 2

DA #159523

RPD 019114-98

CLERK OF DISTRICT COURT  
CLERK'S OFFICE

IN THE JUSTICE COURT OF RENO TOWNSHIP  
IN AND FOR THE COUNTY OF WASHOE, STATE OF NEVADA

\* \* \*

THE STATE OF NEVADA,

FILED

Plaintiff,

RJC: 89,820

'98 FEB -3 P1:58

DEPT: ED

v.

SIAOSI VANISI,  
also known as  
"PE",  
also known as  
"GEORGE",

Defendant.

AMENDED  
CRIMINAL COMPLAINT

DAVID L. STANTON of the County of Washoe, State of Nevada, verifies and declares upon information and belief and under penalty of perjury, that SIAOSI VANISI, also known as "PE", also known as "GEORGE", the defendant above-named, has committed the crimes of:

COUNT I. MURDER IN THE FIRST DEGREE, a violation of NRS 200.010 and NRS 200.030 and NRS 193.165, a felony, in the manner following, to wit:

That the said defendant on or about the 13th day of January, 1998, at Reno Township, within the County of Washoe, State of Nevada, did willfully, unlawfully, and with malice aforethought, deliberation, and premeditation, kill and murder SERGEANT GEORGE SULLIVAN, a human being, by means of repeated blows to the head and face with a hatchet, and/or other implement(s), and/or other blunt force trauma inflicted to the

1 head and upper torso thereby inflicting mortal injuries upon the  
2 said SERGEANT GEORGE SULLIVAN from which he died on January 13,  
3 1998; or

4 That the said defendant during the course of, and in  
5 furtherance of an armed robbery, did willfully and unlawfully  
6 murder SERGEANT GEORGE SULLIVAN in that the said defendant on or  
7 about January 12, 1998, did kill and murder SERGEANT GEORGE  
8 SULLIVAN, a human being, in the perpetration and/or the  
9 furtherance of an armed robbery at the University of Nevada,  
10 Reno, at or near the information kiosk, with the use of a deadly  
11 weapon, to wit, a hatchet, and/or other implement(s); or

12 That the said defendant on or about January 13, 1998,  
13 did kill and murder SERGEANT GEORGE SULLIVAN, a human being, by  
14 lying in wait, in that the said defendant did watch, wait and  
15 conceal himself from SERGEANT GEORGE SULLIVAN, with the intention  
16 of killing SERGEANT GEORGE SULLIVAN, in that he hid and waited  
17 until SERGEANT GEORGE SULLIVAN completed a traffic stop, then  
18 observed and followed SERGEANT GEORGE SULLIVAN to a location  
19 where he was alone and then ambushed SERGEANT GEORGE SULLIVAN  
20 inflicting mortal injuries to his person from which he died on  
21 January 12, 1998.

22 COUNT II. ROBBERY WITH THE USE OF A DEADLY WEAPON, a  
23 violation of NRS 200.380 and NRS 193.165, a felony, in the manner  
24 following, to wit:

25 That the said defendant on or about the 13th day of  
26 January, 1998, at Reno Township, within the County of Washoe,

1 State of Nevada, did willfully and unlawfully take personal  
2 property, to wit: a Glock .45 caliber handgun; Glock  
3 "magazines"; a flashlight; and handcuffs from the person of  
4 SERGEANT GEORGE SULLIVAN, at or near the information kiosk  
5 located at the University of Nevada, Reno campus, Washoe County,  
6 Nevada, against his will, and by means of force or violence to  
7 his person and with the use of a hatchet, and/or other  
8 implement(s), which the said defendant used to strike SERGEANT  
9 GEORGE SULLIVAN repeatedly in the head and face, and/or other  
10 blunt force trauma inflicted to the head and upper torso.

11 COUNT III. ROBBERY WITH THE USE OF A FIREARM, a  
12 violation of NRS 200.380 and NRS 193.165, a felony, in the manner  
13 following, to wit:

14 That the said defendant on or about the 13th day of  
15 January, 1998, at Reno Township, within the County of Washoe,  
16 State of Nevada, did willfully and unlawfully take personal  
17 property, to wit: U.S. currency from the person of PATRICIA  
18 MISITO, the clerk at the 7-11 Store located at 710 Baring  
19 Boulevard, Washoe County, Nevada, against her will, and by means  
20 of force or violence or fear of immediate or future injury to her  
21 person and with the use of a large caliber handgun which the said  
22 defendant displayed to the victim and demanded money.

23 COUNT IV. ROBBERY WITH THE USE OF A FIREARM, a  
24 violation of NRS 200.380 and NRS 193.165, a felony, in the manner  
25 following, to wit:

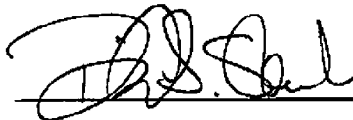
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1 That the said defendant on or about the 13th day of  
2 January, 1998, at Reno Township, within the County of Washoe,  
3 State of Nevada, did willfully and unlawfully take personal  
4 property, to wit: U.S. currency from DIANA LYNN SHOUSE, the  
5 clerk at said establishment, at the Jackson Food Mart located at  
6 2595 Clearacre Lane, Washoe County, Nevada, against her will, and  
7 by means of force or violence or fear of immediate or future  
8 injury to her person and with the use of a large caliber handgun  
9 which the said defendant displayed to the victim and demanded  
10 money.

11 COUNT V. GRAND LARCENY, a violation of NRS 205.220, a  
12 felony, in the manner following, to wit:

13 That the said defendant on or about the 13th day of  
14 January, 1998, at Reno Township, within the County of Washoe,  
15 State of Nevada, did willfully and unlawfully steal, take and  
16 drive away the personal property of LOUIS D. HILL, to wit: a  
17 certain black four door 1993 Toyota Camry bearing Nevada license  
18 plate 029 HPY, with the intent then and there to permanently  
19 deprive the owner thereof.

20  
21 DATED this 3<sup>rd</sup> day of February, 1998.

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23 \_\_\_\_\_

24 Restitution:  
25 Custody:  
26 Bailed:  
Warrant:  
01145000

District Court Dept: 4  
District Att: GAMMICK/STANTON  
Defense Att:  
Bail No Bail

# Exhibit 3

# Exhibit 3

SVAN1S12JDC03462

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JUDICIAL CLERK  
BY *[Signature]*  
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DA #159523

RPD 019114-98

Case No. CR98-0516

Dept. No. 4

IN THE SECOND JUDICIAL DISTRICT COURT OF THE STATE OF NEVADA,  
IN AND FOR THE COUNTY OF WASHOE

\* \* \*

THE STATE OF NEVADA,

Plaintiff,

v.

INFORMATION

SIAOSI VANISI,  
also known as  
"PE",  
also known as  
"GEORGE",

Defendant.

RICHARD A. GAMMICK, District Attorney within and for  
the County of Washoe, State of Nevada, in the name and by the  
authority of the State of Nevada, informs the above entitled  
Court that SIAOSI VANISI, also known as "PE", also known as  
"GEORGE", the defendant above named, has committed the crimes of:  
F720 COUNT I. MURDER IN THE FIRST DEGREE, a violation of  
NRS 200.010 and NRS 200.030 and NRS 193.165, a felony, in the  
manner following:

That the said defendant on the 13th day of January A.D.  
1998, or thereabout, and before the filing of this Information,



1 at and within the County of Washoe, State of Nevada, did  
2 willfully, unlawfully, and with malice aforethought,  
3 deliberation, and premeditation, kill and murder SERGEANT GEORGE  
4 SULLIVAN, a human being, by means of repeated blows to the head  
5 and face with a hatchet, and/or other implement(s), and/or other  
6 blunt force trauma inflicted to the head and upper torso thereby  
7 inflicting mortal injuries upon the said SERGEANT GEORGE SULLIVAN  
8 from which he died on January 13, 1998; or

9 That the said defendant during the course of, and in  
10 furtherance of an armed robbery, did willfully and unlawfully  
11 murder SERGEANT GEORGE SULLIVAN in that the said defendant on or  
12 about January 13, 1998, did kill and murder SERGEANT GEORGE  
13 SULLIVAN, a human being, in the perpetration and/or the  
14 furtherance of an armed robbery at the University of Nevada,  
15 Reno, at or near the information kiosk, with the use of a deadly  
16 weapon, to wit, a hatchet, and/or other implement(s); or

17 That the said defendant on or about January 13, 1998,  
18 did kill and murder SERGEANT GEORGE SULLIVAN, a human being, by  
19 lying in wait, in that the said defendant did watch, wait and  
20 conceal himself from SERGEANT GEORGE SULLIVAN, with the intention  
21 of killing SERGEANT GEORGE SULLIVAN, in that he hid and waited  
22 until SERGEANT GEORGE SULLIVAN completed a traffic stop, then  
23 observed and followed SERGEANT GEORGE SULLIVAN to a location  
24 where he was alone and then ambushed SERGEANT GEORGE SULLIVAN  
25 inflicting mortal injuries to his person from which he died on  
26 January 13, 1998.

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F960

COUNT II. ROBBERY WITH THE USE OF A DEADLY WEAPON, a violation of NRS 200.380 and NRS 193.165, a felony, in the manner following:

That the said defendant on the 13th day of January A.D. 1998, or thereabout, and before the filing of this Information, at and within the County of Washoe, State of Nevada, did willfully and unlawfully take personal property, to wit: a Glock .45 caliber handgun; Glock "magazines"; a flashlight; and handcuffs from the person of SERGEANT GEORGE SULLIVAN, at or near the information kiosk located at the University of Nevada, Reno campus, Washoe County, Nevada, against his will, and by means of force or violence to his person and with the use of a hatchet, and/or other implement(s), which the said defendant used to strike SERGEANT GEORGE SULLIVAN repeatedly in the head and face, and/or other blunt force trauma inflicted to the head and upper torso.

F960

COUNT III. ROBBERY WITH THE USE OF A FIREARM, a violation of NRS 200.380 and NRS 193.165, a felony, in the manner following:

That the said defendant on the 13th day of January A.D. 1998, or thereabout, and before the filing of this Information, at and within the County of Washoe, State of Nevada, did willfully and unlawfully take personal property, to wit: U.S. currency from the person of PATRICIA MISITO, the clerk at the 7-11 Store located at 710 Baring Boulevard, Washoe County, Nevada, against her will, and by means of force or violence or fear of

1 immediate or future injury to her person and with the use of a  
2 large caliber handgun which the said defendant displayed to the  
3 victim and demanded money.

4 **F 960** COUNT IV. ROBBERY WITH THE USE OF A FIREARM, a  
5 violation of NRS 200.380 and NRS 193.165, a felony, in the manner  
6 following:

7 That the said defendant on the 13th day of January A.D.  
8 1998, or thereabout, and before the filing of this Information,  
9 at and within the County of Washoe, State of Nevada, did  
10 willfully and unlawfully take personal property, to wit: U.S.  
11 currency from DIANA LYNN SHOUSE, the clerk at said establishment,  
12 at the Jackson Food Mart located at 2595 Clearacre Lane, Washoe  
13 County, Nevada, against her will, and by means of force or  
14 violence or fear of immediate or future injury to her person and  
15 with the use of a large caliber handgun which the said defendant  
16 displayed to the victim and demanded money.

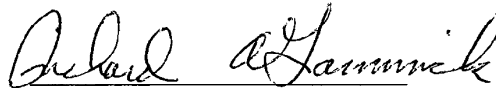
17 **F 520** COUNT V. GRAND LARCENY, a violation of NRS 205.220, a  
18 felony, in the manner following:

19 That the said defendant on the 13th day of January A.D.  
20 1998, or thereabout, and before the filing of this Information,  
21 at and within the County of Washoe, State of Nevada, did  
22 willfully and unlawfully steal, take and drive away the personal  
23 property of LOUIS D. HILL, to wit: a certain black four door  
24 1993 Toyota Camry bearing Nevada license plate 029 HPY, with the  
25 intent then and there to permanently deprive the owner thereof.

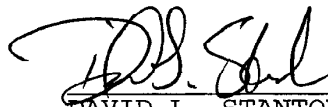
26 ///

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1 All of which is contrary to the form of the Statute in  
2 such case made and provided, and against the peace and dignity of  
3 the State of Nevada.



RICHARD A. GAMMICK  
District Attorney  
Washoe County, Nevada



DAVID L. STANTON  
Chief Deputy District Attorney

1           The following are the names and addresses of such  
2 witnesses as are known to me at the time of the filing of the  
3 within Information:  
4

5 SALT LAKE COUNTY SHERIFF'S DEPARTMENT

6 DETECTIVE BRENT ADAMSON  
7 INVESTIGATOR JEFF ITAMI  
8 GARY LUCIER  
9 JERRY TOWNSEND

10 RENO POLICE DEPARTMENT

11 DETECTIVE GREG BALLEW  
12 DETECTIVE JOE DEPCZYNSKI  
13 DETECTIVE RON DREHER  
14 DETECTIVE JOHN DOUGLAS  
15 DETECTIVE JIM DUNCAN  
16 DETECTIVE DAVE JENKINS  
17 DETECTIVE MOHAMAD RAFAQAT

18 UNIVERSITY OF NEVADA POLICE DEPARTMENT

19 SERGEANT LOUIS LEPERA  
20 OFFICER CARL SMITH

21 WASHOE COUNTY SHERIFF'S OFFICE CRIME LAB

22 TONI LEAL  
23 WILLIE STEVENSON

24 SCOTT ALBIN, 1555 Sky Valley Drive, Apartment C-104, Reno, Nevada

25 CAROL DIANA ARROYO, 5785 Conti Circle, Sun Valley, Nevada

26 MATHEW DONALD BANTA, Nye Hall, Room #863, Reno, Nevada

KALEB LEE BARTLEHEIM, 5034 Pleasant View Drive, Sparks, Nevada

LEMONT BONNER, University Inn, Room #729, Reno, Nevada


GUSTAVO MARTIN CERON, 943 Bell Street, Apartment #2, Reno, Nevada

ANDREW GUY "DREW" CIOCCA, 1316 Buena Vista Avenue, Apartment B,  
Reno, Nevada

ELLEN G.I. CLARK, MD, Forensic Pathologist

1 PRISCILLA LUPE ENDEMANN, 930 Manhattan, Apartment #3, Reno,  
Nevada  
2 JESSIE JAMES GARLAND, JR., 805 Kuenzli, Apartment #225, Reno,  
3 Nevada  
4 CHAITRA MICHELLE HANKE, 2860 Brittania Curt, Reno, Nevada  
5 LOUIS D. HILL, 6075 Bankside Drive, Reno, Nevada  
6 NATHAN DOUGLAS HUNT, 345 Ralston, Apartment G, Reno, Nevada  
7 MAKALETA KAVAPALU  
8 DAVID KINIKINI, 1665 South Riverside Drive, Salt Lake City, Utah  
9 VAINGA IMONA KINIKINI, 1665 South Riverside Drive, Salt Lake  
City, Utah  
10 NIA KOFUTUA  
11 GABRIEL PHILLIP KNOX, 835 Evans Avenue (S.A.E. Fraternity House,  
12 Reno, Nevada  
13 CORINA SALOTE LOUIS, 1098 North Rock Boulevard, Apartment A,  
Sparks, Nevada  
14 MARIA LOSA LOUIS, 1098 North Rock Boulevard, Apartment A, Sparks,  
15 Nevada  
16 DANIELLE MALLEY  
17 BRENDA MARTINEZ, 720 Robinhood Drive, #218, Reno, Nevada  
18 MELE MAVENI  
19 PATRICIA MARY MISITO, 472 Emerson Way, Sparks, Nevada  
20 MANAMOUI PEAUA, 1645 Sterling Way, Reno, Nevada  
21 RENEE NANCY PEAUA, 1645 Sterling Way, Reno, Nevada  
22 SHOMARI KAMU ROBERTS, 1966 Bishop Street, Reno, Nevada  
23 DIANA LYNN SHOUSE, 7900 North Virginia Street, #121, Reno, Nevada  
24 GAR SOWLE  
25 SATEKI TAUKIEUVEA, 230 Booth Street, Apartment A, Reno, Nevada  
26 ///

1 METUISELA TAUVELI, 1098 Rock Boulevard, Apartment A, Sparks,  
Nevada or 280 East Eighth Avenue, Sun Valley, Nevada  
2 NAMOA STEPHANOTIS TUPOU, 2712 Star Meadows Loop, Reno, Nevada  
3 SIVAKUMAR UTHIRAM, 830 North Center Street, #11, Reno, Nevada  
4 RONALD THOMAS VIETTI  
5 DARLENE GAY WILSON, 850 North Virginia Street, #106, Reno, Nevada  
6 JACK GRANT WOOD, 810 'H' Street, Sparks, Nevada  
7 JULIE MICHELLE WOOD, 810 'H' Street, Sparks, Nevada  
8 JAMES BYONG YIM, 1647 Wedekind Road, #23C, Reno, Nevada  
9

16   
17 RICHARD A. GAMMICK  
18 District Attorney

20   
21 DAVID L. STANTON  
22 Chief Deputy District Attorney

25 PCN 88877081

26 02251114

# Exhibit 5

# Exhibit 5



**Declaration of Mark J. S. Heath, M.D.**

I, Mark J.S. Heath, M.D., hereby declare as follows:

1. I am an Assistant Professor of Clinical Anesthesiology at Columbia University in New York City. I received my Medical Doctorate degree from the University of North Carolina at Chapel Hill in 1986 and completed residency and fellowship training in Anesthesiology in 1992 at Columbia University Medical Center. I am Board Certified in Anesthesiology, and am licensed to practice Medicine in New York State. My work consists of approximately equal parts of performing clinical anesthesiology, teaching residents, fellows, and medical students, and managing a neuroscience laboratory. As a result of my training and research I am familiar and proficient with the use and pharmacology of the chemicals used to perform lethal injection. I am qualified to do animal research at Columbia University and am familiar with the American Veterinary Medical Association's guidelines.
2. Over the past several years, as a result of concerns about the mechanics of lethal injection as practiced in the United States, I have performed many hundreds of hours of research into the techniques that are used during this procedure. I have testified as an expert medical witness in courts in Maryland, Georgia, Tennessee, Kentucky, Virginia, and Louisiana in the following actions: *Baker v. Saar*, No. WDQ-05-3207 (D. Md.); *Evans v. Saar*, No. 1:06-CV-00149-BEL, (D. Md.); *Reid v. Johnson*, No. 3:03cv1039 (E.D. Va.); *Abdur Rahman v. Bredesen*, No. 02-2236-III (Davidson County Chancery Ct., Tenn.); *State v. Michael Wayne Nance*, 95-B-2461-4 (Ga. Superior Ct.); *Ralph Baze & Thomas Bowling v. Rees*, 04-CI-01094 (Franklin County Circuit Ct., Ky.); *Taylor v. Crawford*, 05-4173-CV-C-FJG (W.D. Mo.); and *State v. Nathaniel Code*, No.138860, (1st Judicial D. Ct. of LA for Caddo Parish 2003). I have filed affidavits that have

been reviewed by courts in the above states and also in California, Pennsylvania, New York, Alabama, North Carolina, South Carolina, Ohio, Oklahoma, Texas, Missouri, and by the United States Supreme Court.

3. During court proceedings, I have heard testimony from prison wardens who are responsible for conducting executions by lethal injection. I have testified before the Nebraska Senate Judiciary Committee regarding proposed legislation to adopt lethal injection. I have testified before the Pennsylvania Senate Judiciary Committee regarding proposed legislation to prohibit the use of pancuronium and the other neuromuscular blockers in Pennsylvania's lethal injection protocol. My research regarding lethal injection has involved both extensive conversations with recognized experts in the field of lethal injection, toxicology, and forensic pathology and the exchange of personal correspondence with the individuals responsible for introducing lethal injection as a method of execution in Oklahoma (the first state to formulate the procedure) and in the United States.

4. My qualifications are further detailed in my curriculum vitae, a copy of which is attached hereto as Exhibit A and incorporated by reference as if fully rewritten herein.

5. I have been asked by counsel for Edward Lee Beets to review the procedures concerning lethal injection currently in place in Nevada to assess whether there is a risk of the inmate experiencing pain and suffering while the lethal injection is administered. I hold all opinions expressed in this Declaration to a reasonable degree of medical certainty, except as specifically noted at the end of paragraph 35, where I make a speculative comment.

6. I have reviewed the Nevada Department of Corrections' "Confidential Execution Manual."

7. In addition, I have reviewed numerous documents, including execution logs, for California's executions. Comparable information about executions by lethal injection in Nevada is unavailable. However, Nevada's lethal injection protocol is similar to that used in California prior to the proceedings in *Morales v. Hickman*.

8 I have also reviewed Nev. Rev. Stat. § 638.005 and N.A.C. §§ 638.450 et. seq. which pertain to the training for those performing euthanasia on animals, as well as statutes pertaining to euthanasia of animals from the states of: California, Florida, Georgia, Maine, Maryland, Massachusetts, New Jersey, New York, Oklahoma, Tennessee, Texas, Connecticut, Delaware, Illinois, Kansas, Kentucky, Louisiana, Missouri, Rhode Island and South Carolina. I have also reviewed the 2000 Report of the Panel on Euthanasia of the American Veterinary Medical Association, attached hereto as Exhibit B, the American Society of Anesthesiologist's Practice Advisory for Intraoperative Awareness and Brain Function Monitoring, attached hereto as Exhibit C, and the American Society of Anesthesiologist's Standards for Basic Anesthetic Monitoring, attached hereto as Exhibit D.

9. Based upon my review of this material and my knowledge of and experience in the field of anesthesiology, I have formed several conclusions with respect to the protocol of the Nevada Department of Corrections ("NDOC") for carrying out lethal injections. These conclusions arise both from the details disclosed in the materials I have reviewed and from medically relevant, logical inferences drawn from the omission of details in those materials (e.g., details regarding the training of the personnel involved; details of all of the medical equipment used; and details of the precise methods by which the personnel involved use the equipment to carry out an execution by lethal injection).

**A. NDOC's Lethal Injection Protocol**

10. NDOC's lethal injection protocol calls for the administration of 5 grams of sodium thiopental, 20 milligrams of pancuronium bromide (Pavulon), and 160 milliequivalents of potassium chloride. Broadly speaking, the sodium thiopental is intended to serve as an anesthetic, rendering the inmate unconscious for the duration of the execution. Five grams of sodium thiopental is a massive, and potentially lethal, dose. The pancuronium bromide paralyzes the inmate's voluntary muscles, including those of his chest and diaphragm. Pancuronium is not an anesthetic or sedative drug, and it does not affect consciousness. Potassium chloride is a salt solution that, when rapidly administered in high concentrations, induces cardiac arrest.

11. Although the successful delivery into the circulation of 5 grams of sodium thiopental and 20 milligrams of pancuronium would be lethal, it is important to understand that the lethality of sodium thiopental and pancuronium is due to respiratory arrest, which takes several minutes to ensue and does not typically occur prior to the administration of potassium. In the execution sequence, before death is caused by respiratory arrest from sodium thiopental and pancuronium, death is caused by cardiac arrest caused by potassium. I base this opinion, that the potassium and not the pancuronium or sodium thiopental is responsible for the death of prisoners during lethal injection, on the following:

- A) Review of records from EKGs from lethal injection procedures conducted in other states. During lethal injection, cardiac activity consistent with generating perfusion persists through the administration of sodium thiopental and pancuronium and only stops after potassium has been administered. The relatively sudden cessation of organized EKG activity is not consistent with a cessation of circulation due to administration of sodium thiopental and/or pancuronium and is consistent with cessation of

circulation after the administration of a large dose of potassium chloride.

- B) Properties of Sodium Thiopental and Pancuronium. Sodium thiopental and pancuronium exert their effects by interacting with molecular targets in the nervous system and on muscle cells in a manner that induces unconsciousness and stops breathing. Sodium thiopental and pancuronium, unlike other chemicals such as cyanide, do not kill cells or tissues, and are useful to clinicians precisely because they do not kill or harm cells or tissues. The reason that sodium thiopental and pancuronium can cause death is that they cause the prisoner to stop breathing. Failure to breathe will result in brain damage, brain death, and cardiac arrest as the level of oxygen in the blood declines over time. These processes take a varying amount of time, depending on many factors. Physicians generally use four minutes of not breathing as the approximate benchmark time after which irreversible brain damage from lack of oxygen occurs, and death typically occurs some number of minutes after the onset of brain damage. It is worth noting, however, that this general figure of four minutes is often used in the context of cardiac arrest, in which there is no circulation of blood through the brain. If some level of blood circulation persists, it is very likely that brain damage and brain death would take longer than four minutes.

In the context of lethal injection, sodium thiopental and pancuronium, if successfully delivered into the circulation in large doses, would indeed each be lethal, because they would stop the inmate's breathing. However, as described above, in execution by lethal injection as

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practiced by Nevada and other states the administration of potassium and death precede any cardiac arrest that would be caused by sodium thiopental and pancuronium.

12. Intravenous injection of concentrated potassium chloride solution causes excruciating pain. The vessel walls of veins are richly supplied with sensory nerve fibers that are highly sensitive to potassium ions. The intravenous administration of concentrated potassium in doses intended to cause death therefore would be extraordinarily painful. NDOC's selection of potassium chloride to cause cardiac arrest needlessly increases the risk that a prisoner will experience excruciating pain prior to execution. There exist, however, alternative chemicals that do not activate the nerves in the vessel walls of the veins in the way that potassium chloride does. Despite the fact that the statute authorizing lethal injection in Nevada does not specify or require the use of potassium, NDOC has failed to choose a chemical that would cause death in a painless manner.

13. Thus, NDOC chose the means of causing death by choosing a medication (potassium chloride) that causes extreme pain upon administration, instead of selecting available, equally effective yet essentially painless medications for stopping the heart. In so doing, NDOC has taken on the responsibility of ensuring, through all reasonable and feasible steps, that the prisoner is sufficiently anesthetized and cannot experience the pain of potassium chloride injection.

14. The provision of anesthesia has become a mandatory standard of care whenever a patient is to be subjected to a painful procedure. Throughout the civilized world, the United States, and Nevada, whenever a patient is required to undergo a painful procedure, it is the standard of care to provide some form of anesthesia. Circumstances arise in which prisoners in Nevada require surgery, and in many instances the surgery requires the provision of general

anesthesia. In these circumstances general anesthesia is provided, and it is provided by an individual with specific training and qualifications in the field of anesthesiology. It is critical to understand that the great majority of physicians and nurses and other health care professionals do not possess the requisite training, skills, experience, and credentials to provide general anesthesia. It would be unconscionable to forcibly subject any person, including a prisoner in Nevada, to a planned and anticipated highly painful procedure without first providing an appropriate anesthetic, and it would be unconscionable to allow personnel who are not properly trained in the field of anesthesiology to attempt to provide or supervise this anesthetic care.

15. As a living person who is about to be subjected to the excruciating pain of potassium injection, it is imperative that all prisoners undergoing lethal injection be provided with adequate anesthesia. This imperative is of the same order as the imperative to provide adequate anesthesia for any Nevada prisoner requiring general anesthesia (or any type of anesthesia) before undergoing painful surgery. Given that the injection of potassium is a scheduled and premeditated event that is known without any doubt to be extraordinarily painful, it would be unconscionable and barbaric for potassium injection to take place without the provision of sufficient general anesthesia to ensure that the prisoner is rendered and maintained unconscious throughout the procedure, and it would be unconscionable to allow personnel who are not properly trained in the field of anesthesiology to attempt to provide or supervise this anesthetic care.

**B. Failure to Adhere to a Medical Standard of Care in Administering Anesthesia**

16. It is my opinion to a reasonable degree of medical certainty that the lethal injection procedures selected for use in Nevada and used elsewhere subject the prisoner to an increased and unnecessary risk of experiencing excruciating pain in the course of execution.

Because of the potential for an excruciating death created by the use of potassium chloride, it is necessary to induce and maintain an appropriate and deep plane of anesthesia. The circumstances and environment under which anesthesia is to be induced and maintained according to NDOC's execution manual create, needlessly, a significant risk that inmates will suffer the pain that accompanies the injection of potassium chloride.

17. Presumably because of the excruciating pain evoked by potassium, lethal injection protocols like Nevada's plan for the provision of general anesthesia by the inclusion of sodium thiopental. When successfully delivered into the circulation in sufficient quantities, sodium thiopental causes sufficient depression of the nervous system to permit excruciatingly painful procedures to be performed without causing discomfort or distress. Failure to successfully deliver into the circulation a sufficient dose of sodium thiopental would result in a failure to achieve adequate anesthetic depth and thus failure to block the excruciating pain of potassium administration.

18. NDOC's procedures do not comply with the medical standard of care for inducing and maintaining anesthesia prior to and during a painful procedure. Likewise, NDOC's procedures are not compliant with the guidelines set forth by the American Veterinary Medical Association for the euthanasia of animals. Further, NDOC has made insufficient preparation for the real possibility, encountered in many other jurisdictions, and planned for in those jurisdictions, that peripheral IV access cannot be successfully established.

#### 1. The Dangers of Using Sodium Thiopental as an Anesthetic

19. A major concern I have based on what I know about NDOC's lethal injection protocol relates to the use of sodium thiopental. Sodium thiopental is an ultrashort-acting barbiturate with a relatively short shelf life in liquid form. Sodium thiopental is distributed in



powder form to increase its shelf life; it must be mixed into a liquid solution by trained personnel before it can be injected.

20. When anesthesiologists use sodium thiopental, we do so for the purposes of temporarily anesthetizing patients for sufficient time to intubate the trachea and institute mechanical support of ventilation and respiration. Once this has been achieved, additional drugs are administered to maintain a "surgical depth" or "surgical plane" of anesthesia (i.e., a level of anesthesia deep enough to ensure that a surgical patient feels no pain and is unconscious). The medical utility of sodium thiopental derives from its ultrashort-acting properties: if unanticipated obstacles hinder or prevent successful intubation, patients will likely quickly regain consciousness and resume ventilation and respiration on their own.

21. The benefits of sodium thiopental in the operating room engender serious risks in the execution chamber. Although the full five grams of sodium thiopental, if properly administered into the prisoner's bloodstream, would be more than sufficient to cause unconsciousness and, eventually, death, if no resuscitation efforts were made, my research into executions by lethal injection strongly indicates that executions have occurred where the full dose of sodium thiopental listed in the protocol was not fully and properly administered. If an inmate does not receive the full dose of sodium thiopental because of errors or problems in administering the drug, the inmate might not be rendered unconscious and unable to feel pain, or alternatively might, because of the short-acting nature of sodium thiopental, regain consciousness during the execution.

22. Thus, the concerns raised in this affidavit apply regardless of the size of the dose of sodium thiopental that is prescribed under the protocol. The level of anesthesia, if any, achieved in each individual inmate depends on the amount that is successfully administered, although other factors such as the inmate's weight and sensitivity/resistance to barbiturates are

also relevant. Many foreseeable situations exist in which human or technical errors could result in the failure to successfully administer the intended dose. NDOC's execution manual both fosters these potential problems and fails to provide adequate instruction for preventing or rectifying these situations, and it does these things needlessly and without legitimate reason. Examples of problems that could prevent proper administration of sodium thiopental include, but are not limited to, the following:

- a) Errors in Preparation. Sodium thiopental is delivered in powdered form and must be mixed into an aqueous solution prior to administration. This preparation requires the correct application of pharmaceutical knowledge and familiarity with terminology and abbreviations. Calculations are also required, particularly if the protocol requires the use of a concentration of drug that differs from that which is normally used.
- b) Error in Labeling of Syringes. NDOC's execution manual states the syringes will be "clearly marked," but does not specify a standard order in which the syringes will be prepared or how they will be labeled. This could cause confusion in creating the syringes, leading to mislabeling, which, depending on the labeling system used, might not be detected and corrected later in the process.
- c) Error in Selecting the Correct Syringe during the sequence of administration.
- d) Error in Correctly Injecting the Drug into the Intravenous Line. Nevada's execution manual fails to identify the person(s) responsible for injecting the lethal drugs and further fails to identify their qualifications.
- e) The IV Tubing May Leak. An "IV setup" consists of multiple components that are assembled by hand prior to use. If, as is the practice in Nevada, the personnel who are

injecting the drugs are not at the bedside but are instead in a different room or part of the room, multiple IV extension sets need to be inserted between the inmate and the administration site. Any of these connections may loosen and leak. In clinical practice, it is important to maintain visual surveillance of the full extent of IV tubing so that such leaks may be detected. Nevada's practice, by which the executioner(s) is in a separate room with no visual surveillance precludes detection of any leak that may occur.

f) Incorrect Insertion of the Catheter. If the catheter is not properly placed in a vein, the sodium thiopental will enter the tissue surrounding the vein but will not be delivered to the central nervous system and will not render the inmate unconscious. This condition, known as infiltration, occurs with regularity in the clinical setting. Recognition of infiltration requires continued surveillance of the IV site during the injection, and that surveillance should be performed by the individual who is performing the injection so as to permit correlation between visual observation and tactile feedback from the plunger of the syringe.

g) Migration of the Catheter. Even if properly inserted, the catheter tip may move or migrate, so that at the time of injection it is not within the vein. This would result in infiltration, and therefore a failure to deliver the drug to the inmate's circulation and failure to render the inmate unconscious.

h) Perforation or Rupture or Leakage of the Vein. During the insertion of the catheter, the wall of the vein can be perforated or weakened, so that during the injection some or all of the drug leaves the vein and enters the surrounding tissue. The likelihood of rupture occurring is increased if too much pressure is applied to the plunger of the syringe during injection, because a high pressure injection results in a high velocity jet of drug in the vein that can penetrate or tear the vessel wall.

i) Excessive Pressure on the Syringe Plunger. Even without damage or perforation of the vein during insertion of the catheter, excessive pressure on the syringe plunger during injection can result in tearing, rupture, and leakage of the vein due to the high velocity jet that exits the tip of the catheter. Should this occur, the drug would not enter the circulation and would therefore fail to render the inmate unconscious.

j) Securing the Catheter. After insertion, catheters must be properly secured by the use of tape, adhesive material, or suture. Movement by the inmate, even if restrained by straps, or traction on the IV tubing may result in the dislodging of the catheter.

k) Failure to Properly Administer Flush Solutions Between Injections of Drugs. Solutions of paralytic agents such as pancuronium cause sodium thiopental to precipitate out of solution on contact, thereby interfering with the delivery of the drug to the inmate and to the central nervous system. NDOC's manual does not specify if, how, or when the lines will be flushed.

l) Failure to Properly Loosen or Remove the Tourniquet from the Arm or Leg after placement of the IV catheter will delay or inhibit the delivery of the drugs by the circulation to the central nervous system. This may cause a failure of the sodium thiopental to render and maintain the inmate in a state of unconsciousness.

m) Impaired Delivery Due to Restraining Straps. Restraining straps may act as tourniquets and thereby impede or inhibit the delivery of drugs by the circulation to the central nervous system. This may cause a failure of the sodium thiopental to render and maintain the inmate in a state of unconsciousness. Even if the IV is checked for "free flow" of the intravenous

fluid prior to commencing injection, a small movement within the restraints on the part of the inmate could compress the vein and result in impaired delivery of the drug.

## 2. The Need for Adequate Training in Administering Anesthesia

23. Because of these foreseeable problems in administering anesthesia, in Nevada and elsewhere in the United States, the provision of anesthetic care is performed only by personnel with advanced training in the medical subspecialty of Anesthesiology. This is because the administration of anesthetic care is complex and risky, and can only be safely performed by individuals who have completed the extensive requisite training to permit them to provide anesthesia services. Failure to properly administer a general anesthetic not only creates a high risk of medical complications including death and brain damage, but also is recognized to engender the risk of inadequate anesthesia, resulting in the awakening of patients during surgery, a dreaded complication known as "intraoperative awareness." The risks of intraoperative awareness are so grave that, in October 2005, the American Society of Anesthesiologists published a new practice advisory on the subject of intraoperative awareness. If the individual providing anesthesia care is inadequately trained or experienced, the risk of these complications is enormously increased. In Nevada and elsewhere in the United States, general anesthesia is administered by physicians who have completed residency training in the specialty of Anesthesiology, and by nurses who have undergone the requisite training to become Certified Registered Nurse Anesthetists (CRNAs). Physicians and nurses who have not completed the requisite training to become anesthesiologists or CRNAs are not permitted to provide general anesthesia.

24. In my opinion, individuals providing general anesthesia in the Nevada State Prison should not be held to a different or lower standard than is set forth for individuals providing general anesthesia in any other setting in Nevada. Specifically, the individuals

providing general anesthesia within Nevada State Prison should possess the experience and proficiency of anesthesiologists and/or CRNAs. Conversely, a physician who is not an anesthesiologist or a nurse who is not a CRNA should not be permitted to provide general anesthesia within Nevada State Prison (or anywhere else in Nevada).

25. NDOC's execution protocol fails to specify whether the person or persons administering the lethal injection have any training in administering anesthesia, or, if personnel are given training, what that training might be. The absence of any details as to the training, certification, or qualifications of injection personnel raises critical questions about the degree to which condemned inmates risk suffering excruciating pain during the lethal injection procedure. The great majority of nurses are not trained in the use of ultrashort-acting barbiturates; indeed, this class of drugs is essentially only used by a very select group of nurses who have obtained significant experience in intensive care units and as nurse anesthetists. Very few paramedics are trained or experienced in the use of ultrashort-acting barbiturates. Based on my medical training and experience, and based upon my research of lethal injection procedures and practices, inadequacies in these areas elevate the risk that the lethal injection procedure will cause the condemned to suffer excruciating pain during the execution process. Failure to require that the person or persons administering the lethal injection have training equivalent to that of an anesthesiologist or a CRNA compounds the risk that inmates will suffer excruciating pain during their executions.

**3. NDOC's Failure to Account for Foreseeable Problems in Anesthesia Administration**

26. In addition to lacking any policy on the training necessary to perform a lethal injection, NDOC's execution manual imposes conditions that exacerbate the foreseeable risks of improper anesthesia administration described above, and fails to provide any procedures for

dealing with these risks. Perhaps most disturbingly, Nevada's lethal injection practice prevents any type of effective monitoring of the inmate's condition or whether he is anesthetized and unconscious. After the IV lines are inserted into the inmate but before the administration of the sodium thiopental, the execution chamber is closed and the prisoner is left alone in the chamber for the duration of the execution. Nevada's practice is that all prison personnel and others involved in the execution will be in a separate room. There is no window through which the executioner(s) can observe the inmate as the series of drugs is injected. This falls below the standard of care. Accepted medical practice dictates that trained personnel monitor the IV lines and the flow of anesthesia into the veins through visual and tactile observation and examination. The lack of any qualified personnel present in the chamber during the execution thwarts the execution personnel from taking the standard and necessary measures to reasonably ensure that the sodium thiopental is properly flowing into the inmate and that he is properly anesthetized prior to the administration of the pancuronium and potassium.

27. In my opinion, having a properly trained and credentialed individual examine the inmate after the administration of the sodium thiopental (but prior to the administration of pancuronium) to verify that the inmate is completely unconscious would substantially mitigate the danger that the inmate will suffer excruciating pain during his execution. As discussed later in this affidavit, this is the standard of care, and in many states the law, that is set forth for dogs and cats and other household pets when they are subjected to euthanasia by potassium injection. Yet NDOC's execution manual does not provide for such verification, and indeed Nevada practice actively prevents the person or persons administering the lethal injection from determining whether or not the inmate remains conscious by requiring that all of the drugs must be administered remotely, from another room without even visual surveillance.

28. By requiring that the drugs be administered remotely, Nevada practice

necessitates the use of multiple connection sites in the IV tubing. This unnecessarily increases the risk of leakage and/or pinching of the tubes, and therefore creates a greater risk that the inmate will not be properly sedated. Any reasonable standard of care would require a system to be in place to ensure that the prisoner is properly anesthetized.

29. Other than stating "the lethal medication will be administered at a rapid rate," NDOC's execution manual provides no specifications regarding the timing of the administration of the drugs, thereby compounding the risks described in this Declaration. This concern is greatly amplified by the use of an ultrashort-acting barbiturate and is borne out by a review of the execution records from California. In each of the executions, the time between administrations of the three drugs varied for no apparent reason. The lack of a defined schedule for the administration of the three drugs increases the risk that the sedative effect of the sodium thiopental will wear off, should the inmate not receive the full dose.

30. Nevada's lethal injection protocol does not account for procedures designed to ensure the proper preparation of the drugs used. I have not seen details regarding the credentials, certification, experience, or proficiency of the personnel who will be responsible for the mixing of the sodium thiopental from powder form, or for the drawing up of the drugs into the syringes. Preparation of drugs, particularly for intravenous use, is a technical task requiring significant training in pharmaceutical concepts and calculations. It is my opinion based on my review of lethal execution procedures in states that have disclosed more detailed information than what I have seen about Nevada's procedures, that there exist many risks associated with drug preparation that, if not properly accounted for, further elevate the risk that the drug will not be properly administered and the inmate will consciously experience excruciating pain during the lethal injection procedures.



31. The altering of established medical procedures without adequate medical review and research, by untrained personnel, causes great concern about the structure of the lethal injection protocol and its medical legitimacy. There is no indication of how Nevada's execution protocol was developed, who was consulted, what procedures were considered and why. The protocol may be something the Warden developed alone, or in consultation with other corrections personnel, some of whom may or may not have any medical training, or any specialized knowledge of anesthetic literature and practice. Appropriate mechanisms for medical review, and standardization of the implementation and amendment process, are critical features in any medical protocol so that the medical professionals and the public can be assured that proper and humane procedures are in place and being followed. Indeed, in other states, physicians and other medical personnel play a role in ensuring that any protocol is consistent with basic medical standards of care and humaneness. Otherwise, the process is subject and prone to ad hoc administration and error, if not gross negligence, or worse, an alteration of the process so as to inflict as much agony as possible. With lethal injection, such concerns are highly elevated.

32. There are no procedures contained within NDOC's execution manual for the resuscitation of the inmate once the sodium thiopental is administered. To the contrary, the manual states that "once infusion of the lethal injection has begun . . . the execution cannot be stopped." This would foreclose the possibility of altering the course of an execution in the event of legal relief. Any time up until the potassium chloride is administered, the prisoner could be readily resuscitated given the appropriately trained personnel and routine resuscitation medication and equipment. If this were to occur after the potassium chloride was administered, resuscitation would be more challenging but still possible. Resuscitation would require equipment close-by, and properly credentialed personnel, neither of which are specified in the execution manual.

33. Based on my medical training and experience, and based on my research into lethal injection procedures and practices, it is my opinion to a reasonable degree of medical certainty that any reliable, humane lethal injection procedure must account for the foreseeable circumstance of a condemned inmate having physical characteristics that prevent intravenous access from being obtained by a needle piercing the skin and entering a superficial vein suitable for the reliable delivery of drugs. There have been multiple lethal injections in which this problem has arisen from a variety of circumstances. Some of these circumstances could be due to conditions including obesity, corticosteroid treatment, history of intravenous drug use, history of undergoing chemotherapy. Additionally, some people happen to have veins that are too small or deep to permit peripheral access. It is often not possible to anticipate difficult intravenous access situations, and there are multiple examples of executions in which the personnel placing the IVs struggled to obtain peripheral IV access and eventually abandoned the effort. NDOC's execution manual is deficient in its failure to plan for the foreseeable possibility that peripheral IV access can not be obtained.

34. In this setting, state lethal injection protocols typically specify the use of a "cut-down" procedure to access a vein adequate for the reliable infusion of the lethal drugs. Aside from specifying in the "List of Needed Equipment and Materials," which "may vary," a "sterile cut-down tray if necessary," Nevada's lethal injection execution protocol contains no reference to plans for dealing with the foreseeable circumstance wherein peripheral intravenous access cannot be obtained in the arm or leg. No information regarding the training, experience, expertise, credentials, certification, or proficiency of the personnel who would perform such a "cut down" procedure is listed in the Nevada lethal injection protocol. In this regard, NDOC's lethal injection protocol is deficient in comparison to those of other states that I have reviewed. This complicated medical procedure requires equipment and skill that are not accounted for in the execution manual. It has a very high probability of not proceeding properly in the absence of

adequately trained and experienced personnel, and without the necessary equipment. If done improperly, the "cut-down" process can result in very serious complications including severe hemorrhage (bleeding), pneumothorax (collapse of a lung which may cause suffocation), and severe pain. It is well documented that lethal injection procedures in other states have at times required the use of a central intravenous line. NDOC has not, to my knowledge, released information about the need for central intravenous access during prior executions, and therefore it is not possible to make any assessment about whether the necessary safeguards have been set in place to ensure that the procedure is reasonably humane.

35. This concern over the challenges of IV placement has been demonstrated in numerous cases. For example, most recently, during the execution of Joseph Clark in Ohio, difficulties in finding a vein delayed the execution by almost 90 minutes. *See* Andrew Welsh-Huggins, *IV Flasco Led Killer to Ask for Plan B*, AP (May 12, 2006), attached hereto as Exhibit E. The execution team struggled for several minutes to find usable vein. The team placed a "shunt" in Clark's left arm, but the vein "collapsed". Subsequently, the team placed a "shunt" in Clark's right arm, but mistakenly attempted to administer the lethal drugs through the IV in the left arm where the vein had already "collapsed". The difficulties prompted Clark to sit up and tell his executioners "It don't work" and to ask "Can you just give me something by mouth to end this?" Similar problems occurred during the execution of Stanley "Tookie" Williams, the injection team took 12 minutes to insert the IV lines. The first line was placed quickly but spurted blood, and the staff struggled for 11 minutes to insert the second line, having so much difficulty that Williams asked whether they were "doing that right." *See The Execution of Stanley Tookie Williams*, SFGate.com (Dec. 14, 2005), attached hereto as Exhibit F. The difficulty of the challenge presented to the IV team is evidenced by the comment that "By 12:10 a.m., the medical tech's lips were tight and white and sweat was pooling on her forehead as she probed Williams' arm." Similarly, the execution log of Donald Beardslee's execution indicates that the

second IV line was inserted with "difficulty," and the time entries indicate that it took 12 minutes to insert the second line, which is consistent with encountering problems in inserting the IV. When it proceeds smoothly, placement of a peripheral IV should, in my experience, take on the order of two minutes or less. In the execution of William Bonin, it took the staff assigned anywhere between 18 and 27 minutes to fashion the IV lines (the records are unclear as to this point). This is an unusually long period of time for an experienced and properly trained professional. In the execution of Stephen Anderson on January 29, 2002, one of the persons who attempted to secure an IV was unable to do so without causing significant bleeding and the need to remove his gloves. Again, this indicates that the process is a difficult one and that it is necessary that the persons doing it are properly trained and experienced. As is widely recognized in the medical community, administration of intravenous medications and the management of intravenous systems are complex endeavors. While speculative and not evidence-based, it is my opinion that it is likely that IV placement is rendered more difficult in the context of executions because the inmates are often in a very anxious status, which causes the release of epinephrine (adrenalin) and norepinephrine, thereby causing constriction (narrowing) of blood vessels (including veins). When veins are constricted/narrowed it can be difficult or impossible to insert an IV catheter. This is the best explanation I can provide for the otherwise unexplained extremely high incidence of difficult or failed peripheral IV placement, in individuals lacking known risk factors for difficult IV access.

36. It is my further opinion that to ensure a lethal injection without substantial risks of inflicting severe pain and suffering, there must be proper procedures that are clear and consistent: there must be qualified personnel to ensure that anesthesia has been achieved prior to the administration of pancuronium bromide and potassium chloride, there must be qualified personnel to select chemicals and dosages, set up and load the syringes, administer "pre-injections," insert the IV catheter, and perform the other tasks required by such procedures; and

there must be adequate inspection and testing of the equipment and apparatus by qualified personnel. The Nevada Department of Corrections' written procedures for implementing lethal injection, to the extent that they have been made available, provide for none of the above.

### **C. The Use of Pancuronium Bromide**

37. Nevada's use of the drug pancuronium bromide serves no rational or legitimate purpose and compounds the risk that an inmate may suffer excruciating pain during his execution. Pancuronium paralyzes all voluntary muscles, but does not affect sensation, consciousness, cognition, or the ability to feel pain and suffocation. Because the sodium thiopental and potassium chloride would in themselves be sufficient to cause death, and the potassium is administered well before death would result from the pancuronium alone, it is my opinion held to a reasonable degree of medical certainty that there would be no rational place in the protocol for pancuronium as the lethal amount of potassium chloride is administered.

38. Pancuronium bromide is a neuromuscular blocking agent. Its effect is to render the muscles unable to contract but it does not affect the brain or the nerves. It is used in surgery to ensure that there is no movement and that the patient is securely paralyzed so that surgery can be performed without contraction of the muscles. In surgery, pancuronium bromide is not administered until the patient is adequately anesthetized. The anesthetic drugs must first be administered so that the patient is unconscious and does not feel, see, or perceive the procedure. This can be determined by a trained medical professional, either a physician anesthesiologist or a nurse anesthetist, who provides close and vigilant monitoring of the patient, their vital signs, and various diagnostic indicators of anesthetic depth. NDOC's execution manual, to the extent disclosed, fails to provide an assurance that anesthetic depth will be properly assessed prior to the administration of pancuronium bromide.

39. If sodium thiopental is not properly administered in a dose sufficient to cause the loss of consciousness for the duration of the execution procedure, then it is my opinion held to a reasonable degree of medical certainty that the use of pancuronium places the condemned inmate at risk for consciously experiencing paralysis, suffocation and the excruciating pain of the intravenous injection of high dose potassium chloride.

40. If administered alone, a lethal dose of pancuronium would not immediately cause a condemned inmate to lose consciousness. It would totally immobilize the inmate by paralyzing all voluntary muscles and the diaphragm, causing the inmate to suffocate to death while experiencing an intense, conscious desire to inhale. Ultimately, consciousness would be lost, but it would not be lost as an immediate and direct result of the pancuronium. Rather, the loss of consciousness would be due to suffocation, and would be preceded by the torment and agony caused by suffocation. This period of torturous suffocation would be expected to last at least several minutes and would only be relieved by the onset of suffocation-induced unconsciousness or by death from potassium chloride.

41. Because the administration of a paralyzing dose of pancuronium bromide to a conscious person would necessarily cause excruciating suffering, it would be unconscionable to administer pancuronium without first ensuring that the induction of general anesthesia had successfully achieved the necessary anesthetic depth.

42. Based on the information available to me, it is my opinion held to a reasonable degree of medical certainty that Nevada's lethal injection protocol creates an unacceptable risk that the inmate will not be anesthetized to the point of being unconscious and unaware of pain for the duration of the execution procedure. If the inmate is not first successfully anesthetized, then it is my opinion to a reasonable degree of medical certainty that the pancuronium will

paralyze all voluntary muscles and mask external, physical indications of the excruciating pain being experienced by the inmate during the process of suffocating (caused by the pancuronium) and having a cardiac arrest (caused by the potassium chloride).

43. It is my understanding that NDOC's execution protocol requires the presence of six to nine official witnesses to the execution and permits media witnesses to the execution. It is my opinion based on a reasonable degree of medical certainty that pancuronium, when properly and successfully administered, effectively nullifies the ability of witnesses to discern whether or not the condemned prisoner is experiencing a peaceful or agonizing death. Regardless of the experience of the condemned prisoner, whether he or she is deeply unconscious or experiencing the excruciation of suffocation, paralysis, and potassium injection, he or she will appear to witnesses to be serene and peaceful due to the relaxation and immobilization of the facial and other skeletal muscles. The use of pancuronium, in my opinion, therefore prevents the press from fulfilling its essential function of informing the citizens, officials, and courts of Nevada about whether execution by lethal injection is conducted in Nevada State Prison in a manner that is constitutionally compliant and humane.

44. The doses of sodium thiopental and potassium chloride are lethal doses. Therefore, it is unnecessary to administer pancuronium bromide in the course of an execution when it is quickly followed by a lethal dose of potassium chloride. It serves no legitimate purpose and only places a chemical veil on the process that prevents an adequate assessment of whether or not the condemned is suffering in agony, and greatly increases the risks that such agony will ensue. Removal of pancuronium from the protocol would eliminate the risk of conscious paralysis from occurring. It would also eliminate the risk that an inhumane execution would appear humane to witnesses. Finally, removal of pancuronium would vastly reduce the possibility that the citizens, officials, and courts of Nevada could be inadvertently misled by

media reports describing a peaceful-appearing execution when in fact the prisoner could be experiencing excruciating suffering.

#### **D. Consequences of Improper Anesthesia Administration**

45. Execution records from California indicate that four out of the six inmates executed in California since 2000 continued to display activity and behavior that is inconsistent with the successful administration of 5 grams of thiopental, the amount required under California's lethal injection protocol. Five grams of thiopental, the dose required by the California protocol, is a massive dose that, if successfully administered, far exceeds the amount necessary to completely arrest respiratory activity in any prisoner. I therefore can provide no medical explanation for the inmates' continued breathing other than that the thiopental was not administered in its entirety. If the full dose of thiopental was not administered successfully – as is strongly suggested by the inmates' continued breathing – those inmates faced a significant risk of remaining conscious or regaining consciousness during the lethal injection procedure. Importantly, a person who is breathing while under general anesthesia cannot be deeply anesthetized, and may well be awakened by a painful stimulation such as a surgical incision or the administration of potassium.

46. The handwritten records of Stanley "Tookie" Williams' execution indicate that Mr. Williams did not stop breathing until 12:34, upon the injection of the potassium chloride, 12 minutes after the thiopental was injected. Thus, the thiopental did not have the effect on Mr. Williams' brain and respiratory activity that would be expected with a high degree of certainty from the delivery into the circulation of the full 5-gram dose of thiopental.

47. The execution log of Clarence Ray Allen states that Mr. Allen continued breathing for 9 minutes after the delivery of the thiopental. Again, 5 grams of thiopental, if



successfully delivered into the circulation, simply should not take 9 minutes to ablate cerebral electrical activity and respiratory activity.

48. The January 29, 2002 execution log of Stephen Wayne Anderson, reveals that Mr. Anderson continued breathing until 12:22, 5 minutes after the thiopental was administered. Again, this persistent respiratory activity is not consistent with the expected effect of 5 grams of thiopental, which would be to stop all visible respiratory activity within a minute of its delivery into the circulation.

49. The March 15, 2000 execution log of Darrell Keith Rich, states that Mr. Rich's respirations ceased at 12:08, with the administration of the pancuronium, but that Mr. Rich had "chest movements" lasting from 12:09 to 12:10. These chest movements, beginning after Mr. Rich had ostensibly stopped breathing (and while he was still alive, as shown by his heart rate of 110 beats per minute), and 3 minutes after the administration of the thiopental, are again inconsistent with successful administration of the thiopental. The chest movements are consistent, however, with an attempt to fight against the accruing paralytic effect of the pancuronium. Had the 5-gram dose of thiopental reached Mr. Rich and had the expected effect, he would not have been able to fight against the pancuronium by attempting to breathe, nor would he even have been aware of the effect of the pancuronium. Indeed, because 5 grams of thiopental would have arrested all cerebral activity, including all respiratory drive, there would have been no effort on Mr. Rich's part to attempt to breathe during the onset of the pancuronium.

**E. Nevada's Execution Protocol Falls Below the Minimum Standards  
Mandated for Veterinary Euthanasia**

50. The American Veterinary Medical Association (AVMA) states that when potassium chloride is to be used as a euthanasia agent, the animals must be under a surgical plane

of anesthesia and the personnel performing the euthanasia must be properly trained to assess the depth of anesthesia. The AVMA panel specifically states that the animal must be in a surgical plane of anesthesia characterized not simply by loss of consciousness, but also by "loss of reflex muscle response and loss of response to noxious stimuli." It is difficult to understand why the NDOC would chose, at its discretion, to use potassium to execute prisoners and would then fail to adhere to the basic requirements set forth by the AVMA to ensure that animals do not experience the excruciating pain of potassium injection during euthanasia.

51. In *Beardslee v. Woodford*, the Ninth Circuit recognized that nineteen states have enacted statutes that, like the AVMA Report, mandate the exclusive use of a sedative in the euthanasia of animals. Although Nevada has not yet enacted such a statute, Nevada law expressly contemplates the use of sodium pentobarbital and requires that personnel who perform euthanasia of animals must be properly trained in the procedure. No such requirement exists in NDOC's execution manual.

#### Conclusion

52. Based on my research into methods of lethal injection used by various states and the federal government, and based on my training and experience as a medical doctor specializing in anesthesiology, it is my opinion based on a reasonable degree of medical certainty that, given the apparent absence of a central role for a properly trained medical or veterinary professional in NDOC's execution procedure, the chemicals used, the lack of adequately defined roles and procedures, and the failure to properly account for foreseeable risks, the lethal injection procedure Nevada employs creates medically unacceptable risks of inflicting excruciating pain and suffering on inmates during the lethal injection procedure. All of these problems could easily be addressed, and indeed have been addressed for the euthanasia of dogs and cats. It is difficult to understand why NDOC has failed to address these problems and has failed to meet the

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minimum standards set forth for veterinary euthanasia.

53. In addition, in order to more fully and fairly assess the impact of the failings of Nevada's execution protocol, it is necessary to obtain all the records and logs used, and all official witness statements from prior executions, as well as the full rules and regulations devised by NDOC for lethal injection. This would include identifying the qualifications, experience and training of those persons who apply the IVs and who administer and monitor the injection.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and that this declaration was executed on May 16, 2006 in New York City, New York.



Mark J. S. Heath, M.D.

8.TDA-00004744

## Attachment A

Curriculum Vitae

- 1) Date of preparation: December 19, 2004
- 2) Name: Mark J. S. Heath  
Birth date: March 28, 1960  
Birthplace: New York, NY  
Citizenship: United States, United Kingdom
- 3) Academic Training:  
Harvard University B.A., Biology, 1983  
University of North Carolina, Chapel Hill M.D., 1987  
Medical License New York: 177101-1
- 4) Traineeship:  
1987 - 1988 Internship, Internal Medicine, George Washington University Hospital, Washington, DC.  
1988 - 1991 Residency, Anesthesiology, Columbia College of Physicians and Surgeons, New York, NY  
1991 - 1993 Fellowship, Anesthesiology, Columbia College of Physicians and Surgeons, New York, NY
- 5) Board Qualification:  
Diplomate, American Board of Anesthesiology, October 1991.  
Testamur, Examination of Special Competence in Perioperative Transesophageal Echocardiography (PTEeXAM), 2001.
- 6) Military Service: None
- 7) Professional Organizations:  
American Society of Anesthesiologists  
International Anesthesia Research Society  
Society of Cardiovascular Anesthesiology
- 8) Academic Appointments:  
1993 - 2002 Assistant Professor of Anesthesiology, Columbia University, New York, NY  
2002 - present Assistant Professor of Clinical Anesthesiology, Columbia University, New York, NY

9) Hospital/Clinical Appointments:

1993 – present      Assistant Attending Anesthesiologist, Presbyterian Hospital, New York, NY.

10) Honors:

Magna cum laude, Harvard University  
Alpha Omega Alpha, University of North Carolina at Chapel Hill  
First Prize, New York State Society of Anesthesiologists Resident Presentations, 1991

11) Fellowship and Grant Support:

Foundation for Anesthesia Education and Research, Research Starter Grant Award, Principal Investigator, funding 7/92 - 7/93, \$15,000.

Foundation for Anesthesia Education and Research Young Investigator Award, Principal Investigator, funding 7/93 - 7/96, \$70,000.

NIH    KO8 "Inducible knockout of the NK1 receptor"  
Principal Investigator, KO8 funding 12/98 - 11/02,  
\$431,947 over three years  
(no-cost extension to continue through 11/30/2002)

NIH    RO1 "Tachykinin regulation of anxiety and stress responses"  
Principal Investigator, funding 9/1/2002 - 8/30/2007  
\$1,287,000 over 5 years

12) Departmental and University Committees:

Research Allocation Panel (1998 - 2001)  
Institutional Review Board (Alternate Boards 1-2, full member Board 3)  
(2003 - present)

13) Teaching:

Lecturer and clinical teacher: Anesthesiology Residency Program,  
Columbia University and Presbyterian Hospital, New York, NY

Advanced Cardio Life Support Training

*Anesthetic considerations of LVAD implantation. Recurrent  
lecture at Columbia University LVAD implantation course.*

Invited Lectures:

*NK1 receptor functions in pain and neural development, Cornell  
University December 1994*

*Anxiety, stress, and the NK1 receptor*, University of Chicago, Department of Anesthesia and Critical Care, July 2000

*Anesthetic Considerations of LVAD Implantation*, University of Chicago, Department of Anesthesia and Critical Care, July 2000

*NK1 receptor function in stress and anxiety*, St. John's University Department of Medicinal Chemistry, March 2002

*Making a brave mouse (and making a mouse brave)*, Mt. Sinai School of Medicine, May 2002

*Problems with anesthesia during lethal injection procedures*, Geneva, Switzerland. Duke University School of Law Conference, "International Law, Human Rights, and the Death Penalty: Towards an International Understanding of the Fundamental Principles of Just Punishment", July 2002.

*NK1 receptor function in stress and anxiety*, Visiting Professor, NYU School of Medicine, New York, New York. October 2002.

*Anesthetic Depth, Paralysis, and other medical problems with lethal injection protocols: evidence and concerns*, Federal Capital Habeas Unit Annual Conference, Jacksonville, Florida. May 2004.

*Medical Scrutiny of Lethal Injection Procedures*, National Association for the Advancement of Colored People Capital Defender Conference, Airlie Conference Center, Warrenton, Virginia. July 2004.

*Anesthetic considerations of LVAD implantation*, Recurrent lecture at Columbia University LVAD implantation course.

- 14) Grant Review Committees: None

## 15) Publications:

Original peer reviewed articles

- \* Santarelli, L., Gobbi, G., Debs, P.C., Sibille, E. L., Blier, P., Hen, R., Heath, M.J.S. (2001). Genetic and pharmacological disruption of neurokinin 1 receptor function decreases anxiety-related behaviors and increases serotonergic function. Proc. Nat. Acad. Sci., 98(4), 1912 - 1917.
- \* King, T.E. <sup>1</sup>, Heath M. J. S<sup>2</sup>, Debs, P, Davis, MB, Hen, R, Barr, G. (2000). The development of nociceptive responses in neurokinin-1 receptor knockout mice. Neuroreport;11(3), 587-91     2 authors contributed equally to this work
- \* Heath, M. J. S., Lints, T., Lee, C. J., Dodd, J. (1995). Functional expression of the tachykinin NK<sub>1</sub> receptor by floor plate cells in the embryonic rat spinal cord and brainstem. Journal of Physiology 486.1, 139 -148.
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#### Case reports

none

#### Review, chapters, editorials

- \* Heath, M. J. S., Dickstein, M. L. (2000). Perioperative management of the left ventricular assist device recipient. Prog Cardiovasc Dis.;43(1):47-54.
- \* Dickstein, M.L., Mets B, Heath M.J.S. (2000). Anesthetic considerations during left ventricular assist device implantation. Cardiac Assist Devices pp 63 - 74.
- \* Heath, M. J. S. and Hen, R. (1995). Genetic insights into serotonin function. Current Biology 5.9, 997 -999.
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Attachment B

—8.TDA-00004751—

AA03324

# **2000 Report of the AVMA Panel on Euthanasia**



# 2000 Report of the AVMA Panel on Euthanasia

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## PREFACE

At the request of the AVMA Council on Research, the Executive Board of the AVMA convened a Panel on Euthanasia in 1999 to review and make necessary revisions to the fifth Panel Report, published in 1993.<sup>1</sup> In this newest version of the report, the panel has updated information on euthanasia of animals in research and animal care and control facilities; expanded information on ectothermic, aquatic, and fur-bearing animals; added information on horses and wildlife; and deleted methods or agents considered unacceptable. Because the panel's deliberations were based on currently available scientific information, some euthanasia methods and agents are not discussed.

Welfare issues are increasingly being identified in the management of free-ranging wildlife, and the need for humane euthanasia guidelines in this context is great. Collection of animals for scientific investigations, euthanasia of injured or diseased wildlife species, removal of animals causing damage to property or threatening human safety, and euthanasia of animals in excess population are drawing more public attention. These issues are acknowledged in this report and special considerations are described for handling animals under free-ranging conditions, where their needs are far different from those of their domestic counterparts.

This report is intended for use by members of the

veterinary profession who carry out or oversee the euthanasia of animals. Although the report may be interpreted and understood by a broad segment of the general population, a veterinarian should be consulted in the application of these recommendations. The practice of veterinary medicine is complex and involves diverse animal species. Whenever possible, a veterinarian experienced with the species in question should be consulted when selecting the method of euthanasia, particularly when little species-specific euthanasia research has been done. Although interpretation and use of this report cannot be limited, the panel's overriding commitment is to give veterinarians guidance in relieving pain and suffering of animals that are to be euthanatized. The recommendations in this report are intended to serve as guidelines for veterinarians who must then use professional judgment in applying them to the various settings where animals are to be euthanatized.

## INTRODUCTION

The term euthanasia is derived from the Greek terms *eu* meaning good and *thanatos* meaning death.<sup>2</sup> A "good death" would be one that occurs with minimal pain and distress. In the context of this report, euthanasia is the act of inducing humane death in an animal. It is our responsibility as veterinarians and human beings to ensure that if an animal's life is to be taken, it is done with the highest degree of respect, and with an emphasis on making the death as painless and distress free as possible. Euthanasia techniques should result in rapid loss of consciousness followed by cardiac or respiratory arrest and the ultimate loss of brain function. In addition, the technique should minimize distress and anxiety experienced by the animal prior to loss of consciousness. The panel recognized that the absence of pain and distress cannot always be achieved. This report attempts to balance the ideal of minimal pain and distress with the reality of the many environments in which euthanasia is performed. A veterinarian with appropriate training and expertise for the species involved should be consulted to ensure that proper procedures are used.

Criteria for painless death can be established only after the mechanisms of pain are understood. Pain is that sensation (perception) that results from nerve impulses reaching the cerebral cortex via ascending neural pathways. Under normal circumstances, these pathways are relatively specific, but the nervous system is sufficiently plastic that activation of nociceptive pathways does not always result in pain and stimulation of other (non-nociceptive) peripheral and central neurons can give rise to pain. The term nociceptive is derived from the word *noc*i meaning to injure and *cep*tive meaning to receive, and is used to describe neuronal input caused by noxious stimuli, which threaten to, or actually do, destroy tissue. These noxious stimuli initiate nerve impulses by acting at primary nociceptors and other sensory nerve endings that respond to noxious and non-noxious stimuli from mechanical, thermal, or chemical activity. Endogenous chemical substances such as hydrogen ions, potassium ions, ATP, serotonin, histamine, bradykinin, and prostaglandins, as well as electrical currents, are capable of generating nerve impulses in nociceptor nerve fibers. Activity in

nociceptive pathways can also be triggered in normally silent receptors that become sensitized by chronic pain conditions.<sup>3,4</sup>

Nerve impulse activity generated by nociceptors is conducted via nociceptor primary afferent fibers to the spinal cord or the brainstem where it is transmitted to two general sets of neural networks. One set is related to nociceptive reflexes (eg, withdrawal and flexion reflexes) that are mediated at the spinal level, and the second set consists of ascending pathways to the reticular formation, hypothalamus, thalamus, and cerebral cortex (somatosensory cortex and limbic system) for sensory processing. It is important to understand that ascending nociceptive pathways are numerous, often redundant, and are capable of considerable plasticity under chronic conditions (pathology or injury). Moreover, even the transmission of nociceptive neural activity in a given pathway is highly variable. Under certain conditions, both the nociceptive reflexes and the ascending pathways may be suppressed, as, for example, in epidural anesthesia. Under another set of conditions, nociceptive reflex actions may occur, but activity in the ascending pathways is suppressed; thus, noxious stimuli are not perceived as pain. It is incorrect to use the term pain for stimuli, receptors, reflexes, or pathways because the term implies perception, whereas all the above may be active without consequential pain perception.<sup>5,6</sup>

Pain is divided into two broad categories: (1) sensory-discriminative, which indicates the site of origin and the stimulus giving rise to the pain; and (2) motivational-affective in which the severity of the stimulus is perceived and the animal's response is determined. Sensory-discriminative processing of nociceptive impulses is most likely to be accomplished by subcortical and cortical mechanisms similar to those used for processing other sensory-discriminative input that provides the individual with information about the intensity, duration, location, and quality of the stimulus. Motivational-affective processing involves the ascending reticular formation for behavioral and cortical arousal. It also involves thalamic input to the forebrain and the limbic system for perceptions such as discomfort, fear, anxiety, and depression. The motivational-affective neural networks also have strong inputs to the limbic system, hypothalamus and the autonomic nervous system for reflex activation of the cardiovascular, pulmonary, and pituitary-adrenal systems. Responses activated by these systems feed back to the forebrain and enhance perceptions derived via motivational-affective inputs. On the basis of neurosurgical experience in humans, it is possible to separate the sensory-discriminative components from the motivational-affective components of pain.<sup>7</sup>

For pain to be experienced, the cerebral cortex and subcortical structures must be functional. If the cerebral cortex is nonfunctional because of hypoxia, depression by drugs, electric shock, or concussion, pain is not experienced. Therefore, the choice of the euthanasia agent or method is less critical if it is to be used on an animal that is anesthetized or unconscious, provided that the animal does not regain consciousness prior to death.

An understanding of the continuum that represents stress and distress is essential for evaluating techniques that minimize any distress experienced by an animal being euthanatized. Stress has been defined as the effect of physical, physiologic, or emotional factors (stressors) that induce an alteration in an animal's homeostasis or adaptive state.<sup>8</sup> The response of an animal to stress represents the adaptive process that is necessary to restore the baseline mental and physiologic state. These responses may involve changes in an animal's neuroendocrinologic system, autonomic nervous system, and mental status that may result in overt behavioral changes. An animal's response varies according to its experience, age, species, breed, and current physiologic and psychologic state.<sup>9</sup>

Stress and the resulting responses have been divided into three phases.<sup>10</sup> Eustress results when harmless stimuli initiate adaptive responses that are beneficial to the animal. Neutral stress results when the animal's response to stimuli causes neither harmful nor beneficial effects to the animal. Distress results when an animal's response to stimuli interferes with its well-being and comfort.<sup>11</sup>

As with many other procedures involving animals, some methods of euthanasia require physical handling of the animal. The amount of control and kind of restraint required will be determined by the animal's species, breed, size, state of domestication, degree of taming, presence of painful injury or disease, degree of excitement, and method of euthanasia. Proper handling is vital to minimize pain and distress in animals, to ensure safety of the person performing euthanasia, and, often, to protect other people and animals.

An in-depth discussion of euthanasia procedures is beyond the scope of this report; however, personnel who perform euthanasia must have appropriate certification and training, experience with the techniques to be used, and experience in the humane restraint of the species of animal to be euthanatized, to ensure that animal pain and distress are minimized during euthanasia. Training and experience should include familiarity with the normal behavior of the species being euthanatized, an appreciation of how handling and restraint affects that behavior, and an understanding of the mechanism by which the selected technique induces loss of consciousness and death. Prior to being assigned full responsibility for performing euthanasia, all personnel must have demonstrated proficiency in the use of the technique in a closely supervised environment. References provided at the end of this document may be useful for training personnel.<sup>12-21</sup>

Selection of the most appropriate method of euthanasia in any given situation depends on the species of animal involved, available means of animal restraint, skill of personnel, number of animals, and other considerations. Available information focuses primarily on domestic animals, but the same general considerations should be applied to all species.

This report includes four appendices that summarize information from the text. Appendix 1 lists acceptable and conditionally acceptable methods of euthanasia, categorized by species. Appendices 2 and 3 provide summaries of characteristics for acceptable and condi-

tionally acceptable methods of euthanasia. Appendix 4 provides a summary of some unacceptable euthanasia agents and methods. Criteria used for acceptable, conditionally acceptable, and unacceptable methods are as follows: acceptable methods are those that consistently produce a humane death when used as the sole means of euthanasia; conditionally acceptable methods are those techniques that by the nature of the technique or because of greater potential for operator error or safety hazards might not consistently produce humane death or are methods not well documented in the scientific literature; and unacceptable techniques are those methods deemed inhumane under any conditions or that the panel found posed a substantial risk to the human applying the technique. The report also includes discussion of several adjunctive methods, which are those methods that cannot be used as the sole method of euthanasia, but that can be used in conjunction with other methods to produce a humane death.

## GENERAL CONSIDERATIONS

In evaluating methods of euthanasia, the panel used the following criteria: (1) ability to induce loss of consciousness and death without causing pain, distress, anxiety, or apprehension; (2) time required to induce loss of consciousness; (3) reliability; (4) safety of personnel; (5) irreversibility; (6) compatibility with requirement and purpose; (7) emotional effect on observers or operators; (8) compatibility with subsequent evaluation, examination, or use of tissue; (9) drug availability and human abuse potential; (10) compatibility with species, age, and health status; (11) ability to maintain equipment in proper working order; and (12) safety for predators/scavengers should the carcass be consumed.

The panel discussed the definition of euthanasia used in this report as it applies to circumstances when the degree of control over the animal makes it difficult to ensure death without pain and distress. Slaughter of animals for food, fur, or fiber may represent such situations. However, the same standards for euthanasia should be applied to the killing of animals for food, fur, or fiber, and wildlife or feral animals. Animals intended for food should be slaughtered humanely, taking into account any special requirements of the US Department of Agriculture.<sup>22</sup> Painless death can be achieved by properly stunning the animal, followed immediately by exsanguination. Handling of animals prior to slaughter should be as stress free as possible. Electric prods or other devices should not be used to encourage movement of animals and are not needed if chutes and ramps are properly designed to enable animals to be moved and restrained without undue stress.<sup>23-27</sup> Animals must not be restrained in a painful position before slaughter.

Ethical considerations that must be addressed when euthanatizing healthy and unwanted animals reflect professional and societal concerns.<sup>28,29</sup> These issues are complex and warrant thorough consideration by the profession and all those concerned with the welfare of animals. Whereas the panel recognizes the need for those responsible for the euthanasia of ani-



imals to be cognizant of these issues, it does not believe that this report is the appropriate forum for an in-depth discussion of this topic.

It is the intent of the panel that euthanasia be performed in accordance with applicable federal, state, and local laws governing drug acquisition and storage, occupational safety, and methods used for euthanasia and disposal of animals. However, space does not permit a review of current federal, state, and local regulations.

The panel is aware that circumstances may arise that are not clearly covered by this report. Whenever such situations arise, a veterinarian experienced with the species should use professional judgment and knowledge of clinically acceptable techniques in selecting an appropriate euthanasia technique. Professional judgment in these circumstances will take into consideration the animal's size and its species-specific physiologic and behavioral characteristics. In all circumstances, the euthanasia method should be selected and used with the highest ethical standards and social conscience.

It is imperative that death be verified after euthanasia and before disposal of the animal. An animal in deep narcosis following administration of an injectable or inhalant agent may appear dead, but might eventually recover. Death must be confirmed by examining the animal for cessation of vital signs, and consideration given to the animal species and method of euthanasia when determining the criteria for confirming death.

#### ANIMAL BEHAVIORAL CONSIDERATIONS

The need to minimize animal distress, including fear, anxiety, and apprehension, must be considered in determining the method of euthanasia. Gentle restraint (preferably in a familiar and safe environment), careful handling, and talking during euthanasia often have a calming effect on animals that are used to being handled. Sedation and/or anesthesia may assist in achieving the best conditions for euthanasia. It must be recognized that any sedatives or anesthetics given at this stage that change circulation may delay the onset of the euthanasia agent. Preparation of observers should also be taken into consideration.

Animals that are wild, feral, injured, or already distressed from disease pose another challenge. Methods of pre-euthanasia handling suitable for domestic animals may not be effective for them. Because handling may stress animals unaccustomed to human contact (eg, wildlife, zoo, and feral species), the degree of restraint required to perform any euthanasia procedure should be considered when evaluating various methods. When handling these animals, calming may be accomplished by minimizing visual, auditory, and tactile stimulation. When struggling during capture or restraint may cause pain, injury, or anxiety to the animal or danger to the operator, the use of tranquilizers, analgesics, and/or anesthetics may be necessary. A route of injection should be chosen that causes the least distress in the animal for which euthanasia must be performed. Various techniques for oral delivery of sedatives to dogs and cats have been described that may be useful under these circumstances.<sup>30,31</sup>

Facial expressions and body postures that indicate various emotional states of animals have been described for some species.<sup>32-37</sup> Behavioral and physiologic responses to noxious stimuli include distress vocalization, struggling, attempts to escape, defensive or redirected aggression, salivation, urination, defecation, evacuation of anal sacs, pupillary dilatation, tachycardia, sweating, and reflex skeletal muscle contractions causing shivering, tremors, or other muscular spasms. Unconscious as well as conscious animals are capable of some of these responses. Fear can cause immobility or "playing dead" in certain species, particularly rabbits and chickens. This immobility response should not be interpreted as loss of consciousness when the animal is, in fact, conscious. Distress vocalizations, fearful behavior, and release of certain odors or pheromones by a frightened animal may cause anxiety and apprehension in other animals. Therefore, for sensitive species, it is desirable that other animals not be present when individual animal euthanasia is performed.

#### HUMAN BEHAVIORAL CONSIDERATIONS

When animals must be euthanatized, either as individuals or in larger groups, moral and ethical concerns dictate that humane practices be observed. Human psychologic responses to euthanasia of animals need to be considered, with grief at the loss of a life as the most common reaction.<sup>38</sup> There are six circumstances under which we are most aware of the effects of animal euthanasia on people.

The first of these is the veterinary clinical setting where owners have to make decisions about whether and when to euthanatize. Although many owners rely heavily on their veterinarian's judgment, others may have misgivings about making their own decision. This is particularly likely if an owner feels responsible for allowing an animal's medical or behavioral problem to go unattended so that euthanasia becomes necessary. When owners choose to be present during euthanasia, they should be prepared for what will happen. What drugs are being used and how the animal could respond should be discussed. Behaviors such as vocalization, muscle twitches, failure of the eyelids to close, urination, or defecation can be distressing. Counseling services for grieving owners are now available in some communities<sup>39</sup> and telephone counseling is available through some veterinary schools.<sup>40,41</sup> Owners are not the only people affected by euthanasia of animals. Veterinarians and their staffs may also become attached to patients they have known and treated for many years and may continue to struggle with the ethical implications of ending an animal's life.

The second is animal care and control facilities where unwanted, homeless, diseased, and injured animals must be euthanatized in large numbers. Distress may develop among personnel directly involved in performing euthanasia repeatedly. Emotional uneasiness, discomfort, or distress experienced by people involved with euthanasia of animals may be minimized. The person performing euthanasia must be technically proficient, use humane handling methods, understand the reasons for euthanasia, and be familiar with the

method of euthanasia being employed (ie, what is going to happen to the animal). When the person is not knowledgeable about what to expect, he or she may mistakenly interpret any movement of animals as consciousness and a lack of movement as loss of consciousness. Methods that preclude movement of animals are more aesthetically acceptable to most technical staff even though lack of movement is not an adequate criterion for evaluating euthanasia techniques. Constant exposure to, or participation in, euthanasia procedures can cause a psychologic state characterized by a strong sense of work dissatisfaction or alienation, which may be expressed by absenteeism, belligerence, or careless and callous handling of animals.<sup>42</sup> This is one of the principal reasons for turnover of employees directly involved with repeated animal euthanasia. Management should be aware of potential personnel problems related to animal euthanasia and determine whether it is necessary to institute a program to prevent, decrease, or eliminate this problem. Specific coping strategies can make the task more tolerable. Some strategies include adequate training programs so that euthanasia is performed competently, peer support in the workplace, professional support as necessary, focusing on animals that are successfully adopted or returned to owners, devoting some work time to educational activities, and providing time off when workers feel stressed.

The third setting is the laboratory. Researchers, technicians, and students may become attached to animals that must be euthanatized.<sup>43</sup> The same considerations afforded pet owners or shelter employees should be provided to those working in laboratories.

The fourth situation is wildlife control. Wildlife biologists, wildlife managers, and wildlife health professionals are often responsible for euthanatizing animals that are injured, diseased, in excessive number, or that threaten property or human safety. Although relocation of some animals is appropriate and attempted, relocation is often only a temporary solution to a larger problem. People who must deal with these animals, especially under public pressure to save the animals rather than destroy them, can experience extreme distress and anxiety.

The fifth setting is livestock and poultry slaughter facilities. The large number of animals processed daily can take a heavy toll on employees physically and emotionally. Federal and state agricultural employees may also be involved in mass euthanasia of poultry and livestock in the face of disease outbreaks, bioterrorism, and natural disasters.

The last situation is public exposure. Because euthanasia of zoo animals, animals involved in roadside or racetrack accidents, stranded marine animals, nuisance or injured wildlife, and others can draw public attention, human attitudes and responses should be considered whenever animals are euthanatized. Natural disasters and foreign animal disease programs also present public challenges. These considerations, however, should not outweigh the primary responsibility of using the most rapid and painless euthanasia method possible under the circumstances.

## MODES OF ACTION OF EUTHANATIZING AGENTS

Euthanatizing agents cause death by three basic mechanisms: (1) hypoxia, direct or indirect; (2) direct depression of neurons necessary for life function; and (3) physical disruption of brain activity and destruction of neurons necessary for life.

Agents that induce death by direct or indirect hypoxia can act at various sites and can cause loss of consciousness at different rates. For death to be painless and distress-free, loss of consciousness should precede loss of motor activity (muscle movement). Loss of motor activity, however, cannot be equated with loss of consciousness and absence of distress. Thus, agents that induce muscle paralysis without loss of consciousness are not acceptable as sole agents for euthanasia (eg, depolarizing and nondepolarizing muscle relaxants, strychnine, nicotine, and magnesium salts). With other techniques that induce hypoxia, some animals may have motor activity following loss of consciousness, but this is reflex activity and is not perceived by the animal.

A second group of euthanatizing agents depress nerve cells of the brain, inducing loss of consciousness followed by death. Some of these agents release inhibition of motor activity during the first stage of anesthesia, resulting in a so-called excitement or delirium phase, during which there may be vocalization and some muscle contraction. These responses do not appear to be purposeful. Death follows loss of consciousness, and is attributable to cardiac arrest and/or hypoxemia following direct depression of respiratory centers.

Physical disruption of brain activity, caused by concussion, direct destruction of the brain, or electrical depolarization of neurons, induces rapid loss of consciousness. Death occurs because of destruction of midbrain centers controlling cardiac and respiratory activity or as a result of adjunctive methods (eg, exsanguination) used to kill the animal. Exaggerated muscular activity can follow loss of consciousness and, although this may disturb some observers, the animal is not experiencing pain or distress.

## INHALANT AGENTS

Any gas that is inhaled must reach a certain concentration in the alveoli before it can be effective; therefore, euthanasia with any of these agents takes some time. The suitability of a particular agent depends on whether an animal experiences distress between the time it begins to inhale the agent and the time it loses consciousness. Some agents may induce convulsions, but these generally follow loss of consciousness. Agents inducing convulsions prior to loss of consciousness are unacceptable for euthanasia.

Certain considerations are common to all inhalant agents. (1) In most cases, onset of loss of consciousness is more rapid, and euthanasia more humane, if the animal is rapidly exposed to a high concentration of the agent. (2) The equipment used to deliver and maintain this high concentration must be in good working order and in compliance with state and federal regulations. Leaky or faulty equipment may lead to

slow, distressful death and be hazardous to other animals and to personnel. (3) Most of these agents are hazardous to personnel because of the risk of explosions (eg, ether), narcosis (eg, halothane), hypoxemia (eg, nitrogen and carbon monoxide), addiction (eg, nitrous oxide), or health effects resulting from chronic exposure (eg, nitrous oxide and carbon monoxide). (4) Alveolar concentrations rise slowly in an animal with decreased ventilation, making agitation more likely during induction. Other noninhalant methods of euthanasia should be considered for such animals. (5) Neonatal animals appear to be resistant to hypoxia, and because all inhalant agents ultimately cause hypoxia, neonatal animals take longer to die than adults. Glass et al,<sup>44</sup> reported that newborn dogs, rabbits, and guinea pigs survived a nitrogen atmosphere much longer than did adults. Dogs, at 1 week old, survived for 14 minutes compared with a 3-minute survival time after a few weeks of age. Guinea pigs survived for 4.5 minutes at 1 day old, compared with 3 minutes at 8 days or older. Rabbits survived for 13 minutes at 6 days old, 4 minutes at 14 days, and 1.5 minutes at 19 days and older. The panel recommends that inhalant agents not be used alone in animals less than 16 weeks old except to induce loss of consciousness, followed by the use of some other method to kill the animal. (6) Rapid gas flows can produce a noise that frightens animals. If high flows are required, the equipment should be designed to minimize noise. (7) Animals placed together in chambers should be of the same species, and, if needed, should be restrained so that they will not hurt themselves or others. Chambers should not be overloaded and need to be kept clean to minimize odors that might distress animals subsequently euthanatized. (8) Reptiles, amphibians, and diving birds and mammals have a great capacity for holding their breath and anaerobic metabolism. Therefore, induction of anesthesia and time to loss of consciousness when using inhalants may be greatly prolonged. Other techniques may be more appropriate for these species.

#### Inhalant anesthetics

Inhalant anesthetics (eg, ether, halothane, methoxyflurane, isoflurane, sevoflurane, desflurane, and enflurane) have been used to euthanatize many species.<sup>45</sup> Halothane induces anesthesia rapidly and is the most effective inhalant anesthetic for euthanasia. Enflurane is less soluble in blood than halothane, but, because of its lower vapor pressure and lower potency, induction rates may be similar to those for halothane. At deep anesthetic planes, animals may seizure. It is an effective agent for euthanasia, but the associated seizure activity may be disturbing to personnel. Isoflurane is less soluble than halothane, and it should induce anesthesia more rapidly. However, it has a slightly pungent odor and animals often hold their breath, delaying onset of loss of consciousness. Isoflurane also may require more drug to kill an animal, compared with halothane. Although isoflurane is acceptable as a euthanasia agent, halothane is preferred. Sevoflurane is less soluble than halothane and does not have an objectionable odor. It is less potent

than isoflurane or halothane and has a lower vapor pressure. Anesthetic concentrations can be achieved and maintained rapidly. Desflurane is currently the least soluble potent inhalant anesthetic, but the vapor is quite pungent, which may slow induction. This drug is so volatile that it could displace oxygen (O<sub>2</sub>) and induce hypoxemia during induction if supplemental O<sub>2</sub> is not provided. Methoxyflurane is highly soluble, and slow anesthetic induction with its use may be accompanied by agitation. It is a conditionally acceptable agent for euthanasia in rodents.<sup>46</sup> Ether has high solubility in blood and induces anesthesia slowly. It is irritating to the eyes and nose, poses serious risks associated with its flammability and explosiveness, and has been used to create a model for stress.<sup>47-50</sup>

With inhalant anesthetics, the animal can be placed in a closed receptacle containing cotton or gauze soaked with an appropriate amount of the anesthetic,<sup>51</sup> or the anesthetic can be introduced from a vaporizer. The latter method may be associated with a longer induction time. Vapors are inhaled until respiration ceases and death ensues. Because the liquid state of most inhalant anesthetics is irritating, animals should be exposed only to vapors. Also, sufficient air or O<sub>2</sub> must be provided during the induction period to prevent hypoxemia.<sup>51</sup> In the case of small rodents placed in a large container, there will be sufficient O<sub>2</sub> in the chamber to prevent hypoxemia. Larger species placed in small containers may need supplemental air or O<sub>2</sub>.<sup>51</sup>

Nitrous oxide (N<sub>2</sub>O) may be used with other inhalants to speed the onset of anesthesia, but alone it does not induce anesthesia in animals, even at 100% concentration. When used by itself, N<sub>2</sub>O produces hypoxemia before respiratory or cardiac arrest. As a result, animals may become distressed prior to loss of consciousness.

Occupational exposure to inhalant anesthetics constitutes a human health hazard. Spontaneous abortion and congenital abnormalities have been associated with exposure of women to trace amounts of inhalation anesthetic agents during early stages of pregnancy.<sup>52</sup> Regarding human exposure to inhalant anesthetics, the concentrations of halothane, enflurane, and isoflurane should be less than 2 ppm, and less than 25 ppm for nitrous oxide.<sup>52</sup> There are no controlled studies proving that such concentrations of anesthetics are safe, but these concentrations were established because they were found to be attainable under hospital conditions. Effective procedures must be used to protect personnel from anesthetic vapors.

**Advantages**—(1) Inhalant anesthetics are particularly valuable for euthanasia of smaller animals (< 7 kg) or for animals in which venipuncture may be difficult. (2) Halothane, enflurane, isoflurane, sevoflurane, desflurane, methoxyflurane, and N<sub>2</sub>O are nonflammable and nonexplosive under ordinary environmental conditions.

**Disadvantages**—(1) Animals may struggle and become anxious during induction of anesthesia because anesthetic vapors may be irritating and can induce excitement. (2) Ether is flammable and explo-

sive. Explosions have occurred when animals, euthanized with ether, were placed in an ordinary (not explosion proof) refrigerator or freezer and when bagged animals were placed in an incinerator. (3) Induction with methoxyflurane is unacceptably slow in some species. (4) Nitrous oxide will support combustion. (5) Personnel and animals can be injured by exposure to these agents. (6) There is a potential for human abuse of some of these drugs, especially N<sub>2</sub>O.

**Recommendations**—In order of preference, halothane, enflurane, isoflurane, sevoflurane, methoxyflurane, and desflurane, with or without nitrous oxide, are acceptable for euthanasia of small animals (< 7 kg). Ether should only be used in carefully controlled situations in compliance with state and federal occupational health and safety regulations. It is conditionally acceptable. Nitrous oxide should not be used alone, pending further scientific studies on its suitability for animal euthanasia. Although acceptable, these agents are generally not used in larger animals because of their cost and difficulty of administration.

#### Carbon dioxide

Room air contains 0.04% carbon dioxide (CO<sub>2</sub>), which is heavier than air and nearly odorless. Inhalation of CO<sub>2</sub> at a concentration of 7.5% increases the pain threshold, and higher concentrations of CO<sub>2</sub> have a rapid anesthetic effect.<sup>53-58</sup>

Leake and Waters<sup>56</sup> reported the experimental use of CO<sub>2</sub> as an anesthetic agent for dogs. At concentrations of 30% to 40% CO<sub>2</sub> in O<sub>2</sub>, anesthesia was induced within 1 to 2 minutes, usually without struggling, retching, or vomiting. For cats, inhalation of 60% CO<sub>2</sub> results in loss of consciousness within 45 seconds, and respiratory arrest within 5 minutes.<sup>59</sup> Signs of effective CO<sub>2</sub> anesthesia are those associated with deep surgical anesthesia, such as loss of withdrawal and palpebral reflexes.<sup>60</sup> Time to loss of consciousness is decreased by use of higher concentrations of CO<sub>2</sub> with an 80 to 100% concentration providing anesthesia in 12 to 33 seconds in rats and 70% CO<sub>2</sub> in O<sub>2</sub> inducing anesthesia in 40 to 50 seconds.<sup>61,62</sup> Time to loss of consciousness will be longer if the concentration is increased slowly rather than immersing the animal in the full concentration immediately.

Several investigators have suggested that inhalation of high concentrations of CO<sub>2</sub> may be distressing to animals,<sup>63-66</sup> because the gas dissolves in moisture on the nasal mucosa. The resulting product, carbonic acid, may stimulate nociceptors in the nasal mucosa. Some humans exposed to concentrations of around 50% CO<sub>2</sub> report that inhaling the gas is unpleasant and that higher concentrations are noxious.<sup>67,68</sup> A brief study of swine examined the aversive nature of CO<sub>2</sub> exposure<sup>69</sup> and found that 90% CO<sub>2</sub> was aversive to pigs while 30% was not. For rats, exposure to increasing concentrations of CO<sub>2</sub> (33% achieved after 1 minute) in their home cage produced no evident stress as measured by behavior and ACTH, glucose, and corticosterone concentrations in serum.<sup>70</sup>

Carbon dioxide has been used to euthanize groups of small laboratory animals, including mice,

rats, guinea pigs, chickens, and rabbits,<sup>5,71-76</sup> and to render swine unconscious before humane slaughter.<sup>22,63, 64</sup> The combination of 40% CO<sub>2</sub> and approximately 3% CO has been used experimentally for euthanasia of dogs.<sup>65</sup> Carbon dioxide has been used in specially designed chambers to euthanize individual cats<sup>77,78</sup> and other small laboratory animals.<sup>51,72,79</sup>

Studies of 1-day-old chickens have revealed that CO<sub>2</sub> is an effective euthanizing agent. Inhalation of CO<sub>2</sub> caused little distress to the birds, suppressed nervous activity, and induced death within 5 minutes.<sup>73</sup> Because respiration begins during embryonic development, the unhatched chicken's environment may normally have a CO<sub>2</sub> concentration as high as 14%. Thus, CO<sub>2</sub> concentrations for euthanasia of newly hatched chickens and neonates of other species should be especially high. A CO<sub>2</sub> concentration of 60% to 70% with a 5-minute exposure time appears to be optimal.<sup>73</sup>

In studies of mink, high concentrations of CO<sub>2</sub> would kill them quickly, but a 70% CO<sub>2</sub> concentration induced loss of consciousness without killing them.<sup>80</sup> Some burrowing animals, such as rabbits of the species *Oryctolagus*, also have prolonged survival times when exposed to CO<sub>2</sub>.<sup>81</sup> Some burrowing and diving animals have physiologic mechanisms for coping with hypercapnia. Therefore, it is necessary to have a sufficient concentration of CO<sub>2</sub> to kill the animal by hypoxemia following induction of anesthesia with CO<sub>2</sub>.

**Advantages**—(1) The rapid depressant, analgesic, and anesthetic effects of CO<sub>2</sub> are well established. (2) Carbon dioxide is readily available and can be purchased in compressed gas cylinders. (3) Carbon dioxide is inexpensive, nonflammable, nonexplosive, and poses minimal hazard to personnel when used with properly designed equipment. (4) Carbon dioxide does not result in accumulation of tissue residues in food-producing animals. (5) Carbon dioxide euthanasia does not distort murine cholinergic markers<sup>82</sup> or corticosterone concentrations.<sup>83</sup>

**Disadvantages**—(1) Because CO<sub>2</sub> is heavier than air, incomplete filling of a chamber may permit animals to climb or raise their heads above the higher concentrations and avoid exposure. (2) Some species, such as fish and burrowing and diving mammals, may have extraordinary tolerance for CO<sub>2</sub>. (3) Reptiles and amphibians may breathe too slowly for the use of CO<sub>2</sub>. (4) Euthanasia by exposure to CO<sub>2</sub> may take longer than euthanasia by other means.<sup>61</sup> (5) Induction of loss of consciousness at lower concentrations (< 80%) may produce pulmonary and upper respiratory tract lesions.<sup>67,84</sup> (6) High concentrations of CO<sub>2</sub> may be distressful to some animals.

**Recommendations**—Carbon dioxide is acceptable for euthanasia in appropriate species (Tables 1 and 2). Compressed CO<sub>2</sub> gas in cylinders is the only recommended source of carbon dioxide because the inflow to the chamber can be regulated precisely. Carbon dioxide generated by other methods such as from dry ice, fire extinguishers, or chemical means (eg, antacids) is unacceptable. Species should be separated and cham-

bers should not be overcrowded. With an animal in the chamber, an optimal flow rate should displace at least 20% of the chamber volume per minute.<sup>85</sup> Loss of consciousness may be induced more rapidly by exposing animals to a CO<sub>2</sub> concentration of 70% or more by pre-filling the chamber for species in which this has not been shown to cause distress. Gas flow should be maintained for at least 1 minute after apparent clinical death.<sup>86</sup> It is important to verify that an animal is dead before removing it from the chamber. If an animal is not dead, CO<sub>2</sub> narcosis must be followed with another method of euthanasia. Adding O<sub>2</sub> to the CO<sub>2</sub> may or may not preclude signs of distress.<sup>67,87</sup> Additional O<sub>2</sub> will, however, prolong time to death and may complicate determination of consciousness. There appears to be no advantage to combining O<sub>2</sub> with carbon dioxide for euthanasia.<sup>87</sup>

### Nitrogen, argon

Nitrogen (N<sub>2</sub>) and argon (Ar) are colorless, odorless gases that are inert, nonflammable, and nonexplosive. Nitrogen comprises 78% of atmospheric air, whereas Ar comprises less than 1%.

Euthanasia is induced by placing the animal in a closed container that has been prefilled with N<sub>2</sub> or Ar or into which the gas is then rapidly introduced. Nitrogen/Ar displaces O<sub>2</sub>, thus inducing death by hypoxemia.

In studies by Herin et al.,<sup>88</sup> dogs became unconscious within 76 seconds when a N<sub>2</sub> concentration of 98.5% was achieved in 45 to 60 seconds. The electroencephalogram (EEG) became isoelectric (flat) in a mean time of 80 seconds, and arterial blood pressure was undetectable at 204 seconds. Although all dogs hyperventilated prior to loss of consciousness, the investigators concluded that this method induced death without pain. Following loss of consciousness, vocalization, gasping, convulsions, and muscular tremors developed in some dogs. At the end of a 5-minute exposure period, all dogs were dead.<sup>88</sup> These findings were similar to those for rabbits<sup>89</sup> and mink.<sup>80,90</sup>

With N<sub>2</sub> flowing at a rate of 39% of chamber volume per minute, rats collapsed in approximately 3 minutes and stopped breathing in 5 to 6 minutes. Regardless of flow rate, signs of panic and distress were evident before the rats collapsed and died.<sup>85</sup> Insensitivity to pain under such circumstances is questionable.<sup>91</sup>

Tranquilization with acepromazine, in conjunction with N<sub>2</sub> euthanasia of dogs, was investigated by Quine et al.<sup>92</sup> Using ECG and EEG recordings, they found these dogs had much longer survival times than dogs not given acepromazine before administration of N<sub>2</sub>. In one dog, ECG activity continued for 51 minutes. Quine also addressed distress associated with exposure to N<sub>2</sub> by removing cats and dogs from the chamber following loss of consciousness and allowing them to recover. When these animals were put back into the chamber, they did not appear afraid or apprehensive.

Investigations into the aversiveness of Ar to swine and poultry have revealed that these animals will tolerate breathing 90% Ar with 2% O<sub>2</sub>.<sup>69,71</sup> Swine voluntarily entered a chamber containing this mixture, for a

food reward, and only withdrew from the chamber as they became ataxic. They reentered the chamber immediately to continue eating. Poultry also entered a chamber containing this mixture for a food reward and continued eating until they collapsed.<sup>71</sup> When Ar was used to euthanatize chickens, exposure to a chamber prefilled with Ar, with an O<sub>2</sub> concentration of < 2%, led to EEG changes and collapse in 9 to 12 seconds. Birds removed from the chamber at 15 to 17 seconds failed to respond to comb pinching. Continued exposure led to convulsions at 20 to 24 seconds. Somatosensory-evoked potentials were lost at 24 to 34 seconds, and the EEG became isoelectric at 57 to 66 seconds. Convulsion onset was after loss of consciousness (collapse and loss of response to comb pinch), so this would appear to be a humane method of euthanasia for chickens.<sup>93</sup> Despite the availability of some information, there is still much about the use of N<sub>2</sub>/Ar that needs to be investigated.

**Advantages**—(1) Nitrogen and Ar are readily available as compressed gases. (2) Hazards to personnel are minimal.

**Disadvantages**—(1) Loss of consciousness is preceded by hypoxemia and ventilatory stimulation, which may be distressing to the animal. (2) Reestablishing a low concentration of O<sub>2</sub> (ie, 6% or greater) in the chamber before death will allow immediate recovery.<sup>69</sup>

**Recommendations**—Nitrogen and Ar can be distressful to some species (eg, rats).<sup>85</sup> Therefore, this technique is conditionally acceptable only if O<sub>2</sub> concentrations < 2% are achieved rapidly, and animals are heavily sedated or anesthetized. With heavy sedation or anesthesia, it should be recognized that death may be delayed. Although N<sub>2</sub> and Ar are effective, other methods of euthanasia are preferable.

### Carbon monoxide

Carbon monoxide (CO) is a colorless, odorless gas that is nonflammable and nonexplosive unless concentrations exceed 10%. It combines with hemoglobin to form carboxyhemoglobin and blocks uptake of O<sub>2</sub> by erythrocytes, leading to fatal hypoxemia.

In the past, mass euthanasia has been accomplished by use of 3 methods for generating CO: (1) chemical interaction of sodium formate and sulfuric acid, (2) exhaust fumes from idling gasoline internal combustion engines, and (3) commercially compressed CO in cylinders. The first 2 techniques are associated with problems such as production of other gases, achieving inadequate concentrations of carbon monoxide, inadequate cooling of the gas, and maintenance of equipment. Therefore, the only acceptable source is compressed CO in cylinders.

In a study by Ramsey and Eilmann,<sup>94</sup> 8% CO caused guinea pigs to collapse in 40 seconds to 2 minutes, and death occurred within 6 minutes. Carbon monoxide has been used to euthanatize mink<sup>80,90</sup> and chinchillas. These animals collapsed in 1 minute, breathing ceased in 2 minutes, and the heart stopped beating in 5 to 7 minutes.

In a study evaluating the physiologic and behavioral characteristics of dogs exposed to 6% CO in air, Chalifoux and Dallaire<sup>95</sup> could not determine the precise time of loss of consciousness. Electroencephalographic recordings revealed 20 to 25 seconds of abnormal cortical function prior to loss of consciousness. It was during this period that the dogs became agitated and vocalized. It is not known whether animals experience distress; however, humans in this phase reportedly are not distressed.<sup>96</sup> Subsequent studies have revealed that tranquilization with acepromazine significantly decreases behavioral and physiologic responses of dogs euthanatized with CO.<sup>97</sup>

In a comparative study, CO from gasoline engine exhaust and 70% CO<sub>2</sub> plus 30% O<sub>2</sub> were used to euthanize cats. Euthanasia was divided into 3 phases. Phase I was the time from initial contact to onset of clinical signs (eg, yawning, staggering, or trembling). Phase II extended from the end of phase I until recumbency, and phase III from the end of phase II until death.<sup>54</sup> The study revealed that signs of agitation before loss of consciousness were greatest with CO<sub>2</sub> plus O<sub>2</sub>. Convulsions occurred during phases II and III with both methods. However, when the euthanasia chamber was prefilled with CO (ie, exhaust fumes), convulsions did not occur in phase III. Time to complete immobilization was greater with CO<sub>2</sub> plus O<sub>2</sub> (approximately 90 seconds) than with CO alone (approximately 56 seconds).<sup>54</sup> In neonatal pigs, excitation was more likely to precede loss of consciousness if the pigs were exposed to a rapid rise in CO concentration. This agitation was reduced at lower flow rates, or when CO was combined with nitrogen.<sup>98</sup>

In people, the most common symptoms of early CO toxicosis are headache, dizziness, and weakness. As concentrations of carboxyhemoglobin increase, these signs may be followed by decreased visual acuity, tinnitus, nausea, progressive depression, confusion, and collapse.<sup>99</sup> Because CO stimulates motor centers in the brain, loss of consciousness may be accompanied by convulsions and muscular spasms.

Carbon monoxide is a cumulative poison.<sup>96</sup> Distinct signs of CO toxicosis are not evident until the CO concentration is 0.05% in air, and acute signs do not develop until the CO concentration is approximately 0.2% in air. In humans, exposure to 0.32% CO and 0.45% CO for one hour will induce loss of consciousness and death, respectively.<sup>100</sup> Carbon monoxide is extremely hazardous for personnel because it is highly toxic and difficult to detect. Chronic exposure to low concentrations of carbon monoxide may be a health hazard, especially with regard to cardiovascular disease and teratogenic effects.<sup>101-103</sup> An efficient exhaust or ventilatory system is essential to prevent accidental exposure of humans.

**Advantages**—(1) Carbon monoxide induces loss of consciousness without pain and with minimal discernible discomfort. (2) Hypoxemia induced by CO is insidious, so that the animal appears to be unaware. (3) Death occurs rapidly if concentrations of 4 to 6% are used.

**Disadvantages**—(1) Safeguards must be taken to prevent exposure of personnel. (2) Any electrical

equipment exposed to CO (eg, lights and fans) must be explosion proof.

**Recommendations**—Carbon monoxide used for individual animal or mass euthanasia is acceptable for dogs, cats, and other small mammals, provided that commercially compressed CO is used and the following precautions are taken: (1) personnel using CO must be instructed thoroughly in its use and must understand its hazards and limitations; (2) the CO chamber must be of the highest quality construction and should allow for separation of individual animals; (3) the CO source and chamber must be located in a well-ventilated environment, preferably out of doors; (4) the chamber must be well lit and have view ports that allow personnel direct observation of animals; (5) the CO flow rate should be adequate to rapidly achieve a uniform CO concentration of at least 6% after animals are placed in the chamber, although some species (eg, neonatal pigs) are less likely to become agitated with a gradual rise in CO concentration;<sup>98</sup> and (6) if the chamber is inside a room, CO monitors must be placed in the room to warn personnel of hazardous concentrations. It is essential that CO use be in compliance with state and federal occupational health and safety regulations.

#### NONINHALANT PHARMACEUTICAL AGENTS

The use of injectable euthanasia agents is the most rapid and reliable method of performing euthanasia. It is the most desirable method when it can be performed without causing fear or distress in the animal. When the restraint necessary for giving an animal an intravenous injection would impart added distress to the animal or pose undue risk to the operator, sedation, anesthesia, or an acceptable alternate route of administration should be employed. Aggressive, fearful, wild, or feral animals should be sedated or given a nonparalytic immobilizing agent prior to intravenous administration of the euthanasia agent.

When intravenous administration is considered impractical or impossible, intraperitoneal administration of a nonirritating euthanasia agent is acceptable, provided the drug does not contain neuromuscular blocking agents. Intracardiac injection is acceptable only when performed on heavily sedated, anesthetized, or comatose animals. It is not considered acceptable in awake animals, owing to the difficulty and unpredictability of performing the injection accurately. Intramuscular, subcutaneous, intrathoracic, intrapulmonary, intrahepatic, intrarenal, intrasplenic, intrathecal, and other nonvascular injections are not acceptable methods of administering injectable euthanasia agents.

When injectable euthanasia agents are administered into the peritoneal cavity, animals may be slow to pass through stages I and II of anesthesia. Accordingly, they should be placed in small cages in a quiet area to minimize excitement and trauma.

#### Barbituric acid derivatives

Barbiturates depress the central nervous system in descending order, beginning with the cerebral cortex,

with loss of consciousness progressing to anesthesia. With an overdose, deep anesthesia progresses to apnea, owing to depression of the respiratory center, which is followed by cardiac arrest.

All barbituric acid derivatives used for anesthesia are acceptable for euthanasia when administered intravenously. There is a rapid onset of action, and loss of consciousness induced by barbiturates results in minimal or transient pain associated with venipuncture. Desirable barbiturates are those that are potent, long-acting, stable in solution, and inexpensive. Sodium pentobarbital best fits these criteria and is most widely used, although others such as secobarbital are also acceptable.

**Advantages**—(1) A primary advantage of barbiturates is speed of action. This effect depends on the dose, concentration, route, and rate of the injection. (2) Barbiturates induce euthanasia smoothly, with minimal discomfort to the animal. (3) Barbiturates are less expensive than many other euthanasia agents.

**Disadvantages**—(1) Intravenous injection is necessary for best results and requires trained personnel. (2) Each animal must be restrained. (3) Current federal drug regulations require strict accounting for barbiturates and these must be used under the supervision of personnel registered with the US Drug Enforcement Administration (DEA). (4) An aesthetically objectionable terminal gasp may occur in unconscious animals. (5) These drugs tend to persist in the carcass and may cause sedation or even death of animals that consume the body.

**Recommendations**—The advantages of using barbiturates for euthanasia in small animals far outweigh the disadvantages. Intravenous injection of a barbituric acid derivative is the preferred method for euthanasia of dogs, cats, other small animals, and horses. Intraperitoneal injection may be used in situations when an intravenous injection would be distressful or even dangerous. Intracardiac injection must only be used if the animal is heavily sedated, unconscious, or anesthetized.

#### Pentobarbital combinations

Several euthanasia products are formulated to include a barbituric acid derivative (usually sodium pentobarbital), with added local anesthetic agents or agents that metabolize to pentobarbital. Although some of these additives are slowly cardiotoxic, this pharmacologic effect is inconsequential. These combination products are listed by the DEA as Schedule III drugs, making them somewhat simpler to obtain, store, and administer than Schedule II drugs such as sodium pentobarbital. The pharmacologic properties and recommended use of combination products that combine sodium pentobarbital with lidocaine or phenytoin are interchangeable with those of pure barbituric acid derivatives.

A combination of pentobarbital with a neuromuscular blocking agent is not an acceptable euthanasia agent.

#### Chloral hydrate

Chloral hydrate depresses the cerebrum slowly; therefore, restraint may be a problem for some animals. Death is caused by hypoxemia resulting from progressive depression of the respiratory center, and may be preceded by gasping, muscle spasms, and vocalization.

**Recommendations**—Chloral hydrate is conditionally acceptable for euthanasia of large animals only when administered intravenously, and only after sedation to decrease the aforementioned undesirable side effects. Chloral hydrate is not acceptable for dogs, cats, and other small animals because the side effects may be severe, reactions can be aesthetically objectionable, and other products are better choices.

#### T-61

T-61 is an injectable, nonbarbiturate, non-narcotic mixture of 3 drugs used for euthanasia. These drugs provide a combination of general anesthetic, curariform, and local anesthetic actions. T-61 has been withdrawn from the market and is no longer manufactured or commercially available in the United States. It is available in Canada and other countries. T-61 should be used only intravenously and at carefully monitored rates of injection, because there is some question as to the differential absorption and onset of action of the active ingredients when administered by other routes.<sup>1</sup>

#### Tricaine methane sulfonate (MS 222, TMS)

MS 222 is commercially available as tricaine methane sulfonate (TMS), which can be used for the euthanasia of amphibians and fish. Tricaine is a benzoic acid derivative and, in water of low alkalinity (< 50 mg/L as CaCO<sub>3</sub>); the solution should be buffered with sodium bicarbonate.<sup>104</sup> A 10 g/L stock solution can be made, and sodium bicarbonate added to saturation, resulting in a pH between 7.0 and 7.5 for the solution. The stock solution should be stored in a dark brown bottle, and refrigerated or frozen if possible. The solution should be replaced monthly and any time a brown color is observed.<sup>105</sup> For euthanasia, a concentration ≥ 250 mg/L is recommended and fish should be left in this solution for at least 10 minutes following cessation of opercular movement.<sup>104</sup> In the United States, there is a 21-day withdrawal time for MS 222; therefore, it is not appropriate for euthanasia of animals intended for food.

#### Potassium chloride in conjunction with prior general anesthesia

Although unacceptable and condemned when used in unanaesthetized animals, the use of a supersaturated solution of potassium chloride injected intravenously or intracardially in an animal under general anesthesia is an acceptable method to produce cardiac arrest and death. The potassium ion is cardiotoxic, and rapid intravenous or intracardiac administration of 1 to 2 mmol/kg of body weight will cause cardiac arrest. This is a preferred injectable technique for euthanasia of livestock or wildlife species to reduce the risk of toxicosis for predators or scavengers in situations where carcasses of euthanatized animals may be consumed.<sup>106,107</sup>

**Advantages**—(1) Potassium chloride is not a controlled substance. It is easily acquired, transported, and mixed in the field. (2) Potassium chloride, when used with appropriate methods to render an animal unconscious, results in a carcass that is potentially less toxic for scavengers and predators in cases where carcass disposal is impossible or impractical.

**Disadvantage**—Rippling of muscle tissue and clonic spasms may occur on or shortly after injection.

**Recommendations**—It is of utmost importance that personnel performing this technique are trained and knowledgeable in anesthetic techniques, and are competent in assessing anesthetic depth appropriate for administration of potassium chloride intravenously. Administration of potassium chloride intravenously requires animals to be in a surgical plane of anesthesia characterized by loss of consciousness, loss of reflex muscle response, and loss of response to noxious stimuli. Saturated potassium chloride solutions are effective in causing cardiac arrest following rapid intracardiac or intravenous injection. Residual tissue concentrations of general anesthetics after anesthetic induction have not been documented. Whereas no scavenger toxicoses have been reported with potassium chloride in combination with a general anesthetic, proper carcass disposal should always be attempted to prevent possible toxicosis by consumption of a carcass contaminated with general anesthetics.

#### Unacceptable injectable agents

When used alone, the injectable agents listed in **Appendix 4** (strychnine, nicotine, caffeine, magnesium sulfate, potassium chloride, cleaning agents, solvents, disinfectants and other toxins or salts, and all neuromuscular blocking agents) are unacceptable and are absolutely condemned for use as euthanasia agents.

### PHYSICAL METHODS

Physical methods of euthanasia include captive bolt, gunshot, cervical dislocation, decapitation, electrocution, microwave irradiation, kill traps, thoracic compression, exsanguination, stunning, and pithing. When properly used by skilled personnel with well-maintained equipment, physical methods of euthanasia may result in less fear and anxiety and be more rapid, painless, humane, and practical than other forms of euthanasia. Exsanguination, stunning, and pithing are not recommended as a sole means of euthanasia, but should be considered adjuncts to other agents or methods.

Some consider physical methods of euthanasia aesthetically displeasing. There are occasions, however, when what is perceived as aesthetic and what is most humane are in conflict. Physical methods may be the most appropriate method for euthanasia and rapid relief of pain and suffering in certain situations. Personnel performing physical methods of euthanasia must be well trained and monitored for each type of physical technique performed. That person must also be sensitive to the aesthetic implications of the method and inform onlookers about what they should expect when possible.

Since most physical methods involve trauma, there is inherent risk for animals and humans. Extreme care and caution should be used. Skill and experience of personnel is essential. If the method is not performed correctly, animals and personnel may be injured. Inexperienced persons should be trained by experienced persons and should practice on carcasses or anesthetized animals to be euthanatized until they are proficient in performing the method properly and humanely. When done appropriately, the panel considers most physical methods conditionally acceptable for euthanasia.

#### Penetrating captive bolt

A penetrating captive bolt is used for euthanasia of ruminants, horses, swine, laboratory rabbits, and dogs.<sup>108</sup> Its mode of action is concussion and trauma to the cerebral hemisphere and brainstem.<sup>109,110</sup> Captive bolt guns are powered by gunpowder or compressed air and must provide sufficient energy to penetrate the skull of the species on which they are being used.<sup>109</sup> Adequate restraint is important to ensure proper placement of the captive bolt. A cerebral hemisphere and the brainstem must be sufficiently disrupted by the projectile to induce sudden loss of consciousness and subsequent death. Accurate placement of captive bolts for various species has been described.<sup>109-112</sup> A multiple projectile has been suggested as a more effective technique, especially for large cattle.<sup>109</sup>

A nonpenetrating captive bolt only stuns animals and should not be used as a sole means of euthanasia (see "Stunning" under "Adjunctive Methods").

**Advantage**—The penetrating captive bolt is an effective method of euthanasia for use in slaughterhouses, in research facilities, and on the farm when use of drugs is inappropriate.

**Disadvantages**—(1) It is aesthetically displeasing. (2) Death may not occur if equipment is not maintained and used properly.

**Recommendations**—Use of the penetrating captive bolt is an acceptable and practical method of euthanasia for horses, ruminants, and swine. It is conditionally acceptable in other appropriate species. The nonpenetrating captive bolt must not be used as a sole method of euthanasia.

#### Euthanasia by a blow to the head

Euthanasia by a blow to the head must be evaluated in terms of the anatomic features of the species on which it is to be performed. A blow to the head can be a humane method of euthanasia for neonatal animals with thin craniums, such as young pigs, if a single sharp blow delivered to the central skull bones with sufficient force can produce immediate depression of the central nervous system and destruction of brain tissue. When properly performed, loss of consciousness is rapid. The anatomic features of neonatal calves, however, make a blow to the head in this species unacceptable. Personnel performing euthanasia by use of a blow to the head must be properly trained and monitored for proficiency with this method of euthanasia, and they must be aware of its aesthetic implications.



## Gunshot

A properly placed gunshot can cause immediate insensibility and humane death. In some circumstances, a gunshot may be the only practical method of euthanasia. Shooting should only be performed by highly skilled personnel trained in the use of firearms and only in jurisdictions that allow for legal firearm use. Personnel, public, and nearby animal safety should be considered. The procedure should be performed outdoors and away from public access.

For use of a gunshot to the head as a method of euthanasia in captive animals, the firearm should be aimed so that the projectile enters the brain, causing instant loss of consciousness.<sup>51,112-114</sup> This must take into account differences in brain position and skull conformation between species, as well as the energy requirement for skull bone and sinus penetration.<sup>109,115</sup> Accurate targeting for a gunshot to the head in various species has been described.<sup>114,116-119</sup> For wildlife and other freely roaming animals, the preferred target area should be the head. The appropriate firearm should be selected for the situation, with the goal being penetration and destruction of brain tissue without emergence from the contralateral side of the head.<sup>120</sup> A gunshot to the heart or neck does not immediately render animals unconscious and thus is not considered to meet the panel's definition of euthanasia.<sup>121</sup>

**Advantages**—(1) Loss of consciousness is instantaneous if the projectile destroys most of the brain. (2) Given the need to minimize stress induced by handling and human contact, gunshot may at times be the most practical and logical method of euthanasia of wild or free-ranging species.

**Disadvantages**—(1) Gunshot may be dangerous to personnel. (2) It is aesthetically unpleasant. (3) Under field conditions, it may be difficult to hit the vital target area. (4) Brain tissue may not be able to be examined for evidence of rabies infection or chronic wasting disease when the head is targeted.

**Recommendations**—When other methods cannot be used, an accurately delivered gunshot is a conditionally acceptable method of euthanasia.<sup>114,122-125</sup> When an animal can be appropriately restrained, the penetrating captive bolt is preferred to a gunshot. Prior to shooting, animals accustomed to the presence of humans should be treated in a calm and reassuring manner to minimize anxiety. In the case of wild animals, gunshots should be delivered with the least amount of prior human contact necessary. Gunshot should not be used for routine euthanasia of animals in animal control situations, such as municipal pounds or shelters.

## Cervical dislocation

Cervical dislocation is a technique that has been used for many years and, when performed by well-trained individuals, appears to be humane. However, there are few scientific studies to confirm this observation. This technique is used to euthanatize poultry, other small birds, mice, and immature rats and rabbits. For mice and rats, the thumb and index finger are

placed on either side of the neck at the base of the skull or, alternatively, a rod is pressed at the base of the skull. With the other hand, the base of the tail or the hind limbs are quickly pulled, causing separation of the cervical vertebrae from the skull. For immature rabbits, the head is held in one hand and the hind limbs in the other. The animal is stretched and the neck is hyperextended and dorsally twisted to separate the first cervical vertebra from the skull.<sup>72,111</sup> For poultry, cervical dislocation by stretching is a common method for mass euthanasia, but loss of consciousness may not be instantaneous.<sup>134</sup>

Data suggest that electrical activity in the brain persists for 13 seconds following cervical dislocation,<sup>127</sup> and unlike decapitation, rapid exsanguination does not contribute to loss of consciousness.<sup>128,129</sup>

**Advantages**—(1) Cervical dislocation is a technique that may induce rapid loss of consciousness.<sup>84,127</sup> (2) It does not chemically contaminate tissue. (3) It is rapidly accomplished.

**Disadvantages**—(1) Cervical dislocation may be aesthetically displeasing to personnel. (2) Cervical dislocation requires mastering technical skills to ensure loss of consciousness is rapidly induced. (3) Its use is limited to poultry, other small birds, mice, and immature rats and rabbits.

**Recommendations**—Manual cervical dislocation is a humane technique for euthanasia of poultry, other small birds, mice, rats weighing < 200 g, and rabbits weighing < 1 kg when performed by individuals with a demonstrated high degree of technical proficiency. In lieu of demonstrated technical competency, animals must be sedated or anesthetized prior to cervical dislocation. The need for technical competency is greater in heavy rats and rabbits, in which the large muscle mass in the cervical region makes manual cervical dislocation physically more difficult.<sup>130</sup> In research settings, this technique should be used only when scientifically justified by the user and approved by the Institutional Animal Care and Use Committee.

Those responsible for the use of this technique must ensure that personnel performing cervical dislocation techniques have been properly trained and consistently apply it humanely and effectively.

## Decapitation

Decapitation can be used to euthanatize rodents and small rabbits in research settings. It provides a means to recover tissues and body fluids that are chemically uncontaminated. It also provides a means of obtaining anatomically undamaged brain tissue for study.<sup>131</sup>

Although it has been demonstrated that electrical activity in the brain persists for 13 to 14 seconds following decapitation,<sup>132</sup> more recent studies and reports indicate that this activity does not infer the ability to perceive pain, and in fact conclude that loss of consciousness develops rapidly.<sup>127-129</sup>

Guillotines that are designed to accomplish decapitation in adult rodents and small rabbits in a uniformly instantaneous manner are commercially available.

Guillotines are not commercially available for neonatal rodents, but sharp blades can be used for this purpose.

**Advantages**—(1) Decapitation is a technique that appears to induce rapid loss of consciousness.<sup>127-129</sup> (2) It does not chemically contaminate tissues. (3) It is rapidly accomplished.

**Disadvantages**—(1) Handling and restraint required to perform this technique may be distressful to animals.<sup>83</sup> (2) The interpretation of the presence of electrical activity in the brain following decapitation has created controversy and its importance may still be open to debate.<sup>127-129,132</sup> (3) Personnel performing this technique should recognize the inherent danger of the guillotine and take adequate precautions to prevent personal injury. (4) Decapitation may be aesthetically displeasing to personnel performing or observing the technique.

**Recommendations**—This technique is conditionally acceptable if performed correctly, and it should be used in research settings when its use is required by the experimental design and approved by the Institutional Animal Care and Use Committee. The equipment used to perform decapitation should be maintained in good working order and serviced on a regular basis to ensure sharpness of blades. The use of plastic cones to restrain animals appears to reduce distress from handling, minimizes the chance of injury to personnel, and improves positioning of the animal in the guillotine. Decapitation of amphibians, fish, and reptiles is addressed elsewhere in this report.

Those responsible for the use of this technique must ensure that personnel who perform decapitation techniques have been properly trained to do so.

### Electrocution

Electrocution, using alternating current, has been used as a method of euthanasia for species such as dogs, cattle, sheep, swine, foxes, and mink.<sup>113,133-138</sup> Electrocution induces death by cardiac fibrillation, which causes cerebral hypoxia.<sup>135,137,139</sup> However, animals do not lose consciousness for 10 to 30 seconds or more after onset of cardiac fibrillation. It is imperative that animals be unconscious before being electrocuted. This can be accomplished by any acceptable means, including electrical stunning.<sup>25</sup> Although an effective, 1-step stunning and electrocution method has been described for use in sheep and hogs, euthanasia by electrocution in most species remains a 2-step procedure.<sup>25,63,140</sup>

**Advantages**—(1) Electrocution is humane if the animal is first rendered unconscious. (2) It does not chemically contaminate tissues. (3) It is economical.

**Disadvantages**—(1) Electrocution may be hazardous to personnel. (2) When conventional single-animal probes are used, it may not be a useful method for mass euthanasia because so much time is required per animal. (3) It is not a useful method for dangerous, intractable animals. (4) It is aesthetically objectionable because of violent extension and stiffening of the limbs, head, and neck. (5) It may not result in death in

small animals (< 5 kg) because ventricular fibrillation and circulatory collapse do not always persist after cessation of current flow.

**Recommendations**—Euthanasia by electrocution requires special skills and equipment that will ensure passage of sufficient current through the brain to induce loss of consciousness and cardiac fibrillation in the 1-step method for sheep and hogs, or cardiac fibrillation in the unconscious animal when the 2-step procedure is used. Although the method is conditionally acceptable if the aforementioned requirements are met, its disadvantages far outweigh its advantages in most applications. Techniques that apply electric current from head to tail, head to foot, or head to moistened metal plates on which the animal is standing are unacceptable.

### Microwave irradiation

Heating by microwave irradiation is used primarily by neurobiologists to fix brain metabolites *in vivo* while maintaining the anatomic integrity of the brain.<sup>141</sup> Microwave instruments have been specifically designed for use in euthanasia of laboratory mice and rats. The instruments differ in design from kitchen units and may vary in maximal power output from 1.3 to 10 kw. All units direct their microwave energy to the head of the animal. The power required to rapidly halt brain enzyme activity depends on the efficiency of the unit, the ability to tune the resonant cavity and the size of the rodent head.<sup>142</sup> There is considerable variation among instruments in the time required for loss of consciousness and euthanasia. A 10 kw, 2,450 MHz instrument operated at a power of 9 kw will increase the brain temperature of 18 to 28 g mice to 79°C in 330 ms, and the brain temperature of 250 to 420 g rats to 94°C in 800 ms.<sup>143</sup>

**Advantages**—(1) Loss of consciousness is achieved in less than 100 ms, and death in less than 1 second. (2) This is the most effective method to fix brain tissue *in vivo* for subsequent assay of enzymatically labile chemicals.

**Disadvantages**—(1) Instruments are expensive. (2) Only animals the size of mice and rats can be euthanatized with commercial instruments that are currently available.

**Recommendations**—Microwave irradiation is a humane method for euthanatizing small laboratory rodents if instruments that induce rapid loss of consciousness are used. Only instruments that are designed for this use and have appropriate power and microwave distribution can be used. Microwave ovens designed for domestic and institutional kitchens are absolutely unacceptable for euthanasia.

### Thoracic (cardiopulmonary, cardiac) compression

Thoracic (cardiopulmonary, cardiac) compression is used to euthanatize small- to medium-sized free-ranging birds when alternate techniques described in this report are not practical.<sup>144</sup>

**Advantages**—(1) This technique is rapid. (2) It is apparently painless. (3) It maximizes carcass use for analytical/contaminant studies.

**Disadvantages**—(1) It may be considered aesthetically unpleasant by onlookers. (2) The degree of distress is unknown.

**Recommendations**—Thoracic (cardiopulmonary, cardiac) compression is a physical technique for avian euthanasia that has applicability in the field when other methods cannot be used. It is accomplished by bringing the thumb and forefinger of one hand under the bird's wing from the posterior and placing them against the ribs.<sup>144</sup> The forefinger of the other hand is placed against the ventral edge of the sternum, just below the furculum. All fingers are brought together forcefully and held under pressure to stop the heart and lungs. Loss of consciousness and death develop quickly. Proper training is needed in the use of this technique to avoid trauma to the bird. Cardiopulmonary compression is not appropriate for laboratory settings, for large or diving birds,<sup>144</sup> or for other species.

### Kill traps

Mechanical kill traps are used for the collection and killing of small, free-ranging mammals for commercial purposes (fur, skin, or meat), scientific purposes, to stop property damage, and to protect human safety. Their use remains controversial, and the panel recognizes that kill traps do not always render a rapid or stress-free death consistent with criteria for euthanasia found elsewhere in this document. For this reason, use of live traps followed by other methods of euthanasia is preferred. There are a few situations when that is not possible or when it may actually be more stressful to the animals or dangerous to humans to use live traps. Although newer technologies are improving kill trap performance in achieving loss of consciousness quickly, individual testing is recommended to be sure the trap is working properly.<sup>145</sup> If kill traps must be used, the most humane available must be chosen,<sup>146-148</sup> as evaluated by use of International Organization for Standardization (ISO) testing procedures,<sup>149</sup> or by the methods of Gilbert,<sup>150</sup> Proulx et al,<sup>151,152</sup> or Hiltz and Roy.<sup>153</sup>

To reach the required level of efficiency, traps may need to be modified from manufacturers production standards. In addition, as specified in scientific studies, trap placement (ground versus tree sets), bait type, set location, selectivity apparatus, body placement modifying devices (eg, sidewings, cones), trigger sensitivity, and trigger type, size, and conformation are essential considerations that could affect a kill trap's ability to reach these standards.

Several kill traps, modifications, and set specifics have been scientifically evaluated and found to meet the aforementioned standards for various species.<sup>151,152,154-167</sup>

**Advantage**—Free-ranging small mammals may be killed with minimal distress associated with handling and human contact.

**Disadvantages**—(1) Traps may not afford death within acceptable time periods. (2) Selectivity and efficiency is dependent on the skill and proficiency of the operator.

**Recommendations**—Kill traps do not always meet the panel's criteria for euthanasia. At the same time, it is recognized that they can be practical and effective for scientific animal collection when used in a manner that ensures selectivity, a swift kill, no damage to body parts needed for field research, and minimal potential for injury of nontarget species.<sup>168,169</sup> Traps need to be checked at least once daily. In those instances when an animal is wounded or captured but not dead, the animal must be killed quickly and humanely. Kill traps should be used only when other acceptable techniques are impossible or have failed. Traps for nocturnal species should not be activated during the day to avoid capture of diurnal species.<sup>168</sup> Trap manufacturers should strive to meet their responsibility of minimizing pain and suffering in target species.

### Adjunctive methods

Stunning and pithing, when properly done, induce loss of consciousness but do not ensure death. Therefore, these methods must be used only in conjunction with other procedures,<sup>123</sup> such as pharmacologic agents, exsanguination, or decapitation to euthanize the animal.

#### EXSANGUINATION

Exsanguination can be used to ensure death subsequent to stunning, or in otherwise unconscious animals. Because anxiety is associated with extreme hypovolemia, exsanguination must not be used as a sole means of euthanasia.<sup>170</sup> Animals may be exsanguinated to obtain blood products, but only when they are sedated, stunned, or anesthetized.<sup>171</sup>

#### STUNNING

Animals may be stunned by a blow to the head, by use of a nonpenetrating captive bolt, or by use of electric current. Stunning must be followed immediately by a method that ensures death. With stunning, evaluating loss of consciousness is difficult, but it is usually associated with a loss of the menace or blink response, pupillary dilatation, and a loss of coordinated movements. Specific changes in the electroencephalogram and a loss of visually evoked responses are also thought to indicate loss of consciousness.<sup>60,172</sup>

**Blow to the head**—Stunning by a blow to the head is used primarily in small laboratory animals with thin craniums.<sup>9,173-175</sup> A single sharp blow must be delivered to the central skull bones with sufficient force to produce immediate depression of the central nervous system. When properly done, consciousness is lost rapidly.

**Nonpenetrating captive bolt**—A nonpenetrating captive bolt may be used to induce loss of consciousness in ruminants, horses, and swine. Signs of effective stunning by captive bolt are immediate collapse and a several second period of tetanic spasm, followed by slow hind limb movements of increasing frequency.<sup>60,176</sup>

Other aspects regarding use of the nonpenetrating captive bolt are similar to the use of a penetrating captive bolt, as previously described.

**Electrical stunning**—Alternating electrical current has been used for stunning species such as dogs, cattle, sheep, goats, hogs, fish and chickens.<sup>133,134,140,177,178</sup> Experiments with dogs have identified a need to direct the electrical current through the brain to induce rapid loss of consciousness. In dogs, when electricity passes only between fore- and hind limbs or neck and feet, it causes the heart to fibrillate but does not induce sudden loss of consciousness.<sup>139</sup> For electrical stunning of any animal, an apparatus that applies electrodes to opposite sides of the head, or in another way directs electrical current immediately through the brain, is necessary to induce rapid loss of consciousness. Attachment of electrodes and animal restraint can pose problems with this form of stunning. Signs of effective electrical stunning are extension of the limbs, opisthotonos, downward rotation of the eyeballs, and tonic spasm changing to clonic spasm, with eventual muscle flaccidity.

Electrical stunning should be followed promptly by electrically induced cardiac fibrillation, exsanguination, or other appropriate methods to ensure death. Refer to the section on electrocution for additional information.

#### PITHING

In general, pithing is used as an adjunctive procedure to ensure death in an animal that has been rendered unconscious by other means. For some species, such as frogs, with anatomic features that facilitate easy access to the central nervous system, pithing may be used as a sole means of euthanasia, but an anesthetic overdose is a more suitable method.

### SPECIAL CONSIDERATIONS

#### Equine euthanasia

Pentobarbital or a pentobarbital combination is the best choice for equine euthanasia. Because a large volume of solution must be injected, use of an intravenous catheter placed in the jugular vein will facilitate the procedure. To facilitate catheterization of an excitable or fractious animal, a tranquilizer such as acepromazine, or an alpha-2 adrenergic agonist can be administered, but these drugs may prolong time to loss of consciousness because of their effect on circulation and may result in varying degrees of muscular activity and agonal gasping. Opioid agonists or agonist/antagonists in conjunction with alpha-2 adrenergic agonists may further facilitate restraint.

In certain emergency circumstances, such as euthanasia of a horse with a serious injury at a racetrack, it may be difficult to restrain a dangerous horse or other large animal for intravenous injection. The animal might cause injury to itself or to bystanders before a sedative could take effect. In such cases, the animal can be given a neuromuscular blocking agent such as succinylcholine, but the animal must be euthanatized with an appropriate technique as soon as the

animal can be controlled. Succinylcholine alone or without sufficient anesthetic must not be used for euthanasia.

Physical methods, including gunshot, are considered conditionally acceptable techniques for equine euthanasia. The penetrating captive bolt is acceptable with appropriate restraint.

#### Animals intended for human or animal food

In euthanasia of animals intended for human or animal food, chemical agents that result in tissue residues cannot be used, unless they are approved by the US Food and Drug Administration.<sup>179</sup> Carbon dioxide is the only chemical currently used for euthanasia of food animals (primarily swine) that does not result in tissue residues. Physical techniques are commonly used for this reason. Carcasses of animals euthanatized by barbituric acid derivatives or other chemical agents may contain potentially harmful residues. These carcasses should be disposed of in a manner that will prevent them from being consumed by human beings or animals.

Selection of a proper euthanasia technique for free-ranging wildlife must take into account the possibility of consumption of the carcass of the euthanatized animal by nontarget predatory or scavenger species. Numerous cases of toxicosis and death attributable to ingestion of pharmaceutically contaminated carcasses in predators and scavengers have been reported.<sup>107</sup> Proper carcass disposal must be a part of any euthanasia procedure under free-range conditions where there is potential for consumption toxicity. When carcasses are to be left in the field, a gunshot to the head, penetrating captive bolt, or injectable agents that are nontoxic (potassium chloride in combination with a nontoxic general anesthetic) should be used so that the potential for scavenger or predator toxicity is lessened.

#### Euthanasia of nonconventional species: zoo, wild, aquatic, and ectothermic animals

Compared with objective information on companion, farm, and laboratory animals, euthanasia of species such as zoo, wild, aquatic, and ectothermic animals has been studied less, and guidelines are more limited. Irrespective of the unique or unusual features of some species, whenever it becomes necessary to euthanatize an animal, death must be induced as painlessly and quickly as possible.

When selecting a means of euthanasia for these species, factors and criteria in addition to those previously discussed must be considered. The means selected will depend on the species, size, safety aspects, location of the animals to be euthanatized, and experience of personnel. Whether the animal to be euthanatized is in the wild, in captivity, or free-roaming are major considerations. Anatomic differences must be considered. For example, amphibians, fish, reptiles, and marine mammals differ anatomically from domestic species. Veins may be difficult to locate. Some species have a carapace or other defensive anatomic adaptations (eg, quills, scales, spines). For physical methods, access to the central nervous system may be difficult because the brain may be small and difficult to locate by inexperienced persons.

## ZOO ANIMALS

For captive zoo mammals and birds with related domestic counterparts, many of the means described previously are appropriate. However, to minimize injury to persons or animals, additional precautions such as handling and physical or chemical restraint are important considerations.<sup>16</sup>

## WILDLIFE

For wild and feral animals, many recommended means of euthanasia for captive animals are not feasible. The panel recognizes there are situations involving free-ranging wildlife when euthanasia is not possible from the animal or human safety standpoint, and killing may be necessary. Conditions found in the field, although more challenging than those that are controlled, do not in any way reduce or minimize the ethical obligation of the responsible individual to reduce pain and distress to the greatest extent possible during the taking of an animal's life. Because euthanasia of wildlife is often performed by lay personnel in remote settings, guidelines are needed to assist veterinarians, wildlife biologists, and wildlife health professionals in developing humane protocols for euthanasia of wildlife.

In the case of free-ranging wildlife, personnel may not be trained in the proper use of remote anesthesia, proper delivery equipment may not be available, personnel may be working alone in remote areas where accidental exposure to potent anesthetic medications used in wildlife capture would present a risk to human safety, or approaching the animal within a practical darting distance may not be possible. In these cases, the only practical means of animal collection may be gunshot and kill trapping.<sup>13,180-184</sup> Under these conditions, specific methods chosen must be as age-, species-, or taxonomic/class-specific as possible. The firearm and ammunition should be appropriate for the species and purpose. Personnel should be sufficiently skilled to be accurate, and they should be experienced in the proper and safe use of firearms, complying with laws and regulations governing their possession and use.

Behavioral responses of wildlife or captive nontraditional species (zoo) in close human contact are very different from those of domestic animals. These animals are usually frightened and distressed. Thus, minimizing the amount, degree, and/or cognition of human contact during procedures that require handling is of utmost importance. Handling these animals often requires general anesthesia, which provides loss of consciousness and which relieves distress, anxiety, apprehension, and perception of pain. Even though the animal is under general anesthesia, minimizing auditory, visual, and tactile stimulation will help ensure the most stress-free euthanasia possible. With use of general anesthesia, there are more methods for euthanasia available.

A 2-stage euthanasia process involving general anesthesia, tranquilization, or use of analgesics, followed by intravenous injectable pharmaceuticals, although preferred, is often not practical. Injectable anesthetics are not always legally or readily available to

those working in nuisance animal control, and the distress to the animal induced by live capture, transport to a veterinary facility, and confinement in a veterinary hospital prior to euthanasia must be considered in choosing the most humane technique for the situation at hand. Veterinarians providing support to those working with injured or live-trapped, free-ranging animals should take capture, transport, handling distress, and possible carcass consumption into consideration when asked to assist with euthanasia. Alternatives to 2-stage euthanasia using anesthesia include a squeeze cage with intraperitoneal injection of sodium pentobarbital, inhalant agents (CO<sub>2</sub> chamber, CO chamber), and gunshot. In cases where pre-euthanasia anesthetics are not available, intraperitoneal injections of sodium pentobarbital, although slower in producing loss of consciousness, should be considered preferable over intravenous injection, if restraint will cause increased distress to the animal or danger to the operator.

Wildlife species may be encountered under a variety of situations. Euthanasia of the same species under different conditions may require different techniques. Even in a controlled setting, an extremely fractious large animal may threaten the safety of the practitioner, bystanders, and itself. When safety is in question and the fractious large animal, whether wild, feral, or domestic, is in close confinement, neuromuscular blocking agents may be used immediately prior to the use of an acceptable form of euthanasia. For this technique to be humane, the operator must ensure they will gain control over the animal and perform euthanasia before distress develops. Succinylcholine is not acceptable as a method of restraint for use in free-ranging wildlife because animals may not be retrieved rapidly enough to prevent neuromuscular blocking agent-induced respiratory distress or arrest.<sup>185</sup>

## DISEASED, INJURED, OR LIVE-CAPTURED WILDLIFE OR FERAL SPECIES

Euthanasia of diseased, injured, or live-trapped wildlife should be performed by qualified professionals. Certain cases of wildlife injury (eg, acute, severe trauma from automobiles) may require immediate action, and pain and suffering in the animal may be best relieved most rapidly by physical methods including gunshot or penetrating captive bolt followed by exsanguination.

## BIRDS

Many techniques discussed previously in this report are suitable for euthanasia of captive birds accustomed to human contact. Free-ranging birds may be collected by a number of methods, including nets and live traps, with subsequent euthanasia. For collection by firearm, shotguns are recommended. The bird should be killed outright by use of ammunition loads appropriate for the species to be collected. Wounded birds should be killed quickly by appropriate techniques previously described. Large birds should be anesthetized prior to euthanasia, using general anesthetics.

## AMPHIBIANS, FISH, AND REPTILES

Euthanasia of ectothermic animals must take into account differences in their metabolism, respiration, and tolerance to cerebral hypoxia. In addition, it is often more difficult to ascertain when an animal is dead. Some unique aspects of euthanasia of amphibians, fishes, and reptiles have been described.<sup>13,51,186,187</sup>

**Injectable agents**—Sodium pentobarbital (60 to 100 mg/kg of body weight) can be administered intravenously, intraabdominally, or intrapleuroperitoneally in most ectothermic animals, depending on anatomic features. Subcutaneous lymph spaces may also be used in frogs and toads. Time to effect may be variable, with death occurring in up to 30 minutes.<sup>1,187,188</sup> Barbiturates other than pentobarbital can cause pain on injection.<sup>189</sup>

**Clove oil**—Because adequate and appropriate clinical trials have not been performed on fish to evaluate its effects, use of clove oil is not acceptable.

**External or topical agents**—Tricaine methane sulfonate (TMS, MS-222) may be administered by various routes to euthanize. For fish and amphibians, this chemical may be placed in water.<sup>190-193</sup> Large fish may be removed from the water, a gill cover lifted, and a concentrated solution from a syringe flushed over the gills. MS 222 is acidic and in concentrations  $\geq 500$  mg/L should be buffered with sodium bicarbonate to saturation resulting in a solution pH of 7.0 to 7.5.<sup>105</sup> MS 222 may also be injected into lymph spaces and pleuroperitoneal cavities.<sup>194</sup> These are effective but expensive means of euthanasia.

Benzocaine hydrochloride, a compound similar to TMS, may be used as a bath or in a recirculation system for euthanasia of fish<sup>184</sup> or amphibians.<sup>13</sup> Benzocaine is not water soluble and therefore is prepared as a stock solution (100 g/L), using acetone or ethanol, which may be irritating to fish tissues. In contrast, benzocaine hydrochloride is water soluble and can be used directly for anesthesia or euthanasia.<sup>105</sup> A concentration  $\geq 250$  mg/L can be used for euthanasia. Fish should be left in the solution for at least 10 minutes following cessation of opercular movement.<sup>104</sup>

The anesthetic agent 2-phenoxyethanol is used at concentrations of 0.5 to 0.6 mL/L or 0.3 to 0.4 mg/L for euthanasia of fish. Death is caused by respiratory collapse. As with other agents, fish should be left in solution for 10 minutes following cessation of opercular movement.<sup>195,196</sup>

**Inhalant agents**—Many reptiles and amphibians, including chelonians, are capable of holding their breath and converting to anaerobic metabolism, and can survive long periods of anoxia (up to 27 hours for some species).<sup>197-202</sup> Because of this ability to tolerate anoxia, induction of anesthesia and time to loss of consciousness may be greatly prolonged when inhalants are used. Death in these species may not occur even after prolonged inhalant exposure.<sup>203</sup> Lizards, snakes, and fish do not hold their breath to the same extent and can be euthanatized by use of inhalant agents.

**Carbon dioxide**—Amphibians,<sup>1</sup> reptiles,<sup>1</sup> and fish<sup>203-205</sup> may be euthanatized with CO<sub>2</sub>. Loss of con-

sciousness develops rapidly, but exposure times required for euthanasia are prolonged. This technique is more effective in active species and those with less tendency to hold their breath.

**Physical methods**—Line drawings of the head of various amphibians and reptiles, with recommended locations for captive bolt or firearm penetration, are available.<sup>13</sup> Crocodilians and other large reptiles can also be shot through the brain.<sup>51</sup>

Decapitation with heavy shears or a guillotine is effective for some species that have appropriate anatomic features. It has been assumed that stopping blood supply to the brain by decapitation causes rapid loss of consciousness. Because the central nervous system of reptiles, fish, and amphibians is tolerant to hypoxic and hypotensive conditions,<sup>13</sup> decapitation must be followed by pithing.<sup>188</sup>

**Two-stage euthanasia procedures**—Propofol and ultrashort-acting barbiturates may be used for these species to produce rapid general anesthesia prior to final administration of euthanasia.

In zoos and clinical settings, neuromuscular blocking agents are considered acceptable for restraint of reptiles if given immediately prior to administration of a euthanatizing agent.

Most amphibians, fishes, and reptiles can be euthanatized by cranial concussion (stunning) followed by decapitation, pithing, or some other physical method.

Severing the spinal cord behind the head by pithing is an effective method of killing some ectotherms. Death may not be immediate unless both the brain and spinal cord are pithed. For these animals, pithing of the spinal cord should be followed by decapitation and pithing of the brain or by another appropriate procedure. Pithing requires dexterity and skill and should only be done by trained personnel. The pithing site in frogs is the foramen magnum, and it is identified by a slight midline skin depression posterior to the eyes with the neck flexed.<sup>187</sup>

**Cooling**—It has been suggested that, when using physical methods of euthanasia in ectothermic species, cooling to 4 C will decrease metabolism and facilitate handling, but there is no evidence that whole body cooling reduces pain or is clinically efficacious.<sup>206</sup> Local cooling in frogs does reduce nociception, and this may be partly opioid mediated.<sup>207</sup> Immobilization of reptiles by cooling is considered inappropriate and inhumane even if combined with other physical or chemical methods of euthanasia. Snakes and turtles, immobilized by cooling, have been killed by subsequent freezing. This method is not recommended.<sup>13</sup> Formation of ice crystals on the skin and in tissues of an animal may cause pain or distress. Quick freezing of deeply anesthetized animals is acceptable.<sup>208</sup>

## MARINE MAMMALS

Barbiturates or potent opioids (eg, etorphine hydrochloride [M 99] and carfentanil) are the agents of choice for euthanasia of marine mammals,<sup>209</sup> although it is recognized their use is not always possible and can

be potentially dangerous to personnel. An accurately placed gunshot may also be a conditionally acceptable method of euthanasia for some species and sizes of stranded marine mammals.<sup>51,209,210</sup>

For stranded whales or other large cetaceans or pinnipeds, succinylcholine chloride in conjunction with potassium chloride, administered intravenously or intraperitoneally, has been used.<sup>211</sup> This method, which is not an acceptable method of euthanasia as defined in this report, leads to complete paralysis of the respiratory musculature and eventual death attributable to hypoxemia.<sup>209</sup> This method may be more humane than allowing the stranded animal to suffocate over a period of hours or days if no other options are available.

#### Euthanasia of animals raised for fur production

Animals raised for fur are usually euthanatized individually at the location where they are raised. Although any handling of these species constitutes a stress, it is possible to minimize this by euthanatizing animals in or near their cages. For the procedures described below, please refer to previous sections for more detailed discussion.

**Carbon monoxide**—For smaller species, CO appears to be an adequate method for euthanasia. Compressed CO is delivered from a tank into an enclosed cage that can be moved adjacent to holding cages. Using the apparatus outside reduces the risk to humans; however, people using this method should still be made aware of the dangers of CO. Animals introduced into a chamber containing 4% CO lost consciousness in  $64 \pm 14$  seconds and were dead within  $215 \pm 45$  seconds.<sup>80</sup> In a study involving electroencephalography of mink being euthanatized with 3.5% CO, the mink were comatose in  $21 \pm 7$  seconds.<sup>212</sup> Only 1 animal should be introduced into the chamber at a time, and death should be confirmed in each case.

**Carbon dioxide**—Administration of CO<sub>2</sub> is also a good euthanasia method for smaller species and is less dangerous than CO for personnel operating the system. When exposed to 100% CO<sub>2</sub>, mink lost consciousness in  $19 \pm 4$  seconds and were dead within  $153 \pm 10$  seconds. When 70% CO<sub>2</sub> was used with 30% O<sub>2</sub>, mink were unconscious in 28 seconds, but they were not dead after a 15-minute exposure.<sup>80</sup> Therefore, if animals are first stunned by 70% CO<sub>2</sub>, they should be killed by exposure to 100% CO<sub>2</sub> or by some other means. As with carbon monoxide, only one animal should be introduced into the chamber at a time.

**Barbiturates**—Barbiturate overdose is an acceptable procedure for euthanasia of many species of animals raised for fur. The drug is injected intraperitoneally and the animal slowly loses consciousness. It is important that the death of each animal be confirmed following barbiturate injection. Barbiturates will contaminate the carcass; therefore the skinned carcass cannot be used for animal food.

**Electrocution**—Electrocution has been used for killing foxes and mink.<sup>135</sup> The electric current must

pass through the brain to induce loss of consciousness before electricity is passed through the rest of the body. Electrical stunning should be followed by euthanasia, using some other technique. Cervical dislocation has been used in mink and other small animals and should be done within 20 seconds of electrical stunning.<sup>213</sup> Use of a nose-to-tail or nose-to-foot method<sup>135</sup> alone may kill the animal by inducing cardiac fibrillation, but the animal may be conscious for a period of time before death. Therefore, these techniques are unacceptable.

#### Prenatal and neonatal euthanasia

When ovarian hysterectomies are performed, euthanasia of feti should be accomplished as soon as possible after removal from the dam. Neonatal animals are relatively resistant to hypoxia.<sup>44,214</sup>

#### Mass euthanasia

Under unusual conditions, such as disease eradication and natural disasters, euthanasia options may be limited. In these situations, the most appropriate technique that minimizes human and animal health concerns must be used. These options include, but are not limited to, CO<sub>2</sub> and physical methods such as gunshot, penetrating captive bolt, and cervical dislocation.

#### POSTFACE

This report summarizes contemporary scientific knowledge on euthanasia in animals and calls attention to the lack of scientific reports assessing pain, discomfort, and distress in animals being euthanatized. Many reports on various methods of euthanasia are either anecdotal, testimonial narratives, or unsubstantiated opinions and are, therefore, not cited in this report. The panel strongly endorses the need for well-designed experiments to more fully determine the extent to which each procedure meets the criteria used for judging methods of euthanasia.

Each means of euthanasia has advantages and disadvantages. It is unlikely that, for each situation, any means will meet all desirable criteria. It is also impractical for this report to address every potential circumstance in which animals are to be euthanatized. Therefore, the use of professional judgment is imperative.

Failure to list or recommend a means of euthanasia in this report does not categorically condemn its use. There may occasionally be special circumstances or situations in which other means may be acceptable. For research animals, these exceptions should be carefully considered by the attending veterinarian and the Institutional Animal Care and Use Committee. In other settings, professional judgment should be used.

The panel discourages the use of unapproved products for euthanasia, unless the product has a clearly understood mechanism of action and pharmacokinetics, and studies published in the literature that scientifically verify and justify its use. Those responsible for euthanasia decisions have a critically important responsibility to carefully assess any new technique, method, or device, using the panel's criteria. In the absence of definitive proof or reasonable expectation, the best interest of the animal should guide the decision process.

References cited in this report do not represent a comprehensive bibliography on all methods of euthanasia. Persons interested in additional information on a particular aspect of animal euthanasia are encouraged to contact the Animal Welfare Information Center, National Agricultural Library, 10301 Baltimore Blvd, Beltsville, MD 20705.

The Panel on Euthanasia is fully committed to the concept that, whenever it becomes necessary to kill any animal for any reason whatsoever, death should be induced as painlessly and quickly as possible. It has been our charge to develop workable guidelines for veterinarians needing to address this problem, and it is our sincere desire that these guidelines be used conscientiously by all animal care providers. We consider this report to be a work in progress with new editions warranted as results of more scientific studies are published.

Acknowledgment: The panel acknowledges the assistance of Ms. Julie Horvath and Dr. David Granstrom in coordinating the preparation and circulation of various drafts of the report. The panel also acknowledges and thanks Dr. Laurence Roy, Dr. Leah Greer, and the many other individuals and organizations that provided valuable review, criticism, and input to the panel through the many drafts of the report. The research and humane communities were especially helpful in shaping important changes and additions to the report.

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## Appendix 1

Agents and methods of euthanasia by species (refer to Appendix 4 for unacceptable agents and methods.)

Species	Acceptable* (refer to Appendix 2 and text for details)	Conditionally acceptable† (refer to Appendix 3 and text for details)
Amphibians	Barbiturates, inhalant anesthetics (in appropriate species), CO <sub>2</sub> , CO, tricaine methane sulfonate (TMS, MS 222), benzocaine hydrochloride, double pithing	Penetrating captive bolt, gunshot, stunning and decapitation, decapitation and pithing
Birds	Barbiturates, inhalant anesthetics, CO <sub>2</sub> , CO, gunshot (free-ranging only)	N <sub>2</sub> , Ar, cervical dislocation, decapitation, thoracic compression (small, free-ranging only)
Cats	Barbiturates, inhalant anesthetics, CO <sub>2</sub> , CO, potassium chloride in conjunction with general anesthesia	N <sub>2</sub> , Ar
Dogs	Barbiturates, inhalant anesthetics, CO <sub>2</sub> , CO, potassium chloride in conjunction with general anesthesia	N <sub>2</sub> , Ar, penetrating captive bolt, electrocution
Fish	Barbiturates, inhalant anesthetics, CO <sub>2</sub> , tricaine methane sulfonate (TMS, MS 222), benzocaine hydrochloride, 2-phenoxyethanol	Decapitation and pithing, stunning and decapitation/pithing
Horses	Barbiturates, potassium chloride in conjunction with general anesthesia, penetrating captive bolt	Chloral hydrate (IV, after sedation), gunshot, electrocution
Marine mammals	Barbiturates, etorphine hydrochloride	Gunshot (cetaceans < 4 meters long)
Mink, fox, and other mammals produced for fur	Barbiturates, inhalant anesthetics, CO <sub>2</sub> (mink require high concentrations for euthanasia without supplemental agents), CO, potassium chloride in conjunction with general anesthesia	N <sub>2</sub> , Ar, electrocution followed by cervical dislocation
Nonhuman primates	Barbiturates	Inhalant anesthetics, CO <sub>2</sub> , CO, N <sub>2</sub> , Ar
Rabbits	Barbiturates, inhalant anesthetics, CO <sub>2</sub> , CO, potassium chloride in conjunction with general anesthesia	N <sub>2</sub> , Ar, cervical dislocation (< 1 kg), decapitation, penetrating captive bolt
Reptiles	Barbiturates, inhalant anesthetics (in appropriate species), CO <sub>2</sub> (in appropriate species)	Penetrating captive bolt, gunshot, decapitation and pithing, stunning and decapitation
Rodents and other small mammals	Barbiturates, inhalant anesthetics, CO <sub>2</sub> , CO, potassium chloride in conjunction with general anesthesia, microwave irradiation	Methoxyflurane, ether, N <sub>2</sub> , Ar, cervical dislocation (rats < 200 g), decapitation
Ruminants	Barbiturates, potassium chloride in conjunction with general anesthesia, penetrating captive bolt	Chloral hydrate (IV, after sedation), gunshot, electrocution
Swine	Barbiturates, CO <sub>2</sub> , potassium chloride in conjunction with general anesthesia, penetrating captive bolt	Inhalant anesthetics, CO, chloral hydrate (IV, after sedation), gunshot, electrocution, blow to the head (< 3 weeks of age)
Zoo animals	Barbiturates, inhalant anesthetics, CO <sub>2</sub> , CO, potassium chloride in conjunction with general anesthesia	N <sub>2</sub> , Ar, penetrating captive bolt, gunshot
Free-ranging wildlife	Barbiturates IV or IP, inhalant anesthetics, potassium chloride in conjunction with general anesthesia	CO <sub>2</sub> , CO, N <sub>2</sub> , Ar, penetrating captive bolt, gunshot, kill traps (scientifically tested)

\*Acceptable methods are those that consistently produce a humane death when used as the sole means of euthanasia. †Conditionally acceptable methods are those that by the nature of the technique or because of greater potential for operator error or safety hazards might not consistently produce humane death or are methods not well documented in the scientific literature.

Continued on next page.

## Appendix 2

Acceptable agents and methods of euthanasia—characteristics and modes of action (refer to text for details)

Agent	Classification	Mode of action	Rapidity	Ease of performance	Safety for personnel	Species suitability	Efficacy and comments
Barbiturates	Hypoxia attributable to depression of vital centers	Direct depression of cerebral cortex, subcortical structures, and vital centers; direct depression of heart muscle	Rapid onset of anesthesia	Animal must be restrained; personnel must be skilled to perform IV injection	Safe except human abuse potential; DEA-controlled substance	Most species	Highly effective when appropriately administered; acceptable IP in small animals and IV
Benzocaine hydrochloride	Hypoxia attributable to depression of vital centers	Depression of CNS	Very rapid, depending on dose	Easily used	Safe	Fish, amphibians	Effective but expensive
Carbon dioxide (bottled gas only)	Hypoxia attributable to depression of vital centers	Direct depression of cerebral cortex, subcortical structures, and vital centers; direct depression of heart muscle	Moderately rapid	Used in closed container	Minimal hazard	Small laboratory animals, birds, cats, small dogs, rabbits, mink (high concentrations required), zoo animals, amphibians, fish, some reptiles, swine	Effective, but time required may be prolonged in immature and neonatal animals
Carbon monoxide (bottled gas only)	Hypoxia	Combines with hemoglobin, preventing its combination with oxygen	Moderate onset time, but insidious so animal is unaware of onset	Requires appropriately maintained equipment	Extremely hazardous, toxic, and difficult to detect	Most small species including dogs, cats, rodents, mink, chinchillas, birds, reptiles, amphibians, zoo animals, rabbits	Effective; acceptable only when equipment is properly designed and operated
Inhalant anesthetics	Hypoxia attributable to depression of vital centers	Direct depression of cerebral cortex, subcortical structures, and vital centers	Moderately rapid onset of anesthesia, excitation may develop during induction	Easily performed with closed container; can be administered to large animals by means of a mask	Must be properly scavenged or vented to minimize exposure to personnel	Some amphibians, birds, cats, dogs, furbearing animals, rabbits, some reptiles, rodents and other small mammals, zoo animals, fish, free-ranging wildlife	Highly effective provided that subject is sufficiently exposed; either is conditionally acceptable
Microwave irradiation	Brain enzyme inactivation	Direct inactivation of brain enzymes by rapid heating of brain	Very rapid	Requires training and highly specialized equipment	Safe	Mice, rats	Highly effective for special needs
Penetrating captive bolt	Physical damage to brain	Direct concussion of brain tissue	Rapid	Requires skill, adequate restraint, and proper placement of captive bolt	Safe	Horses, ruminants, swine	Instant loss of consciousness, but motor activity may continue
2-Phenoxyethanol	Hypoxia attributable to depression of vital centers	Depression of CNS	Very rapid, depending on dose	Easily used	Safe	Fish	Effective but expensive
Potassium chloride (intracardially or intravenously in conjunction with general anesthesia only)	Hypoxia	Direct depression of cerebral cortex, subcortical structures, and vital centers secondary to cardiac arrest.	Rapid	Requires training and specialized equipment for remote injection anesthesia, and ability to give IV injection of potassium chloride	Anesthetics may be hazardous with accidental human exposure	Most species	Highly effective, some clonic muscle spasms may be observed
Tricaine methane sulfonate (TMS, MS 222)	Hypoxia attributable to depression of vital centers	Depression of CNS	Very rapid, depending on dose	Easily used	Safe	Fish, amphibians	Effective but expensive

## Appendix 3

Conditionally acceptable agents and methods of euthanasia—characteristics and modes of action (refer to text for details)

Agent	Classification	Mode of action	Rapidity	Ease of performance	Safety	Species suitability	Efficacy and comments
Blow to the head	Physical damage to brain	Direct concussion of brain tissue	Rapid	Requires skill, adequate restraint, and appropriate force	Safe	Young pigs < 3 weeks old	Must be properly applied to be humane and effective
Carbon dioxide (bottled gas only)	Hypoxia due to depression of vital centers	Direct depression of cerebral cortex, subcortical structures and vital centers; direct depression of heart muscle	Moderately rapid	Used in closed container	Minimal hazard	Nonhuman primates, free-ranging wildlife	Effective, but time required may be prolonged in immature and neonatal animals
Carbon monoxide (bottled gas only)	Hypoxia	Combines with hemoglobin, preventing its combination with oxygen	Moderate onset time, but insidious so animal is unaware of onset	Requires appropriately maintained equipment	Extremely hazardous, toxic, and difficult to detect	Nonhuman primates, free-ranging wildlife	Effective; acceptable only when equipment is properly designed and operated
Cervical dislocation	Hypoxia due to disruption of vital centers	Direct depression of brain	Moderately rapid	Requires training and skill	Safe	Poultry, birds, laboratory mice, rats (< 200 g), rabbits (< 1 kg)	Irreversible; violent muscle contractions can occur after cervical dislocation
Chloral hydrate	Hypoxia from depression of respiratory center	Direct depression of brain	Rapid	Personnel must be skilled to perform IV injection	Safe	Horses, ruminants, swine	Animals should be sedated prior to administration
Decapitation	Hypoxia due to disruption of vital centers	Direct depression of brain	Rapid	Requires training and skill	Guillotine poses potential employee injury hazard	Laboratory rodents; small rabbits; birds; some fish, amphibians, and reptiles (latter 3 with pithing)	Irreversible; violent muscle contraction can occur after decapitation
Electrocution	Hypoxia	Direct depression of brain and cardiac fibrillation	Can be rapid	Not easily performed in all instances	Hazardous to personnel	Used primarily in sheep, swine, foxes, mink (with cervical dislocation), ruminants, animals > 5 kg	Violent muscle contractions occur at same time as loss of consciousness
Gunshot	Hypoxia due to disruption of vital centers	Direct concussion of brain tissue	Rapid	Requires skill and appropriate firearm	May be dangerous	Large domestic and zoo animals, reptiles, amphibians, wildlife, cetaceans (< 4 meters long)	Instant loss of consciousness, but motor activity may continue
Inhalant anesthetics	Hypoxia due to depression of vital centers	Direct depression of cerebral cortex, subcortical structures, and vital centers	Moderately rapid onset of anesthesia; excitation may develop during induction	Easily performed with closed container; can be administered to large animals by means of a mask	Must be properly scavenged or vented to minimize exposure to personnel; ether has explosive potential and exposure to ether may be stressful	Nonhuman primates, swine; ether is conditionally acceptable for rodents and small mammals; methoxyflurane is conditionally acceptable for rodents and small mammals.	Highly effective provided that subject is sufficiently exposed
Nitrogen, argon	Hypoxia	Reduces partial pressure of oxygen available to blood	Rapid	Used in closed chamber with rapid filling	Safe if used with ventilation	Cats, small dogs, birds, rodents, rabbits, other small species, mink, zoo animals, nonhuman primates, free-ranging wildlife	Effective except in young and neonates; an effective agent, but other methods are preferable
Penetrating captive bolt	Physical damage to brain	Direct concussion of brain tissue	Rapid	Requires skill, adequate restraint and proper placement of captive bolt	Safe	Dogs, rabbits, zoo animals, reptiles, amphibians, free-ranging wildlife	Instant loss of consciousness but motor activity may continue
Pithing	Hypoxia due to disruption of vital centers, physical damage to brain	Trauma of brain and spinal cord tissue	Rapid	Easily performed but requires skill	Safe	Some ectotherms	Effective, but death not immediate unless brain and spinal cord are pithed
Thoracic compression	Hypoxia and cardiac arrest	Physical interference with cardiac and respiratory function	Moderately rapid	Requires training	Safe	Small- to medium-sized free-ranging birds	Apparently effective

## Appendix 4

Some unacceptable agents and methods of euthanasia (refer to text for details)

Agent or method	Comments
Air embolism	Air embolism may be accompanied by convulsions, opisthotonos, and vocalization. If used, it should be done only in anesthetized animals.
Blow to the head	Unacceptable for most species.
Burning	Chemical or thermal burning of an animal is not an acceptable method of euthanasia.
Chloral hydrate	Unacceptable in dogs, cats, and small mammals.
Chloroform	Chloroform is a known hepatotoxin and suspected carcinogen and, therefore, is extremely hazardous to personnel.
Cyanide	Cyanide poses an extreme danger to personnel and the manner of death is aesthetically objectionable.
Decompression	Decompression is unacceptable for euthanasia because of numerous disadvantages. (1) Many chambers are designed to produce decompression at a rate 15 to 60 times faster than that recommended as optimum for animals, resulting in pain and distress attributable to expanding gases trapped in body cavities. (2) Immature animals are tolerant of hypoxia, and longer periods of decompression are required before respiration ceases. (3) Accidental recompression, with recovery of injured animals, can occur. (4) Bleeding, vomiting, convulsions, urination, and defecation, which are aesthetically unpleasant, may develop in unconscious animals.
Drowning	Drowning is not a means of euthanasia and is inhumane.
Exsanguination	Because of the anxiety associated with extreme hypovolemia, exsanguination should be done only in sedated, stunned, or anesthetized animals.
Formalin	Direct immersion of an animal into formalin, as a means of euthanasia, is inhumane.
Household products and solvents	Acetone, quaternary compounds (including $\text{CCl}_4$ ), laxatives, clove oil, dimethylketone, quaternary ammonium products*, antacids, and other commercial and household products or solvents are not acceptable agents for euthanasia.
Hypothermia	Hypothermia is not an appropriate method of euthanasia.
Neuromuscular blocking agents (nicotine, magnesium sulfate, potassiumchloride, all curariform agents)	When used alone, these drugs all cause respiratory arrest before loss of consciousness, so the animal may perceive pain and distress after it is immobilized.
Rapid freezing	Rapid freezing as a sole means of euthanasia is not considered to be humane. If used, animals should be anesthetized prior to freezing.
Strychnine	Strychnine causes violent convulsions and painful muscle contractions.
Stunning	Stunning may render an animal unconscious, but it is not a method of euthanasia (except for neonatal animals with thin craniums). If used, it must be immediately followed by a method that ensures death.
Tricaine methane sulfonate (TMS, MS 222)	Should not be used for euthanasia of animals intended as food.

\*Roccal D Plus, Pharmacia & Upjohn, Kalamazoo, Mich.

8JDA-00004780

## Attachment C



## **Practice Advisory for Intraoperative Awareness and Brain Function Monitoring**

**(Approved by the House of Delegates on October 25, 2005)**

*A Report by the American Society of Anesthesiologists Task Force on Intraoperative Awareness\**

PRACTICE advisories are systematically developed reports that are intended to assist decision-making in areas of patient care. Advisories provide a synthesis and analysis of expert opinion, clinical feasibility data, open forum commentary, and consensus surveys. Advisories are not intended as standards, guidelines, or absolute requirements. They may be adopted, modified, or rejected according to clinical needs and constraints.

The use of practice advisories cannot guarantee any specific outcome. Practice advisories summarize the state of the literature and report opinions derived from a synthesis of task force members, expert consultants, open forums and public commentary. Practice advisories are not supported by scientific literature to the same degree as are standards or guidelines because sufficient numbers of adequately controlled studies are lacking. Practice advisories are subject to periodic revision as warranted by the evolution of medical knowledge, technology, and practice.

### **Methodology**

#### *A. Definitions*

Intraoperative awareness under general anesthesia is a rare occurrence, with a reported incidence of 0.1-0.2%.<sup>1-4</sup> Significant psychological sequelae (e.g., post traumatic stress disorder) may occur

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\* Developed by the American Society of Anesthesiologists Task Force on Intraoperative Awareness: Jeffrey L. Apfelbaum, M.D., (Chair), Chicago, Illinois; James F. Arens, M.D., Houston, Texas; Daniel J. Cole, M.D., Phoenix, Arizona; Richard T. Connis, Ph.D., Woodinville, Washington; Karen B. Domino, M.D., Seattle, Washington; John C. Drummond, M.D., San Diego, California; Cor J. Kalkman, M.D., Ph.D., Utrecht, the Netherlands; Ronald D. Miller, M.D., San Francisco, California; David G. Nickinovich, Ph.D., Bellevue, Washington; and Michael M. Todd, M.D., Iowa City, Iowa.

Submitted for publication October 28, 2005. Accepted for publication \_\_\_\_\_. Supported by the American Society of Anesthesiologists under the direction of James F. Arens, M.D., Chair, Committee on Practice Parameters. Approved by the House of Delegates on October 25, 2005. A complete list of references used to develop this Advisory is available by writing to the American Society of Anesthesiologists.

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following an episode of intraoperative awareness, and affected patients may remain severely disabled for extended periods of time.<sup>5</sup> However, in some circumstances, intraoperative awareness may be unavoidable in order to achieve other critically important anesthetic goals.

The following terms or concepts discussed in this Advisory include: consciousness, general anesthesia, depth of anesthesia or depth of hypnosis, recall, amnesia, intraoperative awareness, and brain function monitors. Consistent definitions for these terms are not available in the literature. For purposes of this Advisory, these terms are operationally defined or identified as follows:

- (1) Consciousness: Consciousness is a state in which a patient is able to process information from his or her surroundings. Consciousness is assessed by observing a patient's purposeful responses to various stimuli. Identifiers of purposeful responses include organized movements following voice commands or noxious/painful stimuli.<sup>†</sup> For example, opening of the eyes is one of several possible identifiers or markers of consciousness. Purposeful responses may be absent when paralysis is present as a consequence of neurological disease or the administration of a neuromuscular blocking drug.
- (2) General anesthesia: General anesthesia is defined as a drug-induced loss of consciousness during which patients are not arousable, even by painful stimulation.<sup>‡</sup> The ability to maintain ventilatory function independently is often impaired. Patients often require assistance in maintaining a patent airway, and positive pressure ventilation may be required because of depressed spontaneous ventilation or drug-induced depression of neuromuscular function. Cardiovascular function may be impaired.

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<sup>†</sup> Reflex withdrawal from a painful stimulus is NOT considered a purposeful response, as indicated by the "continuum of depth of sedation, definition of general anesthesia, and levels of sedation/analgesia;" American Society of Anesthesiologists, 2004.

<sup>‡</sup> American Society of Anesthesiologists: Continuum of depth of sedation, definition of general anesthesia, and levels of sedation/analgesia;" ASA Standards, Guidelines and Statements, 2004.

- (3) Depth of anesthesia: Depth of anesthesia or depth of hypnosis refers to a continuum of progressive central nervous system depression and decreased responsiveness to stimulation.
- (4) Recall: For the purpose of this Advisory, recall is the patient's ability to retrieve stored memories. Recall is assessed by a patient's report of previous events, in particular, events that occurred during general anesthesia. *Explicit memory* is assessed by the patient's ability to recall specific events that took place during general anesthesia. *Implicit memory* is assessed by changes in performance or behavior without the ability to recall specific events that took place during general anesthesia that led to those changes.<sup>6</sup> A report of recall may be spontaneous or it may only be elicited in a structured interview or questionnaire. This Advisory does not address implicit memory.
- (5) Amnesia: Amnesia is the absence of recall. Many anesthetic drugs produce amnesia at concentrations well below those necessary for suppression of consciousness. Anterograde amnesia is intended when a drug with amnestic properties is administered before induction of anesthesia. Retrograde amnesia is intended when a drug such as a benzodiazepine is administered after an event that may have caused or been associated with intraoperative consciousness in the hope that it will suppress memory formation and "rescue" from recall.
- (6) Intraoperative awareness: Intraoperative awareness occurs when a patient becomes conscious during a procedure performed under general anesthesia and subsequently has recall of these events. For the purpose of this Advisory, recall is limited to explicit memory, and does not include the time before general anesthesia is fully induced or the time of emergence from general anesthesia, when arousal and return of consciousness are intended. Dreaming is not considered intraoperative awareness.
- (7) Brain function monitors: Brain function monitors are devices that record or process brain electrical activity and convert these signals mathematically into a continuous measure

typically scaled from 0 to 100. In addition to spontaneous cortical electrical activity (electroencephalogram, EEG), these devices may also record and process evoked cortical and subcortical activity (auditory evoked potentials, or AEP) as well as electromyographic (EMG) activity from scalp muscles. For the purpose of this Advisory, only monitors purported to measure depth of anesthesia or hypnosis will be considered. Other, non-EEG/AEP/EMG devices are also available, but are not addressed by this Advisory.

### *B. Purposes of the Advisory*

Intraoperative awareness under general anesthesia is an important clinical problem that clearly is within the foundation of training and continuing medical education in anesthesiology. The purposes of this Advisory are to identify risk factors that may be associated with intraoperative awareness, provide decision tools that may enable the clinician to reduce the frequency of unintended intraoperative awareness, stimulate the pursuit and evaluation of strategies that may prevent or reduce the frequency of intraoperative awareness, and provide guidance for the intraoperative use of brain function monitors as they relate to intraoperative awareness.

### *C. Focus*

This Advisory focuses on the perioperative management of patients who are undergoing a procedure during which general anesthesia is administered. This Advisory is not intended for the perioperative management of minimal, moderate, or deep sedation in the OR or ICU; regional or local anesthesia without general anesthesia; monitored anesthesia care; tracheal intubation of patients or those undergoing resuscitation in emergency trauma after the administration of a neuromuscular block, or intentional intraoperative wake-up testing (e.g., for the purposes of assessing intraoperative neurologic function). In addition, this Advisory is not intended to address the perioperative management of pediatric patients.

### *D. Application*

This Advisory is intended for use by anesthesiologists, other physicians who supervise the administration of general anesthesia, and all other individuals who administer general anesthesia. The Advisory may also serve as a resource for other physicians and health care professionals who are involved in the perioperative management of patients receiving general anesthesia.

*E. Task Force Members and Consultants*

The American Society of Anesthesiologists (ASA) appointed this Task Force of 10 members to (1) review and assess the currently available scientific literature on intraoperative awareness, (2) obtain expert consensus and public opinion, and (3) develop a practice advisory. The Task Force is comprised of anesthesiologists from various geographic areas of the United States, an anesthesiologist from the Netherlands, and two methodologists from the ASA Committee on Practice Parameters.

The ASA appointed the 10 members to the Task Force because of their knowledge or expertise in the medical specialty of anesthesiology, and the development of practice parameters. The members include but are not limited to anesthesiologists with specialized knowledge or expertise in the area of neuroanesthesiology. Two of the 10 members disclosed receipt of funds from or a financial interest in a company developing or manufacturing brain function monitors, which companies have a direct financial interest in the expanded use of such monitors. Other members may have received funds from or have a financial interest in other companies, such as developers or manufacturers of anesthetics, that may be indirectly affected by the expanded use of brain function monitors. The Task Force did not request its members to disclose such interests because they were deemed too remote and speculative to present conflicts of interest.

The Task Force, in turn, sought input from consultants, many of whom who had particularized knowledge, expertise and/or interest in intraoperative awareness and brain function monitors. Such knowledge or expertise is based in part in some cases on research or investigational activities funded

by a company developing or manufacturing brain function monitors. Fifty-four percent of the consultants disclosed receipt of funds from or a financial interest in a company developing or manufacturing brain function monitors. Consultants also may have received funds from or have a financial interest in other companies that may be indirectly affected by the use of brain function monitors. The Task Force did not request its consultants to disclose such interests because they were deemed too remote and speculative to present conflicts of interest.

The Task Force used a six-step process. First, the members reached consensus on the criteria for evidence of effective perioperative interventions for the prevention of intraoperative awareness. Second, they evaluated original articles published in peer-reviewed journals relevant to this issue. Third, consultants who had expertise or interest in intraoperative awareness and who practiced or worked in diverse settings (e.g., scientists and/or physicians in academic and private practice) were asked to participate in opinion surveys on the effectiveness of various perioperative management strategies, and to review and comment on a draft of the Advisory developed by the Task Force. Fourth, additional opinions were solicited from a random sample of active members of the ASA. Fifth, the Task Force held open forums at three national and international anesthesia meetings to solicit input on the key concepts of this Advisory. Sixth, all available information was used to build consensus within the Task Force on the Advisory.

The draft document was made available for review on the ASA website, and commentary was invited via e-mail announcement to all ASA members. All submitted comments were considered by the Task Force in preparing the final draft.

#### *F. Availability and Strength of Evidence*

Practice advisories are developed by a protocol similar to that of an ASA evidence-based practice guideline, including a systematic search and evaluation of the literature. However, practice advisories lack the support of a sufficient number of adequately controlled studies to permit

aggregate analyses of data with rigorous statistical techniques such as meta-analysis. Nonetheless, literature-based evidence from case reports and other descriptive studies are considered during the development of the Advisory. This literature often permits the identification of recurring patterns of clinical practice.

As with a practice guideline, formal survey information is collected from consultants and members of the ASA. The following terms describe survey responses for any specified issue. Responses are solicited on a 5-point scale; ranging from 1 (strongly disagree) to 5 (strongly agree) with a score of 3 being equivocal. Survey responses are summarized based on median values as follows:

<u>Strongly Agree:</u>	Median score of 5 (At least 50% of the responses are 5)
<u>Agree:</u>	Median score of 4 (At least 50% of the responses are 4 or 4 and 5)
<u>Equivocal:</u>	Median score of 3 (At least 50% of the responses are 3, or no other response category or combination of similar categories contain at least 50% of the responses)
<u>Disagree:</u>	Median score of 2 (At least 50% of responses are 2 or 1 and 2)
<u>Strongly Disagree:</u>	Median score of 1 (At least 50% of responses are 1)

Additional information is obtained from open forum presentations and other invited and public sources. The advisory statements contained in this document represent a distillation of the current spectrum of clinical opinion and literature-based findings.<sup>§</sup>

## **Advisories**

### *I. Preoperative Evaluation*

A preoperative evaluation includes (1) obtaining a focused history (i.e., medical records, laboratory reports, patient or patient and family interview), (2) conducting a physical examination, (3) identifying patients at risk for intraoperative awareness (e.g., planned anesthetics, type of surgery), and (4) informing selected patients of the possibility of intraoperative awareness.

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<sup>§</sup> Refer to appendix 1 for a summary of the advisories.

Descriptive studies and case reports suggest that certain patient characteristics may be associated with intraoperative awareness, including age, gender, ASA status, and drug resistance or tolerance.<sup>4,7-</sup>

<sup>11</sup> Descriptive studies and case reports suggest that certain procedures (e.g., cesarean section, cardiac surgery, trauma surgery)<sup>4,8,12-29</sup> as well as anesthetic techniques (e.g., rapid-sequence induction, reduced anesthetic doses with or without the presence of paralysis)<sup>2,3,9,13,16,21, 23,30-33</sup> may be associated with an increased risk of intraoperative awareness. No studies were found that examined the clinical impact of informing the patient prior to surgery of the possibility of intraoperative awareness.

The consultants and ASA members agree that a preoperative evaluation may be helpful in identifying patients at risk for intraoperative awareness.<sup>\*\*</sup> In addition, they agree that a focused preoperative evaluation to identify patients at risk of intraoperative awareness should include review of a patient's medical record, a thorough physical examination, and a patient or patient and family interview. They agree that patient characteristics that may place a patient at risk for intraoperative awareness include: substance use or abuse, limited hemodynamic reserve, and ASA status of 4 or 5. The consultants strongly agree and the ASA members agree that a history of intraoperative awareness may place a patient at risk. The consultants disagree and the ASA members are equivocal regarding whether all patients should be informed of the possibility of intraoperative awareness. The consultants strongly agree and the ASA members agree that only patients considered to be at elevated risk of intraoperative awareness should be informed of the possibility of intraoperative awareness. Finally the consultants and the ASA members disagree that informing the patient preoperatively of the risk of intraoperative awareness increases the *actual* risk of intraoperative awareness.

**Advisory.** The Task Force believes that some components of the preoperative evaluation may be useful in identifying a patient at increased risk for awareness. An evaluation should include, if possible, a review of a patient's medical records for previous occurrences of awareness or other

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<sup>\*\*</sup> Refer to appendix 2 for complete results of the consultant and ASA membership surveys.



potential risk factors, a patient interview to assess level of anxiety or previous experiences with anesthesia, and a physical examination. Potential risk factors to consider for patients undergoing general anesthesia include substance use or abuse (e.g., opioids, benzodiazepines, cocaine), a history of awareness, a history of difficult intubation or anticipated difficult intubation, chronic pain patients on high doses of opioids, cardiac surgery, Cesarean section, trauma and emergency surgery, reduced anesthetic doses in the presence of paralysis, planned use of muscle relaxants during the maintenance phase of general anesthesia, total intravenous anesthesia, the planned use of nitrous oxide-opioid anesthesia, ASA status of 4 or 5, and limited hemodynamic reserve. The consensus of the Task Force is that patients whom the individual clinician considers to be at substantially increased risk of intraoperative awareness should be informed of the possibility of intraoperative awareness when circumstances permit.

## *II. Preinduction Phase of Anesthesia*

Issues concerned with the preinduction phase of anesthesia related to the prevention of intraoperative awareness include checking the functioning of anesthesia delivery systems, and the prophylactic administration of benzodiazepines.

Although checking the functioning of anesthesia delivery systems is standard practice, some cases of intraoperative awareness have resulted from too low concentrations of inspired volatile anesthetics or drug errors, including drug delivery errors.<sup>8,34-39</sup> One double-blind randomized clinical trial evaluated the efficacy of the prophylactic administration of midazolam as an anesthetic adjuvant during ambulatory procedures under total intravenous anesthesia and reported a lower frequency of intraoperative awareness in the midazolam groups compared to the placebo group.<sup>40</sup> Two randomized clinical trials examined anterograde amnesia by providing pictures as stimuli after administration of midazolam but before induction of general anesthesia. Although these studies

reported reduced recall in patients administered midazolam, the presence of consciousness during general anesthesia and subsequent intraoperative awareness was not examined.<sup>41,42</sup>

The consultants and ASA members strongly agree that the functioning of anesthesia delivery systems (e.g., vaporizers, infusion pumps, fresh gas flow, IV lines) should be checked to reduce the risk of intraoperative awareness. The consultants disagree, and the ASA members are equivocal that a benzodiazepine or scopolamine should be used as a component of the anesthetic to reduce the risk of intraoperative awareness for *all* patients. The consultants agree that a benzodiazepine or scopolamine should be used for patients requiring smaller dosages of anesthetics, patients undergoing cardiac surgery, and patients undergoing trauma surgery. They are equivocal regarding patients undergoing Cesarean section, emergency surgery, and with total intravenous anesthesia. The ASA members agree that a benzodiazepine or scopolamine should be used for patients requiring smaller dosages of anesthetics, patients undergoing cardiac surgery, emergency surgery, trauma surgery, and total intravenous anesthesia. They are equivocal regarding patients undergoing Cesarean section.

**Advisory.** Since intraoperative awareness may be caused by equipment malfunction or misuse, the Task Force believes that there should be adherence to a checklist protocol for anesthesia machines and equipment to assure that the desired anesthetic drugs and doses will be delivered. These procedures should be extended to include verification of the proper functioning of intravenous access, infusion pumps and their connections. The Task Force consensus is that the decision to administer a benzodiazepine prophylactically should be made on a case-by-case basis for selected patients (e.g., patients requiring smaller dosages of anesthetics). The Task Force cautions that delayed emergence may accompany the use of benzodiazepines.

### *III. Intraoperative Monitoring*

Intraoperative awareness cannot be measured during the intraoperative phase of general anesthesia, since the recall component of awareness can only be determined postoperatively by

obtaining information directly from the patient. Therefore, the primary issue regarding intraoperative monitoring addressed by this Advisory is whether the use of clinical techniques, conventional monitoring systems, or brain function monitors reduce the occurrence of intraoperative awareness.

The majority of literature obtained during the search and review process did not directly address whether these techniques, systems, or monitors reduce the frequency of intraoperative awareness. However, many studies were found that report intraoperative measures or index values from monitoring activities. This literature, while not directly assessing the impact of an intervention on awareness, often reported patterns or values that occurred at identifiable times during the perioperative period with the intention of describing or predicting variations in the depth of anesthesia. Therefore, commonly reported findings from this literature are summarized below.

The literature for each intervention is presented in the following order: (1) randomized clinical trials, (2) nonrandomized comparative studies (e.g., quasi-experimental, prospective cohort studies), (3) correlational studies (e.g., correlations of index values with end-tidal concentrations of hypnotic drugs or with movement in response to noxious stimuli), (4) descriptive reports of monitor index values at particular times during a procedure; and (5) case reports of unusual or unintended benefits or harms occurring during a monitoring activity. Correlational studies often report a measure of association between two continuous variables (e.g., the correlation between index values and anesthetic drug concentrations). Other correlational measures include a prediction probability (Pk) value that provides a measure of how well a monitor or technique can differentiate between two different clinical states (e.g., response versus no response to verbal command).<sup>43</sup> A Pk value of 1.0 indicates perfect association between an index value and a clinical state, while a Pk value of 0.50 indicates a prediction probability equal to chance.

#### *A. Clinical Techniques and Conventional Monitoring:*

Among the clinical techniques utilized to assess intraoperative consciousness are checking for movement, response to commands, opened eyes, eyelash reflex, pupillary responses or diameters, perspiration and tearing. Conventional monitoring systems include ASA standard monitoring<sup>††</sup> as well as the end-tidal anesthetic analyzer.

No clinical trials or other comparative studies were found that examine the effect of clinical techniques or conventional monitoring on the incidence of intraoperative awareness. Correlational studies reported Pk values ranging from 0.74 to 0.76 for the association between reflex or purposeful movement and indicators for depth of anesthesia.<sup>44</sup> One study reported a significant association between response to command and memory when continuous infusions of propofol were used as the induction anesthetic.<sup>45</sup> Pk values for mean arterial pressure (MAP) ranged from 0.68 to 0.94 for distinguishing a responsive state from an unresponsive state, and from 0.81 to 0.89 for distinguishing an anesthetized state from emergence following anesthesia (i.e., first response). Pk values for heart rate (HR) ranged from 0.50 to 0.82 for distinguishing a responsive state from an unresponsive state, and from 0.54 to 0.67 for emergence.<sup>46-48</sup> Wide ranges of mean MAP and HR values were reported during various intraoperative times. Studies reported ranges of mean MAP values as follows: before induction or baseline, 90 to 103 mmHg; at induction, 58.4 to 88 mmHg; during surgery, 78 to 102 mmHg; at emergence or end of surgery, 58.7 to 97 mmHg; and during postoperative recovery, 86 to 104mmHg. Mean HR ranges were reported as follows: before induction or baseline, 61 to 82 bpm; at induction, 55 to 67 bpm; during surgery, 74 to 82 bpm; at emergence or end of surgery, 59 to 92 bpm; and during postoperative recovery, 82 to 89 bpm.<sup>49-56</sup> Awareness has been reported to occur in the absence of tachycardia or hypertension.<sup>8,23,24</sup>

The consultants and ASA members agree that clinical techniques (e.g., checking for purposeful or reflex movement) are valuable and should be used to assess intraoperative consciousness. In

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<sup>††</sup> American Society of Anesthesiologists: Standards for basic anesthetic monitoring. *In* ASA Standards, Guidelines and Statements; American Society of Anesthesiologists Publication: October, 2004.

addition, the consultants and ASA members agree that conventional monitoring systems (e.g, ECG, BP, HR, end-tidal anesthetic analyzer, capnography) are valuable and should be used to help assess intraoperative consciousness.

*B. Brain Electrical Activity Monitoring:*

Most of the devices designed to monitor brain electrical activity for the purpose of assessing anesthetic effect record electroencephalographic (EEG) activity from electrodes placed on the forehead. Systems can be subdivided into those that process spontaneous EEG and electromyographic (EMG) activity and those that acquire evoked responses to auditory stimuli (auditory evoked potential, AEP). After amplification and conversion of the analog EEG signal to the digital domain, various signal processing algorithms are applied to the frequency, amplitude, latency and/or phase relationship data derived from the raw EEG or AEP to generate a single number, often referred to as an “index” typically scaled between 100 and zero. This index represents the progression of clinical states of consciousness (‘awake’, ‘sedated’, ‘light anesthesia’, ‘deep anesthesia’), with a value of 100 being associated with the awake state, and values of zero occurring with an isoelectric EEG (or absent middle latency AEP). These processing algorithms may either be published and in the public domain or proprietary. Detailed descriptions of the various approaches to EEG signal processing, including bispectral analysis may be found elsewhere.<sup>57</sup> Artifact recognition algorithms intended to avoid contaminated, and therefore spurious, ‘index’ values are an important component of the software in most monitors.

Although EMG activity from scalp muscles can be considered an artifact from the viewpoint of pure EEG analysis, it may be an important source of clinically relevant information. Sudden appearance of frontal (forehead) EMG activity suggests somatic response to noxious stimulation resulting from inadequate analgesia and may give warning of impending arousal. For this reason, some monitors separately provide information on the level of EMG activity.

### *1. Spontaneous EEG Activity Monitors.*

**Bispectral Index.** Bispectral index (BIS) is a proprietary algorithm (Aspect Medical Systems) that converts a single channel of frontal EEG into an index of hypnotic level (bispectral index; BIS). BIS is available either as a separate device (BIS monitor; Aspect Medical Systems) or incorporated - under license from Aspect Medical Systems - in 'BIS modules' made by various anesthesia equipment manufacturers. To compute the BIS, several variables derived from the EEG time domain (burst-suppression analysis), frequency domain (power spectrum, bispectrum: interfrequency phase relationships) are combined into a single index of hypnotic level. BIS values are scaled from 0 to 100, with specific ranges (e.g., 40-60) reported to reflect a low probability of consciousness under general anesthesia. The weight factors for the various components in the multivariate model that generates the BIS were empirically derived from a prospectively collected database of over 1500 anesthetics. The BIS model accounts for the nonlinear stages of EEG activity by allowing different parameters to dominate the resulting BIS as the EEG changes its character with increasing plasma concentrations of various anesthetics, resulting in a linear decrease in BIS. As more data have become available and as methods and algorithms to suppress artifacts have been improved, revised iterations of the algorithm and optimized hardware have been released.

Several RCTs have compared outcomes with BIS-guided anesthetic administration versus standard clinical practice without BIS. In one RCT that enrolled 2500 patients at high risk of intraoperative awareness, explicit recall occurred in 0.17% of patients when BIS monitors were used and in 0.91% of patients managed by routine clinical practice ( $p < 0.02$ ).<sup>58</sup> A small (N = 30) single-blinded RCT (i.e., the anesthesiologists were blinded to the recorded BIS values) compared BIS monitoring with clinical signs during cardiac surgery), and reported one episode of recall in

the clinical signs group compared to no episodes in the BIS-monitored group ( $p > 0.50$ ).<sup>59</sup> In other RCTs, times to awakening, first response, or eye opening and consumption of anesthetic drugs were reduced with the use of BIS.<sup>8,60-68</sup>

One nonrandomized comparison of the use of BIS monitoring versus a cohort of historical controls ( $N = 12,771$ ) found explicit recall occurring in 0.04% of the BIS monitored patients versus 0.18% of the historical controls ( $p < 0.038$ ).<sup>68</sup> Another prospective nonrandomized cohort study ( $N = 19,575$ ) designed to establish the incidence of awareness with recall during routine general anesthesia and to determine BIS values associated with intraoperative awareness events reported no statistically significant difference when BIS was used (0.18% of patients) compared to when BIS was not used (0.10% of patients). Other nonrandomized comparative studies reported higher index values upon arrival in the PACU, shorter recovery times, and lower anesthetic usage among patients monitored with BIS compared to patients not monitored with BIS.<sup>70,71</sup> Numerous correlational studies reported Pk values for BIS ranging from 0.72 to 1.00 for awake versus loss of response following induction with propofol (with or without opioids); and from 0.79 to 0.97 for anesthetized versus first response.<sup>46-48,72-78</sup> One study reported a Pk value of 0.86 for movement from electrical stimulation.<sup>44</sup> Wide ranges of mean BIS values have been reported during various intraoperative times. Ranges of mean BIS values were as follows: before induction or baseline, 80 to 98; at or after induction, 37 to 70; during surgery, 20 to 58; at emergence or end of surgery, 42 to 96; and during postoperative recovery, 64 to 96.<sup>50,51,54-56,79-110</sup> Several case reports indicate that intraoperative events unrelated to titration of anesthetic agents can produce rapid changes in BIS values, e.g., cerebral ischemia or hypoperfusion, gas embolism, unrecognized hemorrhage, inadvertent blockage of anesthesia drug delivery.<sup>111-119</sup> Other case reports suggest that routine intraoperative events (e.g., administration of depolarizing muscle relaxants, activation of electromagnetic equipment or devices, patient warming or planned

hypothermia) may interfere with BIS functioning.<sup>120-128</sup> Two case reports were found that reported patients experiencing intraoperative awareness in spite of monitored values indicating an adequate depth of anesthesia.<sup>129,130</sup> Finally, still other case reports suggested that certain patient conditions may affect BIS values.<sup>131-133</sup>

**Entropy.** Entropy (GE Healthcare Technologies) describes the irregularity, complexity, or unpredictability characteristics of a signal. A single sine wave represents a completely predictable signal (entropy = 0), whereas noise from a random number generator represents entropy = 1. The algorithm for calculation of entropy in the EEG signal (as incorporated in the Datex-Ohmeda S/5 entropy Module) is in the public domain and detailed descriptions have recently been published.<sup>134</sup>

Entropy is independent of absolute scales such as the amplitude or the frequency of the signal. The commercially available Datex-Ohmeda module calculates entropy over time windows of variable duration and reports two separate entropy values. State entropy (SE) is an index ranging from zero to 91 (awake), computed over the frequency range from 0.8 Hz to 32 Hz, reflecting the cortical state of the patient. Response Entropy (RE) is an index ranging from zero to 100 (awake) computed over a frequency range from 0.8 Hz to 47 Hz, containing the higher EMG-dominated frequencies, and will thus also respond to the increased EMG activity resulting from inadequate analgesia. No clinical trials or other comparative studies were found that examine the impact of entropy monitoring on the incidence of intraoperative awareness. One clinical trial reported reduced times to eye opening, response to command, and consumption of anesthetic drugs with the use of entropy monitoring.<sup>135</sup>

Correlational studies report the following Pk values for loss of consciousness: for RE, 0.83 to 0.97; for SE, 0.81 to 0.90.<sup>45,136-137</sup> For anesthetized versus first response, the following Pk values are reported: for RE, 0.85; and for SE, 0.82.<sup>46</sup> Ranges of mean RE and SE values were as



follows: before induction or baseline, 98 (RE) and 89 to 91 (SE); during surgery, 34 to 52 (RE) and 50 to 63 (SE); and at emergence or end of surgery, 96 (RE) and 85 (SE).<sup>52,135,138,139</sup>

**Narcotrend.** The Narcotrend (MonitorTechnik) is derived from a system developed for the visual classification of the EEG patterns associated with various stages of sleep. After artifact exclusion and Fourier transformation, the original electronic algorithm classified the raw (frontal) EEG according to the following system: A (awake), B (sedated), C (light anesthesia), D (general anesthesia), E (general anesthesia with deep hypnosis), F (general anesthesia with increasing burst suppression). The system included a series of sub-classifications resulting in a total of 14 possible sub-stages: A, B0–2, C0–2, D0–2, E0–1, and F0–1.<sup>140</sup> In the most recent iteration of the Narcotrend software (version 4.0), the alphabet-based scale has been “translated” into a dimensionless index, the Narcotrend index, scaled from zero (deeply anesthetized) to 100 (awake), with the stated intention of producing a scale quantitatively similar to the BIS index.

No clinical trials or other comparative studies were found that examine the impact of Narcotrend monitoring on the incidence of intraoperative awareness. One RCT has compared the use of Narcotrend-controlled versus clinically controlled anesthetic administration and found a shorter recovery time in the Narcotrend group (i.e., opened eyes) after termination of anesthesia.<sup>63</sup> Pk values for Narcotrend ranged from 0.93 to 0.99 for awake versus loss of response following induction with propofol combined with an opioid, and from 0.94 to 0.99 for anesthetized versus first response.<sup>47,48</sup> Reported mean Narcotrend values are as follows: after induction (loss of response), 72 to 80; and at emergence or end of surgery (spontaneously opened eyes), 80.<sup>73</sup>

**Patient State Analyzer.** The Patient State Index, or PSI (Physiometrix) is derived from a 4-channel EEG. The derivation of the PSI is based on the observation that there are reversible spatial changes in power distribution of quantitative EEG at loss and return of consciousness. The Patient State Index (PSI) has a range of 0 to 100, with decreasing values indicating

decreasing levels of consciousness or increasing levels of sedation, similar to BIS, Entropy and Narcotrend. The PSI algorithm was constructed using stepwise, discriminant analysis based on multivariate combinations of quantitative EEG variables, derived after Fourier transformation of the raw EEG, and found to be sensitive to changes in the level of anesthesia.

No clinical trials or other comparative studies were found that examine the impact of PSI monitoring on the incidence of intraoperative awareness. One correlational study reported a Pk value of 0.70 for predicting response to command, with a sensitivity of 85.6% and specificity of 38.8%,<sup>77</sup> and another study reported a significant correlation of the PSI with unconsciousness.<sup>141</sup> Reported mean PSI values are as follows: before induction or baseline, 92; during surgery, 32; at emergence or end of surgery, 53; and during postoperative recovery, 81.<sup>141</sup>

**SNAP index.** The SNAPII (Everest Biomedical Instruments) calculates a “SNAP index” from a single channel of EEG. The index calculation is based on a spectral analysis of EEG activity in the 0-18 Hz and 80-420 Hz frequency ranges, and a burst suppression algorithm. There are no published data on the actual algorithm used to calculate the SNAP index, which is based on a composite of both low (0-40 Hz) and high (80-420 Hz) frequency components.

No clinical trials or other comparative studies were found that examine the impact of SNAP monitoring on the incidence of intraoperative awareness. One correlational study was found that reported a mean SNAP index of 71 to be predictive of a loss of consciousness in 95% of elective surgery patients.<sup>142</sup>

**Danmeter Cerebral State Monitor/Cerebral State Index.** The Danmeter CSM is a handheld device that analyzes a single channel EEG and presents a cerebral state ‘index’ scaled from 0-100. In addition, it also provides EEG suppression percentage and a measure of EMG activity (75-85 Hz).

No published literature was found that examined the impact of Danmeter CSM monitoring on

the incidence of intraoperative awareness.

## *2. Evoked Brain Electrical Activity Monitors.*

**AEP Monitor/2** (Danmeter). Auditory evoked potentials (AEP) are the electrical responses of the brainstem, the auditory radiation and the auditory cortex to auditory sound stimuli (clicks) delivered via headphones. The effects of anesthetics on AEP have been studied since the early 1980s.<sup>143-145</sup> The brainstem response is relatively insensitive to anesthetics while early cortical responses, known as the middle-latency AEP (MLAEP) change predictably with increasing concentrations of both volatile and intravenous anesthetics. The typical AEP response to increasing anesthetic concentrations is increased latency and decreased amplitude of the various waveform components. These signals are extremely small (less than one microvolt) necessitating extraction from the spontaneous EEG using signal averaging techniques. Prior to recent innovations, signal averaging was relatively time consuming (several minutes per averaged waveform). More recent signal filtering advances have resulted in an instrument (A-Line) that can record and rapidly update a single channel of AEP from forehead electrodes. From a mathematical analysis of the AEP waveform, the device generates an 'AEP-index' that provides a correlate of anesthetic concentration. The AEP index, or AAI, is scaled from 0 to 100. In contrast to many EEG indices, the AAI corresponding with low probability of consciousness is less than 25, rather than the higher numeric thresholds associated with the other monitors. The device is FDA approved but is not currently marketed in North America.

RCTs that compared MLAEP monitoring (e.g., to titrate anesthetics) to standard clinical practice without MLAEP reported reduced times to eye opening or orientation.<sup>63,64,146</sup> A Pk value of 0.79 was reported for loss of eyelash reflex following induction with propofol and an opioid,<sup>74</sup> and Pk values of 0.63 and 0.66 were reported for responsiveness following discontinuation of remifentanyl or sevoflurane, respectively.<sup>147</sup> One study reported a Pk value of 0.87 for

movement,<sup>148</sup> and another study reported a Pk value of 0.99 for awareness after LMA insertion,<sup>149</sup>

Descriptive studies reported ranges of mean values as follows: before induction or baseline, 73.5 to 85; at or after induction, 33.4 to 61; during surgery, 21.1 to 37.8; at emergence or end of surgery, 24.6 to 40; and during postoperative recovery, 89.7.<sup>74,80,144,150-151</sup>

### *C. Consultant and ASA Member Survey Findings.*

Consultants who participated in this Advisory typically either had a particular knowledge or an expressed interest in intraoperative awareness and brain function monitors. The majority of these consultants disclosed receipt of funds from or a financial interest in a company developing or manufacturing brain function monitors. Consultants were not asked to disclose similar relationships with other companies that may be indirectly affected by the use of brain function monitors. ASA members were randomly selected from a list of active members of the society.

The consultants and ASA members disagree that a brain electrical activity monitor is valuable and should be used to reduce the risk of *intraoperative awareness* for *all* patients. The consultants and ASA members disagree that a brain electrical activity monitor is valuable and should be used to reduce the risk of intraoperative awareness for *no* patient. The consultants agree that a brain electrical activity monitor should be used for patients with conditions that may place them at risk, patients requiring smaller doses of general anesthetics, trauma surgery, Cesarean section, and total intravenous anesthesia. They are equivocal regarding the use of brain electrical activity monitoring for cardiac surgery and emergency surgery. The ASA members agree with the use of such monitors for patients with conditions that may place them at risk, patients requiring smaller doses of general anesthetics, and patients undergoing cardiac surgery. They are equivocal regarding the use of these monitors for patients undergoing Cesarean section, emergency surgery, trauma surgery, and total intravenous anesthesia.

The consultants and ASA members disagree that a brain electrical activity monitor is valuable

and should be used to assess intraoperative *depth of anesthesia* for *all* patients. The consultants and ASA members disagree with the statement that “a brain electrical activity monitor is valuable and should be used to assess intraoperative depth of anesthesia for *no* patient.” The consultants agree that a brain electrical activity monitor should be used to assess intraoperative depth of anesthesia for selected patients. The ASA members agree with the use of brain electrical activity monitors for patients with conditions that may place them at risk and patients requiring smaller doses of general anesthetics. They are equivocal regarding the use of such monitors for patients undergoing cardiac surgery, Cesarean section, emergency surgery, trauma surgery, and total intravenous anesthesia.

**Advisory.** Intraoperative monitoring of depth of anesthesia, for the purpose of minimizing the occurrence of awareness, should rely on multiple modalities, including clinical techniques (e.g., checking for clinical signs such as purposeful or reflex movement) and conventional monitoring systems (e.g., ECG, BP, HR, end-tidal anesthetic analyzer, capnography). The use of neuromuscular blocking drugs may mask purposeful or reflex movements, and adds additional importance to the use of monitoring methods that assure the adequate delivery of anesthesia.

Brain function monitors are dedicated to the assessment of the effects of anesthetics on the brain, and provide information that correlates with some depth of anesthesia indicators, such as plasma concentrations of certain anesthetics (e.g., propofol). In general, the indices generated by these monitors vary in parallel with other established correlates of depth of anesthesia, although the values generated by individual devices in any given anesthetic state differ among the various monitoring technologies. In addition, the values generated by individual devices in the face of a given depth of anesthesia achieved by different combinations of anesthetic drugs (e.g., with or without opioids) will also differ. In other words, a specific numerical value may not correlate with a specific depth of anesthesia. Furthermore, the measured values do not have uniform sensitivity across different anesthetic drugs or types of patients. As with other monitors, common occurrences in the OR may

introduce artifacts into the values derived by these monitors (e.g., electrocautery, lasers, warming devices).

The general clinical applicability of these monitors in the prevention of intraoperative awareness has not been established. While a single randomized clinical trial reported a decrease in the frequency of awareness in high-risk patients, there is insufficient evidence to justify a standard, guideline, or absolute requirement that these devices be used to reduce the occurrence of intraoperative awareness in high-risk patients undergoing general anesthesia. In addition, there is insufficient evidence to justify a standard, guideline, or absolute requirement that these devices be used to reduce the occurrence of intraoperative awareness for any other group of patients undergoing general anesthesia.

It is the consensus of the Task Force that brain function monitoring is not routinely indicated for patients undergoing general anesthesia, either to reduce the frequency of intraoperative awareness or to monitor depth of anesthesia. This consensus is based, in part, on the state of the literature and survey responses from the consultants and ASA membership, who generally disagree with the following statements: "Brain function monitors are valuable and should be used to reduce the risk of intraoperative awareness for all patients under general anesthesia," and "Brain function monitors are valuable and should be used when possible to assess intraoperative depth of anesthesia for all patients under general anesthesia" (see above and tables 1 and 2).

It is the consensus of the Task Force that the decision to use a brain function monitor should be made on a case-by-case basis by the individual practitioner for selected patients (e.g., light anesthesia). This consensus is based, in part, on the state of the literature and survey response patterns from consultants and ASA members regarding specific risk factors (see above and tables 1 and 2). The Task Force cautions that maintaining low brain function monitor values in an attempt to prevent intraoperative awareness may conflict with other important anesthesia goals (e.g.,

preservation of vital organ functions, minimizing the risks of aggravating existing co-morbidities<sup>152</sup>). It is the opinion of the Task Force that brain function monitors currently have the status of the many other monitoring modalities that are currently used in selected situations at the discretion of individual clinicians.

#### *IV. Intraoperative and Postoperative Interventions*

Intraoperative and postoperative interventions include: (1) the intraoperative administration of benzodiazepines to patients who may have become conscious, (2) providing a postoperative structured interview to patients to define the nature of the episode after an episode of intraoperative awareness has been reported, (3) providing a postoperative questionnaire to patients to define the nature of the episode, and (4) offering postoperative counseling or psychological support.

No studies were found that evaluated the efficacy of the intraoperative administration of benzodiazepines to patients who have unexpectedly become conscious in reducing the occurrence of awareness. Two randomized clinical trials examined retrograde amnesia by providing pictures as stimuli to awake patients before administration of midazolam and induction of general anesthesia. The studies reported no evidence of retrograde amnesia.<sup>41,42</sup> However, these studies did not examine the effect of administering a benzodiazepine to patients after the apparent occurrence of consciousness during general anesthesia.

Although several studies have applied structured interviews and questionnaires to obtain additional information about reported incidences of intraoperative awareness,<sup>4,11,26,28,153-157</sup> no studies were found that demonstrated improvements in patient well-being or psychological state following such interactions. No studies were found that followed up on the efficacy of counseling or psychological support provided to patients who experienced a documented incidence of intraoperative awareness.

The consultants are equivocal and ASA members agree that benzodiazepines or scopolamine

should be administered intraoperatively to prevent awareness after a patient has unexpectedly become conscious. The consultants strongly agree, and the ASA members agree that, once an episode of intraoperative awareness has been reported, a structured interview should be conducted to define the nature of the episode. Both the consultants and ASA members are equivocal regarding whether a questionnaire should be given to define the nature of the episode. The consultants strongly agree, and the ASA members agree that, in documented cases of intraoperative awareness, patients should be offered counseling or psychological support. Finally, the consultants strongly agree, and the ASA members agree that, in documented cases of intraoperative awareness, an occurrence report concerning the event should be completed for the purpose of quality management.

**Advisory.** The Task Force consensus is that the decision to administer a benzodiazepine intraoperatively after a patient unexpectedly becomes conscious should be made on a case-by-case basis. . This consensus is based, in part, on the state of the literature and on responses from the Consultants and ASA members who generally agree with the following statement: “Benzodiazepines or scopolamine should be administered intraoperatively to prevent awareness after a patient has unexpectedly become conscious.” However, the Task Force believes that evidence from the literature is not sufficient to provide guidance regarding this issue. Finally, the Task Force cautions that the use of scopolamine may result in unintended side-effects (e.g., emergence delirium).

Practitioners should speak with patients who report recall of intraoperative events to obtain details of the event and to discuss possible reasons for its occurrence.<sup>††</sup> A questionnaire or structured interview may be used to obtain a detailed account of the patient’s experience. Once an episode of intraoperative awareness has been reported, an occurrence report concerning the event should be completed for the purpose of quality management. Finally, the patient should be offered counseling or psychological support.

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<sup>††</sup> Refer to the ASA Director of Communications at 847-825-5586 for further information and guidance.



## **Appendix 1: Summary of Practice Advisory**

### **Preoperative Evaluation**

- Review patient medical records for potential risk factors
  - Substance use or abuse
  - Previous episode of intraoperative awareness
  - History of difficult intubation or anticipated difficult intubation
  - Chronic pain patients on high doses of opioids
  - ASA status 4-5
  - Limited hemodynamic reserve
- Interview patient
  - Assess level of anxiety
  - Obtain information regarding previous experiences with anesthesia
- Determine other potential risk factors
  - Cardiac surgery
  - Cesarean section
  - Trauma surgery
  - Emergency surgery
  - Reduced anesthetic doses in the presence of paralysis
  - Planned use of muscle relaxants during the maintenance phase of general anesthesia
  - Planned use of nitrous oxide-opioid anesthesia
- Patients whom the individual clinician considers to be at substantially increased risk of intraoperative awareness should be informed of the possibility of intraoperative awareness when circumstances permit

### **Preinduction Phase of Anesthesia**

- Adhere to a checklist protocol for anesthesia machines and equipment to assure that the desired anesthetic drugs and doses will be delivered
- Verify the proper functioning of intravenous access, infusion pumps and their connections, including the presence of appropriate back-flow check valves
- The decision to administer a benzodiazepine prophylactically should be made on a case-by-case basis for selected patients (e.g., patients requiring smaller dosages of anesthetics)

### **Intraoperative Monitoring**

- Use multiple modalities to monitor depth of anesthesia
  - Clinical techniques (i.e., checking for purposeful or reflex movement)
    - Neuromuscular blocking drugs may mask purposeful or reflex movement
  - Conventional monitoring systems (e.g., ECG, BP, HR, end-tidal anesthetic analyzer, capnography)
  - Brain function monitoring
    - Not routinely indicated for general anesthesia patients
    - The decision to use a brain function monitor should be made on a case-by-case basis by the individual practitioner for selected patients (e.g., light anesthesia)

## **Intraoperative and Postoperative Management**

- The decision to administer a benzodiazepine intraoperatively after a patient unexpectedly becomes conscious should be made on a case-by-case basis
- Speak with patients who report recall of intraoperative events to obtain details of the event and to discuss possible reasons for its occurrence
- A questionnaire or structured interview may be used to obtain a detailed account of the patient's experience
- Once an episode of intraoperative awareness has been reported, an occurrence report concerning the event should be completed for the purpose of quality management
- Offer counseling or psychological support to those patients who report an episode of intraoperative awareness

## Appendix 2: Literature Review and Consensus-Based Evidence

For this Advisory, a literature review was used in combination with opinions obtained from experts and other sources (e.g., professional society members, open forums, web-based postings) to provide guidance to practitioners regarding intraoperative awareness. Both the literature review and opinion data were based on *evidence linkages*, consisting of directional statements about relationships between specific perioperative interventions and intraoperative awareness. The interventions for the evidence linkages are listed below:

### Preoperative Evaluation

- Focused history (i.e., medical records, patient interview, physical exam)
- Patient characteristics associated with risk of awareness
- Procedures associated with higher risk of intraoperative awareness
- Anesthetic techniques may be associated with higher risk of intraoperative awareness
- Informing patients of the possibility of intraoperative awareness

### Preinduction Phase of Anesthesia

- Check anesthesia delivery systems to reduce errors
- Prophylactic administration of benzodiazepines as co-anesthetics

### Intraoperative Monitoring

- Commonly used clinical techniques
- Conventional monitoring systems
- Brain function monitors
  - Spontaneous electrical activity (EEG/EMG)
    - Bispectral index (BIS)
    - Danmeter Cerebral State Monitor/Cerebral State Index
    - Entropy
    - Narcotrend
    - Patient state analyzer (PSA)
    - SNAP index
  - Evoked electrical activity (auditory evoked potential monitoring)
    - AEP Monitor/2

### Intraoperative and Postoperative Interventions

- Intraoperative use of benzodiazepines for unexpected consciousness
- Structured interview of patients who report recall of intraoperative events
- Questionnaire administered to patients who report recall of intraoperative events
- Patient counseling for patients who report recall of intraoperative events

### *A. State of the Literature.*

A study or report that appears in the published literature is included in the development of an advisory if the study: (1) is related to one of the specified linkage statements, (2) reports a finding or set of findings that can be tallied or measured (e.g., articles that contain only opinion are not included), and (3) is the product of an original investigation or report (i.e., review articles or follow-up studies that summarize previous findings are not included).

For the literature review, potentially relevant studies were identified via electronic and manual searches of the literature. The electronic search covered a 40-year period from 1966 through 2005. The manual search covered a 36-year period of time from 1970 through 2005. Over 1500 citations were initially identified, yielding a total of 711 non-overlapping articles that addressed topics related to the evidence linkages and met our criteria for inclusion. Following review of the articles, 389 studies did not provide direct evidence, and were subsequently eliminated. A total of 322 articles contained direct linkage-related evidence. No evidence linkage contained enough studies with well-defined experimental designs and statistical information to conduct a quantitative analysis (i.e., meta-analysis).

Interobserver agreement among Task Force members and two methodologists was established by interrater reliability testing. Agreement levels using a kappa ( $\kappa$ ) statistic for two-rater agreement pairs were as follows: (1) type of study design,  $\kappa = 0.60$  to  $0.85$ ; (2) type of analysis,  $\kappa = 0.60$  to  $0.93$ ; (3) evidence linkage assignment,  $\kappa = 0.77$  to  $0.88$ ; and (4) literature inclusion for database,  $\kappa = 0.76$  to  $1.00$ . Three-rater chance-corrected agreement values were: (1) study design,  $Sav = 0.82$ ,  $Var(Sav) = 0.007$ ; (2) type of analysis,  $Sav = 0.73$ ,  $Var(Sav) = 0.008$ ; (3) linkage assignment,  $Sav = 0.69$ ,  $Var(Sav) = 0.012$ ; (4) literature database inclusion,  $Sav = 0.84$ ,  $Var(Sav) = 0.014$ . These values represent moderate-to-high levels of agreement.

The primary focus of this Advisory was to examine studies with hypothesis-driven research designs, such as RCTs, that examined the effect of an intervention (such as a brain function monitor) on reducing the occurrence or frequency of intraoperative awareness. To date, only two randomized controlled trials were found that reported intraoperative awareness as the primary study endpoint.<sup>55,56</sup> Additional controlled trials will be necessary before data from published literature can be aggregated to provide a basis for quantitative evidence (i.e., meta-analysis).

Several other RCTs were reviewed that reported primary outcomes other than intraoperative awareness, including emergence time, consumption of anesthetic drugs and recovery characteristics. In addition, many other published studies applied non-hypothesis driven research designs to obtain non-causal or indirect data. For example, descriptive literature (i.e., reports of frequency or incidence) may provide an indication of the scope of the problem. Correlational or predictive data provides information regarding the direction and strength of association of values obtained from patient monitoring devices with other intraoperative measures such as blood concentrations of anesthetic drugs, time to loss of eyelash reflex, and time to awakening. Case reports are typically employed as a forum for reporting and recognizing unusual or unintended benefits or harms. Often, case reports, as well as descriptive or correlational data provide useful hypotheses-generating information that may stimulate additional causal examination of the topic of intraoperative awareness.

Future studies should focus on prospective methodologies, when possible, that utilize traditional hypothesis testing techniques. Use of the following methodological procedures for assessing the impact of interventions for intraoperative awareness is recommended: (1) comparison studies assessing the efficacy of one technique versus other techniques; (2) random assignment to treatment groups with blinding if appropriate; and (3) full reporting of sample size, effect size estimates, test scores, measures of variability, and p-values. The Task Force recognizes that conducting such

studies may be difficult and expensive, because intraoperative awareness is a very low incidence event. The required sample size for a RCT to test the impact of an intervention (e.g., brain function monitor) on the incidence of intraoperative awareness is invariably large. The Task Force also recognizes that, with low incidence data, a difference in the recording of one or two cases of intraoperative awareness can affect the statistical significance of study findings.

Limiting the study to patient subgroups thought to have a higher risk for intraoperative awareness (e.g., cardiac surgery, cesarean section, emergency trauma surgery) may allow for a smaller sample size and provide useful information regarding these subgroups. However, the Task Force recognizes that the generalizability of these findings to the larger population of general anesthesia patients may be limited.

#### *B. Consensus-Based Evidence.*

Consensus was obtained from multiple sources, including: (1) survey opinion from Consultants who were selected based on their knowledge or expertise in intraoperative awareness, (2) survey opinions from a randomly selected sample of active members of the American Society of Anesthesiologists, (3) testimony from attendees of three open forums held at national anesthesia meetings,<sup>§§</sup> (4) internet commentary, and (5) Task Force opinion and interpretation. The survey rate of return was 60% (N = 57/95) for Consultants, and 30% (N=151/500) for the ASA membership. Survey results are presented in the text of the document and in tables 1 and 2.

Ninety-one percent of the consultants and 72% of the ASA members indicated that they had personally used a brain function device in the past. Fifty-seven percent of the consultants indicated that they make use in their current practice of a brain function device either always (11.1%), frequently (20.4%), or sometimes (25.9%). Thirty-six percent of the ASA members

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<sup>§§</sup> American Society of Anesthesiologists, Annual Meeting, October 25, 2004 in Las Vegas, NV; International Anesthesia Research Society, 79<sup>th</sup> Clinical and Scientific Congress, March 12, 2005 in Honolulu, HI; and Association of University Anesthesiologists 52<sup>nd</sup> Annual Meeting, May 6, 2005 in Baltimore, MD.

indicated that they make use in their current practice of a brain function device either always (6.0%), frequently (13.4%), or sometimes (16.8%).

The Consultants were also asked to indicate which, if any, of the evidence linkages would change their clinical practices if the Advisory was instituted. The rate of return was 18% (N = 17/95). The percent of responding Consultants expecting *no change* associated with each linkage were as follows: preoperative evaluation - 82%; informing patients of the possibility of intraoperative awareness - 65%; check anesthesia delivery systems - 94%; prophylactic use of benzodiazepines as co-anesthetics - 100%; use of clinical techniques to monitor for intraoperative awareness - 94%; use of conventional monitoring systems to monitor for intraoperative awareness - 100%; use of brain function monitors to monitor for intraoperative awareness - 59%; intraoperative use of benzodiazepines for unexpected consciousness - 100%; use of a structured interview for patients who report recall of intraoperative events - 41%; use of a questionnaire for patients who report recall of intraoperative events - 53% and counseling for patients who report recall of intraoperative events - 76%. Seventy-one percent of the respondents indicated that the Advisory would have *no effect* on the amount of time spent on a typical case. Four respondents (24%) indicated that there would be an increase in the amount of time they would spend on a typical case with the implementation of this Advisory. The amount of increased time anticipated by these respondents ranged from 1 to 20 minutes.

Table 1. Consultant Survey Responses \*\*\*

		Percent Responding to Each Item				
		Strongly				Strongly
Preoperative evaluation:	N	Agree	Agree	Uncertain	Disagree	Disagree
1. Helpful to identify pts at risk of intraoperative awareness	57	31.6	43.9*	7.0	10.5	7.0
2. A preop eval should include:						
Review of medical records	48	41.7	45.8*	4.2	6.3	2.1
A physical examination	47	21.3	34.0*	17.0	25.5	2.1
A patient/family interview	48	39.6	35.4*	14.6	8.3	2.1
3. Potential patient risk factors:						
Substance use or abuse	54	38.9	42.6*	5.6	13.0	0.0
Pt history of intraop awareness	55	52.7*	29.1	10.9	7.3	0.0
Limited hemodynamic reserve	54	38.9	40.7*	13.0	7.4	0.0
ASA status of 4 or 5	54	24.1	48.1*	20.4	7.1	0.0
4. Procedures/ anesthetic techniques that may place a patient at risk for intraop awareness:						
Cesarean section under GA, cardiac surgery, trauma, emergency surgery	57	75.4*	24.6	0.0	0.0	0.0
Planned use of reduced doses of anesthetics in the presence of paralysis	56	66.1*	25.0	5.4	1.8	1.8
Planned use of muscle relaxants for maintenance	57	26.4	45.6*	8.8	17.5	1.8
Planned use of total intravenous anesthesia	57	10.5	33.3	24.6*	21.1	10.5
Planned use of volatile anesthetics	57	3.5	5.3	12.3	57.9*	21.1
Planned use of nitrous oxide-narcotic anesthesia	57	29.8	35.1*	14.0	19.3	1.8
Preoperative or intraoperative use of beta-blockers under general anesthesia	57	5.3	35.1	26.3*	29.8	3.5
Rapid-sequence induction	57	5.3	29.8	19.3*	42.1	3.5
5. All pts should be informed of the possibility of intraop awareness	57	10.5	31.6	5.3	42.1*	10.5
6. Only patients considered to be at elevated risk of intraop awareness should be informed of the possibility of intraop awareness	40	17.5	60.0*	5.0	7.5	10.0

\*\*\* N = the number of consultants who responded to each item. An astrisk beside a percentage score indicates the median.



	<u>N</u>	<u>Strongly</u> <u>Agree</u>	<u>Agree</u>	<u>Uncertain</u>	<u>Disagree</u>	<u>Strongly</u> <u>Disagree</u>
7. Informing the pt preoperatively of the risk of intraop awareness increases the actual risk of intraoperative awareness	53	3.8	5.7	30.2	35.8*	24.5

#### **Preinduction activities:**

8. The functioning of anesthesia delivery systems should be checked preoperatively to reduce the risk of intraop awareness	57	77.2*	17.5	1.8	3.5	0.0
9. A benzodiazepine or scopolamine should be used as a component of the anesthetic to reduce the risk of intraop awareness:						
<u>For all patients</u> under GA	54	7.4	24.1	1.9	33.3*	33.3
<u>For no patients</u> under GA	54	3.7	3.7	3.7	46.3*	42.6
For pts with conditions that may place them at risk for intraop awareness	53	20.8	58.5*	7.5	7.5	5.7
For patients requiring smaller dosages of general anesthetics ("light anesthesia")	53	17.0	43.4*	11.3	20.8	7.5
For patients undergoing cardiac surgery	54	22.2	44.4*	11.1	16.7	5.6
For patients undergoing Cesarean section under GA	54	7.4	29.6	20.4*	31.5	11.1
For patients undergoing emergency surgery under GA	53	15.1	30.2	20.8*	28.3	5.7
For patients undergoing trauma surgery under GA	54	16.7	35.2*	20.4	22.2	5.6
For patients undergoing total intravenous anesthesia	54	16.7	31.5	18.5*	24.1	9.3

#### **Intraoperative Monitoring:**

10. Commonly used clinical techniques (e.g., checking for purposeful or reflex movement) are valuable and should be used to detect intraop consciousness	53	18.9	47.2*	5.7	18.9	9.4
11. Conventional monitoring systems are valuable and should be used to detect intraoperative consciousness	53	22.6	41.5*	5.7	24.5	5.7

	<u>N</u>	<u>Strongly Agree</u>	<u>Agree</u>	<u>Uncertain</u>	<u>Disagree</u>	<u>Strongly Disagree</u>
12. Brain function monitors are valuable and should be used to reduce the risk of intraoperative awareness:						
<u>For all patients</u> under GA	57	7.0	21.1	19.3	15.8*	36.8
<u>For no patients</u> under GA	56	3.6	7.1	14.3	35.7*	39.3
For pts with conditions that may place them at risk for intraop awareness	57	36.8	26.3*	14.0	14.0	8.8
For patients requiring smaller dosages of general anesthetics (“light anesthesia”)	56	26.8	32.1*	14.3	19.6	7.1
For patients undergoing cardiac surgery	57	28.1	21.1	26.3*	14.0	10.5
For patients undergoing Cesarean section under GA	57	31.6	21.1*	21.1	17.5	8.8
For patients undergoing emergency surgery under GA	57	21.1	28.1	24.6*	17.5	8.8
For patients undergoing trauma surgery under GA	57	26.3	24.6*	24.6	15.8	8.8
For patients undergoing total intravenous anesthesia	56	16.1	39.3*	23.2	14.3	7.1
13. Brain function monitors are valuable and should be used when possible to assess intraoperative depth of anesthesia:						
<u>For all patients</u> under GA	56	12.5	21.4	10.7	14.3*	41.1
<u>For no patients</u> under GA	54	9.3	5.6	9.3	37.0*	38.9
For pts with conditions that may place them at risk for intraop awareness	56	33.9	30.4*	8.9	14.3	12.5
For patients requiring smaller dosages of general anesthetics (“light anesthesia”)	56	28.6	35.7*	10.7	10.7	14.3
For patients undergoing cardiac surgery	56	26.8	28.6*	16.1	14.3	14.3
For patients undergoing Cesarean section under GA	56	28.6	32.1*	12.5	12.5	14.3

	<u>N</u>	<u>Strongly Agree</u>	<u>Agree</u>	<u>Uncertain</u>	<u>Disagree</u>	<u>Strongly Disagree</u>
For patients undergoing emergency surgery under GA	57	21.1	36.8*	10.5	17.5	14.0
For patients undergoing trauma surgery under GA	57	22.8	38.6*	10.5	14.0	14.0
For patients undergoing total intravenous anesthesia	57	26.3	35.1*	17.5	8.8	12.3

#### **Intraoperative & Postoperative Interventions:**

14. Benzodiazepines or scopolamine should be administered intraoperatively to prevent awareness after a pt has unexpectedly become conscious	57	21.1	26.3	15.8*	21.1	15.8
15. Once an episode of intraoperative awareness has been reported, a <u>structured interview</u> should be conducted to define the nature of the episode	57	63.2*	31.5	1.8	0.0	0.0
16. Once an episode of intraop awareness has been reported, a <u>questionnaire</u> should be given to define the nature of the episode	57	10.5	19.3	36.8*	28.1	5.3
17. Once an episode of intraop awareness has been reported and documented, the pt should be offered counseling or psychological support	56	69.6*	25.0	5.4	0.0	0.0
18. Once an episode of intraop awareness has been reported, an occurrence report concerning the event should be completed for the purpose of quality management	57	54.4*	40.4	0.0	5.3	0.0

Table 2. ASA Member Survey Responses<sup>†††</sup>

		<u>Percent Responding to Each Item</u>					
	<u>N</u>	<u>Strongly Agree</u>	<u>Agree</u>	<u>Uncertain</u>	<u>Disagree</u>	<u>Strongly Disagree</u>	
<b>Preoperative evaluation:</b>							
1. Helpful to identify pts at risk of intraoperative awareness	146	27.4	46.6*	14.4	10.3	1.4	
2. A preop eval should include:							
Review of medical records	121	38.8	47.9*	7.4	5.0	0.8	
A physical examination	118	23.7	37.3*	18.6	17.8	2.5	
A patient/family interview	121	46.3	43.0*	6.6	3.3	0.8	
3. Potential patient risk factors:							
Substance use or abuse	147	31.3	44.2*	16.3	6.8	1.4	
Pt history of intraop awareness	146	45.2	31.5*	11.0	11.6	0.7	
Limited hemodynamic reserve	145	46.3	38.6*	6.9	6.9	1.4	
ASA status of 4 or 5	145	33.1	40.7*	11.0	13.1	2.1	
4. Procedures/ anesthetic techniques that may place a patient at risk for intraop awareness:							
Cesarean section under GA, cardiac surgery, trauma, emergency surgery	151	70.2*	27.2	0.7	1.3	0.7	
Planned use of reduced doses of anesthetics in the presence of paralysis	148	48.6	44.6*	4.1	2.7	0.0	
Planned use of muscle relaxants for maintenance	147	21.1	34.7*	16.3	26.5	1.4	
Planned use of total intravenous anesthesia	146	13.0	26.7	24.0*	32.2	4.1	
Planned use of volatile anesthetics	148	0.7	10.1	10.1	63.5*	15.5	
Planned use of nitrous oxide-narcotic anesthesia	147	11.6	46.9*	18.4	19.7	3.4	
Preoperative or intraoperative use of beta-blockers under general anesthesia	148	4.7	31.1	23.0*	36.5	4.7	
Rapid-sequence induction	148	3.4	31.1	18.9*	41.9	4.7	
5. All pts should be informed of the possibility of intraop awareness	147	15.0	28.6	10.9*	40.1	5.4	
6. Only patients considered to be at elevated risk of intraop awareness should be informed of the possibility of intraop awareness	112	17.0	49.1*	7.1	21.4	5.4	

<sup>†††</sup> N = the number of members who responded to each item. An astrisk beside a percentage score indicates the median.

	<u>N</u>	<u>Strongly Agree</u>	<u>Agree</u>	<u>Uncertain</u>	<u>Disagree</u>	<u>Strongly Disagree</u>
7. Informing the pt preoperatively of the risk of intraop awareness increases the <i>actual</i> risk of intraoperative awareness	147	2.7	10.9	33.3	38.8*	14.3

**Preinduction activities:**

8. The functioning of anesthesia delivery systems should be checked preoperatively to reduce the risk of intraop awareness	148	60.8*	37.8	0.7	0.7	0.0
9. A benzodiazepine or scopolamine should be used as a component of the anesthetic to reduce the risk of intraop awareness:						
<u>For all patients</u> under GA	150	15.3	34.0	6.0*	30.7	14.0
<u>For no patients</u> under GA	144	0.7	2.8	3.5	50.7*	42.4
For pts with conditions that may place them at risk for intraop awareness	148	37.8	56.1*	3.4	2.7	0.0
For patients requiring smaller dosages of general anesthetics ("light anesthesia")	150	31.3	60.7*	4.7	3.3	0.0
For patients undergoing cardiac surgery	147	39.5	48.3*	9.5	2.7	0.0
For patients undergoing Cesarean section under GA	151	13.2	23.2	27.8*	28.5	7.3
For patients undergoing emergency surgery under GA	151	21.1	42.4*	21.9	13.9	0.7
For patients undergoing trauma surgery under GA	150	24.0	44.7*	22.7	8.7	0.0
For patients undergoing total intravenous anesthesia	150	23.3	48.0*	14.0	12.7	2.0

**Intraoperative Monitoring:**

10. Commonly used clinical techniques (e.g., checking for purposeful or reflex movement) are valuable and should be used to detect intraop consciousness	151	10.6	50.3*	21.2	13.9	4.0
11. Conventional monitoring systems are valuable and should be used to detect intraoperative consciousness	150	20.7	56.7*	9.3	10.7	2.7

	<u>N</u>	<u>Strongly Agree</u>	<u>Agree</u>	<u>Uncertain</u>	<u>Disagree</u>	<u>Strongly Disagree</u>
12. Brain function monitors are valuable and should be used to reduce the risk of intraoperative awareness:						
<u>For all patients</u> under GA	149	10.7	10.7	16.1	37.6*	24.8
<u>For no patients</u> under GA	146	2.7	3.4	24.7	44.5*	24.7
For pts with conditions that may place them at risk for intraop awareness	147	21.1	48.3*	19.0	10.2	1.4
For patients requiring smaller dosages of general anesthetics ("light anesthesia")	147	19.7	38.8*	24.5	13.6	3.4
For patients undergoing cardiac surgery	148	20.3	33.8*	30.4	12.2	3.4
For patients undergoing Cesarean section under GA	148	12.8	34.5	25.0*	23.0	4.7
For patients undergoing emergency surgery under GA	146	17.8	26.0	28.8*	24.0	3.4
For patients undergoing trauma surgery under GA	148	18.9	29.7	28.4*	19.6	3.4
For patients undergoing total intravenous anesthesia	148	13.5	35.1	25.7*	20.3	5.4
13. Brain function monitors are valuable and should be used when possible to assess intraoperative depth of anesthesia:						
<u>For all patients</u> under GA	150	12.0	9.3	16.0	30.7*	32.0
<u>For no patients</u> under GA	147	2.7	4.8	24.5	41.5*	26.5
For pts with conditions that may place them at risk for intraop awareness	148	20.3	43.2*	20.9	10.8	4.7
For patients requiring smaller dosages of general anesthetics ("light anesthesia")	149	20.1	37.6*	20.8	15.4	6.0
For patients undergoing cardiac surgery	149	20.1	27.5	28.2*	19.5	4.7
For patients undergoing Cesarean section under GA	149	13.4	30.2	22.8*	26.2	7.4
For patients undergoing emergency surgery under GA	149	14.8	26.8	24.8*	26.8	5.4
For patients undergoing trauma surgery under GA	149	16.1	28.9	25.5*	24.2	5.4
For patients undergoing total intravenous anesthesia	149	15.4	32.9	24.8*	20.1	6.7

	<u>N</u>	<u>Strongly Agree</u>	<u>Agree</u>	<u>Uncertain</u>	<u>Disagree</u>	<u>Strongly Disagree</u>
<b>Intraoperative &amp; Postoperative Interventions:</b>						
14. Benzodiazepines or scopolamine should be administered intraoperatively to prevent awareness after a pt has unexpectedly become conscious	151	33.1	49.7*	9.9	7.3	0.0
15. Once an episode of intraoperative awareness has been reported, a <u>structured interview</u> should be conducted to define the nature of the episode	151	49.0	43.0*	7.3	0.7	0.0
16. Once an episode of intraop awareness has been reported, a <u>questionnaire</u> should be given to define the nature of the episode	151	19.9	21.9	38.4*	18.5	1.3
17. Once an episode of intraop awareness has been reported and documented, the pt should be offered counseling or psychological support	151	44.4	39.1*	14.6	1.3	0.7
18. Once an episode of intraop awareness has been reported, an occurrence report concerning the event should be completed for the purpose of quality management	151	47.7	41.1*	9.3	1.3	0.7

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<sup>†††</sup> The references listed here do not represent a complete bibliography of the literature reviewed. A complete bibliography is available by writing to the American Society of Anesthesiologists or by accessing the *Anesthesiology* Web site: <http://www.anesthesiology.org>



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## Attachment D



# **STANDARDS FOR BASIC ANESTHETIC MONITORING**

## **Committee of Origin: Standards and Practice Parameters**

**(Approved by the ASA House of Delegates on October 21, 1986, and last amended on October 25, 2005)**

These standards apply to all anesthesia care although, in emergency circumstances, appropriate life support measures take precedence. These standards may be exceeded at any time based on the judgment of the responsible anesthesiologist. They are intended to encourage quality patient care, but observing them cannot guarantee any specific patient outcome. They are subject to revision from time to time, as warranted by the evolution of technology and practice. They apply to all general anesthetics, regional anesthetics and monitored anesthesia care. This set of standards addresses only the issue of basic anesthetic monitoring, which is one component of anesthesia care. In certain rare or unusual circumstances, 1) some of these methods of monitoring may be clinically impractical, and 2) appropriate use of the described monitoring methods may fail to detect untoward clinical developments. Brief interruptions of continual† monitoring may be unavoidable. These standards are not intended for application to the care of the obstetrical patient in labor or in the conduct of pain management.

### **STANDARD I**

Qualified anesthesia personnel shall be present in the room throughout the conduct of all general anesthetics, regional anesthetics and monitored anesthesia care.

#### **OBJECTIVE**

Because of the rapid changes in patient status during anesthesia, qualified anesthesia personnel shall be continuously present to monitor the patient and provide anesthesia care. In the event there is a direct known hazard, e.g., radiation, to the anesthesia personnel which might require intermittent remote observation of the patient, some provision for monitoring the patient must be made. In the event that an emergency requires the temporary absence of the person primarily responsible for the anesthetic, the best judgment of the anesthesiologist will be exercised in comparing the emergency with the anesthetized patient's condition and in the selection of the person left responsible for the anesthetic during the temporary absence.

### **STANDARD II**

During all anesthetics, the patient's oxygenation, ventilation, circulation and temperature shall be continually evaluated.

#### **OXYGENATION**

##### **OBJECTIVE**

To ensure adequate oxygen concentration in the inspired gas and the blood during all anesthetics.

##### **METHODS**

- 1) Inspired gas: During every administration of general anesthesia using an anesthesia machine, the concentration of oxygen in the patient breathing system shall be measured by an oxygen analyzer with a low oxygen concentration limit alarm in use.\*

† Note that "continual" is defined as "repeated regularly and frequently in steady rapid succession" whereas "continuous" means "prolonged without any interruption at any time."

\* Under extenuating circumstances, the responsible anesthesiologist may waive the requirements marked with an asterisk (\*); it is recommended that when this is done, it should be so stated (including the reasons) in a note in the patient's medical record.

## **STANDARDS FOR BASIC ANESTHETIC MONITORING**

- 2) Blood oxygenation: During all anesthetics, a quantitative method of assessing oxygenation such as pulse oximetry shall be employed.\* When the pulse oximeter is utilized, the variable pitch pulse tone and the low threshold alarm shall be audible to the anesthesiologist or the anesthesia care team personnel.\* Adequate illumination and exposure of the patient are necessary to assess color.\*

### **VENTILATION**

#### **OBJECTIVE**

To ensure adequate ventilation of the patient during all anesthetics.

#### **METHODS**

- 1) Every patient receiving general anesthesia shall have the adequacy of ventilation continually evaluated. Qualitative clinical signs such as chest excursion, observation of the reservoir breathing bag and auscultation of breath sounds are useful. Continual monitoring for the presence of expired carbon dioxide shall be performed unless invalidated by the nature of the patient, procedure or equipment. Quantitative monitoring of the volume of expired gas is strongly encouraged.\*
- 2) When an endotracheal tube or laryngeal mask is inserted, its correct positioning must be verified by clinical assessment and by identification of carbon dioxide in the expired gas. Continual end-tidal carbon dioxide analysis, in use from the time of endotracheal tube/laryngeal mask placement, until extubation/removal or initiating transfer to a postoperative care location, shall be performed using a quantitative method such as capnography, capnometry or mass spectroscopy.\* When capnography or capnometry is utilized, the end tidal CO<sub>2</sub> alarm shall be audible to the anesthesiologist or the anesthesia care team personnel.\*
- 3) When ventilation is controlled by a mechanical ventilator, there shall be in continuous use a device that is capable of detecting disconnection of components of the breathing system. The device must give an audible signal when its alarm threshold is exceeded.
- 4) During regional anesthesia and monitored anesthesia care, the adequacy of ventilation shall be evaluated by continual observation of qualitative clinical signs and/or monitoring for the presence of exhaled carbon dioxide.

### **CIRCULATION**

#### **OBJECTIVE**

To ensure the adequacy of the patient's circulatory function during all anesthetics.

#### **METHODS**

- 1) Every patient receiving anesthesia shall have the electrocardiogram continuously displayed from the beginning of anesthesia until preparing to leave the anesthetizing location.\*
  - 2) Every patient receiving anesthesia shall have arterial blood pressure and heart rate determined and evaluated at least every five minutes.\*
  - 3) Every patient receiving general anesthesia shall have, in addition to the above, circulatory function continually evaluated by at least one of the following: palpation of a pulse, auscultation of heart sounds, monitoring of a tracing of intra-arterial pressure, ultrasound peripheral pulse monitoring, or pulse plethysmography or oximetry.
- \* Under extenuating circumstances, the responsible anesthesiologist may waive the requirements marked with an asterisk (\*); it is recommended that when this is done, it should be so stated (including the reasons) in a note in the patient's medical record.

## **STANDARDS FOR BASIC ANESTHETIC MONITORING**

### **BODY TEMPERATURE**

#### **OBJECTIVE**

To aid in the maintenance of appropriate body temperature during all anesthetics.

#### **METHODS**

Every patient receiving anesthesia shall have temperature monitored when clinically significant changes in body temperature are intended, anticipated or suspected.

## Attachment E

# The Columbus Dispatch

Ohio's Greatest Online Newspaper

## IV fiasco led killer to ask for plan B

Friday, May 12, 2006

Andrew Welsh - Huggins  
ASSOCIATED PRESS

A condemned inmate asked prison staffers to find another way to kill him after difficulty finding a vein delayed his execution by almost 90 minutes, state prison records show.

"Can you just give me something by mouth to end this?" convicted killer Joseph Clark asked members of the execution



Joseph Clark, 57, was executed on May 2 for killing a clerk while robbing a gas station in Toledo in 1984.

team as they struggled to find a way to insert an intravenous line after the first try failed.

Clark's execution was plagued with problems from the beginning, when team members struggled for several minutes to find a vein to take the IV. After proceeding with a shunt in Clark's left arm, the vein collapsed and the execution team had to start over.

After finally attaching a shunt to Clark's right arm, the execution team apparently tried to administer the lethal drugs through the original IV line by mistake, according to written accounts of the execution obtained by the Associated Press.

A member of the execution team said he realized a problem "upon noticing the wrong reaction by Inmate Clark again," the member's statement said.

"I noticed I had picked up the wrong line. Once I switched to proper IV line, execution was completed successfully."

The team member noticed Clark moved his left foot, said prisons spokeswoman Andrea Dean.

During the first attempt to administer the drugs, Clark continued to move and then finally pushed himself up and said, "It don't work."

Clark, 57, sentenced to die in November 1984 for killing David Manning, had been facing execution longer than all but 11 of the 193 men on Ohio's Death Row.

The problems with the execution fueled a growing debate about lethal injection, with many Death Row inmates saying that their executions could be painful, either because of the drug combination or because the procedure is not handled by specially trained medical personnel.

A lawyer representing Clark's family said the records underscore the need for a thorough investigation.

"There's something drastically wrong with the procedures that are in place, and we hope that this leads to an honest evaluation and discussion of these problems," Alan Konop said. "This should never happen and hopefully will never happen again."

The Department of Rehabilitation and Correction is re-viewing the execution because of the problems but doesn't think its procedures are flawed.

"The vein simply collapsed; that wasn't a flaw in the process," Dean said.

The handwritten reports by members of the execution team, who volunteer for the job, provide an intimate though emotionless view of the execution process. No report indicated a team member was upset by what happened, and the reports do not include the prison employees' names.

"I assisted by holding the inmate's feet, patting them in an attempt to calm him down," one team member wrote.

The team appeared to anticipate problems early on. "As an observer for the insertion of the IV catheters, I noted that Mr. Clark's veins were not going to be easy to find," one member wrote.

Several team members said they didn't think Clark suffered during the ordeal, which began at 9:58 a.m. when members of the team entered a holding cell to insert the shunts.

"Clark showed no signs of suffering during this process," one report said.

But another report said the "inmate seemed to have some discomfort" where the left shunt was placed.

The same team member who picked up the wrong line wrote, "Inmate Clark was afraid, but not in any distress."

As the troubles finding Clark's vein continued, a team member standing with reporters, Clark's attorney and members of Manning's family decided to draw the curtain that blocked public view of the death chamber.

That decision elicited a protest from the American Civil Liberties Union, which previously sued to force the prison system to show more of the state's execution process.

The team member defended the decision, saying people were getting upset.

"I could feel the tension rising inside the viewing chamber, and upon that time closed the curtain," the team member wrote. "I personally felt this was a very wise decision to alleviate extra stress upon all witnesses until the team could determine what happened."

Dean, a witness of this and several other executions, gave a slightly different account.

"There was an air of apprehension because we didn't know what was going on because this had never happened before," she said.

The team, numbering between 15 and 18, consists mostly of guards with some medical technicians and other prison employees.

Every capital-punishment state but one uses lethal injection; Nebraska still uses the electric chair.

A North Carolina inmate was executed last month only after the state changed its procedures to

satisfy a federal judge.

In California, executions are on hold while a federal judge considers the constitutionality of that state's protocol. A hearing is scheduled in September.

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## Attachment F



# THE EXECUTION OF STANLEY TOOKIE WILLIAMS / Eyewitness: Prisoner did not ... Page 1 of 5

SFGate.com

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## THE EXECUTION OF STANLEY TOOKIE WILLIAMS

Eyewitness: Prisoner did not die meekly, quietly

Kevin Lewis, Chronicle Staff Writer

Wednesday, December 14, 2006



It took 36 agonizing minutes to get to the defining moment of Stanley Tookie Williams' execution by lethal injection early Tuesday, and when it came it shot through the stuffy, crowded witness room like lightning.

Williams lay dead, strapped to his gurney. It was 12:35 a.m. The prison guards had just ordered the 39 witnesses to leave, and the first to go were three friends Williams had asked to watch his final moments. It was so quiet that when one man jangled his pocket change, it echoed off the walls.

Then, just as they crossed the doorway to the chilly outdoors, the three whipped their heads back and screamed in unison: "The state of California just killed an innocent man!" Across the room sat Lora Owens, stepmother of one of the murder victims -- and the stone face she'd worn for the entire execution dissolved. Her eyes filled with horror, and she burst into tears, pressing a tissue to her face.

And there it was: The twin emotions enveloping the execution of the 12th man put to death by California since capital punishment was revived in 1992 after a quarter-century hiatus.

On one side were the furious supporters of Williams, 51, who co-founded the Crips gang in the early 1970s but later renounced violence while in prison and wrote influential books advocating peace. On the other was the trail of survivors left grieving for the four people he was convicted of shotgunning to death in 1979 in Southern California.

The two sides never came to a meeting of the minds. Not even in the end.

The dramatics seemed far from anybody's mind when the execution began precisely at 11:59 p.m. Monday.

The oval door of the death chamber popped open -- it looks like a submarine hatch -- and Williams shuffled in with a green-uniformed guard on each side, loosely holding his arms, and three following behind. His wrists were handcuffed to a waist chain. His eyes were calm behind steel-frame glasses, lips set firmly above a gray beard.

<http://sfgate.com/cgi-bin/article.cgi?file=/c/a/2005/12/14/MNG05G7QMA1.DTL&type=pr...> 1/10/2006

## THE EXECUTION OF STANLEY TOOKIE WILLIAMS / Eyewitness: Prisoner did not ... Page 2 of 5

It looked like it would be just like the nine lethal injections before it: controlled, noiseless, practically antiseptic.

With a chest like a barrel and bulging arms the size of toned thighs, Williams had to squeeze with his guards along the 7 1/2-foot-wide chamber's glass window just to get to the side of the gurney. There, he lay down slowly, and after the guards unlocked his wrists, he helpfully spread his arms along the gurney and became still. In two minutes, the team had him lashed down tight: black straps with buckles at his shoulders, chest, waist, knees and feet, and brown-leather Velcro straps at his wrists.

Williams stared straight up and his lips moved rapidly, praying quietly. At one point, a tiny tear slid down his cheek.

The three guards left, and five others walked in.

It was time to insert the needles.

Watching tensely the whole while were the 39 witnesses. They'd been marched into the witness room by a phalanx of guards a few minutes before midnight and placed in a half-circle around the death chamber — 11 in chairs at the window, the rest on risers against three walls. It's impossible to tell who many witnesses are, because by prison rules nobody can move from their spot or talk, but they always consist of four groups: Supporters of the condemned man, supporters of his victims, 17 media representatives, and more than dozen law enforcement and legal officials.

In this execution, at least five were related to the four people Williams was convicted of killing — convenience store clerk Albert Owens, 26, and motel owners Yen-I Yang, 76, Tsai-Shai Chen Yang, 63, and their daughter Yee-Chen Lin, 43. Prison sources said the victim witnesses were all from the Owens family.

The three who shouted on their way out were led by bushy-haired Barbara Beemel, co-author of his anti-gang books. Also witnessing on Williams' behalf were his attorney, Peter Fleming, and another lawyer.

Nobody said a word at first. Everybody stood rigidly.

The first catheter slid in messily at the crook of Williams' right elbow, taking just two minutes to seat but spurting so much blood at the needle point that a cotton swab was soaked, shining deep red before it was taped off.

Then came the real trouble. A medical technician, a woman with short black hair, had to poke for 11 minutes before her needle hit home.

At the first stick, at 12:04, Williams clenched his toes. At 12:05, he struggled mightily against the straps holding him down to look up at the press gallery behind him, dishing out a hard stare for six long seconds. By 12:10 a.m., the medical tech's lips were tight and white and sweat was pooling on her forehead as she probed Williams' arm.

"You guys doing that right?" Williams asked angrily, frustration clear on his face. The female guard whispered something back; it was hard to hear anything through the thick

## THE EXECUTION OF STANLEY TOOKIE WILLIAMS / Eyewitness: Prisoner did not ... Page 3 of 5

glass walls of the death chamber. One guard, jaw clenched tightly, patted Williams' shoulder as if to comfort him.

Outside the chamber, Beemel stood with her two companions -- a woman and a man -- at the only window with a clear line of sight into Williams' eyes, and it was as if they were trying to will themselves right through the glass to stand alongside their friend. They thrust their fists up in what seemed to be a black power salute, and the man called out softly, "Tookie." They whispered "I love you" and "God bless you" as they looked adoringly into Williams' eyes.

Meanwhile, 10 feet away, Lora Owens sat stiffly, looking through the glass at the top of Williams' head. Her thick red hair never moved, and her mouth was a tight line. A blond woman sitting next to her put her arm around her, and then removed it and clasped her hands in her lap.

At 12:16 a.m., the second needle was inserted. His hands were taped, mummy-like, to the gurney arms. The guards hurried out the door and sealed it, leaving Williams alone with two clear intravenous lines snaking off his arms and into holes in the back wall of the death chamber.

At 12:18 a.m., a female prison guard loudly read off the warrant proclaiming that prisoner number C29300 had been sentenced to die and "the execution shall now proceed." Williams forced his head up one last time to stare into the eyes of his five friends -- and he kept it raised until he passed out 1 1/2 minutes later from the first salvo of chemicals, sodium pentothal to put him to sleep. Sorrow washed over the faces of Beemel and her female companion as his head sank, and they clasped their hands in prayer.

From there on it was a nail-biting vigil for everyone outside staring in. There was no way to know which chemicals were being administered because the plungers sending them into the intravenous tubes are pressed by unseen hands behind the chamber walls. Williams' chest heaved several times as he lay with his eyes closed, but somewhere in the 15 minutes from 12:20 to 12:35 a.m., the executioners filled his veins with pancuronium bromide to stop his breathing, then potassium chloride to stop his heart.

Finally, someone behind the walls called out, "He's flatlined," and it was over. A hand shoved a paper through a peephole in the witness room, a guard read off a quick statement affirming Williams' death, and 30 seconds later the room was cleared.

That's when the outburst happened. It was the first time since California restarted executions in 1992 that anybody had yelled or even spoken loudly during the grim procedure -- and as much as anything, that is what set this execution apart.

All of the other men killed by lethal injection lay so quietly on the gurney that, except for a few small movements, it was hard to tell if they were even awake. Even in the two gasings at San Quentin that preceded the injections, Robert Alton Harris and David Edwin Mason faced their ends stoically. The witnesses, too, have never done more than mouth a few silent words and cry quietly -- and the victim and prisoner advocates certainly never reacted to each other.

Williams and his friends were different.

THE EXECUTION OF STANLEY TOOKIE WILLIAMS / Eyewitness: Prisoner did not ... Page 4 of 5

It was like they were determined to get through his final minutes on Earth on their own terms -- even up to the tradition of the condemned man issuing a final statement. Williams, ever-defiant against the system he considered unfair, gave no final words to Warden Steve Ornoski, who said later that Williams chose instead to leave his final message with Beccel. Sources said she may reveal it at a funeral in Los Angeles on Tuesday.

The main complication in the death chamber this time was the excruciatingly long wait for the poisons to work. During the last execution, when triple-killer Donald Beardslee was killed in January, the actual injection process took four fewer minutes; injections for "Freeway Killer" William Bonin required only four minutes in 1996. But prison officials had an explanation.

He was a big man," Warden Steve Ornoski said in a post-execution briefing. The techs didn't have to administer extra shots of chemicals, he said; the poisons just needed time to work.

It made sense. Williams was the most muscular man put to death in the modern era of executions in California, and it appeared as if his bulky body was fighting off the inevitable, even after consciousness and the ability to move had fled.

This was not a man who went meekly.

*This was the sixth execution witnessed by Kevin Fagan. E-mail him at [kfagan@sfgchronicle.com](mailto:kfagan@sfgchronicle.com).*

A look at California's 647 Death Row inmates

Here is a statistical summary of inmates sentenced to death in California.

By ethnicity

White	39.51%
Black	35.34%
Hispanic	18.98%
Other	6.17%

By age range

10-19	0%
20-29	4.8%
30-39	31.4%
40-49	36.5%
50-59	21.3%
60-69	5.3%
70-79	0.8%
80-89	0%
90 and above	0%

Figures as of December 2005. Numbers may not total 100% because of rounding

Executions Name, year executed and time spent on Death Row:

Robert Alton Harris (1992; 13 years, 1 month)

<http://sfgate.com/cgi-bin/article.cgi?file=/c/a/2005/12/14/MNG05G7QMA1.DTL&type=pr...> 1/10/2006

# THE EXECUTION OF STANLEY TOOKIE WILLIAMS / Eyewitness: Prisoner did not ... Page 5 of 5

Keith Daniel Williams (1996; 17 years)  
 Robert Lee Massie (2001; 21 years, 10 months)  
 Darrell Keith Rich (2000; 19 years, 1 month)  
 Kelvin Malone\* (1999; 15 years, 6 months)  
 Stephen Wayne Anderson (2002; 20 years, 6 months)  
 Donald Beardslee (2005; 20 years, 10 months)  
 Stanley Tookie Williams (2005; 24 years, 8 months)  
 William George Bonin (1996; 13 years, 1 month)  
 Manuel Babbitt (1999; 16 years, 10 months)  
 Jaturun Siriponga (1999; 15 years, 9 months)  
 David Edwin Mason (1993; 9 years, 7 months)  
 Thomas M. Thompson (1998; 14 years, 1 month)  
 \* Extradited to Missouri and executed in that state.

## By sentencing county

Bay Area totals		
County	Total	Percentage
Alameda	96	13.3%
Santa Clara	32	8.0
Contra Costa	34	5.3
San Mateo	28	4.3
Sonoma	8	1.2
Napa	4	0.6
Solano	4	0.6
Marin	2	0.3
San Francisco	2	0.3

Sources: California Department of Corrections, Associated Press

Page A - 12

URL: <http://sfgate.com/cgi-bin/article.cgi?file=/c/a/2005/12/14/MNG05G7QMA1.DTL>

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# Exhibit 6

# Exhibit 6

**TATAU MO'ONI 'O HA LESISITA FA'ELE**  
**TRUE COPY OF BIRTH REGISTRATION**

**FIKA LESISITA:** 1716/1970  
**REGISTRATION NO:**

142577

<b>Hingoa 'o e Tamasi'i:</b> <i>Name of Child:</i>  <b>Fa'ele'i 'i fe:</b> <i>Place of Birth:</i>  <b>Fa'ele'i 'anefe:</b> <i>Date of Birth:</i>  <b>Tangata pe Fefine:</b> <i>Sex:</i>	SIAOSI VANISI  KOLOFO'OU, TONGATAPU  <div style="border: 1px solid black; width: 100px; height: 20px; margin: 0 auto;"></div> MALE
<b>Tamai:</b> <i>Father's Name:</i>  <b>Fa'ele'i 'i fe:</b> <i>Place of Birth:</i>  <b>Fa'e:</b> <i>Mother's Name:</i>  <b>Fa'ele'i 'i fe:</b> <i>Place of Birth:</i>  <b>Tamasi'i mali pe 'ikai:</b> <i>Legitimate or Illegitimate:</i>	MAKAA'FA VANISI  KOLOFO'OU  LU'ISA TAFUNGA VANISI  PANGAI HP  LEGITIMATE
<b>Tohinima 'o e Lesisita:</b> <i>By Whom Registered:</i>	L.T VANISI

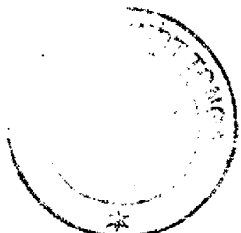
'Oku ou fakamo'oni 'eni koe ngaahi me'a kuo tohi 'i 'olunga ko e tatau mo'oni ia 'o e me'a 'oku tu'u 'i he Lesisita Fa'ele ki he  
 I hereby certify that the above is a true copy of particulars contained in the Birth Register for the

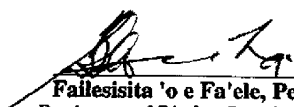
vahefonua 'o                      Tongatapu                      ki he ta'u                      1970  
 District of                      for the year

Vakai he'eku tohinima hingoa moe sila 'o e Fakamaau'anga Lahi na'e fai 'i he  
 Witness my hand and the seal of the Supreme Court dated the

15th                      'o e mahina ko                      November    2010  
                                  of the month of

Vahefonua 'o                      Tongatapu  
 District of



  
 Falesisita 'o e Fa'ele, Pekia moe Mali, TONGA  
 Registrar of Births, Deaths and Marriages, TONGA

**FAKATOKANGA:** Koe tohi ni 'oku fokotu'u 'i loto ha ngaahi me'a malu'i  
 CAUTION: This document contains inbuilt security features.

# Exhibit 7

# Exhibit 7



FORM I-151 MAILED

IV 6327399

IMMIGRANT VISA AND ALIEN REGISTRATION

THE IMMIGRANT  
☐ HAS ☒ HAS NOT  
BEEN PREVIOUSLY IN  
THE UNITED STATES

OF:

(Family Name)

(First Name)

(Middle Name)

VANISI,

Siaosi

INS FILE NUMBER, IF  
KNOWN

ACTION BY IMMIGRANT INSPECTOR

THE IMMIGRANT NAMED ABOVE ARRIVED IN THE UNITED  
STATES VIA

SFC. 212(a)(14)  
LABOR CERTIFICATION

(Name of vessel or flight no. of arrival)

INELIGIBILITY FOR VISA WAIVED UNDER SECTION

☐ 212(e)

☐ 212(h)

☐ 212(g)

☐ 212(i)

☒ NOT APPLICABLE

☐ STATUTORILY EXEMPT

☐ ATTACHED

☐ NOT REQUIRED

COUNTRY OF BIRTH

Tonga

OCCUPATION

Minox

COUNTRY OF LAST  
RESIDENCE

Tonga

MARITAL STATUS

☐ M ☐ W ☐ D ☐ SEP

SEX

☒ M ☐ F

NATIONALITY

Tongan

FINAL ADDRESS  
IN THE UNITED  
STATES

STREET ADDRESS

199 Fernwood Drive

CITY, STATE, AND ZIP CODE, IF AVAILABLE

San Bruno, California

ACTION OF S.I.O.

ACTION ON APPEAL

U.S.P.H.S.

This visa is issued under Section 221 of the Immigration and Nationality Act, and upon the basis of the facts stated in the application. Possession of a visa does not entitle the bearer to enter the United States if at the time he seeks to enter he is found to be inadmissible. Upon arrival in the United States, it must be surrendered to a United States Immigration Officer.

IMMIGRANT CLASSIFICATION

CLASSIFICATION SYMBOL

P5-3

FOREIGN STATE OF ORIGIN

Tonga

IMMIGRANT VISA NO.

392

ISSUED ON

(Day)

(Month)

(Year)

31

May

1976

THE VALIDITY OF THIS VISA EXPIRES MIDNIGHT AT THE END OF

(Day)

(Month)

(Year)

30

September

1976

PASSPORT

NO.

3116/72

OR OTHER TRAVEL DOCUMENTS (Describe)

- - -

ISSUED

TO

Luisa Finau Vanisi

BY

Minister of Police, Tonga

ON

12/7/71

EXPIRES

12/7/76

IV 6327399

AMERICAN Embassy

AT Suva, Fiji

Walter V. Hall

Consul of the United States of America.



Tariff Item No. 21

Fee Paid \$20

Local Cy Equiv.

F\$15.50

Exhibit 11

Exhibit 11

ORIGINAL

FILED

Case No. CR98-0516

Dept. No. 4

SEP 27 1999

AMY HARVEY  
By: *M. Stone*  
DEPUTY CLERK

IN THE SECOND JUDICIAL DISTRICT COURT OF THE STATE OF NEVADA,  
IN AND FOR THE COUNTY OF WASHOE

\* \* \*

THE STATE OF NEVADA,

Plaintiff,

v.

SIAOSI VANISI,  
also known as  
"PE",  
also known as  
"GEORGE",

Defendant.

LADIES AND GENTLEMEN OF THE JURY:

It is my duty as judge to instruct you in the law that  
applies to this case, and it is your duty as jurors to follow the  
law as I shall state it to you, regardless of what you may think  
the law is or ought to be. On the other hand, it is your  
exclusive province to determine the facts in the case, and to  
consider and weigh the evidence for that purpose. The authority  
thus vested in you is not an arbitrary power, but must be

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exercised with sincere judgment, sound discretion, and in  
accordance with the rules of law stated to you.

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Instruction No. 1

The defendant in this matter, SIAOSI VANISI also known as "PE" also known as "GEORGE", is being tried upon an Information which was filed on the 26th day of February, 1998, in the Second Judicial District Court, charging the said defendant, SIAOSI VANISI also known as "PE" also known as "GEORGE", with:

COUNT I. MURDER IN THE FIRST DEGREE, a violation of NRS 200.010 and NRS 200.030 and NRS 193.165, a felony, in the manner following:

That the said defendant on the 13th day of January A.D. 1998, or thereabout, and before the filing of the Information, at and within the County of Washoe, State of Nevada, did willfully, unlawfully, and with malice aforethought, deliberation, and premeditation, kill and murder SERGEANT GEORGE SULLIVAN, a human being, by means of repeated blows to the head and face with a hatchet, and/or other implement(s), and/or other blunt force trauma inflicted to the head and upper torso thereby inflicting mortal injuries upon the said SERGEANT GEORGE SULLIVAN from which he died on January 13, 1998; or

That the said defendant during the course of, and in furtherance of an armed robbery, did willfully and unlawfully murder SERGEANT GEORGE SULLIVAN in that the said defendant on or about January 13, 1998, did kill and murder SERGEANT GEORGE SULLIVAN, a human being, in the perpetration and/or the furtherance of an armed robbery at the University of Nevada, Reno, at or near the information kiosk, with the use of a deadly weapon, to wit, a hatchet, and/or other implement(s); or

That the said defendant on or about January 13, 1998, did kill and murder SERGEANT GEORGE SULLIVAN, a human being, by lying in wait, in that the said defendant did watch, wait and conceal himself from SERGEANT GEORGE SULLIVAN, with the intention of killing SERGEANT GEORGE SULLIVAN, in that he hid and waited until SERGEANT GEORGE SULLIVAN completed a traffic stop, then observed and followed SERGEANT GEORGE SULLIVAN to a location where he was alone and then ambushed SERGEANT GEORGE SULLIVAN inflicting mortal injuries to his person from which he died on January 13, 1998.

COUNT II. ROBBERY WITH THE USE OF A DEADLY WEAPON, a violation of NRS 200.380 and NRS 193.165, a felony, in the manner following:

That the said defendant on the 13th day of January A.D. 1998, or thereabout, and before the filing of the Information, at and within the County of Washoe, State of Nevada, did willfully and unlawfully take personal property, to wit: a Glock .45 caliber handgun; Glock "magazines"; a flashlight; and handcuffs from the person of SERGEANT GEORGE SULLIVAN, at or near the information kiosk located at the University of Nevada, Reno campus, Washoe County, Nevada, against his will, and by means of force or violence to his person and with the use of a hatchet, and/or other implement(s), which the said defendant used to strike SERGEANT GEORGE SULLIVAN repeatedly in the head and face, and/or other blunt force trauma inflicted to the head and upper torso.

COUNT III. ROBBERY WITH THE USE OF A FIREARM, a violation of NRS 200.380 and NRS 193.165, a felony, in the manner following:

That the said defendant on the 13th day of January A.D. 1998, or thereabout, and before the filing of the Information, at and within the County of Washoe, State of Nevada, did willfully and unlawfully take personal property, to wit: U.S. currency from the person of PATRICIA MISITO, the clerk at the 7-11 Store located at 710 Baring Boulevard, Washoe County, Nevada, against her will, and by means of force or violence or fear of immediate or future injury to her person and with the use of a large caliber handgun which the said defendant displayed to the victim and demanded money.

COUNT IV. ROBBERY WITH THE USE OF A FIREARM, a violation of NRS 200.380 and NRS 193.165, a felony, in the manner following:

That the said defendant on the 13th day of January A.D. 1998, or thereabout, and before the filing of the Information, at and within the County of Washoe, State of Nevada, did willfully and unlawfully take personal property, to wit: U.S. currency from DIANA LYNN SHOUSE, the clerk at said establishment, at the Jackson Food Mart located at 2595 Clearacre Lane, Washoe County, Nevada, against her will, and by means of force or violence or fear of immediate or future injury to her person and with the use of a large caliber handgun which the said defendant displayed to the victim and demanded money.

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COUNT V. GRAND LARCENY, a violation of NRS 205.220, a felony, in the manner following:

That the said defendant on the 13th day of January A.D. 1998, or thereabout, and before the filing of the Information, at and within the County of Washoe, State of Nevada, did willfully and unlawfully steal, take and drive away the personal property of LOUIS D. HILL, to wit: a certain black four door 1993 Toyota Camry bearing Nevada license plate 029 HPY, with the intent then and there to permanently deprive the owner thereof.

To the charges stated in the Information, the defendant, SIAOSI VANISI also known as "PE" also known as "GEORGE", pled "NOT GUILTY."

Instruction No. 2



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An Information is a formal method of accusing a  
defendant of a crime. It is not evidence of any kind against the  
accused, and does not create any presumption or permit any  
inference of guilt.

Instruction No. 3

1681

SVAN1S12JDC06292

If in these instructions, any rule, direction or idea is  
stated in varying ways, no emphasis thereon is intended by me and  
none must be inferred by you. For that reason, you are not to  
single out any certain sentence, or any individual point or  
instruction, and ignore the others, but you are to consider all  
the instructions as a whole and to regard each in the light of  
all the others.

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Instruction No. 4

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If, during this trial, I have said or done anything which has suggested to you that I am inclined to favor the position of either party, you will not be influenced by any such suggestion.

I have not expressed, nor intended to express any opinion as to which witnesses are or are not worthy of belief, what facts are or are not established, or what inference should be drawn from the evidence. If any expression of mine has seemed to indicate an opinion relating to any of these matters, I instruct you to disregard it.

Instruction No. 5

1683

SVan1s12JDC06294

Although you are to consider only the evidence in the case in reaching a verdict, you must bring to the consideration of the evidence your everyday common sense and judgment as reasonable men and women. Thus, you are not limited solely to what you see and hear as the witnesses testify. You may draw reasonable inferences which you feel are justified by the evidence, keeping in mind that such inferences should not be based on speculation or guess.

A verdict may never be influenced by sympathy, passion, prejudice, or public opinion. Your decision should be the product of sincere judgment and sound discretion in accordance with these rules of law.

Instruction No. 6

1684