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## NEUROETHICS GUIDELINES ANALYSIS

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An analysis of existing neuroethics/neurotechnology/neuroscience recommendations from five sources, which were commonly identified as important sources in literature reviews done by Global Neuroethics Summit and OECD members

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Recommendations/instruments analyzed:

1. **European Citizens' Assessment Report** (Meeting of Minds, 2006)
2. **Brain Waves Module 1: Neuroscience, society and policy** (The Royal Society, 2011)
3. **Novel neurotechnologies: intervening in the brain** (Nuffield Council on Bioethics, 2013)
4. **Gray Matters, Vol. I** (Presidential Commission for the Study of Bioethical Issues, 2014)
5. **Gray Matters, Vol. II** (Presidential Commission for the Study of Bioethical Issues, 2015)
6. **Recommendation of the Council of Responsible Innovation in Neurotechnology** (OECD, 2019)

### Areas of commonality:

#### *General Themes*

- Justice and equity: access and control of access to neurotechnology and its benefits
- Privacy
- Cognitive enhancement and neuropsychopharmacology
- Safety and patient protection
- Capacity and consent
- Agency and autonomy
- Legal system: criminal justice
- Dual use
- Neural and brain interfaces
- Transcranial brain stimulation and deep brain stimulation

#### *Recommendations*

- Include diverse individuals (e.g., experts, community) in advisory boards, funding review committees, etc.
- Public engagement and education of both neuroscience and neuroethics
- Accurate communication and transparency about ethical and practical implications and applications of neuroscience research results
- Incorporation and funding of ethics research



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**Unique points of emphasis:**

1. *European Citizen's Assessment Report: Complete Results*  
(Meeting of Minds, 2006)

- Advocates diversity over normalcy, avoiding medicalizing society
- Recognizes pressure from economic interests (pharmaceutical research with low-profit potential)
- Focuses more on social implications for the general public and direct interaction with them for neuroscience recommendations

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2. *Brain Waves Module 1*  
(The Royal Society, 2011)

- Reviews current state of development in neuroscience and neurotechnology
- Addresses neuromarketing and its role in decision making science (consumer behavior) for businesses

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3. *Novel neurotechnologies: intervening in the brain*  
(Nuffield Council on Bioethics, 2013)

- Details possible exploitation of intellectual property rights (e.g., more risky explorations of possible solutions) on marketable neurotechnology to meet expectations of investors
- Notes novel neurotechnologies often enter "valley of death" due to lack of funding during process of translating research into commercial products
- Recommends making existing evidence of neurotechnologies transparent for public understanding and trust
- Includes stem cell tourism as a potential result of natural stem cell therapies
- Compares beneficence vs. uncertainty
- Outlines caution vs. precautionary issues in neurotechnology

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4. *Gray Matters: Integrative Approaches for Neuroscience, Ethics and Society, Volume I*  
(Presidential Commission for the Study of Bioethical Issues, 2014)

- Includes societal and ethical concerns of dementia research: how dementia affects notion of self/selfhood overall, preferences (pre- vs. post-dementia), decision-making capacity
- Emphasizes distinction between treatment and enhancement

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5. *Gray Matters: Integrative Approaches for Neuroscience, Ethics and Society, Volume II*  
(Presidential Commission for the Study of Bioethical Issues, 2015)

- Recommends legal system and affiliated bodies to develop, expand, and promote training resources to understand application of neuroscience for jurors, judges, attorneys, and public (i.e., publish challenges/limitations of neuroscience application, provide leveled interpretation of neuroscientific evidence)



6. *Recommendation of the Council on Responsible Innovation in Neurotechnology*

- Provides 9 principles that is embodied by the Recommendation for both governments and innovators alike to anticipate and address the ethical, legal, and social challenges that arise from neurotechnologies
  - Aims to guide each step of the innovation process (e.g., research, technology transfer, investment, commercialization, regulation) in order to maximize benefits and minimize risks
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