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Annals of Neurology and Neuroscience

Research Article

Population-Controlled Study of Neurological Deaths in USA v Other Western Nations Compared with All-other-Causes-Mortality in 21st Century: Early Adult Deaths Indicative of Earlier Onsets

Colin Pritchard* **and Anne Silk**

Emily Rosenorn-Lanng, Statistician, Faculty of Health & Social Sciences, Bournemouth University, UK, Dr. Lars Hansen, Hon Senior Lecturer, Department of Psychiatry, University of Southampton UK

Abstract

Objectives: To compare neurological deaths rates during the 21st Century 2000-2015 between the USA and twenty Other Western Nations (OWN) and contrast with All-Other-Cause-Mortality (AOCM) and focus on Early-Adult-Deaths (E.A.D) (55-74yearolds) population to challenge the demography assumed causes.

Methodology: Population-controlled used WHO global mortality categories of Nervous Disease Deaths (NDD) and Alzheimer & Other Dementias Deaths (AlzD) rates per million (pm) to provide Combined Neurological Mortality (CNM) rates for people aged 55-74 (below Western life-expectancy), and, Total Age-Standardised-Death-Rates (ASDR) for both sexes. Using WHO ASDR for AOCM as a control of changes of CNM. Confidence Intervals used to compare USA with the OWN mortality during 2000-2015.

Results: *55-74Year Olds*: NDD rates were higher than AlzD in every country. CNM rates rose substantially (>20%) in eleven; Belgium, Canada, and France rates fell. USA CMN significantly higher than nine OWN between 2000-2015.

ASDR: ASDR CMN increased substantially in every country, many >50+%. The USA significantly increased than six countries during the Century. Every nation had substantial reductions in AOCM, conversely to CMN outcomes, Odds Ratio range from 1:1.48 to 1:2.75, doubling during the Century in twelve nations, indicating the acceleration of neurological deaths.

Numbers: America 55-74Year CNM rose from 21,818 to 48,047, total USA rose 174,708 to 436,430, meaning the last year was higher than the covid-19 deaths in 2020.

Conclusions: Early Adult Death (55-74) rose in most countries, whose results challenge the Gompertzian hypothesis, with matching new clinical studies on Early-Onset-Dementia across the contents. Causal factors pointing towards multiple-interactive environmental causes. Continued increases in neurological disorders have the potential to overwhelm families, health, and social services. As the USA used to have amongst the lowest neurological morbidity and now the second highest, and having the speeding acceleration, America should be leading the world to be alert to the `hidden' neurological epidemic.

Keywords: Increases; Neurological; Premature; Mortality; International; Environment.

***Correspondence to**: Colin Pritchard, Faculty of Health & Social Sciences, Bournemouth University, Bournemouth Gateway Building, 10 St. Paul's Lane, Bournemouth BH88AJ, Email: cpritchard@bounremouth.ac.uk

Received date: September 22, 2022; **Accepted date:** Sep 01, 2022; **Published date:** Sep 07, 2022

Citation: Colin Pritchard (2022) Population-Controlled Study of Neurological Deaths in USA v Other Western Nations Compared with All-other-Causes-Mortality in 21st Century: Early Adult Deaths Indicative of Earlier Onsets. Ann of Neuro and NeuroSci 2022; v1(1): 1-9

1. Abstract

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1.3.1. ASDR: ASDR CMN increased substantially in every country, many >50+%. The USA significantly increased than six countries during the Century. Every nation had substantial reductions in AOCM, conversely to CMN outcomes, Odds Ratio range from 1:1.48 to 1:2.75, doubling during the Century in twelve nations, indicating the acceleration of neurological deaths.

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2. Introduction

There is growing evidence of increases in neurological disease deaths [1-4], that include such conditions as Alzheimer's Disease, Motor Neurone Disease and Parkinson's Disease, as well are the more rare, Multiple System Atrophy and Progressive Supra-nuclear Palsy, etc, etc [5-7]. These rising neurological disorders have been associated with environmental factors, including various occupations such as chemicals, engineering, electronics and wider environmental influences, ranging from organophosphates to ubiquitous background electromagnetism [8-18]. This is not to ignore under-lying genetic factors, but rather acknowledged the classic concept that genetics loads the gun, awaiting the environment pulls the trigger to end in disease. It has argued that any neurological increases are mainly due to improved longevity and is linked to the Gompertzian hypothesis. This suggest that as people live longer, they are more likely to develop more age-related diseases and along with improved accurate diagnosis, therefore most of the rises are an artefact [19-21]. However, this perspective has ignored remarkable rise in early-onset-dementias, related to under-lying genetics factors with early dementias [22-27]. To challenge the Gompertzian perspective, we pay especial attention to neurological deaths of people aged 55-74years, which is well below current Western life expectancy (WHO, 2020). Hence mortality rates in this age-band (55-74) can be described as `Early Adult Death' (E.A.D). As well as total neurological deaths, controlled for age and population in the WHO Age-Standardised-Death-Rates (ASDR) (WHO, 2020) used to compare mortality between the USA and the Other-Western-Nations (OWN) during the 21st century, building upon the earlier work of international of research between 1990-2010 [28]. As it can be argue that the USA is the most `modern' world, its justify to any extent to any greater neurological increases than the OWN. To control any changes in neurological E.A.D and total ASDR over the period 2000-2015, we use All-Other-Causes-Mortality (AOCM) for both age-bands, E.A.D and ASDR for each nations. These are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal Spain, Sweden, Switzerland, and the USA.

There are two null hypotheses

1. That there will be no substantial rise in USA neurological mortality for both 55-74 year (EAD) and total neurological ASDR compared to the Other Western Nations (OWN) during the 21st Century.

2. There will be no substantial difference between AOCM and neurological deaths during the 21st Century.

3. Methodology

To examine of neurological mortality in Western countries we examine the WHO global neurological diagnostic categories, which contains all neurological deaths. The first global category is the Nervous Disease Deaths (NDD), coded G00-G99. This includes conditions such as motor neurone disease, Parkinson's Disease, multiple system atrophy, Multiple Sclerosis etc, etc. The other category is Alzheimer' & the Dementias Deaths (AlzD), coded F01, F03, G30-31, which includes all Alzheimer's Disease, Other dementias and Picks Disease (WHO, 2020). Combining the two categories become becomes the Combined Neurological Mortality (CNM) rates, based upon population-controlled to provide rates per million (pm). We examine two age bands, first Early Adults Deaths (E.A.D) of people aged 55-74, whose mortality is below the average Western life expectancy of 82yrs (WHO, 2020). To calculate rates of E.A.D is based upon WHO data of numbers of deaths, divided by the 55-74 population, to provide rates of death per million (pm), for both sexes. The second age-band use the WHO controlled Age-Standard-

ised-Death-Rates (ASDR), based upon total population and sexes for each combined categories to calculate the Combined Neurological Mortality (CNM) (WHO, 2020). To test the USA neurological changes during the Century compared to the twenty OWN, we calculate Confidence Intervals using SPSS package to determine any significant difference (+95%). The control for the neurological mortalities are All-Other-Causes-Mortality (AOCM), which are total mortality minus the CMN, for both E.A.D and ASDR rates over the period.

To compare AOCM and CNM, we use a ratio of change for each type of mortality and then calculate the Odds Ratios of changes for each nation during the Century. The mortality rates during the 21st Century come from a base-line of three-year averages of 2000-02, compared with the latest index average years of 2013-15 from which ratios of change for each of the twenty-one Western nations. Each country becomes its own control group and become a control for any changes in USA rates. It has been previously argued that the increases in neurological diseases, such as Motor Neurone Disease, were due mainly to be better diagnosis [29] and the Gompertzian Hypothesis argued that this is because people are now living longer and therefore able to develop old-age-related disease, such as neurological disorders [30,31]. This Gompertzian will be tested in these results, especially mortality of the 55-74 age-band, the E.A.D, as well as other research has noted rising in early-onset-dementia.

The latest available WHO data is used for the index years 2013-15, although Canada, France, New Zealand, and Portugal had earlier index years, which is noted in the tables. However, Austria, the Netherlands and Sweden had data for 2016 but to maintain consistency to measure against the UK result, we use these nation's 2013-15 results (WHO, 2020).Whilst it is necessary to use rates of mortality when comparing countries of different size, to an extent this can mask results that effect upon practice impact. To provide a more practice perspective, we draw from the WHO actual *Numbers* of EAD (55-74) and total neurological deaths, as selective countries of those who had lowest and highest increases over the period.

4. Results.

4.1. Early Adult Deaths (EAD) 55-74Year olds: Table [1] list first separate the neurological categories and then join the two categories to become the Combined Neurological Mortality (CNM) rates.

Nervous Disease deaths (NDD) rates were higher than Alzheimer & Other Dementia (AlzD,) in every country across both periods 2000-02 and 2013-15. Though in nine nations AlzD rise substantially (>20%) rose more than in the NDD increases. The highest Combined Neurological Mortality (CNM) rates was in Finland at 1006pm, followed by the USA 710pm and the UK 710pm. The lowest rates were in Japan 206pm, Greece 378pm and Austria 415pm. Eleven countries rose substantially (>20%) in neurological E.A.D during the Century. Conversely, there were falls amongst the E.A.D in Belgium, down 5%, Canada 10% and France 23%. However, there were notable E.A.D increases over the period in Austria by 77%, Germany 52%, Sweden 48% Finland 44%, the USA 39%, Japan 36%, Australia 34%, Denmark 33%, and the UK 32% during the 21st Century.

4.2. USA v Other Western Nations E.A.D: Column 5 of Table [1] presents comparing OWN E.A.D rates compared to USA using C.I (95%). Apart from Austria, who had significantly greater increases than the USA, America had significantly greater rises than Belgium, Canada, France, Greece, Ireland, Italy, New Zealand, Norway, Portugal, and Spain.

Table 1: Nervous Disease Deaths (NDD), Alzheimer & Other Dementia Deaths (AlzD) the Combined Neurological Mortality (CNM) Early-Adult-Deaths (55-74) rates per million 2000-02 v 2013-15 Ratio change. Other Western Nations v USA Confidence Intervals. Ranked by Highest CNM rates.

Country & Ratio change	NDD 55-74 2000 v2015	AlzD 55-74 2000 v 2015	CNM 55-74 2000 v 2015	OWN v USA Low – High
1.Finland	394 - 642	305 – 364	699 – 1006	0.83 – 1.12
Ratio change	63%	19%	44%	
2.USA	364 – 455	147 - 255	511- 710	0.85 – 1.17
Ratio change	25%	73%	39%	
3.UK	256 - 399	164 - 254	420 – 653	0.76 – 1.06
Ratio change	56%	55%	32%	
4.Sweden	267 - 387	157 - 239	424 - 626	0.80 – 1.11
Ratio change	45%	52%	48%	
5=.Netherland	350 - 379	116 - 223	466 - 602	0.91 – 1.27
Ratio change	8%	92%	29%	
5=.Denmark	339 - 398	115 - 204	454 - 602	0.89 – 1.24
Ratio change	17%	77%	33%	
7.Norway	365- 390	125 - 176	490- 566	**1.02 - 1.42**
Ratio change	7%	39%	16%	
8.Belgium	377 - 383	206 - 172	583 - 555	**1.24 – 1.72**
/Ratio change	2%	-17% #	-5% #	
9.Switzerland	297 - 356	141 - 180	438 - 536	0.96 – 1.35
Ratio change	20%	28%	22%	
10.Ireland 2014	291 - 345	174 - 176	465 - 521	**1.05 – 1.47**
Ratio change	19%	1%	12%	
11.Spain	299 - 329	195 - 179	494- 508	**1.14 – 1.60**
Ratio change	10%	-8% #	3%	

12.Australia %change	272 - 335 23%	105 - 171 63%	377- 506 34%	0.87 – 1.23
13.Canada 2013 Ratio change	376 - 318 -15 #	159- 165 4%	535 - 483 -10% #	**1.30 – 1.82**
14.Germany Ratio change	254 - 342 35%	60 - 136 127%	314 - 478 52%	0.76 – 1.10
15.New Zealand 2013 %change	279 - 314 13%	129 - 161 25%	408 - 475 16%	**1.00 - 1.42**
16.Italy Ratio change	266 - 327 23%	186 - 133 -28% #	452 - 460 2%	**1.15 – 1.62**
17.Portugal 2014 Ratio change	230 - 290 26%	144 - 142 -1 % #	374 - 432 16%	**1.01 – 1.44**
18.France Ratio change	397- 321 -19 % #	173 - 119 -31% #	570- 440 -23% #	**1.52 – 2.13**
19.Austria Ratio change	160 – 286 79%	74 - 129 74%	234 - 415 77%	*0.64 – 0.95 #*
20.Greece Ratio change	213 - 279 31%	121 - 99 -18% #	334 - 378 13%	**1.02 – 1.48**
21.Japan %change	123 - 180 46%	28 - 26 -7 % #	151 - 206 36%	0.80 – 1.29

#greater than USA, BOLD USA significant greater increase. # Fell CMN

4.3. Total ASDR (Total). Table [2] shows that total CNM increased rates by than >20% in most countries, the smaller increases were in Canada 8%, France 11%, and Italy 19%. The highest ASDR was in Finland 472pm, up by 82%, the USA 292pm up 68% and the UK 249pm up by 95%. The lowest rate was again in Japan 54pm, nonetheless this was equivalent to a rise of 80%, Greece 67pm,was up 26% and 106pm was up Austria 77%. Other substantial rises (>25%) were in Australia 55% Belgium 26%, Greece 26%, Denmark 61%, Germany 52%, Ireland 81%, Netherlands 64%, Norway 68%, Portugal 46%, Sweden 53% and Switzerland 25% over the period.

4.4. USA v Other Western Nation ASDR (Total): In comparing the OWN with the USA, no other country had a significant bigger increase than the USA. The Confidence Intervals results showed that the USA had significant greater rise in neurological total deaths than Belgium, Canada, France, Italy, New Zealand, Spain, and Switzerland, despite that every country had increased total neurological deaths over just sixteen years.

Table 2: Age-Standardised-Death-Rates – Combined Neurological Mortality (CNM) rates per million 2000-2 v2014-16: Ratio of Change. Compared Other Countries v USA Confidence Intervals. Ranks Highest CNM rates.

Country Rank And Year	**ASDR 2000-02**	**ASDR 2014-16**	**Ratio of Change**	**OWN v USA C.I Low - High**
1. Finland 2015	259	472	1.82	0.72 – 1.17
2. USA 201	174	292	1.68	0.77 – 1.30
3. UK 2015	128	249	1.95	0.65 – 1.15
4. Netherlands 2016	149	244	1.64	0.78 – 1.35
5. Sweden 2016	141	216	1.53	0.83 – 1.45
6. Switzerland 2015	158	198	1.25	**1.01 – 1.77**
7. Ireland 2014	108	196	1.81	0.68 – 1.25
8. Canada 2013	182	195	1.08	0.77 – 1.40
9. Denmark 2015	119	192	1.61	0.77 – 1.40
10. Germany 2015	124	192	1.55	0.81 – 1.45
11. Norway 2015	114	191	1.68	0.74 – 1.35
12. Belgium 2015	150	189	1.26	**1.00 – 1.77**
13.. Spain 2015	155	188	1.21	**1.04 – 1.84**
14. Australia 2015	121	188	1.55.	0.80 – 1.45
15. France 2014	159	176	2.15	**1.14 – 2.02**
16. N. Zealand 2013	141	173	1.23	**1.02 – 1.83**
17. Italy 2014	109	130	1.19	**1.03 – 1.93**
18. Portugal 2014	79	115	1.46	0.82 – 1.62
19. Austria 2016	64	106	1.66	0.71 – 1.46
20. Greece 2015	53	67	1.26	0.88 – 1.99
21. Japan 2015	30	54	1.80	0.57 – 1.51
Western Average	**129**	**192**	**+49%**	**1.07 (0.96 – 1.78)**

USA significant great increase in BOLD

4.5. All-Other-Causes-Mortality v Combined Neurological Mortalities (E.A.D 55-74): Each country compares it's All Other Mortality Causes E.A.D rates with its national neurological rates during the Century and calculate a ratio for change over the period. This then calculated the Odds Ratios between AOCM and the CMN during the Century for Early Adult Deaths (55-74) and total ASDR.

Table [3] shows the average of 55-74 olds for AOCM and CMN. Every country had a positive Odds Ratios, the narrowest being France at 1:1.10, followed by Canada 1:1.30 and Belgium 1:1.30. Whilst twelve Odds ratios, were greater than 1:1.75, with Australia, Austria, Finland, and UK more than double 1:2.00.

The AOCM average ratio of change was 0.70, which is in equivalent a 30% mortality fall but conversely the CMN average change was 1.23, equivalent to a rise of 23%, yielding an average Odds Ratios of 1.76. The narrowest Odds Ratios was in France 1:1.10, every over country had wider than 1:1.30, fifteen greater than 1:1.50.

Table 3: All Western Nations All-Other-Causes-Mortality v Combined Neurological Mortality (CNM) 55-74 year olds rates per million 2000-02 v 2013-15. Ratio of Change. Ranked by Highest CNM Early-Adult-Deaths.

Country & Ratio change	**AOCM 55-74 2000 v 2015**	**CNM 55-74 2000 v 2015**	**All Countries Odds Ratio**
1.Finland Ratio change	13235 - 9150 0.68	699 – 1006 1.44	**2.12**
2.USA Ratio change	14603 - 10457 0.72	511- 710 1.39	**1.93**
3.UK Ratio change	14982 - 9771 0.65	420 – 653 1.32	**2.03**
4.Sweden Ratio change	11389 - 8838 0.78	424 - 626 1.48	**1.90**
5.Denmark Ratio change	15972 - 10752 0.67	454 - 602 1.33	**1.99**
6.Netherland Ratio change	13804 - 9233 0.67	466 - 602 1.29	**1.93**
7.Norway Ratio change	12533 - 8231 0.66	490- 566 1.16	**1.76**
8.Belgium Ratio change	13498 - 9498 0.70	583 - 555 0.95 #	**1.36**
9.Switzerland Ratio change	10660 - 7574 0.71	438 - 536 1.22	**1.72**
10.Ireland Ratio change	16021 - 8843 0.55	465 - 521 1.12	**1.72**
11.Spain Ratio change	12056 - 8286 0.69	494- 508 1.03	**1.49**
12.Australia Ratio change	11090 - 7458 0.67	377- 506 1.34	**2.00**
13.Canada 2013 Ratio change	11848 - 8178 0.69	535 - 483 0.90 #	**1.30**
14.Germany Ratio change	13890 - 10907 0.79	314 - 478 1.52	**1.92**
15.New Zealand 2013 Ratio change	12847- 8281 0.64	408 - 475 1.16	**1.82**
16.Italy Ratio change	12098 - 8351 0.79	452 - 460 1.02	**1.48**
17.France Ratio change	11698 - 8156 0.70	570- 440 0.77 #	1.10
18.Portugal Ratio change	14571 - 9555 0.66	374 - 432 1.16	**1.76**
19.Austria Ratio change	13258 - 9924 0.75	234 - 415 1.77	**2.36**
20.Greece Ratio change	13281 - 10032 0.76	334 - 378 1.13	**1.49**
21.Japan %change	10453 - 8238 0.79	151 - 206 1.36	**1.72**
Average Ratio Countries	0.70	1.23	**1.76**

 # rate fell over the period. Odds Ratio AOCM v E.A.D. >1:1.20 BOLD

4.6. ASDR (Total) AOCM v CMN: Again the highest CNM were of course Finland, the USA and the UK as shown in Table [4] and that every country had a positive Odd Ratios for total AOCM compared to neurological deaths over the period. The narrowest Odds Ratios were France at 1:1.48, Canada 1:1.52 and Italy 1:1.59.

Conversely, twelve Odds ratio were greater than 1:2.00. The widest being the UK 1:2.75, Finland 1:2.53 and Ireland 1:2.59. The total AOCM average ratio was 0.73, equivalent of an average of fall in non-neurological mortality of 27%, whereas the CMN average ratio was equivalent to an increase of 49% during the Century. By using AOCM changes of mortality as a `control' for CMN, this indicates major differences of neurological morbidity and mortality during this 21st Century.

Table 4: All Western Nations All-Other-Causes-Mortality v ASDR Combined Neurological Mortality (ASDR) per million 2000-02 v 2013-15. Change Ranked by Highest AOCM Rates.

Country & Ratio change	AOCM ASDR 2000-02 v 2013-15	CNM ASDR 2000-02 v2013-15	All Countries Odds Ratios
1.Finland Ratio change	4704 - 3368 0.72	259 - 472 1.82	2.53
2.USA Ratio change	5259 - 4315 0.82	174 - 292 1.68	2.05
3.UK Ratio change	4998 - 3527 0.71	128 - 249 1.95	2.75
4.Netherland Ratio change	4885 - 3373 0.69	149 - 244 1.64	2.38
5.Sweden Ratio change	4224- 3206 0.76	141 - 216 1.53	2.01
6.Switzerland Ratio change	3983 - 2915 0.73	158 - 198 1.25	1.71
7.Ireland Ratio change	5573 - 3713 0.70	108 - 196 1.81	2.59
8.Canada 2013 Ratio change	4246 - 3286 0.71	182 - 195 1.08	1.52
9.Germany Ratio change	5469 - 3803 0,70	124 - 192 1.55	2.21
10.Denmark Ratio change	5456 - 3771 0.69	119 - 192 1.61	2.33
11.Norway Ratio change	433 - 3321 0.72	114 - 191 1.68	2.33
12.Belgium Ratio change	4942 – 3732 0.76	150 - 189 1.26	1.66
13.Spain Ratio change	4325 - 3110 0.;72	155 - 188 1.21	1.68
14.Australia Ratio change	4067 - 3076 0.76	121 - 188 1.55	2.04
15.France Ratio change	4406 - 3313 0.75	159 - 176 1.11	1.48
16.New Zealand 2013 Ratio change	4644 – 3564 0.67	141 - 173 1.23	1.84
17.Italy Ratio change	4296 - 3238 0.75	109 - 130 1.19	1.59
18.Portugal Ratio change	5549 - 3944 0.71	79 - 115 1.46	2.06
19.Austria Ratio change	4879 - 3219 0.66	64 - 106 1.66	2.52
20.Greece Ratio change	5145 - 3892 0.76	53 - 67 1.26	1.66
21.Japan Ratio change	3691 - 3007 0.81	30 - 54 1.80	2.22
Average Countries	**0.73**	**1.49**	**2.04**

4.7. Neurological Numbers - Implication for Practice: To provide the implications for services we report on actual numbers of neurological deaths. These are the exemplar of the three lowest and highest countries of changes in neurological deaths. Early Adult Deaths (55-75) fell in Belgium, Canada, and France but all their total neurological numbers increased. Indeed, for example, France whose Early Adult Deaths fell from 6,236 to 5,997, a 4% fall, but their total number of neurological deaths rose from 40,594 to 71,543, a rise of 76%. Equally Belgium total rose from 6,400 to 13, o54, more than doubling, whilst Canada went from 19293 to 35,091, an increase of 82% just sixteen years. Britain's E.A.D neurological went from 4,650 in 2000 to 9,019 by 2015, up 94%. The UK's total neurological deaths in 2000 started from 24,601 but to 103,550, a remarkable rise of 321% during the 21st Century. American's numbers E.A.D rose from 21,818 to 48,047, a startling rise of 120% and total neurological deaths went from 174,708 rising to 436,438 by 2015 an increase of 149%. In both country's final neurological death were higher than a year's of covid-19 mortalties.

5. Discussion

We can reject the null hypothesis there would be no significant greater Early Adult Deaths (55-74) amongst most OWN and total ASDR neurology deaths compared to All-Other-Causes-Mortality in every country over the period. We partly reject the second hypothesis that there would be no significant differences between the USA and Other Western Nations of increased CNM, as the USA had greater increase of Early-Adult-Deaths (55-74) than nine OWN, and, in six countries significantly greater ASDR neurological deaths. These increases were at the same time the OWN also had increases during the Century, indicating that the US have a singular problem with neurological morbidity and mortality. In one sense, America is `special' when on the first international comparison, in 1979 the USA initially were fifteenth highest of the twenty-one nations but are now, 2015 are second highest for neurological deaths of the 21 countries can be said to leading the virtual `hidden' epidemic across the Western world. The most important results are in regard to Early Adult Deaths (55-74) neurological conditions, which are a serious challenge to the Gompertzian hypothesis, that assumed that increases had been mainly due to demographics or improving diagnostics [33,35].This is strongly challenged by many international comparative, provide an external validity of our results from studies that highlighting early-onset-dementia (E.O.D) across continents [36-38]. Indeed, a recent example from Japan, that noted not only were there rises in Alzheimer's Disease (AD) over the period, they were having greater proportion of E.O.D amongst Alzheimer's in their cohorts [39,40]. Whilst a Norwegian found greater increases amongst their E.O.D patients [41]. This was also found in an important from Italy comparing examined incidence of E.O.D between 2006 and 2019. These E.O.D rates, rose from 13.2 per 100,000 in 2006, now to 75.0 per 100,000 by 2019 as five-fold increase in such a short time [42]. Thus, we are confident that in most Western countries there are starting increases in neurological, seen in Early Adult Deaths during the 21st Century, which we argue must contain major elements of multi-interactive environmental pollutants, contributing to increases neuro-degenerative disease. America has been described as the most `modern' technological world. We ask might they are environmental factors, therefore there is growing research that indicative-multiple-interactive pollutions beginning are impacting upon human health, especially in regard to neurological disorders [43-45]. For example, the association of electromagnetism with the development of both cancer and neurological diseases is well established and occupational factors and changes in oxidative stress contributing to neurodegeneration [42,44]. Moreover, with Finland, with an established genetic-weighting of neurological disorder, they have accelerated and doubled their CNM this Century, faster than expected in genetics factors, all points towards the influences of multiple-interactive environmental factors in all the other countries. We recall Sir Walter Bodmer's adage "genetics load's the gun, but the environment pulls the trigger", which is the essence of epigenetics. Our concern is that there may be a parallel of earlier experiences of `environmental' impact on health, exemplified by asbestosis, this often took twenty years to develop serious symptom. Sadly, the impact of the asbestos crisis is still being seen in increases in a mini epidemic of mesothelioma cases from people who were exposed in the 20th century, we fear something similar in the developing of neurological disorders.

5.1. Possible Multiple-Interactive - Environmental Factors: This leads us to explore the multi-interactive environmental factors, that appear to contribute to neurological morbidity. In the 1950's and into the 1960's few people owned a car, phones, or annual airflights etc. Whilst newly recognised, endocrine disruptive chemicals, has been added to the human environment, that is associated with neurodegenerative conditions. The environmental interactive factors now include the world-wide blanket of plastics, organophosphates, endocrine disrupter chemicals, solvents, petrochemicals, heavy metals in water, food additives, air, and water pollutants and the low ubiquitous but prolonged electro-magnetism, are factors have been associated with neurological conditions. We do not wish to over-state the link with the new digital ubiquitous world, but in the USA the Environmental Health Trust, successfully sued the Federal Communications Commission in the Supreme Court, because the FCC had inadequately warned the public about low prolonged exposure of electromagnetism and its possible health effects (Environmental Health Trust (2021). Indeed, the European Union Health Commission argued that manufacturers have not given a high priority about the possible health impacts, because there is *"increasing evidence that this is beginning to emerge"*. After all, the brain is essentially an electro-bio-chemical organism and a recent authoritative study showed that the rising geomagnetic fields can impact upon the nervous system. They stated that there is "*compelling evidence of new electric mechanisms in human brains may interfere with the evolution*

of neuro-degenerative disease". Nonetheless, we stress that the digital world is not the major cause but rather part of a range of a *multiplicity of environmental interactive* factors, impacting on health.

We fear these results, with earlier onsets and unprecedented rates of neurological morbidity in the 21st Century, is a development by a new human caused pathology. Every government must ask the question about the multi-causes of these accelerating+ neurological morbidity. This is like climate-change as Rachel Carson taught us, we also live in the `natural' world, that is rapidly changing (1978). Such practice changes are reflected of the consequence of the `hidden' epidemic is the UK is the development of two charities concerned with neurological conditions - 'Young Dementia UK', and 'The Young Person's section' of 'The Parkinson's Disease Society', many clients under aged 50 years! Hence we fear the reality from for the rising the numbers of neurological conditions in America and Britain, when in in the last year neurological deaths were greater than covid-19 in 2020. Yet the epidemic is still virtually `hidden' The last word is not about statistics but rather an example of the practice reality of families and front-line carers, for us to hear the reality of a family experience of daily neuro-degenerative disease. A young man aged 34, was diagnosed with Parkinson's Disease. He worked for four years until he was incapacitated. He and his family then had to deal with falls, fractures, and emergency hospitalised for respiratory crises. For the last four years he could not speak, for the last two-years he was fed-tube and died at fifty. Such examples of cases have virtually doubled in many countries. His words should be heard, as we fear these results are not welcome, and vested may seek to soften or challenge this `hidden' among Early Adult Deaths. We fear that patients, their families, and front-line services are close to being overwhelmed. There is an urgent research need to explain the multiplicity of causes for these accelerating changes, which if continue, will overwhelm our health and social care systems. These results will not be welcome but we "dare to speak truth to power" (Rustin, 1955), if not we, who will?

References

1. Allemani C, Matsuda T, Di Carlo V. CONCORD Working Group. Global surveillance of trends in cancer survival 2000-14 (CONCORD-3): analysis of individual records for 37 513 025 patients diagnosed with one of 18 cancers from 322 population-based registries in 71 countries. Lancet. 2018; 391:1023-1075.
2. Alonso A, Logroscino G, Jilick SS, Hernan MA. Incidence and lifetime risk of motor neurone disease in the United Kingdom: A population based study. Eur J Neurology. 2009; 16:745-51.
3. Ayton S, Diouf I, Bush AI. for the Alzheimer's disease Neuroimaging Initiative. Evidence that iron accelerates Alzheimer's pathology: a CSF biomarker study. J Neurol Neurosurg Psychiatry. 2018; 89: 456-460.
4. Awata S, Edahiro A, Arai T, Ikeda M, Ikeuchi T, Kawakatsu S, et al. Prevalence and subtype distribution of early-onset dementia in Japan. Psychogeriatrics. 2020; 20(6):817-823.
5. Barnes JL, Zubair M, John K, Poirier MC, Martin FL. Carcinogens and DNA damage. Biochem Soc Trans. 2018; 19:1213-1224.
6. Beard JD, Steege AL, Ju J. Mortality from amyotrophic lateral sclerosis and Parkinson's Disease among different occupation groups - United States, 1985-2011. Morb Mortal Wkly Rep. 2017; 66 (22) :718–722.
7. Belyaev I, Dean A, Eger H, Hubmann G, Jandrisovits R. EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses. Environ Health. 2016; 31(3):363-97.
8. Bhargav H, Srinivasan TM, Varambally S, Gangadhar BN, Koka P. Effect of Mobile Phone-Induced Electromagnetic Field on Brain Hemodynamics and Human Stem Cell Functioning: Possible Mechanistic Link to Cancer Risk and Early Diagnostic Value of Electronphotonic Imaging. J Stem Cells. 2015; 10(4):287-94.
9. Chiari A, Vinceti G, Adani G, Tondelli M, Galli C. Epidemiology of early onset dementia and its clinical presentations in the province of Modena, Italy. Alzheimers Dement. 202; 17(1):81-88.
10. Chen H, Kwong J, Copes R, Tu K, Villeneuve PJ, van Donkenlarn A. Living near major roads and the incidence of dementia, Parkinson's disease and multiple sclerosis. Lancet. 2017; 389:718-726.
11. Cuyvers E, van der Zee J, Bettern K. Genetic variability in SQSTM1 and risk of early- onset Alzheimer dementia: a European early- onset dementia consortium study. Neurobiol Ageing. 2015; 36:15-22.
12. Easton DM. Complementary Gompertz survival models: decreasing alive versus increasing dead. J Gerontol A Biol Sci Med Sci. 2009; 64:550-5.
13. Egdell V, Cook M, Stavert J, Ritchie L, Tolson D, Danson M. Dementia in the workplace: are employers supporting employees living with dementia? Aging Ment Health. 2019;1-8.
14. Feigin VL, Nicholas G, AlamT, Bannick MS, Beghi E. GBD 2016 Disease and Injury Incidence and Prevalence Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990–2016: a systematic analysis for the Global Burden of Disease Study. Lancet. Neurology. 2016; 18: 459-480.
15. Fidler MM, Gupta S, Soerjomataram I, Ferlay J, Steliarova-Foucher E. Cancer incidence and mortality among young adults aged 20-39 years worldwide in 2012: a population-based study.Lancet Oncol. 2017; 18(12):1579-1589.
16. Furuya S, Chimed-Ochir O, Takahashi K. Global Asbestos Disaster. Int J Environ Res Public Health. 2018; 15(5).
17. Goldacre MJ, Duncan M, Griffith M, Turner MR. Trends in death certification for multiple sclerosis, motor neurone disease, Parkinson's disease and epilepsy in English populations 1979- 2006. J Neurol. 2010; 257:706-715.
18. Gore AC. Neuro- endocrine targets of endocrine disruptors. Hormones. 2010; 9(16–2):7.
19. Hallberg O. A trend modal Alzheimer's disease. ADMET. 2015; 3:281-286.

20. Hirano S, Sakakibara R, Komatsu N, Shimizu K, Ishikawa M. Characteristics of Early-Onset Dementia in Chiba Prefecture, Japan: A Multicenter Survey. Dement Geriatr Cogn Disord. 2021; 50(3):283-288.
21. Johnansen C. Electromagnetic fields and health effects – epidemiological studies of cancer, diseases of the central nervous system and arrhythmia heart disease. Scand J Work Envion Health. 2004; 30: 1-80.
22. Kletetschka G, Bazala R, Takáč M, Svecova E. (2021). Magnetic domains oscillation in the brain with neurodegenerative disease Gunther Science Reports Nature Research. 2021; 11:714.
23. Kim JM, Jeong HJ, Bae YJ. Loss of substantia nigra hyperintensity on 7 Tesla MRI of Parkinson's disease, multiple system atrophy, and progressive supranuclear palsy. Parkinsonism Relat Disord. 2016; 26:47–54.
24. Kerger BD. Longevity and pleural mesothelioma: age-period-cohort analysis of incidence data from the Surveillance, Epidemiology, and End Results (SEER) Program, 1973-2013. BMC Res Notes. 2018; 11(1):337.
25. Kvello-Alme M, Bråthen G, White LR, Sando SB. Incidence of Young Onset Dementia in Central Norway: A Population-Based Study. J Alzheimers Dis. 2020; 75(3):697-704.
26. Luukkainen L, Huttula S, Väyrynen H, Helisalmi S, Kytövuori L, Haapasalo A, et al. Mutation Analysis of the Genes Associated with Parkinson's Disease in a Finnish Cohort of Early-Onset Dementia. Alzheimers Dis. 2020; 76(3):955-965.
27. Maiovis P, Ioannidis P, Konstantinopoulus E, Karacostas D. Early onset dementias: demographic characteristics and aetiological classification in a tertiary referral centre. A Neurologica Belgica. 2019.
28. Mehta PR, Jones AR, Opie-Martin S, Shatunov A, Iacoangeli A. Younger age of onset in familial amyotrophic lateral sclerosis is a result of pathogenic gene variants, rather than ascertainment bia. J Neurol Neurosurg Psychaitry. 2019; 90: 268-271.
29. Mendez MF. Early-onset Alzheimer Disease and Its Variants.Continuum (Minneap Minn). 2019; 25(1):34-51.
30. Merlo DF, Bruzzone M, Bruzzi P, Garrone E, Puntoni R, Maiorana L, et al. Mortality among workers exposed to asbestos at the shipyard of Genoa, Italy: a 55 years follow-up. Environ Health. 2018; 17(1):94.
31. Pedersen C, Poulsen AH, Rod NH, Frei P, Hansen J. Occupational exposure to extremely low-frequency magnetic fields and risk for central nervous system disease: an update of a Danish cohort study among utility workers. Int Arch Occup Environ Health. 2019.
32. Poleggi A, van der Lee S, Capellari S, Puopolo M, Ladogana A, et al Age at onset of genetic (E200K) and sporadic Creutzfeldt-Jakob diseases is modulated by the CYP4X1 gene. J Neurol Neurosurg Psychiatry. 2018; 89: 1243-1249.
33. Pritchard C, Silk A, Hansen L. Are Rises in Electro-Magnetic Field in the Human Environment, interacting with Multiple Environmental Pollutions, the Tripping Point for Increases in Neurological Deaths in the Western World? Medical Hypothesis. 2019; 127:76-83.
34. Pritchard C, Rosenorn-Lanng E, Silk A, Hansen L. International and USA population-based study comparing adult [55-74] neurological deaths with control cancer and circulatory disease deaths 1989-2014. Acta Neurol Scand. 2017;136:698–707.
35. Riggs JE, Schochet SS Jr. Rising mortality due to Parkinson' disease & ALS: a manifestation of the competitive nature of human mortality. J Clin Epidemiol. 1998; 45:1007–1012.
36. Ringen K, Dement J, Hines S, Quinn P, Chen A, Haas S. Mortality of older construction and craft workers employed at department of energy nuclear sites: Follow-up through 2016. Am J Ind Med. 2019; 62:742-754.
37. Ross SM, McManus IC, Harrison V, Mason O. Neurobehavioral problems following low-level exposure to organophosphate pesticides: a systematic and meta-analytic review. Crit Rev Toxicol. 2913; 43: 21-44.
38. Robinson J. Organochlorine compounds in man and his environment. Chem Br. 1971; 7:472-5.
39. Rustin B. Speak Truth to Power. New York. American Friends Service Committee. 1995.
40. Strand BH, Knapskog AB, Persson K, Holt Edwin T, Bjertness E, Engedal K, et al. The Loss in Expectation of Life due to Early-Onset Mild Cognitive Impairment and Early-Onset Dementia in Norway. Dement Geriatr Cogn Disord. 2019; 18:1-11.
41. Turner MC, Benke G, Bowman JD, Figuerola J, Fleming S. Interactions between occupational exposure to extremely low frequency magnetic fields and chemicals for brain tumour risk in the INTEROCC study. Occup Environ Med. 2017; 74:802-809.
42. West GH, Sokas RK, Welch LS. Change in prevalence of asbestos-related disease among sheet metal workers 1986 to 2016. Am J Ind Med. 2019; 62(7):609-615.
43. World Health Organization. World Statistical Annual 11: 126-139. Geneva, Switzerland: World Health Organization. 2020.
44. Wu L, Rosa-Neto P, Hsiung GY, Sadovnick AD, Masellis M, Black SE, et al. Early-onset familial Alzheimer's disease (EOFAD). J Neurol Sci. 2021; 39(4):436-45.
45. Zhang L, Cao B, Zou Y. Causes of death in Chinese patients with multiple system atrophy. Aging Dis. 2018; 9(1):102-108.