A

Appendix for Literature Review

A.1 Methodological Aspects of the Literature Review

In 1994, the British Medical Journal published an article named "The scandal of poor medical research: Sloppy use of literature often to blame" [179]. In the case of seasonal mortality, there is a considerable risk for "sloppy use" as scientists from various disciplines are working on that subject. Consequently, it is likely that researchers from one discipline are not aware of important findings from another area. An exhaustive search for literature is therefore indispensable. For this purpose, bibliographic reference indices (e.g. OVID, Population Index) have been searched as well as databases which give online access to articles (e.g. JSTOR, ScienceDirect). Relying only on databases for literature reviews may include various problems such as incompleteness [59]. However, querying several databases in conjunction with the archives of journals and using cross-references, it is fairly certain that no seminal paper on seasonal mortality has been left out. More details on the indices, databases, and journals searched are given in Table A.1.

Table A.1. Databases Used for Literature Search

• Population Index	• ScienceDirect
• JSTOR	• Springer LINK Search
• OVID	• EBSCO
• British Medical Journal (BMJ)	• Ingenta
• The Lancet	• New England Journal of Medicine (NEJM)
• Journal of Epidemiology and Community Health (JECH)	

One possible shortcoming has to be pointed out anyway: There might be a "Tower of Babel Bias" in this review [134]. This phenomenon refers to the problem that the inclusion of English as the only language in literature searches may lead to different findings than in multilingual approaches. Including studies in German and French besides English moderates the possibility of a "Tower of Babel—Bias", however, this drawback can not be completely eradicated.

Population Index. The *Population Index* is the main database for demographic and population literature published between 1986 and 2000. Its range of about 400 journals covers not only demography but also biology, economics, geography, and sociology. While the emphasis is on European languages, relevant literature in Asian languages is also included.
The site is available online at: `http://popindex.princeton.edu`

JSTOR. JSTOR is an online article archive of the most prominent journals in almost every academic discipline. Articles are usually provided starting with Volume 1 of each journal. That implies to have a vast resource available — especially for historical articles which would be very hard to obtain otherwise.
The site is available online at: `http://www.jstor.org`

OVID. OVID is probably the largest of the databases presented here. It is a reference database run by the Max Planck Society. With the various databases it covers such as *Medline, Sociofile, EconLit, Dissertation Abstracts, etc.* and its broad temporal perspective (while most databases start in the 1960s, the collection for data from *PSYCINFO* began in 1887) the primary literature on seasonal mortality should be identifiable.
The site is available online at: `http://http://ovid.gwdg.de`

ScienceDirect, Springer LINK Search, EBSCO, Ingenta ScienceDirect, Springer LINK Search, EBSCO, and Ingenta are bibliographic databases. The majority of the articles are available online, otherwise the bibliographic information is given for ordering. The URLs for their homepages and the number of available online journals according to themselves is given here:

Database	Journals	Homepage
ScienceDirect	1800+	`http://www.sciencedirect.com`
Springer LINK	500+	`http://link.springer.de`
EBSCO	"thousands"	`http://www.ebsco.com`
Ingenta	6000+	`http://www.ingenta.com`

BMJ, NEJM, The Lancet, JECH. Medicine and Epidemiology are the disciplines which publish most of the research on seasonal mortality. The choice for these four journals was made because they are leading in their field and, especially the British Medical Journal and the Journal of Epidemiology and Community Health, have published findings on winter excess deaths regularly.

A.2 Appendix for Literature Review

A.2.1 Studies on Seasonal Mortality of Cardiovascular, Cerebrovascular and Respiratory Disease

Cardiovascular Diseases

- **In General:** [18] [19] [82] [91] [208] [235] [411]
- **(Acute) Myocardial Infarction:** [36] [37] [138] [199] [345] [356]
- **Coronary Thrombosis:** [187]
- **Coronary Heart Disease:** [246] [340]
- **Coronary Artery Disease:** [341]
- **Arterial Thrombosis:** [97] [188]
- **Ischaemic Heart Disease** [58] [76] [77] [81] [98] [176] [253] [269] [317] [322] [355] [376]
- **Heart Attack** [57]
- **Hypertension** [58]

Cerebrovascular Diseases

- **In General:** [19] [58] [76] [77] [81] [82] [98] [253] [376]
- **Stroke:** [37] [57] [269] [345]
- **Cerebral Infarction:** [36]
- **Cerebral Thrombosis:** [187]

Respiratory Diseases

- **In General:** [18] [19] [36] [58] [76] [77] [81] [82] [98] [97] [187] [188] [208] [235] [246] [269] [319] [376]
- **Pneumonia:** [37] [319]
- **Influenza:** [63] [319]
- **Bronchitis:** [319]

B

Appendix for Measuring Seasonality

B.1 Empirical Distributions for Hewitt's & Rogerson's Tests

The articles for Hewitt's test [150] and its generalization by Rogerson [315] for peak period of 3,4, and 5 months printed significance values for the respective distributions of their test statistics based on Monte-Carlo simulations. Exact significance levels have only been calculated for Hewitt's test by Walter [395]. In the original contributions, the distributions have been determined by Monte-Carlo simulations. In my opinion, the number of runs (Hewitt's Test: 5000; Rogerson's Extension: 20,000 for each peak period) is relatively small. Therefore I programmed functions which allow you to make your own Monte-Carlo simulations. Table B.1 shows for peak periods of 6 (Hewitt), 5, 4, and 3 months (Rogerson) the significance values from the original papers (column: "Orig. Values") and also the exact values for Hewitt's test (column: "Exact Values"). The last seven columns are taken from my own simulations where I generated between 10^1 and 10^7 random sequences of ranks from 1 to 12.[1] For Hewitt's test we can see that our simulated results are converging towards the exact values. The orignal (simulated) values give the correct results for two decimals. If further exactness is required I recommend to take the orignal values. As no exact values are given for Rogerson's test, I suggest to use my results from 10,000,000 randomly generated sequences. I have basically used the same algorithm for Rogerson's tests as for Hewitt's test. Thus, we can expect that our results are converging towards the exact values also for the tests for a peak period of 3, 4, and 5 months. The code to simulate the four distribution functions is given below.

[1] A sample of size taken 12 was taken from the twelve integers $1, 2, \ldots, 12$ without replacement.

Table B.1. Comparison of Significance Values for Hewitt's Test and Rogerson's Extensions: Orignal Simulations vs. Own Simulations

Length of Peak	Rank Sum	Orig. Values†	Exact Values‡	Values of Own Simulations (by number of randomly generated sequences)						
				10^1	10^2	10^3	10^4	10^5	10^6	10^7
Hewitt										
6	57	0.0134	0.0130	0.0	0.02	0.009	0.1110	0.01206	0.012922	0.0129574
	56	0.0248	0.0253	0.0	0.02	0.017	0.0226	0.2410	0.025032	0.0251664
	55	0.0464	0.0483	0.0	0.04	0.033	0.0439	0.04770	0.047849	0.0482275
	54	0.0766	0.0805	0.0	0.09	0.067	0.0794	0.07919	0.079921	0.0804839
	53	0.1260	0.1299	0.1	0.19	0.139	0.1262	0.12687	0.129554	0.1298305
Rogerson										
5	50	0.0152	-	0.0	0.00	0.014	0.0165	0.01528	0.014965	0.0150873
	49	0.0294	-	0.0	0.01	0.024	0.0282	0.02949	0.029402	0.0293668
	48	0.0573	-	0.0	0.04	0.051	0.0561	0.05719	0.056105	0.0561672
	47	0.0949	-	0.2	0.11	0.086	0.0924	0.09360	0.093477	0.0934898
	46	0.1499	-	0.3	0.18	0.152	0.1474	0.14992	0.150608	0.1505676
4	42	0.0267	-	0.0	0.03	0.021	0.0234	0.02392	0.024418	0.0241888
	41	0.0509	-	0.0	0.04	0.052	0.0469	0.04677	0.047279	0.0469308
	40	0.0927	-	0.0	0.10	0.095	0.0914	0.08954	0.089382	0.0891868
	39	0.1540	-	0.2	0.14	0.153	0.1549	0.14844	0.147507	0.1475288
	38	0.2398	-	0.3	0.22	0.247	0.2409	0.23686	0.235546	0.2356594
3	33	0.0543	-	0.2	0.05	0.047	0.0552	0.05399	0.054786	0.0546313
	32	0.1056	-	0.3	0.10	0.084	0.1055	0.10441	0.105131	0.1052277
	31	0.1975	-	0.3	0.17	0.194	0.1994	0.19716	0.197245	0.1977746
	30	0.3220	-	0.4	0.34	0.347	0.3234	0.32170	0.322490	0.3223236
	29	0.4711	-	0.5	0.43	0.482	0.4717	0.46931	0.469512	0.4696976

† Sources: Hewitt et al. [150] and Rogerson [315]
‡ Source: Walter [395]

C

Problems of Gaussian Densities to Smooth a Straight Line

As described in Section 4.4.2 (page 97ff), *B*-Splines are similar to Gaussian densities without the problematic characteristics of the latter. For example, with Gaussian densities, it is not possible to fit a straight line properly, because of its defintion from $[-\infty; \infty]$. Figure C.1 shows the typical result from such an approach: the so-called "Gaussian ripple" [86]).

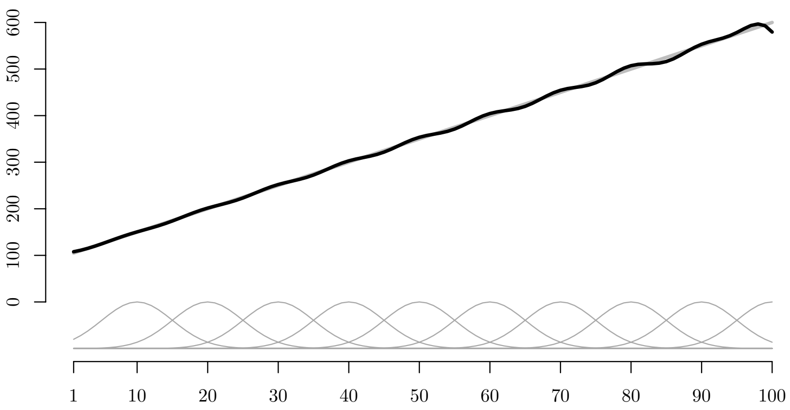

Fig. C.1. "Gaussian Ripple": The Problem of Normal ("Gaussian") Densities to Smooth a Straight Line

D

Appendix for Danish Register Analysis

D.1 Seasonal Mortality by Sex, Education and Cause of Death

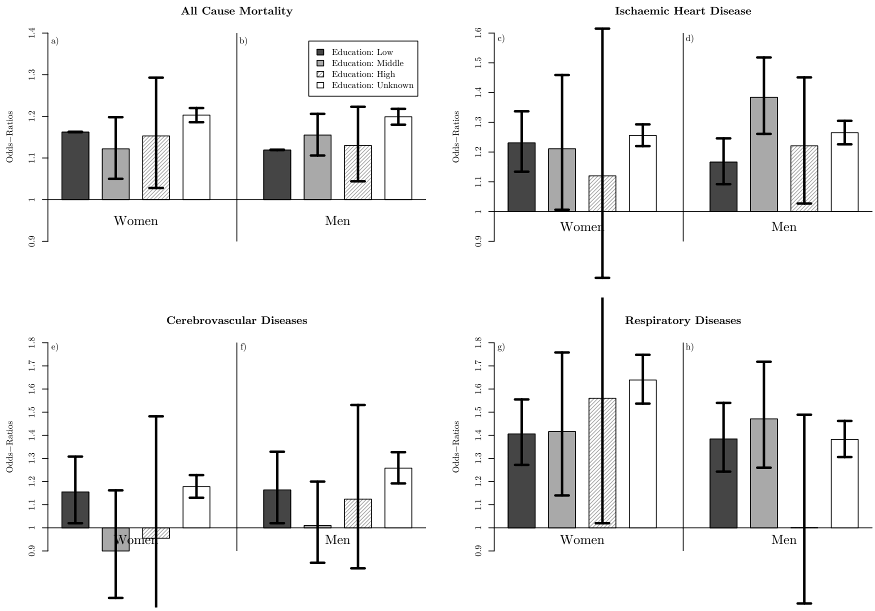

Fig. D.1. Winter Excess Mortality by Sex, Education, and Cause of Death (Odds-Ratios and 95% Confidence Intervals)