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Application of principal component analysis to time series of daily air pollution and mortality

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Abstract

The overall objective of this study was to investigate whether cause-specific daily mortality (i.e. respiratory, cardiovascular, pneumonia, COPD and total mortality) can be attributed to specific sources of air pollution.

Therefore we formulated the following aims:

1. To apply a principal component analysis (PCA) on air pollution data in order to provide a meaningful description in components that are interpretable in terms of different sources of air pollution.
2. To quantify the association between daily mortality (total, cardiovascular diseases, respiratory, pneumonia and COPD mortality) and the source-specific components.
3. To investigate the effect of season-specific associations between daily mortality and the components.
4. To consider whether this method leads to new insights with regard to the approach of mortality analyses.

The first part of this report is focussed on the principal component analysis and the allocation of new variables into source-related variables.
The second part relates to the quantification of associations between mortality and the principal components (source-related explanatory variables).

Based on data series used for the mortality analyses in Fischer et al. (in preparation), (concerning daily mortality, air pollution and confounding variables in the period 1993-1998), we applied a principal component analysis on standardised air pollution data. We considered the first part of these principal components, that is the principal components with the largest variances, since these components are supposed to contain the most information and therefore can be used as summary of the air pollution data. We standardised the principal components and applied a varimax rotation on the loadings of the first part of the standardised components (in our case on the first three, four and five components), to consider whether we obtain vectors that seem to reflect the pollution of specific source categories. We eventually used five principal components that explain 92% of the variance in the data. For these rotated components we computed the daily values and the corresponding lags, which were then used in the mortality analysis in Part two.
We identified five major components that can be related to source categories using principal component analysis: traffic, secondary inorganic transformations, bio-industry, industry and photochemical transformations.
These five components were analysed in relation to (cause-specific) mortality.

The association between these components and mortality was modelled with a generalised additive model (GAM), in one- and multi-component models. In these models also a large number of confounding variables were included, to correct for meteorological influences, influenza epidemics, time of the year etc.

Our conclusions of the study are:

1. Routinely collected air quality data can be used to identify at least five major components that can be related to source categories using principal component analysis: traffic, secondary inorganic transformations, bio-industry, industry and photochemical transformations.
2. Although PCA leads to a clear insight in the most important sources of the air pollution mixture in the Netherlands, the results do not exclude certain source categories from the policy process.
3. We found statistically significant associations between the components and daily mortality, both in one-component and in multi-component models. These associations were spread over the different rotated components; we did not find an indication for a sole causal factor for the observed mortality associations.
4. The strongest associations were found with the week-averages of the industrial component (significant for all mortality categories) and with the photochemical component (significant for total, respiratory, pneumonia and COPD mortality). Also for the traffic-related, secondary inorganic transformations and the bio-industry components we found significant results, but with lower relative risks.
5. Comparing associations between different causes of death, relative risks were generally higher for pneumonia and respiratory mortality than for total mortality.
6. In the summer season, components generally had a higher impact on mortality than in the winter.

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Samenvatting

Meer dan 100 epidemiologische studies, verspreid over de hele wereld, hebben een relatie aangetoond tussen dagelijkse variaties in de niveaus van luchtverontreiniging en dagelijkse sterfte. Ook in Nederland is deze relatie aangetoond. Omdat in de buitenlucht meerdere stoffen tegelijkertijd voorkomen, is het moeilijk om exact aan te geven welk onderdeel van het luchtverontreinigingsmengsel verantwoordelijk is voor de gevonden verbanden. Voor beleidsmakers is inzicht in de rol van de afzonderlijke componenten echter van groot belang, omdat kennis over de relevante componenten, en dus ook relevante bronnen, een effectief beleid ter vermindering van de gezondheidseffecten mogelijk maakt. In deze studie is gepoogd om door middel van een specifieke statistische methodiek de relatie tussen dagelijkse sterfte en vijf belangrijke bronnen van luchtverontreiniging te onderzoeken.

De vraagstelling van het onderzoek was om een relatie te leggen tussen dagelijkse oorzaak-specifieke sterfte in de Nederlandse bevolking en specifieke bronnen van grootschalige luchtverontreiniging.

De volgende doelstellingen werden hierbij gehanteerd:
1. toepassing van principale componenten analyse (PCA) op luchtverontreinigingsgegevens, en om op basis van de resultaten van deze analyses verschillende bronnen van luchtverontreiniging te kunnen identificeren.
2. de relatie tussen dagelijkse sterfte (totale, cardiovasculaire, respiratoire, longontsteking en COPD) en de bronnen te kwantificeren.
3. seizoensspecifieke relaties tussen sterfte en bronnen te onderzoeken.
4. aangeven in hoeverre deze methode nieuw inzicht geeft in de relatie luchtverontreiniging en sterfte.

Het eerste gedeelte van dit rapport beschrijft de methodiek van principale componenten analyse; het tweede deel beschrijft de relatie tussen sterfte en de geïdentificeerde bronnen.

Op basis van bestaande datareeksen over de periode 1993-1998 van dagelijkse sterftestatistieken en dagelijkse luchtverontreingingsniveaus, is een principale componenten analyse uitgevoerd op de luchtverontreinigingsdata. Resultaat van deze analyse was vijf principale componenten waarmee 92% van de variantie in de luchtverontreinigingsdata kon worden verklaard. Deze vijf componenten zijn vervolgens geanalyseerd in relatie tot de dagelijkse sterfte.
De geïdentificeerde componenten konden aan de volgende bronnen gerelateerd worden: verkeer, secundair anorganisch aërosol, bio-industrie, industrie en fotochemische verontreiniging.
Met behulp van “Generalised Additive Models” (GAM) is vervolgens de relatie onderzocht met sterfte, waarbij voor een groot aantal potentiële verstorende variabelen is gecorrigeerd.

De conclusies van de studie zijn:

1. Op basis van principale componenten analyse van routinematig verzamelde gegevens over dagelijkse luchtverontreinigingsniveaus zijn vijf principale componenten te identificeren die aan bronnen gerelateerd kunnen worden: verkeer, secundair anorganisch aërosol, bio-industrie, industrie en fotochemische verontreiniging.

2. Alhoewel met principale componenten analyse meer inzicht wordt verkregen in de rol van de afzonderlijke bronnen in het gehele mengsel van luchtverontreiniging, heeft dit inzicht er niet toe geleid dat bepaalde broncategorieën uitgesloten kunnen worden met betrekking tot de invloed op sterfte.
3. Er zijn statistisch significante associaties tussen de componenten en dagelijkse (oorzaakspecifieke) sterfte aangetoond; deze associaties zijn gevonden met alle vijf componenten, waarbij er geen voorkeur werd gevonden voor een specifieke factor.
4. De sterkste associaties werden gevonden voor de industriële component en voor de fotochemische componenten. Voor de andere componenten werden eveneens significante associaties gevonden, maar met een lager relatief risico.
5. Relatieve risico's voor de specifieke doodsoorzaken longontsteking en respiratoire sterfte waren in het algemeen hoger dan voor de totale dagelijkse sterfte.
6. Voor het zomerseizoen werden in het algemeen hogere relatieve risico's gevonden dan voor het winterseizoen.

1 Introduction

A large number of epidemiological studies, conducted all over the world, have reported on associations between acute health effects and exposure of populations to particulate matter (PM), especially on PM_{10} (Samet, 2002). Most of the studies focused on the association between mortality or hospital admissions and particulate matter. Reported health outcomes are pulmonary function decrements, respiratory symptoms, hospital and emergency department admissions and mortality. More recently, studies were published that focused on birth defects and general practitioner visits in relation to PM exposure (Wilhelm et al., 2003; Hajat et al., 2002).

Recently, in the Netherlands a study was performed on the association between mortality and air pollution over the period 1986-1994 (Hoek et al., 1997, 2000). The results of this study showed statistically significant associations between several air pollution components (including PM_{10}) and daily mortality. The relative risk (RR) of that study was 1.02, 95% confidence interval (1.003, 1.034), for a change of the PM_{10} concentration with 100 $\mu g/m^3$, resulting in approximately 1000 premature deaths per year in the Netherlands attributable to PM_{10}. In 2001 an extension of the time series analyses on mortality and air pollution was conducted, considering the period 1992-1998, see Fischer et al. (in preparation). In comparison to earlier analyses on this relationship, a larger PM_{10} data set (4-5 additional years, resulting in a seven - eight year time series) was analysed in single- and two-pollutant models. The results of this study were along the same lines as the previous study with a RR of 1.04 and 95% confidence interval (1.025, 1.047) for a change of the PM_{10} concentration with 100 $\mu g/m^3$.

A complicating factor in studying associations between air pollution and mortality is that air pollution concentrations are generally mutually positively correlated, since e.g. meteorology has the same influence on all concentrations. High correlations between components also occur when pollutants have a common source, for example traffic or industry. Fitting several highly correlated air pollution components in the same model leads to inflation of standard errors and does not lead to meaningful results. Therefore in multi-component models, one usually fits only those air pollution components that have a low interrelation.

Although there is consensus in the scientific literature about the consistency of the associations found in epidemiological time-series studies, it is still unknown what the responsible causal factors for these associations can be. Therefore both toxicological and epidemiological research is focusing on the sources of air pollution that may explain the association between PM and health effects. One of the first studies in this context has been presented by Dr. Halûk Özkaynak at the “PM2000: Particulate Matter and Health” conference (Özkaynak et al., 2000). He presented the application of principal component analysis techniques on a set of air pollution and meteorological data to identify sources. Subsequently, these principal components (among other things auto, fossil fuel, ozone/regional haze, etc.) were used in time-series models to estimate the association between cause-specific mortality and each of these components. Analysis of an extensive twenty years of mortality and pollution records for the greater Toronto area showed statistically significant associations between PM, O_3 and motor vehicle related air pollution, and the various cause specific daily mortality categories. Specifically, the average contribution of auto-related pollution in Toronto to either daily total or cardiovascular mortality was estimated to be around 2%, while the average contribution of motor vehicle pollutants to acute respiratory or pneumonia deaths was predicted to be about 5%. Several recent studies reported source-oriented evaluation of PM associated health effects using factor and principal component analysis to estimate daily concentrations due to underlying source types (e.g. mobile emissions, soil, coal) (Laden et al., 2000; Mar et al., 2000; Tsai et al., 2000). In summary, these studies suggest that a number of source-types are associated with mortality, including automobile emissions, coal burning, and vegetative burning.

Laden (2000) used the elemental composition of size-fractioned integrated 24-hr fine particle measurements, collected at least every other day from 1979 until the late 1980s, to identify several distinct source-related fractions. They examined the association of these fractions with daily mortality in six cities. In the fine fraction, 15 elements were routinely found: silicon, sulphur, chlorine, potassium, calcium, vanadium, manganese, aluminium, nickel, zinc, selenium, lead, copper and iron. With specific rotation factors per city up to 5 common factors from the 15 specified elements were identified. The factors identified in all six cities were a silicon factor (classified as soil and crustal material), a lead factor (classified as motor vehicle exhaust), and a selenium factor (classified as coal combustion sources). Dependent on the cities, additional factors identified were vanadium (fuel oil combustion), chlorine (salt), and selected metals (nickel, zinc or manganese) as possible targets and sources. For each city the daily mortality was regressed on the daily score for each of the identified factors. For the three source factors identified in all metropolitan areas, the strongest increase in daily mortality was associated with the mobile sources factor (lead). The coal factor (selenium) was also positively associated with mortality with the exception of one city (Topeka). The crustal factor in fine particulate matter was not associated with mortality. There were some suggestions that the fuel oil combustion factor was positively associated with mortality, but this association was non-significant. In models with measurements for the individual elements, nickel, lead and sulphur were significantly associated with mortality. These results indicate that combustion particles in the fine fraction from mobile and coal combustion sources, but not fine crustal particles, are associated with increased mortality.

Mar et al. (2000) conducted a principal component analysis and varimax rotation on the daily concentrations of the chemical components of $PM_{2.5}$ and on the gaseous species emitted by combustion sources (CO, NO_2, SO_2) in Phoenix over the period 1995 – 1997 to assess the association with total and cardiovascular mortality. Chemical components were Al, Si, S, Ca, Fe, Zn, Mn, Pb, Br, K, Organic Carbon (OC) and Elemental Carbon (EC). Results from the analyses with five factors were presented. Identified factors were: motor vehicle exhaust and resuspended road dust (high loadings (or correlations) on Mn, Fe, Zn, Pb, EC, CO and NO_2), soil (high loadings on Al, Si, Fe), vegetative burning (high loadings on OC and "soil corrected" K), a local source of SO_2 (high loading on SO_2) and regional sulphate (a high loading on S). Total mortality was not associated with the identified factors, except the regional sulphate with a lag of 0 days. Cardiovascular mortality was significantly associated with the factors representing motor vehicles and vegetative burning. The results based on the factors were consistent with time-series results for individual pollutants (CO, NO_2, K, EC, OC).

Tsai et al. (2000) also applied factor analysis and poisson regression to a data set with mortality and extensive PM chemical specification measurements (including trace metals, sulphate and particulate organic matter). Ambient pollution data were collected between 1981 and 1983 at three sites in New Jersey: Newark, Elizabeth and Camden. Chemical components included in the factor analysis with varimax rotation were Pb, Mn, Cd, V, Zn, Fe, Ni, SO_4 and

CO. Tracers that were used to identify PM sources were: Mn and Fe for dust, SO_4 for secondary aerosol, Zn, Cd and Cu for various industrial sources. Up to 7 sources were identified in the factor analyses:

Source	*High loading*
Oil burning	V and Ni
Industrial-1	Cu
Geological	Mn
Industrial-2	Zn
Motor vehicle	CO
Sulphate	SO_4
Industrial-3	Cd

In Newark oil burning (tracers: V and Ni), industrial sources (tracer: Zn and Cd) and sulphate aerosol showed positive relationships with total daily mortality. For cardiopulmonary deaths only sulphate was a significant factor. In Camden results indicated that oil-burning and motor vehicle emissions (tracers: Pb and CO) were two important sources for total daily mortality; sources traced by copper showed a negative association with total daily deaths. Three PM sources were significant predictors for cardiovascular mortality: oil burning, motor vehicles and sulphate. In Elizabeth total daily mortality showed a negative association with resuspended dust (tracers: Fe and Mn). Three factors were significantly associated with cardiopulmonary mortality: industrial sources (tracer: Cd) showed positive associations and resuspended dust and industrial sources traced by copper showed negative associations.

In the Netherlands, the National Institute for Public Health and the Environment operates the ambient air quality monitoring network. Large time series are available of daily concentrations of various pollutants. It would be useful to create source-related variables from these time series, like in the above described literature, which can be used to model the association between sources of air pollution and mortality. This can be interesting for policy makers, since this might give a clue which sources are most important in this relationship.

This study will focus on the feasibility of a principal component analysis on air pollution data for the Netherlands.

The overall objective of this study is to investigate whether cause-specific mortality (i.e. respiratory, cardiovascular, pneumonia, COPD and total mortality) can be attributed to specific sources of air pollution.

Therefore we formulated the following aims:

1. To apply a principal component analysis on air pollution data in order to provide a meaningful description in components that are interpretable in terms of different sources of air pollution.
2. To quantify the association between mortality (total, cardiovascular diseases, respiratory, pneumonia and COPD mortality) and the source-specific components.
3. To investigate the effect of season-specific associations between mortality and the components.
4. To consider whether this method leads to new insights with regard to the approach of mortality analyses.

The first part of this report is focussed on the principal component analysis and the allocation of new variables into source-related variables.

The second part relates to the quantification of associations between mortality and the principal components (source-related explanatory variables). Finally, we will discuss the results in relation with previous findings and related studies.

2 Part one: Principal component analysis on air pollution data

2.1 Overview

We will shortly describe the principal component analysis; the results of the principal component analysis together with a more detailed explanation will follow later.

Based on data series used for the mortality analyses in Fischer et al. (in preparation), (concerning daily mortality, air pollution and confounding variables in the period 1993-1998), we apply a principal component analysis on standardised air pollution data. We consider the first part of these principal components, that is the principal components with the largest variances, since these components are supposed to contain the most information and therefore can be used as summary of the air pollution data. We standardise the principal components and apply a varimax rotation on the loadings of the first part of the standardised components (in our case on the first three, four and five components), to consider whether we obtain vectors that seem to reflect the pollution of specific source categories. We will eventually use five principal components that explain 92% of the variance in the data. For these rotated components we compute the daily values and the corresponding lags, which will be used in the mortality analysis in Part two. We list the consecutive steps for later reference:
1. PCA of the standardised air pollution concentrations.
2. Standardise the principal components.
3. Apply a varimax rotation on the first standardised components.
4. Determine the number of (rotated) principal components we want to use, such that the rotated components are interpretable in terms of sources of air pollution.
5. Compute the daily values of the rotated principal components.

2.2 Data

For a more detailed description of the data we refer to Fischer et al. (in preparation), in which the same data are used.

For the principal component analyses we use air quality data of the period 1993-1998, obtained from the National Institute for Public Health and the Environment (RIVM). The pollutants involved are PM_{10}, black smoke (BS), carbon monoxide (CO), nitrogen oxide (NO), nitrogen dioxide (NO_2), ammonia (NH_3), nitrate (NO_3), sulphate (SO_4), sulphur dioxide (SO_2) and ozone (O_3). We use the daily averages of the concentrations (also averaged over the Netherlands) of these pollutants, except for ozone, of which we use eight-hour averages (12.00 to 20.00 hours).

2.3 Statistical software

The principal component analysis and rotations are performed in Splus 2000 (for Windows).

2.4 Results and explanation of the principal component analysis

2.4.1 Principal component analysis

We first sketch the idea of a principal component analysis (PCA), as far as it applies to our specific context. For details on the subject we refer to Jolliffe, (1986). In the following, we will talk about *the* mean, *the* covariance etc. of certain air pollutant concentrations. This might be a bit misleading, of course these concentrations are not at all independent samples from a multivariate probability distribution, but are also influenced by e.g. meteorology, day of the week and time of the year. We use the mean, covariance etcetera of the daily concentrations in the period 1993 –1998.

We have a database of air pollution data, containing the daily concentrations of the pollutants PM_{10}, BS, NH_3, CO, NO, NO_2, SO_2, O_3, NO_3 and SO_4 in the period 1993-1998. We shift these concentrations such that the shifted concentrations have zero means, i.e. we subtract the means of the original concentrations. In a principal component analysis, a new co-ordinate system is chosen (the new co-ordinates are called principal components). Each principal component is a linear combination of the shifted (and eventually also standardised) concentrations, obeying certain conditions. For $i \in \{1, \cdots 10\}$, the i^{th} principal component is written as:

$$PC_i = a_{i,1}PM_{10} + a_{i,2}BS + a_{i,3}NH_3 + a_{i,4}CO + a_{i,5}NO + a_{i,6}NO_2 + a_{i,7}SO_2 + \\ + a_{i,8}O_3 + a_{i,9}NO_3 + a_{i,10}SO_4,$$

the $a_{i,j}, i, j \in \{1, \cdots, 10\}$ are real constants specified later. Here PM_{10}, BS etcetera are the (eventually standardised) shifted concentrations of PM_{10}, BS etc. We write a_i for the vector $(a_{i,1}, \ldots, a_{i,10})$. The constants $a_{i,j}$ (which are called loadings) are chosen such that:

- The length of the vectors a_i equals 1, i.e. $\sqrt{a_{i,1}^2 + \cdots + a_{i,10}^2} = 1$.
- The first principal component PC_1 is chosen such that $Var(PC_1)$ is maximal.
- Then the second principal component is chosen such that $Var(PC_2)$ is maximal under the restriction that PC_1 and PC_2 are uncorrelated.
- In general, the j^{th} principal component is chosen such that $Var(PC_j)$ is maximal on the condition that PC_k and PC_j are uncorrelated for $k \in \{1, \cdots, j-1\}$.

When we use shifted concentrations (and not standardised), this leads to the result that $Var(PC_1)$ is equal to the largest eigenvalue of the covariance matrix of the concentrations and a_1 a corresponding eigenvector of length one, $Var(PC_2)$ is equal to the second largest eigenvalue and a_2 a corresponding eigenvector of length one, etc. When we use standardised concentrations (i.e. shifted concentrations divided by the corresponding standard deviations) a similar correspondence holds, but now with the correlation matrix of the concentrations.

As mentioned in Jolliffe (1986) section 2.3, a principal component analysis depends on the scale of the measurements (e.g. the loadings in the correlation and covariance case are not equal, nor can the first be directly obtained from the second). Therefore we should decide whether we want to rescale the measurements. When shifted concentrations (without dividing by the standard deviation) are used, the pollutants with the largest variance tend to dominate the first principal component(s). The covariance matrix of the air pollution concentrations in the period 1993-1998 is displayed in Table 1 and the correlations are given in Table 2 below.

Table 1 Covariances of the air pollution concentrations

	PM_{10}	BS	NH_3	CO	NO	NO_2	SO_2	O_3	NO_3	SO_4
PM_{10}	447.3	173.7	53.1	302.5	192.0	158.6	74.6	-31.2	39.5	39.6
BS	173.7	100.8	16.1	192.4	147.1	92.1	41.4	-119.9	13.9	14.7
NH_3	53.1	16.1	37.3	33.7	24.6	28.9	2.5	60.3	7.1	3.9
CO	302.5	192.4	33.7	514.0	394.6	218.9	68.9	-345.8	27.8	26.8
NO	192.0	147.1	24.6	394.6	373.7	161.0	40.2	-299.3	13.74	13.9
NO_2	158.6	92.1	28.9	218.9	161.0	143.3	40.6	-133.8	14.4	11.1
SO_2	74.6	41.4	2.5	68.9	40.2	40.6	36.7	-43.8	6.0	7.6
O_3	-31.2	-119.9	60.3	-345.8	-299.3	-133.8	-43.8	990.1	-5.4	-4.2
NO_3	39.5	13.9	7.1	27.8	13.7	14.4	6.0	-5.4	10.2	7.2
SO_4	39.6	14.7	3.9	26.8	13.9	11.1	7.6	-4.2	7.2	9.3

Table 2 Correlations of the air pollution concentrations

	PM_{10}	BS	NH_3	CO	NO	NO_2	SO_2	O_3	NO_3	SO_4
PM_{10}	1.00	0.82	0.41	0.63	0.47	0.63	0.58	-0.05	0.59	0.61
BS	0.82	1.00	0.26	0.85	0.76	0.77	0.68	-0.38	0.43	0.48
NH_3	0.41	0.26	1.00	0.24	0.21	0.40	0.07	0.31	0.36	0.21
CO	0.63	0.85	0.24	1.00	0.90	0.81	0.50	-0.48	0.38	0.39
NO	0.47	0.76	0.21	0.90	1.00	0.70	0.34	-0.49	0.22	0.24
NO_2	0.63	0.77	0.40	0.81	0.70	1.00	0.56	-0.36	0.38	0.31
SO_2	0.58	0.68	0.07	0.50	0.34	0.56	1.00	-0.23	0.31	0.41
O_3	-0.05	-0.38	0.31	-0.48	-0.49	-0.36	-0.23	1.00	-0.05	-0.04
NO_3	0.59	0.43	0.36	0.38	0.22	0.38	0.31	-0.05	1.00	0.74
SO_4	0.61	0.48	0.21	0.39	0.24	0.31	0.41	-0.04	0.74	1.00

We see that the variances (on the diagonal of Table 1) of the air pollution concentrations are very different. Applying a principal component analysis to the shifted data leads to a result in which the loadings for the pollutants NO_3, SO_4, NH_3 and SO_2 are very small loadings in the first components. We therefore decided to standardise the concentrations before applying a principal component analysis.

In Table 3 below, we see the loadings of the principal component analysis of the standardised air pollution concentrations, for example:

$$PC_1 = 0.37PM_{10} + 0.41BS + 0.16NH_3 + 0.39CO + 0.34NO + 0.37NO_2 + 0.30SO_2 + \\ -0.17O_3 + 0.27NO_3 + 0.27SO_4.$$

Since the matrix of the numbers in Table 3 is orthogonal, we can also read this table from left to right, for example for the standardised concentration of PM_{10} we have:

$$PM_{10} = 0.37PC_1 + 0.24PC_2 + 0.02PC_3 + 0.21PC_4 - 0.28PC_5 - 0.66PC_6 - 0.03PC_7 + \\ - 0.11PC_8 + 0.33PC_9 + 0.35PC_{10}.$$

Table 3 PCA of the standardised air pollution concentrations

	PC_1	PC_2	PC_3	PC_4	PC_5	PC_6	PC_7	PC_8	PC_9	PC_{10}
PM_{10}	0.37	0.24	0.02	0.21	-0.28	-0.66	-0.03	-0.11	0.33	0.35
BS	0.41	-0.08	-0.01	0.17	-0.20	-0.26	-0.13	0.13	-0.64	-0.49
NH_3	0.16	0.42	-0.63	-0.12	0.36	0.04	-0.49	0.08	0.04	-0.04
CO	0.39	-0.22	-0.13	-0.14	-0.20	0.19	0.14	0.06	0.62	-0.53
NO	0.34	-0.31	-0.25	-0.23	-0.36	0.31	-0.04	0.29	-0.18	0.57
NO_2	0.37	-0.11	-0.25	0.08	0.36	0.08	0.49	-0.60	-0.18	0.11
SO_2	0.30	-0.02	0.28	0.69	0.33	0.33	-0.12	0.29	0.13	0.13
O_3	-0.17	0.55	-0.28	0.34	-0.46	0.30	0.40	0.06	-0.07	-0.07
NO_3	0.27	0.40	0.29	-0.43	0.29	-0.08	0.44	0.46	-0.07	0.02
SO_4	0.27	0.37	0.46	-0.23	-0.21	0.38	-0.34	-0.47	-0.06	0.00

The variances and standard deviations of these principal components are displayed in Table 4.

Table 4 Variances and standard deviations of the principal components of the standardised concentrations

	PC_1	PC_2	PC_3	PC_4	PC_5	PC_6	PC_7	PC_8	PC_9	PC_{10}
Var.	5.22	1.75	1.07	0.74	0.41	0.26	0.23	0.19	0.07	0.06
St. dev.	2.28	1.32	1.03	0.86	0.64	0.51	0.48	0.43	0.27	0.24

The idea is that, since the last principal components have very small variances, they contain less information than the first principal components with larger variances.
We standardise the principal components; i.e. we divide each principal component by its standard deviation. We denote the standardised principal components by PC_j^*, where $PC_j^* = \frac{PC_j}{st.dev(PC_j)}$. When we standardise the components, also the loadings change. We get two new tables of loadings, depending on whether we want to express the standardised principal components as a linear combination of the standardised concentrations or the other way around. The results can be found in Table 5 and Table 6.

Table 5 Correlation loadings (of the standardised concentrations as linear combination of the standardised principal components)

	PC^*_1	PC^*_2	PC^*_3	PC^*_4	PC^*_5	PC^*_6	PC^*_7	PC^*_8	PC^*_9	PC^*_{10}
PM_{10}	0.84	0.32	0.02	0.18	-0.18	-0.34	-0.02	-0.05	0.09	0.08
BS	0.94	-0.11	-0.01	0.15	-0.13	-0.13	-0.06	0.06	-0.17	-0.12
NH_3	0.38	0.56	-0.65	-0.10	0.23	0.02	-0.23	0.03	0.01	-0.01
CO	0.90	-0.29	-0.14	-0.12	-0.13	0.10	0.07	0.03	0.17	-0.13
NO	0.78	-0.41	-0.26	-0.20	-0.23	0.16	-0.02	0.13	-0.05	0.14
NO_2	0.85	-0.14	-0.26	0.07	0.23	0.04	0.24	-0.26	-0.05	0.03
SO_2	0.68	-0.02	0.29	0.60	0.21	0.17	-0.06	0.13	0.03	0.03
O_3	-0.38	0.73	-0.29	0.29	-0.29	0.15	0.19	0.03	-0.02	-0.02
NO_3	0.61	0.53	0.30	-0.37	0.19	-0.04	0.21	0.20	-0.02	0.00
SO_4	0.61	0.48	0.48	-0.20	-0.13	0.19	-0.17	-0.20	-0.02	0.00

Table 6 Loadings of the standardised components as linear combination of the standardised concentrations

	PC^*_1	PC^*_2	PC^*_3	PC^*_4	PC^*_5	PC^*_6	PC^*_7	PC^*_8	PC^*_9	PC^*_{10}
PM_{10}	0.16	0.18	0.02	0.24	-0.44	-1.30	-0.07	-0.26	1.23	1.46
BS	0.18	-0.06	-0.01	0.20	-0.32	-0.51	-0.27	0.31	-2.36	-2.05
NH_3	0.07	0.32	-0.61	-0.14	0.56	0.08	-1.02	0.18	0.16	-0.18
CO	0.17	-0.16	-0.13	-0.16	-0.30	0.38	0.28	0.14	2.28	-2.22
NO	0.15	-0.24	-0.24	-0.27	-0.57	0.61	-0.07	0.66	-0.66	2.38
NO_2	0.16	-0.08	-0.25	0.10	0.56	0.15	1.02	-1.38	-0.65	0.46
SO_2	0.13	-0.01	0.27	0.81	0.51	0.65	-0.25	0.68	0.46	0.54
O_3	-0.07	0.42	-0.27	0.39	-0.71	0.59	0.83	0.14	-0.27	-0.28
NO_3	0.12	0.30	0.28	-0.50	0.46	-0.15	0.91	1.05	-0.26	0.08
SO_4	0.12	0.28	0.45	-0.26	-0.33	0.75	-0.72	-1.07	-0.21	0.00

Table 5 must be read from left to right:

$$PM_{10} = 0.84PC_1^* + 0.32PC_2^* + 0.02PC_3^* + 0.18PC_4^* - 0.18PC_5^* - 0.34PC_6^* - 0.02PC_7^* + \\ - 0.05PC_8^* + 0.09PC_9^* + 0.08PC_{10}^*.$$

Table 6 must be read from top to bottom:

$$PC_1^* = 0.16PM_{10} + 0.18BS + 0.07NH_3 + 0.17CO + 0.15NO + 0.16NO_2 + 0.13SO_2 + \\ - 0.07O_3 + 0.12NO_3 + 0.12SO_4.$$

Observe that, since $Var(PC_j^* = 1)$ for all j, and $Cov(PC_i^*, PC_j^*) = 0$ for $i \neq j$, the loadings in Table 5 are also the correlations between the principal components and the pollutant concentrations: e.g. the correlation between NO_3 and PC_3^* equals 0.30. These loadings are therefore called correlation loadings and convenient when we want to interpret the principal components.

2.4.2 Rotation of the standardised principal components and interpretation

As mentioned before, we would like to use the principal components as summary of the air pollution data: we want to include only the first principal components (or eventually rotations of these components) as explanatory variables in mortality analyses. Since the last principal components have relatively small variances, it is unlikely that we lose important information by excluding these variables. The question is how many principal components to retain and whether a rotation should be carried out. The idea of a rotation is that we choose new co-ordinates (which are a rotation of the first standardised principal components), such that the rotated components span the same subspace as the original first standardised principal components (in that sense, they contain the same information). The purpose of rotation is that we hope to find variables that have an interpretation in terms of different sources of air pollution. For a detailed explanation of rotations, we refer to Chapter 5 of Basilevsky (1994).

We examine the correlation loadings of the first components (see Table 5), but we cannot interpret these components as representing certain sources of air pollution. We therefore decide to apply a varimax rotation on the first three standardised principal components. We want to achieve that some of the new correlation loadings will be relatively large, while other loadings will be relatively small. This might simplify the interpretation of the various components. In the case of the varimax rotation on the first three standardised principal components, the rotation is chosen for which the sum of the variances of the new first three squared correlation loadings is maximal (see Basilevsky 1994 p. 263). In Splus, this rotation is obtained by choosing the option normalize=F in the rotate command. We denote the rotated components by vc3comp1, vc3comp2 and vc3comp3, to express that these are the result of the **v**arimax rotation of the **c**orrelation loadings of the first **3** standardised principal components.

The correlation loadings of the varimax rotation of the first three standardised components can be found in Table 7 below.

Table 7 Correlation loadings after a varimax rotation of the first three standardised principal components

	vc3comp1	*vc3comp2*	*vc3comp3*
PM_{10}	0.53	0.66	-0.28
BS	0.83	0.45	-0.04
NH_3	0.24	0.14	-0.90
CO	0.92	0.24	-0.02
NO	0.92	0.03	-0.01
NO_2	0.85	0.23	-0.20
SO_2	0.49	0.53	0.15
O_3	-0.58	0.05	-0.65
NO_3	0.16	0.82	-0.19
SO_4	0.14	0.90	-0.03

The rotated components vc3comp1, vc3comp2 and vc3comp3 have variance 1, are mutually uncorrelated and also uncorrelated with PC_4^* up to PC_{10}^* (inclusive). To make things clearer, we give an example. For the standardised concentration of PM_{10} we have:

$$PM_{10} = 0.53vc3comp1 + 0.66vc3comp2 - 0.28vc3comp3 + 0.18PC_4^* - 0.18PC_5^* - 0.34PC_6^* - 0.02PC_7^* - 0.05PC_8^* + 0.09PC_9^* + 0.08PC_{10}^*.$$

When we consider the correlation loadings of the rotated components, we see that vc3comp1 is highly correlated with the pollutants BS, CO, NO and NO_2 and moderately correlated with PM_{10} and O_3. This might indicate a relation with traffic emissions. The second and third rotated component cannot be associated to different categories of air pollution. We decided that these rotated components are not (all) interpretable as source-related variables. We therefore apply a varimax rotation on the first four standardised principal components, to see whether this leads to a more interpretable result. The corresponding correlation loadings are displayed in Table 8.

Table 8 Varimax rotation of the first four standardised principal components (correlation loadings)

	vc4comp1	*vc4comp2*	*vc4comp3*	*vc4comp4*
PM_{10}	0.38	0.50	-0.32	0.58
BS	0.70	0.30	-0.09	0.57
NH_3	0.21	0.19	-0.90	-0.02
CO	0.89	0.23	-0.06	0.29
NO	0.93	0.08	-0.05	0.13
NO_2	0.76	0.14	-0.25	0.41
SO_2	0.24	0.18	0.08	0.90
O_3	-0.67	-0.04	-0.64	0.04
NO_3	0.18	0.90	-0.17	0.08
SO_4	0.10	0.89	-0.02	0.27

The correlations between the concentrations and vc4comp1 resemble the situation of vc3comp1 and we can interpret this again as traffic. The second component, vc4comp2, is highly correlated with NO_3 an SO_4, which are secondary aerosols. The third component, vc4comp3, is strongly correlated with NH_3, which might suggest a relation with bio-industry, but the relatively strong correlation with O_3 is not expected for a component representing bio-industry. The last component, vc4comp4, is highly correlated with SO_2 and moderately with PM_{10} and BS, we could interpret this as industrial sources.

We finally rotate the first five standardised principal components, to see whether this makes the picture clearer. The results can be found in table 9.The rotated components are denoted by vc5comp1 up to vc5comp5.

Table 9 with five uncorrelated components presents the most promising results to use for the mortality analysis. An interpretation of the various components will be presented according to the structure of the emissions of the different source categories that can be discerned in the Netherlands. Concerning the correlation structure of the air pollution concentrations, we must realise that stemming from the same source is not the only reason for the observed interrelationships between pollutant concentrations. A number of modulating factors must be taken into account. The foremost important factor will be large-scale meteorology that governs transport of pollution and controls the dispersion and removal. On a smaller scale also diurnal modulation plays a role, because of differences in source patterns and temporal profiles of source categories influence the correlation pattern. One of the other factors we have to consider is the influence of seasons, as a number of air polluting components in the

Netherlands have a seasonal pattern that differs from the rest of the components. In this light it might seem illogical to search for uncorrelated components to represent the different sources of air pollution. Nevertheless we think that we can give a meaningful interpretation of the five varimax-rotated components and that it is worthwhile to use these components as explanatory variables in a mortality analysis.

Table 9 Varimax rotation of the first five standardised principal components (correlation loadings)

	vc5comp1	*vc5comp2*	*vc5comp3*	*vc5comp4*	*vc5comp5*
PM_{10}	0.53	0.51	-0.20	0.48	-0.25
BS	0.76	0.30	-0.08	0.50	0.05
NH_3	0.17	0.17	-0.91	0.01	-0.23
CO	0.88	0.21	-0.13	0.24	0.22
NO	0.94	0.06	-0.08	0.06	0.21
NO_2	0.64	0.12	-0.42	0.45	0.26
SO_2	0.23	0.20	0.01	0.92	0.09
O_3	-0.38	-0.01	-0.25	-0.09	-0.85
NO_3	0.10	0.89	-0.29	0.11	0.13
SO_4	0.19	0.90	0.03	0.20	-0.08

The first component, vc5comp1, can be interpreted as a component associated to traffic emissions for reasons elaborated below. This component is correlated highest with NO (a correlation of 0.94 in Table 9). This is also the principal fraction that is emitted by traffic, approximately 80-90% of the NO_x emissions of traffic is emitted directly as NO, which afterwards gets transformed into NO_2 quite quickly and eventually into NO_3^- by a number of secondary inorganic reaction steps. In a component representing traffic, we expect that this is expressed by the magnitude of the correlations with NO_2 and NO_3^-, we expect that the correlation with NO_2 is substantial, but the correlation with NO_3^- could be pretty low. We see such a pattern in vc5comp1: the component has a correlation of 0.64 with NO_2 and of 0.10 with NO_3^-. The second most important correlation with vc5comp1 is with CO: 0.88, which also is an important indicator of traffic. The third largest correlation is with BS (0.76), which is also in line with traffic as a dominant source. Most of the particulate traffic emissions are from diesel engines and comprise carbonaceous PM of a sooty character that is easily captured by BS measurements. The influence of traffic on the BS levels in the Netherlands is considerably larger than that on PM_{10} in general, which fits with a lower correlation of vc5comp1 with PM_{10} (0.53) than with BS.

RIVM (1996) reports that in 1995 the total Dutch NO_x emissions were 518 kT/y, of which 334 kT was from traffic. The other important sources of NO_x emissions were energy production 60 kT and industry + refineries 78 kT in 1995. One could therefore argue that the correlation in a traffic-related component with NO is not expected to be as high as in vc5comp1. On the other hand, the last two source categories (energy and industry + refineries) are supposed to have a somewhat different diurnal profile than that of traffic. These source categories possibly have a more continuous character of operation, such that fluctuations in the concentration of NO_x might be mostly attributable to traffic, though the contribution of industry and refineries in absolute terms to the NO_x emissions is by no means negligible.

For the second largest correlation (between vc5comp1 and CO) a similar reasoning can be presented. The total Dutch emissions in 1995 were 873kT/y of CO. Of this amount 518 kT of CO was from traffic and 228 kT of CO was emitted by industry in 1995 (RIVM, 1996).

The second component, vc5comp2, is dominated by high correlation loadings with sulphate and nitrate. This component can be characterised as the result of inorganic transformations, as the end products of secondary aerosol formation from the precursor gases SO_2 and NO_x are the main factors driving the correlation structure for v5comp2. Sulphate and nitrate still are an important part of the total PM_{10} in the Netherlands; in 1995 slightly more than 20% of regional Dutch PM_{10} levels was either sulphate or nitrate (Den Hartog et al. (1997)). Therefore we expect that in a component representing inorganic transformations also the correlation with PM_{10} will be not negligible. This is exactly what we see in vc5comp2: a correlation of 0.51 with PM_{10}. The correlation between vc5comp2 and BS is quite low (0.30). This does not conflict with an interpretation of vc5comp2 as representing inorganic transformations, since sulphate and nitrate are no part of BS, while being a considerable part of PM_{10}.

This vc5comp2 can not be directly related to emissions in the Netherlands, as inorganic secondary aerosol formation is a process that takes time and local ambient concentrations of especially sulphate are for the larger part (95%) dominated by foreign transport. Also for this reason the interrelationship with the local Dutch concentrations of the precursor gases (SO_2 and NO_2) is expected to be lower than of the previously mentioned components of PM.

The third component, vc5comp3, has its main correlation loading (-0.91) with NH_3 and none of the other components. This seems to point to a source as agriculture or bio-industry. In the Netherlands the yearly emissions of NH_3 in 1995 were 155 kT/y, of which 144 kT originated by agriculture (RIVM, 1996). For none of the other air pollution components the source category agriculture is an important contributor, so the fact that all correlations with other pollutants are low, fits with an interpretation of vc5comp3 as representing bio-industry. Maybe only the correlation with NO_2 is a bit stronger than expected.

In the Netherlands the concentrations of NH_3 are more a local phenomenon than concentrations of any of the other primary air pollution components, and foreign contribution of NH_3 is only of secondary importance in our country. In 1995 approximately 6% of PM_{10} was NH_4^+ (Den Hartog et al., 1997), the secondary product of NH_3 after neutralisation, while none of the BS was NH_4^+ or possibly only slightly NH_3 related. Possibly vc5comp3 can also be related to seasonal activities and sources of PM that are related to agricultural activities as haying, harvesting and combining, also these sources tend to peak primarily during summer in the Netherlands. See also Table 32, the mean of vc5comp3 is negative in summer and positive in winter, which points to an average pollution level that is higher in summer than in winter (since the most important correlations with vc5comp3 are negative).

The fourth component vc5comp4 has its highest correlation loading with SO_2 (0.92). This might be somewhat of a surprise as the emissions of SO_2 have decreased considerably in the Netherlands during the past decades. But one should realise that it is not the absolute height of the concentrations or the emissions but the correlation structure that is the driving force behind the components that are found in the principal components analysis (since we use standardised concentrations). In 1995 the total emission of SO_2 was 147 kT/y, of which industry + refineries contributed 94 kT and energy production 18 kT (RIVM, 1996). The traffic contribution was 30kT. Therefore we interpret vc5comp4 as reflecting industrial sources and more in particular those industrial sources or continuously working energy production related sources that have a temporal emission structure that is different from that of traffic. The moderate correlation of vc5comp4 and BS (0.50) and PM_{10} (0.48) also points in the direction of industrial sources: of the total PM_{10} emission of 60kT/y in 1995 in the Netherlands (Buringh et al., 2002) the industrial and traffic contribution to the primary PM_{10} emission was 21 kT each. The very small correlation loading of vc5comp4 with NO seems illogical for a component representing industry, but as we mentioned earlier, fluctuations in NO_x might be mainly driven by traffic emissions.

Finally, vc5comp5 has its strongest correlation loading (-0.85) with ozone, this points to some photochemical processes behind this component. These processes occur more in summer than in winter and we therefore expect the mean of this component to be negative in summer and positive in winter (since the correlation with ozone is negative). This is indeed what we see in Table 32 of the Appendix, the mean is approximately –0.6 in the summer and 0.5 in the winter. Part of PM_{10}, though in the Netherlands the magnitude of this part is unknown, probably is related to ozone by way of secondary organic aerosol formation (SOA). This might explain a similar sign between the photochemical factor vc5comp5 and PM_{10}. Because ozone is not emitted into the air directly, this vc5comp5 cannot be compared with emissions from Dutch sources.

A summary of our interpretation of the components is presented in Table 10 below.

Table 10 Interpretation of the components

component	*Source*
vc5comp1	Traffic related
vc5comp2	Secondary inorganic transformations
vc5comp3	Bio-industry
vc5comp4	Industry related
vc5comp5	Photochemical transformations

The loadings for the varimax rotation of the first five standardised components as linear combination of the air pollution concentrations can be found in Table 11.

Table 11 Loadings of the varimax rotation of the first five standardised components as linear combination of the standardised concentrations

	vc5comp1	*vc5comp2*	*vc5comp3*	*vc5comp4*	*vc5comp5*
PM_{10}	0.20	0.11	0.15	0.14	-0.46
BS	0.27	-0.03	0.17	0.15	-0.23
NH_3	-0.11	-0.08	-0.88	-0.05	0.11
CO	0.39	-0.01	0.08	-0.17	-0.05
NO	0.57	-0.07	0.16	-0.38	-0.18
NO_2	-0.04	-0.17	-0.45	0.26	0.34
SO_2	-0.33	-0.15	-0.01	0.92	0.12
O_3	0.14	-0.07	0.05	0.01	-0.94
NO_3	-0.26	0.57	-0.25	-0.14	0.41
SO_4	0.02	0.58	0.30	-0.15	-0.14

The daily values of the components are easily computed with the loadings in Table 11. We also constructed the lag 1 day, lag 2 days and lag 3 days variables of the components and the average value of the components in the preceding week (which is the average of lag 1 up to and including lag 7). The lag-variables are successively denoted by l1, l2, l3 or wk after the name of the rotated principal component.

2.5 Conclusion Part one:

In our opinion, the variables vc5comp1 up to vc5comp 5, which result from a varimax rotation of the first five standardised principal components, are appropriate to be used as source related explanatory variables in a mortality analysis. The correlation structure of these components and the air pollution concentrations is presented in Table 9 and our interpretation in Table 10. We will use these variables and the corresponding lag-variables as source related explanatory variables for mortality in Part two of this study.

3 Part two: Associations between mortality and the five varimax rotated standardised principal components

3.1 Overview

In Part one, we extracted five readily interpretable components after principal component analyses (PCA) with varimax rotation from a time series of air pollution data. As mentioned in the conclusion of Part one, we think the correlation structure of these vc5comp1 up to vc5comp5 (see Table 9) makes it worthwhile to use these variables (and the associated lag-variables) as explanatory variables for daily mortality. Recall that our interpretation of these components can be found in Table 10.

The association between these components and mortality is modelled with a generalised additive model (GAM), in one- and multi-component models. In these models also a large number of confounding variables is included, to correct for meteorological influences, influenza epidemics, time of the year etc. We call the models with only the confounding variables *base-models*. We also fit models in which the rotated components interact with the season. In this part of the report, we will first describe the data and the computer programs used. Then we will describe the method and the base-model and we present the results.

3.2 Data

3.2.1 Rotated principal components

We use the five varimax rotated principal components vc5comp1, vc5comp2, vc5comp3, vc5comp4, vc5comp5 and the associated lags as described in Part one of this report.

For a more detailed description of the further data, the origin of the data and the data collection, we refer to Fischer et al. (in preparation). In that study the same data are used (but during a longer period). We here only shortly list the variables used for this study (period 1993-1998).

3.2.2 Mortality data

These data are obtained from the Central Bureau of Statistics (CBS) and do not include deaths of Dutch citizens who died outside the Netherlands and non-residents who died inside the Netherlands, nor deaths for whom the exact date of death was unknown. Also deaths due to accidents were excluded. We use the following categories:

- Daily total mortality (ICD-9 <800)
- Daily respiratory mortality (ICD-9 460-519)
- Daily pneumonia mortality (ICD-9 480-486)
- Daily chronic obstructive disease (COPD) mortality (ICD-9 490-496)
- Daily cardiovascular diseases mortality (ICD-9 390-448)

3.2.3 Meteorological data
We use daily averages of temperature, relative humidity and barometric pressure, averaged over the Netherlands. Meteorological data were obtained from the Royal Dutch Meteorological Institute (KNMI).

3.2.4 Influenza
We use data on influenza morbidity (obtained from the Dutch Institute for Research of Health care in Utrecht). For each day we have three variables, namely an estimate of the weekly average of influenza morbidity of the past week (lag 0-6 days), the week before the past week (lag 7-13 days) and two weeks before the past week (lag 14-20 days).

3.2.5 Pollen
We use data on airborne pollen obtained through Dr. Spieksma (Hospital Leiden). In this study we use pollen counts of Rumex, Betula and Poacea.

3.3 Software

We use Splus 2000 (for Windows) and Splus 6.0 (for UNIX) to perform the GAM analyses and to compute correlations and quantiles. Relative risks are computed with Microsoft Excel 97.

3.4 Method and base models

3.4.1 Generalised additive models

As is usual (Samet, 2002) in epidemiological studies on associations between air pollution and mortality, we used Generalised Additive Models (GAM) to estimate associations between the (lags of) rotated principal components and the five mortality variables: total, respiratory, cardiovascular diseases, pneumonia and COPD mortality. For a detailed description of generalised additive models we refer to Hastie and Tibshirani (1990).

We use the built-in GAM function of Splus. As reported in Dominici et al. (2002), there are some problems with the default settings of the convergence parameters of this function. We therefore use the new control parameters communicated by Trevor Hastie via the s-news list: the convergence threshold for local scoring iterations and for back fitting iterations is set to 10^{-7}, the maximum number of scoring iterations and of back fitting iterations is set to 30. In a generalised additive model for mortality one usually uses a Poisson family and corrects standard errors for overdispersion, but Splus obtains the same effect estimates when we use a quasi likelyhood family (family=quasi(link=log, var='mu')), while the standard errors are the corrected ones, so we used this family.

To simplify interpretation, the rotated principal components are fitted linearly in the models. We include functions of confounding variables, to adjust for date (to incorporate seasonal and long-term trends), influenza, temperature, relative humidity, atmospheric pressure, day of the week, holidays and pollen. Some of these variables were included linearly in the models, others with loess smoothers, polynomial splines, with values for different categories of the data, or as factor. As mentioned in Fischer et al. (in preparation), the technique of loess smoothing can be seen as an advanced version of using moving averages. In loess smoothing a span is involved, that is a parameter indicating the fraction of the range of the data that is used in the smoother. We use the same base models as in Fischer et al. (in preparation), which will be described later. We start with one-component models in which only one rotated principal component is used as explanatory variable (together with the confounding variables of the base models) later we also fit multi-component models.

To estimate the influence of the season on the effects, we also fit models in which the rotated principal components are fitted in interaction with the season. We also fit one-component models with the original (not rotated) principal components.

Relative risks
To make the effect estimates easier to interpret, we computed relative risks. We compared the risk at the 95%-quantile of the component by the risk at the 5%-quantile for the variables vc5comp1, vc5comp2 and vc5comp4. For vc5comp3 and vc5comp5 we compared the risk at the 5%-quantile by the risk at the 95-quantile, since for these components negative values generally correspond to days with high air pollution concentrations (see also Table 11, the largest loadings are negative). We also computed the 95% lower confidence limits of the relative risks (RR-lo) and the 95% upper confidence limits of the relative risks (RR-hi).

3.4.2 Base models

As indicated earlier, we use the same base-models as in Fischer et al. (in preparation), since in that study almost the same data set is used: there is only one extra year involved, 1992, that is excluded from our analysis because of many missing values for NH_3. For this reason we make an adjustment for the loess functions of date included in the base models: we multiply the spans used in Fischer et al. (in preparation) by 7/6, to correct for the shorter time-period used in the current study (six instead of seven years). For details on the construction of the base models we refer to Fischer et al. (in preparation), we limit ourselves here to the description of the final base models.

For *total mortality* the base model is made up of the following functions:

- a loess smoother of the date with a span of $0.03 \times 7/6$
- a loess smoother of the average influenza morbidity of the past week with a span of 0.8
- a linear function of the average influenza morbidity of two weeks before the past week
- a loess smoother of the temperature with a span of 0.6
- a loess smoother of lag 2 of the temperature with a span of 0.6
- a polynomial spline function (of degree 1) with 70 knots of lag 2 of the relative humidity
- a linear function of the barometric pressure
- a piecewise constant function of lag 2 of the pollen counts of Poacea with jumps at -1, 21, 77, 135 and 10000
- a piecewise constant function of lag 2 of the pollen counts of Betula with jumps at -1, 17, 68, 600 and 10000
- a piecewise constant function of lag 2 of the pollen counts of Rumex with jumps at -1, 5 and 10000
- a factor function of the day of the week (that comes down to adding a different constant for each day of the week)

- a linear function of holidays (that comes down to adding a constant in periods of holidays, since holidays are represented by an indicator variable)

For respiratory mortality the base model consists of:
- a loess smoother of the date with a span of $0.03 \times 7/6$
- a linear function of the average influenza morbidity of the past week
- a loess smoother of the influenza morbidity of the week before the past week with a span of 0.9
- a loess smoother of lag 1 of the temperature with a span of 0.8
- a loess smoother of lag 3 of the temperature with a span of 0.8
- a polynomial spline function (of degree 1) with 70 knots of lag 1 of the relative humidity
- a linear function of the barometric pressure
- a piecewise constant function of lag 2 of the pollen counts of Poacea with jumps at -1, 21, 77, 135 and 10000
- a piecewise constant function of lag 2 of the pollen counts of Betula with jumps at -1, 17, 68, 600 and 10000
- a piecewise constant function of lag 2 of the pollen counts of Rumex with jumps at -1, 5 and 10000
- a factor function of the day of the week
- a linear function of holidays

For cardiovascular diseases mortality the base model is made up of:
- a loess smoother of the date with a span of $0.04 \times 7/6$
- a loess smoother of the average influenza morbidity of the past week with a span of 0.7
- a loess smoother of lag 1 of the temperature with a span of 0.5
- a loess smoother of lag 2 of the temperature with a span of 0.5
- a linear function of the relative humidity
- a linear function of barometric pressure
- a piecewise constant function of lag 2 of the pollen counts of Poacea with jumps at -1, 21, 77, 135 and 10000
- a piecewise constant function of lag 3 of the pollen counts of Betula with jumps at -1, 17, 68, 600 and 10000
- a piecewise constant function of lag 3 of the pollen counts of Rumex with jumps at -1, 5 and 10000
- a factor function of the day of the week
- a linear function of holidays

For pneumonia mortality, the base model is composed of:
- a loess smoother of date with a span of $0.04 \times 7/6$
- a loess smoother of the average influenza morbidity of the past week with a span of 0.9
- a loess smoother of the average influenza morbidity of two weeks before the past week with a span of 0.9
- a loess smoother of lag 1 of the temperature with a span of 0.8
- a loess smoother of lag 3 of the temperature with a span of 0.8
- a loess smoother of lag 1 of the relative humidity with a span of 1
- a loess smoother of the barometric pressure with a span of 1
- a piecewise constant function of lag 2 of the pollen counts of Poacea with jumps at -1, 21, 77, 135 and 10000

- a piecewise constant function of lag 3 of the pollen counts of Betula with jumps at -1, 17, 68, 600 and 10000
- a piecewise constant function of lag 2 of the pollen counts of Rumex with jumps at -1, 5 and 10000
- a factor function of the day of the week
- a linear function of holidays

For COPD mortality we used the following functions in the base model:
- a loess smoother of date with a span of $0.04 \times 7/6$
- a linear function of the average influenza morbidity of the past week
- a loess smoother of the average influenza morbidity of a week before the past week with a span of 0.6
- a loess smoother of the temperature with a span of 0.8
- a loess smoother of lag 2 of the temperature with a span of 0.8
- a linear function of the relative humidity
- a linear function of the barometric pressure
- a piecewise constant function of lag 3 of the pollen counts of Poacea with jumps at -1, 21, 77, 135 and 10000
- a piecewise constant function of lag 3 of the pollen counts of Betula with jumps at -1, 17, 68, 600 and 10000
- a piecewise constant function of lag 3 of the pollen counts of Rumex with jumps at -1, 5 and 10000
- a factor function of the day of the week
- a linear function of holidays

3.5 Results

3.5.1 Associations with the five varimax rotated principal components: one-component models

To quantify the associations between the rotated principal components and the five mortality variables, we first add one component (lag 0, 1, 2, 3 or the average of the lags 1-7) to the base models. The components are added as a linear function, to simplify interpretation. That is, we fit a generalised additive model with confounding variables as in the base models and a linear function of (a lag of) a component.

Table 12 gives the quantiles of the rotated components, which are used to compute relative risks. In the column 90% range, the difference between the 95%-quantile and the 5%-quantile is displayed. Quantiles of the lag 1, 2 and 3 variables are (almost) equal to the quantiles of the corresponding lag 0 variables and are therefore omitted.

Table 12 Quantiles of the five varimax rotated principal components

Component	*5% quantile*	*95% quantile*	*90% range*
vc5comp1	-0.83	2.02	2.85
vc5comp1wk	-0.57	1.49	2.06
vc5comp2	-1.12	1.80	2.92
vc5comp2wk	-0.74	1.19	1.93
vc5comp3	-1.80	1.25	3.05
vc5comp3wk	-1.35	0.93	2.28
vc5comp4	-0.98	1.58	2.56
vc5comp4wk	-0.67	1.12	1.78
vc5comp5	-1.86	1.35	3.21
vc5comp5wk	-1.73	1.01	2.74

In Table 13 up to Table 17 below, the results of the one-component models are presented, significant results are highlighted. For the effect measure, realise that the fitted models look like:

$$\ln(number\ of\ \ deaths) = effect * component\ value + functions\ of\ \ confounders$$

Therefore the relative risks are computed as:

$$RR = \exp(effect * \pm 90\%\ range)$$
$$RR{-}lo = \exp((effect - 1.96 * st.error) * \pm 90\%\ range)$$
$$RR{-}hi = \exp((effect + 1.96 * st.error) * \pm 90\%\ range),$$

here the sign for the 90% range is taken positive for the components vc5comp1, vc5comp2 and vc5comp4, and negative for vc5comp3 and vc5comp5 (for all lags). For reasons of presentation and interpretation, we changed the original signs of the regression coefficients and t-values from the GAM-analyses for the components vc5comp3 and vc5comp5.

Table 13 one-component models for total mortality

Component	*Effect*	*st. error*	*RR*	*RR-lo*	*RR-hi*	*t-value*
vc5comp1l0	0.0012	0.0013	1.003	0.996	1.011	0.87
vc5comp1l1	0.0041	0.0013	1.012	1.004	1.019	3.08
vc5comp1l2	0.0003	0.0014	1.001	0.993	1.008	0.18
vc5comp1l3	0.0006	0.0013	1.002	0.994	1.009	0.45
vc5comp1wk	0.0018	0.0022	1.004	0.995	1.013	0.82
vc5comp2l0	0.0055	0.0012	1.016	1.009	1.023	4.37
vc5comp2l1	0.0043	0.0012	1.013	1.005	1.020	3.46
vc5comp2l2	0.0038	0.0012	1.011	1.004	1.018	3.04
vc5comp2l3	0.0015	0.0012	1.004	0.997	1.011	1.19
vc5comp2wk	0.0026	0.0019	1.005	0.998	1.012	1.37
vc5comp3l0	0.0029	0.0014	1.009	1.000	1.017	2.07
vc5comp3l1	0.0032	0.0014	1.010	1.002	1.018	2.34
vc5comp3l2	0.0010	0.0014	1.003	0.995	1.011	0.74
vc5comp3l3	-0.0006	0.0013	0.998	0.990	1.006	0.42
vc5comp3wk	-0.0009	0.0019	0.998	0.990	1.006	0.48
vc5comp4l0	0.0013	0.0013	1.003	0.997	1.010	0.97
vc5comp4l1	0.0028	0.0014	1.007	1.000	1.014	1.97
vc5comp4l2	0.0057	0.0014	1.015	1.008	1.022	4.19
vc5comp4l3	0.0076	0.0013	1.020	1.013	1.026	6.00
vc5comp4wk	0.0237	0.0021	1.043	1.035	1.051	11.11
vc5comp5l0	0.0015	0.0015	1.005	0.995	1.015	0.97
vc5comp5l1	0.0079	0.0016	1.026	1.015	1.036	5.01
vc5comp5l2	0.0002	0.0017	1.001	0.990	1.011	0.10
vc5comp5l3	0.0038	0.0016	1.012	1.002	1.022	2.41
vc5comp5wk	0.0129	0.0023	1.036	1.023	1.049	5.59

Table 14 one-component models for respiratory mortality

Component	*Effect*	*st. error*	*RR*	*RR-lo*	*RR-hi*	*t-value*
vc5comp1l0	-0.0024	0.0040	0.993	0.971	1.016	-0.59
vc5comp1l1	0.0092	0.0040	1.026	1.004	1.050	2.27
vc5comp1l2	0.0070	0.0040	1.020	0.998	1.043	1.74
vc5comp1l3	0.0020	0.0040	1.006	0.984	1.028	0.51
vc5comp1wk	0.0046	0.0066	1.009	0.983	1.037	0.69
vc5comp2l0	0.0204	0.0039	1.061	1.038	1.085	5.28
vc5comp2l1	0.0111	0.0039	1.033	1.010	1.056	2.87
vc5comp2l2	0.0066	0.0038	1.020	0.997	1.042	1.73
vc5comp2l3	0.0032	0.0039	1.009	0.987	1.032	0.83
vc5comp2wk	0.0108	0.0060	1.021	0.998	1.044	1.81
vc5comp3l0	0.0063	0.0041	1.019	0.994	1.045	1.52
vc5comp3l1	0.0082	0.0041	1.025	1.000	1.051	1.99
vc5comp3l2	0.0057	0.0041	1.018	0.993	1.043	1.40
vc5comp3l3	0.0029	0.0041	1.009	0.985	1.034	0.71
vc5comp3wk	0.0012	0.0057	1.003	0.977	1.029	0.21
vc5comp4l0	0.0084	0.0042	1.022	1.001	1.043	2.01
vc5comp4l1	0.0139	0.0042	1.036	1.015	1.058	3.33
vc5comp4l2	0.0125	0.0039	1.033	1.012	1.053	3.18
vc5comp4l3	0.0157	0.0037	1.041	1.022	1.061	4.22
vc5comp4wk	0.0534	0.0063	1.100	1.076	1.124	8.53
vc5comp5l0	0.0041	0.0049	1.013	0.983	1.045	0.85
vc5comp5l1	0.0083	0.0052	1.027	0.994	1.061	1.60
vc5comp5l2	0.0163	0.0049	1.054	1.022	1.087	3.35
vc5comp5l3	0.0158	0.0047	1.052	1.021	1.084	3.34
vc5comp5wk	0.0583	0.0070	1.174	1.130	1.219	8.30

Table 15 one-component models for cardiovascular diseases mortality

Component	*Effect*	*st. error*	*RR*	*RR-lo*	*RR-hi*	*t-value*
vc5comp1l0	0.0030	0.0021	1.009	0.997	1.020	1.42
vc5comp1l1	0.0061	0.0021	1.018	1.006	1.029	2.97
vc5comp1l2	-0.0006	0.0021	0.998	0.987	1.010	-0.31
vc5comp1l3	0.0010	0.0020	1.003	0.992	1.014	0.52
vc5comp1wk	0.0010	0.0033	1.002	0.989	1.016	0.31
vc5comp2l0	0.0038	0.0019	1.011	1.000	1.022	1.94
vc5comp2l1	0.0020	0.0019	1.006	0.995	1.017	1.04
vc5comp2l2	0.0022	0.0019	1.006	0.995	1.017	1.14
vc5comp2l3	0.0014	0.0019	1.004	0.993	1.015	0.73
vc5comp2wk	-0.0009	0.0029	0.998	0.987	1.009	-0.29
vc5comp3l0	0.0038	0.0021	1.012	0.999	1.024	1.84
vc5comp3l1	0.0025	0.0021	1.008	0.995	1.020	1.24
vc5comp3l2	0.0018	0.0021	1.006	0.993	1.018	0.89
vc5comp3l3	-0.0008	0.0021	0.998	0.985	1.010	-0.38
vc5comp3wk	-0.0010	0.0029	0.998	0.985	1.011	-0.34
vc5comp4l0	0.0027	0.0022	1.007	0.996	1.018	1.24
vc5comp4l1	0.0027	0.0020	1.007	0.997	1.017	1.30
vc5comp4l2	0.0053	0.0019	1.014	1.004	1.024	2.74
vc5comp4l3	0.0064	0.0019	1.017	1.007	1.026	3.37
vc5comp4wk	0.0249	0.0032	1.045	1.034	1.057	7.80
vc5comp5l0	0.0008	0.0026	1.003	0.986	1.019	0.32
vc5comp5l1	0.0054	0.0025	1.018	1.002	1.033	2.20
vc5comp5l2	-0.0040	0.0024	0.987	0.973	1.002	-1.66
vc5comp5l3	0.0015	0.0023	1.005	0.990	1.020	0.65
vc5comp5wk	0.0007	0.0034	1.002	0.984	1.021	0.20

Table 16 one-component models for pneumonia mortality

Component	*Effect*	*st.error*	*RR*	*RR-lo*	*RR-hi*	*t-value*
vc5comp1l0	0.0079	0.0063	1.023	0.988	1.059	1.26
vc5comp1l1	0.0216	0.0062	1.064	1.028	1.101	3.50
vc5comp1l2	0.0107	0.0062	1.031	0.996	1.068	1.73
vc5comp1l3	0.0038	0.0062	1.011	0.976	1.046	0.61
vc5comp1wk	-0.0058	0.0103	0.988	0.948	1.030	-0.57
vc5comp2l0	0.0166	0.0061	1.050	1.014	1.087	2.73
vc5comp2l1	0.0063	0.0061	1.018	0.983	1.055	1.02
vc5comp2l2	0.0008	0.0061	1.002	0.968	1.038	0.13
vc5comp2l3	-0.0070	0.0061	0.980	0.946	1.015	-1.14
vc5comp2wk	0.0159	0.0093	1.031	0.995	1.068	1.71
vc5comp3l0	0.0234	0.0064	1.074	1.034	1.116	3.64
vc5comp3l1	0.0166	0.0064	1.052	1.013	1.093	2.61
vc5comp3l2	0.0113	0.0064	1.035	0.996	1.076	1.78
vc5comp3l3	0.0051	0.0064	1.016	0.978	1.055	0.80
vc5comp3wk	0.0112	0.0089	1.026	0.986	1.067	1.25
vc5comp4l0	0.0099	0.0065	1.026	0.993	1.060	1.52
vc5comp4l1	0.0154	0.0065	1.040	1.007	1.075	2.35
vc5comp4l2	0.0191	0.0061	1.050	1.018	1.083	3.12
vc5comp4l3	0.0224	0.0058	1.059	1.029	1.091	3.87
vc5comp4wk	0.0690	0.0096	1.131	1.094	1.170	7.18
vc5comp5l0	0.0028	0.0076	1.009	0.962	1.058	0.37
vc5comp5l1	0.0131	0.0081	1.043	0.991	1.097	1.62
vc5comp5l2	0.0287	0.0075	1.096	1.046	1.149	3.81
vc5comp5l3	0.0368	0.0073	1.125	1.075	1.178	5.06
vc5comp5wk	0.0989	0.0108	1.312	1.238	1.390	9.16

Table 17 one-component models for COPD mortality

Component	*Effect*	*st.error*	*RR*	*RR-lo*	*RR-hi*	*t-value*
vc5comp1l0	-0.0076	0.0056	0.978	0.948	1.010	-1.36
vc5comp1l1	-0.0035	0.0055	0.990	0.960	1.021	-0.64
vc5comp1l2	0.0032	0.0054	1.009	0.979	1.040	0.59
vc5comp1l3	0.0027	0.0052	1.008	0.979	1.038	0.51
vc5comp1wk	0.0072	0.0088	1.015	0.979	1.052	0.82
vc5comp2l0	0.0186	0.0052	1.056	1.025	1.088	3.54
vc5comp2l1	0.0152	0.0051	1.046	1.015	1.077	2.96
vc5comp2l2	0.0127	0.0051	1.038	1.008	1.069	2.47
vc5comp2l3	0.0085	0.0052	1.025	0.995	1.056	1.65
vc5comp2wk	0.0081	0.0080	1.016	0.985	1.047	1.01
vc5comp3l0	-0.0116	0.0058	0.965	0.933	0.999	-2.00
vc5comp3l1	-0.0015	0.0056	0.995	0.962	1.029	0.28
vc5comp3l2	0.0014	0.0055	1.004	0.971	1.038	0.25
vc5comp3l3	0.0032	0.0055	1.010	0.977	1.044	0.57
vc5comp3wk	-0.0038	0.0077	0.991	0.958	1.026	-0.50
vc5comp4l0	0.0006	0.0057	1.002	0.973	1.031	0.11
vc5comp4l1	0.0059	0.0054	1.015	0.988	1.043	1.10
vc5comp4l2	0.0068	0.0051	1.018	0.992	1.044	1.33
vc5comp4l3	0.0143	0.0050	1.037	1.012	1.064	2.88
vc5comp4wk	0.0428	0.0084	1.079	1.048	1.111	5.07
vc5comp5l0	0.0054	0.0071	1.017	0.973	1.064	0.76
vc5comp5l1	0.0081	0.0066	1.026	0.984	1.070	1.22
vc5comp5l2	0.0113	0.0065	1.037	0.995	1.080	1.74
vc5comp5l3	0.0008	0.0064	1.003	0.963	1.044	0.12
vc5comp5wk	0.0195	0.0094	1.055	1.003	1.110	2.07

We are interested in the behaviour of the effects when we add more than one component as explanatory variable for mortality in the GAM analyses. We want to include at most one lag per component per model. The total number of possibilities for multi-component models is very high (there are $5^5 = 3125$ options for five-component models alone), which makes it undesirable to consider all possibilities. We therefore decide to make a selection of lags of components to consider for further analysis. For completeness and comparability with other studies, we have included lag 0 variables in the one-component models, although this implies that we explain mortality with a component computed from pollutant concentrations to which part of the dead persons have never been exposed, which is undesirable.

We include the lags for each component that have the most significant results in the one-component models, since we want to investigate whether inclusion of several components in the same model gives a similar picture of the effect estimates as the one-component models. It could be the case that some associations 'disappear' or change in the multi-component models. Below we discuss the results of the one-component models and explain which lags we include in the multi-component models.

For the first component (vc5comp1) in the one-component models, lag 1 is the only lag that gives significant associations with total, respiratory, cardiovascular diseases and pneumonia mortality. We therefore decide to include vc5comp1l1 in the multi-component analyses. Vc5comp1l1 does not have a significant association with COPD mortality, but neither have the other lags. We find relative risks estimates of approximately 1.01 for total mortality, 1.03 for respiratory mortality, 1.02 for cardiovascular diseases mortality and 1.06 for pneumonia mortality. The relative risk was 0.99 for COPD mortality, but this association was not significant.

For the second component, lag 0 is significantly associated with all the five mortality variables. For lag 1 we find a positive association with total, respiratory and COPD mortality, lag 2 has significant associations with total and COPD mortality. Since we found higher t-values for lag 1 we decided to use vc5comp2l1 for further analysis. The estimated relative risks are pretty low, about 1.01 for total, 1.03 for respiratory, 1.01 for cardiovascular diseases (not significant), 1.01 for pneumonia (not significant) and 1.05 for COPD mortality.

The third component gives significant associations at lag 0 with total and COPD mortality, and significant associations at lag 1 with total, respiratory and pneumonia mortality, with estimated relative risks of 1.01, 1.03, 1.05 respectively. Observe that the corresponding t-values are relatively low: -2.34, -1.99 and –2.61. Given the possible underestimation of standard errors by Splus (Ramsey et al. (2003), it could be that the RR-lo's should in fact be smaller than one, in these models. We did not find significant results with other lags and decided to include vc5comp3l1 in the multi-component models.

For the fourth component, we found significant results for several lags, but t-values and relative risks are clearly higher at longer lags, and highest when we consider the week-average. We therefore have chosen to use vc5comp4wk in the multi-component models, estimated relative risks in the one–component models are 1.04 for total mortality, 1.10 for respiratory mortality, 1.05 for cardiovascular diseases mortality, 1.13 for pneumonia mortality and 1.08 for COPD mortality.

Considering the results for the lags of the fifth component, we see significant associations in the one-component models with lag 1 for total and cardiovascular diseases mortality (relative risks 1.03 and 1.02 respectively) with lag 2 for respiratory and pneumonia mortality and with lag 3 for respiratory and pneumonia mortality. We find also significant associations with the week-average for total, respiratory, pneumonia and COPD mortality (relative risks of 1.04, 1.17, 1.31 and 1.06 respectively). Since the picture is a bit unclear, we decided to include vc5comp5l1 and vc5comp5wk in separate multi-component models, but not together in one multi-component model.

Correlations between the variables selected for the multi-component models can be found in Table 18. The variables are generally lowly correlated (except vc5comp5l1 and vc5comp5wk of course, but these are not fitted together in the same model). A more detailed version of the correlation structure of the rotated components can be found in Table 19 up to Table 23 in the Appendix.

Table 18 Correlations between some lag variables

	vc5comp1 l1	*Vc5comp 2l1*	*vc5comp3 l1*	*vc5comp4 wk*	*vc5comp5 l1*	*vc5comp5 wk*
vc5comp1 l1	1.00	-0.01	-0.01	0.11	0.02	0.19
vc5comp2 l1	-0.01	1.00	-0.01	0.26	0.00	-0.12
vc5comp3 l1	-0.01	-0.01	1.00	0.02	0.00	0.13
vc5comp4 wk	0.11	0.26	0.02	1.00	0.11	0.12
vc5comp5 l1	0.02	0.00	0.00	0.11	1.00	0.76
vc5comp5 wk	0.19	-0.12	0.13	0.12	0.76	1.00

3.5.2 Associations between mortality and the five varimax rotated principal components: multi-component models

Table 24 up to Table 27 in the Appendix contain the results of the two-, three-, four-, and five-component models. In these models the fitted components are chosen from the set vc5comp1l1, vc5comp2l1, vc5comp3l1, vc5comp4wk, and vc5comp5l1 or vc5comp5wk. Significant associations are highlighted. We discuss the results.

As we expect, since the rotated principal components are uncorrelated, for **total mortality**, the two-component models give results comparable with the one-component models. Relative risks are about the same, only vc5comp1l1 has not a significant association combined with vc5comp5l1, and vc5comp2l1 has not a significant association combined with vc5comp4wk. Also in the three-, four- and five- component models, we do not always have significant associations with vc5comp1l1, vc5comp2l1 and vc5comp3l1 (these were also the components with low relative risk estimates in the one-component models). With the variables vc5comp4wk, vc5comp5l1 and vc5comp5wk we always see significant associations. We did not find a five-component model in which all five associations were significant. Relative risks (in models where all fitted components were significant) resemble the one-component situation: approximately 1.01 for vc5comp1l1, vc5comp2l1 and vc5comp3l1 and about 1.04 for vc5comp4wk, vc5comp5l1 and vc5comp5wk.

In the case of **respiratory mortality**, there are no four- and five-component models in which all fitted components are significant. In the two- and three- component models, vc5comp1l1, vc5comp2l1, vc5comp3l1 and vc5comp5l1 sometimes give significant associations. The components vc5comp4wk and vc5comp5wk almost always give significant associations with relatively large relative risks: around 1.10 and 1.17. These associations remain about the same when vc5comp4wk and vc5comp5wk are fitted in the same model. In combination with vc5comp4wk and vc5comp5wk only vc5comp3l1 still gives a significant association: in this combination the estimated relative risks are 1.04 for vc5comp3l1, 1.09 for vc5comp4wk and 1.17 for vc5comp5wk.

Considering the results in the multi-component models for **cardiovascular diseases mortality**, we hardly find significant associations with vc5comp2l1, vc5comp3l1 and vc5comp5wk, but we often see significant associations with vc5comp1l1, vc5comp4wk and vc5comp5l1. The three, four- and five-component models are not so informative, since we never see more than two significant associations in the same model. In the two-component models, vc5comp4wk has a relative risk of approximately 1.05. In a two-component model combined with vc5comp4wk, the relative risk of vc5comp1l1 is approximately 1.01 and the relative risk of vc5comp5l1 about 1.02.

For **pneumonia mortality**, in the multi-component models, significant associations are found with vc5comp1l1, vc5comp3l1, vc5comp4wk and vc5comp5wk, and also with vc5comp5l1, which did not give a significant association in the one-component model. The t-values for vc5comp5wk are much larger (in absolute value) than for vc5comp5l1. We find at most three significant associations per model. In the three-component model with vc5comp1l1, vc5comp4wk and vc5comp5wk we find relative risks of 1.04, 1.12 and 1.28 respectively, the combination vc5comp3l1, vc5comp4wk and vc5comp5l1 gives relative risks of 1.07, 1.13 and 1.08 respectively. These results resemble the one-component case.

Finally for **COPD mortality**, in the one-component models, we did not find significant associations with vc5comp1l1, vc5comp3l1 and vc5comp5l1 and neither we find in the multi-component models. In the two-component models we always find significant associations with vc5comp4wk. We sometimes see significant associations with vc5comp2l1 and with vc5comp5wk, but never in combination with vc5comp4wk. Again relative risks resemble the one-component case: around 1.08 for vc5comp4wk, and about 1.05 for vc5comp2l1 and vc5comp5wk. In this light it seems rather useless to consider the three-, four- and five-component models, and indeed we hardly see more than one significant association per model.

Generally, comparing the different mortality variables, relative risks are higher for respiratory and pneumonia mortality than for total mortality.
For cardiovascular diseases we find less significant associations, the associations which are significant are about the same magnitude as for total mortality. The associations between vc2comp2l1, vc5comp4wk and vc5comp5wk and COPD mortality seem slightly stronger than the corresponding associations with total mortality.

3.5.3 Season-specific analysis

In earlier studies (Hoek et al., 2000; Fischer et al. (in preparation)) with air pollution components generally higher relative risks were found in the summer season than in the winter season. We therefore investigated whether a similar effect is found with the current source-related variables vc5comp1 up to vc5comp5.

We use three different season categories: summer for the period May up to September (inclusive), winter for the period November up to March, and a transition period for the months April and October (this period is denoted by 'none' in the tables with results). In the season-specific models, we find different effect estimates for the components in the various seasons. The effect estimates for the confounding variables of the base model however, are not season-specific. The results of the one-component season-specific models are listed in Table 29 in the Appendix. Significant results are highlighted.

We compute relative risks over the same range as in the earlier one-component models without interactions (i.e. we compare the risk at the 5% quantile with the risk at the 95% quantile of the variables, quantiles are computed over the whole period). On the one hand this might give a biased picture of the risks, since for vc5comp1 until vc5comp4 the season-specific quantiles would give rise to a smaller range in summer than in winter. On the other hand using the same range as for the original models makes it easier to compare effects. Means and quantiles of the rotated components per season can be found in Table 32 in the Appendix. In this table we also see that the means of the components are negative in summer and positive in winter. This means that for vc5comp1, vc5comp2 and vc5comp4, the average pollution levels are higher in winter than in summer, for vc5comp3 and vc5comp5 it is the other way around (which is also to be expected for components representing bio-industry and photochemical transformations respectively). Table 33, Table 34 and Table 35 in the Appendix contain the correlations between the rotated components per season.

The results of the one-component season-specific analyses can be found in Table 29 in the Appendix. We use the most significant lags to fit two- and three-component models. The results of the two- and three-component models are presented in Table 30 and Table 31 in the Appendix. We discuss the results of the one-component models and then only briefly discuss the two- and three component models, since the last do not show surprising results. We will focus on associations with lags 1,2, 3 and the week-average.

3.5.4 One-component models in the season-specific analyses

It attracts attention that for the first component, we get significant results during summer at almost all the mentioned lags, for all mortality categories. However, cardiovascular diseases mortality is not statistically significantly associated with vc5comp1l2 and vc5compl3. Interestingly the highest t-values are observed for the week-average for the first component, while no significant associations for vc5comp1wk at all in the one-component models without interaction is identified. No statistically significant associations with lags of vc5comp1 are found in the winter season, though pollution levels are generally higher and vary more during the winter. Effect estimates in the summer are generally higher than in the models without interaction,

To explain the higher relative risks in summer than in winter, Hoek et al. (2000) give several possible reasons: e.g. the relationship between personal exposure and ambient exposure may be stronger in summer than in winter; in the summer there is less influence from e.g. influenza epidemics and in summer there is a larger pool of sensitive subjects because of fewer competing causes of death. Differences in size distribution and mixture may also be reasons for the higher risks in summer.

With the second component, for total mortality, we observe a significant association with lag 1 in summer and winter and with lag 2 during summer. These lags were also significant in the one-component models without interactions. For respiratory mortality, we find significant associations with lag 1 and lag 2 in the summer, only vc5comp2l1 was also significant in the models without interaction. We do not find any significant associations with any of the lags of vc5comp2 with cardiovascular diseases mortality and neither we did in the model without interactions. For pneumonia mortality we find significant associations in summer with lag1, lag2 and the week-average, while these lags do not give significant associations in the one-component models without interaction. Finally for COPD mortality, we see a significant association with lag 1 during summer; vc2comp2l1 was also significant in the model without interaction. Again we see that effects estimates in the summer are generally higher than in the models without interaction.

For vc5comp3, we do not see significant associations in the interaction models with respiratory and COPD mortality. We find significant associations with vc5comp3l1 in the winter for total, cardiovascular diseases and pneumonia mortality. For total and cardiovascular diseases mortality the effect estimates resemble those of the models without interaction. The associations with pneumonia mortality seem stronger in the season specific models.

Considering vc5comp4, we find associations for all mortality variables at various lags. As for the models without interaction, the highest t-values are observed for vc5comp4wk. Vc5comp4wk is significantly associated with all the five mortality categories, both in summer and in winter. The effect estimates of vc5comp4wk are much larger in the summer season than in the winter season, the winter effect estimates resemble the one-component case without interaction.

Finally for vc5comp5, we see only significant results in summer, which is not strange, since ozone concentrations are generally larger and vary more in summer than in winter. Lags with significant associations in the one-component models (without interactions with the season) do also show significant associations in the season-specific models. Effect estimates are again larger in summer than in the models without interaction terms.

Regarding the results of the two- and three component models (see Table 30 and Table 31) we do not see surprising results. Some effect estimates are a bit lower than in the one-component season-specific models, but we still see relatively high effects at unexpected moments.

3.5.5 Analyses with the original (not rotated) principal components

Out of interest, we also fitted generalised additive models with the original, not rotated principal components corresponding to the loadings in Table 5 and Table 6. We only considered one-component models, the results can be found in Table 28. We see significant results with all lags of the first component for all mortality categories. This component might be interpreted as a general measure for air pollution, since it shows relatively high correlations with almost all air pollution components (except NH_3 and O_3). We see also some associations with the second component, which highest correlations are with 0_3 (0.73), NH_3 (0.56), NO_3 (0.53) and SO_4 (0.48) and with the week-average of the fourth component, which has the highest correlation (0.6) with SO_2. As we expected, it is difficult to interpret the results because we do not have a clear interpretation of the components.

4 Discussion

The results of this study show that it is possible to identify source-related variables with a PCA on air pollution concentrations in the Netherlands. This is consistent with the results of Özkaynak et al. (2000), Laden et al. (2000), Mar et al. (2000) and Tsai et al. (2000), where also source factors are discovered. Our study differed from these studies because we used the whole mixture of air pollutants to find our sources, while in the other studies composition of collected particulate matter was used.
We find significant results for all components, which is in line with the findings of Özkaynak et al. (2000). Laden et al. (2000) reports that the strongest increase in daily mortality is found with the mobile source factor, we do not see such a preference for the situation in the Netherlands.
As mentioned before, in Fischer et al. (in preparation) almost the same data were used (they studied one extra year: the period 1992-1998). In that study one- and two-pollutant models were fitted in which concentrations of one or two air pollutants were added to the base model. Since our study uses almost the same data and the same base models, it will be interesting to compare the results.

In Fischer et al. (in preparation) the ranges on which the relative risks were computed were guided by the difference between the risk at the 99%-quantile and the risk at the 1%-quantile of the pollutant concentrations. In the current study, relative risks are computed between the 5%- and the 95%-quantile of the components, so a priori we expect that relative risks in our study will be lower. We will compare the associations with CO, NO, NO_2 and BS found in Fischer et al. (in preparation) to the association with vc5comp1 in this study. Further, we will compare associations with NO_3 and SO_4 to associations with vc5comp2, of NH_3 to vc5comp3, of SO_2 to vc5comp4, and associations with O_3 to associations with vc5comp5wk. We did not find any striking differences.

Table from Fischer et al., in preparation. Association between air pollution components and total and cause specific mortality in the Netherlands. Relative risk (RR) and 95% confidence interval (RR-lo, RR-hi) for a relevant change of the pollutant concentration, adjusted for confounders (Fischer et al., in preparation).

	Total			Cardiovascular g			COPD			Respiratory			Pneumonia		
Pollutant	RR	RR-lo	RR-hi	RR	RR-lo	RR-hi	RR	RR-lo	RR-hi	RR	RR-lo	RR-hi	RR	RR-lo	RR-hi
BS lag1	1,04	1,028	1,053	1,03	1,01	1,05	1,09	1,04	1,14	1,12	1,08	1,16	1,15	1,08	1,22
BS avg	1,06	1,050	1,087	1,06	1,03	1,08	1,17	1,11	1,24	1,18	1,14	1,23	1,19	1,12	1,27
CO lag1	1,04	1,031	1,075	1,04	1,02	1,07	1,09	1,01	1,16	1,15	1,09	1,21	1,22	1,13	1,33
CO avg	1,07	1,044	1,096	1,07	1,04	1,10	1,20	1,11	1,31	1,18	1,11	1,25	1,16	1,05	1,28
NO lag1	1,02	1,016	1,030	1,02	0,99	1,04	1,01	0,96	1,06	1,06	1,02	1,10	1,10	1,04	1,17
NO avg	1,03	1,019	1,042	1,03	1,01	1,06	1,09	1,02	1,16	1,07	1,02	1,12	1,07	0,99	1,15
NO2 lag1	1,04	1,024	1,056	1,03	1,01	1,05	1,06	1,02	1,11	1,11	1,07	1,15	1,14	1,08	1,20
NO2 avg	1,04	1,048	1,068	1,05	1,03	1,07	1,12	1,07	1,16	1,13	1,09	1,16	1,13	1,07	1,18
NO3 lag1	1,03	1,020	1,040	1,03	1,01	1,04	1,07	1,03	1,12	1,06	1,03	1,10	1,05	0,99	1,11
NO3 avg	1,03	1,025	1,046	1,02	1,00	1,03	1,09	1,04	1,13	1,08	1,05	1,12	1,07	1,02	1,13
SO4 lag 1	1,02	1,028	1,048	1,02	1,00	1,03	1,07	1,03	1,12	1,06	1,03	1,09	1,05	1,00	1,11
SO4 avg	1,03	1,027	1,047	1,01	0,99	1,03	1,09	1,05	1,14	1,09	1,05	1,12	1,09	1,04	1,15
NH3 lag1	1,02	1,010	1,047	1,02	0,99	1,04	1,02	0,96	1,07	1,07	1,02	1,11	1,12	1,05	1,19
NH3 avg	1,01	0,995	1,028	1,00	0,98	1,02	1,02	0,97	1,07	1,05	1,01	1,09	1,10	1,04	1,17
SO2 lag1	1,04	1,020	1,075	1,031	0,997	1,067	1,12	1,03	1,22	1,19	1,12	1,27	1,20	1,08	1,32
SO2 avg	1,13	1,117	1,169	1,081	1,037	1,127	1,30	1,19	1,43	1,39	1,30	1,49	1,43	1,29	1,60
O3 lag1	1,04	1,024	1,069	1,024	0,985	1,065	1,05	0,97	1,13	1,01	0,957	1,08	1,04	0,94	1,14
O3 avg	1,02	1,019	1,057	1,036	0,991	1,083	1,05	0,07	1,14	1,24	1,172	1,322	1,56	1,42	1,71

For total, cardiovascular diseases and COPD mortality, we found the highest relative risk with vc5comp4wk, for pneumonia and respiratory mortality we find the highest relative risk for vc5comp5wk. This is generally in line with the results in Fischer et al. (in preparation), where the highest relative risks for total, respiratory and cardiovascular diseases and COPD mortality is reported with the week-average of SO_2. The highest relative risk for pneumonia mortality is found with the week-average of O_3. Generally speaking, we almost always see a relatively strong association with vc5comp4wk, while also strong associations with the week-average of SO_2 are found in Fischer et al. (in preparation).

Considering the traffic-related component vc5comp1, we only found significant associations with vc5comp1l1, while in Fischer et al. (in preparation), also significant associations with CO, NO, NO_2 and BS are found at other lags than lag 1.

For the third component, vc5comp3, significant results are found with lag1, for total, respiratory and pneumonia mortality, we see an almost similar picture for NH_3 in the analyses of Fischer et al. (in preparation), although also significant associations at longer lags are reported. Also the results for vc5comp2 are similar to results in Fischer et al. (in preparation) for NO_3 and SO_4, only for the last, also associations at longer lags are reported, and for cardiovascular diseases no significant association is found with any lag of vc5comp2.

Indeed relative risks are higher in Fischer et al. (in preparation), than in the current study, this can partly be explained by the difference in range used to compute the relative risks.

As in the current study, Fischer et al. (in preparation) report higher effects in the summer season than in the winter season.

We finish with some topics for discussion:

1. To model the contribution of various source categories to air pollution, principal component analysis, while being the most practical and feasible one, is certainly not the most natural approach. For instance, the construction of uncorrelated variables is open to question, since meteorological influences and diurnal patterns might well positively correlate the pollution of the different sources. It would be promising if we could model the contribution of the different sources to the concentrations in a way that incorporates the different sources of air pollution and influencing circumstances like meteorology, day of the week, season, etc. Or if we would have "source-profiles" on which we could project the data. We think this would be a difficult undertaking and it is questionable whether we have enough information to do so. Nevertheless we think that the correlation pattern of the five varimax rotated principal components was sufficiently interpretable to use the components as explanatory variables in mortality analyses.
2. Özkaynak (2000) mentioned the removal of long-term cycles in the data. On the one hand we think this could be useful to bring down the auto correlation in the data. On the other hand, we think that the relation between the exposure-levels and the levels of the principal components may be lost. Therefore we just used the daily concentrations. In Özkaynak (2000) also temperature and relative humidity is included in the principal component analyses, which we do not because we have included these variables already as confounding variables in the base models for the mortality analyses.

3. Recently in Epidemiology, Ramsey et al. (2003) reported on the influence of concurvity (which is comparable to multi-collinearity in parametric models) on the standard errors of the fitted parameters. In the same volume also commentaries of Samet et al. (2003) and Lumley et al. on the issue of generalised additive models appeared. According to Ramsey et al. (2003), the variance estimates of the fitted parameters will be too low in case of concurvity in the explanatory variables, they give an example in which standard errors were in fact 23% higher than estimated by Splus. The reader should realise that for example the 95% confidence intervals for the relative risks are computed with the standard errors given by Splus. Our confidence intervals may therefore be too small. Particularly results that are only “just statistically significant” might in fact be not significant.
4. In this study we only model short-term effects. Absence of low short-term effects do not need to be an indication of absence of long-term effects. In this context we refer to Hoek et al. (2002), where an association between long term exposure to traffic related air pollution and mortality was found.
5. Roemer and Van Wijnen (2001 and 2002) indicate that effect estimates of daily mortality and air pollution were larger in the population living along busy roads in Amsterdam. This impression of a pivotal role for traffic is confirmed by a recent review of Janssen et al. (2003) prepared for the Ministry of Transport in the Netherlands. This review states that traffic is one of the main causal factors for the associations of air pollution and health effects.

   However, the current PCA does not corroborate this view for acute mortality in the Netherlands. The currently found low associations between the traffic component (vc5comp1, at different lags) and mortality do not point to traffic as the sole or main component for the magnitude of the health impact associated with air pollution. Such a result as from the current PCA does not come as a complete surprise because there are other references of the situation in the Netherlands also pointing in this direction.

   In a longer time-series Fischer et al. (2003) have confirmed the results of Hoek et al., (1997) that there is no statistically significant difference in RR of PM_{10} in the 4 large cities of the Netherlands compared to the rest of the country. In fact the urban RR’s for PM_{10} are even slightly lower than those of the RR’s in the regional setting in the Netherlands.

   To explain this finding and to put it into perspective we have to delve a little deeper in the phenomenology of PM_{10} in the Netherlands. The yearly average PM_{10} levels are nearly the same in the Netherlands for the 4 largest cities and the more regional rest of the country, while the contribution of EC and OC by traffic in the urban background is approximately double the EC/OC traffic contribution in the regional setting (Buringh and Opperhuizen, 2002). If one $\mu g/m^3$ of traffic related PM (and more specifically EC/OC) would be toxicologically more potent than the general ambient PM we would expect the RR for the urban setting in the Netherlands to be higher than that in the regional setting. As we did not find such a difference we have to conclude that there is no compelling evidence to think of traffic related PM as more potent than other fractions of the ambient PM.

   A second argument that shows that in the Netherlands traffic is probably not the sole source of health related air pollution can be found in the previously mentioned time-series analysis of Roemer and van Wijnen (2001 and 2002). They analysed the daily mortality and air pollution along busy streets in Amsterdam for the period 1987-1998. In that period the total population for Amsterdam was 718,000 and approximately 10% of the population was living along busy streets with more than 10,000 motorised vehicles per day. For an increment of 100 μg/m^3 of PM_{10}, which was only measured at background sites, they found for total mortality a RR of 1.027 for the total population and a RR of 1.049 for the population at the traffic sites in Amsterdam. However in their analysis the exposure misclassification was larger for PM_{10} than for other traffic related components because of a complete lack of PM_{10} measurements at the traffic sites. Other components of ambient air pollution have been actually measured at the traffic sites and at the urban background sites in Amsterdam. For NO_2 e.g. there were 4 background stations and 6 traffic stations operational measuring the daily pollution levels. At the background sites in Amsterdam the average NO_2 concentration was 46 μg/m^3 and for the traffic sites the average concentrations were 65 μg/m^3, indicating an increase in NO_2 levels of approximately 40% because of traffic emissions. Per 100μg/m^3 of NO_2 increase Roemer and Van Wijnen reported a RR of total mortality for the background areas in Amsterdam of 1.102 while the RR was 1.073 for the traffic areas.

When instead of NO_2 (which in Amsterdam has an average increase in traffic sites compared to urban background air pollution of 40%) other traffic indicators (CO, NO and BS) with increases well above 100% would have been used a nearly similar picture arises as for NO_2. The actual values of the RR's flop around depending on the chosen lag times. These better indicators of exposure to traffic pollution in Amsterdam do not lead to a better classification of the health effects deemed to be associated with traffic. For Amsterdam the data of Roemer and Van Wijnen (2001 and 2002) show that NO_2 and other even more specific traffic indicators as CO, NO and BS do not seem to point at a higher total mortality in the more polluted areas of the city. Therefore also the study of Roemer and Van Wijnen does not seem to corroborate a special role for traffic-related emissions and acute mortality in the Netherlands.

5 Conclusions

1. Routinely collected air quality data can be used to identify at least five major components that can be related to source categories using principal component analysis: traffic, secondary inorganic transformations, bio-industry, industry and photochemical transformations.
2. Although PCA leads to a clear insight in the most important sources of the air pollution mixture in the Netherlands, the results do not exclude certain source categories from the policy process.
3. We found statistically significant associations between the components and daily mortality, both in one-component and in multi-component models. These associations were spread over the different rotated components; we did not find an indication for a sole causal factor for the observed mortality associations.
4. The strongest associations were found with the week-averages of the industrial component (significant for all mortality categories) and with the photochemical component (significant for total, respiratory, pneumonia and COPD mortality). Also for the traffic-related, secondary inorganic transformations and the bio-industry components we found significant results, but with lower relative risks.
5. Comparing associations between different causes of death, relative risks were generally higher for pneumonia and respiratory mortality than for total mortality.
6. In the summer season, components generally had a higher impact on mortality than in the winter.

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Appendix

Table 19 Correlations between components: vc5comp1

	vc5comp1	Vc5comp1 l1	vc5comp1 l2	vc5comp1 l3	vc5comp1 wk
vc5comp1	1.00	0.61	0.35	0.31	0.47
vc5comp1l1	0.61	1.00	0.60	0.35	0.62
vc5comp1l2	0.35	0.60	1.00	0.60	0.69
vc5comp1l3	0.31	0.35	0.60	1.00	0.72
vc5comp1wk	0.47	0.62	0.69	0.72	1.00
vc5comp2	-0.01	0.28	0.33	0.24	0.24
vc5comp2l1	0.01	-0.01	0.28	0.33	0.24
vc5comp2l2	0.04	0.01	-0.01	0.28	0.23
vc5comp2l3	0.02	0.04	0.01	-0.01	0.21
vc5comp2wk	-0.02	-0.01	0.06	0.14	0.22
vc5comp3	-0.01	0.01	0.08	0.10	0.10
vc5comp3l1	0.10	-0.01	0.01	0.08	0.08
vc5comp3l2	0.14	0.10	-0.01	0.01	0.09
vc5comp3l3	0.12	0.14	0.10	-0.01	0.10
vc5comp3wk	0.15	0.13	0.11	0.10	0.14
vc5comp4	0.01	0.06	0.06	0.05	0.11
vc5comp4l1	0.02	0.02	0.06	0.05	0.10
vc5comp4l2	0.05	0.04	0.02	0.06	0.08
vc5comp4l3	0.06	0.07	0.04	0.02	0.07
vc5comp4wk	0.09	0.11	0.11	0.09	0.13
vc5comp5	0.03	0.17	0.21	0.20	0.30
vc5comp5l1	0.12	0.03	0.17	0.21	0.26
vc5comp5l2	0.16	0.12	0.03	0.17	0.24
vc5comp5l3	0.17	0.17	0.12	0.03	0.23
vc5comp5wk	0.22	0.19	0.18	0.19	0.29

Table 20 Correlations between components: vc5comp2

	vc5comp2	vc5comp2 l1	vc5comp2 l2	vc5comp2 l3	vc5comp2 wk
vc5comp1	-0.01	0.01	0.04	0.02	-0.02
vc5comp1l1	0.28	-0.01	0.01	0.04	-0.01
vc5comp1l2	0.33	0.28	-0.01	0.01	0.06
vc5comp1l3	0.24	0.33	0.28	-0.01	0.14
vc5comp1wk	0.24	0.24	0.23	0.21	0.22
vc5comp2	1.00	0.63	0.36	0.25	0.38
vc5comp2l1	0.63	1.00	0.63	0.36	0.57
vc5comp2l2	0.36	0.63	1.00	0.63	0.68
vc5comp2l3	0.25	0.36	0.63	1.00	0.73
vc5comp2wk	0.38	0.57	0.68	0.73	1.00
vc5comp3	-0.01	-0.02	-0.05	-0.06	-0.08
vc5comp3l1	-0.17	-0.01	-0.02	-0.05	-0.07
vc5comp3l2	-0.19	-0.17	-0.01	-0.02	-0.10
vc5comp3l3	-0.13	-0.19	-0.18	-0.01	-0.12
vc5comp3wk	-0.13	-0.13	-0.13	-0.13	-0.17

vc5comp4	0.00	0.00	0.02	0.02	0.05
vc5comp4l1	0.34	0.00	-0.01	0.02	0.04
vc5comp4l2	0.32	0.34	-0.01	-0.01	0.09
vc5comp4l3	0.21	0.31	0.33	-0.01	0.15
vc5comp4wk	0.29	0.26	0.24	0.21	0.25
vc5comp5	0.00	-0.01	-0.05	-0.03	-0.04
vc5comp5l1	-0.17	0.00	-0.01	-0.04	-0.03
vc5comp5l2	-0.17	-0.17	0.00	-0.01	-0.06
vc5comp5l3	-0.12	-0.17	-0.17	0.01	-0.09
vc5comp5wk	-0.13	-0.12	-0.12	-0.11	-0.13

Table 21 Correlations between components: vc5comp3

	vc5comp3	vc5comp3 l1	vc5comp3 l2	vc5comp3 l3	vc5comp3 wk
vc5comp1	-0.01	0.10	0.14	0.12	0.15
vc5comp1l1	0.01	-0.01	0.10	0.14	0.13
vc5comp1l2	0.08	0.01	-0.01	0.10	0.11
vc5comp1l3	0.10	0.08	0.01	-0.01	0.10
vc5comp1wk	0.10	0.08	0.09	0.10	0.14
vc5comp2	-0.01	-0.17	-0.19	-0.13	-0.13
vc5comp2l1	-0.02	-0.01	-0.17	-0.19	-0.13
vc5comp2l2	-0.05	-0.02	-0.01	-0.18	-0.13
vc5comp2l3	-0.06	-0.05	-0.02	-0.01	-0.13
vc5comp2wk	-0.08	-0.07	-0.10	-0.12	-0.17
vc5comp3	1.00	0.72	0.51	0.39	0.54
vc5comp3l1	0.72	1.00	0.72	0.51	0.68
vc5comp3l2	0.51	0.72	1.00	0.72	0.76
vc5comp3l3	0.39	0.51	0.72	1.00	0.79
vc5comp3wk	0.54	0.68	0.76	0.79	1.00
vc5comp4	-0.04	0.04	0.09	0.10	0.12
vc5comp4l1	0.00	-0.04	0.04	0.09	0.09
vc5comp4l2	0.01	0.00	-0.04	0.03	0.07
vc5comp4l3	0.02	0.00	-0.01	-0.05	0.05
vc5comp4wk	0.02	0.02	0.02	0.02	0.06
vc5comp5	0.00	0.03	0.07	0.11	0.12
vc5comp5l1	0.07	0.01	0.03	0.07	0.10
vc5comp5l2	0.11	0.07	0.01	0.03	0.10
vc5comp5l3	0.12	0.11	0.07	0.01	0.10
vc5comp5wk	0.15	0.13	0.11	0.10	0.13

Table 22 Correlations between components: vc5comp4

	vc5comp4	vc5comp4 l1	vc5comp4 l2	vc5comp4 l3	vc5comp4 wk
vc5comp1	0.01	0.02	0.05	0.06	0.09
vc5comp1l1	0.06	0.02	0.04	0.07	0.11
vc5comp1l2	0.06	0.06	0.02	0.04	0.11
vc5comp1l3	0.05	0.05	0.06	0.02	0.09
vc5comp1wk	0.11	0.10	0.08	0.07	0.13
vc5comp2	0.00	0.34	0.32	0.21	0.29
vc5comp2l1	0.00	0.00	0.34	0.31	0.26
vc5comp2l2	0.02	-0.01	-0.01	0.33	0.24
vc5comp2l3	0.02	0.02	-0.01	-0.01	0.21

vc5comp2wk	0.05	0.04	0.09	0.15	0.25
vc5comp3	-0.04	0.00	0.01	0.02	0.02
vc5comp3l1	0.04	-0.04	0.00	0.00	0.02
vc5comp3l2	0.09	0.04	-0.04	-0.01	0.02
vc5comp3l3	0.10	0.09	0.03	-0.05	0.02
vc5comp3wk	0.12	0.09	0.07	0.05	0.06
vc5comp4	1.00	0.58	0.36	0.28	0.44
vc5comp4l1	0.58	1.00	0.57	0.36	0.59
vc5comp4l2	0.36	0.57	1.00	0.57	0.67
vc5comp4l3	0.28	0.36	0.57	1.00	0.71
vc5comp4wk	0.44	0.59	0.67	0.71	1.00
vc5comp5	0.00	0.07	0.11	0.10	0.13
vc5comp5l1	0.03	-0.01	0.07	0.11	0.11
vc5comp5l2	0.06	0.03	0.00	0.07	0.10
vc5comp5l3	0.07	0.06	0.03	0.00	0.10
vc5comp5wk	0.09	0.07	0.07	0.08	0.12

Table 23 Correlations between components: vc5comp5

	vc5comp5	vc5comp5 l1	vc5comp5 l2	vc5comp5 l3	vc5comp5 wk
vc5comp1	0.03	0.12	0.16	0.17	0.22
vc5comp1l1	0.17	0.03	0.12	0.17	0.19
vc5comp1l2	0.21	0.17	0.03	0.12	0.18
vc5comp1l3	0.20	0.21	0.17	0.03	0.19
vc5comp1wk	0.30	0.26	0.24	0.23	0.29
vc5comp2	0.00	-0.17	-0.17	-0.12	-0.13
vc5comp2l1	-0.01	0.00	-0.17	-0.17	-0.12
vc5comp2l2	-0.05	-0.01	0.00	-0.17	-0.12
vc5comp2l3	-0.03	-0.04	-0.01	0.01	-0.11
vc5comp2wk	-0.04	-0.03	-0.06	-0.09	-0.13
vc5comp3	0.00	0.07	0.11	0.12	0.15
vc5comp3l1	0.03	0.01	0.07	0.11	0.13
vc5comp3l2	0.07	0.03	0.01	0.07	0.11
vc5comp3l3	0.11	0.07	0.03	0.01	0.10
vc5comp3wk	0.12	0.10	0.10	0.10	0.13
vc5comp4	0.00	0.03	0.06	0.07	0.09
vc5comp4l1	0.07	-0.01	0.03	0.06	0.07
vc5comp4l2	0.11	0.07	0.00	0.03	0.07
vc5comp4l3	0.10	0.11	0.07	0.00	0.08
vc5comp4wk	0.13	0.11	0.10	0.10	0.12
vc5comp5	1.00	0.73	0.58	0.54	0.67
vc5comp5l1	0.73	1.00	0.73	0.58	0.76
vc5comp5l2	0.58	0.73	1.00	0.73	0.81
vc5comp5l3	0.54	0.58	0.73	1.00	0.83
vc5comp5wk	0.67	0.76	0.81	0.83	1.00

Table 24 Two-component models

cause	*component*	*effect*	*st.error*	*RR*	*RR-lo*	*RR-hi*	*t-value*
TOTAL	vc5comp1l1	0.0042	0.0013	1.012	1.005	1.020	3.16
-	vc5comp2l1	0.0044	0.0012	1.013	1.006	1.020	3.54
TOTAL	vc5comp1l1	0.0038	0.0013	1.011	1.003	1.018	2.82
-	vc5comp3l1	0.0027	0.0014	1.008	1.000	1.017	1.97
TOTAL	vc5comp1l1	0.0042	0.0014	1.012	1.004	1.020	3.09
-	vc5comp4wk	0.0235	0.0021	1.043	1.035	1.051	11.06
TOTAL	vc5comp1l1	0.0023	0.0014	1.006	0.999	1.014	1.62
-	vc5comp5l1	0.0069	0.0016	1.022	1.012	1.033	4.20
TOTAL	vc5comp1l1	0.0035	0.0014	1.010	1.002	1.018	2.55
-	vc5comp5wk	0.0121	0.0023	1.034	1.021	1.047	5.24
TOTAL	vc5comp2l1	0.0044	0.0012	1.013	1.006	1.020	3.57
-	vc5comp3l1	0.0034	0.0014	1.010	1.002	1.019	2.49
TOTAL	vc5comp2l1	0.0016	0.0013	1.005	0.997	1.012	1.23
-	vc5comp4wk	0.0230	0.0022	1.042	1.034	1.050	10.34
TOTAL	vc5comp2l1	0.0048	0.0012	1.014	1.007	1.021	3.91
-	vc5comp5l1	0.0085	0.0016	1.028	1.017	1.038	5.40
TOTAL	vc5comp2l1	0.0034	0.0013	1.010	1.003	1.018	2.65
-	vc5comp5wk	0.0119	0.0024	1.033	1.020	1.046	5.04
TOTAL	vc5comp3l1	0.0030	0.0014	1.009	1.001	1.017	2.21
-	vc5comp4wk	0.0235	0.0021	1.043	1.035	1.051	11.04
TOTAL	vc5comp3l1	0.0061	0.0014	1.019	1.010	1.027	4.22
-	vc5comp5l1	0.0104	0.0017	1.034	1.023	1.045	6.26
TOTAL	vc5comp3l1	0.0045	0.0014	1.014	1.005	1.022	3.23
-	vc5comp5wk	0.0146	0.0023	1.041	1.028	1.054	6.21
TOTAL	vc5comp4wk	0.0241	0.0021	1.044	1.036	1.052	11.34
-	vc5comp5l1	0.0086	0.0016	1.028	1.018	1.038	5.46
TOTAL	vc5comp4wk	0.0232	0.0021	1.042	1.035	1.050	10.90
-	vc5comp5wk	0.0119	0.0023	1.033	1.021	1.046	5.22
RESPIR	vc5comp1l1	0.0093	0.0040	1.027	1.004	1.050	2.32
-	vc5comp2l1	0.0114	0.0039	1.034	1.011	1.057	2.93
RESPIR	vc5comp1l1	0.0081	0.0041	1.024	1.000	1.047	2.00
-	vc5comp3l1	0.0069	0.0041	1.021	0.996	1.047	1.67
RESPIR	vc5comp1l1	0.0075	0.0042	1.022	0.998	1.046	1.80
-	vc5comp4wk	0.0527	0.0063	1.099	1.075	1.123	8.42
RESPIR	vc5comp1l1	0.0080	0.0045	1.023	0.998	1.049	1.77
-	vc5comp5l1	0.0037	0.0058	1.012	0.976	1.049	0.64
RESPIR	vc5comp1l1	0.0055	0.0042	1.016	0.992	1.040	1.30
-	vc5comp5wk	0.0567	0.0071	1.168	1.124	1.214	7.95
RESPIR	vc5comp2l1	0.0118	0.0039	1.035	1.012	1.058	3.03
-	vc5comp3l1	0.0091	0.0041	1.028	1.003	1.054	2.23
RESPIR	vc5comp2l1	0.0026	0.0041	1.008	0.984	1.032	0.64
-	vc5comp4wk	0.0526	0.0065	1.098	1.074	1.123	8.13
RESPIR	vc5comp2l1	0.0114	0.0039	1.034	1.011	1.057	2.94
-	vc5comp5l1	0.0090	0.0052	1.029	0.996	1.064	1.73
RESPIR	vc5comp2l1	0.0053	0.0041	1.015	0.992	1.040	1.29

-	vc5comp5wk	0.0567	0.0072	1.168	1.124	1.215	7.82
RESPIR	vc5comp3l1	0.0067	0.0041	1.021	0.996	1.046	1.63
-	vc5comp4wk	0.0528	0.0063	1.099	1.075	1.123	8.42
RESPIR	vc5comp3l1	0.0124	0.0044	1.039	1.012	1.066	2.83
-	vc5comp5l1	0.0145	0.0056	1.048	1.012	1.085	2.61
RESPIR	vc5comp3l1	0.0132	0.0042	1.041	1.015	1.067	3.16
-	vc5comp5wk	0.0635	0.0071	1.190	1.146	1.237	8.91
RESPIR	vc5comp4wk	0.0540	0.0063	1.101	1.077	1.125	8.63
-	vc5comp5l1	0.0101	0.0053	1.033	0.999	1.068	1.91
RESPIR	vc5comp4wk	0.0516	0.0063	1.096	1.073	1.121	8.23
-	vc5comp5wk	0.0542	0.0070	1.160	1.117	1.205	7.72
CARDIO	vc5comp1l1	0.0061	0.0021	1.017	1.006	1.029	2.96
-	vc5comp2l1	0.0020	0.0019	1.006	0.995	1.017	1.05
CARDIO	vc5comp1l1	0.0059	0.0021	1.017	1.005	1.029	2.84
-	vc5comp3l1	0.0018	0.0021	1.006	0.993	1.018	0.89
CARDIO	vc5comp1l1	0.0048	0.0021	1.014	1.002	1.026	2.25
-	vc5comp4wk	0.0247	0.0032	1.045	1.033	1.057	7.74
CARDIO	vc5comp1l1	0.0053	0.0022	1.015	1.003	1.028	2.39
-	vc5comp5l1	0.0029	0.0026	1.009	0.993	1.026	1.11
CARDIO	vc5comp1l1	0.0050	0.0022	1.014	1.002	1.027	2.32
-	vc5comp5wk	0.0004	0.0035	0.999	0.980	1.018	0.12
CARDIO	vc5comp2l1	0.0022	0.0019	1.006	0.995	1.017	1.15
-	vc5comp3l1	0.0027	0.0021	1.008	0.996	1.021	1.32
CARDIO	vc5comp2l1	-0.0009	0.0020	0.997	0.986	1.009	-0.45
-	vc5comp4wk	0.0252	0.0033	1.046	1.034	1.058	7.59
CARDIO	vc5comp2l1	0.0024	0.0019	1.007	0.996	1.018	1.26
-	vc5comp5l1	0.0058	0.0025	1.019	1.003	1.035	2.34
CARDIO	vc5comp2l1	0.0014	0.0020	1.004	0.993	1.016	0.70
-	vc5comp5wk	0.0004	0.0035	1.001	0.983	1.020	0.12
CARDIO	vc5comp3l1	0.0015	0.0021	1.005	0.992	1.017	0.75
-	vc5comp4wk	0.0248	0.0032	1.045	1.034	1.057	7.73
CARDIO	vc5comp3l1	0.0046	0.0021	1.014	1.001	1.027	2.14
-	vc5comp5l1	0.0075	0.0026	1.024	1.008	1.041	2.94
CARDIO	vc5comp3l1	0.0024	0.0021	1.007	0.995	1.020	1.14
-	vc5comp5wk	0.0015	0.0035	1.004	0.986	1.023	0.43
CARDIO	vc5comp4wk	0.0251	0.0032	1.046	1.034	1.058	7.85
-	vc5comp5l1	0.0052	0.0025	1.017	1.001	1.033	2.10
CARDIO	vc5comp4wk	0.0250	0.0032	1.046	1.034	1.057	7.74
-	vc5comp5wk	0.0010	0.0034	0.997	0.979	1.016	0.28
PNEUMO	vc5comp1l1	0.0217	0.0062	1.064	1.028	1.101	3.53
-	vc5comp2l1	0.0068	0.0061	1.020	0.985	1.057	1.12
PNEUMO	vc5comp1l1	0.0195	0.0062	1.057	1.021	1.095	3.14
-	vc5comp3l1	0.0136	0.0064	1.043	1.003	1.083	2.13
PNEUMO	vc5comp1l1	0.0212	0.0064	1.062	1.025	1.101	3.32
-	vc5comp4wk	0.0670	0.0096	1.127	1.090	1.165	6.99
PNEUMO	vc5comp1l1	0.0212	0.0068	1.062	1.022	1.104	3.10
-	vc5comp5l1	0.0012	0.0089	1.004	0.949	1.062	0.14
PNEUMO	vc5comp1l1	0.0158	0.0065	1.046	1.009	1.085	2.44
-	vc5comp5wk	0.0949	0.0109	1.297	1.223	1.376	8.67

PNEUMO	vc5comp2l1	0.0072	0.0061	1.021	0.986	1.058	1.18
-	vc5comp3l1	0.0171	0.0064	1.054	1.014	1.095	2.68
PNEUMO	vc5comp2l1	-0.0044	0.0065	0.987	0.951	1.025	-0.68
-	vc5comp4wk	0.0704	0.0100	1.134	1.095	1.174	7.07
PNEUMO	vc5comp2l1	0.0067	0.0062	1.020	0.984	1.056	1.09
-	vc5comp5l1	0.0135	0.0081	1.044	0.993	1.099	1.67
PNEUMO	vc5comp2l1	-0.0040	0.0065	0.988	0.953	1.026	-0.61
-	vc5comp5wk	0.1002	0.0112	1.316	1.240	1.398	8.95
PNEUMO	vc5comp3l1	0.0153	0.0064	1.048	1.008	1.089	2.39
-	vc5comp4wk	0.0677	0.0096	1.128	1.091	1.167	7.04
PNEUMO	vc5comp3l1	0.0237	0.0068	1.075	1.032	1.120	3.50
-	vc5comp5l1	0.0249	0.0086	1.083	1.026	1.143	2.90
PNEUMO	vc5comp3l1	0.0261	0.0065	1.083	1.042	1.126	4.04
-	vc5comp5wk	0.1093	0.0109	1.350	1.273	1.432	10.01
PNEUMO	vc5comp4wk	0.0702	0.0096	1.133	1.096	1.172	7.30
-	vc5comp5l1	0.0160	0.0082	1.053	1.000	1.108	1.95
PNEUMO	vc5comp4wk	0.0659	0.0097	1.125	1.087	1.163	6.83
-	vc5comp5wk	0.0944	0.0108	1.296	1.223	1.374	8.73
COPD	vc5comp1l1	-0.0034	0.0055	0.990	0.960	1.021	-0.61
-	vc5comp2l1	0.0152	0.0051	1.045	1.015	1.077	2.95
COPD	vc5comp1l1	-0.0034	0.0055	0.990	0.960	1.021	-0.61
-	vc5comp3l1	0.0011	0.0056	0.997	0.964	1.031	0.20
COPD	vc5comp1l1	-0.0055	0.0057	0.985	0.954	1.016	-0.96
-	vc5comp4wk	0.0428	0.0084	1.079	1.048	1.112	5.08
COPD	vc5comp1l1	-0.0067	0.0059	0.981	0.949	1.014	-1.15
-	vc5comp5l1	0.0112	0.0071	1.036	0.991	1.084	1.58
COPD	vc5comp1l1	-0.0064	0.0058	0.982	0.951	1.014	-1.10
-	vc5comp5wk	0.0209	0.0095	1.059	1.006	1.115	2.20
COPD	vc5comp2l1	0.0152	0.0051	1.045	1.015	1.077	2.96
-	vc5comp3l1	-0.0003	0.0056	0.999	0.966	1.033	-0.06
COPD	vc5comp2l1	0.0098	0.0054	1.029	0.998	1.061	1.81
-	vc5comp4wk	0.0399	0.0087	1.074	1.041	1.107	4.58
COPD	vc5comp2l1	0.0159	0.0051	1.047	1.017	1.079	3.09
-	vc5comp5l1	0.0099	0.0066	1.032	0.990	1.076	1.50
COPD	vc5comp2l1	0.0132	0.0053	1.039	1.008	1.072	2.48
-	vc5comp5wk	0.0166	0.0095	1.047	0.994	1.102	1.74
COPD	vc5comp3l1	-0.0039	0.0056	0.988	0.956	1.022	-0.69
-	vc5comp4wk	0.0433	0.0085	1.080	1.049	1.113	5.11
COPD	vc5comp3l1	0.0005	0.0058	1.002	0.967	1.037	0.09
-	vc5comp5l1	0.0083	0.0069	1.027	0.983	1.072	1.20
COPD	vc5comp3l1	-0.0006	0.0057	0.998	0.965	1.033	-0.11
-	vc5comp5wk	0.0193	0.0095	1.054	1.002	1.110	2.04
COPD	vc5comp4wk	0.0430	0.0084	1.080	1.048	1.112	5.09
-	vc5comp5l1	0.0068	0.0067	1.022	0.980	1.066	1.01
COPD	vc5comp4wk	0.0421	0.0085	1.078	1.046	1.110	4.97
-	vc5comp5wk	0.0158	0.0094	1.044	0.993	1.099	1.68

Table 25 Three-component models

cause	*component*	*effect*	*st.error*	*RR*	*RR-lo*	*RR-hi*	*t-value*
TOTAL	vc5comp1l1	0.0038	0.0013	1.011	1.004	1.019	2.88
-	vc5comp2l1	0.0045	0.0012	1.013	1.006	1.020	3.62
-	vc5comp3l1	0.0029	0.0014	1.009	1.001	1.017	2.11
TOTAL	vc5comp1l1	0.0043	0.0014	1.012	1.005	1.020	3.13
-	vc5comp2l1	0.0018	0.0013	1.005	0.998	1.013	1.35
-	vc5comp4wk	0.0228	0.0022	1.042	1.033	1.050	10.26
TOTAL	vc5comp1l1	0.0022	0.0014	1.006	0.998	1.014	1.57
-	vc5comp2l1	0.0048	0.0012	1.014	1.007	1.021	3.90
-	vc5comp5l1	0.0075	0.0016	1.024	1.014	1.035	4.58
TOTAL	vc5comp1l1	0.0037	0.0014	1.011	1.003	1.018	2.67
-	vc5comp2l1	0.0036	0.0013	1.011	1.003	1.018	2.77
-	vc5comp5wk	0.0110	0.0024	1.031	1.018	1.044	4.66
TOTAL	vc5comp1l1	0.0039	0.0014	1.011	1.003	1.019	2.83
-	vc5comp3l1	0.0025	0.0014	1.008	0.999	1.016	1.82
-	vc5comp4wk	0.0234	0.0021	1.043	1.035	1.050	11.00
TOTAL	vc5comp1l1	0.0007	0.0014	1.002	0.994	1.010	0.51
-	vc5comp3l1	0.0058	0.0015	1.018	1.009	1.027	3.98
-	vc5comp5l1	0.0100	0.0018	1.032	1.021	1.044	5.63
TOTAL	vc5comp1l1	0.0029	0.0014	1.008	1.000	1.016	2.07
-	vc5comp3l1	0.0041	0.0014	1.012	1.004	1.021	2.89
-	vc5comp5wk	0.0138	0.0024	1.039	1.025	1.052	5.83
TOTAL	vc5comp1l1	0.0023	0.0014	1.007	0.999	1.015	1.63
-	vc5comp4wk	0.0240	0.0021	1.044	1.036	1.051	11.29
-	vc5comp5l1	0.0078	0.0016	1.025	1.015	1.036	4.73
TOTAL	vc5comp1l1	0.0036	0.0014	1.010	1.003	1.018	2.66
-	vc5comp4wk	0.0231	0.0021	1.042	1.034	1.050	10.86
-	vc5comp5wk	0.0111	0.0023	1.031	1.018	1.044	4.86
TOTAL	vc5comp2l1	0.0018	0.0013	1.005	0.998	1.013	1.35
-	vc5comp3l1	0.0031	0.0014	1.009	1.001	1.018	2.28
-	vc5comp4wk	0.0228	0.0022	1.042	1.033	1.050	10.24
TOTAL	vc5comp2l1	0.0053	0.0012	1.016	1.008	1.023	4.27
-	vc5comp3l1	0.0065	0.0014	1.020	1.011	1.029	4.55
-	vc5comp5l1	0.0112	0.0016	1.037	1.026	1.047	6.78
TOTAL	vc5comp2l1	0.0035	0.0013	1.010	1.003	1.018	2.73
-	vc5comp3l1	0.0046	0.0014	1.014	1.006	1.023	3.30
-	vc5comp5wk	0.0136	0.0024	1.038	1.025	1.052	5.65
TOTAL	vc5comp2l1	0.0022	0.0013	1.006	0.999	1.014	1.67
-	vc5comp4wk	0.0233	0.0022	1.042	1.034	1.050	10.47
-	vc5comp5l1	0.0089	0.0016	1.029	1.019	1.039	5.62
TOTAL	vc5comp2l1	0.0009	0.0013	1.003	0.995	1.010	0.71
-	vc5comp4wk	0.0229	0.0022	1.042	1.034	1.050	10.28
-	vc5comp5wk	0.0116	0.0023	1.032	1.020	1.045	4.99
TOTAL	vc5comp3l1	0.0060	0.0014	1.019	1.010	1.027	4.24
-	vc5comp4wk	0.0240	0.0021	1.044	1.036	1.051	11.28
-	vc5comp5l1	0.0111	0.0017	1.036	1.026	1.047	6.71

TOTAL	vc5comp3l1	0.0041	0.0014	1.013	1.004	1.021	2.97
-	vc5comp4wk	0.0230	0.0021	1.042	1.034	1.050	10.77
-	vc5comp5wk	0.0135	0.0023	1.038	1.025	1.051	5.79
RESPIR	vc5comp1l1	0.0082	0.0041	1.024	1.001	1.047	2.02
-	vc5comp2l1	0.0119	0.0039	1.035	1.013	1.059	3.07
-	vc5comp3l1	0.0079	0.0041	1.024	0.999	1.050	1.91
RESPIR	vc5comp1l1	0.0077	0.0042	1.022	0.999	1.046	1.84
-	vc5comp2l1	0.0030	0.0041	1.009	0.985	1.033	0.74
-	vc5comp4wk	0.0518	0.0065	1.097	1.072	1.122	8.00
RESPIR	vc5comp1l1	0.0079	0.0045	1.023	0.997	1.049	1.76
-	vc5comp2l1	0.0115	0.0039	1.034	1.011	1.057	2.95
-	vc5comp5l1	0.0044	0.0058	1.014	0.978	1.052	0.77
RESPIR	vc5comp1l1	0.0058	0.0042	1.017	0.993	1.041	1.37
-	vc5comp2l1	0.0056	0.0041	1.016	0.993	1.040	1.36
-	vc5comp5wk	0.0549	0.0074	1.163	1.118	1.210	7.46
RESPIR	vc5comp1l1	0.0066	0.0042	1.019	0.995	1.043	1.58
-	vc5comp3l1	0.0057	0.0041	1.017	0.992	1.043	1.37
-	vc5comp4wk	0.0523	0.0063	1.098	1.074	1.122	8.34
RESPIR	vc5comp1l1	0.0037	0.0048	1.011	0.984	1.038	0.78
-	vc5comp3l1	0.0110	0.0047	1.034	1.006	1.063	2.36
-	vc5comp5l1	0.0116	0.0065	1.038	0.996	1.081	1.79
RESPIR	vc5comp1l1	0.0031	0.0043	1.009	0.985	1.034	0.73
-	vc5comp3l1	0.0126	0.0042	1.039	1.013	1.066	2.98
-	vc5comp5wk	0.0623	0.0073	1.187	1.141	1.234	8.58
RESPIR	vc5comp1l1	0.0053	0.0046	1.015	0.989	1.041	1.15
-	vc5comp4wk	0.0534	0.0063	1.100	1.076	1.124	8.53
-	vc5comp5l1	0.0073	0.0058	1.024	0.987	1.062	1.26
RESPIR	vc5comp1l1	0.0041	0.0042	1.012	0.988	1.036	0.97
-	vc5comp4wk	0.0512	0.0063	1.096	1.072	1.120	8.17
-	vc5comp5wk	0.0530	0.0071	1.157	1.113	1.202	7.45
RESPIR	vc5comp2l1	0.0033	0.0041	1.010	0.986	1.034	0.79
-	vc5comp3l1	0.0070	0.0041	1.022	0.997	1.047	1.70
-	vc5comp4wk	0.0518	0.0065	1.097	1.072	1.122	7.98
RESPIR	vc5comp2l1	0.0127	0.0039	1.038	1.015	1.061	3.25
-	vc5comp3l1	0.0139	0.0044	1.043	1.016	1.071	3.16
-	vc5comp5l1	0.0160	0.0056	1.053	1.017	1.090	2.88
RESPIR	vc5comp2l1	0.0060	0.0041	1.018	0.994	1.042	1.48
-	vc5comp3l1	0.0135	0.0042	1.042	1.017	1.068	3.25
-	vc5comp5wk	0.0617	0.0073	1.185	1.139	1.232	8.41
RESPIR	vc5comp2l1	0.0029	0.0041	1.009	0.985	1.033	0.72
-	vc5comp4wk	0.0531	0.0065	1.099	1.075	1.124	8.21
-	vc5comp5l1	0.0103	0.0053	1.033	1.000	1.068	1.94
RESPIR	vc5comp2l1	-0.0004	0.0042	0.999	0.975	1.023	-0.08
-	vc5comp4wk	0.0517	0.0065	1.096	1.072	1.121	8.00
-	vc5comp5wk	0.0543	0.0072	1.161	1.117	1.207	7.53
RESPIR	vc5comp3l1	0.0113	0.0044	1.035	1.008	1.063	2.56
-	vc5comp4wk	0.0534	0.0063	1.100	1.076	1.124	8.52
-	vc5comp5l1	0.0159	0.0057	1.052	1.016	1.091	2.81
RESPIR	vc5comp3l1	0.0113	0.0042	1.035	1.010	1.061	2.72

-	vc5comp4wk	0.0504	0.0063	1.094	1.070	1.118	8.02
-	vc5comp5wk	0.0587	0.0071	1.175	1.131	1.221	8.24
CARDIO	vc5comp1l1	0.0058	0.0021	1.017	1.005	1.029	2.82
-	vc5comp2l1	0.0021	0.0019	1.006	0.995	1.017	1.13
-	vc5comp3l1	0.0020	0.0021	1.006	0.994	1.019	0.98
CARDIO	vc5comp1l1	0.0048	0.0021	1.014	1.002	1.026	2.24
-	vc5comp2l1	-0.0008	0.0020	0.998	0.986	1.009	-0.41
-	vc5comp4wk	0.0250	0.0033	1.046	1.033	1.058	7.53
CARDIO	vc5comp1l1	0.0052	0.0022	1.015	1.002	1.027	2.34
-	vc5comp2l1	0.0022	0.0019	1.007	0.996	1.018	1.17
-	vc5comp5l1	0.0033	0.0026	1.011	0.994	1.028	1.25
CARDIO	vc5comp1l1	0.0051	0.0022	1.015	1.002	1.027	2.33
-	vc5comp2l1	0.0015	0.0020	1.004	0.993	1.016	0.75
-	vc5comp5wk	-0.0007	0.0035	0.998	0.979	1.017	-0.20
CARDIO	vc5comp1l1	0.0047	0.0021	1.013	1.001	1.026	2.17
-	vc5comp3l1	0.0010	0.0021	1.003	0.991	1.015	0.46
-	vc5comp4wk	0.0246	0.0032	1.045	1.033	1.057	7.70
CARDIO	vc5comp1l1	0.0043	0.0023	1.012	1.000	1.025	1.90
-	vc5comp3l1	0.0034	0.0022	1.010	0.997	1.024	1.53
-	vc5comp5l1	0.0050	0.0028	1.016	0.998	1.034	1.76
CARDIO	vc5comp1l1	0.0048	0.0022	1.014	1.001	1.026	2.18
-	vc5comp3l1	0.0017	0.0021	1.005	0.993	1.018	0.80
-	vc5comp5wk	0.0002	0.0035	1.001	0.982	1.020	0.06
CARDIO	vc5comp1l1	0.0039	0.0023	1.011	0.998	1.024	1.70
-	vc5comp4wk	0.0249	0.0032	1.045	1.034	1.057	7.78
-	vc5comp5l1	0.0037	0.0027	1.012	0.995	1.029	1.38
CARDIO	vc5comp1l1	0.0049	0.0022	1.014	1.002	1.026	2.27
-	vc5comp4wk	0.0248	0.0032	1.045	1.034	1.057	7.70
-	vc5comp5wk	-0.0020	0.0035	0.994	0.976	1.013	-0.59
CARDIO	vc5comp2l1	-0.0008	0.0020	0.998	0.986	1.009	-0.39
-	vc5comp3l1	0.0015	0.0021	1.005	0.992	1.017	0.71
-	vc5comp4wk	0.0250	0.0033	1.046	1.034	1.058	7.51
CARDIO	vc5comp2l1	0.0029	0.0019	1.009	0.998	1.020	1.53
-	vc5comp3l1	0.0050	0.0021	1.015	1.002	1.028	2.33
-	vc5comp5l1	0.0081	0.0026	1.026	1.010	1.043	3.17
CARDIO	vc5comp2l1	0.0015	0.0020	1.005	0.993	1.016	0.78
-	vc5comp3l1	0.0025	0.0021	1.008	0.995	1.020	1.19
-	vc5comp5wk	0.0012	0.0035	1.003	0.985	1.023	0.35
CARDIO	vc5comp2l1	-0.0005	0.0020	0.998	0.987	1.010	-0.26
-	vc5comp4wk	0.0253	0.0033	1.046	1.034	1.058	7.60
-	vc5comp5l1	0.0052	0.0025	1.017	1.001	1.033	2.07
CARDIO	vc5comp2l1	-0.0009	0.0020	0.997	0.986	1.009	-0.43
-	vc5comp4wk	0.0252	0.0033	1.046	1.034	1.058	7.57
-	vc5comp5wk	-0.0008	0.0035	0.998	0.979	1.017	-0.23
CARDIO	vc5comp3l1	0.0034	0.0021	1.010	0.997	1.023	1.57
-	vc5comp4wk	0.0249	0.0032	1.045	1.034	1.057	7.74
-	vc5comp5l1	0.0068	0.0026	1.022	1.006	1.039	2.62
CARDIO	vc5comp3l1	0.0015	0.0021	1.005	0.992	1.017	0.73
-	vc5comp4wk	0.0248	0.0032	1.045	1.033	1.057	7.66

-	vc5comp5wk	-0.0004	0.0035	0.999	0.980	1.018	-0.13
PNEUMO	vc5comp1l1	0.0196	0.0062	1.057	1.021	1.095	3.15
-	vc5comp2l1	0.0076	0.0061	1.022	0.987	1.059	1.24
-	vc5comp3l1	0.0141	0.0064	1.044	1.005	1.085	2.21
PNEUMO	vc5comp1l1	0.0210	0.0064	1.062	1.025	1.100	3.30
-	vc5comp2l1	-0.0033	0.0065	0.990	0.954	1.028	-0.51
-	vc5comp4wk	0.0680	0.0099	1.129	1.090	1.169	6.85
PNEUMO	vc5comp1l1	0.0212	0.0068	1.062	1.022	1.104	3.10
-	vc5comp2l1	0.0069	0.0061	1.020	0.985	1.057	1.12
-	vc5comp5l1	0.0016	0.0089	1.005	0.950	1.063	0.18
PNEUMO	vc5comp1l1	0.0157	0.0065	1.046	1.008	1.084	2.41
-	vc5comp2l1	-0.0032	0.0065	0.991	0.955	1.028	-0.49
-	vc5comp5wk	0.0959	0.0113	1.301	1.224	1.383	8.45
PNEUMO	vc5comp1l1	0.0192	0.0064	1.056	1.019	1.095	2.98
-	vc5comp3l1	0.0124	0.0064	1.039	0.999	1.079	1.92
-	vc5comp4wk	0.0661	0.0096	1.125	1.088	1.163	6.89
PNEUMO	vc5comp1l1	0.0140	0.0072	1.041	0.999	1.084	1.93
-	vc5comp3l1	0.0186	0.0072	1.059	1.014	1.105	2.59
-	vc5comp5l1	0.0145	0.0100	1.048	0.984	1.116	1.46
PNEUMO	vc5comp1l1	0.0113	0.0066	1.033	0.995	1.071	1.71
-	vc5comp3l1	0.0241	0.0065	1.076	1.035	1.119	3.68
-	vc5comp5wk	0.1057	0.0111	1.337	1.259	1.419	9.50
PNEUMO	vc5comp1l1	0.0193	0.0070	1.057	1.016	1.099	2.76
-	vc5comp4wk	0.0676	0.0096	1.128	1.091	1.166	7.05
-	vc5comp5l1	0.0060	0.0090	1.020	0.964	1.079	0.67
PNEUMO	vc5comp1l1	0.0153	0.0064	1.045	1.008	1.083	2.37
-	vc5comp4wk	0.0646	0.0096	1.122	1.085	1.160	6.70
-	vc5comp5wk	0.0906	0.0110	1.282	1.209	1.360	8.27
PNEUMO	vc5comp2l1	-0.0034	0.0065	0.990	0.954	1.028	-0.52
-	vc5comp3l1	0.0151	0.0064	1.047	1.008	1.088	2.35
-	vc5comp4wk	0.0687	0.0100	1.130	1.092	1.170	6.90
PNEUMO	vc5comp2l1	0.0086	0.0061	1.025	0.990	1.062	1.39
-	vc5comp3l1	0.0246	0.0068	1.078	1.035	1.123	3.62
-	vc5comp5l1	0.0259	0.0086	1.087	1.030	1.147	3.02
PNEUMO	vc5comp2l1	-0.0030	0.0064	0.991	0.956	1.029	-0.46
-	vc5comp3l1	0.0260	0.0065	1.083	1.042	1.125	4.02
-	vc5comp5wk	0.1102	0.0113	1.353	1.273	1.438	9.74
PNEUMO	vc5comp2l1	-0.0039	0.0065	0.989	0.952	1.026	-0.60
-	vc5comp4wk	0.0713	0.0100	1.136	1.097	1.176	7.16
-	vc5comp5l1	0.0157	0.0082	1.052	0.999	1.108	1.92
PNEUMO	vc5comp2l1	-0.0104	0.0066	0.970	0.934	1.008	-1.57
-	vc5comp4wk	0.0690	0.0099	1.131	1.092	1.171	6.95
-	vc5comp5wk	0.0975	0.0111	1.307	1.231	1.387	8.75
PNEUMO	vc5comp3l1	0.0233	0.0068	1.074	1.031	1.119	3.40
-	vc5comp4wk	0.0690	0.0096	1.131	1.094	1.170	7.18
-	vc5comp5l1	0.0280	0.0088	1.094	1.035	1.156	3.20
PNEUMO	vc5comp3l1	0.0242	0.0065	1.077	1.036	1.119	3.75
-	vc5comp4wk	0.0635	0.0097	1.120	1.083	1.158	6.58
-	vc5comp5wk	0.1043	0.0110	1.332	1.255	1.412	9.51

COPD	vc5comp1l1	-0.0034	0.0055	0.990	0.960	1.021	-0.61
-	vc5comp2l1	0.0152	0.0051	1.045	1.015	1.077	2.95
-	vc5comp3l1	0.0001	0.0056	1.000	0.967	1.034	0.01
COPD	vc5comp1l1	-0.0052	0.0057	0.985	0.954	1.017	-0.92
-	vc5comp2l1	0.0096	0.0054	1.029	0.997	1.061	1.78
-	vc5comp4wk	0.0399	0.0087	1.074	1.042	1.107	4.58
COPD	vc5comp1l1	-0.0072	0.0059	0.980	0.948	1.012	-1.23
-	vc5comp2l1	0.0160	0.0051	1.048	1.017	1.079	3.11
-	vc5comp5l1	0.0132	0.0071	1.043	0.998	1.091	1.88
COPD	vc5comp1l1	-0.0059	0.0058	0.983	0.952	1.016	-1.02
-	vc5comp2l1	0.0130	0.0053	1.039	1.008	1.071	2.44
-	vc5comp5wk	0.0180	0.0096	1.051	0.997	1.106	1.86
COPD	vc5comp1l1	-0.0051	0.0057	0.986	0.954	1.018	-0.88
-	vc5comp3l1	-0.0032	0.0056	0.990	0.957	1.024	-0.57
-	vc5comp4wk	0.0432	0.0085	1.080	1.049	1.113	5.10
COPD	vc5comp1l1	-0.0074	0.0060	0.979	0.947	1.013	-1.22
-	vc5comp3l1	0.0024	0.0060	1.008	0.972	1.044	0.41
-	vc5comp5l1	0.0124	0.0075	1.041	0.992	1.091	1.65
COPD	vc5comp1l1	-0.0064	0.0058	0.982	0.950	1.014	-1.10
-	vc5comp3l1	0.0003	0.0057	1.001	0.967	1.036	0.05
-	vc5comp5wk	0.0210	0.0096	1.059	1.006	1.116	2.19
COPD	vc5comp1l1	-0.0082	0.0061	0.977	0.944	1.010	-1.36
-	vc5comp4wk	0.0431	0.0084	1.080	1.048	1.112	5.11
-	vc5comp5l1	0.0101	0.0071	1.033	0.988	1.080	1.42
COPD	vc5comp1l1	-0.0065	0.0058	0.982	0.951	1.014	-1.12
-	vc5comp4wk	0.0421	0.0085	1.078	1.046	1.110	4.96
-	vc5comp5wk	0.0172	0.0095	1.048	0.996	1.104	1.81
COPD	vc5comp2l1	0.0095	0.0054	1.028	0.997	1.061	1.76
-	vc5comp3l1	-0.0030	0.0056	0.991	0.958	1.025	-0.53
-	vc5comp4wk	0.0403	0.0088	1.074	1.042	1.108	4.60
COPD	vc5comp2l1	0.0161	0.0051	1.048	1.018	1.080	3.13
-	vc5comp3l1	0.0025	0.0058	1.008	0.973	1.043	0.43
-	vc5comp5l1	0.0109	0.0069	1.036	0.992	1.081	1.58
COPD	vc5comp2l1	0.0132	0.0053	1.039	1.008	1.072	2.48
-	vc5comp3l1	0.0003	0.0056	1.001	0.968	1.035	0.05
-	vc5comp5wk	0.0167	0.0096	1.047	0.994	1.103	1.73
COPD	vc5comp2l1	0.0103	0.0054	1.031	0.999	1.063	1.91
-	vc5comp4wk	0.0399	0.0087	1.074	1.042	1.107	4.58
-	vc5comp5l1	0.0080	0.0067	1.026	0.984	1.070	1.20
COPD	vc5comp2l1	0.0092	0.0055	1.027	0.996	1.060	1.69
-	vc5comp4wk	0.0394	0.0087	1.073	1.041	1.106	4.52
-	vc5comp5wk	0.0140	0.0095	1.039	0.987	1.094	1.47
COPD	vc5comp3l1	-0.0024	0.0059	0.993	0.958	1.028	-0.41
-	vc5comp4wk	0.0432	0.0085	1.080	1.049	1.113	5.09
-	vc5comp5l1	0.0058	0.0070	1.019	0.975	1.065	0.84
COPD	vc5comp3l1	-0.0028	0.0057	0.992	0.958	1.026	-0.49
-	vc5comp4wk	0.0425	0.0085	1.079	1.047	1.111	4.98
-	vc5comp5wk	0.0149	0.0095	1.042	0.990	1.097	1.57

Table 26 Four-component models

cause	*component*	*effect*	*st.error*	*RR*	*RR-lo*	*RR-hi*	*t-value*
TOTAL	vc5comp1l1	0.0039	0.0014	1.011	1.004	1.019	2.87
-	vc5comp2l1	0.0019	0.0013	1.006	0.998	1.013	1.44
-	vc5comp3l1	0.0026	0.0014	1.008	1.000	1.016	1.89
-	vc5comp4wk	0.0227	0.0022	1.041	1.033	1.049	10.19
TOTAL	vc5comp1l1	0.0005	0.0014	1.001	0.994	1.009	0.36
-	vc5comp2l1	0.0053	0.0012	1.015	1.008	1.023	4.26
-	vc5comp3l1	0.0064	0.0015	1.020	1.011	1.029	4.34
-	vc5comp5l1	0.0109	0.0018	1.036	1.024	1.047	6.18
TOTAL	vc5comp1l1	0.0031	0.0014	1.009	1.001	1.017	2.19
-	vc5comp2l1	0.0036	0.0013	1.011	1.003	1.018	2.83
-	vc5comp3l1	0.0041	0.0014	1.013	1.004	1.021	2.93
-	vc5comp5wk	0.0127	0.0024	1.036	1.022	1.049	5.25
TOTAL	vc5comp1l1	0.0023	0.0014	1.007	0.999	1.015	1.64
-	vc5comp2l1	0.0022	0.0013	1.006	0.999	1.014	1.70
-	vc5comp4wk	0.0231	0.0022	1.042	1.034	1.050	10.41
-	vc5comp5l1	0.0080	0.0016	1.026	1.016	1.037	4.88
TOTAL	vc5comp1l1	0.0037	0.0014	1.011	1.003	1.018	2.70
-	vc5comp2l1	0.0011	0.0013	1.003	0.996	1.011	0.85
-	vc5comp4wk	0.0227	0.0022	1.041	1.033	1.049	10.21
-	vc5comp5wk	0.0108	0.0023	1.030	1.017	1.043	4.61
TOTAL	vc5comp1l1	0.0008	0.0014	1.002	0.994	1.010	0.54
-	vc5comp3l1	0.0058	0.0015	1.018	1.009	1.027	4.01
-	vc5comp4wk	0.0239	0.0021	1.044	1.036	1.051	11.27
-	vc5comp5l1	0.0108	0.0018	1.035	1.024	1.047	6.12
TOTAL	vc5comp1l1	0.0031	0.0014	1.009	1.001	1.017	2.24
-	vc5comp3l1	0.0036	0.0014	1.011	1.003	1.020	2.61
-	vc5comp4wk	0.0229	0.0021	1.042	1.034	1.050	10.76
-	vc5comp5wk	0.0126	0.0023	1.035	1.022	1.048	5.39
TOTAL	vc5comp2l1	0.0027	0.0013	1.008	1.000	1.015	2.07
-	vc5comp3l1	0.0063	0.0014	1.019	1.011	1.028	4.43
-	vc5comp4wk	0.0229	0.0022	1.042	1.034	1.050	10.32
-	vc5comp5l1	-0.0116	0.0017	1.038	1.027	1.049	-6.96
TOTAL	vc5comp2l1	0.0011	0.0013	1.003	0.996	1.011	0.81
-	vc5comp3l1	0.0041	0.0014	1.013	1.004	1.021	3.00
-	vc5comp4wk	0.0226	0.0022	1.041	1.033	1.049	10.14
-	vc5comp5wk	0.0132	0.0024	1.037	1.024	1.050	5.55
RESPIR	vc5comp1l1	0.0068	0.0042	1.019	0.996	1.044	1.61
-	vc5comp2l1	0.0035	0.0041	1.010	0.987	1.034	0.85
-	vc5comp3l1	0.0060	0.0041	1.018	0.993	1.044	1.44
-	vc5comp4wk	0.0512	0.0065	1.095	1.071	1.121	7.89
RESPIR	vc5comp1l1	0.0030	0.0048	1.009	0.982	1.036	0.63
-	vc5comp2l1	0.0126	0.0039	1.037	1.015	1.061	3.23
-	vc5comp3l1	0.0127	0.0046	1.040	1.011	1.069	2.74
-	vc5comp5l1	0.0137	0.0065	1.045	1.003	1.089	2.11
RESPIR	vc5comp1l1	0.0034	0.0043	1.010	0.986	1.034	0.79
-	vc5comp2l1	0.0062	0.0041	1.018	0.995	1.042	1.51
-	vc5comp3l1	0.0129	0.0042	1.040	1.014	1.067	3.06

-	vc5comp5wk	0.0605	0.0075	1.181	1.134	1.229	8.07
RESPIR	vc5comp1l1	0.0053	0.0046	1.015	0.990	1.042	1.17
-	vc5comp2l1	0.0031	0.0041	1.009	0.986	1.033	0.76
-	vc5comp4wk	0.0524	0.0065	1.098	1.073	1.123	8.09
-	vc5comp5l1	0.0074	0.0058	1.024	0.987	1.062	1.28
RESPIR	vc5comp1l1	0.0041	0.0042	1.012	0.988	1.036	0.97
-	vc5comp2l1	0.0001	0.0042	1.000	0.976	1.024	0.02
-	vc5comp4wk	0.0513	0.0065	1.096	1.071	1.121	7.94
-	vc5comp5wk	0.0530	0.0073	1.157	1.112	1.203	7.25
RESPIR	vc5comp1l1	0.0011	0.0048	1.003	0.976	1.031	0.23
-	vc5comp3l1	0.0109	0.0047	1.034	1.005	1.063	2.34
-	vc5comp4wk	0.0533	0.0063	1.100	1.076	1.124	8.50
-	vc5comp5l1	0.0151	0.0065	1.050	1.008	1.094	2.32
RESPIR	vc5comp1l1	0.0021	0.0043	1.006	0.982	1.030	0.48
-	vc5comp3l1	0.0110	0.0042	1.034	1.008	1.061	2.60
-	vc5comp4wk	0.0503	0.0063	1.094	1.070	1.118	8.00
-	vc5comp5wk	0.0580	0.0073	1.172	1.128	1.219	7.98
RESPIR	vc5comp2l1	0.0042	0.0041	1.012	0.989	1.036	1.02
-	vc5comp3l1	0.0118	0.0044	1.037	1.010	1.065	2.68
-	vc5comp4wk	0.0521	0.0065	1.097	1.073	1.122	8.03
-	vc5comp5l1	0.0164	0.0057	1.054	1.017	1.092	2.90
RESPIR	vc5comp2l1	0.0004	0.0042	1.001	0.977	1.025	0.10
-	vc5comp3l1	0.0114	0.0042	1.035	1.010	1.061	2.73
-	vc5comp4wk	0.0503	0.0065	1.094	1.069	1.119	7.77
-	vc5comp5wk	0.0586	0.0073	1.175	1.129	1.222	8.01
CARDIO	vc5comp1l1	0.0047	0.0022	1.013	1.001	1.026	2.17
-	vc5comp2l1	-0.0008	0.0020	0.998	0.986	1.009	-0.38
-	vc5comp3l1	0.0009	0.0021	1.003	0.990	1.015	0.43
-	vc5comp4wk	0.0249	0.0033	1.045	1.033	1.058	7.48
CARDIO	vc5comp1l1	0.0040	0.0023	1.012	0.999	1.025	1.78
-	vc5comp2l1	0.0027	0.0019	1.008	0.997	1.019	1.40
-	vc5comp3l1	0.0038	0.0022	1.012	0.998	1.025	1.74
-	vc5comp5l1	0.0057	0.0028	1.018	1.000	1.037	2.01
CARDIO	vc5comp1l1	0.0048	0.0022	1.014	1.001	1.026	2.18
-	vc5comp2l1	0.0016	0.0020	1.005	0.993	1.016	0.80
-	vc5comp3l1	0.0018	0.0021	1.006	0.993	1.018	0.86
-	vc5comp5wk	0.0001	0.0036	1.000	0.981	1.019	0.02
CARDIO	vc5comp1l1	0.0039	0.0023	1.011	0.998	1.024	1.71
-	vc5comp2l1	-0.0006	0.0020	0.998	0.987	1.010	-0.29
-	vc5comp4wk	0.0251	0.0033	1.046	1.034	1.058	7.55
-	vc5comp5l1	0.0036	0.0027	1.012	0.995	1.029	1.34
CARDIO	vc5comp1l1	0.0049	0.0022	1.014	1.002	1.026	2.26
-	vc5comp2l1	-0.0008	0.0020	0.998	0.986	1.009	-0.37
-	vc5comp4wk	0.0250	0.0033	1.046	1.034	1.058	7.52
-	vc5comp5wk	-0.0019	0.0035	0.995	0.976	1.014	-0.54
CARDIO	vc5comp1l1	0.0031	0.0023	1.009	0.996	1.022	1.35
-	vc5comp3l1	0.0025	0.0022	1.008	0.995	1.021	1.15
-	vc5comp4wk	0.0247	0.0032	1.045	1.033	1.057	7.70
-	vc5comp5l1	-0.0052	0.0028	1.017	0.999	1.035	-1.82

CARDIO	vc5comp1l1	0.0048	0.0022	1.014	1.001	1.026	2.19
-	vc5comp3l1	0.0008	0.0021	1.003	0.990	1.015	0.39
-	vc5comp4wk	0.0247	0.0032	1.045	1.033	1.057	7.64
-	vc5comp5wk	-0.0017	0.0035	0.995	0.977	1.014	-0.49
CARDIO	vc5comp2l1	0.0001	0.0020	1.000	0.988	1.011	0.06
-	vc5comp3l1	0.0033	0.0021	1.010	0.997	1.023	1.56
-	vc5comp4wk	0.0249	0.0033	1.045	1.033	1.058	7.45
-	vc5comp5l1	0.0068	0.0026	1.022	1.005	1.039	2.61
CARDIO	vc5comp2l1	-0.0008	0.0020	0.998	0.986	1.009	-0.38
-	vc5comp3l1	0.0014	0.0021	1.004	0.992	1.017	0.69
-	vc5comp4wk	0.0250	0.0033	1.046	1.033	1.058	7.48
-	vc5comp5wk	-0.0003	0.0035	0.999	0.980	1.018	-0.10
PNEUMO	vc5comp1l1	0.0191	0.0064	1.056	1.019	1.095	2.97
-	vc5comp2l1	-0.0026	0.0065	0.993	0.956	1.030	-0.40
-	vc5comp3l1	0.0122	0.0065	1.038	0.999	1.079	1.89
-	vc5comp4wk	0.0669	0.0099	1.127	1.088	1.166	6.73
PNEUMO	vc5comp1l1	0.0137	0.0072	1.040	0.998	1.083	1.88
-	vc5comp2l1	0.0083	0.0061	1.025	0.989	1.061	1.35
-	vc5comp3l1	0.0196	0.0072	1.062	1.017	1.108	2.73
-	vc5comp5l1	0.0157	0.0100	1.052	0.988	1.120	1.58
PNEUMO	vc5comp1l1	0.0111	0.0066	1.032	0.995	1.071	1.69
-	vc5comp2l1	-0.0025	0.0064	0.993	0.957	1.030	-0.38
-	vc5comp3l1	0.0240	0.0065	1.076	1.035	1.119	3.66
-	vc5comp5wk	0.1065	0.0115	1.339	1.259	1.425	9.24
PNEUMO	vc5comp1l1	0.0192	0.0070	1.056	1.016	1.098	2.75
-	vc5comp2l1	-0.0032	0.0065	0.991	0.954	1.028	-0.50
-	vc5comp4wk	0.0686	0.0099	1.130	1.091	1.170	6.90
-	vc5comp5l1	0.0059	0.0090	1.019	0.963	1.078	0.66
PNEUMO	vc5comp1l1	0.0147	0.0065	1.043	1.006	1.081	2.29
-	vc5comp2l1	-0.0095	0.0066	0.973	0.936	1.010	-1.43
-	vc5comp4wk	0.0674	0.0099	1.128	1.089	1.168	6.80
-	vc5comp5wk	0.0935	0.0113	1.293	1.216	1.374	8.28
PNEUMO	vc5comp1l1	0.0121	0.0074	1.035	0.993	1.079	1.64
-	vc5comp3l1	0.0190	0.0072	1.060	1.015	1.107	2.64
-	vc5comp4wk	0.0677	0.0096	1.128	1.091	1.167	7.05
-	vc5comp5l1	0.0196	0.0100	1.065	1.000	1.134	1.96
PNEUMO	vc5comp1l1	0.0112	0.0065	1.032	0.995	1.071	1.71
-	vc5comp3l1	0.0223	0.0065	1.070	1.029	1.113	3.40
-	vc5comp4wk	0.0628	0.0096	1.118	1.081	1.157	6.51
-	vc5comp5wk	0.1007	0.0112	1.319	1.242	1.400	9.03
PNEUMO	vc5comp2l1	-0.0019	0.0065	0.994	0.958	1.032	-0.30
-	vc5comp3l1	0.0231	0.0069	1.073	1.030	1.118	3.37
-	vc5comp4wk	0.0696	0.0100	1.132	1.093	1.172	6.99
-	vc5comp5l1	0.0278	0.0088	1.093	1.035	1.155	3.17
PNEUMO	vc5comp2l1	-0.0093	0.0066	0.973	0.937	1.011	-1.41
-	vc5comp3l1	0.0238	0.0065	1.076	1.035	1.118	3.68
-	vc5comp4wk	0.0664	0.0099	1.126	1.087	1.165	6.68
-	vc5comp5wk	0.1069	0.0113	1.341	1.262	1.425	9.46
COPD	vc5comp1l1	-0.0049	0.0057	0.986	0.955	1.018	-0.86
-	vc5comp2l1	0.0095	0.0054	1.028	0.997	1.060	1.74

-	vc5comp3l1	0.0024	0.0056	0.993	0.960	1.027	0.42
-	vc5comp4wk	0.0403	0.0088	1.074	1.042	1.108	4.60
COPD	vc5comp1l1	-0.0084	0.0060	0.976	0.944	1.010	-1.40
-	vc5comp2l1	0.0164	0.0051	1.049	1.019	1.081	3.19
-	vc5comp3l1	0.0047	0.0059	1.014	0.979	1.051	0.79
-	vc5comp5l1	0.0156	0.0075	1.051	1.003	1.102	2.09
COPD	vc5comp1l1	-0.0061	0.0058	0.983	0.951	1.015	-1.04
-	vc5comp2l1	0.0131	0.0053	1.039	1.008	1.071	2.45
-	vc5comp3l1	0.0011	0.0057	1.003	0.970	1.038	0.19
-	vc5comp5wk	0.0183	0.0097	1.052	0.998	1.108	1.88
COPD	vc5comp1l1	-0.0083	0.0061	0.976	0.944	1.010	-1.38
-	vc5comp2l1	0.0104	0.0054	1.031	0.999	1.063	1.91
-	vc5comp4wk	0.0400	0.0087	1.074	1.042	1.107	4.59
-	vc5comp5l1	0.0114	0.0071	1.037	0.992	1.085	1.61
COPD	vc5comp1l1	-0.0061	0.0058	0.983	0.951	1.015	-1.06
-	vc5comp2l1	0.0090	0.0055	1.027	0.995	1.060	1.65
-	vc5comp4wk	0.0395	0.0087	1.073	1.041	1.106	4.52
-	vc5comp5wk	0.0154	0.0096	1.043	0.991	1.099	1.60
COPD	vc5comp1l1	-0.0081	0.0062	0.977	0.944	1.011	-1.31
-	vc5comp3l1	-0.0004	0.0060	0.999	0.964	1.035	-0.06
-	vc5comp4wk	0.0432	0.0085	1.080	1.048	1.113	5.07
-	vc5comp5l1	0.0099	0.0075	1.032	0.985	1.083	1.32
COPD	vc5comp1l1	-0.0062	0.0058	0.982	0.951	1.015	-1.07
-	vc5comp3l1	-0.0019	0.0057	0.994	0.961	1.029	-0.33
-	vc5comp4wk	0.0424	0.0085	1.078	1.047	1.111	4.96
-	vc5comp5wk	0.0166	0.0096	1.047	0.994	1.102	1.72
COPD	vc5comp2l1	0.0102	0.0054	1.030	0.999	1.063	1.88
-	vc5comp3l1	-0.0010	0.0059	0.997	0.963	1.032	-0.17
-	vc5comp4wk	0.0401	0.0088	1.074	1.042	1.107	4.56
-	vc5comp5l1	0.0076	0.0070	1.025	0.981	1.071	1.09
COPD	vc5comp2l1	0.0091	0.0055	1.027	0.995	1.060	1.66
-	vc5comp3l1	-0.0021	0.0057	0.994	0.961	1.028	-0.37
-	vc5comp4wk	0.0397	0.0088	1.073	1.041	1.107	4.52
-	vc5comp5wk	0.0134	0.0096	1.037	0.985	1.093	1.39

Table 27 Five-component models

cause	*component*	*effect*	*st.error*	*RR*	*RR-lo*	*RR-hi*	*t-value*
TOTAL	vc5comp1l1	0.0007	0.0014	1.002	0.994	1.010	0.50
-	vc5comp2l1	0.0027	0.0013	1.008	1.000	1.015	2.06
-	vc5comp3l1	0.0061	0.0015	1.019	1.010	1.028	4.20
-	vc5comp4wk	0.0229	0.0022	1.042	1.034	1.050	10.30
-	vc5comp5l1	0.0112	0.0018	1.037	1.025	1.048	6.38
TOTAL	vc5comp1l1	0.0031	0.0014	1.009	1.001	1.017	2.27
-	vc5comp2l1	0.0012	0.0013	1.004	0.996	1.011	0.91
-	vc5comp3l1	0.0037	0.0014	1.011	1.003	1.020	2.63
-	vc5comp4wk	0.0225	0.0022	1.041	1.033	1.049	10.10
-	vc5comp5wk	0.0123	0.0024	1.034	1.021	1.048	5.13
RESPIR	vc5comp1l1	0.0010	0.0048	1.003	0.976	1.030	0.21
-	vc5comp2l1	0.0042	0.0041	1.012	0.989	1.036	1.02
-	vc5comp3l1	0.0115	0.0047	1.036	1.007	1.065	2.46
-	vc5comp4wk	0.0520	0.0065	1.097	1.072	1.122	8.01
-	vc5comp5l1	0.0157	0.0065	1.052	1.009	1.096	2.41
RESPIR	vc5comp1l1	0.0021	0.0043	1.006	0.982	1.030	0.49
-	vc5comp2l1	0.0005	0.0042	1.002	0.978	1.026	0.12
-	vc5comp3l1	0.0110	0.0042	1.034	1.008	1.061	2.61
-	vc5comp4wk	0.0501	0.0065	1.093	1.069	1.118	7.74
-	vc5comp5wk	0.0578	0.0075	1.172	1.126	1.220	7.75
CARDIO	vc5comp1l1	0.0032	0.0023	1.009	0.996	1.022	1.35
-	vc5comp2l1	-0.0003	0.0020	0.999	0.988	1.011	-0.14
-	vc5comp3l1	0.0025	0.0022	1.008	0.994	1.021	1.12
-	vc5comp4wk	0.0248	0.0033	1.045	1.033	1.058	7.43
-	vc5comp5l1	0.0051	0.0028	1.016	0.998	1.035	1.80
CARDIO	vc5comp1l1	0.0048	0.0022	1.014	1.001	1.026	2.19
-	vc5comp2l1	-0.0007	0.0020	0.998	0.986	1.010	-0.35
-	vc5comp3l1	0.0008	0.0021	1.002	0.990	1.015	0.36
-	vc5comp4wk	0.0249	0.0033	1.045	1.033	1.058	7.46
-	vc5comp5wk	-0.0016	0.0036	0.996	0.977	1.015	-0.46
PNEUMO	vc5comp1l1	0.0121	0.0074	1.035	0.993	1.079	1.64
-	vc5comp2l1	-0.0019	0.0065	0.995	0.958	1.032	-0.29
-	vc5comp3l1	0.0188	0.0072	1.059	1.014	1.106	2.61
-	vc5comp4wk	0.0682	0.0100	1.129	1.091	1.169	6.85
-	vc5comp5l1	0.0194	0.0100	1.064	0.999	1.133	1.93
PNEUMO	vc5comp1l1	0.0107	0.0065	1.031	0.994	1.069	1.64
-	vc5comp2l1	-0.0087	0.0066	0.975	0.939	1.012	-1.32
-	vc5comp3l1	0.0219	0.0065	1.069	1.028	1.112	3.35
-	vc5comp4wk	0.0655	0.0099	1.124	1.086	1.164	6.60
-	vc5comp5wk	0.1033	0.0115	1.328	1.248	1.413	8.98
COPD	vc5comp1l1	-0.0086	0.0062	0.976	0.942	1.010	-1.40
-	vc5comp2l1	0.0105	0.0054	1.031	1.000	1.064	1.93
-	vc5comp3l1	0.0012	0.0060	1.004	0.968	1.040	0.19
-	vc5comp4wk	0.0399	0.0088	1.074	1.041	1.107	4.53
-	vc5comp5l1	0.0120	0.0075	1.039	0.991	1.090	1.59
COPD	vc5comp1l1	-0.0060	0.0058	0.983	0.952	1.016	-1.03

-	vc5comp2l1	0.0090	0.0055	1.027	0.995	1.059	1.63
-	vc5comp3l1	-0.0012	0.0057	0.996	0.963	1.031	-0.22
-	vc5comp4wk	0.0396	0.0088	1.073	1.041	1.107	4.51
-	vc5comp5wk	0.0150	0.0097	1.042	0.989	1.098	1.54

Table 28 One-component models with the original, unrotated components

cause	*component*	*Effect*	*st.error*	*RR*	*RR-lo*	*RR-hi*	*t-value*
TOTAL	comp1	0.0025	0.0006	1.018	1.009	1.027	4.05
TOTAL	comp1l1	0.0033	0.0006	1.024	1.015	1.033	5.46
TOTAL	comp1l2	0.0025	0.0006	1.018	1.009	1.026	4.17
TOTAL	comp1l3	0.0022	0.0006	1.016	1.007	1.024	3.75
TOTAL	comp1wk	0.0041	0.0008	1.023	1.014	1.032	5.04
TOTAL	comp2	0.0070	0.0013	1.031	1.020	1.043	5.54
TOTAL	comp2l1	0.0071	0.0012	1.032	1.021	1.043	5.79
TOTAL	comp2l2	0.0043	0.0013	1.019	1.008	1.031	3.35
TOTAL	comp2l3	0.0025	0.0012	1.011	1.001	1.022	2.06
TOTAL	comp2wk	0.0055	0.0016	1.020	1.008	1.032	3.38
TOTAL	comp3	0.0012	0.0013	1.004	0.996	1.012	0.91
TOTAL	comp3l1	-0.0014	0.0013	0.995	0.987	1.004	-1.10
TOTAL	comp3l2	0.0025	0.0013	1.008	1.000	1.016	1.98
TOTAL	comp3l3	0.0022	0.0013	1.007	0.999	1.015	1.73
TOTAL	comp3wk	0.0057	0.0022	1.012	1.003	1.022	2.62
TOTAL	comp4	-0.0016	0.0015	0.996	0.989	1.003	-1.13
TOTAL	comp4l1	0.0012	0.0016	1.003	0.995	1.011	0.78
TOTAL	comp4l2	0.0028	0.0016	1.007	0.999	1.015	1.74
TOTAL	comp4l3	0.0067	0.0015	1.017	1.010	1.025	4.57
TOTAL	comp4wk	0.0253	0.0027	1.041	1.032	1.049	9.49
TOTAL	comp5	0.0004	0.0019	1.001	0.993	1.008	0.22
TOTAL	comp5l1	-0.0043	0.0019	0.992	0.984	0.999	-2.22
TOTAL	comp5l2	0.0023	0.0019	1.005	0.997	1.012	1.20
TOTAL	comp5l3	0.0003	0.0019	1.001	0.993	1.008	0.14
TOTAL	comp5wk	0.0000	0.0030	1.000	0.992	1.008	0.00
RESPIR	comp1	0.0066	0.0019	1.048	1.020	1.076	3.44
RESPIR	comp1l1	0.0097	0.0018	1.072	1.044	1.100	5.26
RESPIR	comp1l2	0.0074	0.0019	1.054	1.027	1.082	4.01
RESPIR	comp1l3	0.0052	0.0018	1.038	1.012	1.064	2.87
RESPIR	comp1wk	0.0104	0.0025	1.060	1.032	1.090	4.18
RESPIR	comp2	0.0236	0.0037	1.110	1.075	1.147	6.34
RESPIR	comp2l1	0.0146	0.0040	1.067	1.030	1.105	3.61
RESPIR	comp2l2	0.0134	0.0038	1.061	1.027	1.096	3.54
RESPIR	comp2l3	0.0115	0.0037	1.052	1.019	1.087	3.07
RESPIR	comp2wk	0.0292	0.0050	1.112	1.073	1.152	5.82
RESPIR	comp3	0.0089	0.0039	1.029	1.004	1.055	2.26
RESPIR	comp3l1	0.0000	0.0039	1.000	0.976	1.025	0.01
RESPIR	comp3l2	-0.0013	0.0039	0.996	0.972	1.021	-0.33
RESPIR	comp3l3	0.0011	0.0038	1.004	0.979	1.028	0.28
RESPIR	comp3wk	0.0104	0.0067	1.023	0.994	1.052	1.56
RESPIR	comp4	-0.0019	0.0047	0.995	0.972	1.019	-0.41
RESPIR	comp4l1	0.0062	0.0050	1.016	0.991	1.041	1.25
RESPIR	comp4l2	0.0098	0.0045	1.025	1.002	1.049	2.18
RESPIR	comp4l3	0.0152	0.0043	1.039	1.017	1.062	3.52
RESPIR	comp4wk	0.0619	0.0078	1.103	1.077	1.130	7.96
RESPIR	comp5	0.0051	0.0059	1.010	0.988	1.033	0.87

RESPIR	comp5l1	0.0000	0.0058	1.000	0.978	1.023	-0.01
RESPIR	comp5l2	-0.0051	0.0058	0.990	0.968	1.012	-0.87
RESPIR	comp5l3	-0.0013	0.0058	0.998	0.976	1.020	-0.22
RESPIR	comp5wk	-0.0110	0.0091	0.985	0.961	1.009	-1.21
CARDIO	comp1	0.0031	0.0010	1.022	1.009	1.036	3.26
CARDIO	comp1l1	0.0035	0.0009	1.025	1.012	1.039	3.79
CARDIO	comp1l2	0.0020	0.0009	1.014	1.002	1.028	2.20
CARDIO	comp1l3	0.0021	0.0009	1.015	1.002	1.028	2.34
CARDIO	comp1wk	0.0036	0.0012	1.021	1.007	1.035	2.96
CARDIO	comp2	0.0045	0.0020	1.020	1.003	1.038	2.26
CARDIO	comp2l1	0.0027	0.0019	1.012	0.995	1.029	1.38
CARDIO	comp2l2	0.0018	0.0019	1.008	0.992	1.025	0.96
CARDIO	comp2l3	0.0010	0.0018	1.005	0.989	1.021	0.56
CARDIO	comp2wk	-0.0011	0.0025	0.996	0.979	1.014	-0.44
CARDIO	comp3	-0.0009	0.0020	0.997	0.985	1.010	-0.44
CARDIO	comp3l1	-0.0024	0.0019	0.992	0.980	1.005	-1.22
CARDIO	comp3l2	0.0020	0.0019	1.006	0.994	1.019	1.00
CARDIO	comp3l3	0.0022	0.0019	1.007	0.995	1.020	1.16
CARDIO	comp3wk	0.0058	0.0033	1.013	0.999	1.027	1.75
CARDIO	comp4	-0.0005	0.0025	0.999	0.986	1.011	-0.20
CARDIO	comp4l1	0.0013	0.0023	1.003	0.992	1.015	0.56
CARDIO	comp4l2	0.0023	0.0022	1.006	0.995	1.017	1.03
CARDIO	comp4l3	0.0051	0.0022	1.013	1.002	1.024	2.34
CARDIO	comp4wk	0.0249	0.0039	1.040	1.028	1.053	6.44
CARDIO	comp5	0.0011	0.0030	1.002	0.991	1.014	0.37
CARDIO	comp5l1	-0.0039	0.0030	0.992	0.981	1.004	-1.31
CARDIO	comp5l2	0.0058	0.0030	1.011	1.000	1.023	1.96
CARDIO	comp5l3	0.0007	0.0029	1.001	0.990	1.013	0.24
CARDIO	comp5wk	0.0082	0.0046	1.011	0.999	1.024	1.79
PNEUMO	comp1	0.0123	0.0030	1.091	1.046	1.137	4.10
PNEUMO	comp1l1	0.0144	0.0029	1.108	1.064	1.153	5.01
PNEUMO	comp1l2	0.0091	0.0029	1.067	1.025	1.111	3.16
PNEUMO	comp1l3	0.0043	0.0028	1.031	0.991	1.073	1.52
PNEUMO	comp1wk	0.0112	0.0039	1.065	1.021	1.111	2.90
PNEUMO	comp2	0.0237	0.0058	1.111	1.056	1.169	4.06
PNEUMO	comp2l1	0.0102	0.0063	1.046	0.991	1.105	1.62
PNEUMO	comp2l2	0.0157	0.0059	1.072	1.018	1.129	2.65
PNEUMO	comp2l3	0.0129	0.0059	1.059	1.006	1.115	2.19
PNEUMO	comp2wk	0.0574	0.0078	1.232	1.166	1.303	7.38
PNEUMO	comp3	-0.0069	0.0061	0.978	0.941	1.017	-1.13
PNEUMO	comp3l1	-0.0120	0.0060	0.962	0.926	0.999	-1.99
PNEUMO	comp3l2	-0.0094	0.0060	0.970	0.934	1.008	-1.56
PNEUMO	comp3l3	-0.0074	0.0060	0.976	0.940	1.014	-1.25
PNEUMO	comp3wk	0.0042	0.0102	1.009	0.966	1.055	0.41
PNEUMO	comp4	-0.0029	0.0074	0.993	0.957	1.030	-0.39
PNEUMO	comp4l1	0.0082	0.0077	1.021	0.982	1.061	1.06
PNEUMO	comp4l2	0.0201	0.0070	1.053	1.016	1.090	2.87
PNEUMO	comp4l3	0.0300	0.0067	1.079	1.044	1.116	4.48
PNEUMO	comp4wk	0.0855	0.0120	1.145	1.103	1.189	7.12
PNEUMO	comp5	0.0117	0.0092	1.023	0.988	1.060	1.28

PNEUMO	comp5l1	-0.0034	0.0091	0.993	0.959	1.029	-0.37
PNEUMO	comp5l2	-0.0075	0.0091	0.985	0.951	1.020	-0.83
PNEUMO	comp5l3	-0.0091	0.0091	0.982	0.949	1.017	-1.00
PNEUMO	comp5wk	-0.0142	0.0142	0.981	0.944	1.019	-1.00
COPD	comp1	0.0006	0.0026	1.004	0.969	1.041	0.24
COPD	comp1l1	0.0036	0.0025	1.026	0.990	1.063	1.43
COPD	comp1l2	0.0059	0.0025	1.043	1.008	1.079	2.40
COPD	comp1l3	0.0069	0.0024	1.050	1.016	1.086	2.87
COPD	comp1wk	0.0092	0.0033	1.053	1.015	1.093	2.76
COPD	comp2	0.0176	0.0054	1.081	1.031	1.134	3.24
COPD	comp2l1	0.0187	0.0051	1.086	1.039	1.136	3.66
COPD	comp2l2	0.0166	0.0051	1.076	1.030	1.125	3.27
COPD	comp2l3	0.0080	0.0049	1.036	0.993	1.081	1.63
COPD	comp2wk	0.0088	0.0067	1.032	0.984	1.083	1.31
COPD	comp3	0.0190	0.0054	1.063	1.028	1.100	3.55
COPD	comp3l1	0.0108	0.0053	1.035	1.001	1.071	2.04
COPD	comp3l2	0.0055	0.0052	1.018	0.985	1.052	1.06
COPD	comp3l3	0.0055	0.0052	1.018	0.985	1.052	1.06
COPD	comp3wk	0.0150	0.0089	1.033	0.994	1.074	1.67
COPD	comp4	-0.0055	0.0068	0.986	0.953	1.020	-0.82
COPD	comp4l1	0.0004	0.0062	1.001	0.971	1.032	0.06
COPD	comp4l2	0.0020	0.0059	1.005	0.976	1.035	0.34
COPD	comp4l3	0.0083	0.0058	1.021	0.992	1.051	1.43
COPD	comp4wk	0.0425	0.0103	1.070	1.036	1.105	4.12
COPD	comp5	-0.0062	0.0080	0.988	0.958	1.019	-0.77
COPD	comp5l1	-0.0018	0.0079	0.996	0.967	1.027	-0.23
COPD	comp5l2	-0.0051	0.0079	0.990	0.960	1.020	-0.65
COPD	comp5l3	0.0060	0.0079	1.012	0.982	1.043	0.76
COPD	comp5wk	-0.0010	0.0124	0.999	0.966	1.033	-0.08

Table 29 One-component season-specific models

cause	*Component*	*season*	*effect*	*st.error*	*RR*	*RR-lo*	*RR-hi*	*t-val.*
TOTAL	vc5comp1	none	0.0007	0.0037	1.002	0.981	1.023	0.19
TOTAL	vc5comp1	summer	0.0140	0.0050	1.041	1.012	1.070	2.78
TOTAL	vc5comp1	winter	0.0004	0.0015	1.001	0.993	1.009	0.26
TOTAL	vc5comp1l1	none	0.0048	0.0038	1.014	0.992	1.035	1.25
TOTAL	vc5comp1l1	summer	0.0251	0.0050	1.074	1.045	1.105	5.04
TOTAL	vc5comp1l1	winter	0.0027	0.0014	1.008	1.000	1.016	1.84
TOTAL	vc5comp1l2	none	-0.0053	0.0039	0.985	0.964	1.007	-1.37
TOTAL	vc5comp1l2	summer	0.0139	0.0050	1.041	1.012	1.070	2.76
TOTAL	vc5comp1l2	winter	0.0001	0.0015	1.000	0.992	1.009	0.07
TOTAL	vc5comp1l3	none	0.0000	0.0039	1.000	0.978	1.022	0.00
TOTAL	vc5comp1l3	summer	0.0177	0.0050	1.052	1.023	1.082	3.51
TOTAL	vc5comp1l3	winter	-0.0003	0.0014	0.999	0.991	1.007	-0.23
TOTAL	vc5comp1wk	none	0.0062	0.0065	1.013	0.986	1.040	0.95
TOTAL	vc5comp1wk	summer	0.0850	0.0081	1.192	1.153	1.231	10.46
TOTAL	vc5comp1wk	winter	-0.0019	0.0024	0.996	0.986	1.006	-0.81
TOTAL	vc5comp2	none	0.0034	0.0027	1.010	0.994	1.026	1.23
TOTAL	vc5comp2	summer	0.0098	0.0025	1.029	1.015	1.044	3.94
TOTAL	vc5comp2	winter	0.0044	0.0017	1.013	1.003	1.023	2.59
TOTAL	vc5comp2l1	none	0.0025	0.0028	1.007	0.991	1.023	0.89
TOTAL	vc5comp2l1	summer	0.0073	0.0025	1.021	1.007	1.036	2.86
TOTAL	vc5comp2l1	winter	0.0039	0.0017	1.011	1.002	1.021	2.34
TOTAL	vc5comp2l2	none	0.0029	0.0028	1.009	0.993	1.025	1.06
TOTAL	vc5comp2l2	summer	0.0075	0.0025	1.022	1.008	1.037	3.01
TOTAL	vc5comp2l2	winter	0.0025	0.0016	1.007	0.998	1.017	1.54
TOTAL	vc5comp2l3	none	0.0003	0.0028	1.001	0.985	1.017	0.12
TOTAL	vc5comp2l3	summer	0.0047	0.0025	1.014	1.000	1.028	1.90
TOTAL	vc5comp2l3	winter	0.0004	0.0016	1.001	0.992	1.011	0.26
TOTAL	vc5comp2wk	none	0.0002	0.0043	1.000	0.984	1.017	0.06
TOTAL	vc5comp2wk	summer	0.0022	0.0041	1.004	0.989	1.020	0.54
TOTAL	vc5comp2wk	winter	0.0036	0.0024	1.007	0.998	1.016	1.49
TOTAL	vc5comp3	none	0.0036	0.0028	1.011	0.994	1.028	1.29
TOTAL	vc5comp3	summer	-0.0004	0.0026	0.999	0.983	1.014	-0.17
TOTAL	vc5comp3	winter	0.0040	0.0018	1.012	1.002	1.023	2.25
TOTAL	vc5comp3l1	none	0.0026	0.0028	1.008	0.991	1.025	0.95
TOTAL	vc5comp3l1	summer	0.0021	0.0026	1.007	0.991	1.022	0.82
TOTAL	vc5comp3l1	winter	0.0039	0.0018	1.012	1.001	1.023	2.18
TOTAL	vc5comp3l2	none	-0.0011	0.0028	0.997	0.980	1.014	-0.38
TOTAL	vc5comp3l2	summer	0.0012	0.0026	1.004	0.988	1.020	0.46
TOTAL	vc5comp3l2	winter	0.0017	0.0018	1.005	0.995	1.016	0.96
TOTAL	vc5comp3l3	none	-0.0012	0.0028	0.996	0.980	1.013	-0.41
TOTAL	vc5comp3l3	summer	0.0033	0.0026	1.010	0.994	1.026	1.26
TOTAL	vc5comp3l3	winter	-0.0020	0.0018	0.994	0.983	1.004	-1.14
TOTAL	vc5comp3wk	none	-0.0024	0.0037	0.995	0.978	1.011	-0.64
TOTAL	vc5comp3wk	summer	0.0032	0.0039	1.007	0.990	1.025	0.82
TOTAL	vc5comp3wk	winter	-0.0018	0.0024	0.996	0.985	1.007	-0.74
TOTAL	vc5comp4	none	0.0011	0.0045	1.003	0.981	1.026	0.25
TOTAL	vc5comp4	summer	0.0030	0.0037	1.008	0.989	1.027	0.81
TOTAL	vc5comp4	winter	0.0011	0.0015	1.003	0.995	1.010	0.75
TOTAL	vc5comp4l1	none	0.0035	0.0046	1.009	0.986	1.032	0.76
TOTAL	vc5comp4l1	summer	0.0121	0.0037	1.031	1.012	1.051	3.25
TOTAL	vc5comp4l1	winter	0.0014	0.0015	1.004	0.996	1.011	0.93
TOTAL	vc5comp4l2	none	0.0056	0.0044	1.014	0.992	1.037	1.26

TOTAL	vc5comp4l2	summer	0.0052	0.0037	1.013	0.995	1.032	1.41
TOTAL	vc5comp4l2	winter	0.0058	0.0015	1.015	1.007	1.023	3.88
TOTAL	vc5comp4l3	none	0.0081	0.0044	1.021	0.999	1.044	1.84
TOTAL	vc5comp4l3	summer	0.0104	0.0036	1.027	1.009	1.046	2.88
TOTAL	vc5comp4l3	winter	0.0071	0.0014	1.018	1.011	1.026	5.07
TOTAL	vc5comp4wk	none	0.0276	0.0074	1.050	1.024	1.078	3.75
TOTAL	vc5comp4wk	summer	0.0404	0.0063	1.075	1.051	1.099	6.40
TOTAL	vc5comp4wk	winter	0.0218	0.0023	1.040	1.031	1.048	9.44
TOTAL	vc5comp5	none	-0.0003	0.0041	0.999	0.974	1.025	-0.08
TOTAL	vc5comp5	summer	0.0050	0.0021	1.016	1.003	1.030	2.41
TOTAL	vc5comp5	winter	-0.0019	0.0025	0.994	0.979	1.010	-0.74
TOTAL	vc5comp5l1	none	0.0024	0.0041	1.008	0.982	1.034	0.58
TOTAL	vc5comp5l1	summer	0.0129	0.0021	1.042	1.028	1.057	6.04
TOTAL	vc5comp5l1	winter	0.0037	0.0025	1.012	0.996	1.028	1.51
TOTAL	vc5comp5l2	none	-0.0033	0.0043	0.989	0.963	1.016	-0.77
TOTAL	vc5comp5l2	summer	0.0032	0.0023	1.010	0.996	1.025	1.40
TOTAL	vc5comp5l2	winter	-0.0018	0.0025	0.994	0.978	1.010	-0.72
TOTAL	vc5comp5l3	none	-0.0037	0.0043	0.988	0.962	1.015	-0.87
TOTAL	vc5comp5l3	summer	0.0081	0.0021	1.026	1.013	1.040	3.86
TOTAL	vc5comp5l3	winter	0.0004	0.0025	1.001	0.986	1.017	0.16
TOTAL	vc5comp5wk	none	0.0063	0.0060	1.018	0.985	1.051	1.05
TOTAL	vc5comp5wk	summer	0.0207	0.0029	1.059	1.042	1.075	7.09
TOTAL	vc5comp5wk	winter	0.0024	0.0038	1.007	0.986	1.028	0.63
RESPIR	vc5comp1	none	-0.0277	0.0125	0.924	0.861	0.991	-2.21
RESPIR	vc5comp1	summer	0.0188	0.0165	1.055	0.962	1.157	1.14
RESPIR	vc5comp1	winter	-0.0009	0.0043	0.998	0.974	1.022	-0.20
RESPIR	vc5comp1l1	none	0.0073	0.0126	1.021	0.952	1.095	0.58
RESPIR	vc5comp1l1	summer	0.0423	0.0164	1.128	1.029	1.237	2.58
RESPIR	vc5comp1l1	winter	0.0074	0.0043	1.021	0.997	1.046	1.70
RESPIR	vc5comp1l2	none	-0.0053	0.0129	0.985	0.916	1.059	-0.41
RESPIR	vc5comp1l2	summer	0.0611	0.0166	1.190	1.085	1.306	3.67
RESPIR	vc5comp1l2	winter	0.0056	0.0042	1.016	0.992	1.041	1.32
RESPIR	vc5comp1l3	none	0.0036	0.0128	1.010	0.940	1.086	0.28
RESPIR	vc5comp1l3	summer	0.0529	0.0165	1.163	1.060	1.275	3.20
RESPIR	vc5comp1l3	winter	-0.0008	0.0042	0.998	0.974	1.022	-0.18
RESPIR	vc5comp1wk	none	0.0021	0.0217	1.004	0.920	1.096	0.10
RESPIR	vc5comp1wk	summer	0.2780	0.0263	1.774	1.595	1.973	10.58
RESPIR	vc5comp1wk	winter	-0.0042	0.0070	0.991	0.964	1.020	-0.60
RESPIR	vc5comp2	none	0.0218	0.0087	1.066	1.014	1.120	2.50
RESPIR	vc5comp2	summer	0.0250	0.0081	1.076	1.027	1.127	3.09
RESPIR	vc5comp2	winter	0.0184	0.0049	1.055	1.026	1.086	3.72
RESPIR	vc5comp2l1	none	0.0071	0.0088	1.021	0.970	1.074	0.80
RESPIR	vc5comp2l1	summer	0.0228	0.0081	1.069	1.020	1.120	2.80
RESPIR	vc5comp2l1	winter	0.0084	0.0050	1.025	0.996	1.055	1.66
RESPIR	vc5comp2l2	none	0.0077	0.0089	1.023	0.972	1.076	0.86
RESPIR	vc5comp2l2	summer	0.0170	0.0082	1.051	1.003	1.102	2.07
RESPIR	vc5comp2l2	winter	0.0028	0.0050	1.008	0.980	1.038	0.57
RESPIR	vc5comp2l3	none	-0.0050	0.0091	0.985	0.935	1.038	-0.55
RESPIR	vc5comp2l3	summer	0.0144	0.0081	1.043	0.996	1.093	1.78
RESPIR	vc5comp2l3	winter	0.0017	0.0050	1.005	0.977	1.034	0.34
RESPIR	vc5comp2wk	none	0.0033	0.0137	1.006	0.956	1.060	0.24
RESPIR	vc5comp2wk	summer	0.0255	0.0135	1.050	0.998	1.105	1.89
RESPIR	vc5comp2wk	winter	0.0092	0.0075	1.018	0.989	1.047	1.22
RESPIR	vc5comp3	none	-0.0062	0.0090	0.981	0.930	1.036	-0.69

RESPIR	vc5comp3	summer	0.0128	0.0084	1.040	0.989	1.093	1.53
RESPIR	vc5comp3	winter	0.0077	0.0052	1.024	0.993	1.056	1.49
RESPIR	vc5comp3l1	none	0.0058	0.0090	1.018	0.964	1.074	0.64
RESPIR	vc5comp3l1	summer	0.0142	0.0085	1.044	0.992	1.099	1.67
RESPIR	vc5comp3l1	winter	0.0069	0.0051	1.021	0.990	1.053	1.34
RESPIR	vc5comp3l2	none	0.0087	0.0091	1.027	0.972	1.085	0.95
RESPIR	vc5comp3l2	summer	0.0123	0.0084	1.038	0.987	1.092	1.46
RESPIR	vc5comp3l2	winter	0.0025	0.0052	1.008	0.977	1.039	0.49
RESPIR	vc5comp3l3	none	0.0143	0.0091	1.045	0.989	1.103	1.58
RESPIR	vc5comp3l3	summer	0.0026	0.0085	1.008	0.958	1.061	0.30
RESPIR	vc5comp3l3	winter	-0.0004	0.0051	0.999	0.969	1.030	-0.08
RESPIR	vc5comp3wk	none	0.0039	0.0122	1.009	0.955	1.065	0.32
RESPIR	vc5comp3wk	summer	0.0247	0.0126	1.058	1.000	1.119	1.95
RESPIR	vc5comp3wk	winter	-0.0061	0.0071	0.986	0.956	1.018	-0.86
RESPIR	vc5comp4	none	0.0048	0.0144	1.012	0.942	1.088	0.33
RESPIR	vc5comp4	summer	0.0265	0.0122	1.070	1.007	1.138	2.18
RESPIR	vc5comp4	winter	0.0065	0.0044	1.017	0.995	1.040	1.48
RESPIR	vc5comp4l1	none	0.0124	0.0146	1.032	0.959	1.111	0.85
RESPIR	vc5comp4l1	summer	0.0279	0.0123	1.074	1.010	1.142	2.27
RESPIR	vc5comp4l1	winter	0.0127	0.0044	1.033	1.010	1.056	2.86
RESPIR	vc5comp4l2	none	0.0132	0.0143	1.035	0.963	1.112	0.93
RESPIR	vc5comp4l2	summer	0.0348	0.0118	1.093	1.030	1.160	2.95
RESPIR	vc5comp4l2	winter	0.0097	0.0043	1.025	1.003	1.047	2.27
RESPIR	vc5comp4l3	none	0.0258	0.0141	1.068	0.995	1.147	1.83
RESPIR	vc5comp4l3	summer	0.0275	0.0118	1.073	1.011	1.138	2.33
RESPIR	vc5comp4l3	winter	0.0136	0.0041	1.035	1.014	1.057	3.30
RESPIR	vc5comp4wk	none	0.0443	0.0235	1.082	0.997	1.175	1.89
RESPIR	vc5comp4wk	summer	0.1448	0.0204	1.295	1.206	1.390	7.10
RESPIR	vc5comp4wk	winter	0.0476	0.0067	1.089	1.063	1.115	7.06
RESPIR	vc5comp5	none	-0.0056	0.0132	0.982	0.904	1.067	-0.42
RESPIR	vc5comp5	summer	0.0205	0.0067	1.068	1.024	1.114	3.08
RESPIR	vc5comp5	winter	-0.0118	0.0074	0.963	0.919	1.009	-1.58
RESPIR	vc5comp5l1	none	-0.0215	0.0135	0.933	0.857	1.016	-1.59
RESPIR	vc5comp5l1	summer	0.0263	0.0071	1.088	1.041	1.138	3.70
RESPIR	vc5comp5l1	winter	-0.0010	0.0075	0.997	0.950	1.045	-0.14
RESPIR	vc5comp5l2	none	-0.0276	0.0137	0.915	0.840	0.998	-2.02
RESPIR	vc5comp5l2	summer	0.0407	0.0067	1.139	1.093	1.188	6.09
RESPIR	vc5comp5l2	winter	0.0007	0.0075	1.002	0.956	1.050	0.09
RESPIR	vc5comp5l3	none	-0.0355	0.0138	0.892	0.818	0.973	-2.57
RESPIR	vc5comp5l3	summer	0.0393	0.0066	1.134	1.088	1.182	5.99
RESPIR	vc5comp5l3	winter	0.0035	0.0074	1.011	0.965	1.059	0.48
RESPIR	vc5comp5wk	none	-0.0100	0.0197	0.973	0.875	1.082	-0.51
RESPIR	vc5comp5wk	summer	0.1062	0.0092	1.339	1.274	1.406	11.60
RESPIR	vc5comp5wk	winter	0.0076	0.0115	1.021	0.960	1.086	0.66
CARDIO	vc5comp1	none	0.0109	0.0056	1.031	1.000	1.064	1.93
CARDIO	vc5comp1	summer	0.0300	0.0078	1.089	1.043	1.138	3.86
CARDIO	vc5comp1	winter	-0.0002	0.0023	0.999	0.987	1.012	-0.09
CARDIO	vc5comp1l1	none	0.0101	0.0058	1.029	0.996	1.063	1.73
CARDIO	vc5comp1l1	summer	0.0245	0.0078	1.072	1.026	1.120	3.13
CARDIO	vc5comp1l1	winter	0.0045	0.0022	1.013	1.000	1.025	2.00
CARDIO	vc5comp1l2	none	-0.0034	0.0060	0.990	0.958	1.024	-0.56
CARDIO	vc5comp1l2	summer	0.0081	0.0078	1.023	0.980	1.069	1.03
CARDIO	vc5comp1l2	winter	-0.0008	0.0022	0.998	0.985	1.010	-0.35
CARDIO	vc5comp1l3	none	0.0085	0.0059	1.025	0.991	1.059	1.44

CARDIO	vc5comp1l3	summer	0.0033	0.0078	1.010	0.966	1.055	0.43
CARDIO	vc5comp1l3	winter	-0.0001	0.0022	1.000	0.988	1.012	-0.04
CARDIO	vc5comp1wk	none	0.0233	0.0100	1.049	1.008	1.092	2.34
CARDIO	vc5comp1wk	summer	0.0764	0.0125	1.171	1.113	1.231	6.10
CARDIO	vc5comp1wk	winter	-0.0042	0.0036	0.991	0.977	1.006	-1.17
CARDIO	vc5comp2	none	0.0012	0.0042	1.003	0.980	1.028	0.28
CARDIO	vc5comp2	summer	0.0035	0.0039	1.010	0.988	1.033	0.89
CARDIO	vc5comp2	winter	0.0048	0.0025	1.014	1.000	1.029	1.90
CARDIO	vc5comp2l1	none	0.0006	0.0042	1.002	0.978	1.026	0.15
CARDIO	vc5comp2l1	summer	0.0055	0.0040	1.016	0.993	1.040	1.39
CARDIO	vc5comp2l1	winter	0.0012	0.0025	1.004	0.989	1.018	0.47
CARDIO	vc5comp2l2	none	0.0016	0.0043	1.005	0.980	1.030	0.36
CARDIO	vc5comp2l2	summer	0.0069	0.0039	1.020	0.998	1.043	1.75
CARDIO	vc5comp2l2	winter	0.0005	0.0025	1.002	0.987	1.016	0.21
CARDIO	vc5comp2l3	none	-0.0018	0.0043	0.995	0.970	1.020	-0.42
CARDIO	vc5comp2l3	summer	0.0069	0.0038	1.020	0.998	1.043	1.80
CARDIO	vc5comp2l3	winter	0.0001	0.0025	1.000	0.986	1.015	0.05
CARDIO	vc5comp2wk	none	-0.0004	0.0066	0.999	0.975	1.025	-0.05
CARDIO	vc5comp2wk	summer	0.0071	0.0065	1.014	0.989	1.039	1.10
CARDIO	vc5comp2wk	winter	-0.0034	0.0037	0.993	0.980	1.007	-0.93
CARDIO	vc5comp3	none	0.0098	0.0041	1.030	1.005	1.056	2.37
CARDIO	vc5comp3	summer	-0.0038	0.0040	0.989	0.965	1.013	-0.94
CARDIO	vc5comp3	winter	0.0048	0.0027	1.015	0.998	1.031	1.76
CARDIO	vc5comp3l1	none	0.0051	0.0042	1.016	0.991	1.041	1.24
CARDIO	vc5comp3l1	summer	-0.0099	0.0040	0.970	0.947	0.994	-2.44
CARDIO	vc5comp3l1	winter	0.0065	0.0027	1.020	1.004	1.037	2.40
CARDIO	vc5comp3l2	none	0.0013	0.0043	1.004	0.978	1.030	0.30
CARDIO	vc5comp3l2	summer	-0.0051	0.0040	0.985	0.961	1.009	-1.26
CARDIO	vc5comp3l2	winter	0.0048	0.0027	1.015	0.999	1.032	1.79
CARDIO	vc5comp3l3	none	0.0012	0.0044	1.004	0.978	1.030	0.27
CARDIO	vc5comp3l3	summer	0.0037	0.0041	1.011	0.987	1.036	0.90
CARDIO	vc5comp3l3	winter	-0.0033	0.0027	0.990	0.974	1.006	-1.23
CARDIO	vc5comp3wk	none	0.0033	0.0057	1.008	0.982	1.034	0.58
CARDIO	vc5comp3wk	summer	-0.0052	0.0060	0.988	0.962	1.015	-0.87
CARDIO	vc5comp3wk	winter	-0.0013	0.0036	0.997	0.981	1.013	-0.35
CARDIO	vc5comp4	none	0.0081	0.0068	1.021	0.987	1.056	1.19
CARDIO	vc5comp4	summer	0.0156	0.0059	1.041	1.010	1.072	2.65
CARDIO	vc5comp4	winter	0.0003	0.0023	1.001	0.989	1.012	0.12
CARDIO	vc5comp4l1	none	0.0046	0.0068	1.012	0.978	1.047	0.67
CARDIO	vc5comp4l1	summer	0.0023	0.0058	1.006	0.977	1.036	0.40
CARDIO	vc5comp4l1	winter	0.0025	0.0022	1.006	0.995	1.018	1.12
CARDIO	vc5comp4l2	none	0.0024	0.0068	1.006	0.972	1.041	0.35
CARDIO	vc5comp4l2	summer	0.0052	0.0056	1.013	0.985	1.042	0.93
CARDIO	vc5comp4l2	winter	0.0056	0.0022	1.015	1.004	1.026	2.61
CARDIO	vc5comp4l3	none	0.0054	0.0068	1.014	0.980	1.049	0.80
CARDIO	vc5comp4l3	summer	0.0163	0.0057	1.043	1.013	1.073	2.88
CARDIO	vc5comp4l3	winter	0.0053	0.0021	1.014	1.003	1.024	2.50
CARDIO	vc5comp4wk	none	0.0234	0.0114	1.043	1.002	1.085	2.06
CARDIO	vc5comp4wk	summer	0.0390	0.0098	1.072	1.036	1.109	3.99
CARDIO	vc5comp4wk	winter	0.0238	0.0035	1.043	1.031	1.056	6.85
CARDIO	vc5comp5	none	-0.0034	0.0065	0.989	0.950	1.030	-0.52
CARDIO	vc5comp5	summer	0.0068	0.0034	1.022	1.000	1.044	1.98
CARDIO	vc5comp5	winter	-0.0048	0.0039	0.985	0.961	1.009	-1.24
CARDIO	vc5comp5l1	none	0.0047	0.0064	1.015	0.975	1.057	0.72

CARDIO	vc5comp5l1	summer	0.0086	0.0034	1.028	1.007	1.050	2.58
CARDIO	vc5comp5l1	winter	0.0026	0.0038	1.008	0.984	1.033	0.68
CARDIO	vc5comp5l2	none	-0.0019	0.0065	0.994	0.954	1.035	-0.29
CARDIO	vc5comp5l2	summer	-0.0048	0.0033	0.985	0.965	1.005	-1.47
CARDIO	vc5comp5l2	winter	-0.0037	0.0038	0.988	0.965	1.012	-0.99
CARDIO	vc5comp5l3	none	0.0017	0.0066	1.005	0.964	1.048	0.25
CARDIO	vc5comp5l3	summer	0.0040	0.0032	1.013	0.993	1.034	1.24
CARDIO	vc5comp5l3	winter	-0.0014	0.0038	0.995	0.972	1.019	-0.38
CARDIO	vc5comp5wk	none	-0.0046	0.0093	0.987	0.939	1.038	-0.49
CARDIO	vc5comp5wk	summer	0.0027	0.0045	1.007	0.983	1.032	0.60
CARDIO	vc5comp5wk	winter	-0.0008	0.0058	0.998	0.967	1.029	-0.14
PNEUMO	vc5comp1	none	-0.0084	0.0199	0.976	0.874	1.091	-0.42
PNEUMO	vc5comp1	summer	0.0312	0.0254	1.093	0.948	1.260	1.23
PNEUMO	vc5comp1	winter	0.0081	0.0067	1.023	0.986	1.063	1.21
PNEUMO	vc5comp1l1	none	0.0121	0.0202	1.035	0.925	1.159	0.60
PNEUMO	vc5comp1l1	summer	0.0622	0.0253	1.194	1.037	1.376	2.46
PNEUMO	vc5comp1l1	winter	0.0201	0.0066	1.059	1.020	1.099	3.03
PNEUMO	vc5comp1l2	none	-0.0353	0.0215	0.904	0.802	1.019	-1.64
PNEUMO	vc5comp1l2	summer	0.0595	0.0256	1.185	1.027	1.367	2.32
PNEUMO	vc5comp1l2	winter	0.0127	0.0066	1.037	0.999	1.076	1.92
PNEUMO	vc5comp1l3	none	-0.0357	0.0214	0.903	0.801	1.018	-1.67
PNEUMO	vc5comp1l3	summer	0.0811	0.0254	1.261	1.093	1.453	3.19
PNEUMO	vc5comp1l3	winter	0.0036	0.0066	1.010	0.973	1.048	0.54
PNEUMO	vc5comp1wk	none	-0.0574	0.0361	0.888	0.768	1.028	-1.59
PNEUMO	vc5comp1wk	summer	0.3126	0.0408	1.906	1.616	2.247	7.66
PNEUMO	vc5comp1wk	winter	-0.0123	0.0109	0.975	0.933	1.019	-1.12
PNEUMO	vc5comp2	none	0.0026	0.0140	1.008	0.930	1.092	0.19
PNEUMO	vc5comp2	summer	0.0275	0.0126	1.084	1.008	1.164	2.18
PNEUMO	vc5comp2	winter	0.0173	0.0078	1.052	1.006	1.100	2.21
PNEUMO	vc5comp2l1	none	-0.0231	0.0144	0.935	0.861	1.015	-1.61
PNEUMO	vc5comp2l1	summer	0.0263	0.0126	1.080	1.005	1.161	2.09
PNEUMO	vc5comp2l1	winter	0.0084	0.0080	1.025	0.979	1.073	1.05
PNEUMO	vc5comp2l2	none	-0.0129	0.0144	0.963	0.887	1.046	-0.90
PNEUMO	vc5comp2l2	summer	0.0284	0.0127	1.087	1.010	1.169	2.24
PNEUMO	vc5comp2l2	winter	-0.0045	0.0079	0.987	0.943	1.033	-0.57
PNEUMO	vc5comp2l3	none	-0.0177	0.0147	0.950	0.873	1.033	-1.21
PNEUMO	vc5comp2l3	summer	0.0132	0.0126	1.039	0.967	1.117	1.04
PNEUMO	vc5comp2l3	winter	-0.0114	0.0079	0.967	0.925	1.012	-1.45
PNEUMO	vc5comp2wk	none	-0.0017	0.0219	0.997	0.918	1.083	-0.08
PNEUMO	vc5comp2wk	summer	0.0793	0.0209	1.165	1.077	1.261	3.80
PNEUMO	vc5comp2wk	winter	0.0031	0.0117	1.006	0.963	1.051	0.27
PNEUMO	vc5comp3	none	0.0027	0.0141	1.008	0.926	1.097	0.19
PNEUMO	vc5comp3	summer	0.0254	0.0129	1.081	1.001	1.167	1.98
PNEUMO	vc5comp3	winter	0.0289	0.0079	1.092	1.042	1.145	3.65
PNEUMO	vc5comp3l1	none	0.0083	0.0140	1.026	0.943	1.115	0.59
PNEUMO	vc5comp3l1	summer	0.0182	0.0131	1.057	0.977	1.144	1.39
PNEUMO	vc5comp3l1	winter	0.0187	0.0079	1.059	1.010	1.110	2.36
PNEUMO	vc5comp3l2	none	0.0117	0.0143	1.037	0.951	1.129	0.82
PNEUMO	vc5comp3l2	summer	0.0141	0.0129	1.044	0.966	1.128	1.09
PNEUMO	vc5comp3l2	winter	0.0102	0.0080	1.032	0.983	1.082	1.28
PNEUMO	vc5comp3l3	none	0.0115	0.0146	1.036	0.949	1.131	0.79
PNEUMO	vc5comp3l3	summer	0.0065	0.0130	1.020	0.943	1.103	0.50
PNEUMO	vc5comp3l3	winter	0.0028	0.0080	1.009	0.962	1.058	0.35
PNEUMO	vc5comp3wk	none	0.0107	0.0192	1.025	0.940	1.117	0.56

PNEUMO	vc5comp3wk	summer	0.0693	0.0194	1.171	1.074	1.277	3.57
PNEUMO	vc5comp3wk	winter	-0.0045	0.0110	0.990	0.943	1.039	-0.41
PNEUMO	vc5comp4	none	0.0378	0.0228	1.102	0.983	1.235	1.66
PNEUMO	vc5comp4	summer	0.0307	0.0188	1.082	0.985	1.189	1.64
PNEUMO	vc5comp4	winter	0.0052	0.0069	1.013	0.979	1.049	0.75
PNEUMO	vc5comp4l1	none	0.0416	0.0229	1.113	0.992	1.248	1.82
PNEUMO	vc5comp4l1	summer	0.0215	0.0190	1.057	0.960	1.163	1.13
PNEUMO	vc5comp4l1	winter	0.0127	0.0069	1.033	0.998	1.070	1.85
PNEUMO	vc5comp4l2	none	0.0201	0.0229	1.053	0.939	1.181	0.88
PNEUMO	vc5comp4l2	summer	0.0326	0.0182	1.087	0.992	1.191	1.79
PNEUMO	vc5comp4l2	winter	0.0173	0.0066	1.045	1.011	1.081	2.63
PNEUMO	vc5comp4l3	none	0.0231	0.0227	1.061	0.947	1.189	1.02
PNEUMO	vc5comp4l3	summer	0.0514	0.0182	1.141	1.041	1.251	2.82
PNEUMO	vc5comp4l3	winter	0.0191	0.0064	1.050	1.017	1.085	2.99
PNEUMO	vc5comp4wk	none	0.0702	0.0375	1.133	0.994	1.292	1.87
PNEUMO	vc5comp4wk	summer	0.1758	0.0319	1.368	1.224	1.529	5.51
PNEUMO	vc5comp4wk	winter	0.0612	0.0103	1.115	1.076	1.156	5.94
PNEUMO	vc5comp5	none	0.0036	0.0212	1.012	0.886	1.156	0.17
PNEUMO	vc5comp5	summer	0.0282	0.0101	1.095	1.028	1.166	2.80
PNEUMO	vc5comp5	winter	-0.0288	0.0118	0.912	0.847	0.982	-2.44
PNEUMO	vc5comp5l1	none	-0.0063	0.0216	0.980	0.855	1.122	-0.29
PNEUMO	vc5comp5l1	summer	0.0433	0.0107	1.149	1.074	1.229	4.04
PNEUMO	vc5comp5l1	winter	-0.0121	0.0119	0.962	0.892	1.037	-1.02
PNEUMO	vc5comp5l2	none	-0.0174	0.0219	0.946	0.824	1.085	-0.80
PNEUMO	vc5comp5l2	summer	0.0585	0.0101	1.206	1.132	1.285	5.82
PNEUMO	vc5comp5l2	winter	0.0052	0.0118	1.017	0.944	1.095	0.44
PNEUMO	vc5comp5l3	none	-0.0448	0.0221	0.866	0.754	0.995	-2.03
PNEUMO	vc5comp5l3	summer	0.0734	0.0098	1.265	1.189	1.346	7.45
PNEUMO	vc5comp5l3	winter	0.0155	0.0116	1.051	0.977	1.130	1.33
PNEUMO	vc5comp5wk	none	0.0091	0.0318	1.025	0.864	1.216	0.29
PNEUMO	vc5comp5wk	summer	0.1699	0.0139	1.594	1.480	1.717	12.26
PNEUMO	vc5comp5wk	winter	0.0159	0.0179	1.044	0.948	1.150	0.88
COPD	vc5comp1	none	-0.0408	0.0169	0.890	0.810	0.978	-2.41
COPD	vc5comp1	summer	-0.0131	0.0223	0.963	0.851	1.091	-0.59
COPD	vc5comp1	winter	-0.0033	0.0060	0.991	0.958	1.024	-0.55
COPD	vc5comp1l1	none	-0.0082	0.0170	0.977	0.888	1.074	-0.48
COPD	vc5comp1l1	summer	0.0251	0.0221	1.074	0.949	1.215	1.13
COPD	vc5comp1l1	winter	-0.0045	0.0059	0.987	0.955	1.020	-0.77
COPD	vc5comp1l2	none	0.0198	0.0167	1.058	0.964	1.161	1.18
COPD	vc5comp1l2	summer	0.0751	0.0221	1.239	1.095	1.402	3.41
COPD	vc5comp1l2	winter	-0.0026	0.0058	0.992	0.961	1.025	-0.45
COPD	vc5comp1l3	none	0.0327	0.0165	1.098	1.001	1.204	1.98
COPD	vc5comp1l3	summer	0.0410	0.0222	1.124	0.993	1.273	1.85
COPD	vc5comp1l3	winter	-0.0026	0.0057	0.993	0.962	1.025	-0.46
COPD	vc5comp1wk	none	0.0303	0.0285	1.065	0.949	1.194	1.06
COPD	vc5comp1wk	summer	0.2165	0.0354	1.563	1.354	1.803	6.11
COPD	vc5comp1wk	winter	-0.0024	0.0095	0.995	0.958	1.034	-0.26
COPD	vc5comp2	none	0.0297	0.0115	1.091	1.021	1.165	2.58
COPD	vc5comp2	summer	0.0283	0.0110	1.086	1.020	1.157	2.58
COPD	vc5comp2	winter	0.0113	0.0068	1.033	0.994	1.075	1.65
COPD	vc5comp2l1	none	0.0312	0.0115	1.096	1.026	1.171	2.71
COPD	vc5comp2l1	summer	0.0294	0.0111	1.090	1.023	1.161	2.66
COPD	vc5comp2l1	winter	0.0052	0.0067	1.015	0.977	1.055	0.77
COPD	vc5comp2l2	none	0.0246	0.0117	1.074	1.005	1.149	2.10

COPD	vc5comp2l2	summer	0.0115	0.0110	1.034	0.971	1.101	1.05
COPD	vc5comp2l2	winter	0.0093	0.0066	1.027	0.989	1.067	1.40
COPD	vc5comp2l3	none	0.0047	0.0120	1.014	0.947	1.086	0.40
COPD	vc5comp2l3	summer	0.0181	0.0108	1.054	0.991	1.122	1.67
COPD	vc5comp2l3	winter	0.0061	0.0067	1.018	0.980	1.057	0.91
COPD	vc5comp2wk	none	0.0140	0.0181	1.027	0.959	1.100	0.78
COPD	vc5comp2wk	summer	0.0061	0.0181	1.012	0.945	1.084	0.33
COPD	vc5comp2wk	winter	0.0068	0.0101	1.013	0.975	1.052	0.67
COPD	vc5comp3	none	-0.0179	0.0121	0.947	0.881	1.018	-1.48
COPD	vc5comp3	summer	-0.0100	0.0116	0.970	0.905	1.040	-0.86
COPD	vc5comp3	winter	-0.0099	0.0072	0.970	0.929	1.013	-1.38
COPD	vc5comp3l1	none	0.0009	0.0120	1.003	0.934	1.077	0.08
COPD	vc5comp3l1	summer	0.0066	0.0113	1.020	0.954	1.092	0.58
COPD	vc5comp3l1	winter	-0.0056	0.0072	0.983	0.942	1.026	-0.78
COPD	vc5comp3l2	none	0.0075	0.0121	1.023	0.952	1.100	0.62
COPD	vc5comp3l2	summer	0.0150	0.0113	1.047	0.978	1.120	1.33
COPD	vc5comp3l2	winter	-0.0056	0.0071	0.983	0.942	1.026	-0.79
COPD	vc5comp3l3	none	0.0145	0.0120	1.045	0.973	1.123	1.21
COPD	vc5comp3l3	summer	0.0093	0.0114	1.029	0.961	1.101	0.82
COPD	vc5comp3l3	winter	-0.0029	0.0071	0.991	0.950	1.034	-0.41
COPD	vc5comp3wk	none	0.0015	0.0161	1.003	0.934	1.078	0.09
COPD	vc5comp3wk	summer	-0.0004	0.0169	0.999	0.927	1.077	-0.02
COPD	vc5comp3wk	winter	-0.0069	0.0097	0.984	0.943	1.028	-0.71
COPD	vc5comp4	none	-0.0319	0.0192	0.921	0.837	1.015	-1.66
COPD	vc5comp4	summer	0.0105	0.0166	1.027	0.945	1.117	0.64
COPD	vc5comp4	winter	0.0024	0.0060	1.006	0.976	1.037	0.40
COPD	vc5comp4l1	none	-0.0284	0.0193	0.930	0.844	1.024	-1.47
COPD	vc5comp4l1	summer	0.0338	0.0159	1.091	1.007	1.181	2.13
COPD	vc5comp4l1	winter	0.0054	0.0058	1.014	0.985	1.044	0.92
COPD	vc5comp4l2	none	0.0060	0.0188	1.015	0.924	1.116	0.32
COPD	vc5comp4l2	summer	0.0490	0.0159	1.134	1.047	1.228	3.09
COPD	vc5comp4l2	winter	0.0021	0.0057	1.005	0.977	1.034	0.37
COPD	vc5comp4l3	none	0.0236	0.0187	1.063	0.967	1.167	1.26
COPD	vc5comp4l3	summer	0.0158	0.0159	1.041	0.961	1.128	1.00
COPD	vc5comp4l3	winter	0.0134	0.0054	1.035	1.007	1.064	2.46
COPD	vc5comp4wk	none	0.0135	0.0313	1.024	0.918	1.143	0.43
COPD	vc5comp4wk	summer	0.1258	0.0277	1.251	1.136	1.378	4.55
COPD	vc5comp4wk	winter	0.0384	0.0091	1.071	1.037	1.105	4.23
COPD	vc5comp5	none	-0.0106	0.0179	0.967	0.864	1.082	-0.59
COPD	vc5comp5	summer	0.0132	0.0097	1.043	0.981	1.109	1.35
COPD	vc5comp5	winter	0.0019	0.0102	1.006	0.943	1.073	0.19
COPD	vc5comp5l1	none	-0.0376	0.0179	0.886	0.792	0.992	-2.11
COPD	vc5comp5l1	summer	0.0232	0.0091	1.077	1.017	1.141	2.54
COPD	vc5comp5l1	winter	0.0036	0.0100	1.012	0.950	1.077	0.36
COPD	vc5comp5l2	none	-0.0260	0.0182	0.920	0.821	1.032	-1.43
COPD	vc5comp5l2	summer	0.0391	0.0091	1.133	1.071	1.200	4.31
COPD	vc5comp5l2	winter	-0.0077	0.0100	0.976	0.916	1.039	-0.77
COPD	vc5comp5l3	none	-0.0184	0.0184	0.943	0.840	1.058	-1.00
COPD	vc5comp5l3	summer	0.0184	0.0090	1.061	1.002	1.123	2.04
COPD	vc5comp5l3	winter	-0.0142	0.0100	0.955	0.897	1.017	-1.42
COPD	vc5comp5wk	none	-0.0266	0.0262	0.930	0.807	1.071	-1.01
COPD	vc5comp5wk	summer	0.0576	0.0124	1.171	1.095	1.252	4.63
COPD	vc5comp5wk	winter	-0.0276	0.0155	0.927	0.853	1.008	-1.78

Table 30 Two-component season-specific models

cause	*component*	*season*	*Effect*	*st.error*	*RR*	*RR-lo*	*RR-hi*	*t-value*
TOTAL	vc5comp1wk	none	0.0045	0.0066	1.009	0.983	1.037	0.68
-	vc5comp1wk	summer	0.0808	0.0084	1.181	1.142	1.222	9.62
-	vc5comp1wk	winter	-0.0040	0.0025	0.992	0.982	1.002	-1.61
-	vc5comp2l1	none	0.0012	0.0028	1.003	0.988	1.020	0.42
-	vc5comp2l1	summer	0.0040	0.0026	1.012	0.997	1.027	1.53
-	vc5comp2l1	winter	0.0043	0.0018	1.013	1.002	1.023	2.40
TOTAL	vc5comp1wk	none	0.0054	0.0067	1.011	0.984	1.039	0.81
-	vc5comp1wk	summer	0.0847	0.0084	1.191	1.151	1.232	10.09
-	vc5comp1wk	winter	-0.0023	0.0024	0.995	0.986	1.005	-0.97
-	vc5comp3l1	none	0.0011	0.0029	1.003	0.986	1.021	0.38
-	vc5comp3l1	summer	0.0001	0.0027	1.000	0.984	1.016	0.05
-	vc5comp3l1	winter	0.0042	0.0018	1.013	1.002	1.024	2.31
TOTAL	vc5comp1wk	none	0.0093	0.0066	1.019	0.993	1.047	1.42
-	vc5comp1wk	summer	0.0738	0.0089	1.164	1.123	1.207	8.31
-	vc5comp1wk	winter	0.0016	0.0024	1.003	0.994	1.013	0.67
-	vc5comp4wk	none	0.0296	0.0075	1.054	1.027	1.082	3.97
-	vc5comp4wk	summer	0.0284	0.0069	1.052	1.027	1.078	4.09
-	vc5comp4wk	winter	0.0219	0.0023	1.040	1.031	1.048	9.47
TOTAL	vc5comp1wk	none	0.0047	0.0069	1.010	0.982	1.038	0.69
-	vc5comp1wk	summer	0.0709	0.0086	1.157	1.118	1.198	8.26
-	vc5comp1wk	winter	-0.0029	0.0024	0.994	0.984	1.004	-1.19
-	vc5comp5wk	none	0.0057	0.0065	1.016	0.981	1.052	0.89
-	vc5comp5wk	summer	0.0133	0.0030	1.037	1.020	1.054	4.35
-	vc5comp5wk	winter	0.0025	0.0039	1.007	0.986	1.028	0.64
TOTAL	vc5comp2l1	none	0.0025	0.0028	1.007	0.991	1.023	0.90
-	vc5comp2l1	summer	0.0072	0.0025	1.021	1.007	1.036	2.85
-	vc5comp2l1	winter	0.0042	0.0017	1.012	1.003	1.022	2.54
-	vc5comp3l1	none	0.0024	0.0028	1.007	0.991	1.024	0.87
-	vc5comp3l1	summer	0.0022	0.0026	1.007	0.991	1.023	0.85
-	vc5comp3l1	winter	0.0043	0.0018	1.013	1.002	1.024	2.40
TOTAL	vc5comp2l1	none	0.0016	0.0027	1.005	0.989	1.021	0.58
-	vc5comp2l1	summer	0.0044	0.0026	1.013	0.998	1.028	1.66
-	vc5comp2l1	winter	0.0003	0.0018	1.001	0.991	1.011	0.16
-	vc5comp4wk	none	0.0275	0.0074	1.050	1.023	1.078	3.69
-	vc5comp4wk	summer	0.0381	0.0067	1.070	1.046	1.095	5.72
-	vc5comp4wk	winter	0.0216	0.0024	1.039	1.031	1.048	8.93
TOTAL	vc5comp2l1	none	0.0023	0.0028	1.007	0.991	1.023	0.84
-	vc5comp2l1	summer	0.0058	0.0026	1.017	1.002	1.032	2.25
-	vc5comp2l1	winter	0.0032	0.0018	1.009	0.999	1.020	1.79
-	vc5comp5wk	none	0.0052	0.0061	1.014	0.982	1.048	0.86
-	vc5comp5wk	summer	0.0196	0.0030	1.055	1.038	1.073	6.54
-	vc5comp5wk	winter	0.0011	0.0040	1.003	0.982	1.025	0.28
TOTAL	vc5comp3l1	none	0.0023	0.0028	1.007	0.991	1.024	0.83
-	vc5comp3l1	summer	0.0011	0.0026	1.003	0.988	1.019	0.42
-	vc5comp3l1	winter	0.0039	0.0018	1.012	1.001	1.023	2.20
-	vc5comp4wk	none	0.0282	0.0074	1.051	1.025	1.079	3.82
-	vc5comp4wk	summer	0.0401	0.0065	1.074	1.050	1.099	6.19
-	vc5comp4wk	winter	0.0216	0.0023	1.039	1.031	1.048	9.35
TOTAL	vc5comp3l1	none	0.0035	0.0028	1.011	0.994	1.028	1.25
-	vc5comp3l1	summer	0.0014	0.0026	1.004	0.989	1.020	0.53
-	vc5comp3l1	winter	0.0051	0.0019	1.016	1.005	1.027	2.77
-	vc5comp5wk	none	0.0094	0.0062	1.026	0.993	1.061	1.52

-	vc5comp5wk	summer	0.0212	0.0030	1.060	1.043	1.077	7.07
-	vc5comp5wk	winter	0.0064	0.0039	1.018	0.996	1.039	1.62
TOTAL	vc5comp4wk	none	0.0281	0.0075	1.051	1.024	1.079	3.75
-	vc5comp4wk	summer	0.0318	0.0068	1.058	1.033	1.084	4.67
-	vc5comp4wk	winter	0.0221	0.0023	1.040	1.032	1.049	9.56
-	vc5comp5wk	none	0.0110	0.0061	1.031	0.997	1.065	1.79
-	vc5comp5wk	summer	0.0180	0.0030	1.051	1.034	1.068	5.95
-	vc5comp5wk	winter	0.0016	0.0039	1.005	0.984	1.026	0.42
RESPIR	vc5comp1wk	none	-0.0023	0.0220	0.995	0.911	1.088	-0.11
-	vc5comp1wk	summer	0.2662	0.0272	1.731	1.551	1.932	9.80
-	vc5comp1wk	winter	-0.0066	0.0073	0.987	0.958	1.016	-0.89
-	vc5comp2l1	none	0.0036	0.0089	1.011	0.960	1.063	0.40
-	vc5comp2l1	summer	0.0125	0.0084	1.037	0.988	1.088	1.48
-	vc5comp2l1	winter	0.0049	0.0055	1.014	0.983	1.047	0.90
RESPIR	vc5comp1wk	none	0.0042	0.0219	1.009	0.923	1.102	0.19
-	vc5comp1wk	summer	0.2327	0.0294	1.616	1.435	1.820	7.91
-	vc5comp1wk	winter	0.0031	0.0071	1.006	0.978	1.036	0.44
-	vc5comp4wk	none	0.0441	0.0237	1.082	0.996	1.175	1.86
-	vc5comp4wk	summer	0.1023	0.0228	1.200	1.108	1.299	4.48
-	vc5comp4wk	winter	0.0477	0.0068	1.089	1.063	1.115	7.06
RESPIR	vc5comp1wk	none	-0.0189	0.0228	0.962	0.877	1.055	-0.83
-	vc5comp1wk	summer	0.1842	0.0278	1.462	1.307	1.636	6.63
-	vc5comp1wk	winter	-0.0078	0.0072	0.984	0.956	1.013	-1.08
-	vc5comp5wk	none	-0.0175	0.0210	0.953	0.851	1.067	-0.83
-	vc5comp5wk	summer	0.0869	0.0096	1.269	1.205	1.337	9.05
-	vc5comp5wk	winter	0.0078	0.0117	1.022	0.959	1.088	0.67
RESPIR	vc5comp2l1	none	0.0051	0.0089	1.015	0.965	1.068	0.57
-	vc5comp2l1	summer	0.0129	0.0086	1.038	0.988	1.091	1.50
-	vc5comp2l1	winter	-0.0037	0.0054	0.989	0.959	1.020	-0.68
-	vc5comp4wk	none	0.0438	0.0238	1.081	0.995	1.175	1.84
-	vc5comp4wk	summer	0.1376	0.0215	1.278	1.185	1.378	6.38
-	vc5comp4wk	winter	0.0485	0.0070	1.090	1.064	1.117	6.95
RESPIR	vc5comp2l1	none	0.0072	0.0088	1.021	0.971	1.074	0.81
-	vc5comp2l1	summer	0.0134	0.0083	1.040	0.991	1.091	1.61
-	vc5comp2l1	winter	0.0022	0.0054	1.006	0.976	1.038	0.40
-	vc5comp5wk	none	-0.0124	0.0198	0.966	0.869	1.075	-0.63
-	vc5comp5wk	summer	0.1035	0.0095	1.329	1.262	1.398	10.92
-	vc5comp5wk	winter	0.0063	0.0119	1.017	0.954	1.084	0.53
RESPIR	vc5comp4wk	none	0.0490	0.0238	1.091	1.004	1.186	2.06
-	vc5comp4wk	summer	0.0897	0.0219	1.173	1.087	1.267	4.09
-	vc5comp4wk	winter	0.0481	0.0068	1.090	1.064	1.116	7.12
-	vc5comp5wk	none	0.0000	0.0201	1.000	0.898	1.114	0.00
-	vc5comp5wk	summer	-0.0958	0.0096	1.301	1.235	1.370	-9.95
-	vc5comp5wk	winter	0.0037	0.0117	1.010	0.948	1.076	0.32
CARDIO	vc5comp1wk	none	0.0227	0.0102	1.048	1.006	1.092	2.24
-	vc5comp1wk	summer	0.0800	0.0129	1.179	1.120	1.243	6.21
-	vc5comp1wk	winter	-0.0043	0.0036	0.991	0.977	1.006	-1.18
-	vc5comp3l1	none	0.0015	0.0043	1.005	0.979	1.031	0.35
-	vc5comp3l1	summer	-0.0120	0.0042	0.964	0.940	0.988	-2.89
-	vc5comp3l1	winter	0.0061	0.0027	1.019	1.002	1.036	2.23
CARDIO	vc5comp1wk	none	0.0256	0.0101	1.054	1.012	1.098	2.55
-	vc5comp1wk	summer	0.0655	0.0139	1.145	1.082	1.211	4.72
-	vc5comp1wk	winter	-0.0015	0.0036	0.997	0.982	1.011	-0.43
-	vc5comp4wk	none	0.0291	0.0116	1.053	1.011	1.097	2.51

-	vc5comp4wk	summer	0.0285	0.0109	1.052	1.013	1.093	2.62
-	vc5comp4wk	winter	0.0234	0.0035	1.043	1.030	1.055	6.72
CARDIO	vc5comp1wk	none	0.0241	0.0102	1.051	1.008	1.095	2.36
-	vc5comp1wk	summer	0.0746	0.0129	1.166	1.107	1.228	5.80
-	vc5comp1wk	winter	-0.0047	0.0036	0.990	0.976	1.005	-1.31
-	vc5comp5l1	none	0.0076	0.0066	1.025	0.983	1.068	1.14
-	vc5comp5l1	summer	0.0071	0.0034	1.023	1.001	1.045	2.08
-	vc5comp5l1	winter	0.0000	0.0040	1.000	0.975	1.025	0.00
CARDIO	vc5comp3l1	none	0.0040	0.0042	1.012	0.987	1.038	0.96
-	vc5comp3l1	summer	-0.0114	0.0041	0.966	0.942	0.990	-2.75
-	vc5comp3l1	winter	0.0055	0.0027	1.017	1.001	1.034	2.04
-	vc5comp4wk	none	0.0236	0.0114	1.043	1.002	1.085	2.07
-	vc5comp4wk	summer	0.0418	0.0100	1.077	1.040	1.116	4.17
-	vc5comp4wk	winter	0.0232	0.0035	1.042	1.030	1.055	6.69
CARDIO	vc5comp3l1	none	0.0074	0.0044	1.023	0.997	1.050	1.70
-	vc5comp3l1	summer	-0.00938	0.0041	0.972	0.948	0.996	-2.29
-	vc5comp3l1	winter	0.01	0.0030	1.031	1.013	1.050	3.39
-	vc5comp5l1	none	0.0088	0.0067	1.029	0.986	1.073	1.31
-	vc5comp5l1	summer	0.0092	0.0034	1.030	1.008	1.053	2.70
-	vc5comp5l1	winter	0.0098	0.0042	1.032	1.005	1.059	2.36
CARDIO	vc5comp4wk	none	0.0235	0.0115	1.043	1.002	1.086	2.04
-	vc5comp4wk	summer	0.03909	0.0101	1.072	1.035	1.111	3.87
-	vc5comp4wk	winter	0.02394	0.0035	1.044	1.031	1.056	6.88
-	vc5comp5l1	none	0.007	0.0065	1.023	0.982	1.065	1.08
-	vc5comp5l1	summer	0.0081	0.0034	1.026	1.004	1.048	2.37
-	vc5comp5l1	winter	0.0018	0.0040	1.006	0.981	1.031	0.44
PNEUMO	vc5comp1wk	none	-0.0653	0.0363	0.874	0.755	1.012	-1.80
-	vc5comp1wk	summer	0.2956	0.0415	1.840	1.555	2.176	7.12
-	vc5comp1wk	winter	-0.0159	0.0115	0.968	0.924	1.014	-1.39
-	vc5comp2wk	none	-0.0052	0.0218	0.990	0.912	1.075	-0.24
-	vc5comp2wk	summer	0.0695	0.0212	1.143	1.055	1.239	3.27
-	vc5comp2wk	winter	0.0098	0.0122	1.019	0.973	1.067	0.80
PNEUMO	vc5comp1wk	none	-0.0635	0.0368	0.877	0.756	1.018	-1.73
-	vc5comp1wk	summer	0.3022	0.0420	1.865	1.574	2.210	7.19
-	vc5comp1wk	winter	-0.0146	0.0110	0.970	0.928	1.014	-1.33
-	vc5comp3l1	none	0.0073	0.0143	1.023	0.939	1.114	0.51
-	vc5comp3l1	summer	0.0099	0.0135	1.031	0.950	1.118	0.73
-	vc5comp3l1	winter	0.0199	0.0080	1.063	1.013	1.115	2.49
PNEUMO	vc5comp1wk	none	-0.0666	0.0371	0.872	0.750	1.013	-1.80
-	vc5comp1wk	summer	0.3015	0.0420	1.862	1.572	2.206	7.19
-	vc5comp1wk	winter	-0.0133	0.0111	0.973	0.930	1.017	-1.20
-	vc5comp3wk	none	0.0072	0.0197	1.017	0.931	1.110	0.37
-	vc5comp3wk	summer	0.0659	0.0200	1.162	1.063	1.270	3.30
-	vc5comp3wk	winter	-0.0046	0.0110	0.990	0.942	1.039	-0.42
PNEUMO	vc5comp1wk	none	-0.0542	0.0365	0.894	0.772	1.036	-1.49
-	vc5comp1wk	summer	0.2610	0.0461	1.713	1.422	2.064	5.66
-	vc5comp1wk	winter	0.0004	0.0110	1.001	0.957	1.046	0.03
-	vc5comp4wk	none	0.0587	0.0379	1.110	0.973	1.267	1.55
-	vc5comp4wk	summer	0.1220	0.0360	1.243	1.096	1.409	3.39
-	vc5comp4wk	winter	0.0612	0.0103	1.115	1.076	1.156	5.94
PNEUMO	vc5comp1wk	none	-0.0948	0.0381	0.822	0.705	0.959	-2.49
-	vc5comp1wk	summer	0.1473	0.0435	1.355	1.136	1.616	3.39
-	vc5comp1wk	winter	-0.0215	0.0112	0.957	0.914	1.001	-1.92
-	vc5comp5wk	none	-0.0041	0.0336	0.989	0.825	1.185	-0.12

-	vc5comp5wk	summer	0.1578	0.0147	1.542	1.425	1.669	10.74
-	vc5comp5wk	winter	0.0208	0.0182	1.059	0.960	1.168	1.14
PNEUMO	vc5comp2wk	none	-0.0010	0.0221	0.998	0.918	1.085	-0.05
-	vc5comp2wk	summer	0.0791	0.0209	1.165	1.076	1.261	3.79
-	vc5comp2wk	winter	0.0025	0.0117	1.005	0.961	1.050	0.21
-	vc5comp3l1	none	0.0082	0.0142	1.025	0.942	1.116	0.58
-	vc5comp3l1	summer	0.0179	0.0131	1.056	0.976	1.143	1.36
-	vc5comp3l1	winter	0.0192	0.0080	1.061	1.011	1.113	2.40
PNEUMO	vc5comp2wk	none	-0.0052	0.0231	0.990	0.907	1.080	-0.22
-	vc5comp2wk	summer	0.0676	0.0215	1.139	1.050	1.236	3.15
-	vc5comp2wk	winter	0.0032	0.0117	1.006	0.963	1.052	0.27
-	vc5comp3wk	none	0.0128	0.0203	1.030	0.940	1.127	0.63
-	vc5comp3wk	summer	0.0561	0.0199	1.136	1.039	1.242	2.81
-	vc5comp3wk	winter	-0.0048	0.0110	0.989	0.942	1.039	-0.43
PNEUMO	vc5comp2wk	none	0.0038	0.0218	1.007	0.928	1.094	0.17
-	vc5comp2wk	summer	0.0656	0.0219	1.135	1.045	1.233	3.00
-	vc5comp2wk	winter	-0.0080	0.0122	0.985	0.940	1.031	-0.65
-	vc5comp4wk	none	0.0739	0.0376	1.141	1.000	1.301	1.97
-	vc5comp4wk	summer	0.1601	0.0334	1.330	1.184	1.495	4.80
-	vc5comp4wk	winter	0.0628	0.0107	1.118	1.077	1.161	5.85
PNEUMO	vc5comp2wk	none	0.0058	0.0218	1.011	0.931	1.098	0.26
-	vc5comp2wk	summer	0.0429	0.0217	1.086	1.001	1.179	1.98
-	vc5comp2wk	winter	-0.0009	0.0120	0.998	0.954	1.045	-0.07
-	vc5comp5wk	none	0.0097	0.0319	1.027	0.865	1.219	0.30
-	vc5comp5wk	summer	0.1634	0.0146	1.566	1.448	1.694	11.17
-	vc5comp5wk	winter	0.0161	0.0186	1.045	0.946	1.155	0.86
PNEUMO	vc5comp3l1	none	0.0059	0.0141	1.018	0.936	1.108	0.41
-	vc5comp3l1	summer	0.0115	0.0135	1.036	0.956	1.123	0.86
-	vc5comp3l1	winter	0.0179	0.0080	1.056	1.007	1.108	2.25
-	vc5comp4wk	none	0.0733	0.0378	1.140	0.999	1.300	1.94
-	vc5comp4wk	summer	0.1716	0.0327	1.358	1.211	1.522	5.25
-	vc5comp4wk	winter	0.0597	0.0103	1.112	1.073	1.153	5.79
PNEUMO	vc5comp3l1	none	0.0155	0.0141	1.049	0.964	1.141	1.10
-	vc5comp3l1	summer	0.0076	0.0133	1.023	0.945	1.108	0.57
-	vc5comp3l1	winter	0.0252	0.0081	1.080	1.029	1.134	3.10
-	vc5comp5wk	none	0.0237	0.0321	1.067	0.898	1.268	0.74
-	vc5comp5wk	summer	0.1723	0.0142	1.605	1.486	1.732	12.12
-	vc5comp5wk	winter	0.0355	0.0183	1.102	0.999	1.216	1.94
PNEUMO	vc5comp3wk	none	0.0034	0.0195	1.008	0.924	1.099	0.17
-	vc5comp3wk	summer	0.0429	0.0208	1.102	1.005	1.210	2.06
-	vc5comp3wk	winter	0.0001	0.0109	1.000	0.952	1.050	0.01
-	vc5comp4wk	none	0.0687	0.0383	1.130	0.989	1.292	1.80
-	vc5comp4wk	summer	0.1530	0.0342	1.314	1.165	1.481	4.47
-	vc5comp4wk	winter	0.0613	0.0104	1.115	1.076	1.157	5.91
PNEUMO	vc5comp3wk	none	0.0266	0.0200	1.062	0.972	1.162	1.33
-	vc5comp3wk	summer	0.0293	0.0207	1.069	0.975	1.172	1.42
-	vc5comp3wk	winter	0.0049	0.0116	1.011	0.960	1.065	0.42
-	vc5comp5wk	none	0.0271	0.0332	1.077	0.901	1.288	0.82
-	vc5comp5wk	summer	0.1680	0.0150	1.586	1.463	1.719	11.17
-	vc5comp5wk	winter	0.0221	0.0190	1.063	0.959	1.177	1.16
PNEUMO	vc5comp4wk	none	0.0792	0.0381	1.152	1.008	1.316	2.08
-	vc5comp4wk	summer	0.0884	0.0344	1.171	1.038	1.320	2.57
-	vc5comp4wk	winter	0.0627	0.0103	1.118	1.079	1.159	6.06
-	vc5comp5wk	none	0.0175	0.0324	1.049	0.881	1.249	0.54

-	vc5comp5wk	summer	0.1608	0.0147	1.555	1.437	1.683	10.95
-	vc5comp5wk	winter	0.0137	0.0183	1.038	0.941	1.146	0.74
COPD	vc5comp1wk	none	0.0105	0.0291	1.022	0.909	1.149	0.36
-	vc5comp1wk	summer	0.1923	0.0366	1.487	1.282	1.724	5.25
-	vc5comp1wk	winter	-0.0054	0.0099	0.989	0.950	1.029	-0.54
-	vc5comp2l1	none	0.0292	0.0117	1.089	1.019	1.164	2.51
-	vc5comp2l1	summer	0.0224	0.0115	1.068	1.000	1.140	1.95
-	vc5comp2l1	winter	0.0027	0.0073	1.008	0.967	1.051	0.37
COPD	vc5comp1wk	none	0.0276	0.0286	1.059	0.943	1.189	0.97
-	vc5comp1wk	summer	0.2148	0.0359	1.557	1.347	1.801	5.98
-	vc5comp1wk	winter	-0.0057	0.0099	0.988	0.950	1.029	-0.57
-	vc5comp2wk	none	0.0087	0.0181	1.017	0.950	1.089	0.48
-	vc5comp2wk	summer	-0.0018	0.0184	0.996	0.930	1.068	-0.10
-	vc5comp2wk	winter	0.0082	0.0105	1.016	0.976	1.057	0.78
COPD	vc5comp1wk	none	0.0274	0.0289	1.058	0.942	1.189	0.95
-	vc5comp1wk	summer	0.1768	0.0393	1.440	1.229	1.688	4.50
-	vc5comp1wk	winter	0.0037	0.0096	1.008	0.969	1.047	0.38
-	vc5comp4wk	none	0.0177	0.0317	1.032	0.924	1.153	0.56
-	vc5comp4wk	summer	0.0953	0.0306	1.185	1.065	1.319	3.11
-	vc5comp4wk	winter	0.0388	0.0091	1.072	1.038	1.106	4.25
COPD	vc5comp1wk	none	0.0203	0.0300	1.043	0.924	1.177	0.68
-	vc5comp1wk	summer	0.1780	0.0373	1.444	1.242	1.678	4.78
-	vc5comp1wk	winter	-0.0012	0.0096	0.998	0.960	1.037	-0.12
-	vc5comp5wk	none	-0.0278	0.0279	0.927	0.797	1.077	-1.00
-	vc5comp5wk	summer	0.0401	0.0129	1.116	1.042	1.196	3.12
-	vc5comp5wk	winter	-0.0300	0.0157	0.921	0.846	1.002	-1.91
COPD	vc5comp2l1	none	0.0327	0.0116	1.100	1.030	1.176	2.83
-	vc5comp2l1	summer	0.0222	0.0116	1.067	0.998	1.140	1.91
-	vc5comp2l1	winter	-0.0046	0.0072	0.987	0.947	1.028	-0.64
-	vc5comp4wk	none	0.0065	0.0316	1.012	0.906	1.130	0.21
-	vc5comp4wk	summer	0.1157	0.0290	1.229	1.111	1.360	3.99
-	vc5comp4wk	winter	0.0401	0.0094	1.074	1.039	1.110	4.27
COPD	vc5comp2l1	none	0.0337	0.0115	1.103	1.033	1.179	2.91
-	vc5comp2l1	summer	0.0265	0.0112	1.080	1.013	1.152	2.36
-	vc5comp2l1	winter	0.0025	0.0072	1.007	0.967	1.049	0.35
-	vc5comp5wk	none	-0.0338	0.0263	0.911	0.791	1.050	-1.29
-	vc5comp5wk	summer	0.0555	0.0127	1.165	1.088	1.247	4.38
-	vc5comp5wk	winter	-0.0286	0.0158	0.925	0.849	1.007	-1.81
COPD	vc5comp2wk	none	0.0166	0.0180	1.033	0.965	1.105	0.92
-	vc5comp2wk	summer	-0.0073	0.0190	0.986	0.918	1.059	-0.38
-	vc5comp2wk	winter	-0.0020	0.0105	0.996	0.958	1.036	-0.19
-	vc5comp4wk	none	0.0166	0.0314	1.030	0.923	1.149	0.53
-	vc5comp4wk	summer	0.1290	0.0289	1.259	1.138	1.392	4.46
-	vc5comp4wk	winter	0.0390	0.0094	1.072	1.037	1.108	4.16
COPD	vc5comp2wk	none	0.0143	0.0182	1.028	0.960	1.101	0.79
-	vc5comp2wk	summer	-0.0091	0.0189	0.983	0.915	1.055	-0.48
-	vc5comp2wk	winter	0.0088	0.0104	1.017	0.978	1.058	0.85
-	vc5comp5wk	none	-0.0230	0.0263	0.939	0.815	1.082	-0.87
-	vc5comp5wk	summer	0.0598	0.0130	1.178	1.099	1.264	4.59
-	vc5comp5wk	winter	-0.0291	0.0159	0.923	0.848	1.006	-1.83
COPD	vc5comp4wk	none	0.0117	0.0319	1.021	0.913	1.142	0.37
-	vc5comp4wk	summer	0.0958	0.0298	1.186	1.069	1.317	3.21
-	vc5comp4wk	winter	0.0389	0.0091	1.072	1.038	1.107	4.26
-	vc5comp5wk	none	-0.0170	0.0267	0.954	0.827	1.102	-0.64

-	vc5comp5wk	summer	0.0442	0.0131	1.129	1.052	1.211	3.37
-	vc5comp5wk	winter	-0.0304	0.0158	0.920	0.845	1.002	-1.92

Table 31 Three component season specific models

cause	*component*	*season*	*effect*	*st. error*	*RR*	*RR-lo*	*RR-hi*	*t-value*
TOTAL	vc5comp1wk	none	0.0092	0.0067	1.019	0.992	1.047	1.37
-	vc5comp1wk	summer	0.0725	0.0090	1.161	1.120	1.204	8.07
-	vc5comp1wk	winter	0.0017	0.0025	1.004	0.993	1.014	0.68
-	vc5comp2l1	none	-0.0001	0.0028	1.000	0.984	1.016	-0.03
-	vc5comp2l1	summer	0.0021	0.0027	1.006	0.991	1.022	0.79
-	vc5comp2l1	winter	-0.0002	0.0019	0.999	0.989	1.010	-0.10
-	vc5comp4wk	none	0.0296	0.0076	1.054	1.027	1.083	3.91
-	vc5comp4wk	summer	0.0275	0.0071	1.050	1.024	1.077	3.85
-	vc5comp4wk	winter	0.0219	0.0025	1.040	1.031	1.049	8.93
TOTAL	vc5comp1wk	none	0.0031	0.0070	1.006	0.978	1.035	0.44
-	vc5comp1wk	summer	0.0673	0.0088	1.149	1.109	1.191	7.64
-	vc5comp1wk	winter	-0.0049	0.0025	0.990	0.980	1.000	-1.91
-	vc5comp2l1	none	0.0014	0.0028	1.004	0.988	1.020	0.48
-	vc5comp2l1	summer	0.0036	0.0027	1.011	0.995	1.026	1.35
-	vc5comp2l1	winter	0.0042	0.0018	1.012	1.002	1.023	2.30
-	vc5comp5wk	none	0.0055	0.0066	1.015	0.980	1.052	0.83
-	vc5comp5wk	summer	0.0130	0.0031	1.036	1.019	1.054	4.21
-	vc5comp5wk	winter	0.0015	0.0040	1.004	0.983	1.026	0.38
TOTAL	vc5comp1wk	none	0.0089	0.0068	1.018	0.991	1.047	1.31
-	vc5comp1wk	summer	0.0737	0.0090	1.164	1.123	1.208	8.16
-	vc5comp1wk	winter	0.0012	0.0024	1.002	0.993	1.012	0.51
-	vc5comp3l1	none	0.0007	0.0028	1.002	0.985	1.019	0.25
-	vc5comp3l1	summer	-0.0004	0.0027	0.999	0.983	1.015	-0.17
-	vc5comp3l1	winter	0.0037	0.0018	1.011	1.001	1.022	2.10
-	vc5comp4wk	none	0.0301	0.0075	1.055	1.028	1.083	4.02
-	vc5comp4wk	summer	0.0286	0.0070	1.052	1.027	1.078	4.09
-	vc5comp4wk	winter	0.0216	0.0023	1.039	1.031	1.048	9.34
TOTAL	vc5comp1wk	none	0.0033	0.0070	1.007	0.979	1.036	0.47
-	vc5comp1wk	summer	0.0692	0.0088	1.154	1.113	1.195	7.88
-	vc5comp1wk	winter	-0.0039	0.0024	0.992	0.982	1.002	-1.58
-	vc5comp3l1	none	0.0021	0.0029	1.007	0.989	1.024	0.74
-	vc5comp3l1	summer	0.0000	0.0027	1.000	0.984	1.016	0.01
-	vc5comp3l1	winter	0.0052	0.0019	1.016	1.005	1.027	2.79
-	vc5comp5wk	none	0.0082	0.0065	1.023	0.988	1.059	1.26
-	vc5comp5wk	summer	0.0140	0.0031	1.039	1.022	1.057	4.50
-	vc5comp5wk	winter	0.0067	0.0040	1.019	0.997	1.041	1.68
TOTAL	vc5comp1wk	none	0.0088	0.0069	1.018	0.991	1.047	1.29
-	vc5comp1wk	summer	0.0624	0.0090	1.137	1.096	1.180	6.89
-	vc5comp1wk	winter	0.0008	0.0024	1.002	0.992	1.011	0.31
-	vc5comp4wk	none	0.0299	0.0076	1.055	1.027	1.083	3.94
-	vc5comp4wk	summer	0.0248	0.0072	1.045	1.019	1.072	3.43
-	vc5comp4wk	winter	0.0220	0.0023	1.040	1.032	1.049	9.50
-	vc5comp5wk	none	0.0092	0.0065	1.026	0.991	1.062	1.43
-	vc5comp5wk	summer	0.0120	0.0031	1.033	1.016	1.051	3.88
-	vc5comp5wk	winter	0.0006	0.0040	1.002	0.981	1.023	0.16
TOTAL	vc5comp2l1	none	0.0016	0.0028	1.005	0.989	1.021	0.58

-	vc5comp2l1	summer	0.0044	0.0026	1.013	0.998	1.028	1.65
-	vc5comp2l1	winter	0.0007	0.0018	1.002	0.992	1.012	0.40
-	vc5comp3l1	none	0.0021	0.0028	1.006	0.990	1.023	0.76
-	vc5comp3l1	summer	0.0013	0.0026	1.004	0.988	1.020	0.49
-	vc5comp3l1	winter	0.0040	0.0018	1.012	1.001	1.023	2.23
-	vc5comp4wk	none	0.0280	0.0074	1.051	1.024	1.079	3.76
-	vc5comp4wk	summer	0.0377	0.0068	1.070	1.044	1.095	5.52
-	vc5comp4wk	winter	0.0213	0.0024	1.039	1.030	1.048	8.77
TOTAL	vc5comp2l1	none	0.0023	0.0028	1.007	0.991	1.023	0.83
-	vc5comp2l1	summer	0.0057	0.0026	1.017	1.002	1.032	2.19
-	vc5comp2l1	winter	0.0035	0.0018	1.010	1.000	1.020	1.96
-	vc5comp3l1	none	0.0033	0.0029	1.010	0.993	1.027	1.15
-	vc5comp3l1	summer	0.0015	0.0026	1.005	0.989	1.020	0.56
-	vc5comp3l1	winter	0.0053	0.0019	1.016	1.005	1.028	2.88
-	vc5comp5wk	none	0.0082	0.0062	1.023	0.989	1.057	1.31
-	vc5comp5wk	summer	0.0200	0.0031	1.057	1.039	1.074	6.53
-	vc5comp5wk	winter	0.0051	0.0040	1.014	0.992	1.036	1.26
TOTAL	vc5comp2l1	none	0.0014	0.0028	1.004	0.988	1.020	0.49
-	vc5comp2l1	summer	0.0035	0.0027	1.010	0.995	1.026	1.32
-	vc5comp2l1	winter	-0.0001	0.0018	1.000	0.989	1.010	-0.05
-	vc5comp4wk	none	0.0279	0.0076	1.051	1.024	1.079	3.69
-	vc5comp4wk	summer	0.0301	0.0071	1.055	1.029	1.082	4.23
-	vc5comp4wk	winter	0.0221	0.0024	1.040	1.031	1.049	9.12
-	vc5comp5wk	none	0.0103	0.0062	1.029	0.995	1.063	1.67
-	vc5comp5wk	summer	0.0177	0.0031	1.050	1.033	1.067	5.79
-	vc5comp5wk	winter	0.0015	0.0040	1.004	0.983	1.026	0.38
TOTAL	vc5comp3l1	none	0.0035	0.0028	1.011	0.994	1.028	1.25
-	vc5comp3l1	summer	0.0009	0.0026	1.003	0.987	1.019	0.35
-	vc5comp3l1	winter	0.0047	0.0018	1.015	1.003	1.026	2.58
-	vc5comp4wk	none	0.0289	0.0075	1.053	1.026	1.081	3.84
-	vc5comp4wk	summer	0.0318	0.0069	1.058	1.033	1.084	4.59
-	vc5comp4wk	winter	0.0218	0.0023	1.040	1.031	1.048	9.41
-	vc5comp5wk	none	0.0138	0.0062	1.039	1.004	1.074	2.22
-	vc5comp5wk	summer	0.0184	0.0031	1.052	1.035	1.069	6.00
-	vc5comp5wk	winter	0.0053	0.0040	1.015	0.993	1.037	1.33
RESPIR	vc5comp1wk	none	-0.0133	0.0230	0.973	0.887	1.068	-0.58
-	vc5comp1wk	summer	0.1589	0.0300	1.388	1.229	1.567	5.29
-	vc5comp1wk	winter	0.0002	0.0073	1.000	0.971	1.030	0.03
-	vc5comp4wk	none	0.0450	0.0240	1.084	0.996	1.178	1.87
-	vc5comp4wk	summer	0.0673	0.0237	1.128	1.038	1.225	2.84
-	vc5comp4wk	winter	0.0479	0.0068	1.089	1.063	1.115	7.03
-	vc5comp5wk	none	-0.0100	0.0211	0.973	0.869	1.090	-0.48
-	vc5comp5wk	summer	0.0813	0.0099	1.250	1.185	1.318	8.22
-	vc5comp5wk	winter	0.0020	0.0119	1.005	0.943	1.072	0.16
CARDIO	vc5comp1wk	none	0.0254	0.0103	1.054	1.011	1.099	2.47
-	vc5comp1wk	summer	0.0686	0.0140	1.152	1.088	1.219	4.89
-	vc5comp1wk	winter	-0.0016	0.0036	0.997	0.982	1.011	-0.46
-	vc5comp3l1	none	0.0008	0.0043	1.002	0.977	1.029	0.19
-	vc5comp3l1	summer	-0.0127	0.0042	0.962	0.938	0.986	-3.04
-	vc5comp3l1	winter	0.0054	0.0027	1.017	1.000	1.033	1.99
-	vc5comp4wk	none	0.0296	0.0116	1.054	1.012	1.098	2.55
-	vc5comp4wk	summer	0.0315	0.0110	1.058	1.018	1.099	2.87
-	vc5comp4wk	winter	0.0228	0.0035	1.041	1.029	1.054	6.55
CARDIO	vc5comp1wk	none	0.0221	0.0103	1.047	1.004	1.091	2.14

-	vc5comp1wk	summer	0.0763	0.0131	1.170	1.110	1.234	5.80
-	vc5comp1wk	winter	-0.0048	0.0036	0.990	0.976	1.005	-1.31
-	vc5comp3l1	none	0.0039	0.0045	1.012	0.985	1.039	0.88
-	vc5comp3l1	summer	-0.0115	0.0042	0.966	0.942	0.990	-2.74
-	vc5comp3l1	winter	0.0085	0.0030	1.026	1.008	1.045	2.82
-	vc5comp5l1	none	0.0096	0.0069	1.031	0.988	1.077	1.39
-	vc5comp5l1	summer	0.0074	0.0035	1.024	1.002	1.047	2.11
-	vc5comp5l1	winter	0.0065	0.0044	1.021	0.994	1.050	1.50
CARDIO	vc5comp1wk	none	0.0267	0.0103	1.057	1.013	1.101	2.59
-	vc5comp1wk	summer	0.0632	0.0140	1.139	1.077	1.206	4.51
-	vc5comp1wk	winter	-0.0021	0.0036	0.996	0.981	1.010	-0.58
-	vc5comp4wk	none	0.0292	0.0117	1.053	1.011	1.097	2.50
-	vc5comp4wk	summer	0.0295	0.0110	1.054	1.014	1.095	2.68
-	vc5comp4wk	winter	0.0235	0.0035	1.043	1.030	1.056	6.72
-	vc5comp5l1	none	0.0091	0.0066	1.030	0.988	1.073	1.37
-	vc5comp5l1	summer	0.0072	0.0034	1.023	1.001	1.046	2.08
-	vc5comp5l1	winter	0.0012	0.0040	1.004	0.979	1.029	0.30
CARDIO	vc5comp3l1	none	0.0066	0.0044	1.020	0.994	1.047	1.50
-	vc5comp3l1	summer	-0.0109	0.0042	0.967	0.943	0.992	-2.61
-	vc5comp3l1	winter	0.0085	0.0030	1.026	1.008	1.045	2.87
-	vc5comp4wk	none	0.0244	0.0116	1.044	1.003	1.088	2.11
-	vc5comp4wk	summer	0.0422	0.0103	1.078	1.040	1.118	4.09
-	vc5comp4wk	winter	0.0233	0.0035	1.042	1.030	1.055	6.69
-	vc5comp5l1	none	0.0106	0.0068	1.035	0.991	1.080	1.57
-	vc5comp5l1	summer	0.0085	0.0035	1.028	1.006	1.050	2.45
-	vc5comp5l1	winter	0.0084	0.0044	1.027	0.999	1.056	1.92
PNEUMO	vc5comp1wk	none	-0.0732	0.0372	0.860	0.740	1.000	-1.97
-	vc5comp1wk	summer	0.2883	0.0424	1.812	1.527	2.151	6.80
-	vc5comp1wk	winter	-0.0168	0.0116	0.966	0.922	1.013	-1.44
-	vc5comp2wk	none	-0.0076	0.0229	0.985	0.904	1.075	-0.33
-	vc5comp2wk	summer	0.0589	0.0217	1.120	1.032	1.216	2.72
-	vc5comp2wk	winter	0.0103	0.0123	1.020	0.974	1.068	0.84
-	vc5comp3wk	none	0.0115	0.0207	1.026	0.936	1.126	0.55
-	vc5comp3wk	summer	0.0552	0.0203	1.134	1.036	1.241	2.72
-	vc5comp3wk	winter	-0.0049	0.0110	0.989	0.941	1.039	-0.44
PNEUMO	vc5comp1wk	none	-0.0586	0.0367	0.886	0.764	1.028	-1.60
-	vc5comp1wk	summer	0.2528	0.0462	1.684	1.398	2.030	5.48
-	vc5comp1wk	winter	0.0040	0.0117	1.008	0.962	1.057	0.34
-	vc5comp2wk	none	-0.0009	0.0218	0.998	0.919	1.084	-0.04
-	vc5comp2wk	summer	0.0615	0.0219	1.126	1.037	1.223	2.81
-	vc5comp2wk	winter	-0.0094	0.0129	0.982	0.935	1.031	-0.73
-	vc5comp4wk	none	0.0596	0.0380	1.112	0.974	1.270	1.57
-	vc5comp4wk	summer	0.1089	0.0370	1.214	1.067	1.382	2.94
-	vc5comp4wk	winter	0.0635	0.0109	1.120	1.078	1.163	5.83
PNEUMO	vc5comp1wk	none	-0.1011	0.0383	0.812	0.695	0.948	-2.64
-	vc5comp1wk	summer	0.1396	0.0438	1.334	1.117	1.592	3.19
-	vc5comp1wk	winter	-0.0249	0.0117	0.950	0.906	0.996	-2.13
-	vc5comp2wk	none	0.0083	0.0218	1.016	0.936	1.103	0.38
-	vc5comp2wk	summer	0.0434	0.0218	1.087	1.001	1.181	1.99
-	vc5comp2wk	winter	0.0099	0.0125	1.019	0.972	1.069	0.79
-	vc5comp5wk	none	-0.0027	0.0337	0.993	0.828	1.190	-0.08
-	vc5comp5wk	summer	0.1523	0.0153	1.519	1.399	1.649	9.96
-	vc5comp5wk	winter	0.0187	0.0188	1.053	0.951	1.165	1.00
PNEUMO	vc5comp1wk	none	-0.0599	0.0378	0.884	0.758	1.030	-1.59

-	vc5comp1wk	summer	0.2643	0.0465	1.725	1.429	2.081	5.68
-	vc5comp1wk	winter	-0.0004	0.0111	0.999	0.955	1.045	-0.04
-	vc5comp3wk	none	0.0029	0.0202	1.007	0.920	1.102	0.14
-	vc5comp3wk	summer	0.0491	0.0210	1.118	1.018	1.228	2.33
-	vc5comp3wk	winter	-0.0005	0.0109	0.999	0.952	1.049	-0.04
-	vc5comp4wk	none	0.0561	0.0390	1.105	0.965	1.267	1.44
-	vc5comp4wk	summer	0.0953	0.0378	1.185	1.039	1.353	2.52
-	vc5comp4wk	winter	0.0612	0.0104	1.115	1.076	1.157	5.89
PNEUMO	vc5comp1wk	none	-0.1064	0.0387	0.803	0.687	0.939	-2.75
-	vc5comp1wk	summer	0.1324	0.0442	1.314	1.099	1.571	3.00
-	vc5comp1wk	winter	-0.0234	0.0112	0.953	0.911	0.997	-2.08
-	vc5comp3wk	none	0.0295	0.0203	1.069	0.977	1.171	1.46
-	vc5comp3wk	summer	0.0336	0.0209	1.079	0.983	1.185	1.61
-	vc5comp3wk	winter	0.0094	0.0116	1.022	0.970	1.076	0.81
-	vc5comp5wk	none	0.0159	0.0345	1.045	0.868	1.258	0.46
-	vc5comp5wk	summer	0.1579	0.0157	1.542	1.418	1.678	10.08
-	vc5comp5wk	winter	0.0323	0.0193	1.093	0.985	1.212	1.68
PNEUMO	vc5comp1wk	none	-0.0865	0.0384	0.837	0.716	0.977	-2.25
-	vc5comp1wk	summer	0.1264	0.0472	1.298	1.072	1.571	2.67
-	vc5comp1wk	winter	-0.0080	0.0113	0.984	0.940	1.030	-0.71
-	vc5comp4wk	none	0.0633	0.0385	1.120	0.979	1.281	1.65
-	vc5comp4wk	summer	0.0638	0.0373	1.120	0.984	1.276	1.71
-	vc5comp4wk	winter	0.0616	0.0104	1.116	1.076	1.157	5.91
-	vc5comp5wk	none	-0.0003	0.0339	0.999	0.833	1.199	-0.01
-	vc5comp5wk	summer	0.1524	0.0152	1.519	1.400	1.649	10.04
-	vc5comp5wk	winter	0.0148	0.0185	1.041	0.942	1.151	0.80
PNEUMO	vc5comp2wk	none	0.0037	0.0231	1.007	0.923	1.099	0.16
-	vc5comp2wk	summer	0.0600	0.0221	1.123	1.033	1.221	2.72
-	vc5comp2wk	winter	-0.0081	0.0123	0.984	0.940	1.031	-0.66
-	vc5comp3wk	none	0.0021	0.0207	1.005	0.916	1.102	0.10
-	vc5comp3wk	summer	0.0328	0.0210	1.077	0.981	1.183	1.56
-	vc5comp3wk	winter	0.0004	0.0110	1.001	0.953	1.051	0.04
-	vc5comp4wk	none	0.0727	0.0385	1.138	0.995	1.302	1.89
-	vc5comp4wk	summer	0.1441	0.0352	1.293	1.143	1.462	4.09
-	vc5comp4wk	winter	0.0629	0.0108	1.119	1.077	1.162	5.81
PNEUMO	vc5comp2wk	none	-0.0005	0.0230	0.999	0.916	1.090	-0.02
-	vc5comp2wk	summer	0.0388	0.0219	1.078	0.992	1.171	1.77
-	vc5comp2wk	winter	-0.0010	0.0123	0.998	0.953	1.046	-0.08
-	vc5comp3wk	none	0.0265	0.0211	1.062	0.967	1.167	1.25
-	vc5comp3wk	summer	0.0232	0.0209	1.054	0.961	1.157	1.11
-	vc5comp3wk	winter	0.0047	0.0119	1.011	0.959	1.066	0.40
-	vc5comp5wk	none	0.0262	0.0333	1.075	0.898	1.286	0.79
-	vc5comp5wk	summer	0.1630	0.0156	1.564	1.438	1.701	10.45
-	vc5comp5wk	winter	0.0217	0.0200	1.061	0.953	1.182	1.09
PNEUMO	vc5comp2wk	none	0.0126	0.0218	1.025	0.944	1.113	0.58
-	vc5comp2wk	summer	0.0375	0.0223	1.075	0.988	1.169	1.68
-	vc5comp2wk	winter	-0.0119	0.0125	0.977	0.932	1.025	-0.95
-	vc5comp4wk	none	0.0828	0.0382	1.159	1.014	1.324	2.17
-	vc5comp4wk	summer	0.0815	0.0353	1.156	1.022	1.308	2.31
-	vc5comp4wk	winter	0.0650	0.0107	1.123	1.082	1.166	6.06
-	vc5comp5wk	none	0.0185	0.0325	1.052	0.883	1.253	0.57
-	vc5comp5wk	summer	0.1567	0.0151	1.537	1.417	1.668	10.35
-	vc5comp5wk	winter	0.0177	0.0190	1.050	0.948	1.163	0.93
PNEUMO	vc5comp3wk	none	0.0210	0.0205	1.049	0.957	1.150	1.03

-	vc5comp3wk	summer	0.0163	0.0216	1.038	0.942	1.143	0.75
-	vc5comp3wk	winter	0.0106	0.0116	1.024	0.973	1.079	0.92
-	vc5comp4wk	none	0.0758	0.0392	1.145	0.998	1.313	1.93
-	vc5comp4wk	summer	0.0804	0.0360	1.154	1.018	1.309	2.23
-	vc5comp4wk	winter	0.0628	0.0104	1.118	1.079	1.160	6.06
-	vc5comp5wk	none	0.0332	0.0340	1.096	0.912	1.316	0.98
-	vc5comp5wk	summer	0.1617	0.0154	1.559	1.434	1.694	10.47
-	vc5comp5wk	winter	0.0250	0.0194	1.071	0.965	1.189	1.28
COPD	vc5comp1wk	none	0.0071	0.0296	1.015	0.900	1.144	0.24
-	vc5comp1wk	summer	0.1576	0.0397	1.384	1.179	1.625	3.97
-	vc5comp1wk	winter	0.0059	0.0102	1.012	0.972	1.055	0.58
-	vc5comp2l1	none	0.0303	0.0118	1.093	1.021	1.169	2.57
-	vc5comp2l1	summer	0.0177	0.0118	1.053	0.984	1.126	1.50
-	vc5comp2l1	winter	-0.0062	0.0077	0.982	0.940	1.026	-0.81
-	vc5comp4wk	none	0.0067	0.0322	1.012	0.904	1.133	0.21
-	vc5comp4wk	summer	0.0902	0.0314	1.174	1.053	1.310	2.88
-	vc5comp4wk	winter	0.0415	0.0096	1.077	1.041	1.113	4.32
COPD	vc5comp1wk	none	-0.0036	0.0309	0.993	0.876	1.125	-0.12
-	vc5comp1wk	summer	0.1515	0.0383	1.367	1.171	1.596	3.95
-	vc5comp1wk	winter	-0.0044	0.0100	0.991	0.952	1.032	-0.44
-	vc5comp2l1	none	0.0323	0.0118	1.099	1.027	1.176	2.73
-	vc5comp2l1	summer	0.0219	0.0116	1.066	0.998	1.139	1.89
-	vc5comp2l1	winter	0.0035	0.0075	1.010	0.968	1.054	0.46
-	vc5comp5wk	none	-0.0372	0.0282	0.903	0.776	1.051	-1.32
-	vc5comp5wk	summer	0.0419	0.0130	1.122	1.046	1.203	3.23
-	vc5comp5wk	winter	-0.0298	0.0160	0.921	0.845	1.004	-1.86
COPD	vc5comp1wk	none	0.0207	0.0303	1.044	0.923	1.179	0.68
-	vc5comp1wk	summer	0.1544	0.0400	1.375	1.170	1.617	3.86
-	vc5comp1wk	winter	0.0054	0.0097	1.011	0.972	1.052	0.55
-	vc5comp4wk	none	0.0140	0.0322	1.025	0.916	1.147	0.43
-	vc5comp4wk	summer	0.0766	0.0320	1.146	1.025	1.282	2.39
-	vc5comp4wk	winter	0.0397	0.0092	1.073	1.039	1.108	4.30
-	vc5comp5wk	none	-0.0213	0.0281	0.943	0.811	1.097	-0.76
-	vc5comp5wk	summer	0.0312	0.0133	1.089	1.014	1.170	2.34
-	vc5comp5wk	winter	-0.0337	0.0160	0.912	0.836	0.993	-2.11
COPD	vc5comp2l1	none	0.0339	0.0116	1.104	1.033	1.180	2.92
-	vc5comp2l1	summer	0.0214	0.0117	1.065	0.996	1.138	1.84
-	vc5comp2l1	winter	-0.0037	0.0074	0.989	0.948	1.032	-0.49
-	vc5comp4wk	none	0.0046	0.0322	1.008	0.901	1.128	0.14
-	vc5comp4wk	summer	0.0851	0.0309	1.164	1.045	1.296	2.75
-	vc5comp4wk	winter	0.0402	0.0094	1.074	1.040	1.110	4.27
-	vc5comp5wk	none	-0.0245	0.0267	0.935	0.810	1.079	-0.92
-	vc5comp5wk	summer	0.0442	0.0132	1.129	1.052	1.212	3.35
-	vc5comp5wk	winter	-0.0295	0.0162	0.922	0.845	1.006	-1.83

Table 32 Means and quantiles per season

component	season	Mean	5%quantile	95%quantile	difference
vc5comp1l1	summer	-0.330	-0.819	0.325	1.144
vc5comp1wk	summer	-0.339	-0.603	-0.022	0.580
vc5comp2l1	summer	-0.044	-1.009	1.419	2.428
vc5comp2wk	summer	-0.035	-0.661	0.892	1.553
vc5comp3l1	summer	-0.132	-1.623	0.936	2.559
vc5comp3wk	summer	-0.137	-1.030	0.695	1.725
vc5comp4l1	summer	-0.270	-0.947	0.719	1.666
vc5comp4wk	summer	-0.266	-0.669	0.210	0.879
vc5comp5l1	summer	-0.587	-2.771	0.776	3.547
vc5comp5wk	summer	-0.601	-2.150	0.344	2.493
vc5comp1l1	winter	0.348	-0.837	2.936	3.773
vc5comp1wk	winter	0.351	-0.549	2.150	2.699
vc5comp2l1	winter	0.023	-1.223	2.279	3.502
vc5comp2wk	winter	0.007	-0.771	1.690	2.461
vc5comp3l1	winter	0.281	-1.649	1.627	3.276
vc5comp3wk	winter	0.259	-1.451	1.192	2.643
vc5comp4l1	winter	0.329	-1.007	2.744	3.751
vc5comp4wk	winter	0.284	-0.636	2.302	2.938
vc5comp5l1	winter	0.507	-0.692	1.514	2.205
vc5comp5wk	winter	0.530	-0.172	1.127	1.299
vc5comp1l1	none	-0.028	-0.846	1.565	2.412
vc5comp1wk	none	-0.030	-0.505	0.870	1.374
vc5comp2l1	none	0.053	-1.192	2.023	3.215
vc5comp2wk	none	0.048	-0.737	1.416	2.153
vc5comp3l1	none	-0.360	-2.690	1.054	3.744
vc5comp3wk	none	-0.344	-1.786	0.740	2.526
vc5comp4l1	none	-0.132	-0.998	1.120	2.118
vc5comp4wk	none	-0.128	-0.674	0.661	1.335
vc5comp5l1	none	0.222	-0.938	1.246	2.184
vc5comp5wk	none	0.226	-0.634	0.841	1.474

Table 33 Correlations in the summer period

	vc5comp1	*vc5comp2*	*vc5comp3*	*vc5comp4*	*vc5comp5*
vc5comp1	1.00	-0.21	-0.29	0.32	-0.37
vc5comp2	-0.21	1.00	-0.05	-0.15	0.00
vc5comp3	-0.29	-0.05	1.00	-0.42	0.23
vc5comp4	0.32	-0.15	-0.42	1.00	-0.44
vc5comp5	-0.37	0.00	0.23	-0.44	1.00

Table 34 Correlations in the winter period

	vc5comp1	*vc5comp2*	*vc5comp3*	*vc5comp4*	*vc5comp5*
vc5comp1	1.00	0.08	0.03	-0.16	-0.24
vc5comp2	0.08	1.00	0.06	0.06	-0.08
vc5comp3	0.03	0.06	1.00	0.08	-0.41
vc5comp4	-0.16	0.06	0.08	1.00	-0.07
vc5comp5	-0.24	-0.08	-0.41	-0.07	1.00

Table 35 Correlations in the period "none"

	vc5comp1	*vc5comp2*	*vc5comp3*	*vc5comp4*	*vc5comp5*
vc5comp1	1.00	-0.21	-0.23	0.03	0.04
vc5comp2	-0.21	1.00	-0.10	-0.14	0.07
vc5comp3	-0.23	-0.10	1.00	-0.27	-0.18
vc5comp4	0.03	-0.14	-0.27	1.00	-0.08
vc5comp5	0.04	0.07	-0.18	-0.08	1.00

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