

# Chapter 1

## Introduction

This chapter presents the background to this research project and the main topics it covers.

### 1.1 Background

In the 1980s and 1990s, there was a reduction in the number of psychiatric beds in the major cities. The idea was to reduce the perceived excess capacity, and the ultimate aim was to be left with a small surplus capacity of 6% for the major cities compared to the rest of the country (Wet Ziekenhuisvoorzieningen, 1991). Even though the beds could fortunately be replaced for the purposes of day care and out-patient care, this was still a major organizational change for mental health care in the large cities. During the same period, Amsterdam was also in the middle of the implementation of the 'Amsterdam model' (Adviesgroep Geestelijke Gezondheidszorg Amsterdam, 1987; Janssen et al., 1993). In this model, patients were no longer to be treated far outside the city in the dunes of Santpoort, but in their own living environment, namely the city (Duurkoop, 1995; Dekker, 1996). Even though some policymakers were aware of the drawbacks of the stressful city as a treatment setting (van Ewijk, 1992), this was thought to be less of a problem than the break with patients' own living environments.

As a result of the required reduction in the number of beds, the management of what was then Psychiatrisch Ziekenhuis Amsterdam (the Amsterdam Psychiatric Hospital) – one of the predecessors of Arkin; which is the combination of Jellinek, Mentrum and AMCdeMeren – felt that there was a need to determine, scientifically if possible, the increased demand in the cities for, in particular, in-patient psychiatric facilities. Led by Jack Dekker, the new research department of the Amsterdam Psychiatric Hospital started a study of this kind in 1994 based on national admission data (Chapters 5-8).

In 1997, data became available in the Netherlands from a major national study ('Nemesis') conducted by the Trimbos Institute into the prevalence of psychiatric disorders (Bijl et al., 1998a,b). Collaboration with the GGD Amsterdam (Amsterdam City Health Service) and the Trimbos Institute made it possible for this research project to use the Nemesis data as a basis for investigating the relationship between levels of urbanization and the prevalence of disorders (Spijker et al., 2001; Peen et al., 2002; Chapter 2). Later, in collaboration with Professor Jacobi of Dresden Technical University, a comparable study proved possible in Germany (Chapter 3). In addition, for the first time, a pooled meta-analysis was conducted on the basis of the international literature into urban-rural differences in the prevalence of psychiatric disorders (Chapter 4).

In addition to a policy-driven interest in the variations in the prevalence of psychiatric problems between urban and rural settings, there was also a similar interest in geographical variations in the prevalence of psychiatric problems in towns. The transfer of the treatment setting from the dunes to the city, which was referred to above, resulted in the 'Amsterdam model' and was an additional reason for this interest. Major geographical variances have been found in the prevalence of psychiatric disorders within cities. For example, the famous Chicago study of Faris & Dunham (1939) had already shown that the highest levels of schizophrenia were found in deprived city areas. Following in the footsteps of Faris and Dunham in Chicago, Dutch researchers later found similar geographical variations in Rotterdam (Verdonk, 1979), Nijmegen (Bosma, 1975) and Maastricht (Hamers & Romme, 1990; Gunther et al., 1993). The Amsterdam Psychiatric Hospital also needed neighbourhood information of this kind for the purposes of formulating neighbourhood-specific policy for mental health services. In addition, it was thought that the link between the use of psychiatric services and socio-economic deprivation might also explain the higher levels of service use in cities. This research project in Amsterdam therefore worked together with the Samenwerkende Instellingen Gezondheidszorg Regio Amsterdam (Joint Institutions for Health Care in the Amsterdam Region - SIGRA) on research into the relationship between psychiatric service use and neighbourhood characteristics (Chapters 10-11). Furthermore, in collaboration with the Psychiatry Department of the Vrije Universiteit Amsterdam, a study was conducted into the relationship between depression symptoms in older age brackets and neighbourhood characteristics (Chapter 9).

## **1.2 Urban-rural differences**

Cities have long been seen as bad influences. The Bible tells us about Sodom and Gomorrah. Much later, Dickens described urban conditions at the time of the Industrial Revolution, leading Shelley to sigh that 'Hell is a city like London'. Nowadays, social problems, health problems and environmental stressors are generally still more prevalent in cities than in the country. Areas with high population densities are characterized, for instance, by higher rates of criminality, mortality, social isolation, air pollution and noise (Freeman, 1984). In the Netherlands, the four largest cities have mortality rates that are 11% higher than the rest of the country (Uitenbroek et al., 2002). This difference can be partly explained by differences in SES (Kunst et al., 2002), which is a major indicator of health inequalities (Mackenbach et al., 2008). As one of a range of environmental stressors, air pollution may also explain the higher mortality rate in urban areas (Verhoeff et al., 1996; Hoek et al., 2002). In addition to higher mortality, people living in the most urbanized municipalities in the Netherlands are less healthy and more of them suffer from physical disabilities compared to people living in strictly rural municipalities. More of them smoke, and more are overweight (Janssen-

Jansen et al., 2002).

Since the prevalence of various social and health problems is related to urbanization, it is often assumed that the same is true of psychiatric disorders. Dohrenwend and Dohrenwend (1974) reviewed nine urban-rural comparisons and concluded that there was a tendency towards higher total rates of psychiatric disorders in urban areas. More specifically, rates for neurosis and personality disorders were higher in urban areas, while rates for functional psychoses combined, and manic-depressive psychoses separately, were higher in rural areas. There was no clear trend in the rates for schizophrenia. Later reviews (Mueller, 1981; Neff, 1983; Webb, 1984; Verheij, 1996; Marsella, 1998) concluded that overall rates in urban areas were marginally higher and, specifically, that rates for depression were higher. In the last decade, there have been no reviews of urban-rural differences in psychiatric morbidity. Nor has there been any pooled meta-analysis of urban-rural differences bringing together all the data. A pooled analysis of this kind could show whether there are differences in psychiatric morbidity between towns and the country at the international level and how large any difference is. An analysis of this kind can also provide an indication of the relationships for specific disorders such as depression, anxiety disorders and substance abuse. This thesis presents the first pooled meta-analysis of urban-rural differences in psychopathology (Chapter 4). On the basis of the literature referred to, we expect a slightly, but significantly, higher total prevalence in urban areas (Dohrenwend & Dohrenwend, 1974; Mueller, 1981; Neff, 1983; Webb, 1984; Verheij, 1996; Marsella, 1998). It is expected that there will be a larger difference for depression.

Large-scale epidemiological studies of the prevalence of psychiatric disorders incorporating levels of urbanization are scarce in the Netherlands. Hodiament et al. (1992) found prevalence rates in the city of Nijmegen that were three times higher than in the surrounding rural municipalities. In 1996, the first observations were made for the national Nemesis study of the prevalence of psychiatric disorders (Bijl et al., 1998a,b). This set of data created the opportunity to look at national differences on the basis of levels of urbanization (Chapter 2). Studies of differences between urban and rural figures generally distinguish between only two urbanization categories. The urbanization levels developed in 1992 by Statistics Netherlands (den Dulk et al., 1992) comprise five categories and allow for the examination of the possibility of a gradient in differences depending on the level of urbanization.

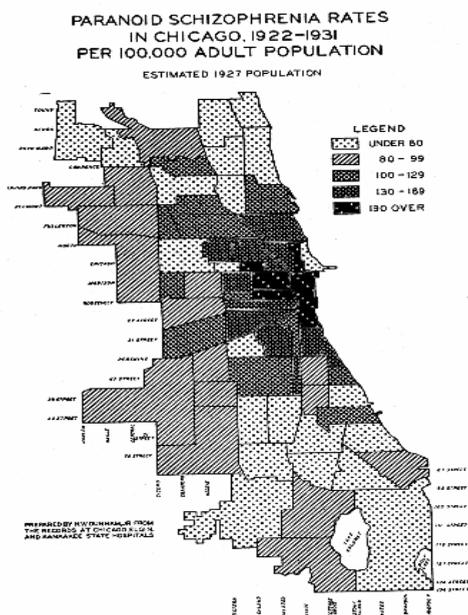
When there are differences in disorder prevalence rates depending upon the level of urbanization, the logical question is whether this is also reflected in variations in the use of psychiatric facilities. Since 1975, there had been no national study in the Netherlands of variations in the use of in-patient urban and rural psychiatric services (van Weerden-Dijkstra & Giel, 1975). We used the same five-category urbanization classification as the Nemesis epidemiological study (den Dulk et al.,

1992) to see whether there were differences in the levels of psychiatric service use associated with the level of urbanization (Chapter 5). In this way, it was possible to determine whether these differences based on the use of in-patient facilities matched variations in prevalence rates found in the population as a whole (Chapter 2).

Differences between the use of urban and rural psychiatric services and the prevalence of disorders could be explained in part by variations in the population profile (gender, age, civil status etc.). As a result, the discussion of these studies will generally present, in addition to the absolute figures, figures corrected for the population profile. Correcting the figures in this way makes it possible to see if there was a genuine urbanization factor and, if so, to identify the effect of that factor and possible explanations. The absolute ratios between urban and rural facilities are important for day-to-day practice: we need to know what proportion of our population receive care or have disorders requiring professional help. The figures collected for the population profile are primarily of interest for theoretical purposes: how can we explain the variations between town and country that remain after correction?

### 1.3 Differences in the prevalence of psychiatric disorders in the city

**Figure 1:** Paranoid schizophrenia rates per 100.000 inhabitants in Chicago neighbourhoods (1922-1931)

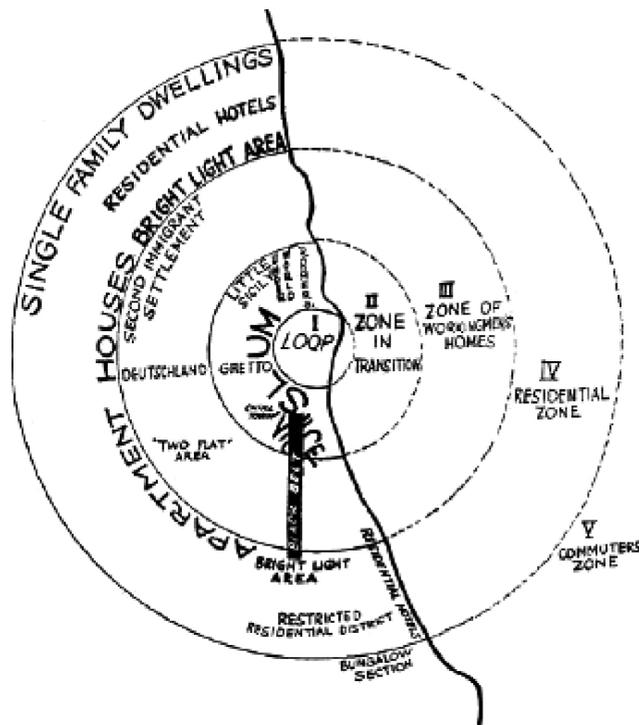


*From:* R. Faris en H. Dunham (1939). Mental disorders in urban areas.

The Chicago study of Faris and Dunham (1939) already showed that the highest levels of schizophrenia were found in the city areas with the highest rates of crime, unemployment, suicide, mobility and population density (see figure 1).

Faris and Dunham (1939) claimed that these social problems, including the high prevalence rates of psychiatric admissions themselves, were *symptomatic* for social pathology at the community level and indicated the need for large numbers of social facilities, including psychiatric facilities. To explain the geographical variations in psychiatric morbidity, we originally had two main theoretical concepts, which originated from the early ecological research of schizophrenia (Faris & Dunham, 1939) and from the Chicago School of Sociology (Park & Burgess, 1925; see figure 2): the drift hypothesis and the breeder hypothesis. The drift hypothesis assumes that geographical selection processes result in a concentration of sick and vulnerable people in socially unstable, deprived neighbourhoods (Freeman & Alpert, 1986; Verheij, 1998). The breeder hypothesis (Durkheim, 1897; Park & Burgess, 1925; Faris & Dunham, 1939) assumes that various environmental factors can cause illness.

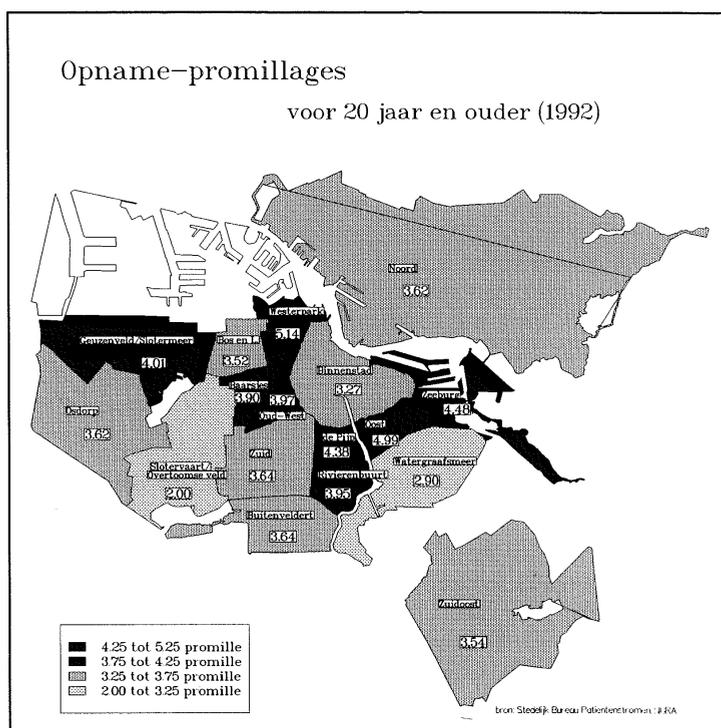
**Figure 2:** The concentric zone model of Park & Burgess



From: R.E. Park & E.W. Burgess (1925). The city.

Following in the footsteps of Faris and Dunham in Chicago, Dutch researchers later found similar variations in Rotterdam (Verdonk, 1979), Nijmegen (Bosma, 1975) and Maastricht (Hamers & Romme, 1990; Gunther et al., 1993). A range of comparable studies have also been conducted in other countries (Hare, 1956; Häfner et al., 1969; Giggs & Cooper, 1987; Klusmann & Angermeyer, 1987; Weyerer & Häfner, 1991; Harrison et al., 1995; Boardman et al., 1997). This 'ecological research' generally focuses, in addition to geographical differences, on correlations between neighbourhood characteristics and the occurrence of psychiatric problems. Links demonstrated in this way between, for example, socio-economic deprivation and the presence of psychiatric problems are admittedly not causal, but they can indicate, in a relatively simple way, areas to target with, for example, prevention activities. Since information of this kind was not yet available for Amsterdam, a study was conducted to determine whether there was also a link in Amsterdam between neighbourhood characteristics and psychiatric prevalence (Chapters 9-11). An example of the neighbourhood data on psychiatric service use is presented in figure 3.

**Figure 3:** Psychiatric admission rates of the Amsterdam neighbourhoods per 1000 inhabitants of 20 years or older in 1992.



From: J. Dekker et al. (1995). Sociale indicatoren en psychiatrische opnamen in Amsterdam. Tijdschrift voor Psychiatrie, 37(1), 15-31.

## **1.4 Aims**

The introduction identifies the following two aims, which will be examined using four research questions.

*Aim 1:* To investigate the relationship between urbanization and the prevalence of psychiatric disorders, as well as psychiatric service use.

*Question 1:* Is degree of urbanization related to the prevalence of psychiatric disorders?

*Question 2:* Is degree of urbanization related to psychiatric admission rates?

*Aim 2:* To investigate the relation between city neighbourhood characteristics and depression symptom levels, as well as psychiatric service use.

*Question 3:* Are neighbourhood characteristics related to depression symptom levels when controlled for individual characteristics?

*Question 4:* Are neighbourhood characteristics related to psychiatric admission rates?

## **1.5 Contents of this thesis**

The four research questions are addressed in the following studies:

### *1.5.1 Part 1: Urban-rural differences in psychiatric morbidity*

Chapters 2-4 investigate the relationship between degree of urbanization and the prevalence of psychiatric disorders (Question 1).

Chapter 2 presents urban-rural differences in the prevalence of psychiatric disorders based on population survey data. Additionally, urban-rural differences are adjusted for a range of demographic variables in order to establish the robustness of the urban-rural differences. As with Chapter 2 for the Netherlands, Chapter 3 presents urban-rural differences in the prevalence of psychiatric disorders in Germany. Chapter 4 reports on a meta-analysis of recent population surveys of urban-rural differences in psychiatric disorders.

Chapters 5-8 investigate the relationship between degree of urbanization and psychiatric admission rates (Question 2).

Chapter 5 deals with a basic investigation of urban-rural differences in psychiatric admission rates in the Netherlands, exploring interrelations between admission rates, urbanization and other demographic characteristics.

Chapter 6 presents urban-rural differences in admission rates for schizophrenia according to age and gender. It also presents urban-rural differences in length of admission and re-admission.

Chapter 7 presents an analysis of the relative importance of urbanization and the basic demographic characteristics of gender, age and marital status for the risk of psychiatric admission for various psychiatric disorders.

Chapter 8 comments on an article about urban-rural differences in admission rates for psychiatric disorders. Various aspects of urban-rural differences in psychiatric disorders (mainly schizophrenia) are discussed.

### *1.5.2 Part 2: Inner-city differences in psychiatric morbidity*

Chapter 9 examines the relation between neighbourhood characteristics, and investigates depression symptom levels in the elderly when controlled for individual characteristics (Question 3).

Chapters 10-11 investigate the relationship between degree of urbanization and psychiatric admission rates (Question 4).

Chapter 10 looks at the link between psychiatric admission rates and demographic characteristics at the neighbourhood level. It also studies relations between demographics and length of stay and re-admission rates.

Chapter 11 details the relation between psychiatric admission rates and demographic characteristics (see Chapter 10) for different diagnostic groups.

Chapter 12 presents a brief summary of the findings, comments on their relevance, and discusses strengths and limitations.

## **1.6 Method**

This section first discusses the central indicator for urbanization. We then turn to a discussion of the various patient datasets used in this thesis.

### *1.6.1 Degree of urbanization used in the Netherlands (Chapters 2,5-7)*

In 1992, the Centraal Bureau voor de Statistiek (Statistics Netherlands – CBS) started to determine the degree of urbanization for every municipality, revising its findings annually (den Dulk et al., 1992). The simple, single-dimensional and numerical unit of measurement it uses for this purpose is 'area address density'. In simple terms: the number of addresses in the immediate vicinity is determined for every address (of a residence, business or organization) in the Netherlands. An address here is a postal address, i.e. individual house/flat number plus street

name, town and post code. The area address density is calculated using a grid of squares measuring 500 by 500 metres each. The address density for each address in a square is then determined as the number of addresses in the square in which the address is located, plus the number of addresses in the twelve squares of which the centres are 1 km from the centre of the square in which the address is situated. The area address density for a municipality is determined by taking the average for the address density of all the individual addresses in a municipality. After determining the average area address density for every municipality, the Statistics Netherlands placed each municipality in one of five categories: very highly urbanized (> 2500 surrounding addresses), highly urbanized (1500-2500 addresses), moderately urbanized (1000-1500 addresses), not very urbanized (500-1000 addresses), not urbanized < 500 addresses). Nowadays, the address density is not only determined at the municipality level but also at the city and neighbourhood levels.

### *1.6.2 Patient data (Chapters 2-3,5-7,9-11)*

Overview of patient data used in this thesis. Note: when two or more chapters are related to the same source, the subset of data used may differ somewhat between those chapters.

*Register/study:* Patiëntenregistratie Intramurale Geestelijke Gezondheidszorg (Patient Registration for In-patient Mental Health Care - PIGG) and Landelijke Medische Registratie (National Medical Register for General Hospitals - LMR).

Institution supplying the data: Stichting Informatievoorziening Gezondheidszorg (Foundation for Information on Health Care - SIG)

*Measures:* Admissions to Algemene Psychiatrische Ziekenhuizen (General Psychiatric Hospitals - APZ), Psychiatrische Universiteitsklinieken (Psychiatric Teaching Clinics in General Hospitals - PUK) and Psychiatrische afdelingen van algemene ziekenhuizen (General Hospital Psychiatric Units - PAAZ), with gender, age, marital status, municipality, diagnosis (ICD-9), length of stay and re-admissions prior to 31 December 1993.

*Period:* 1991

*Chapter(s):* 5, 6 and 7

*Register/study:* Stedelijk Bureau Patiëntenstromen (City Psychiatric Register Amsterdam - SBP)

Institution supplying the data: Samenwerkende Instellingen Gezondheidszorg Regio Amsterdam (Joint Institutions for Health Care in the Amsterdam Region - Sigra)

*Measures:* Admissions to Algemene Psychiatrische Ziekenhuizen (General Psychiatric Hospitals - APZ), Psychiatrische Universiteitsklinieken (Psychiatric

Teaching Clinics in General Hospitals - PUK) and Psychiatrische afdelingen van algemene ziekenhuizen (General Hospital Psychiatric Units - PAAZ) of people over 19 years old living in Amsterdam with gender, age, marital status and diagnosis (ICD-9).

*Period:* 1992-1995

*Chapter(s):* 10 and 11

*Register/study:* The Netherlands Mental Health Survey (NEMESIS)

Institution supplying the data: Trimbos Institute (National Institute of Mental Health and Addiction)

*Measures:* Twelve-month prevalence rates of different psychiatric disorders (CIDI - DSM-III-R) among adults (18-64 yrs) in the Netherlands by degree of urbanization, weighted for gender, age and marital status. Also comorbidity rates, and odds ratios of the prevalence rates of different psychiatric disorders by degree of urbanization, adjusted for gender, age, education, household income, social and occupational status and household composition.

*Period:* 1996

*Chapter(s):* 2

*Register/study:* 1998 German Health Interview and Examination Survey (GHS)

Institution supplying the data: Max Planck Institute of Psychiatry, Munich (Dr. H.U. Wittchen)/TU Dresden (Dr. F. Jacobi)

*Measures:* Twelve-month prevalence cases/non-cases of different psychiatric disorders (M-CIDI - DSM-IV) among adults (18-64 yrs) in Germany by degree of urbanization, with gender, age, degree of urbanization, social class, marital status. Also comorbidity rates.

*Period:* 1998

*Chapter(s):* 3

*Register/study:* The Amsterdam Study of the Elderly (AMSTEL)

Institution supplying the data: Department of Psychiatry of the Vrije Universiteit Amsterdam

*Measures:* GMS-Agecat depression symptom score, with sex, age, socio-economic status, children yes/no, perceived health, chronic disease yes/no.

*Period:* 1992

*Chapter(s):* 9

## References

- Adviesgroep Geestelijke Gezondheidszorg Amsterdam (1987). *Het Amsterdamse model. Eindverslag* (in Dutch).
- Bijl R.V., Zessen, G. van, Ravelli, A., Rijk C. de, & Langendoen, Y. (1998a). The Netherlands Mental Health Survey and Incidence Study (NEMESIS): objectives and design. *Social Psychiatry & Psychiatric Epidemiology*, 33, 581-586.
- Bijl, R.V., Ravelli, A., & Zessen, G. van (1998b). Prevalence of psychiatric disorder in the general population: results of The Netherlands Mental Health Survey and Incidence Study (NEMESIS). *Social Psychiatry & Psychiatric Epidemiology*, 33, 587-595.
- Boardman, A.P., Hodgson, R.E., Lewis, M., & Allen, K. (1997). Social indicators and the prediction of psychiatric admission in different diagnostic groups. *British Journal of Psychiatry*, 171, 457-462.
- Bosma, A. (1975). De ekologische benadering in de psychiatrie. *Tijdschrift voor Psychiatrie*, 17, 231-247 (in Dutch).
- Dekker, J.J.M. (1996). *Het Amsterdamse Sociaal Psychiatrisch Diensten Centrum. Een vergelijkend onderzoek naar een multi-functionele eenheid en de reguliere 24-uurs zorg*. Amsterdam: Psychiatrisch Ziekenhuis Amsterdam (in Dutch).
- Dohrenwend, B.P., & Dohrenwend, B.S. (1974). Psychiatric disorders in urban settings. In G. Caplan (Ed.), *American Handbook of Psychiatry* (pp. 424-447). New York: Basic Books.
- Dulk, C.J. den, Stadt, H. van den, & Vliegen, J.M. (1992). Een nieuwe maatstaf voor stedelijkheid: de omgevingsadressendichtheid. *Maandstatistiek van de Bevolking*, 7, 14-27 (in Dutch).
- Durkheim, E. (1897). *Le suicide. Étude de sociologie*. Paris: Felix Alcan.
- Duurkoop, W.R.A. (1995). *Terug naar Amsterdam. Longitudinaal onderzoek naar het functioneren van chronische patiënten in nieuwe woonsituaties*. Amsterdam: Frederik van Eeden Stichting (in Dutch).
- Ewijk, W.M. van (1992). De keerzijde van het Amsterdamse model. *Maandblad Geestelijke volksgezondheid*, 12, 1357-1363 (in Dutch).
- Faris, R., & Dunham, H. (1939). *Mental disorders in urban areas*. Chicago: University of Chicago Press.
- Freeman, H. (1984). *Mental health and the environment*. London: Churchill Livingstone.
- Freeman, H.L., & Alpert, M. (1986). Prevalence of schizophrenia in an urban population. *British Journal of Psychiatry*, 149, 603-611.
- Giggs, J.A., & Cooper, J.E. (1987). Ecological structure and the distribution of schizophrenia and affective psychoses in Nottingham. *British Journal of Psychiatry*, 151, 627-633.
- Gunther, N.C.H.F., Noorthoorn, E.O., Hamers, H.J.F.R., Jong, J.T.V.M. de, Kaplan, C.D., & Vries, M.W. de (1993). De buurt als sleutel: sociale indicatoren en het gebruik van geestelijke gezondheidszorg. *Tijdschrift voor Psychiatrie*, 35, 675-689 (in Dutch).
- Häfner, H., Reimann, H., Immich, H., Martini, H. (1969). Inzidenz seelischer Erkrankungen in Mannheim. *Social Psychiatry*, 4, 126-135.
- Hamers, H.J.F.R., & Romme, M.A.J. (1990). *Informatie-management in de geestelijke gezondheidszorg: een bijdrage van een casusregister*. Maastricht: van Gorcum (in Dutch).
- Hare E.H. (1956). Mental illness and social conditions in Bristol. *Journal of Mental Science*, 102, 349-357.
- Harrison, J., Barrow, S., & Creed, F. (1995). Social deprivation and psychiatric admission rates among different diagnostic groups. *British Journal of Psychiatry*, 167, 456-462.
- Hodiamont, P.P., Sijben, A.E., Koeter, M.W., & Oldehinkel, A.J. (1992). Psychiatrische problematiek en urbanisatiegraad. *Tijdschrift voor Psychiatrie*, 34, 426-438 (in Dutch).
- Hoek, G., Brunekreef, B., Goldbohm, S., Hischer, P., Brandt, P.A. van den (2002). Association between mortality and indicators of traffic-related air pollution in the Netherlands: a cohort study. *Lancet*, 360(9341), 1203-1209.
- Janssen, M. & Klankbordgroep GGZ Amsterdam (1993). *Het Amsterdamse model halfweg. Een tussenstand van de GGZ-hervormingen in de hoofdstad*. Amsterdam: Gemeente Amsterdam (in Dutch).

- Janssen-Jansen, S.M.A., Lucht, F. van der, Otten, F.W.J., & Geurts, J.M.M. (2002). Verschillen in gezondheid tussen stedelijk en niet-stedelijk gebied. In F. van der Lucht & H. Verkleij (Eds.), *Gezondheid in de grote steden* (pp. 34-37). Bilthoven: RIVM/Bohn Stafleu van Loghem (in Dutch).
- Klusmann, D., & Angermeyer, M.C. (1987). Urban ecology and psychiatric admission rates: results from a study in the city of Hamburg. In M. C. Angermeyer & D. Klusmann (Eds.), *From social class to social stress* (pp. 16-45). Berlin: Springer.
- Kunst, A.E., Bos, V., & Mackenbach, J.P. (2002). Buurtverschillen in sterfte: inkomen en stedelijkheid. In F. van der Lucht & H. Verkleij (Eds.), *Gezondheid in de grote steden* (pp. 34-37). Bilthoven: RIVM/Bohn Stafleu van Loghem (in Dutch).
- Mackenbach, J.P., Stirbu, I., Roskam, A.J., Schaap, M.M., Menvielle, G., Leinsalu, M., & Kunst, A.E. (2008). European Union Working Group on Socioeconomic Inequalities in Health. Socioeconomic inequalities in health in 22 European countries. *New England Journal of Medicine*, 358(23), 2468-2481.
- Marsella, A.J. (1998). Urbanization, mental health, and social deviancy. A review of issues and research. *American Psychologist*, 53, 624-634.
- Mueller, D.P. (1981). The current status of urban-rural differences in psychiatric disorder. An emerging trend for depression. *The Journal of Nervous & Mental Disease*, 169, 18-27.
- Neff, J.A. (1983). Urbanicity and depression reconsidered. The evidence regarding depressive symptomatology. *The Journal of Nervous & Mental Disease*, 171, 546-552.
- Park, R.E., & Burgess, E.W. (1925). *The city*. Chicago: Chicago University Press.
- Peen, J., Bijl, R.V., Spijker, J., & Dekker, J. (2002). Neemt de prevalentie van psychiatrische stoornissen toe met de stedelijkheidsgraad? *Tijdschrift voor Psychiatrie*, 44(4), 225-235 (in Dutch).
- Spijker, J., Bijl, R.V., Dekker, J., & Peen, J. (2001). Psychische morbiditeit in de grote steden. *Tijdschrift voor Gezondheidswetenschappen*, 79, 155-161 (in Dutch).
- Uitenbroek, D.G., Swart, W.A.J.M., Middelkoop, B.J.C., & Mazurkiewicz, E.S. (2002). Sterfte in de grote steden. In F. van der Lucht & H. Verkleij (Eds.), *Gezondheid in de grote steden* (pp. 34-37). Bilthoven: RIVM/Bohn Stafleu van Loghem (in Dutch).
- Verdonk, B. (1979). *Stadsbuurten: de ene is de andere niet*. Deventer: van Loghem Slaterus (in Dutch).
- Verheij, R.A. (1996). Explaining urban-rural variations in health: A review of interactions between individual and environment. *Social Science & Medicine*, 42, 923-935.
- Verheij, R.A. (1998). Urban-rural variations in health in the Netherlands: does selective migration play a part? *Journal of Epidemiology & Community Health*, 52, 487-493.
- Verhoeff, A.P., Hoek, G., Schwartz, J., & Wijnen, J.H. van (1996). Air pollution and daily mortality in Amsterdam. *Epidemiology*, 7(3), 225-230 (in Dutch).
- Webb, S.D. (1984). Rural-urban differences in mental health. In H. Freeman (Ed.), *Mental health and the environment* (pp. 227-249). London: Churchill Livingstone.
- Weerden-Dijkstra, J.R. van, & Giel, R. (1975). Risicogroepen voor psychiatrische opname. *Tijdschrift voor Psychiatrie*, 17, 41-47 (in Dutch).
- Wet ziekenhuisvoorzieningen (1991).
- Weyerer, S., & Häfner, H. (1991). The high incidence of psychiatrically treated disorders in the inner city of Mannheim. *Social Psychiatry & Psychiatric Epidemiology*, 27, 142-146.