

## CV for Bendix Carstensen

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### Education:

Cand. scient. (MSc) in Mathematical Statistics, University of Copenhagen: January 1983  
Graduated gymnasium (high school): June 1971

**Date of birth:** 14 July 1952

**Private address:** Nøddebogade 4, 5.mf., DK-2100 København N.

## Employment

Research assistant, Statistical Research Unit, Copenhagen, Danish Medical and Social Science Research Councils. February 1983 – May 1984.

Statistician, Danish Cancer Registry, Institute of Cancer Epidemiology, Danish Cancer Society, June 1984 – July 1995

Senior statistician, Danish Zoonosis Centre, Danish Veterinary Laboratory, Ministry of Food, Agriculture and Fishery, August 1995 – March 1999.

Senior statistician, Steno Diabetes Center, April 1999 –

Assistant lecturer, Statistical Institute, University of Copenhagen, August 1985 – December 1997.

External lecturer, Department of Biostatistics, University of Copenhagen, January 1998 –.

## Research areas

My expertise and interests are mainly in three areas: Biostatistics, Epidemiology/Public Health and Diabetes Epidemiology;

### Biostatistics:

1. Analysis of follow-up data from register studies and demographic databases:
  - Age-period-cohort models [70, 64].

- Multistate models and their practical application [3, 10, 13, 21, 25, 22, 28, 41, 44, 57, 74].
- 2. Comparison of clinical measurement methods. This is a topic where I have been involved with the clinical departments and laboratory at Steno Diabetes Center in providing practical analyses and as a consequence also in development of the methodology [19, 50, 47, 58, 59, 62, 85, 86]

### **Epidemiology:**

1. Application of registers in surveillance of public health. In my current job this has primarily focused on diabetes on the last 10 years, but I have previously been working in cancer epidemiology. [1, 4, 6, 10, 21, 36, 37, 38, 51, 66, 57, 77, 128, 125].
2. Use of clinical databases for surveillance of patient medical histories. Potential and (in particular) limitations of the results that can be obtained from these. []

### **Demography of diabetes**

1. Application of modern demographic methods for description of the development of the burden of diabetes and its sequelae in the Danish population [6, 10, 13, 21, 24, 36, 37, 38, 57].
2. Clinical epidemiology of diabetes, where modern methods are applied in elucidating clinically relevant aspect of patient histories [25, 22].

In addition to this I have a rather broad experience in practical biostatistical and epidemiological collaborative work; this should be apparent from the list of publications.

## **Teaching**

### **Employments**

Assistant teacher in theoretical statistics for economists Statistical Institute, University of Copenhagen, August 1986– December 1997.

External lecturer, Department of Biostatistics, Institute of Public Health, University of Copenhagen, January 1999–

### **Courses**

Lectures and exercises on Statistical Methods in Epidemiology at European Educational Programme in Epidemiology, Firenze, 1997 and annually 1999–2006.

Lectures on Cohort Studies, Parametrizations of Generalized Linear models and Age-Period-Cohort modelling at Statistical Practise in Epidemiology for Statisticians, Oulanka, Finland, March 2000.

Lectures on Survival analysis and Cohort studies (1 week). Research School for Clinicians, Karolinska Institutet, Stockholm, biannually 2001, 2003, 2005.

Lectures on Statistical Methods in Epidemiology at Diabetology Research Course in Epidemiology and Biostatistics, India, annually 2001–2005.

Course director and teacher (1 of 5) at: “Statistical practice in Epidemiology” (5–6 day course), Tartu, Estonia, annually 2002–2008, 2010, 2014–2017; Lyon, France, 2011, 2013; Pärnu, Estonia, 2012.

Course director and teaching assistant at “Bayesian Data Analysis” (5 day course, main teacher Lyle Gurrin, University of Melbourne):

- University of Copenhagen (Danish Research School of Biostatistics), May 2006, August 2008, August 2012.
- Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, June 2007.

Modern Demographic Methods in Epidemiology:

- Stockholm, 2-3 February 2006 (using R).
- University of Oslo, 28 February - 1 March 2007 (with Paul Lambert, using Stata)
- Cardiovascular research center, Aalborg, 14–16 January 2008 (using R).
- MEGA Center, Melbourne, February 2008 (with Paul Dickman, using Stata & R)
- University of St. Andrews, 1–3 June 2010 (using R)
- IBC, Florence, July 2014 (tutorial).
- University of Edinburgh, 26–29 August 2014 (using R),  
<http://bendixcarstensen.com/AdvCoh/Scot-2014>
- University of Melbourne, November 2015 (using R).
- Freiburg Institute of Advanced Studies, September 2016 (tutorial using R), Freiburg, Germany.
- Years of life lost to diabetes. LEAD symposium at EDEG, May 2017, Dubrovnik.
- Invited to University of Aberdeen, Scotland, August 2017.

Statistical Analysis of Method Comparison Studies:

- Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, 28–30 November 2007.
- School of Population Health, Melbourne, 15 February 2008.
- Australian Statistical Society, Adelaide, 19 February 2009.
- University of Copenhagen (Danish Research School of Biostatistics), 8–10 February 2011.

- Italian Society for Medical Statistics and Clinical Epidemiology (SISMEC), Ancona, 28 September 2011.
- Seminar of Austro-Swiss Region of the International Biometric Society, Dornbirn, September 2013.
- Center for Clinical Research, Haukeland University Hospital, Bergen, March 2014.

Age-Period-Cohort models:

- Max Planck Institute for Demographic Research, Rostock. 23–27 March 2009 (with Eva Gelnarova).
- Department of Medical Epidemiology and Biostatistics, Karolinska Institutet, Stockholm, 3–5 May 2010.
- University of Lisbon, 19–21 September 2011.
- Max Planck Institute for Demographic Research, Rostock. 2–6 May 2016, <http://bendixcarstensen.com/APC/MPIDR-2016/>

## Publications

- [1] M. L. Jensen, F. Persson, G. S. Andersen, M. Ridderstrale, J. J. Nolan, B. Carstensen, and M. E. Jørgensen. Incidence of Ketoacidosis in the Danish Type 2 Diabetes Population Before and After Introduction of Sodium-Glucose Cotransporter 2 Inhibitors-A Nationwide, Retrospective Cohort Study, 1995-2014. *Diabetes Care*, 40(5):e57–e58, May 2017.
- [2] P. F. Rønn, G. S. Andersen, T. Lauritzen, D. L. Christensen, M. Aadahl, B. Carstensen, and M. E. Jørgensen. Ethnic differences in anthropometric measures and abdominal fat distribution: a cross-sectional pooled study in Inuit, Africans and Europeans. *J Epidemiol Community Health*, Jan 2017.
- [3] K. Ishtiak-Ahmed, B. Carstensen, U. Pedersen-Bjergaard, and M. E. Jørgensen. Incidence Trends and Predictors of Hospitalization for Hypoglycemia in 17,230 Adult Patients With Type 1 Diabetes: A Danish Register Linkage Cohort Study. *Diabetes Care*, 40(2):226–232, Feb 2017.
- [4] G. S. Andersen, Z. Kamper-Jørgensen, B. Carstensen, M. Nørredam, I. C. Bygbjerg, and M. E. Jørgensen. Diabetes among migrants in Denmark: Incidence, mortality, and prevalence based on a longitudinal register study of the entire Danish population. *Diabetes Res. Clin. Pract.*, 122:9–16, Sep 2016.
- [5] P. Gæde, J. Oellgaard, B. Carstensen, P. Rossing, H. Lund-Andersen, H. H. Parving, and O. Pedersen. Years of life gained by multifactorial intervention in patients with type 2 diabetes mellitus and microalbuminuria: 21 years follow-up on the Steno-2 randomised trial. *Diabetologia*, Aug 2016.

- [6] B. Carstensen, S. H. Read, S. Friis, R. Sund, I. Keskimaki, A. M. Svensson, R. Ljung, S. H. Wild, J. J. Kerssens, J. L. Harding, D. J. Magliano, and S. Gudbjornsdottir. Cancer incidence in persons with type 1 diabetes: a five-country study of 9,000 cancers in type 1 diabetic individuals. *Diabetologia*, Feb 2016.
- [7] L. Lundby-Christensen, A. Vaag, L. Tarnow, T. P. Almdal, S. S. Lund, J. Wetterslev, C. Gluud, T. W. Boesgaard, N. Wiinberg, H. Perrild, T. Krarup, O. Snorgaard, B. Gade-Rasmussen, B. Thorsteinsson, M. Røder, E. R. Mathiesen, T. Jensen, H. Vestergaard, C. Hedetoft, L. Breum, E. Duun, S. B. Sneppen, O. Pedersen, B. Hemmingsen, B. Carstensen, and S. Madsbad. Effects of biphasic, basal-bolus or basal insulin analogue treatments on carotid intima-media thickness in patients with type 2 diabetes mellitus: the randomised Copenhagen Insulin and Metformin Therapy (CIMT) trial. *BMJ Open*, 6(2):e008377, 2016.
- [8] L. Lundby-Christensen, L. Tarnow, T. W. Boesgaard, S. S. Lund, N. Wiinberg, H. Perrild, T. Krarup, O. Snorgaard, B. Gade-Rasmussen, B. Thorsteinsson, M. Røder, E. R. Mathiesen, T. Jensen, H. Vestergaard, C. Hedetoft, L. Breum, E. Duun, S. B. Sneppen, O. Pedersen, B. Hemmingsen, B. Carstensen, S. Madsbad, C. Gluud, J. Wetterslev, A. Vaag, and T. P. Almdal. Metformin versus placebo in combination with insulin analogues in patients with type 2 diabetes mellitus—the randomised, blinded Copenhagen Insulin and Metformin Therapy (CIMT) trial. *BMJ Open*, 6(2):e008376, 2016.
- [9] S. H. Scheuer, K. Færch, A. Philipsen, M. E. Jørgensen, N. B. Johansen, B. Carstensen, D. R. Witte, I. Andersen, T. Lauritzen, and G. S. Andersen. Response to the Letter: Comment on "Abdominal Fat Distribution and Cardiovascular Risk in Men and Women With Different Levels of Glucose Tolerance" by Scheuer S.H., et al. *J. Clin. Endocrinol. Metab.*, 101(2):L13–14, Feb 2016.
- [10] B. S. Rasmussen, K. B. Yderstræde, B. Carstensen, O. Skov, and H. Beck-Nielsen. Substantial reduction in the number of amputations among patients with diabetes: a cohort study over 16 years. *Diabetologia*, 59(1):121–129, Jan 2016.
- [11] J. L. Harding, J. E. Shaw, A. Peeters, B. Carstensen, and D. J. Magliano. Cancer risk among people with type 1 and type 2 diabetes: disentangling true associations, detection bias, and reverse causation. *Diabetes Care*, 38(2):264–270, Feb 2015.
- [12] J. L. Harding, J. E. Shaw, A. Peeters, B. Carstensen, and D. J. Magliano. Cancer risk among people with type 1 and type 2 diabetes: disentangling true associations, detection bias, and reverse causation. *Diabetes Care* 2015;38:264-270. *Diabetes Care*, 38(4):734–735, Apr 2015.
- [13] Z. Kamper-Jørgensen, B. Carstensen, M. Nørredam, I. C. Bygbjerg, P. H. Andersen, and M. E. Jørgensen. Diabetes-related tuberculosis in Denmark: effect of ethnicity, diabetes duration and year of diagnosis. *Int. J. Tuberc. Lung Dis.*, 19(10):1169–1175, Oct 2015.
- [14] Bendix Carstensen. Simulation of multistate models with multiple timescales: `simLexis` in the `Epi` package.

- <http://BendixCarstensen.com/Epi/simLexis.pdf> or Epi vignette, 2015.
- [15] S. H. Scheuer, K. Færch, A. Philipsen, M. E. Jørgensen, N. B. Johansen, B. Carstensen, D. R. Witte, I. Andersen, T. Lauritzen, and G. S. Andersen. Abdominal Fat Distribution and Cardiovascular Risk in Men and Women With Different Levels of Glucose Tolerance. *J. Clin. Endocrinol. Metab.*, 100(9):3340–3347, Sep 2015.
- [16] P. F. Rønn, L. S. Smith, G. S. Andersen, B. Carstensen, P. Bjerregaard, and M. E. Jørgensen. Birth Weight and Risk of Adiposity among Adult Inuit in Greenland. *PLoS ONE*, 9(12):e115976, 2014.
- [17] A. Peeters, E. Gearon, K. Backholer, and B. Carstensen. Trends in the skewness of the body mass index distribution among urban Australian adults, 1980 to 2007. *Ann Epidemiol*, 25(1):26–33, Jan 2015.
- [18] M. M. Zanders, A. G. Renehan, S. L. Bowker, B. Carstensen, L. V. van de Poll-Franse, and J. A. Johnson. Comment on Bordeleau et al. The association of basal insulin glargine and/or n-3 fatty acids with incident cancers in patients with dysglycemia. *Diabetes Care* 2014;37:1360-1366. *Diabetes Care*, 37(10):e221–222, Oct 2014.
- [19] R. Hiscock, S. Simmons, B. Carstensen, and L. Gurrin. Comparison of Massimo Pronto-7 and HemoCue Hb 201+ with laboratory haemoglobin estimation: a clinical study. *Anaesth Intensive Care*, 42(5):608–613, Sep 2014.
- [20] A. Philipsen, A. L. Hansen, M. E. Jørgensen, S. Brage, B. Carstensen, A. Sandbæk, T. P. Almdal, J. Gram, E. B. Pedersen, T. Lauritzen, and D. R. Witte. Associations of Objectively Measured Physical Activity and Abdominal Fat Distribution. *Med Sci Sports Exerc*, Sep 2014.
- [21] B. Carstensen, M. E. Jørgensen, and S. Friis. The epidemiology of diabetes and cancer. *Curr. Diab. Rep.*, 14(10):535, Oct 2014.
- [22] G. Andresdottir, M. L. Jensen, B. Carstensen, H. H. Parving, P. Hovind, T. W. Hansen, and P. Rossing. Improved prognosis of diabetic nephropathy in type 1 diabetes. *Kidney Int.*, Jun 2014.
- [23] M. L. Jensen, M. E. Jørgensen, E. H. Hansen, L. Aagaard, and B. Carstensen. A multistate model and an algorithm for measuring long-term adherence to medication: a case of diabetes mellitus type 2. *Value Health*, 17(2):266–274, Mar 2014.
- [24] K. Ranc, M. E. Jørgensen, S. Friis, and B. Carstensen. Mortality after cancer among patients with diabetes mellitus: effect of diabetes duration and treatment. *Diabetologia*, 57(5):927–934, May 2014.
- [25] G. Andresdottir, M. L. Jensen, B. Carstensen, H. H. Parving, K. Rossing, T. W. Hansen, and P. Rossing. Improved Survival and Renal Prognosis of Patients With Type 2 Diabetes and Nephropathy With Improved Control of Risk Factors. *Diabetes Care*, Mar 2014.

- [26] K. Færch, B. Carstensen, T. P. Almdal, and M. E. Jørgensen. Improved survival among patients with complicated type 2 diabetes in Denmark: A prospective study (2002-2010). *J. Clin. Endocrinol. Metab.*, page jc20133210, Jan 2014.
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- [28] S. Iacobelli and B. Carstensen. Multiple time scales in multi-state models. *Stat Med*, 32(30):5315–5327, Dec 2013.
- [29] M. E. Jørgensen, T. P. Almdal, and B. Carstensen. Time trends in mortality rates in type 1 diabetes from 2002 to 2011. *Diabetologia*, 56(11):2401–2404, Nov 2013.
- [30] A. Philipsen, B. Carstensen, A. Sandbak, T.P. Almdahl, N.B. Johansen, M.E. Jørgensen, and D.R. Witte. Reproducibility of ultrasonography for assessing abdominal fat distribution in a population at high risk of diabetes. *Clinical Nutrition and Diabetes*, 2013.
- [31] A. L. Hansen, B. Carstensen, J. W. Helge, N. B. Johansen, B. Gram, J. S. Christiansen, S. Brage, T. Lauritzen, M. E. Jørgensen, M. Aadahl, and D. R. Witte. Combined Heart Rate- and Accelerometer-Assessed Physical Activity Energy Expenditure and Associations With Glucose Homeostasis Markers in a Population at High Risk of Developing Diabetes: The ADDITION-PRO Study. *Diabetes Care*, Jun 2013.
- [32] J. Svensson, S. Eising, D. M. Hougaard, H. B. Mortensen, K. Skogstrand, L. B. Simonsen, B. Carstensen, A. Nilsson, A. Lernmark, F. Pociot, and J. Johannesen. Few differences in cytokines between patients newly diagnosed with type 1 diabetes and their healthy siblings. *Hum. Immunol.*, 73(11):1116–1126, Nov 2012.
- [33] J. A. Johnson, B. Carstensen, D. Witte, S. L. Bowker, L. Lipscombe, A. G. Renehan, and the Diabetes and Cancer Research Consortium. Diabetes and cancer (1): evaluating the temporal relationship between type 2 diabetes and cancer incidence. *Diabetologia*, 55(6):1607–1618, Jun 2012.
- [34] A. J. Cameron, D. J. Magliano, J. E. Shaw, P. Z. Zimmet, B. Carstensen, K. G. Alberti, J. Tuomilehto, E. L. Barr, V. K. Pavuvaday, S. Kowlessur, and S. Soderberg. The influence of hip circumference on the relationship between abdominal obesity and mortality. *Int J Epidemiol*, Jan 2012.
- [35] B. Carstensen. Request for clarification from Ruitter et al regarding 'Risk of cancer in patients on insulin glargine and other insulin analogues in comparison with those on human insulin: results from a large population-based follow-up study'. *Diabetologia*, Jan 2012.
- [36] M. B. Hansen, M. L. Jensen, and B. Carstensen. Causes of death among diabetic patients in Denmark. *Diabetologia*, 55(2):294–302, Feb 2012.

- [37] B. Carstensen, D. R. Witte, and S. Friis. Cancer occurrence in Danish diabetic patients: duration and insulin effects. *Diabetologia*, 55(4):948–958, Apr 2012.
- [38] B. Carstensen and Borch-Johnsen K. Register-based studies of diabetes. *Scandinavian Journal of Public Health*, 39(7 suppl):175–179, 2011.
- [39] B. Carstensen, Christensen J.K., Marcussen M.M., and Borch-Johnsen K. The National Diabetes Register. *Scandinavian Journal of Public Health*, 39(7 suppl):58–61, 2011.
- [40] Martyn Plummer and Bendix Carstensen. Lexis: An R class for epidemiological studies with long-term follow-up. *Journal of Statistical Software*, 38(5):1–12, 1 2011.
- [41] Bendix Carstensen and Martyn Plummer. Using Lexis objects for multi-state models in R. *Journal of Statistical Software*, 38(6):1–18, 1 2011.
- [42] S. Eising, A. Nilsson, B. Carstensen, D. M. Hougaard, B. Nørgaard-Pedersen, J. Nerup, Å. Lernmark, and F. Pociot. Danish children born with glutamic acid decarboxylase-65 and islet antigen-2 autoantibodies at birth had an increased risk to develop type 1 diabetes. *Eur. J. Endocrinol.*, 164:247–252, Feb 2011.
- [43] K. Pilgaard, K. Færch, B. Carstensen, P. Poulsen, C. Pisinger, O. Pedersen, D. R. Witte, T. Hansen, T. Jørgensen, and A. Vaag. Low birthweight and premature birth are both associated with type 2 diabetes in a random sample of middle-aged Danes. *Diabetologia*, 53:2526–2530, Dec 2010.
- [44] B. Carstensen. Comment on: Yang et al. (2010) Associations of hyperglycemia and insulin usage with the risk of cancer in type 2 diabetes: the Hong Kong Diabetes Registry. *Diabetes*;59:1254-1260. *Diabetes*, 59:e17–18, Sep 2010.
- [45] L. Lundby-Christensen, T. P. Almdal, B. Carstensen, L. Tarnow, and N. Wiinberg. Carotid intima-media thickness in individuals with and without type 2 diabetes: a reproducibility study. *Cardiovasc Diabetol*, 9:40, 2010.
- [46] R. Borg, J. C. Kuenen, B. Carstensen, H. Zheng, D. M. Nathan, R. J. Heine, J. Nerup, K. Borch-Johnsen, and D. R. Witte. HbA(1c) and mean blood glucose show stronger associations with cardiovascular disease risk factors than do postprandial glycaemia or glucose variability in persons with diabetes: the A1C-Derived Average Glucose (ADAG) study. *Diabetologia*, 54:69–72, Jan 2011.
- [47] B. Carstensen. *Comparing Clinical Measurement Methods: A practical guide*. Wiley, 2010.
- [48] R. Borg, J. C. Kuenen, B. Carstensen, H. Zheng, D. M. Nathan, R. J. Heine, J. Nerup, K. Borch-Johnsen, and D. R. Witte. Real-life glycaemic profiles in non-diabetic individuals with low fasting glucose and normal HbA1c: the A1C-Derived Average Glucose (ADAG) study. *Diabetologia*, 53:1608–1611, Aug 2010.



- [49] R. Borg, J. C. Kuenen, B. Carstensen, H. Zheng, D. M. Nathan, R. J. Heine, J. Nerup, K. Borch-Johnsen, and D. R. Witte. Associations between features of glucose exposure and A1C: the A1C-Derived Average Glucose (ADAG) study. *Diabetes*, 59:1585–1590, Jul 2010.
- [50] B. Carstensen. Comparing methods of measurement: Extending the LoA by regression. *Stat Med*, 29:401–410, Feb 2010.
- [51] A. M. Vaiserman, M. D. Khalangot, B. Carstensen, M. D. Tronko, V. I. Kravchenko, V. P. Voitenko, L. V. Mechova, N. M. Koshel, and P. E. Grigoriev. Seasonality of birth in adult type 2 diabetic patients in three Ukrainian regions. *Diabetologia*, Sep 2009.
- [52] P. Poulsen, L. G. Grunnet, K. Pilgaard, H. Storgaard, A. Alibegovic, M. P. Sonne, B. Carstensen, H. Beck-Nielsen, and A. Vaag. Increased risk of type 2 diabetes in elderly twins. *Diabetes*, 58:1350–1355, Jun 2009.
- [53] L. G. Sadleir, I. E. Scheffer, S. Smith, B. Carstensen, K. Farrell, and M. B. Connolly. EEG features of absence seizures in idiopathic generalized epilepsy: impact of syndrome, age, and state. *Epilepsia*, 50:1572–1578, Jun 2009.
- [54] C. Lau, U. Toft, I. Tetens, B. Carstensen, T. Jørgensen, O. Pedersen, and K. Borch-Johnsen. Dietary Patterns Predict Changes in Two-Hour Post-Oral Glucose Tolerance Test Plasma Glucose Concentrations in Middle-Aged Adults. *J. Nutr.*, Jan 2009.
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- [58] B Carstensen, J Simpson, and LC Gurrin. Statistical models for assessing agreement in method comparison studies with replicate measurements. *International Journal of Biostatistics*, 4(1):Article 16, 2008.
- [59] B Carstensen, J Lindström, J Sundvall, K Borch-Johnsen, J Tuomilehto, and the DPS Study Group. Measurement of blood glucose: Comparison between different types of specimens. *Ann Clin Biochem.*, 45(2):140–148, 2008.
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- [61] J. Johannesen, S. Eising, S. Kohlwes, S. Riis, M. Beck, B. Carstensen, I. Bendtson, and J. Nerup. Treatment of Danish adolescent diabetic patients with CSII - a matched study to MDI. *Pediatr Diabetes*, 9:23–28, Feb 2008.
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- [66] JK Kristensen, TB Drivsholm, B Carstensen, M Steding-Jensen M, and A Green. [Validation of methods to identify known diabetes on the basis of health registers] (in Danish). *Ugeskr Laeger*, 169(18):1687–1692, 2007.
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- [70] B Carstensen. Age-Period-Cohort models for the Lexis diagram. *Statistics in Medicine*, 26(15):3018–3045, July 2007.
- [71] A M Vaiserman, B Carstensen, V P Voitenko, M D Tronko, V I Kravchenko, M D Khalangot, and L V Mechova. Seasonality of birth in children and young adults (0-29 years) with type 1 diabetes in Ukraine. *Diabetologia*, 50(1):32–35, Jan 2007.
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## Software

- Author of the SAS-macro `%Lexis.sas` for use in time-splitting of follow-up studies, particularly in register-follow-up. Available as:  
<http://BendixCarstensen.com/Lexis/Lexis.sas>.
- Maintainer of the Epi package for **R**. Further details about the package and latest version available at:  
<http://BendixCarstensen.com/Epi>

- Main author and maintainer of the MethComp package for **R**. Further details about the package at:  
<http://BendixCarstensen.com/MethComp>