References

Chapter 27

- 1 Murray CJ, Vos T, Lozano R, Naghavi M, Flaxman AD, Michaud C, et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*. 2012:380:2197–223.
- **2** Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, ir-Rohani H, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet.* 2012;**380**:2224–60.
- 3 Perk J, De BG, Gohlke H, Graham I, Reiner Z, Verschuren M, et al. European Guidelines on cardiovascular disease prevention in clinical practice (version 2012). The Fifth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of nine societies and by invited experts). European Heart Journal. 2012;33:1635–701.
- **4** Halvorsen S, Andreotti F, ten Berg JM, Cattaneo M, Coccheri S, Marchioli R, et al. Aspirin therapy in primary cardiovascular disease prevention: a position paper of the European Society of Cardiology working group on thrombosis. *Journal of the American College of Cardiology*. 2014;**64**:319–27.
- **5** Morris PB, Ballantyne CM, Birtcher KK, Dunn SP, Urbina EM. Review of clinical practice guidelines for the management of LDL-related risk, *Journal of the American College of Cardiology*. 2014;**64**:196–206.
- **6** Kotseva K, Wood D, De BG, De BD, Pyorala K, Keil U. Cardiovascular prevention guidelines in daily practice: a comparison of EUROASPIRE I, II, and III surveys in eight European countries. *Lancet*. 2009;**373**:929–40.

- **7** Republic of Estonia Agency of Medicine. Estonian Statistics on Medicines 2006–2010. Available from: http://www.ravimiamet.ee/en/statistics-medicines (last accessed 18 November 2015).
- **8** Sakshaug S, Strom H, Berg C, Blix HS, Litleskare I, Granum T. Drug Consumption in Norway 2008–2012. Available from: http://www.fhi.no/dokumenter/5cf2f40d01.pdf (last accessed 18 November 2015).
- **9** Finnish Medicines Agency Fimea and Social Insurance Institution. Finnish Statistics on Medicines. Available from: http://www.kela.fi/web/en/medicine-reimbursement-statistics_finnish-statistics-on-medicines (last accessed 18 November 2015).
- 10 Kildemoes HW, Stovring H, Andersen M. Driving forces behind increasing cardiovascular drug utilization: a dynamic pharmacoepidemiological model. *British Journal of Clinical Pharmacology*. 2008;66: 885–95.
- **11** Jackevicius CA, Cox JL, Carreon D, Tu JV, Rinfret S, So D, et al. Long-term trends in use of and expenditures for cardiovascular medications in Canada. *CMAJ.* 2009;**181**:E19–28.
- 12 Senes S, Penm E. Medicines for cardiovascular health: are they used appropriately? Available from: http://www.aihw.gov.au/WorkArea/Download Asset.aspx?id=6442454974 (last accessed 18 November 2015).
- **13** Wallach KH, Vass M, Hendriksen C, Andersen M. Statin utilization according to indication and age: a Danish cohort study on changing prescribing and purchasing behaviour. *Health Policy*. 2012;**108**:216–27.
- 14 Chow CK, Teo KK, Rangarajan S, Islam S, Gupta R, Avezum A, et al. Prevalence, awareness, treatment, and control of hypertension in rural and urban communities in high-, middle-, and low-income countries. *Journal of the American Medical Association*. 2013;310:959–68.

- 15 Stolk P, Van Wijk BL, Leufkens HG, Heerdink ER. Between-country variation in the utilization of antihypertensive agents: guidelines and clinical practice. *Journal of Human Hypertension*. 2006;**20**:917–22.
- 16 Qvarnstrom M, Kahan T, Kieler H, Brandt L, Hasselstrom J, Bengtsson BK, et al. Persistence to antihypertensive drug treatment in Swedish primary healthcare. European Journal of Clinical Pharmacology. 2013;69:1955–64.
- 17 Tuppin P, Ricci-Renaud P, de Peretti C, Fagot-Campagna A, Gastaldi-Menager C, Danchin N, et al. Antihypertensive, antidiabetic and lipid-lowering treatment frequencies in France in 2010. Archives of Cardiovascular Disease. 2013;106:274–86.
- **18** Wolf M, Heuten HG, De Swaef A, de Falleur M, Verpooten GA. The evolution of hypertension treatment in Belgium, a pharmacoepidemiological study. *Acta Cardiology*. 2012;**67**:147–52.
- **19** Liberman JN, Berger JE, Lewis M. Prevalence of antihypertensive, antidiabetic, and dyslipidemic prescription medication use among children and adolescents. *Archives of Pediatric and Adolescent Medicine*. 2009;**163**:357–64.
- **20** Martirosyan L, Arah OA, Haaijer-Ruskamp FM, Braspenning J, Denig P. Methods to identify the target population: implications for prescribing quality indicators. *BMC Health Services Research*. 2010;**10**:137.
- **21** Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, et al. The seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure: the JNC 7 report. *Journal of the American Medical Association*. 2003;**289**:2560–72.
- **22** Catic T, Begovic B. Outpatient antihypertensive drug utilization in Canton Sarajevo during five years period (2004-2008) and adherence to treatment guidelines assessment. *Bosnian Journal of Basic Medical Science*. 2011;**11**:97–102.
- **23** Poluzzi E, Strahinja P, Vargiu A, Chiabrando G, Silvani MC, Motola D, et al. Initial treatment of hypertension and adherence to therapy in general practice in Italy. *European Journal of Clinical Pharmacology*. 2005;**61**:603–9.
- **24** Selmer R, Blix HS, Landmark K, Reikvam A. Choice of initial antihypertensive drugs and persistence of drug use a 4-year follow-up of 78 453 incident users. *European Journal of Clinical Pharmacology*. 2012;**68**:1435–42.

- **25** Sofat R, Casas JP, Grosso AM, Prichard BN, Smeeth L, MacAllister R, Hingorani AD. Could NICE guidance on the choice of blood pressure lowering drugs be simplified? *British Medical Journal*. 2012;**344**:d8078.
- **26** Cifkova R, Erdine S, Fagard R, Farsang C, Heagerty AM, Kiowski W, et al. Practice guidelines for primary care physicians: 2003 ESH/ESC hypertension guidelines. *Journal of Hypertension*. 2003;**21**:1779–86.
- **27** Wettermark B, Godman B, Neovius M, Hedberg N, Mellgren TO, Kahan T. Initial effects of a reimbursement restriction to improve the cost-effectiveness of antihypertensive treatment. *Health Policy.* 2010;**94**:221–9.
- **28** Qvarnstrom M, Wettermark B, Ljungman C, Zarrinkoub R, Hasselstrom J, Manhem K, et al. Antihypertensive treatment and control in a large primary care population of 21 167 patients. *Journal of Human Hypertension*. 2011;**25**:484–91.
- **29** Van Wijk BL, Shrank WH, Klungel OH, Schneeweiss S, Brookhart MA, Avorn J. A cross-national study of the persistence of antihypertensive medication use in the elderly, *Journal of Hypertension*. 2008;**26**:145–53.
- **30** Poluzzi E, Strahinja P, Vaccheri A, Vargiu A, Silvani MC, Motola D, et al. Adherence to chronic cardiovascular therapies: persistence over the years and dose coverage. *British Journal of Clinical Pharmacology*. 2007;**63**:346–55.
- 31 Magrini N, Einarson T, Vaccheri A, McManus P, Montanaro N, Bergman U. Use of lipid-lowering drugs from 1990 to 1994: an international comparison among Australia, Finland, Italy (Emilia Romagna Region), Norway and Sweden. *European Journal of Clinical Pharmacology*. 1997;53:185–9.
- **32** Cooke C, Nissen L, Sketris I, Tett SE. Quantifying the use of the statin antilipemic drugs: comparisons and contrasts between Nova Scotia, Canada, and Queensland, Australia. *Clinical Therapeutics*. 2005;**27**:497–508.
- **33** Walley T, Folino-Gallo P, Stephens P, Van Ganse E. Trends in prescribing and utilization of statins and other lipid lowering drugs across Europe 1997–2003. *British Journal of Clinical Pharmacology*. 2005;**60**:543–51.
- **34** Godman B, Sakshaug S, Berg C, Wettermark B, Haycox A. Combination of prescribing restrictions and policies to engineer low prices to reduce reimbursement costs. *Expert Reviews in Pharmacoeconomic Outcomes Research*. 2011;**11**:121–9.

- **35** Vancheri F, Wettermark B, Strender LE, Backlund GE. Trends in coronary heart disease mortality and statin utilization in two European areas with different population risk levels: Stockholm and Sicily. *International Cardiovascular Forum Journal*. 2014;**1**(3):140–6.
- **36** Lesen E, Sandstrom TZ, Carlsten A, Jonsson AK, Mardby AC, Sundell KA. A comparison of two methods for estimating refill adherence to statins in Sweden: the RARE project. *Pharmacoepidemiology & Drug Safety.* 2011;**20**:1073–9.
- 37 Patented Medicine Prices Review Board. Use of the World Health Organization Defined Daily Dose in Canadian Drug Utilization and Cost Analyses. Available from: http://www.pmprb-cepmb.gc.ca/CMFiles/Publications/Analytical%20Studies/NPDUIS-WHO-DDD-e.pdf (last accessed 18 November 2015).
- **38** Hartz I, Sakshaug S, Furu K, Engeland A, Eggen AE, Njolstad I, Skurtveit S. Aspects of statin prescribing in Norwegian counties with high, average and low statin consumption an individual-level prescription database study. *BMC Clinical Pharmacology*. 2007:**7**:14.
- **39** Jackevicius CA, Tu JV, Ross JS, Ko DT, Carreon D, Krumholz HM. Use of fibrates in the United States and Canada. *Journal of the American Medical Association*. 2011;**305**:1217–24.
- **40** Lu L, Krumholz HM, Tu JV, Ross JS, Ko DT, Jackevicius CA. Impact of the ENHANCE trial on the use of ezetimibe in the United States and Canada. *American Heart Journal*. 2014;**167**:683–9.
- **41** Blazing MA, Giugliano RP, Cannon CP, Musliner TA, Tershakovec AM, White JA, et al. Evaluating cardiovascular event reduction with ezetimibe as an adjunct to simvastatin in 18 144 patients after acute coronary syndromes: final baseline characteristics of the IMPROVE-IT study population. *American Heart Journal*. 2014;**168**:205–12.
- **42** Kuklina EV, Carroll MD, Shaw KM, Hirsch R. Trends in high LDL cholesterol, cholesterol-lowering medication use, and dietary saturated-fat intake: United States, 1976–2010. *NCHS Data Brief*. 2013:**117**:1–8.
- **43** Rikala M, Huupponen R, Helin-Salmivaara A, Korhonen MJ. Channelling of statin use towards low-risk population and patients with diabetes. *Basic Clinical Pharmacology & Toxicology*. 2013;**113**:173–8.

- **44** Shalev V, Weil C, Raz R, Goldshtein I, Weitzman D, Chodick G. Trends in statin therapy initiation during the period 2000–2010 in Israel. *European Journal of Clinical Pharmacology*. 2014;**70**:557–64.
- **45** Jackevicius CA, Tu K, Filate WA, Brien SE, Tu JV. Trends in cardiovascular drug utilization and drug expenditures in Canada between 1996 and 2001. *Canadian Journal of Cardiology.* 2003;**19**:1359–66.
- **46** Teeling M, Bennett K, Feely J. The influence of guidelines on the use of statins: analysis of prescribing trends 1998–2002. *British Journal of Clinical Pharmacology*. 2005;**59**:227–32.
- **47** Martikainen JE, Saastamoinen LK, Korhonen MJ, Enlund H, Helin-Salmivaara A. Impact of restricted reimbursement on the use of statins in Finland: a register-based study. *Medical Care*. 2010;**48**:761–6.
- **48** Martirosyan L, Voorham J, Haaijer-Ruskamp FM, Braspenning J, Wolffenbuttel BH, Denig P. A systematic literature review: prescribing indicators related to type 2 diabetes mellitus and cardiovascular risk management. *Pharmacoepidemiology & Drug Safety.* 2010;**19**:319–34.
- **49** Carey IM, DeWilde S, Shah SM, Harris T, Whincup PH, Cook DG. Statin use after first myocardial infarction in UK men and women from 1997 to 2006: who started and who continued treatment? *Nutrition, Metabolism and Cardiovascular Disease*. 2012;**22**:400–8.
- **50** Kale MS, Bishop TF, Federman AD, Keyhani S. Trends in the overuse of ambulatory health care services in the United States. *Journal of the American Medical Association Internal Medicine*, 2013:**173**:142–8.
- 51 Javed U, Deedwania PC, Bhatt DL, Cannon CP, Dai D, Hernandez A, et al. Use of intensive lipid-lowering therapy in patients hospitalized with acute coronary syndrome: an analysis of 65 396 hospitalizations from 344 hospitals participating in Get With The Guidelines (GWTG). *American Heart Journal*. 2011;161:418–24.
- **52** van Staa TP, Smeeth L, Ng ES, Goldacre B, Gulliford M. The efficiency of cardiovascular risk assessment: do the right patients get statin treatment? *Heart*. 2013;**99**:1597–602.
- 53 Wu J, Zhu S, Yao GL, Mohammed MA, Marshall T. Patient factors influencing the prescribing of lipid lowering drugs for primary prevention of cardiovascular disease in UK general practice: a national retrospective cohort study. *PLoS ONE*. 2013;8:e67611.

- **54** Kirley K, Qato DM, Kornfield R, Stafford RS, Alexander GC. National trends in oral anticoagulant use in the United States, 2007 to 2011. *Circulation and Cardiovascular Quality Outcomes*. 2012;**5**:615–21.
- 55 Virjo I, Makela K, Aho J, Kalliola P, Kurunmaki H, Uusitalo L, et al. Who receives anticoagulant treatment with warfarin and why? A population-based study in Finland. *Scandinavian Journal of Primary Health Care*. 2010;28:237–41.
- 56 Camm AJ, Kirchhof P, Lip GY, Schotten U, Savelieva I, Ernst S, et al. Guidelines for the management of atrial fibrillation: the Task Force for the Management of Atrial Fibrillation of the European Society of Cardiology (ESC). European Heart Journal. 2010;31(19):2369–429.
- 57 Fuster V, Rydén LE, Cannom DS, Crijns HJ, Curtis AB, Ellenbogen KA, et al. ACC/AHA/ESC 2006 guidelines for the management of patients with atrial fibrillation. *Circulation*. 2006;114(7):e257–354.
- **58** Pottegård A, Poulsen BK, Larsen MD, Hallas J. Dynamics of vitamin K antagonist and new oral anticoagulants use in atrial fibrillation: a Danish drug utilization study. *Journal of Thrombosis and Haemostasis*. 2014;**12**:1413–18.
- **59** Budnitz DS, Lovegrove MC, Shehab N, Richards CL. Emergency hospitalizations for adverse drug events in older Americans. *New England Journal of Medicine*. 2011;**365**:2002–12.
- **60** Xu Y, Holbrook AM, Simpson CS, Dowlatshahi D, Johnson AP. Prescribing patterns of novel oral anti-coagulants following regulatory approval for atrial fibrillation in Ontario, Canada: a population-based descriptive analysis. *CMAJ Open.* 2013;**1**:E115–19.
- 61 Camm AJ, Lip GY, De CR, Savelieva I, Atar D, Hohnloser SH, et al. 2012 focused update of the ESC Guidelines for the management of atrial fibrillation: an update of the 2010 ESC Guidelines for the management of atrial fibrillation developed with the special contribution of the European Heart Rhythm Association. *European Heart Journal*. 2012;33(21):2719–47.
- **62** Godman B, Malmstrom RE, Diogene E, Jayathissa S, McTaggart S, Cars T, et al. Dabigatran a continuing exemplar case history demonstrating the need for comprehensive models to optimize the utilization of new drugs. *Frontiers in Pharmacology.* 2014;**5**:109.
- **63** Olesen JB, Sorensen R, Hansen ML, Lamberts M, Weeke P, Mikkelsen AP, et al. Non-vitamin K antag-

- onist oral anticoagulation agents in anticoagulant naive atrial fibrillation patients: Danish nationwide descriptive data 2011–2013. *Europace*. 2015;17: 187–93.
- **64** Ogilvie IM, Newton N, Welner SA, Cowell W, Lip GY. Underuse of oral anticoagulants in atrial fibrillation: a systematic review. *American Journal of Medicine*. 2010;**123**:638–45.
- **65** Mohammed MA, Marshall T, Nirantharakumar K, Stevens A, Fitzmaurice D. Patterns of warfarin use in subgroups of patients with atrial fibrillation: a cross-sectional analysis of 430 general practices in the United Kingdom. *PLoS ONE*. 2013;**8**:e61979.
- 66 Forslund T, Wettermark B, Wandell P, von Euler M, Hasselstrom J, Hjemdahl P. Risk scoring and throm-boprophylactic treatment of patients with atrial fibrillation with and without access to primary healthcare data: experience from the Stockholm health care system. *International Journal of Cardiology*. 2013;170:208–14.
- 67 Forslund T, Wettermark B, Wandell P, von Euler M, Hasselstrom J, Hjemdahl P. Risks for stroke and bleeding with warfarin or aspirin treatment in patients with atrial fibrillation at different CHA(2) DS(2)VASc scores: experience from the Stockholm region. *European Journal of Clinical Pharmacology*. 2014;70:1477–85.
- **68** Baczek VL, Chen WT, Kluger J, Coleman CI. Predictors of warfarin use in atrial fibrillation in the United States: a systematic review and meta-analysis. *BMC Family Practice*. 2012;**13**:5.
- **69** Desai NR, Krumme AA, Schneeweiss S, Shrank WH, Brill G, Pezalla EJ, et al. Patterns of initiation of oral anticoagulants in patients with atrial fibrillation quality and cost implications. *American Journal of Medicine*. 2014;**127**:1075–82.
- 70 Pfeilschifter W, Luger S, Brunkhorst R, Lindhoff-Last E, Foerch C. The gap between trial data and clinical practice an analysis of case reports on bleeding complications occurring under dabigatran and rivaroxaban anticoagulation. *Cerebrovascular Disease*. 2013;36:115–19.
- 71 Schmidt M, Hallas J, Friis S. Potential of prescription registries to capture individual-level use of aspirin and other nonsteroidal anti-inflammatory drugs in Denmark: trends in utilization 1999–2012. *Clinical Epidemiology*. 2014;6:155–68.

- **72** Yusuf S, Islam S, Chow CK, Rangarajan S, Dagenais G, Diaz R, et al. Use of secondary prevention drugs for cardiovascular disease in the community in high-income, middle-income, and low-income countries (the PURE Study): a prospective epidemiological survey. *Lancet*. 2011;**378**:1231–43.
- **73** VanWormer JJ, Miller AW, Rezkalla SH. Aspirin overutilization for the primary prevention of cardiovascular disease. *Clinical Epidemiology*. 2014:**6**:433–40.
- **74** Cramer JA, Benedict A, Muszbek N, Keskinaslan A, Khan ZM. The significance of compliance and persistence in the treatment of diabetes, hypertension and dyslipidaemia: a review. *International Journal of Clinical Practice*. 2008;**62**:76–87.
- **75** Chowdhury R, Khan H, Heydon E, Shroufi A, Fahimi S, Moore C, et al. Adherence to cardiovascular therapy: a meta-analysis of prevalence and clinical consequences. *European Heart Journal*. 2013;**34**:2940–8.
- **76** Lemstra M, Blackburn D, Crawley A, Fung R. Proportion and risk indicators of nonadherence to statin therapy: a meta-analysis. *Canadian Journal of Cardiology*. 2012;**28**:574–80.
- 77 Lewey J, Shrank WH, Bowry AD, Kilabuk E, Brennan TA, Choudhry NK. Gender and racial disparities in adherence to statin therapy: a meta-analysis. *American Heart Journal*. 2013;**165**:665–78.
- **78** Kneeland PP, Fang MC. Current issues in patient adherence and persistence: focus on anticoagulants for the treatment and prevention of thromboembolism. *Patient Preference and Adherence*. 2010;**4**:51–60.
- **79** Zalesak M, Siu K, Francis K, Yu C, Alvrtsyan H, Rao Y, et al. Higher persistence in newly diagnosed nonvalvular atrial fibrillation patients treated with dabigatran versus warfarin. *Circulation and Cardiovascular Quality Outcomes*. 2013;**6**:567–74.
- **80** Aarnio EJ, Martikainen JA, Helin-Salmivaara A, Huupponen RK, Hartikainen JE, Peura PK, Korhonen MJ. Register-based predictors of adherence among new statin users in Finland. *Journal of Clinical Lipidology*. 2014;**8**:117–25.
- **81** Steiner JF, Ho PM, Beaty BL, Dickinson LM, Hanratty R, Zeng C, et al. Sociodemographic and clinical characteristics are not clinically useful predictors of refill adherence in patients with hypertension. *Circulation and Cardiovascular Quality Outcomes*. 2009;**2**:451–7.

- **82** Dormuth CR, Patrick AR, Shrank WH, Wright JM, Glynn RJ, Sutherland J, Brookhart MA. Statin adherence and risk of accidents: a cautionary tale. *Circulation*. 2009;**119**:2051–7.
- **83** Payne RA, Avery AJ, Duerden M, Saunders CL, Simpson CR, Abel GA. Prevalence of polypharmacy in a Scottish primary care population. *European Journal of Clinical Pharmacology*. 2014;**70**:575–81.
- **84** Eckert KA, Shi Z, Taylor AW, Wittert G, Price K, Goldney RD. Learning from an epidemiological, population-based study on prescribed medicine use in adults. *Pharmacoepidemiology & Drug Safety*. 2013;**22**:271−7.
- 85 Nobili A, Marengoni A, Tettamanti M, Salerno F, Pasina L, Franchi C, et al. Association between clusters of diseases and polypharmacy in hospitalized elderly patients: results from the REPOSI study. *European Journal of Internal Medicine*. 2011;22:597–602.
- **86** Morgado MP, Rolo SA, Pereira L, Castelo-Branco M. Blood pressure control and antihypertensive pharmacotherapy patterns in a hypertensive population of Eastern Central Region of Portugal. *BMC Health Services Research.* 2010;**10**:349.
- **87** Fleg JL, Aronow WS, Frishman WH. Cardiovascular drug therapy in the elderly: benefits and challenges. *National Reviews in Cardiology.* 2011;**8**:13–28.
- **88** Castellano JM, Sanz G, Fernandez OA, Garrido E, Bansilal S, Fuster V. A polypill strategy to improve global secondary cardiovascular prevention: from concept to reality. *Journal of the American College of Cardiology*. 2014;**64**:613–21.
- **89** Huffman MD, de Cates AN, Ebrahim S. Fixed-dose combination therapy (polypill) for the prevention of cardiovascular disease. *Journal of the American Medical Association*. 2014;**312**:2030–1.
- **90** Reddy KS. Polypill opens a path for improving adherence. *Journal of the American College of Cardiology*. 2014;**64**:2083–5.
- **91** Thom S, Poulter N, Field J, Patel A, Prabhakaran D, Stanton A, et al. Effects of a fixed-dose combination strategy on adherence and risk factors in patients with or at high risk of CVD: the UMPIRE randomized clinical trial. *Journal of the American Medical Association*. 2013;**310**:918–29.
- **92** Reeve E, Shakib S, Hendrix I, Roberts MS, Wiese MD. Review of deprescribing processes and development of an evidence based, patient-centred

- deprescribing process. *British Journal of Clinical Pharmacology*. 2014;**78**(4):738–47.
- **93** Kirchmayer U, Di Martino M, Agabiti N, Bauleo L, Fusco D, Belleudi V, et al. Effect of evidence-based drug therapy on long-term outcomes in patients discharged after myocardial infarction: a nested
- case-control study in Italy. *Pharmacoepidemiology & Drug Safety.* 2013;**22**:649−57.
- **94** Musini VM, Tejani AM, Bassett K, Wright JM. Pharmacotherapy for hypertension in the elderly. *Cochrane Database of Systematic Reviews*. 2009;CD000028.