Cardiac rehabilitation: clinical effectiveness and utilisation in Belgium - Supplement

KCE reports 140S

Belgian Health Care Knowledge Centre
Federaal Kenniscentrum voor de Gezondheidszorg
Centre fédéral d'expertise des soins de santé
2010

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2010

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Title:	Cardiac rehabilitation: clinical effectiveness and utilisation in Belgium- Supplement
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Acknowledgments:	Patrice Chalon (KCE), Stefaan Devriese (KCE), Sophie Gerkens (KCE), Xiao Li (Deloitte), Ruth McAllister (Abacus), Mattias Neyt (KCE), Hans Van Brabandt (KCE), Stephan Van de Sande (KCE), France Vrijens (KCE)
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Conflicts of interest:	C. Brohet, P. Dendale, J. Desutter, C. Laruelle, W. Mullens, M. Renard and L. Vanhees work (or have worked) in a cardiac rehabilitation centre. C. Brohet declared that he had received funds from the pharmaceutical industry for scientific work. J. Boly, M. Renard and A. Wyffels declared conflicts of interest relating to their professional activities within the NIHDI working groups.
Disclaimer:	The external experts were consulted on a (preliminary) version of the scientific report. A (final) version was then submitted to the validators. Validation of the report results in a consensus or a majority vote of the validators. This report was approved <unanimously / by a majority> by the board of directors. KCE has sole responsibility for any errors or omissions that may remain, as well as for the recommendations made to the public authorities.
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Appendices

Table of content

GLOSSARY

ADL	Activities of daily living
CABG	Coronary artery bypass graft
CAD	Coronary artery disease
CHD	Coronary heart disease
CI	Confidence interval
Convention	Multidisciplinary cardiac rehabilitation centres officially recognised by the National Institute for Health and Disability Insurance
CR	Cardiac rehabilitation
EQ-5D	EuroQol-5D
GP	General/primary care practitioner
ESRD	End stage renal disease
HF	Heart failure
HRQoL	Health related quality of life
HTA	Health technology assessment
ICER	Incremental cost effectiveness ratio
ICSI	Institute for Clinical Systems Improvement
IMA/AMI	Database from the Common Sickness Funds Agency
INAHTA	International Network of Agencies for Health Technology Assessment
INAMI-RIZIV	National Institute for Health and Disability Insurance
ISCED	International Standard Classification of Education
MDCR	Multidisciplinary cardiac rehabilitation
MESH	Medical index subject headings
MI	Myocardial Infarction
MLHFQ	Minnesota living with heart failure questionnaire
MMSE	Mini mental state examination
MKG/RCM	Minimale Klinische Gegevens/Résumé Clinique Minimum
MEG	Mutually exclusive group
Nomenclature codes	The codes used by Belgian health authority to identify the medical services provided by the medical professionals for the purpose of reimbursement and finance
PCI	Percutaneous coronary intervention
NYHA	New York heart association
NICE	National Institute for Clinical Excellence
NIHDI	National Institute for Health and Disability Insurance
OR	Odds ratio
PCI	Percutaneous Coronary Intervention
PRM	Physical and Rehabilitation Medicine
PRO	Patient reported outcome
QoL	Quality of life
RCT	Randomised controlled trial
RR	Relative risk
SD	Standard deviation
SF-36	Short form 36 health survey
SIGN	Scottish intercollegiate guideline network
SS	Statistical sector
WMD	Weighted mean difference

1 APPENDICES SYSTEMATIC LITERATURE REVIEW

APPENDIX 1: SYSTEMATIC REVIEW SEARCH STRATEGY

Date	10th August 2009
Database	EMBASE 1980 to 2009 Week 31
Search Strategy	1 exp Heart Muscle Ischemia/ 2 (myocard* adj isch?emi*).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 3 exp Coronary Artery Bypass Graft/ 4 exp Coronary Artery Disease/ 5 exp Heart Muscle Revascularization/ 6 exp Heart Infarction/ 7 (myocard* adj infarct*).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 8 (heart adj infarct*).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 9 exp Angina Pectoris/ 10 angina.mp. 11 exp Heart Failure/ 12 (heart and (failure or attack)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 13 CABG.mp. 14 PCI.mp. 15 (stent* and (heart or cardiac*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 16 exp Extracorporeal Circulation/ 17 exp Rehabilitation Center/ 18 rehabilitat*.mp. 19 (physical* adj3 (fit* or train* or therap* or activit*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 20 (physical* adj (fit* or train* or therap* or activit*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 21 exp Exercise/ 22 (train* adj3 (strength* or aerobic or exercise*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 23 ((exercise* or fitness) adj3 (treatment or intervent* or programme*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 24 exp Rehabilitation/

	25 exp Patient Education/ 26 (patient* adj3 educat*).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 27 ((lifestyle or life-style) adj3 (intervent* or programme* or treatment*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 28 exp Self Care/ 29 exp Ambulatory Care/ 30 (self adj (manage* or care or motivat*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 31 exp Health Education/ 32 heart manual.mp. 33 Clinical Trial/ 34 exp Controlled Clinical Trial/ 35 randomi?ed controlled trial*.mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 36 randomi?ed clinical trial*.mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 37 Random Allocation.mp. or exp Randomization/ 38 Double Blind Procedure/ 39 Single Blind Procedure/ 40 Clinical Trial/ 41 (clin* adj25 trial*).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 42 ((singl* or doubl* or trebl* or tripl*) adj25 (blind* or mask*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 43 exp Placebo/ 44 (Cost* or (cost* and (healthcare or health care)) or (cost* and estimate*) or (cost* and effectiv*) or (cost* and benef*) or (economic* or pharmacoeconomic*) or resource or (length and stay) or hospitali*).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 45 exp Prospective Study/ 46 heart surgery/ 47 (exercise or movement or physical exertion).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 48 cardiac rehabilitation.mp. or heart rehabilitation/ 49 multidisciplinary cardiac rehabilitation.mp. 50 (cardiac adj2 rehabilitation).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]

	51 exp Meta Analysis/ 52 ((meta adj analy*) or metaanalys*).tw. 53 (systematic adj (review* or overview*)).tw. 54 reference lists.ab. 55 bibliograph*.ab. 56 hand-search*.ab. 57 manual search*.ab. 58 relevant journals.ab. 59 56 or 57 or 54 or 53 or 58 or 55 or 52 or 51 60 data extraction.ab. 61 selection criteria.ab. 62 60 or 61 63 review.pt. 64 63 and 62 65 letter.pt. 66 editorial.pt. 67 animal/ 68 66 or 67 or 65 69 64 or 59 70 exp heart surgery/ 71 11 or 70 or 7 or 2 or 1 or 46 or 16 or 13 or 6 or 3 or 9 or 12 or 14 or 15 or 8 or 4 or 10 or 5 72 32 or 21 or 26 or 17 or 48 or 22 or 18 or 30 or 23 or 29 or 25 or 27 or 50 or 28 or 20 or 47 or 49 or 24 or 19 or 31 73 72 and 71 74 69 not 68 75 74 and 73 76 limit 75 to ((dutch or english or french or german) and yr="1999 - Current")
Note	

Date	10th August 2009
Database	Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1950 to Present
Search Strategy	1 exp Myocardial Ischemia/ 2 (myocard* adj3 isch?emi*).mp. [mp=title, original title, abstract, name of substance word, subject heading word] 3 exp Coronary Artery Bypass/ 4 exp Coronary Disease/ 5 exp Myocardial Revascularization/ 6 exp Myocardial Infarction/ 7 (myocard* adj3 infarct*).mp. [mp=title, original title, abstract, name of substance word, subject heading word] 8 (heart adj3 infarct*).mp. [mp=title, original title, abstract, name of substance word, subject heading word] 9 exp Angina Pectoris/ 10 angina.mp. 11 exp Heart Failure/

	12 (heart and (failure or attack)).mp. [mp=title, original title, abstract, name of substance word, subject heading word] 13 CABG.mp. 14 PCI.mp. 15 (stent* and (heart or cardiac*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word] 16 exp Heart Bypass, Right/ 17 exp Heart Bypass, Left/ 18 exp Rehabilitation Centers/ 19 exp Exercise Therapy/ 20 rehabilitat*.mp. 21 (physical* adj3 (fit* or train* or therap* or activit*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word] 22 exp Exercise/ 23 (train* adj3 (strength* or aerobic or exercise*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word] 24 ((exercise* or fitness) adj3 (treatment or intervent* or programme*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word] 25 exp Rehabilitation/ 26 heart manual.mp. 27 Controlled Clinical Trial*.mp. 28 randomi?ed controlled trial*.mp. [mp=title, original title, abstract, name of substance word, subject heading word] 29 randomi?ed clinical trial*.mp. [mp=title, original title, abstract, name of substance word, subject heading word] 30 random allocation.mp. or exp Random Allocation/ 31 exp Double-Blind Method/ 32 exp Single-Blind Method/ 33 Placebos.mp. or exp Placebos/ 34 (Cost* or (cost* and (healthcare or health care)) or (cost* and estimate*) or (cost* and effectiv*) or (cost* and benef*) or (economic* or pharmacoeconomic*) or resource or (length and stay) or hospitali*).mp. [mp=title, original title, abstract, name of substance word, subject heading word] 35 exp Prospective Studies/ 36 exp heart surgery/ 37 exercise/ or movement/ or physical exertion/ 38 cardiac rehabilitation.mp. 39 multidisciplinary cardiac rehabilitation.mp. 40 (cardiac adj2 rehabilitation).mp. [mp=title, original title, abstract, name of substance word, subject heading word] 41 exp Patient Education as Topic/ 42 (patient* adj3 educat*).mp. [mp=title, original title, abstract, name of substance word, subject heading word] 43 ((lifestyle or life-style) adj3 (intervt* or programme* or treatment*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word] 44 exp Self Care/ 45 exp Ambulatory Care/ 46 (self adj (manage* or care or motivat*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word] 47 exp Health Education/ 48 Meta-analysis as Topic/ 49 meta analy*.tw. 50 metaanaly*.tw. 51 Meta-Analysis/ 52 (systematic adj (review or overview)).tw. 53 exp Review Literature as Topic/ 54 search*.ab.

	55 hand-search*.ab. 56 relevant journals.ab. 57 manual search.ab. 58 ((selection or inclusion) adj criteria).ab. 59 Review/ 60 Comment/ 61 Letter/ 62 Editorial/ 63 animal/ 64 49 or 53 or 57 or 54 or 48 or 55 or 56 or 52 or 50 or 51 65 data extraction.ab. 66 65 or 58 67 59 and 66 68 67 or 64 69 63 or 60 or 62 or 61 70 68 not 69 71 exp Cardiac Surgical Procedures/ 72 11 or 71 or 7 or 17 or 2 or 1 or 16 or 13 or 6 or 36 or 3 or 9 or 12 or 14 or 15 or 8 or 4 or 10 or 5 73 21 or 26 or 42 or 22 or 18 or 46 or 23 or 44 or 25 or 39 or 40 or 41 or 47 or 20 or 38 or 45 or 24 or 37 or 19 or 43 74 72 and 73 75 74 and 70 76 limit 75 to (yr="1999 -Current" and (dutch or english or french or german))
Note	

Date	10th August 2009
Database	CRD databases
Search Strategy	# 1 MeSH Myocardial Ischemia EXPLODE 1 2 # 2 myocar* NEAR isch* # 3 MeSH Coronary Artery Bypass EXPLODE 1 2 # 4 MeSH Coronary Disease EXPLODE 1 2 # 5 MeSH Myocardial Revascularization EXPLODE 1 2 # 6 MeSH Myocardial Infarction EXPLODE 1 2 # 7 myocard* NEAR infarct* # 8 heart NEAR infarct* # 9 MeSH Angina Pectoris EXPLODE 1 2 3 # 10 angina # 11 MeSH Heart Failure EXPLODE 1 # 12 heart AND (failure OR attack) # 13 CABG # 14 PCI # 15 stent* AND (heart AND cardiac*) # 16 MeSH Heart Bypass, Left EXPLODE 1 # 17 MeSH Heart Bypass, Right EXPLODE 1 2 3 # 18 MeSH Cardiac Surgical Procedures EXPLODE 1 2 # 19 MeSH Cardiovascular Surgical Procedures EXPLODE 1 2 # 20 heart AND surgery # 21 #1 OR #2 OR #3 Or #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 # 22 MeSH Rehabilitation Centers EXPLODE 1 # 23 MeSH Exercise Therapy EXPLODE 1 2 3 # 24 rehabilitat* # 25 physical AND (fit* OR train* OR activit*) # 26 MeSH Exercise Therapy EXPLODE 1 2 3 # 27 MeSH Exercise EXPLODE 1 2 # 28 (exercise OR fitness) AND (treatment OR intervent* OR programme*) # 29 physcial AND (fit* OR therap* OR activit*)

	# 30 physical AND (fit* OR therap* OR activit*) # 31 train* AND (strength* OR aerobic OR exercise*) # 32 exercise OR movement OR physical AND exertion # 33 cardiac AND rehabilitation # 34 cardiac NEAR rehabilitation # 35 MeSH Patient Education as Topic EXPLODE 1 2 3 # 36 patient NEAR education # 37 (life-style OR lifetstyle) AND (intervent* OR programme* OR treatment*) # 38 (life-style OR lifestyle) AND (intervent* OR programme* OR treatment*) # 39 MeSH Self Care EXPLODE 1 2 # 40 MeSH Ambulatory Care EXPLODE 1 2 # 41 self NEAR manage* OR care # 42 MeSH Health Education EXPLODE 1 2 3 # 43 #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42 # 44 MeSH Meta-Analysis as Topic EXPLODE 1 2 3 4 # 45 meta AND analy* OR metaanaly* OR meta-analy* # 46 MeSH Meta-Analysis EXPLODE 1 # 47 systematic NEAR review # 48 systematic NEAR overview # 49 MeSH Review EXPLODE 1 2 # 50 review # 51 MeSH Review Literature as Topic EXPLODE 1 # 52 #44 OR #45 OR #46 OR #47 OR #48 OR #49 OR #50 OR #51 # 53 #21 OR #43 OR #52 # 54 #21 AND #43 AND #52 # 55 french:la # 56 #54 RESTRICT YR 1999 2009
Note	

Date	10th August 2009
Database	The Cochrane library
Search Strategy	#1 MeSH descriptor Myocardial Ischemia explode all trees #2 myocard* NEAR/2 isch*mia #3 MeSH descriptor Coronary Artery Bypass explode all trees #4 MeSH descriptor Coronary Disease explode all trees #5 myocardial revascularisation #6 myocardial revascularization #7 myocard* NEXT infarct* #8 MeSH descriptor Myocardial Infarction explode all trees #9 heart NEXT infarct* #10 MeSH descriptor Angina Pectoris explode all trees #11 angina #12 MeSH descriptor Heart Failure explode all trees #13 heart AND (failure OR attack) #14 CABG #15 PCI #16 stent* AND (cardiac* or heart) #17 MeSH descriptor Heart Bypass, Left explode all trees #18 MeSH descriptor Heart Bypass, Right explode all trees #19 heart surgery #20 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19) #21 MeSH descriptor Rehabilitation Centers explode all trees #22 MeSH descriptor Exercise Therapy explode all trees #23 rehabilit* #24 physical* NEAR/3 (strength* OR aerobic OR exercise*)

	#25 MeSH descriptor Exercise explode all trees #26 physical NEAR/3 (fit* OR train* OR therp* or activit*) #27 train NEAR/3 (strength OR aerobic OR exercise*) #28 (exercise OR fitness) AND (treatment OR intervent* OR programme*) #29 MeSH descriptor Rehabilitation explode all trees #30 heart manual #31 MeSH descriptor Exercise explode all trees #32 MeSH descriptor Movement explode all trees #33 MeSH descriptor Physical Exertion explode all trees #34 cardiac rehabilitation #35 cardiac NEAR/2 rehab* #36 MeSH descriptor Patient Education as Topic explode all trees #37 patient* NEAR/2 educat* #38 (lifestyle OR life-style) NEAR/3 (intervent* OR programme* OR treatment*) #39 MeSH descriptor Self Care explode all trees #40 MeSH descriptor Ambulatory Care explode all trees #41 self NEAR/2 (manage* OR care OR motivat*) #42 MeSH descriptor Health Education explode all trees #43 (#21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42) #44 (#20 AND #43) #45 (#44), from 1999 to 2009
Note	

Date	10th August 2009
Database	Pedro
Search Strategy	Myocardial ischemia Myocardial ischaemia Coronary artery bypass Coronary disease Myocardial revascularization Myocardial revascularization Myocardial infarction Heart infarction Angina pectoris Angina Heart failure Heart attack CABG Coronary artery bypass graft PCI Percutaneous conronary intervention Heart bypass Heart surgery Cardiac rehabilitation Rehabilitation Rehabilitation centers Exercise therapy Rehabilitation (cardiothoracics) Exercise (cardiothoracics) Fitness programme (cardiothoracics) Heart manual Patient education (cardiothoracics) Health education Self care Ambulatory care
Note	Only a simple query-based interface ; unable to run search strings All searches limited to systematic review dated from 1999 onwards and results reviewed manually

APPENDIX 2: RCT SEARCH STRATEGY

Date	2nd November 2009
Database	EMBASE 1980 to 2009 Week 31
Search Strategy	1 exp Heart Muscle Ischemia/ 2 (myocard* adj isch?emi*).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 3 exp Coronary Artery Bypass Graft/ 4 exp Coronary Artery Disease/ 5 exp Heart Muscle Revascularization/ 6 exp Heart Infarction/ 7 (myocard* adj infarct*).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 8 (heart adj infarct*).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 9 exp Angina Pectoris/ 10 angina.mp. 11 exp Heart Failure/ 12 (heart and (failure or attack)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 13 CABG.mp. 14 PCI.mp. 15 (stent* and (heart or cardiac*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 16 exp Extracorporeal Circulation/ 17 exp Rehabilitation Center/ 18 rehabilitat*.mp. 19 (physical* adj3 (fit* or train* or therap* or activit*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 20 (physical* adj (fit* or train* or therap* or activit*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 21 exp Exercise/ 22 (train* adj3 (strength* or aerobic or exercise*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 23 ((exercise* or fitness) adj3 (treatment or intervent* or programme*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 24 exp Rehabilitation/ 25 exp Patient Education/ 26 (patient* adj3 educat*).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 41123 27 ((lifestyle or life-style) adj3 (intervent* or programme* or treatment*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 28 exp Self Care/ 29 exp Ambulatory Care/ 30 (self adj (manage* or care or motivat*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name]

	31 exp Health Education/ 32 heart manual.mp. 33 Clinical Trial/ 34 exp Controlled Clinical Trial/ 35 randomi?ed controlled trial*.mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 36 randomi?ed clinical trial*.mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 37 Random Allocation.mp. or exp Randomization/ 38 Double Blind Procedure/ 39 Single Blind Procedure/ 40 Clinical Trial/ 41 (clin* adj25 trial*).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 42 ((singl* or doubl* or trebl* or tripl*) adj25 (blind* or mask*)).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 43 exp Placebo/ 44 (Cost* or (cost* and (healthcare or health care)) or (cost* and estimate*) or (cost* and effectiv*) or (cost* and benef*) or (economic* or pharmacoeconomic*) or resource or (length and stay) or hospitali*).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 536799 45 exp Prospective Study/ 46 heart surgery/ 47 (exercise or movement or physical exertion).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 48 cardiac rehabilitation.mp. or heart rehabilitation/ 49 multidisciplinary cardiac rehabilitation.mp. 50 (cardiac adj2 rehabilitation).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer name] 51 exp Meta Analysis/ 52 ((meta adj analy*) or metaanalys*).tw. 53 (systematic adj (review* or overview*)).tw. 54 reference lists.ab. 55 bibliograph*.ab. 56 hand-search*.ab. 57 manual search*.ab. 58 relevant journals.ab. 59 56 or 57 or 54 or 53 or 58 or 55 or 52 or 51 60 data extraction.ab. 61 selection criteria.ab. 62 60 or 61 63 review.pt. 64 63 and 62 65 letter.pt. 66 editorial.pt. 67 animal/ 68 66 or 67 or 65 69 64 or 59 70 exp heart surgery/ 71 11 or 70 or 7 or 2 or 1 or 46 or 16 or 13 or 6 or 3 or 9 or 12 or 14 or 15 or 8 or 4 or 10 or 5 72 32 or 21 or 26 or 17 or 48 or 22 or 18 or 30 or 23 or 29 or 25 or 27

	or 50 or 28 or 20 or 47 or 49 or 24 or 19 or 31 73 72 and 71 74 69 not 68 75 74 and 73 76 limit 75 to ((dutch or english or french or german) and yr="1999 - Current") 77 Clinical trial/ 78 Randomized controlled trial/ 79 Randomization/ 80 Single blind procedure/ 81 Double blind procedure/ 82 Crossover procedure/ 83 Placebo/ 84 Placebo/ 85 Randomi?ed controlled trial$.tw. 86 Rct.tw. 87 Random allocation.tw. 88 Allocated randomly.tw. 89 (allocated adj2 random).tw. 90 Single blind$.tw. 91 Double blind$.tw. 92 ((treble or triple) adj blind$).tw. 93 Placebo$.tw. 94 Prospective study/ 95 90 or 91 or 80 or 78 or 79 or 87 or 93 or 88 or 77 or 82 or 84 or 85 or 83 or 94 or 81 or 92 or 89 or 86 96 Case study/ 97 Case report.tw. 98 Abstract report/ or letter/ 99 98 or 97 or 96 100 95 not 99 101 95 and 73 102 101 not 99 103 limit 102 to (human and (dutch or english or french or german) and yr="2003 - 2009")
Note	

Date	2nd November 2009
Database	Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) 1950 to Present
Search Strategy	#1 exp Myocardial Ischemia/ #2 (myocard* adj3 isch?emi*).mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] #3 exp Coronary Artery Bypass/ #4 exp Coronary Disease/ #5 exp Myocardial Revascularization/ #6 exp Myocardial Infarction/ #7 (myocard* adj3 infarct*).mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] #8 (heart adj3 infarct*).mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] #9 exp Angina Pectoris/ #10 angina.mp. #11 exp Heart Failure/ #12 (heart and (failure or attack)).mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] #13 CABG.mp. #14 PCI.mp. #15 (stent* and (heart or cardiac*)).mp. [mp=title, original title,

	abstract, name of substance word, subject heading word, unique identifier] #16 exp Heart Bypass, Right/ #17 exp Heart Bypass, Left/ #18 exp Rehabilitation Centers/ #19 exp Exercise Therapy/ #20 rehabilitat*.mp. #21 (physical* adj3 (fit* or train* or therap* or activit*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] #22 exp Exercise/ #23 (train* adj3 (strength* or aerobic or exercise*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] #24 ((exercise* or fitness) adj3 (treatment or intervent* or programme*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] #25 exp Rehabilitation/ #26 heart manual.mp. #27 Controlled Clinical Trial*.mp. #28 randomi?ed controlled trial*.mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] #29 randomi?ed clinical trial*.mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] #30 random allocation.mp. or exp Random Allocation/ #31 exp Double-Blind Method/ #32 exp Single-Blind Method/ #33 Placebos.mp. or exp Placebos/ #34 (Cost* or (cost* and (healthcare or health care)) or (cost* and estimate*) or (cost* and effectiv*) or (cost* and benef*) or (economic* or pharmacoeconomic*) or resource or (length and stay) or hospitali*).mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] #35 exp Prospective Studies/ #36 exp heart surgery/ #37 11 or 7 or 17 or 2 or 1 or 16 or 13 or 6 or 36 or 3 or 9 or 12 or 14 or 15 or 8 or 4 or 10 or 5 #38 exercise/ or movement/ or physical exertion/ #39 cardiac rehabilitation.mp. #40 multidisciplinary cardiac rehabilitation.mp. #41 (cardiac adj2 rehabilitation).mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] #42 exp Patient Education as Topic/ #43 (patient* adj3 educat*).mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] #44 ((lifestyle or life-style) adj3 (intervt* or programme* or treatment*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] #45 exp Self Care/ #46 exp Ambulatory Care/ #47 (self adj (manage* or care or motivat*)).mp. [mp=title, original title, abstract, name of substance word, subject heading word, unique identifier] #48 exp Health Education/ #49 11 or 7 or 17 or 2 or 1 or 16 or 13 or 6 or 36 or 3 or 9 or 12 or 14 or 15 or 8 or 4 or 10 or 5 #50 21 or 26 or 48 or 42 or 22 or 18 or 46 or 23 or 44 or 25 or 39 or 40 or 41 or 47 or 20 or 38 or 24 or 45 or 19 or 43 #51 50 and 49 #52 Meta-analysis as Topic/

	#53 meta analy*.tw. #54 metaanaly*.tw. #55 Meta-Analysis/ #56 (systematic adj (review or overview)).tw. #57 exp Review Literature as Topic/ #58 search*.ab. #59 hand-search*.ab. #60 relevant journals.ab. #61 manual search.ab. #62 ((selection or inclusion) adj criteria).ab. #63 Review/ #64 Comment/ #65 Letter/ #66 Editorial/ #67 animal/ #68 53 or 57 or 61 or 58 or 52 or 59 or 60 or 56 or 54 or 55 #69 data extraction.ab. #70 69 or 62 #71 63 and 70 #72 71 or 68 #73 67 or 64 or 66 or 65 #74 72 not 73 #75 74 and 51 #76 limit 75 to (yr="1999 -Current" and (dutch or english or french or german)) #77 Randomized controlled trials as Topic/ #78 Randomized controlled trial/ #79 Random allocation/ #80 Double blind method/ #81 Single blind method/ #82 Single blind method/ #83 Clinical trial/ #84 exp Clinical Trials as Topic/ #85 84 or 83 or 80 or 78 or 79 or 81 or 77 or 82 #86 (clinic$ adj trial$1).tw. #87 ((singl$ or doubl$ or treb$ or tripl$) adj (blind$3 or mask$3)).tw. #88 Placebos/ #89 Placebo$.tw. #90 Randomly allocated.tw. #91 (allocated adj2 random).tw. #92 90 or 88 or 89 or 91 #93 92 or 85754601 #94 Case report.tw. #95 Letter/ #96 Historical article/ #97 Review of reported cases.pt. #98 Review, multicase.pt. #99 98 or 95 or 97 or 94 or 96 #100 93 not 99 #101 50 and 49 and 100 #102 limit 101 to (yr="2003 - 2009" and (dutch or english or french or german))
Note	

Date	2nd November 2009
Database	The cochrane library (Clinical trials only)
Search Strategy	#1 MeSH descriptor Myocardial Ischemia explode all trees #2 myocard* NEAR/2 isch*mia #3 MeSH descriptor Coronary Artery Bypass explode all trees #4 MeSH descriptor Coronary Disease explode all trees #5 myocardial revascularisation #6 myocardial revascularization #7 myocard* NEXT infarct* #8 MeSH descriptor Myocardial Infarction explode all trees #9 heart NEXT infarct* #10 MeSH descriptor Angina Pectoris explode all trees #11 angina #12 MeSH descriptor Heart Failure explode all trees #13 heart AND (failure OR attack) #14 CABG #15 PCI #16 stent* AND (cardiac* or heart) #17 MeSH descriptor Heart Bypass, Left explode all trees #18 MeSH descriptor Heart Bypass, Right explode all trees #19 heart surgery #20 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19) #21 MeSH descriptor Rehabilitation Centers explode all trees #22 MeSH descriptor Exercise Therapy explode all trees #23 rehabilit* #24 physical* NEAR/3 (strength* OR aerobic OR exercise*) #25 MeSH descriptor Exercise explode all trees #26 physical NEAR/3 (fit* OR train* OR therp* or activit*) #27 train NEAR/3 (strength OR aerobic OR exercise*) #28 (exercise OR fitness) AND (treatment OR intervent* OR programme*) #29 MeSH descriptor Rehabilitation explode all trees #30 heart manual #31 MeSH descriptor Exercise explode all trees #32 MeSH descriptor Movement explode all trees #33 MeSH descriptor Physical Exertion explode all trees #34 cardiac rehabilitation #35 cardiac NEAR/2 rehab* #36 MeSH descriptor Patient Education as Topic explode all trees #37 patient* NEAR/2 educat* #3 (lifestyle OR life-style) NEAR/3 (intervent* OR programme* OR treatment*) #39 MeSH descriptor Self Care explode all trees #40 MeSH descriptor Ambulatory Care explode all trees #41 self NEAR/2 (manage* OR care OR motivat*) #42 MeSH descriptor Health Education explode all trees #43 (#21 OR #22 OR #23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34 OR #35 OR #36 OR #37 OR #38 OR #39 OR #40 OR #41 OR #42) #44 (#20 AND #43) #45 (#44), from 2003 to 2009
Note	

Date	2nd November 2009
Database	Pedro
Note	Myocardial ischemia Myocardial ischaemia Coronary artery bypass Coronary disease Myocardial revascularization Myocardial revascularization Myocardial infarction Heart infarction Angina pectoris Angina Heart failure Heart attack CABG Coronary artery bypass graft PCI Percutaneous conronary intervention Heart bypass Heart surgery Cardiac rehabilitation Rehabilitation Rehabilitation centers Exercise therapy Rehabilitation (cardiothoracics) Exercise (cardiothoracics) Fitness programme (cardiothoracics) Heart manual Patient education (cardiothoracics) Health education Self care Ambulatory care
	Only a simple query-based interface ; unable to run search strings All searches limited to clinical trial and dated from 2003 onwards and results reviewed manually

APPENDIX 3: INAHTA MEMBER WEBSITES SEARCHED

Organisation	Full name	Country
AETMIS	Agence d´Évaluation des Technologies et des Modes d´Intervention en Santé	Canada
AETS	Agencia de Evaluación de Tecnologias Sanitarias	Spain
AETSA	Andalusian Agency for Health Technology Assessment	Spain
AGENAS	L'Agenzia nazionale per i servizi sanitari regionali - The Agency for Regional Healthcare	Italy
AHRQ	Agency for Healthcare Research and Quality	USA
AHTA	Adelaide Health Technology Assessment	Australia
AHTAPol	Agency for Health Technology Assessment in Poland	Poland
ASERNIP-S	Australian Safety and Efficacy Register of New Interventional Procedures -Surgical	Australia
AVALIA-T	Galician Agency for Health Technology Assessment	Spain
CADTH	Canadian Agency for Drugs and Technologies in Health	Canada
CAHTA	Catalan Agency for Health Technology Assessment and Research	Spain
CDE	Center for Drug Evaluation	Taiwan, Republic of China
CEDIT	Comité dÉvaluation et de Diffusion des Innovations Technologiques	France
CENETEC	Centro Nacional de Excelencia Tecnológica en Salud Reforma	Mexico
CNHTA	Committee for New Health Technology Aseessment	Korea
CVZ	College voor Zorgverzekeringen	The Netherlands
DACEHTA	Danish Centre for Evaluation and Health Technology Assessment	Denmark
DAHTA @DIMDI	German Agency for HTA at the German Institute for Medical Documentation and Information	Germany
DECIT-CGATS	Secretaria de Ciëncia, Tecnologia e Insumos Estratégicos, Departamento de Ciência e Tecnologia	Brazil
DSI	Danish Institute for Health Services Research	Denmark
ETESA	Department of Quality and Patient Safety of the Ministry Health of Chile	Chile
FinOHTA	Finnish Office for Health Care Technology Assessment	Finland
GOG	GÖG - Gesunheit Österreich GmbH	Austria
GR	Gezondheidsraad	The Netherlands

HAS	Haute Autorité de Santé	France
HIQA	Health Information and Quality Authority	Ireland
HSAC	Health Services Assessment Collaboration	New Zealand
ICTAHC	Israel Center for Technology Assessment in Health Care	Israel
IECS	Institute for Clinical Effectiveness and Health Policy	Argentina
IHE	Institute of Health Economics	Canada
INAHTA	International Network of Agencies for Health Technology Assessment	International
IQWiG	Institut für Qualität und Wirtschaftlichkeit im Gesundheitswesen	Germany
KCE	Belgian Federal Health Care Knowledge Centre	Belgium
LBI of HTA	Ludwig Boltzmann Institut für Health Technonoly Assessment	Austria
MaHTAS	Health Technology Assessment Section, Ministry of Health Malaysia	Malaysia
MAS	Medical Advisory Secretariat	Canada
MSAC	Medicare Services Advisory Committee	Australia
MTU-SFOPH	Medical Technology Unit - Swiss Federal Office of Public Health	Switzerland
NCCHTA	National Coordinating Centre for Health Technology Assessment	United Kingdom
NHS QIS	Quality Improvement Scotland	United Kingdom
NHSC	National Horizon Scanning Center	United Kingdom
NOKC	Norwegian Knowledge Centre for Health Services	Norway
OSTEBA	Basque Office for Health Technology Assessment	Spain
SBU	Swedish Council on Technology Assessment in Health Care	Sweden
UETS	Unidad de evaluacíon Technologias Santarias	Spain
UVT	HTA Unit in A.Gemelli University Hospital	Italy
VASPVT	State Health Care Accreditation Agency under the Ministry of Health of the Republic of Lithuania	Lithuania
VATAP	VA Technology Assessment Programme	USA
ZonMw	The Medical and Health Research Council of The Netherlands	The Netherlands
NICE	National Institute for Clinical Excellence	United Kingdom

APPENDIX 4: CLINICAL EVIDENCE TABLES

Table 1: Systematic reviews evaluating exercise therapy in heart failure patients

Study	Comparator(s)	Supplementary information	Results	Summary
Bartlo, 2007 [1]	Studies of healthy persons, patients with CAD or chronic diseases other than CHF, patients undergoing a stretching programme, or those who performed no exercise were included as control groups.	Patients with either CHF or Coronary artery disease.	Aerobic Exercise: Clinically important benefits (shown as percentage of outcome improvement) and statistically significant results (P values) were found for the outcomes of V O2max (18%, P < .01; 25%, P < .001; and 19%, P < .001), dyspnea (56%, P < .01), work capacity (54%, P < .01; and 24%, P < .001), and left ventricular function (16%, P < .01) in the aerobic exercise treatment group in comparison with the control group of rest or no exercise. RESISTANCE Exercise: This analysis demonstrated clinical importance (shown as percentage of outcome improvement) and statistical significance (P values) for improvements in left ventricular function (29%, P = .0085), peak lactate levels (27%, P= .064), muscle strength (44%, P< .016; and 25%, P < .05), and muscle endurance (64%, P = .001).	Aerobic exercise led to significant improvements in physiological outcomes versus rest or no exercise Resistance exercise led to significant improvements in physiological outcomes
Chien 2008 [2]	Usual activity	Chronic heart failure (duration at least 3 months).	Peak O2 volume increased by 2.7 ml/kg/min (95% CI 0.7-4.7); 6 min walking distance increased by 41 m (95% CI 19-63); no improvement in QoL. No change in hospitalisation rates or mortality.	Home- based exercise increased exercise capacity safely but did not improve QoL in patients with CHF. It could therefore be used to improve the management of people with chronic heart failure who do not have access to hospital- based exercise.
ExTraMATCH 2004 [3]	Usual care	Patients with HF and left ventricular systolic dysfunction.	Lower mortality with exercise (RR 0.65, 95% CI 0.46-0.92) RR for death or admission to hospital 0.72 (95% CI 0.56-0.93)	Exercise significantly reduced deaths and hospital re-admission
Feijts, 2004 [4]	Rest		Pooled analysis for endurance was possible using data from 10/15 studies. Weighted mean difference for exercise vs. rest was 2.47 (95% CI: 1.48 - 3.46). Individually 7/10 studies showed significant benefits, and 3 studies did not show benefits.	Exercise significantly improved physiological markers compared with rest
Haykowsky 2007 [5]	Usual care		Significant improvement in ejection fraction from pooled trials (14 trials; 812 patients; WMD=1.83%; 95% CI 0.45% to 3.21%), but substantial heterogeneity (I2=49.2%). Aerobic training trials only: consistent benefits (9 trials, 538 patients, WMD=2.59%; 95% CI 1.44% to 3.74%, I2=17.2%). Trials with combined training: combined training inconclusive (4 trials, 249 patients, WMD for EF=0.37%; 95% CI -2.23% to -2.97%, I2=25.7%). Left ventricular volume: significant decline in end-diastolic volume (569 patients; WMD= -9.75 ml; 95% CI -16.64 to -2.86 ml) and end-systolic volume (569 patients; WMD= -12.31 ml; 95% CI -17.12 to -7.49 ml). Aerobic training only: significant improvements in end-diastolic volume (371 patients; WMD= -11.49 ml; 95% CI -19.95 to -3.02 ml) and end-systolic volume (371 patients; WMD= -12.87 ml; 95% CI -17.80 to -7.93 ml) combined aerobic and strength training: inconclusive for both end-diastolic volume (198 patients; WMD= 0.39 ml; 95% CI -25.84 to -26.62 ml, I2=0%) and end-systolic volume (WMD= -0.73 ml; 95% CI -23.19 to -21.72 ml; I2=0%)	Aerobic training reverses LV remodelling in clinically stable individuals with Heart Failure. This benefit was not confirmed with combined aerobic and strength training.
Horner 2001 [6]	Not reported	Chronic heart failure (as defined by the ESC 1995)		
Johansson 2006 [7]	Not reported			Several individual factors impact HR- QoL, therefore, most nursing interventions are individually adapted to the patient's resources.
Lloyd-Williams	Not reported	74% of studies: patients under 65	Not reported	Short-term physical exercise training in

Study	Comparator(s)	Supplementary information	Results	Summary
2002 [8]		years. Women underrepresented in the studies.		selected subgroups of patients with CHF has physiological benefits and positive effects on quality of life.
Rees 2004a [9]	Usual care		OR for all-cause mortality is 1.12 (95% CI 0.58-2.15), peak O2 consumption +2.16 ml/kg/min (95% CI 2.82-1.49), exercise duration +2.38 min (95% CI 2.85-1.92), max work capacity +15.1 (95% CI 64.7-17.1), 6 min walk +40.9m (95% CI 64.7-17.1)	This review shows that exercise training improves exercise capacity and HRQoL in patients with NYHA functional status class II or III heart failure.
Smart 2004 [10]	Not reported	Baseline ejection fraction <40%, concurrent drug therapy allowed.	Mean increase of O2 uptake was 16.8%+/-8.0% (95%CI 13.7%-17.9%). Mean increase of O2 consumption with either continuous or intermittent aerobic exercise 16.5%+/-6.9%, 95% CI 14.3%-18.7%. OR for adverse events 0.83 (95% CI 0.50-1.39). OR for adverse events and death 0.98 (95% CI 0.61-1.32). OR for death 0.71 (95% CI 0.37-1.02)	Exercise training is safe and effective in patients with heart failure. The risk of adverse events may be reduced, but further studies are required to determine whether there is any mortality benefit.
Tai 2008 [11]	Not reported	Aged 45 or over, with heart failure or left ventricular dysfunction		Study findings suggest that the favourable physiological responses to exercise might slow some of the pathophysiological progression of HF. However, most of the trials reviewed here were based on relatively small samples and selected participant groups, and the exercise programmes varied widely.
van Tol 2006 [12]	Usual care		Cardiac performance at rest (HR SES -0.17, SBP SES -0.12, DBP SES -0.33, LVEF SES 0.16, ESV SES -0.26, EDV SES -0.21, CO SES 0.27), during maximal exercise (HR SES 0.2, SBP SES 0.22, DBP -0.26, CO SES 0.58), exercise capacity (peak O2 consumption SES 0.6, Watt SES 0.57, anaerobic threshold SES 0.84, 6 min walking distance SES 0.52), HRQL increased significantly (MLWHFQ SES -0.41)	Exercise training in stable patients with mild to moderate CHF, results in statistically significant improvements in maximum heart rate, maximum cardiac output, peak VO2, anaerobic threshold, 6-MWD and HRQL.

Table 2: Systematic reviews evaluating exercise therapy in mixed patient groups

Study	Comparator(s)	Condition	Supplementary information	Results	Summary
Brown 2003 [13]	Usual care	Coronary artery disease	Patients of all ages, in both hospital-based and community-based settings, who had experienced an MI, or undergone a CABG or PCI, or who had angina pectoris or CAD defined by angiography. Studies predominantly involving participants with heart transplants, heart valve surgery, heart failure, pacemakers and congenital heart disease were excluded.	Pooled results: RR for all-cause mortality 0.76 95% CI 0.59-0.98 for exercise and 0.87 95% CI 0.74-1.02 for comprehensive programmes. RRs were 0.73 (0.56 to 0.96) and 0.80 (0.65 to 0.99) for cardiac mortality, 0.78 (0.59 to 1.03) and 1.07 (0.85 to 1.35) for non-fatal MI, 0.87 (0.58 to 1.29) and 0.81 (0.59 to 1.10) for CABG, and 0.57 (0.28 to 1.16) and 0.84 (0.59 to 1.19) for PCI respectively. Mean difference in risk factors for exercise and comprehensive programmes respectively: total cholesterol (mmol/l) -0.17 (-0.34 to 0.00) and 0.71 (-0.83 to –0.60); HDL cholesterol (mmol/l) 0.04 (-0.009 to 0.09) and 0.02 (-0.01 to 0.16); LDL cholesterol (mmol/l) -0.27 (-043 to –0.12) and -0.52 (-0.7 to –0.31); Triglycerides (mmol/l) -0.18(-0.31 to –0.04) and -0.29(-0.44 to –0.14), Systolic blood pressure (mmHg) -2.35 (-6.6 to 2.1) and -3.5 (-6.1 to –0.9), Diastolic blood pressure (mmHg) 1.0 (-2.6 to 4.7) and -1.62 (-3.27 to 0.02). RR for smoking: 0.82 (0.62 to 1.18) and 0.76 (0.58 to 1.00)	Exercise significantly reduced cardiac and all-cause mortality, comprehensive programmes reduced only cardiac mortality
AHCPR clinical guidelines, 1995 [14]	No exercise/ rest	Mixed	CHD, angina, MI, CABG, PCI, CHF	Not reported	Meta-analysis of the RCTs of exercise rehabilitation in patients following MI establishes a reduction in mortality approximating 25 % at 3-year followup. The reduction in cardiovascular mortality was 26 percent in multifactorial randomized trials of cardiac rehabilitation and 15 percent in trials that involved only an exercise intervention. The panel concluded that multifactorial cardiac rehabilitation services can reduce mortality in patients following myocardial infarction.
Oliveira 2008 [15]	Not reported	Mixed	Patients with coronary artery disease who suffered myocardial infarction or CABG, older than 45 years		Resistance exercise reduced physical, social and psychological disabilities by increased tolerance in occupational activities. Combination resistance exercise with aerobic exercise can contribute to increased tolerance in aerobic exercise, when longer than 3 months. Resistance exercise is well-tolerated.
Puetz 2006 [16]	Various	Mixed	CHD, MI or surgery	Effects on feeling of energy and fatigue: 34 of 36 studies showed an effect >0. Mean effect size 0.51 (95% CI 0.42-0.61)	This review quantifies the potential benefit of cardiac rehabilitation exercise programmes on feelings of energy and fatigue, and suggests that cardiac rehabilitation researchers and practitioners may benefit from examining, and perhaps even focusing on, feelings of energy and fatigue as an important outcome variable.
Taylor 2004 [17]	Usual care	Mixed	Patients with coronary heart disease who had a myocardial infarction, coronary artery	Exercise therapy compared with usual care: OR for all-cause mortality 0.80 95% CI 0.68-0.93, OR for total cardiac mortality 0.74 95% CI 0.61-0.96. Total cholesterol -0.37 mmol/l 95% CI -0.63 to -0.11, triglyceride -0.23	Exercise therapy compared with usual care: All-cause mortality and total cardiac mortality reduced. No difference the rates of

Study	Comparator(s)	Condition	Supplementary information	Results	Summary
			bypass graft, percutaneous coronary intervention or angina pectoris or coronary heart disease defined by angiography.	mmol/l 95% CI -0.39 to -0.07. Systolic blood pressure -3-2 mmHg 95% CI -5.4 to -0.9. OR for smoking 0.64 95% CI 0.50-0.83	myocardial infarction, coronary artery bypass grafting or percutaneous coronary intervention. Less total cholesterol and triglycerides. LDL and HDL unchanged. Systolic blood pressure reduced, but no difference for diastolic blood pressure. Fewer smokers.
Taylor 2006 [18] (analysis based on data subset from Taylor 2004 [17])	Usual care	Mixed	Subpopulation of RCTs from Taylor 2004 analysed using the IMPACT coronary heart disease model Myocardial infarction, revascularisation, angina	Exercise reduced cardiac mortality by 28% (95% CI 5-45%); 80 deaths were observed with exercise (30 less than with usual care 110). Greater risk factor decreases were seen with exercise training (18% decrease in smoking prevalence; pooled mean difference of 0.11 mmol/l for cholesterol, and 2.0 mmHg for systolic blood pressure. Smoking cessation accounted for 24% of mortality reduction, systolic blood pressure reduction for 15% and cholesterol for 19.7% and in total accounted for 57% of the reduction in total mortality.	
Woodgate 2008 [19]	Not reported	Mixed	Patients with MI, CABG, or CVD engaged in cardiac rehabilitation.		The development of task and self-regulatory skills for managing rehabilitative exercise is a central part of CR participants' rehabilitation. The successful acquisition of these skills as well as the development and preservation of self-efficacy beliefs may influence the maintenance of the adherence necessary to produce favourable short- and long-term CR outcomes
Bitzer 2002 [20]	No or usual treatment	Myocardial infarction	Any permitted but 32/53 studies on myocardial infarction and is the basis of the paper		

Table 3: Systematic reviews evaluating multidisciplinary cardiac rehabilitation in heart failure patients

Study	Comparator(s)	Supplementary information	Results	Summary
Balinsky, 2003 [21]	Control group	Elderly patients		In- patient based multifaceted interventions appear to be effective and inexpensive
Bazian ltd 2005 [22]	Usual care		Only data from a previous systematic review is quoted.	These studies show that comprehensive care delivered by a highly specialised team reduces hospital admissions and mortality. However, evidence is lacking on comprehensive care delivered by non- specialist teams.
Bruggink-André 2005 [23]	Not reported		Not reported	15 of 21 studies report a positive impact on one of the primary outcome parameters; no effect in three; negative effect in one. The outcome parameters studied varied greatly and included readmission rates, time to readmission, readmission-free survival and the combined endpoint readmission for CHF and/or allcause mortality.
Duffy 2004 [24]	Not reported	Community-based HF patients, mean age of 71.5.	NR	This systematic review of nonpharmacological randomized clinical trials specific to community-based HF patients suggests that benefits in QoL and hospital readmission can be realized by both multidisciplinary disease management and nonpharmacological nurseled interventions.
Gensichen 2004 [25]	Not reported (uncontrolled studies were included)		RR for mortality after 3-6 months (3 studies) was 0.65, 95% CI 0.44-0.94, after 12-18 months (4 studies) RR 0.85 95% CI 0.66-1.09. The number of hospital stays was significantly reduced in 4/7 simple and 13/16 complex studies. Number of hospital days significantly reduced in 4/7 simple and 11/15 complex studies. Cost was significantly reduced in 4/6 simple and 9/11 complex studies. Quality of life was significantly improved in 6/8 complex studies. Functional state was significantly improved in 1/1 simple and 4/6 complex studies. Adherence was not improved in one simple study and significantly improved in 3/3 complex studies.	
Gonseth 2004 [26]	Not reported	Elderly patients (≥ 65 yrs)	RCTs: RR for readmission for cardiovascular cause: 0.7 (95% CI 0.62-0.79); RR for all-cause readmission 0.88 (95% CI 0.79-0.97); RR for readmission or death: 0.82 (95% CI 0.72-0.94); CCTs: RR for hospitalizations for HF 0.38 (95% CI 0.16-0.93); RR for all-cause readmissions 0.50 (95% CI 0.34-0.74); RR for readmission or death 0.37 (95% CI 0.24-0.58)	This review provides evidence that DMPs (Disease management programmes) reduce readmissions for HF or cardiovascular cause, all-cause re-admissions, and the frequency of the combined endpoint of re-admission or death among older patients with heart failure. These results were observed regardless of the type of healthcare delivery within DMPs, such as being home-based or clinic-based, and the duration of follow-up.
Grady 2006	Not reported	Mean age 65		

Study	Comparator(s)	Supplementary information	Results	Summary
[27]		years or over.		
Gwadry-Sridhar 2004 [28]	Usual care	Patients to be hospitalized for HF and enrolled just before, during or after hospital stay.	Pooled RR for readmissions significant at 0.79 (P<0.001). Pooled RR for mortality 0.98 (95% CI 0.72-1.34)	Patients with HF seem to benefit from a reduced risk of readmission. An educational intervention in patients with HF as part of a programme resulted in statistically significant relative risk reduction in readmissions.
Holland 2005 [29]	Usual care		All cause admission RR 0.87, 95% CI 0.79-0.95, p=0.002. Subgroups: home visit RR 0.80, 95% CI 0.71-0.89, p<0.0001.Telephone-type interventions RR 0.86, 95% CI 0.73-1.02, p=0.09. Hospital based interventions RR 0.99, 95% CI 0.90-1.10, p=0.56. All-cause mortality RR 0.79, 95% CI 0.69-0.92, p=0.002). Subgroups: telemonitoring RR 0.49, 95% CI 0.33-0.73, p<0.001, telephone follow up RR 0.70, 95% CI 0.53-0.94, p=0.02. in the home RR 0.87, 95% CI 0.72-1.06, p=0.44; clinic RR 1.00, 95% CI 0.84-1.20, p=0.98. HF admission RR 0.70 (95% CI 0.61-0.81, p<0.0001). RR for home and telephone-type interventions: 0.62 (95% CI 0.51-0.74, p<0.001) and 0.70 (95% CI 0.57-0.85, p<0.001). RR for hospital or community based intervention 0.94, 95% CI 0.78-1.13, p=0.51.	This systematic review shows that delivering multidisciplinary interventions to patients with heart failure not only reduces hospital admission but also is an effective method for reducing mortality.
Jerant 2005 [30]	Not reported			There is preliminary evidence from RCTs that, when targeted to recently hospitalized patients with moderately severe to severe heart failure (NYHA class III or IV), a variety of loosely related 'disease management' interventions that incorporate telemedicine can result in significantly improved outcomes as compared with usual care. The strongest evidence exists for their impact on heart- failure- related and all- cause hospitalizations and emergency visits.
McAlister 2001a [31]	Usual care		Hospitalization rate RR 0.87 (95% CI 0.79-0.96), total hospitalizations RR 0.81 (95% CI 0.77-0.85)	Results suggest that randomized trials have established that some disease management programmes, particularly those involving patient education, multidisciplinary teams, and specialized follow-up procedures, improve prescribing practices, are cost saving, and reduce the risk of hospitalization in patients with heart failure.
McAlister 2004 [32]	Usual care		All-cause mortality: RR for multidisciplinary teams providing specialized follow-up 0.75 95% CI 0.59-0.96, RR with telephone follow-up or programmes enphasiszing enhanced patient self-care 1.14 95% CI 0.67-1.94 All-cause hospitalization: RR for multidisciplinary teams 0.81 95% CI 0.71-0.92, RR for enhanced patient self-care 0.73 95% CI 0.57-0.93 HF hospitalization rate: RR for MMS 0.73 95% CI 0.66-0.82 Total hospitalizations: RR for intervention 0.7 95% CI 0.62-0.80 RR for total HF hospitalizations 0.57 95% CI 0.49-0.67	Pooling the data from the 29 randomized trials of multidisciplinary management strategies for patients with HF reveals that these programmes are associated with a 27% reduction in HF hospitalization rates (NNT = 11) and a 43% reduction in total number of HF hospitalizations. Those strategies that incorporate specialized follow-up by a multidisciplinary team or in a multidisciplinary HF clinic also reduce all-cause mortality by approximately one-quarter (NNT = 17) and all-

Study	Comparator(s)	Supplementary information	Results	Summary
				cause hospitalizations by one-fifth (NNT = 10).
Philbin 1999 [33]	Control group or historical reference sample	Patients with congestive heart failure		Comprehensive, multidisciplinary management programmes for CHF can improve functional status and reduce the risk of hospital admission, and they may lower medical costs.
Philips 2005 [34]	Usual care	Patients diagnosed with Congestive heart failure	RR for readmission (intervention vs. usual care): 0.91 (95% CI 0.72-1.16). Point estimates for complex programmes vs. simple programmes: 0.30 (0.04, 2.60) vs. 1.00 (0.86, 1.17) for readmission, 0.09 [0.10, 0.65] vs. 0.65 [0.43, 1.00] for HF readmission, and -0.26 [-0.49, -0.02] vs. 0.09 [-1.17, 1.34] for the number of hospital days during follow-up. Mortality 0.80 [0.57, 1.13]. (0.96 [0.63, 1.47] for complex programmes vs. 0.75 [0.55, 1.03] for less complex protocols.) Combined endpoint of mortality and hospitalization was 0.61 [0.18, 2.02] vs. 0.91 [0.80, 1.03].	HF DM with specialist nurse-led HF clinics is a promising strategy or effective alternative whose benefit may be optimized by programmes with a homogeneous structure and components that are delivered with consistency.
Rich 1999 [35]	Not reported			There has been a consistency in the reported findings in that all studies have shown a favourable effect on hospital utilization. In addition, several studies have reported significant improvements in QoL, functional capacity, patient satisfaction, and compliance with medications and diet. Also, the heart failure disease management programmes are highly cost- effective and frequently cost- saving.
Roccaforte 2005 [36]	Usual care	Patients to be followed in an outpatient setting	Pooled OR for mortality 0.8 95% CI 0.69-0.93, p=0.003; combined RR 0.84, 95% CI 0.74-0.94, p=0.003. Combined OR for (re)hospitalisation 0.76 95% CI 0.69-0.94, p<0.00001, pooled RR 0.86 95% CI 0.82-0.91, p<0.00001. Combined OR for HF-specific (re)hospitalisation 0.58 95% CI 0.50-0.67, p<0.00001, combined RR 0.69 95% CI 0.63-0.77, p<0.00001. HF-specific mortality OR 0.37, 95% CI 0.21-0.73, p<0.0002. WMD for hospital days = -1.49 95% CI -2.03 to -0.95, p<0.00001.	DMP reduce mortality and hospitalisations in HF patients. Because various types of DMP appear to be similarly effective, the choice of a specific programme depends on local health services characteristics, patient population, and resources available.
Taylor 2005 [37]	Usual care		OR for mortality: 0.86 95% CI 0.67-1.10, p=0.23, but interventions differed in content, duration and follow-up.	There is some evidence that case management interventions may confer benefit in terms of overall survival and a tentative suggestion that they might be associated with a reduction in hospital readmissions for heart failure. There is also evidence that some case management interventions may be associated with improvements in health related quality of life. A single RCT of a multidisciplinary intervention showed evidence of benefits in terms of reduced heart-failure related re-admissions in the short term.
Windham	Not reported	Older patients with congestive	57% of studies showed reductions in total hospital admissions. Of 12 studies, 5 found decreased use of emergency departments, 4 found no difference. QoL	Care management interventions can be clinically effective, although cost effectiveness remains to be established. Common elements in

Study	Comparator(s)	Supplementary information	Results	Summary
2003 [38]		HF	improved in 5 studies, unchanged in 6. Mortality decreased in 1 of 13 studies.	effective care management programmes included the teaming of a physician with a nurse or care manager; frequent patient monitoring for CHF decompensation; and patient education to improve self-assessment skills. Most ineffective programmes showed deficiencies in nurse training, study design, or patient selection.
Yu 2006 [39]	Not reported	Effective and ineffective MMS are compared		Twenty-one trials were identified, 11 (52.4%) of which reported DMPs improving the discharge outcomes of older people with heart failure. The results indicate that an effective DMP should be multi-faceted and consists of an in-hospital phase of care, intensive patient education, self-care supportive strategy, optimization of medical regimen, and ongoing surveillance and management of clinical deterioration. Cardiac nurse and cardiologist should be actively involved and a flexible app----------roach should be adopted to deliver the follow-up care.

Table 4: Systematic reviews evaluating multidisciplinary cardiac rehabilitation in mixed patient populations

Study	Comparator(s)	Condition	Supplementary information	Results	Summary
Auer, 2008 [40]	Usual care	Myocardial infarction	Patients hospitalized for an acute coronary syndrome, defined as unstable angina, non-ST-segment myocardial infarction, or ST-segment myocardial infarction.	In-hospital interventions showed increased smoking cessation rates (RR, 1.29; 95% CI, 1.02 to 1.63), but there was evidence of heterogeneity (P for heterogeneity 0.001;I2 66%) .The overall pooled RR for all-cause mortality was 0.78 (95% CI, 0.71 to 0.86; P for heterogeneity 0.28; I2 14%) using a random-effect model. The pooled RR for 1-year all-cause mortality was 0.79 (95% CI, 0.69 to 0.92), with a value for statistical heterogeneity of P 0.12 and an I2 of 32%. Readmission - The pooled RR for readmission between the intervention and control groups was 0.84 (95% CI, 0.73 to 0.98; P for heterogeneity 0.16; I2 32%).	Only interventions including a provider- or system-level intervention suggested reduced mortality compared with patient-level– only interventions. The evidence for in-hospital, patient-level interventions for secondary prevention is promising but not definitive because only before-after studies suggest a significant reduction in mortality.
Clark, 2005 [41]	Usual Care	Majority (Acute MI), Surgical procedure (CABG, PCI) CAD (others)	MI, CABG, PCI, surgery or angina	The summary risk ratio for all 40 trials reporting all-cause mortality (16 142 patients) was 0.85 (95% CI, 0.77 to 0.94; P for heterogeneity 0.96; I2 0%). The treatment effects did not statistically significantly differ among the 3 types of secondary prevention programmes, even if all exercise-based programmes were combined (27 trials, 6940 patients) (summary risk ratio, 0.83 [CI, 0.72 to 0.96]) and compared with non–exercise-based programmes (14 trials, 9202 patients) (summary risk ratio, 0.87 [CI, 0.76 to 0.99]; P 0.64). Recurrent MI rate: The summary risk ratio for reinfarction for all 11 723 patients over a median follow- up of 12 months was 0.83 (CI, 0.74 to 0.94; P for heterogeneity= 0.55; I2= 0%).	Secondary prevention programmes positively affect processes of care (risk factor profiles and use of proven efficacious therapies) and functional status or quality of life for participants and reduce MIs by 17% over a median follow- up of 12 months. The mortality benefit derived from participation in secondary prevention programmes (15% overall and 47% at 2 years) became apparent with longer follow-up and was of similar magnitude in recently published trials and in trials published more than 2 decades ago (before the widespread use of contemporary medical therapies). Benefits did not differ among the 3 types of programmes
Clark 2007 [42]	Usual care	Coronary artery disease		RR for all-cause mortality 0.87 (95% CI 0.79-0.97)	Patients with CHD who are less clinically complex can benefit from programmes which are shorter, based in general-practice settings, and provided by generalists. Longer, hospital-based programmes staffed by specialists would be most efficiently employed if they are reserved for patients with substantial comorbidities, lower motivation or more complicated disease.
Jolly 2006[43]	Home-based cardiac rehabilitation is compared to centre-based rehabilitation and usual care	Mixed	Patients with myocardial infarction, PCI, CABG or coronary artery disease.	Home-based cardiac rehabilitation vs. usual care: systolic blood pressure -4mm Hg, 95% CI -6.5 to -1.5, cholesterol mmol/l -0.07 95% CI -0.91 to 0.77, RR of death 1.39 95% CI 0.98 to 1.97, RR for being a smoker at follow-up 0.71 95% CI 0.51-1.00 Home-based cardiac rehabilitation versus supervised care: systolic blood pressure -1mm Hg, 95% CI -3.7 to 6.0, cholesterol mmol/l 0.03 95% CI -0.29 to 0.35, RR of death 1.15 95% CI 0.47 to 2.82, RR	Differences in exercise capacity, total cholesterol, anxiety and depression were all in favour of the home-based group. In patients post-myocardial infarction exercise capacity was significantly improved in the home rehabilitation group by 1.1 METS (95% CI 0.2, 2.1) compared to usual care. The comparison of home-based with supervised centre-based cardiac rehabilitation revealed no significant differences in exercise capacity, systolic blood pressure and total cholesterol.

Study	Comparator(s)	Condition	Supplementary information	Results	Summary
				for being a smoker at follow-up 0.55 95% CI 0.24 to 1.22	
Linden 2007 [44]	Usual care or multi-component usual care	Mixed	Most are myocardial infarction, also included patients with coronary heart disease, CABG, PCI, and angina	OR for short term mortality: 0.72 95% CI 0.65-0.94. Event recurrence OR 0.57 (95% CI 0.37-0.86) long term and 0.84 (95% CI 0.7-1.02) short term. Mortality men OR 0.73 95% CI 0.51-1.05, women 1.01 95% CI 0.46-2.23. r-scores for heart rate, social support and QoL were -0.21, -0.16 and -0.34 respectively.	These findings reveal that PT offered in addition to UC reduces mortality for at least the first 2 years. Overall, PT of cardiac patients reduced mortality by 27% for follow-up of 2 years or less and reduced event recurrence at follow-up longer than 2 years by 43%. There were no mortality benefits for women (OR 1.01 and OR 1.30, for short- and long-term follow-up, respectively). PT initiated within 2 months of the cardiac event produced no significant mortality benefits (-13%, n.s.), whereas studies that recruited cardiac patients later reported much greater benefits (-72%, P = 0.01) at less than 2-year follow-up.
McAlister 2001 [45]	Usual care	Coronary artery disease		Reinfarction rate RR 0.94 (95% CI 0.80-1.10), all cause mortality RR 0.91 (95% CI 0.79-1.04), RR for hospital admissions 0.84 (95% CI 0.76-0.94)	
McGillion 2008 [46]	Routine or usual care	Angina	Adult outpatients with CAD and Canadian Cardiovascular Society Class I-III angina, experiencing stable symptoms for at least 6 months.	Angina frequency -2.85 95% CI -4.04 to -1.66, p<0.001. Angina duration -5.86 95% CI -16.97 to 2.25, p=0.001. Nitrate use -3.69 95% CI -5.50 to -1.89, p<0.001. Physical limitation improvement = 8.00 95% CI 4.23-11.77, p<0.001, effect size 0.51. Disease perception change = 4.46 95% CI 0.15-8.77, p=0.042, effect size 0.26.	Pooled trial results suggest that psychoeducational interventions may have a positive, short term impact on angina symptom frequency, SL nitrate use, and aspects of self reported HRQL.
Page 2005 [47]	Not reported (reported for each individual study)	Mixed	angina, CHD		Nurse- led clinics were as effective as general practitioner clinic for most outcomes, although not all outcomes obtained statistical significance.
Rees 2004 [48]	Usual care/ No intervention	Mixed	Adults of all ages with coronary heart disease (myocardial infarction, coronary heart disease, CABG,	Psychological interventions: OR for total mortality 0.93 95% CI 0.81-1.06. OR for cardiac mortality 0.86 95% CI 0.72-1.03. Non-fatal MI OR 0.78 95% CI 0.67-0.90. WMD for total cholesterol -0.27, -0.55 to 0.00; SMD for anxiety -0.08, -0.16 to -0.01, depression SMD -0.3, -0.48 to 0.13. Stress management: mortality OR 0.88 95% CI 0.67-1.15; cardiac mortality OR 0.62 95% CI 0.38-0.99), non-fatal MI OR 0.69 95% CI	Overall psychological interventions showed no evidence of effect on total or cardiac mortality, but did show small reductions in anxiety and depression in patients with CHD. Similar results were seen for SM (Stress Mangement) interventions when considered separately.

Study	Comparator(s)	Condition	Supplementary information	Results	Summary
			PCI, and angina)	0.52-0.92; WMD for total cholesterol 0.02, -0.12 to 0.15	However, the poor quality of trials, considerable heterogeneity observed between trials and evidence of significant publication bias make the pooled finding of a reduction in non-fatal myocardial infarction insecure.

Table 5: Systematic review evaluating exercise or multidisciplinary cardiac rehabilitation

Study	Comparator(s)	Condition	Supplementary information	Results	Summary
Taylor 2004 [17]	Usual care	Mixed	Patients with coronary heart disease who had a myocardial infarction, coronary artery bypass graft, percutaneous coronary intervention or angina pectoris or coronary heart disease defined by angiography.	Exercise therapy compared with usual care: OR for all-cause mortality 0.80 95% CI 0.68-0.93, OR for total cardiac mortality 0.74 95% CI 0.61-0.96. Total cholesterol -0.37 mmol/l 95% CI -0.63 to -0.11, triglyceride -0.23 mmol/l 95% CI -0.39 to -0.07. Systolic blood pressure -3-2 mmHg 95% CI -5.4 to -0.9. OR for smoking 0.64 95% CI 0.50-0.83	Exercise therapy compared with usual care: All-cause mortality and total cardiac mortality reduced. No difference the rates of myocardial infarction, coronary artery bypass grafting or percutaneous coronary intervention. Less total cholesterol and triglycerides. LDL and HDL unchanged. Systolic blood pressure reduced, but no difference for diastolic blood pressure. Fewer smokers.

Table 6: Systematic reviews evaluating exercise therapy and multidisciplinary cardiac rehabilitation

Study	Treatment	Comparator(s)	Condition	Supplementary information	Results	Summary
Jolliffe 2001 [49]	Exercise therapy or multidisciplinary cardiac rehabilitation	Usual care	Mixed	Patients of all ages in both hospital-based and community-based settings with myocardial infarction, coronary artery bypass graft or percutaneous conronary intervention or who have angina pectoris or coronary artery disease.	Exercise only: 27% reduction in all cause mortality (13% for comprehensive cardiac rehab). Total cardiac mortality reduced by 31% and 26% respectively. Pooled adverse clinical outcomes: pooled effect estimate 0.81 (0.65. 1.01) for exercise only and 0.81 (0.69, 0.96) for comprehensive rehab. Total cholesterol reduced with comprehensive rehab (WMD -0.57 mmol/l 95% CI -0.83 to -0.31), but not with exercise only (WMD -0.03 mmol/l 95% CI -0.27 to 0.22). No effect on HDL cholesterol. Exercise only: no effect on LDL cholesterol. Comprehensive rehab: WMD for LDL cholesterol -0.51 mmol/l 95% CI -0.82 to -0.19. Two larger trials showed favourable effects of comprehensive cardiac rehabilitation on BP:	Total mortality reduced for exercise only vs. usual care (also, but less so for comprehensive cardiac rehabilitation). Cardiac mortality reduced. Cardiac rehabilitation reduces pooled adverse clinical outcomes. Lipids measured in few trials, with a trend towards reduction. Blood pressure measured in 5 trials, reductions seen in 2. Changes in HRQL were small. Comprehensive cardiac rehabilitation appears to have a positive effect more often than exercise only.
Subgroup analysis in Taylor 2004 [17]	Exercise therapy OR MDCR with exercise component	Usual care group (no structured exercise training or advice but could include standard medical care)	Mixed	Patients with coronary heart disease who had a myocardial infarction, coronary artery bypass graft, percutaneous coronary intervention or angina pectoris or coronary heart disease defined by angiography.	Subgroup analysis: Total mortality: exercise only (versus usual care): 12 trials, OR=0.67; 95% CI 0.59 to 0.98; Comprehensive CR (versus usual care): 20 trials; OR=0.84; 95% CI: 0.72 to 0.99	No significant difference in mortality between exercise only and comprehensive cardiac rehabilitation.

Table 7: Critical appraisal of the quality of the 49 systematic reviews

	Internal validity					Overall assessment				
Study	**Appropriate and clearly focussed question?**	**Methodology described?**	**Literature searches adequate?**	**Study quality assessed and taken into account?**	**Was pooling of data appropriate? (If applicable)**	**Bias minimisation?**	**If biased, how would bias affect results?**	**Types of study included**	**Research questions answered?**	**High quality systematic review?**
AHCPR clinical guidelines, 1995 [14]	Adequately addressed	Adequately addressed	Adequately addressed	Not reported	Not applicable	++		RCT	Yes, comprehensive review of exercise and multidisciplinary rehab for a number of different outcomes	Yes
Auer, 2008 [40]	Well covered	Adequately addressed	Well covered	Adequately addressed	Adequately addressed	++		RCT	Yes, though a specific review of in-hospital rehab for post-MI patients	Yes
Balinsky, 2003 [21]	Adequately addressed	Poorly addressed	Poorly addressed	Adequately addressed		+	Poor quality review, no 'results' presented, difficult to anticipate direction overall of potential bias	RCT	Limited use as qualitative overview of four RCTs	No
Bartlo, 2007 [1]	Well covered	Well covered	Adequately addressed	Adequately addressed	Not applicable	++		RCT	Yes, benefits of aerobic exercise of clinical outcomes	Yes
Bazian 2005 [22]	Adequately addressed	Adequately addressed	Adequately addressed	Poorly addressed	Not reported	++		RCT	Limited use, an update of Holland 2005, only includes large RCTs, shows benefit of multidisciplinary approach	Yes

	Internal validity					Overall assessment				
Study	**Appropriate and clearly focussed question?**	**Methodology described?**	**Literature searches adequate?**	**Study quality assessed and taken into account?**	**Was pooling of data appropriate? (If applicable)**	**Bias minimisation?**	**If biased, how would bias affect results?**	**Types of study included**	**Research questions answered?**	**High quality systematic review?**
Bitzer 2002 [20]	Adequately addressed	Adequately addressed	Well covered	Adequately addressed	Not applicable	++		RCT	Yes, evidence that any exercise therapy will lead to improved fitness, net benefit corresponding with exercise intensity	Yes
Brown 2003 [13]	Adequately addressed	Well covered	Well covered	Adequately addressed	Adequately addressed	++		RCT	Yes, comprehensive evaluation, no significant difference between exercise and muldisciplinary rehabiliation	Yes
Bruggink-André 2005 [23]	Poorly addressed	Poorly addressed	Not reported	Not reported	Not applicable	-	Essentially a qualitative review undertaken in order to publish a trial protocol, no 'results' presented	RCT	Not really, some discussion of inter-country issues	No
Chien 2008 [2]	Adequately addressed	Adequately addressed	Well covered	Well covered	Adequately addressed	++		RCT	Yes, benefits of home-base exercise versus usual care, studies not consistently positive but VO2 max and 6 min test significantly improved	Yes
Clark 2007 [42]	Adequately addressed	Adequately addressed	Well covered	Adequately addressed	Adequately addressed	++		RCT	Yes, primary care programmes staffed by	Yes

	Internal validity					Overall assessment				
Study	**Appropriate and clearly focussed question?**	**Methodology described?**	**Literature searches adequate?**	**Study quality assessed and taken into account?**	**Was pooling of data appropriate? (If applicable)**	**Bias minimisation?**	**If biased, how would bias affect results?**	**Types of study included**	**Research questions answered?**	**High quality systematic review?**
									generalists at least as effective in reducing all cause mortality as longer, hospital-based, or specialist-run	
Clark, 2005 [41]	Adequately addressed	Adequately addressed	Well covered	Adequately addressed	Adequately addressed	++		RCT	Yes, three different types of programmes all showed benefits in mortality, processes of care, and QoL	Yes
Duffy 2004 [24]	Poorly addressed	Adequately addressed	Poorly addressed	Adequately addressed	Not applicable	+	Poor quality review (limited searching and untested quality assessment) that could over-estimate treatment effects	RCT	Relevant studies included but poor quality review	No
ExTraMATCH 2004 [3]	Adequately addressed	Adequately addressed	Adequately addressed	Not reported	Not reported	++		Other	Yes, evidence of reduction in mortality following exercise training with no evidence that dangerous to patient population Individual patient data meta-analysis	Yes
Feijts, 2004 [4]	Well covered	Adequately addressed	Well covered	Well covered	Adequately addressed	++		CCT	Yes, majority of studies showed significant benefits	Yes

	Internal validity					Overall assessment				
Study	**Appropriate and clearly focussed question?**	**Methodology described?**	**Literature searches adequate?**	**Study quality assessed and taken into account?**	**Was pooling of data appropriate? (If applicable)**	**Bias minimisation?**	**If biased, how would bias affect results?**	**Types of study included**	**Research questions answered?**	**High quality systematic review?**
									of exercise therapy	
Gensichen 2004 [25]	Adequately addressed	Adequately addressed	Poorly addressed	Adequately addressed	Adequately addressed	+	Searches only addressed a single database and references of selected review, other information may have been missed, unable to predict influence on direction of results	Other	Short term studies show a significant reduction in mortality, long term studies show a non-significant improvement.	Yes
Gonseth 2004 [26]	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	++		RCT	Yes, benefits of different multidisciplinary approaches, documents that non-randomised studies significantly over-estimated treatment benefits (twice over)	Yes
Grady 2006 [27]	Adequately addressed	Adequately addressed	Poorly addressed	Not reported	Not reported	-	Even though systematic methods are listed, the authors describes as to highlight current literature, low quality research, potential to include only favourable studies	RCT	Not really, a qualitative review focussed on QoL, 4/5 studies showed improved QoL with home-based rehab	Yes

	Internal validity					Overall assessment				
Study	**Appropriate and clearly focussed question?**	**Methodology described?**	**Literature searches adequate?**	**Study quality assessed and taken into account?**	**Was pooling of data appropriate? (If applicable)**	**Bias minimisation?**	**If biased, how would bias affect results?**	**Types of study included**	**Research questions answered?**	**High quality systematic review?**
Gwadry-Sridhar 2004 [28]	Adequately addressed	Well covered	Well covered	Adequately addressed	Adequately addressed	++		RCT	Yes, multidisciplinary approach associated with signiifcantly reduced hospital readmission rates but no affect on mortality	Yes
Haykowsky 2007 [5]	Well covered	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	++		RCT	Yes, exercise training significantly improved ejection fraction, combined aerobic and strength not asscciated with significant improvements	Yes
Holland 2005 [29]	Well covered	Adequately addressed	Well covered	Well covered	Adequately addressed	++		RCT	Yes, multidisciplinary interventions reduced both hospital admissions and all-cause mortality, most effective interventions were delivered at least partly at home	Yes
Horner 2001 [6]	Poorly addressed	Adequately addressed	Poorly addressed	Not reported	Not applicable	-	Associate improvements in QoL with exercise outcomes when	CCT	Exercise programme can significantly improve outcomes for	No

	Internal validity					Overall assessment				
Study	**Appropriate and clearly focussed question?**	**Methodology described?**	**Literature searches adequate?**	**Study quality assessed and taken into account?**	**Was pooling of data appropriate? (If applicable)**	**Bias minimisation?**	**If biased, how would bias affect results?**	**Types of study included**	**Research questions answered?**	**High quality systematic review?**
							there is none		selected subpopulations	
Jerant 2005 [30]	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Not applicable	++		RCT	Limited, benfits of telemedicine as a component of multidisicplinary rehab	Yes
Johansson 2006 [7]	Adequately addressed	Adequately addressed	Poorly addressed	Not addressed	Not applicable	+	Poor quality review focusing on QoL though some relevant exercise outcomes	RCT	Not really, 3/10 exercise studies could not detect positive effect on QoL despite improvement in 6 min walking test or only where good baseline fitness	No
Jolliffe 2001 [49]	Well covered	Well covered	Well covered	Adequately addressed	Adequately addressed	++		RCT	Yes, compares exercise to multidisciplinary (usual care), exercise lead to greater reduction in mortality but did not affect total cholesterol (multidisciplinary care did)	Yes
Jolly 2006 [43]	Well covered	Adequately addressed	Well covered	Well covered	Not reported	++		Other	Yes, home-based cardiac rehab and exercise no worse than centre based/ supervised care	Yes

	Internal validity					Overall assessment				
Study	**Appropriate and clearly focussed question?**	**Methodology described?**	**Literature searches adequate?**	**Study quality assessed and taken into account?**	**Was pooling of data appropriate? (If applicable)**	**Bias minimisation?**	**If biased, how would bias affect results?**	**Types of study included**	**Research questions answered?**	**High quality systematic review?**
Linden 2007 [44]	Adequately addressed	Well covered	Well covered	Not reported	Adequately addressed	++		RCT	Partly, demonstrates additional benefit of psychological compoenent to usual care	Yes
Lloyd-Williams 2002 [8]	Well covered	Adequately addressed	Adequately addressed	Adequately addressed	Not reported	++		RCT	Yes, benefits of physical exercise in CHF sub groups	Yes
McAlister 2001 [45]	Adequately addressed	Adequately addressed	Well covered	Not addressed	Adequately addressed	++		RCT	Yes, multidisciplinary rehabilitation reduce hospitalisations though findings for mortality benefits are inconclusive	Yes
McAlister 2001a [31]	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	++		RCT	Yes, multidisciplinary approach positive effect on process of care, readmission, exerise tolerance and QoL, no overall survival benefit	Yes
McAlister 2004 [32]	Adequately addressed	Adequately addressed	Well covered	Not reported	Adequately addressed	++		RCT	Yes, analysis of different types of multidisciplinary care; specialised team (in or out of clinic), telephone	Yes

	Internal validity					Overall assessment				
Study	**Appropriate and clearly focussed question?**	**Methodology described?**	**Literature searches adequate?**	**Study quality assessed and taken into account?**	**Was pooling of data appropriate? (If applicable)**	**Bias minimisation?**	**If biased, how would bias affect results?**	**Types of study included**	**Research questions answered?**	**High quality systematic review?**
									follow-up/telemonitoring; educational programmes	
McGillion 2008 [46]	Adequately addressed	Adequately addressed	Adequately addressed	Well covered	Adequately addressed	++		RCT	Yes, benefit of psychoeducational components to multidisciplinary rehab in angina	Yes
Oliveira 2008 [15]	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Not applicable	++		CCT	Yes, resistance exercise reduced physical, social and psychological disabilities by increased tolerance in occupational activities	Yes
Page 2005 [47]	Adequately addressed	Adequately addressed	Well covered	Well covered	Adequately addressed	++		RCT	Yes, nurse-led clinics at least as effective as GP clinics	Yes
Philbin 1999 [33]	Adequately addressed	Adequately addressed	Poorly addressed	Not reported	Not applicable	+	Bias could be introduced by limited searching and quality appraisal	Other	Yes, multidisciplinary approach can improve functional outcomes and reduce risk of readmission	No
Philips 2005 [34]	Adequately addressed	Adequately addressed	Well covered	Adequately addressed	Not reported	++		RCT	Yes, better results for more complex programmes including	Yes

	Internal validity					Overall assessment				
Study	**Appropriate and clearly focussed question?**	**Methodology described?**	**Literature searches adequate?**	**Study quality assessed and taken into account?**	**Was pooling of data appropriate? (If applicable)**	**Bias minimisation?**	**If biased, how would bias affect results?**	**Types of study included**	**Research questions answered?**	**High quality systematic review?**
									discharge planning	
Puetz 2006 [16]	Well covered	Adequately addressed	Well covered	Adequately addressed	Not reported	++		RCT	Of limited interest due to focus on energy/fatigue and few RCTs included	Yes
Rees 2004 [48]	Adequately addressed	Well covered	Well covered	Well covered	Adequately addressed	++		Other	Yes, exercise improved QoL and fitness short term in patients with mild to moderate disease, improvements in VO2 max related to training intensity, one study demonstrated benefit at 3 yrs	Yes
Rees 2004a [9]	Well covered	Adequately addressed	Well covered	Well covered	Adequately addressed	++		RCT	Largely, half of trials included psychological intervention as part of multidisciplinary rehabilitation	Yes
Rich 1999 [35]	Poorly addressed	Poorly addressed	Poorly addressed	Not reported	Not applicable	-	No assessment of study quality could lead to an overestimation of efficacy	Other	Relies heavily on observation reasearch, RCTs support finding that multidiciplinary approach can reduce re-admissions and	No

	Internal validity					Overall assessment				
Study	**Appropriate and clearly focussed question?**	**Methodology described?**	**Literature searches adequate?**	**Study quality assessed and taken into account?**	**Was pooling of data appropriate? (If applicable)**	**Bias minimisation?**	**If biased, how would bias affect results?**	**Types of study included**	**Research questions answered?**	**High quality systematic review?**
									improve QoL	
Roccaforte 2005 [36]	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Not reported	++		RCT	Yes, a mulstidisciplinary approach reduces mortaliy and hospitalisations	Yes
Smart 2004 [10]	Adequately addressed	Adequately addressed	Well covered	Not reported	Not reported	++		RCT	Yes, exercise training associated with improvements in oxygen consumption and death/adeverse events, optimal form of exercise remains undefined	Yes
Tai 2008 [11]	Adequately addressed	Poorly addressed	Poorly addressed	Not reported	Not applicable	-	Qualitative review with no 'results' as such identified	RCT	Potentially, different exercise interventions are compared in heart failure plus other outcomes of interest, write-up is qualitative and not helpful but tables are comprehensive	No
Taylor 2004 [17]	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	++		RCT	Positive effect of rehabilitation independent on mortality independent of diagnosis, type of rehabilitation, dose of exercise, follow-up, trial	Yes

	Internal validity					Overall assessment				
Study	**Appropriate and clearly focussed question?**	**Methodology described?**	**Literature searches adequate?**	**Study quality assessed and taken into account?**	**Was pooling of data appropriate? (If applicable)**	**Bias minimisation?**	**If biased, how would bias affect results?**	**Types of study included**	**Research questions answered?**	**High quality systematic review?**
									quality and publication date	
Taylor 2005 [37]	Adequately addressed	Well covered	Well covered	Adequately addressed	Adequately addressed	++		RCT	Yes, review of multidisciplinary care organisation, though difficult to distinguish between the different care pathways for current purposes as all appear to involve a number of different professions	Yes
Taylor 2006 [18] (related to Taylor 2004)	Well covered	Well covered	Well covered	Well covered	Well covered	++		RCT	Yes, approximately 50% of the direct benefits associated with exercise therapy can be attributed to reductions in major risk factors (indirect effect)	Yes
van Tol 2006 [12]	Adequately addressed	Adequately addressed	Well covered	Well covered	Adequately addressed	++		Other	Yes, exercise training has clinically important effects on exercise capacity and QoL	Yes
Windham 2003 [38]	Adequately addressed	Adequately addressed	Poorly addressed	Not reported	Not reported	-	Vague inclusion criteria, no quality assessment	RCT	Of limited use as poor quality, suggests that effective programmes	No

	Internal validity					Overall assessment				
Study	**Appropriate and clearly focussed question?**	**Methodology described?**	**Literature searches adequate?**	**Study quality assessed and taken into account?**	**Was pooling of data appropriate? (If applicable)**	**Bias minimisation?**	**If biased, how would bias affect results?**	**Types of study included**	**Research questions answered?**	**High quality systematic review?**
									involved nurse and cardiologist, re-admissions reductions between 30-80%	
Woodgate 2008 [19]	Adequately addressed	Adequately addressed	Adequately addressed	Not reported	Not applicable	++		RCT	Of limited use, focuses exclusively on self efficacy in relation to adherence	Yes
Yu 2006 [39]	Adequately addressed	Adequately addressed	Adequately addressed	Not reported	Not applicable	+	No quality appraisal of studies	RCT	Emphasises need for multidisciplinary approach and role of cardiac nurse and cardiologist	Yes

Table 8: Randomised controlled trials evaluating MDCR in heart failure patients

Study	Treatment	Comparator(s)	Results	Summary
Austin, 2005 [50]	Weekly out-patient monitoring of clinical status for 8 weeks, disease education, dietary and medical advice. 8-week cardiac rehab programme (2.5hrs twice weekly) followed by 16 weeks community care of supervised 1 hr exercise sessions. Exercises consisted of aerobic endurance training, low resistance/high repetition strength work. Patients also encouraged to exercise at home 3 times per week and received additional education.	Weekly out-patient monitoring of clinical status for 8 weeks, disease education, dietary and medical advice.	Mean walking distance increased by16% at 24 weeks compared to a decrease with usual care ($p<0.001$ from baseline). MLHF significantly improved with treatment for both groups but with treatment improvement was seen across all domains at 8 and 24 weeks ($p<0.01$/$p<0.001$ from baseline). EuroQol and EuroQol-VAS scores showed little change. Significant improvements in NYHA scores with treatment with 45% improving versus 11% with usual treatment. Treatment resulted in significantly reduced total re-admissions ($p<0.01$) and fewer days in hospital ($p<0.001$) though there was no significant differences in mortality ($p>0.2$).	Sustained MDCR resulted in improved walking distance, NHYA and QoL and significantly reduced total hospital admissions and days in hospital. The treatment had no effect on utilities or mortality
Austin, 2008 [51]	Follow-up at 5 years of Austin 2005†	Follow-up at 5 years of Austin 2005†	59.5% of patients were alive at 5 years. Sustained improvement in MLHF but most other measures showed non-significant deterioration. The usual care group showed a significant deterioration in walking distance (5% versus 11%, $p<0.05$), significantly more MDCR patients were still taking regular exercise (71% versus 51%, $p<0.05$). There was no significant difference in resource use or mortality.	Reduced resource use associated with MDCR not sustained at 5 years and no long term benefits in mortality observed, although more patients in this group maintain regular exercise and most functional and QoL measures are to the advantage of the MDCR group.
Azad, 2008 [52]	Clinical pathway programme (usual care plus 12 visits over 6 weeks to optimise care and engage in MDCR)	Usual care	No significant differences in MMSE, MLHFQ ($p<0.470$), PSMS ($p<0.321$), or GDS at 6 weeks. No significant differences at 6 months though a trend showing greater deterioration in the treatment group. Significant difference in the number of cardiologist visits; 38 on treatment versus 17 with usual care ($p<0.0001$). There were no significant differences between groups in ER visits ($p=0.108$) (for CHF $p=0.081$) , hospitalisations ($p=0.16$) (for CHF $p=0.019$), and family doctor visits ($p=0.018$) (for CHF $P=0.608$). No significant difference in mortality $p=0.218$	MDCR treatment pathway resulted in no significant differences other than number of cardiologist visits (increased with treatment)

†Another follow-up was published in 2009 [53], comparing the groups of "survivors" and "deaths", but not reporting any data on MDCR vs comparator.
Rows in green denote that the publication in question reports on the same trial as the publication above.

Table 9: Details of interventions in the randomised controlled trials evaluating MDCR in heart failure patients

Reference	Intervention										Comparator treatments										Population	
	Treatment	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/ counseling	Other e.g. music therapy, yoga	Comparator treatments	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/counseling	Other e.g. music therapy, yoga	Condition	Details of population (if reported)
Austin, 2005 [50]	MDCR	Yes Nurse specialist	Yes	Yes	Yes	Yes	No	No	Yes	No	Usual care	No	Yes	No		Yes	No	No	Yes	No	Heart failure	Heart failure
Austin, 2008 [51]	MDCR	Yes Nurse specialist	Yes	Yes	Yes	Yes	No	No	Yes	No	Usual care	No	Yes	No		Yes	No	No	Yes	No	Heart failure	Heart failure
Azad, 2008 [52]	MDCR	Yes Clinic coordinator	Yes	Yes	No	Yes	No	Yes	Yes	Yes	Usual care										Heart failure	Heart failure

Table 10: Randomised controlled trials evaluating MDCR in surgical patients

Study	Treatment	Comparator(s)	Results	Summary
Macchi, 2007 [54]	Patients transferred from surgery dept to rehab as inpatients. Programme included medication adjustment, ECG monitoring, 2hr per day of physical training (65-75% of max heart rate and short calisthenic sessions), educational, psychological and nutritional counselling	Patients were discharged as soon as clinically stable and followed-up 3 times per week as out-patients. Programme included medication adjustment, ECG monitoring, 2hr per day of physical training (65-75% of max heart rate and short calisthenic sessions), educational, psychological and nutritional counselling	New-onset atrial fibrilliation was significantly more frequent with early rehabilitation (p=0.007) and anaemia was significantly more frequent in older patients. At 1 year follow-up there were no significant differences between groups for any outcome.	Early rehabilitation (2 weeks) does not result in any long-term significant differences compared to traditional timing (4 weeks)
Körtke, 2005 [55]	Home-based exercise: an individual training programme is determined according to individual exercise capacity. Bicycle ergometer is then installed in the patient's home.	After discharge from hospital patients attended a 3-week in-patient CR programme (otherwise very similar to the home-based programme).	No significant difference between the groups with regards to changes in exercise capacity or heart frequency. In-patient CR group: only the physical QoL components significantly improved. Home-based CR: all QoL components significantly improved.	Home-based, tele-monitored CR is just as effective as in-patient CR (with regards to QoL and exercise capacity). Replacement of in-patient CR by home-based CR can be reasonable.

Table 11: Details of interventions in randomised controlled trials evaluating MDCR in surgical patients

Reference	Intervention										Comparator treatments										Population	
	Treatment	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/ counseling	Other e.g. music therapy, yoga	Comparator treatments	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/counseling	Other e.g. music therapy, yoga	Condition	Details of population (if reported)
Macchi, 2007 [54]	MDCR	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	MDCR	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Heart surgery	Heart surgery; CABG; PTCA (acute, recovery)
Körtke, 2005 [55]	MDCR	No	Yes	Yes	Yes	Yes	No	No	No	No	MDCR	No	Yes	Yes	No	Yes	No	No	No	No	Heart surgery	Heart surgery; CABG; PTCA (acute, recovery)

Table 12: Randomised controlled trials evaluating MDCR in MI patients

Study	Treatment	Comparator(s)	Results	Summary
Dalal, 2007 [57]	Outpatient classes held at hospital (2hrs with 8-10 patients) once weekly for 8-10 weeks delivered by multidisciplinary team. Patients were encouraged to exercise at home,	Issued with the heart manual during admission to use for 6 weeks following discharge, the heart manual is a comprehensive step-by-step structured programme of exercise, stress management and education. Nurse visit in week and follow-up calls over 6 weeks	At 9 months follow-up there were no between group differences in mean depression score (mean diff 0, 95%CI -1.12 to 1.12), mean anxiety score (-0.07, -1.42 to 1.28), global MacNew score (0.14, -0.35 to 0.62) and mean cholesterol levels (-0.18, -0.62 to 0.27). Nor were there significant differences in smokers, BMI, blood pressure or rate of revascularization procedures between baseline and follow-up. There were significant differences between groups in exercise capacity p=0.048 but this was not sustained when the analyses were adjusted for age, sex, and exercise capacity at 3 months.	Home-based self-directed rehabilitation using the heart manual was as effective as hospital-based rehabilitation
Liao, 2003 [58]	Early rehabilitation programme (commencing within the first 2 weeks). Exact details of the programme are not given.	Traditional rehabilitation programme (i.e. commencing after more than 10-14 days of bed rest). Exact details of the programme are not given.	The heart rate variability (HRV) indexes and ECG (Holter) examination showed there was no significant difference for the early rehabilitation group versus the control group (P>0.05). However, self-care ability and mental status were improved in the early rehabilitation group, as compared with control (P<0.05).	Early rehabilitation, as compared with traditional rehabilitation, has no adverse effect on heart rate variability of AMI patients without complications. In addition, it can improve life self-care ability and mental status of patients and their quality of life.
Marchionni, 2003 [59]	Hospital-based MDCR consisting of 40 exercise sessions: 24 sessions (3 per week) on a bicycle ergometer (30 mins) plus 16 (2 per week) of stretching and flexibility (1 hr). Intensity was set at 70-85% of symptom-limited maximum. Counselling (2 per week) plus monthly support group sessions.	MDCR: 4-8 supervised out-patient sessions and exercise prescription for a home programme (supervised by physiotherapist home visits). Counselling and monthly support group sessions No CR: The no CR group received a single counselling sessions and were referred back to their GP	Over 14 months, TWC improved in both CR groups (no significant between-group differences). Effects of interventions were greater in middle-aged and old patients but not in the very old. With hospital-based CR, TWC remained higher than at baseline over the duration of the study only in middle-aged patients and returned toward baseline at 6 and 12 months in the old and very old. With home-based CR, TWC remained higher than baseline for the duration of the study in all age groups. QoL improved significantly over study duration regardless of of treatment assignment; for very old patients QoL improved with either active treatment but not with control. There were fewer medical visits (6.5±0.5 versus 7.1±0.6 versus 9.2 ±0.9, p=0.018) and rehospitalisations (0.33±0.07 versus 0.46±0.1 versus 0.49±0.1, p=0.018) with hospital-based, home-based and no CR respectively.	Hospital-based CR and home-based CR are similarly in the short-term and improve QoL but home-based treatment was also associated with lower costs and more prolonged positive effects. Interventions may be less effective in the very old
Kovoor, 2006 [60]	Cardiac rehabilitation (exercise, education, counselling 2-4 hospital sessions weekly) for 5 weeks and return to work 1 week later versus return to work at 2 weeks with no formalised rehabilitation programme but encourage to	Return to normal activities at 2 weeks	Rehabilitation group showed significant improvement in exercise capacity at 6 weeks but this was not sustained at 6 months. At 6 months there were no significant differences in further events, left ventricular function, utilisation of health care resources, BMI, cholesterol and triglyceride levels, smoking, exercise at home or diet. There were significant within group differences for BMI (increased by 1.4 kg in the early return to work group vs 0.3 kg), smoking, exercise at home, and diet.	In low risk patients, early return to normal activities results in the same clinical outcomes as 5 weeks rehabilitation and delayed return to normal activities

Study	Treatment	Comparator(s)	Results	Summary
	exercise.			
Giannuzzi, 2008 [61]	long term reinforced MDCR and education versus usual care	Usual care	Extended MDCR did not decrease primary combined endpoint (cv mortality, nonfatal MI, nonfatal stroke, angina with hospitalisation, heart failure or urgent revasc) significantly p=0.12. Decreased cv mortality and nonfatal MI by 33%, cardiac death plus nonfatal MI by 36%, and nonfatal MI by 48%. 6 month scores for physical activity were higher with intervention 7.5 (2.2) v 7.1 (2.3), for mediterranean-like diet habits (17.9% v 14.5%, p<0.001), for better stress management p<0.001, smoking cessation p=0.02. Prescription of statins and ACE inhibitors was significantly higher in the MDCR group. No differences for cholesterol or glycaemic levels	Extended MDCR resulted in improved risk factors and medication adherence plus considerable improvements in lifestyle habits. The primary endpoint did not reach statistical significance.

Table 13: Details of interventions in randomised controlled trials evaluating MDCR in MI patients

Reference	Intervention										Comparator treatments										Population	
	Treatment	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/ counseling	Other e.g. music therapy, yoga	Comparator treatments	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/counseling	Other e.g. music therapy, yoga	Condition	Details of population (if reported)
Dalal, 2007 [57]	MDCR	No	Yes	Yes	No	Yes	No	Yes	No	No	Usual care	No	No	No	No	No	No	Yes	No	No	Myocardial infarction	Myocardial infarction (acute, recovery)
Liao, 2003 [58]	MDCR	No	No	Yes	No	No	No	No	No	No	Usual care	No	No	Yes	No	No	No	No	No	No	Myocardial infarction	Myocardial infarction (acute, recovery)
Marchionni, 2003 [59]	MDCR	No	No	Yes	Yes	No	No	Yes	Yes	No	MDCR	No	No	Yes	Yes	No	No	Yes	Yes	No	Myocardial infarction	Myocardial infarction (acute, recovery)
											Usual care	No	No	No	No	No	No	No	No	No		
Kovoor, 2006 [60]	MDCR	Yes Nurse	No	Yes	No	No	No	Yes	Yes	No	Usual care	Yes Nurse	No	No	No	No	No	No	No	No	Myocardial infarction	Myocardial infarction (acute, recovery)
Giannuzzi, 2008 [61]	MDCR	No	No	Yes	Yes	No	No	No	No	No	Usual care	No	No	No	No	No	No	No	Yes	No	Myocardial infarction	Myocardial infarction

Table 14: Randomised controlled trials evaluating MDCR in a mixed patient population

Study	Treatment	Comparator(s)	Results	Summary
Hevey, 2003 [62]	10-week (30 exercise sessions) multifactorial rehabilitation programme. Exercise sessions lasted approximately 50 mins and were conducted by trained CR co-ordinators in an outpatient hospital setting. Patients exercised at between 60-80% of submaximal heart rate.	4-week (20 exercise sessions) multifactorial rehabilitation programme. Exercise sessions lasted approximately 50 mins and were conducted by trained CR co-ordinators in an outpatient hospital setting. Patients exercised at between 60-80% of submaximal heart rate.	There were no significant differences between the groups in relation to exercise capacity and quality of life. However, both groups showed statistically significant improvements from baseline to end of study as well as at a further 6 months later, in relation to the measures of exercise capacity ($p<0.01$). The 10-week group had significantly higher levels of depression than the 4-week group at the end of the cardiac rehabilitation. The attendance rate in the 4-week group was significantly higher than that of the 10-week group (96.2% vs 83.9%, $p<0.05$).	There were no significant differences between a shortened 4-week cardiac rehabilitation programme and a standard 10-week programme in relation to exercise capacity and quality of life.
Jolly, 2009 [63]	Four centre-based programmes varied in length, nine sessions at weekly intervals, 12 sessions over 8 weeks, and 24 individualised sessions over 12 weeks. The programmes commenced between 4 and 8 weeks following the cardiac event. Patients exercised at 65-75% of their predicted maximal heart rate.	Home-based programme consisting of a manual, three home visits (10days, 6 and 12 weeks) and telephone contact at 3 weeks. The manual encourages patients to build up their exercise gradually to achieve a minimum 15 minutes of moderately intensive activity daily.	There were no significant differences between the home-based and centre-based groups in relation to systolic blood pressure (mean difference 1.37mm Hg), diastolic blood pressure (mean difference 0.73mm Hg), total cholesterol (0.11), HADS anxiety score (0.43), HADS depression score (-0.17), distance walked on the incremental walking shuffle test (-15.52m) and smoking cessation (2% mean difference).	There were no significant differences in the main outcomes when the home-based was compared with the centre-based programme at 12 months.
Karlsson, 2007 [64]	60 min session led by a physiotherapist (45 min physical exercise, 15 min relaxation) for 6 weeks followed by a test and increase in intensity as appropriate. Training was continued twice weekly for 3 months. Patients also received counselling, heart school (2 90min education sessions), out-patient clinic, and individual counselling on social insurance etc.	All activities of routine rehabilitation plus stress management (20 2hr group sessions), 5 days at the patient hotel following discharge, cooking session with counsellor regarding diet	Perceived QoL increased significantly from baseline in both groups ($p<0.01$ and $p<0.001$). Patients in the expanded programme had a greater compliance rate (78% versus 54% attendance at exercise sessions, $p<0.01$; 84% versus 43%, $p<0.001$ attendance at counselling hour with cardiologist). At 12 months follow-up perceived quality of life was significantly higher with the expanded intervention ($p<0.05$). Other changes affected both groups such as decline in anxiety and depression.	Expanded rehabilitation significantly improves QoL and improves self-estimated depression and anxiety
Reid, 2005 [65]	33 sessions distributed across 3 months. 4 types of case contacts were provided; educational workshops, case manager contacts, physician visits and	33 sessions distributed across 12 months; 4 types of case contacts were provided; educational workshops, case manager contacts, physician	Both groups demonstrated improvements in time in cardiorespiratory fitness, daily physical activity LDL-C, generic and heart disease specific QoL, and depressive symptoms. Blood pressure and BMI worsened over time HDL-C and TG remained unchanged. There were no statistically significant differences	There was no clinically meaningful or statistically significant difference in outcomes at 12 or 24 months or for costs

Study	Treatment	Comparator(s)	Results	Summary
	supervised exercise classes. Supervised exercise classes were held twice weekly for 13.5 weeks.	visits and supervised exercise classes held twice weekly for 13.5 weeks.	between groups in any outcome out to 2 years of follow-up.	
Focht, 2004 [66]	Months one to three, centre-based exercise therapy followed by group discussions, with self-planned activity providing the additional exercise sessions for a frequency equivalent to 3-times per week. The group sessions were for purposes of encouragement, motivation and support in order to maintain long-term physical activity. Participants were also shown the concept of self-monitoring using a pedometer and received help setting individual and group goals for exercise. Months four to nine consisted of less contact with the centre, through phone contacts, newsletters and mailing back activity cards to the centre on a monthly basis, as well as booster exercise sessions. Months nine to 12 were home-based activity, completely independent of the centre.	Participants engaged in three months of centre-based exercise sessions, performed three days per week.	Analysis of the Mental Health composite scale and Vitality sub-scale yielded significant 2-way Gender x Treatment interactions ($p<0.0001$ and $p=0.0171$, respectively). For the remaining tests on sub-scales of the SF-36, there were no other significant effects or interactions by treatment arm.	Improvements in HRQoL in older adults enrolled in cardiac rehabilitation differ as a function of treatment, gender and initial mental health status.
Brugemann, 2007 [67]	Physical training (at least 30 mins at a percieved exertion of 'somewhat hard' supervised by a physiotherapist three times per week) with information about disease for 6 weeks plus weekly group (4-6 patients) psychoeducational sessions and relaxation therapy led by a psychologist for 8 weeks	Physical training (at least 30 mins at a percieved exertion of 'somewhat hard' supervised by a physiotherapist three times per week) with information about disease for 6 weeks	QoL (Leiden total $p=0.570$) and exercise capacity (mean change at 9 months 17 with exercise and 20 with MDCR, $p=0.257$) improved in both treatment groups up to 9 months but there were no between group differences. Blood lipid profile was unaffected and energy intake decreased, neither resulted in significant differences between treatment group, $p=0.499$ and $p=0.836$.	Exercise programme results in comparable outcomes to a MDCR programme
Mittag, 2006 [68]	One-year telephone counselling programme, following in-patient cardiac rehabilitation. Patients	Patients received six flyers by post every second month for a year. These covered general	At follow-up, the group difference in Framingham risk scores was statistically in favour of the intervention group (standardised scores: M=-0.1174/0.1264, SD=0.89/1.09, t=2.10, P=0.038). Separate	Overall, telephone counselling intervention aimed at improvement of long-term effects of CR and related quality of life was effective,

Study	Treatment	Comparator(s)	Results	Summary
	also received six flyers by post every second month for a year. These covered general health topics - relaxation, sports and physical exercise, sleep disorders, low back pain and nutrition.	health topics - relaxation, sports and physical exercise, sleep disorders, low back pain and nutrition.	analyses by sex reveal that this effect was mostly due to the men in the sample (raw score: M=5.28/6.16, SD=3.69/3.25, t=2.29, P=0.023); in women there was no difference between groups (raw score: M=8.42/8.59, SD=4.29/5.46, t=0.13, P=0.900). There was also less increase in systolic blood pressure (t=-2.02, P=0.043) and for men (t=-2.13, P=0.034) but not for women in the treatment group compared with control. There was a marginally significant decrease of anxiety for female patients (t=-1.93, P=0.054) for the intervention versus control group.	with lower coronary risk scores in the intervention group compared to the control group.
Butler, 2009 [69]	Six-week intervention including self-monitored physical activity using a pedometer and step calendar and 2 behavioural counselling and goal-setting sessions. Participants also received generic physical activity information brochures.	Control group received generic physical activity information brochures.	After adjusting for baseline differences, improvement in total physical activity minutes (6 months, effect size = 0.43; 6 weeks not stated), total physical activity sessions (6 months, effect size = 0.52; 6 weeks, p = 0.002), walking minutes (6 months, not stated; 6 weeks, p=0.013) and walking sessions (6 months, effect size = 0.46; 6 weeks, p<0.001) were significantly greater in the intervention group than in the control group. Changes in behavioural and cognitive self-management strategies use in intervention group were significantly greater than in the control group (6 weeks behavioural, p=0.039; 6 months behavioural not stated; 6 weeks cognitive, p=0.024; 6 months cognitive, p=0.001). No significant changes were detected between groups in cardiorespiratory fitness at 6 weeks or 6 months.	Pedometer-based intervention was successful in increasing physical activity in cardiac patients after they had attended a group cardiac rehabilitation programme.
Yu, 2003 [70]	Phase 1, inpatient ambulatory programme that lasted 7-14 days; Phase 2, 16-session, twice weekly, outpatient exercise and education programme lasting 8 weeks. Each session included 1 hour education class and 2 hours exercise training. Target intensity of 65-85% maximal aerobic capacity. Phase 3, community-based home exercise programme for a further 6 months. Phase 4, long-term follow-up programme until 2 years after randomisation, monitoring lipid levels and stressing importance of regular exercise and risk factor modification.	A 2-hour talk explaining CHD, importance of risk factor modification, potential benefits of physical activity, but without undergoing an outpatient exercise training programme.	When comparing the intervention group to control group, exercise time in Phase 2 was significantly longer for the former group (p=0.02), with a trend toward higher metabolic equivalents (METS) (p=0.10). In the intervention group, those who had lower baseline exercise capacity were associated with having a higher percent gain in post-training exercise time (Phase 2, r=-0.65; Phase 3, r=-0.65; Phase 4, r=-0.64; all p<0.001). There was no difference between groups in the prevalence of regular exercise in Phase 1 or Phase 4, but it was significantly higher in Phase 2 (96% vs 70%, p=0.007) and Phase 3 (89% vs 67%, p=0.01) for the intervention group. QoL results are reported by group, not compared between groups. 4 of 8 SF-36 domains were significantly improved after Phase 2 (all p<0.05), improvement of mental health became significant at phase 4 (p<0.01).	The cardiac rehabilitation and prevention programme was effective in promoting an early improvement in exercise capacity and QoL in obese patients with CHD after a recent AMI or PCI and the benefits were maintained long-term.
Scholz, 2006 [71]	Participants were those already enrolled to a 3-week standard	Participants were those already enrolled to a 3-week standard	Using regression analyses, the intervention was shown to be positively related to physical exercise at 4 months after discharge.	Compared to a standard-care treatment, combining planning strategies with a weekly

Study	Treatment	Comparator(s)	Results	Summary
	care CR programme. During their last week at the rehabilitation clinic, they took part in a 15-min planning session, specifying up to three action plans for their proposed physical activity following discharge, as well as three coping plans on possible barriers and how to overcome them. During the first 6 weeks after discharge, participants were sent a brief diary each week with the patient's personal action plans and coping plans written at the top of each page.	care CR programme. Upon discharge, patients were advised to engage in long-term exercise comparable to the exercise intensity level during rehabilitation.	Participation in the intervention led to an increase in physical activity of about half a SD compared to the control group (y-standardised □y = 0.53, p<0.01). For 12 months after discharge, mean difference between control and intervention groups for minutes of exercise per week was significant (t=2.94, p<0.01). For depressive symptoms at 12 months, participation in the intervention group decreases depressive symptoms by about 0.4 SDs compared to the control group (y-standardised □y = -0.40, p<0.05).	diary enhanced physical activity and lowered depressive symptoms 12 months after discharge from rehabilitation.
Yu, 2004 [72]	Patients first entered into an inpatient ambulating programme lasting 7 to 14 days. Followed by, 8-week, twice-weekly sessions consisting of a 1-hour education class, followed by 2 hours of aerobic exercise. Cardiovascular training was conducted at 65-85% of age-adjusted heart rate reserve. For a further 6 months, patients underwent a community based home exercise programme. The final phase was a long-term maintenance period, lasting until 2 years after recruitment.	These patients received "conventional treatment" without undergoing the outpatient exercise programme. They received advice from their cardiologist about secondary prevention, as well as attending a 2-hour talk about the disease, risk-factor modification and potential benefits of physical activity.	In the intervention group, 6 of the 8 SF-36 dimensions improved significantly at the end of the 8-week programme; these were maintained when reassessed at the end of 6 months and 2 years. At the end of the 2 years, 4 dimensions were improved in the control group. Between group differences were significant at 6 months and 2 years in the dimensions of Physical Functioning; Physical Role; Bodily Pain and Emotional Role. However, no p values are reported in the article. See also results under "Economic Evidence".	The improvement in QoL was quick and sustained for at least 2 years after CRPP. Additionally, a short course CR programme was highly cost-effective in providing better QoL to patients with recent AMI or after elective PCI.
Zwisler, 2008 [73]	6-week intensive CR programme included patient education, 12 exercise training sessions, dietary counselling, smoking cessation, psychosocial support, risk factor management and clinical assessment. Follow-up occurred at 3, 6 and 12 months.	Pharmaceutical treatment followed routine clinical practice. The patients were informed they would be contacted after 12 months to assess outcomes.	At 12 months, comprehensive cardiac rehabilitation (CCR) patients had 15% lower average stay for all readmissions (p=0.04) and 17% lower length of stay for acute readmissions (p=0.04). They also had significantly fewer modifiable risk factors and lifestyle items above treatment target (p=0.01). Significantly fewer CCR patients had systolic blood pressure above target (p=0.003), were physically inactive (p=0.01) or had "heart-unhealthy" dietary habits (p=0.0003). SF-36 and HADS did not differ significantly.	Comprehensive CR did not significantly affect the composite primary outcome of overall mortality and cardiac events, compared with usual care during the 12 months. However, it did significantly reduce length of hospital stay and improved cardiac risk factors.
Briffa, 2005 [74]	Rehabilitation commenced within 2 weeks of leaving	Usual care	The total number of re-admissions was non-significantly higher for the usual care group compared with the rehabilitation group (36 vs	No significant difference in QoL measures, except for the “physical function” SF-36

Study	Treatment	Comparator(s)	Results	Summary
	hospital. Sessions were for 6-weeks, 3-times weekly, comprising of 60-90 mins supervised exercise, combined with 45 mins of education (12 occasions) and psychosocial counselling (6 sessions). Sessions were conducted in groups and additional one-to-one counselling was provided where necessary.		29; p=0.56).	domain.
Lear, 2006 [75]	Following completion of cardiac rehab programme patients randomised to either usual care or extensive lifestyle management intervention (yr1; 6 rehab sessions, 6 telephone calls, 3 counselling sessions, yr2,3,4; 4 telephone calls and two counselling sessions) over four years	Usual care	Only patients with complete data included in analyses. After adjustment for age, sex, baseline scores, treatment was a significant predictor of 48-month systolic blood pressure, TC, and LDL-C p<0.01. Medication usage was significantly higher with intervention p<0.01. There were no other significant differences between groups.	An extended lifestyle management programme resulted in a significant reduction in global risk compared with usual care

Table 15: Details of interventions in randomised controlled trials evaluating MDCR in a mixed patient population

Reference	Intervention										Comparator treatments										Population	
	Treatment	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/ counseling	Other e.g. music therapy, yoga	Comparator treatments	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/counseling	Other e.g. music therapy, yoga	Condition	Details of population (if reported)
Hevey, 2003 [62]	MDCR	Yes Trained CR coordinator	Yes	Yes	Yes	Yes	No	Yes	Yes	No	MDCR	Yes Trained CR coordinator	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Mixed	Mixed/Other
Jolly, 2009 [63]	Exercise therapy	No	No	Yes	Yes	No	Yes	No	Yes	Yes	MDCR	No	No	Yes	No	No	No	No	Yes	Yes	Mixed	Heart surgery; CABG; PTCA (acute, recovery)
Karlsson, 2007 [64]	MDCR	N	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	MDCR	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Mixed	Heart surgery; CABG; PTCA (chronic, secondary prevention)
Reid, 2005 [65]	MDCR	Yes Case manager	Yes	Yes	Yes	Yes	Yes	No	Yes	No	MDCR	Yes Case manager	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Mixed	Mixed/Other
Focht, 2004 [66]	MDCR	No	No	Yes	No	No	No	No	No	Group therapy sessions	Exercise therapy	No	No	Yes	No	No	No	No	No	No	Mixed	Mixed/Other
Brugemann, 2007 [67]	MDCR		Yes	Yes	Yes	Yes	No	Yes	No	Yes	Exercise therapy		No	Yes	Yes	Yes	No	Yes	No	No	Mixed	Heart surgery; CABG;

																					PTCA (acute, recovery)
Mittag, 2006 [68]	MDCR	Yes Nurse specialist	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Other	Yes Nurse specialist	No	No	No	Yes	No	No	No	No	Mixed	Mixed/Other
Butler, 2009 [69]	MDCR	No	No	Yes	No	Yes	No	No	Yes	No	Other	No	No	Yes	No	No	No	No	No	No	Mixed	Mixed/Other
Yu, 2003 [70]	MDCR	No	No	Yes	Yes	Yes	Yes	No	Yes	No	Other	No	No	No	No	Yes	No	No	No	No	Mixed	Mixed/Other
Scholz, 2006 [71]	MDCR	No	No	Yes	No	Yes	Yes	No	Yes	No	Usual care	No	No	Yes	No	Yes	Yes	No	Yes	No	Mixed	Mixed/Other
Yu, 2004 [72]	MDCR	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Usual care	No	Yes	Yes	No	Yes	Yes	No	No	No	Mixed	Myocardial infarction (acute, recovery)
Zwisler, 2008 [73]	MDCR	Yes Physician	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Usual care	Yes Physician	Yes	Yes	No	Yes	Yes	No	No	No	Mixed	Mixed/Other
Briffa, 2005 [74]	MDCR	No	Yes	Yes	No	No	No	No	Yes	No	Usual care	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Mixed	Mixed/Other
Lear, 2006 [75]	MDCR	Yes Case manager	Yes	Yes	No	Yes	Yes	No	Yes	No	Usual care	No	No	No	No	No	No	No	No	No	Mixed	Heart surgery; CABG; PTCA (chronic, secondary prevention)

Table 16: Randomised controlled trials evaluating exercise in heart failure patients

Study	Treatment	Comparator(s)	Results	Summary
Dracup, 2007 [76]	Graduated low-level exercise (aerobice training initially 10 mins for 40% maximal heart rate increasing up to 45 mins at 60% 4 times weekly, resistance added at 6 weeks for upper and lower body at 80% for 2 sets of 10 repetitions 3 days weekly)	Usual care (usual level of daily activities). Follow-up over 12 months	No significant difference for combined endpoint (all-cause hospitalisation, ED admission, urgent transplantation, death) P=0.88, individually only the number of hospitalisations was significantly different between groups, P=0.024 with fewer in the treatment group (mean number 0.56 versus 0.99). Significantly more usual care patients had multiple admissions (26.6% versus 12.8%, p=0.02). No significant differences in functional performance (cardiopulmonary exercise test and 6 min walk test).	Home-based exercise did not results in clinical differences from usual care but did reduce hospitalisation rates
Gary, 2006 [77]	The 12- weeks walking intervention consisted of 3 components - the walking programme, self monitoring of symptom severity, and self-monitoring of exertion level. Women in the intervention group began a programme of walking at 40%, 3 days per week. Duration of walking was increased with the goal was to have participants walking at 60% intensity for a minimum of 30 minutes by the end of the programme.	Education: The 12 weeks educational programme included topics relevant to HF disease management and issues related to women's health (e.g., breast self- examination, osteoporosis)	Adherence rate: Intervention 85%, Control 83%. 6MWT: 203 feet at T2 and the control women declined by 92 feet. Both QoL and depressive symptoms improved in women in the intervention group, but not in control participants. Among women in the intervention group, distances walked from T1 to T2 were significantly correlated with self- efficacy barriers (r= 0.86, p=0.000), self- efficacy adherence (r=0.75, p= 0.002), but not outcome expectancies. Moderate inverse correlations between the MLHFQ and the 6MWT distance (r= -0.69, p= 0.009), the self-efficacy workload (r = -0.56, 0.036), self- efficacy barriers (r= -0.52, p= 0.05), and self- efficacy adherence (r= -0.55, p= 0.04) were found. Paired t tests indicated a significant reduction in depressive symptoms among the intervention women at T2, however, an increase in depression scores was noted among controls.	Overall adherence rate, 6- minute walk test (6MWT), QoL were better in the intervention group than the control group.
Jolly, 2009 [78]	Three supervised exercise sessions and an individualised home-based regimen (home visits at 4,10, and 20 weeks, telephone support at 6,15, and 24 weeks). Exercise consisted of progressive walking and self-exercise logs at 70% of peak performance. Goal was to achieve conitnuous bouts of exercise (20-30 mins) 5 times per week and accompanied by low itensity strength training. Specialist heart failure nurse support was also provided. Patients encouraged to keep exercising after 24 weeks	Specialist heart failure nurse providing clinic and home visits and information and advice about heart failure and self management and medication	At 6 and 12 months there was no significant between-group differences in MLwHFQ or secondary outcomes with the exception of a higher EQ-5D score at 6 months (mean 0.11,95%CI 0.04 to 0.18) and a lower HAD depression score (-1.07, 95%CI -2.0 to -0.14) in the exercise group. Adherent patients had a significantly higher EQ-5D at 12 months (0.14, 95%CI 0.05 to 0.22, p=0.001). Mean time to first event (admission for heart failure, MI, or death) was 425 days (95%CI 407-443) with exercise and 531 (95%CI 513-550) with control. Adjusted HR for an event in the exercise group was 1.45 (95%CI 0.43 to 4.86). There were few significant differences within groups. A similar number of patients in both groups were admitted to hospital for any cause (16/84 exercise vs. 20/85 with control), there was no difference in the mean number of nights of admission.	There was evidence of improvement in selected outcomes (higher quality of life at 6 months and reduced depression at 12 months - though baseline score was higher) but the addition of exercise conferred no other significant benefits

Study	Treatment	Comparator(s)	Results	Summary
Corvera-Tindel, 2004 [79]	12 week progressive home walking exercise programme (once daily, 5 days per week starting at 10 mins at 40% max heart rate and increasing to 60 mins at 65% max heart rate). Patients also wore a pedometer.	Usual activity. Patients also wore a pedometer but instructed not to begin an exercise programme but maintain normal daily activities.	No adverse events related to exercise training occurred. Compliance progressively declined from 81% in the 5th week to 65%. Peak oxygen consumption and Heart Failure Functional Status Inventory were unchanged with training. Compared to the usual activityy group, the training group had significantly longer walking distances and improved global rating of symptoms. Dyspnea-Fatigue Index scores were reduced in the training group (3.2 v 3.7, p=0.03).	Progressive home walking programme is associated with improved walking distance and improved global symptom rating but associated with poor compliance
Evangelista, 2006 [80]	Graduated low-level exercise at least 4 times per week consisting of light aerobic exercise (inidividually tailored walking programme of 45 min at 60% of maximal heart rate) and resistive training. Pedometers worn.	Usual levels of daily activities with no additional exercise components. Pedometers worn.	Patients exercising showed significant weight reduction from baseline to 6 months compared with usual care (-6.37kg v -0.33kg, p=0.002).Modest weight loss (>5%) were associated with decreased depression (p=0.01), hostility (p=0.005). Exercise also resulted in significantly reduced hospital admissions (0.63 versus 1.07, p<0.05). There were no differences in functional status (VO2 workload and 6 min walk distance) or psychological state in either treatment group.	Home-based exercise resulted in significant reductions in weight and hospital readmissions but without any additional functional or psychological benefits
Flynn, 2009 [81]	Exercise therapy (36 supervised aerobic sessions at 60% to 70% of max heart rate 3 times per week followed by home-based training at the same intensity 5 times per week)	Usual medical care (including optimal medical therapy)	At 3 months, exercise was associated with a greater improvement in overall summary score (5.2 95%CI 4.4-6.0) versus usual care (3.3 95%CI 2.5-4.1). KCCQ changes from baseline were associated with changes in exercise time on the cardiopulmonary test (p<0.001), peak oxygen consumption (p<0.001), and 6 min walking distance (p<0.001); a change of 5 pts on the KCCQ corresponded to a 1.7 min change in exercise time, a 1.4mL/min/kg change in peak oxygen consumption, and a 49.7m change in distance walked.	Exercise training was associated with significant improvements in QoL that were maintained out 2.5 years
Giannuzzi, 2003 [82]	Supervised exercise sessions (30 mins bicycling at least 3 times weekly at 60% of peak VO2. Increased gradually over the first two months. Patients were also asked to take a brisk daily walk for >30 mins and intermittent unsupervised sessions of calisthenics for 30 mins as part of a home-based exercise programme.	Patients received educational support and to continue medication and usual lifestyle habits but were discouraged from physcial activity that caused breathlessness or fatigue	Significant within group improvement in work capacity (p<0.001), peak VO2 (p<0.006), walking distance during the 6 min walk test (p<0.001), clinical score (p<0.01) and QoL (p<0.01) was observed with exercise but not with usual care (p=NS). Exercise treatment also showed a trend (p=0.05) toward fewer hospital readmissions for worsening dyspnea in the absence of other adverse cardiac events.	Exercise improved exercise tolerance and QoL with a non-significant reduction in hospital readmissions
Nilsson, 2008 [83]	Monitoring at out-patient clinic and uptitration of medication with nurse and cardiologist plus a 16-week aerobic interval training programme (50 mins sessions twice per week) followed by 15-30 mins of	Monitoring at out-patient clinic and uptitration of medication with nurse and cardiologist.	At 16 weeks functional capacity improved significantly with exercise (6 min walk test; +58 versus -15 metres, p<0.001) and for both workload and time measured by workload and time on a bicyle ergometer (+10 versus -1 W, p<0.001; +57 versus -8 seconds, p<0.001) compared with control. QoL also improved significantly, p=0.03.	At 16 weeks exercise significantly improved QoL and functional capacity with improvements in QoL significantly related to changes in functional capacity

Study	Treatment	Comparator(s)	Results	Summary
	disease counselling with a physiotherapist Follow-up results reported by Nilsson et al. 2008			
Nilsson, 2008a [84]	Follow-up of Nillson et al. 2008	Follow-up of Nillson et al. 2008	After 12 months, results were still significant for the exercise group compared with usual care group for all parameters	Initial results at 16 weeks were sustained at 12 months
Whellan, 2008 [85]	Exercise therapy	Usual medical care (including optimal medical therapy)	At 3 years, no difference in mortality/hospitalisation (HR 0.93, 95%CI 0.84-1.02, p=0.13) between treatments. Adjustment for other prognostic factors meant that mortality/hospotalisation was decreased in the exercise arm (p=0.03). CV mortality and CV hospitalisation (p=0.14), 6 min walk distance (p=0.26) similar but peak VO2 higher in the exercise training arm. Serious side effects similar between both arms.	Exercise training safe and effective in conjunction with optimal medical therapy
Witham, 2005 [86]	Patients attended exercise classes with a physiotherapist twice a week as outpatients for 3 months. During the next 3 months, participants were asked to continue performing their exercises at home 2 to 3 times a week with the aid of a video or audio cassette. During this second phase, the physiotherapist telephoned once a week to give encouragement and agree on new targets for daily walking activity. Additionally, standardised written information about the diagnosis and management of heart failure were given to participants.	Standardised written information about the diagnosis and management of heart failure were given to participants. Participants were told that exercise was not harmful to their condition.	There was no significant difference between groups for the primary outcome, which was the 6-minute walk distance. However, there was a significant increase in everyday physical activity measured by accelerometry in the intervention group compared with control at 6 months (median change 2.3% vs -14.0%, p=0.036). These findings were mirrored by the preservation of functional capacity in the intervention group as measured by the Functional Limitations Profile, compared with a decrease in the control group, although this did not reach statistical significance.	There was a significant increase in everyday physical activity measured by accelerometry in the intervention group at 6 months.
Witham, 2007 [87]	Trial previously described in Witham 2005. Twice-weekly exercise classes for 3 months. Patients kept an activity diary and agreed weekly goals with the supervising physiotherapist.	Trial previously described in Witham 2005. No special instructions given about exercise.	The mean change in 6-minute walk distance was not significantly different for the intervention group as compared with control (-3.4m vs -4.8m, p=0.92). Similarly for mean change in accelerometry (p=0.18); mean change in depression from HADS (p=0.34) and mean change in FLP (p=0.86). Only mean change in HADS anxiety differed between groups (-0.96 exercise group vs 0.84 control group, p=0.02).	There were no significant differences between the exercise and control groups at long-term follow-up (mean 19 months post-enrolment).

Table 17: Details of interventions in randomised controlled trials evaluating exercise in heart failure patients

Reference	Intervention										Comparator treatments										Population	
	Treatment	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/ counseling	Other e.g. music therapy, yoga	Comparator treatments	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/ counseling	Other e.g music therapy, yoga	Condition	Details of population
Dracup, 2007 [76]	Exercise therapy	No	No	Yes	Yes	No	No	No	No	No	Exercise therapy	No	No	No	No	No	No	No	No	No	Heart failure	Heart failure
Gary, 2006 [77]	Exercise therapy	No	Yes	Yes	Yes	No	No	No	No	No	Other	No	Yes	No	No	No	No	No	Yes	No	Heart failure	Heart failure
Jolly, 2009	MDCR	No	Yes	Yes	Yes	No	No	No	No	Yes	Other	No	Yes	No	No	No	No	No	No	Yes	Heart failure	Heart failure
Corvera-Tindel, 2004 [79]	Exercise therapy	No	No	Yes	Yes	No	No	No	No	No	Usual care	No	No	No	No	No	No	No	No	No	Heart failure	Heart failure
Evangelista, 2006 [80]	Exercise therapy	No	No	Yes	Yes	No	No	No	No	No	Usual care	No	No	No	No	No	No	No	No	No	Heart failure	Heart failure
Flynn, 2009 [81]	Exercise therapy	No	Yes	Yes	Yes	No	No	No	No	No	Usual care	No	Yes	No	No	No	No	No	No	No	Heart failure	Heart failure
Giannuzzi, 2003 [82]	Exercise therapy	No	No	Yes	Yes	No	No	No	No	No	Usual care	No	No	No	No	No	No	No	Yes	No	Heart failure	Heart failure
Nilsson, 2008 [83]	Exercise therapy	No	Yes	Yes	Yes	No	No	No	Yes	No	Usual care	No	Yes	No	No	No	No	No	No	No	Heart failure	Heart failure
Nilsson, 2008a [84]	Exercise therapy	No	Yes	Yes	Yes	No	No	No	Yes	No	Usual care	No	Yes	No	No	No	No	No	No	No	Heart failure	Heart failure
Whellan, 2008 [85]	Exercise therapy	No	Yes	Yes	Yes	No	No	No	No	No	Usual care	No	Yes	No		No	No	No	No	No	Heart failure	Heart surgery; CABG; PTCA (chronic, secondary prevention)
Witham, 2005 [86]	Exercise therapy	Yes Physiotherapist	No	Yes	No	No	No	No	No	No	Usual care	No	No	No	No	No	No	No	No	No	Heart failure	Heart failure
Witham, 2007 [87]	Exercise therapy	Yes Physiotherapist	No	Yes	No	No	No	No	No	No	Usual care	No	No	No	No	No	No	No	No	No	Heart failure	Heart failure

Rows in green denote that the publication in question reports on the same trial as the publication above.

Table 18: Randomised controlled trials evaluating exercise in surgical patients

Study	Treatment	Comparator(s)	Results	Summary
van der Peijl, 2004 [88]	High frequency (twice daily, inc weekend, starting 1st day after surgery). Patients encourage to repeat exercises without supervision. Exercises consisted of motion, muscle strengthening, coordination, stair climbing and walking. Treatment delivered by physiotherapists.	Low frequency (once daily, not weekends, started first week day). Patients encourage to repeat exercises without supervision. Exercises consisted of motion, muscle strengthening, coordination, stair climbing and walking. Treatment delivered by physiotherapists.	Mean number of exercise sessions was 10 (SD 3.1) and 4 (SD 1.6). Median length of hospital stay was 7 days for both high and low frequency groups (5-11 and 5-18, p=0.510). High frequency group achieved 4/5 functional milestones significantly faster; the difference for the fifth milestone (stair climbing) was not achieved. Univariate analysis showed that age (p<0.001), sex (p=0.02), off-pump CABG (p=0.002), NYHA class (P<0.001) and LVF (p=0.03) to be significantly related to achievement of stair climbing. Outcomes from semi-structured interviews and physical achievement monitoring did not reveal any significant differences. High frequency resulted in significantly greater patient satisfaction (treatment variables p<0.05 4/6 questions, empathy p<0.05 for 2/6 questions, information p<0.05 for ¾ questions). Overall appreciation 8.3 vs 7.6 p=0.032	High frequency programme led to earlier achievement of functional milestones and greater patient satisfaction and theoretically earlier hospital discharge (though this was not demonstrated)
Hirschhorn, 2008 [89]	Walking exercise versus walking/breathing exercise versus standard intervention	Standard intervention	Walking (444±84m) and walking/breathing (431±98m) groups had significantly higher 6 six-minute walk assessment than standard treatment (377±90m) at hospital discharge though this was not sustained at 4 weeks. There were no significant differences between groups in vital capacity or QoL.	Adding respiratory and musculoskeletal exercise to walking during inpatient rehab following CABG does not confer any additional benefits
Karapolat, 2007 [90]	Hospital based exercise versus home-based. Both regimens consisted of flexibility, aerobic, strengthening, breathing and relaxation exercises	Hospital based exercise versus home-based. Both regimens consisted of flexibility, aerobic, strengthening, breathing and relaxation exercises	Significant improvement for hospital based regimen in VO2 (P>0.05). Between groups, improvement in peak VO2 was significantly better with the hospital based regimen than home based (p<0.05). Significant improvement for hospital based regimen in all SF-36 scores except vitality and social function (P>0.05), no differences for BECK or STAI. Home-based showed no improvement except for bodily pain on SF-36 (p>0.05)	Supervised exercise in a rehabilitation unit resulted in greater within group changes. Only VO2 max was significant between hospital and home based treatment

Table 19: Details of interventions in randomised controlled trials evaluating exercise in surgical patients

Reference	Intervention										Comparator treatments										Population	
	Treatment	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/ counseling	Other eg music therapy, yoga	Comparator treatments	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/ counseling	Other eg music therapy, yoga	Condition	Details of population
van der Peijl, 2004 [88]	Exercise therapy		No	Yes	Yes	No	No	No	No	No	Exercise therapy	No	No	Yes	Yes	No	No	No	No	No	CABG	Heart surgery; CABG; PTCA (acute, recovery)
Hirschhorn, 2008 [89]	Exercise therapy	Supervision of physiotherapist	Yes	Yes	Yes	No	No	No	No	No	Exercise therapy	Supervision of physiotherapist	Yes	Yes	Yes	No	No	No	No	No	CABG	Heart surgery; CABG; PTCA (acute, recovery)
Karapolat, 2007 [90]	Exercise therapy	No	No	Yes	Yes	No	No	Yes	No	No	Exercise therapy	No	No	Yes	Yes	No	No	Yes	No	No	Heart surgery	Heart surgery; CABG; PTCA (chronic, secondary prevention)

Table 20: Randomised controlled trials evaluating exercise in myocardial infarction patients

Study	Treatment	Comparator(s)	Results	Summary
Walther, 2008 [91]	No details of the regular exercise training are reported other than that it lasted for two years. These are the 2-year results for which the 1-year results are reported in Hambrecht et al. 2004. Study details are reported in this earlier article.	PCI was used in the second group. No additional details of the treatment are given. However, these results reported are for 2-years and for which the 1-year results are reported in Hambrecht et al. 2004. Study details are reported in this earlier article.	Event-free survival rates after 2 years were 78% for the exercise training and 62% for PCI (P=0.039). Maximal oxygen consumption had increased by 10% in the exercise group versus baseline (P=0.0171), whereas it was 7% for the PCI group versus baseline (p=0.4248).	Longer-term exercise therapy leads to a better event-free survival than PCI with stent implantation, with a reduction of inflammatory markers and ischemic events.
Zhang, 2006 [92]	Absolute bed rest for 24 hrs. Day 2: passive movement of limb joints. Day 3: patients sat up 3 x per day, 10 min each. Days 4-5: more and longer sitting. Days 6-7: patients stand at bedside 3 x per day, with increasing duration of standing. Days 8-9: Patients move limbs at bedside and walk around room. Days 10-14: Some walking, increasing gradually in distance and duration until they are climbing stairs.	Routine drug treatment and absolute bedrest.	Mean duration of hospital stay: 17.1 day with exercise, 24.5 days without (P < 0.05) Bartel index comparable between groups before intervention. After intervention: 81.43+/-13.57 for the exercise group versus 70.68+/-11.48, P < 0.05) MI recurrence after 2 yrs: 5% vs 22% in favour of exercise group.	The mean duration of hospital stay was lower in the early rehabilitation group (exercise in the first 2 weeks after event) than in the absolute bedrest group.Barthel index, self-care ability and recurrence of MI were also improved in the early exercise group.
Hambrecht, 2004 [93]	First 2 weeks in hospital: 6 x per day 10 min on bicycle ergometer at 70% of the max heart rate. After discharge: 20 min per day on bicycle ergometer at home and one 60-min group training session aerobic exercise per week.	Stent angioplasty	At 12 months event-free survival with PCI was 70% versus 88% with exercise (OR 0.33, 95%CI 0.12 to 0.9, p=0.023). Maximal oxygen uptake (16% p<0.001) and exercise tolerance (20% p<0.001) versus PCI also increased with exercise. Exercise was the only influence on the rate of ischaemic events in multivariate analysis (p=0.009). Clinical symptoms improved significantly during the study; CCS class decreased in both groups (p<0.001 versus baseline).	A 12 month exercise intervention for stable CAD resulted in significantly improved event free survival (fewer events and hospitalisations) and exercise capacity at lower cost when compared with PCI

Table 21: Details of interventions in randomised controlled trials evaluating exercise in myocardial infarction patients

Reference	Intervention										Comparator treatments										Population	
	Treatment	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/ counseling	Other eg music therapy, yoga	Comparator treatments	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/ counseling	Other eg music therapy, yoga	Condition	Details of population
Walther, 2008 [91]	Exercise therapy	No	No	Yes	No	No	No	No	No	No	Other	No	No	No	No	No	No	No	No	No	Coronary artery disease	Coronary artery disease, angina, MI chronic (chronic, secondary prevention)
Zhang, 2006 [92]	Exercise therapy	Rehabilitation therapist	No	Yes	Yes	No	No	No	No	No	Other	Not reported	No	No	No	No	No	No	No	No	Myocardial infarction	Myocardial infarction (acute, recovery)
Hambrecht, 2004 [93]	Exercise therapy	No	No	Yes	Yes	No	No	No	No	No	Other	No	No	No	No	No	No	No	No	No	Coronary artery disease	Coronary artery disease, angina, MI chronic (chronic, secondary prevention)

Table 22: Randomised controlled trials evaluating exercise in a mixed patient population

Study	Treatment	Comparator(s)	Results	Summary
Hage, 2003 [94]	50 mins of aerobic training three times a week for three months. The programme was supported by music. Follow-up was conducted 3 to 6 years after randomisation (mean 4.4 years).	Patients were instructed to restart their physical activities as soon as they felt able to do so.	Patients were assessed at three months, 12 months and between 3-6 years (mean 4.4 years). The self-estimated level of physical activity score for those in the intervention group improved significantly over time, as compared with the control group ($p<0.05$), with the most pronounced effects after three months ($p<0.01$). The changes in physical activity (more physically active, equally physically active and less physically active from baseline) were not significant between groups. There was no significant change over time, or between the groups with regards to EuroQoL score.	Those in the intervention group improved their level of physical activity significantly over time, in contrast to the control group. The EuroQoL showed no difference between the groups.
Arthur, 2007 [95]	Aerobic training (2 40 min sessions supervised per week for 6 months at 40-70% of functional capacity) versus. Patients were also free to take part in other, non- exercise, services offered by the CHRC as part of their CR Programme (e.g. nutrition counselling, smoking cessation classes).	Aerobic + strength training (as before plus 2 sets of 8-10 upper body repetitions and 10-12 lower body repetitions totalling 20-15 mins and increasing in intensity over time) over 6 months. Patients were also free to take part in other, non-exercise, services offered by the CHRC as part of their CR Programme (e.g. nutrition counselling, smoking cessation classes).	Both groups demonstrated similar significant improvements in peak VO2 (19% versus 22%) and similar declines at 1 yr. No statistically significant differences were observed. Strength and self efficacy also improved in both groups ($p<0.0001$ and $p=0.0024$, $p<0.0001$, $p=0.0012$ respectively) at 1 yr, no significant differences between groups. PCS scores increased over 6 months in both groups ($p=0.0002$) but there no significant differences between groups ($p=0.52$) at 6 months or 1 yr follow-up. At 1 year, PCS scores continued to improve in aerobic + strength group yielding a statistically significant difference ($p=0.05$)	Both regimens resulted in statistically significant improvements. There were no statistically significant differences observed between groups.
Blumenthal, 2005 [96]	Patients were assigned to usual care plus supervised aerobic exercise training for 35 minutes 3 times per week for 16 consecutive weeks. Exercise sessions consisted of a 10-minute warm- up involving stretching and exercise on a stationary bicycle at 50% to 70% of heart rate reserve followed by 35 minutes of walking and jogging at a target intensity of 70% to 85% of heart rate reserve.	Usual care and Stress management training	Patients in the exercise and stress management groups had lower mean (SE) BDI scores (exercise: 8.2 [0.6]; stress management: 8.2 [0.6]) vs usual care (10.1 [0.6]; P = .02); reduced distress by GHQ (General health questionnaire) scores (exercise: 56.3 [0.9]; stress management: 56.8 [0.9]) vs usual care (53.6 [0.9]; P = .02); and smaller reductions in LVEF during mental stress testing (exercise: −0.54% [0.44%]; stress management: −0.34% [0.45%]) vs usual care (−1.69% [0.46%]; P = .03). Exercise and stress management were associated with lower mean (SE) WMA (wall motion abnormalities) rating scores (exercise: 0.20 [0.07]; stress management: 0.10 [0.07]) in a subset of patients with significant stress-induced WMA at baseline vs usual care (0.36 [0.07]; P = .02). Patients in the exercise and stress management groups had greater mean (SE) improvements in flow-mediated dilation (exercise: mean [SD], 5.6% [0.45%]; stress management: 5.2% [0.47%]) vs usual care patients (4.1% [0.48%]; P = .03). In a subgroup, those receiving stress management showed improved mean (SE) baroreflex sensitivity (8.2 [0.8] ms/mm Hg) vs usual care (5.1 [0.9] ms/mm Hg; P = .02) and significant increases in heart rate variability (193.7 [19.6] ms) vs usual care (132.1 [21.5] ms; P = .04).	Patients in exercise training group showed greater reductions in general distress as measured by the BDI compared with usual care controls. There were no treatment group differences in hostility, anxiety

Table 23: Details of interventions in randomised controlled trials evaluating exercise in a mixed patient population

Reference	Intervention										Comparator treatments										Population	
	Treatment	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/ counseling	Other eg music therapy, yoga	Comparator treatments	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/ counseling	Other eg music therapy, yoga	Condition	Details of population
Hage, 2003 [94]	Exercise therapy	Yes Specialist physiotherapist	No	Yes	No	No	No	No	No	Yes	Other	No	No	Yes	No	No	No	No	No	No	Mixed	Mixed/ Other
Arthur, 2007 [95]	Exercise therapy	No	No	Yes	Yes	Yes	Yes	No	No	No	Exercise therapy	No	No	Yes		Yes	Yes	No	No	No	Mixed	Heart surgery; CABG; PTCA (acute, recovery)
Blumenthal, 2005 [96]	Exercise therapy	No	Yes	Yes	Yes	No	No	No	No	No	Usual care	No	Yes	No	No	No	No	No	No	No	Mixed	Mixed/ Other

Table 24: Randomised controlled trials comparing MDCR with exercise

Study	Treatment	Comparator(s)	Patient population	Results	Summary
Brugemann, 2007 [67]	Physical training (at least 30 min at a perceived exertion of 'somewhat hard' supervised by a physiotherapist three times per week) with information about disease for 6 weeks plus weekly group (4-6 patients) psychoeducational sessions and relaxation therapy led by a psychologist for 8 weeks	Physical training (at least 30 min at a perceived exertion of 'somewhat hard' supervised by a physiotherapist three times per week) with information about disease for 6 weeks	Mixed	QoL (Leiden total p=0.570) and exercise capacity (mean change at 9 months 17 with exercise and 20 with MDCR, p=0.257) improved in both treatment groups up to 9 months but there were no between group differences. Blood lipid profile was unaffected and energy intake decreased, neither resulted in significant differences between treatment group, p=0.499 and p=0.836.	Exercise programme results in comparable outcomes to a MDCR programme
Focht, 2004 [66]	Months one to three, centre-based exercise therapy followed by group discussions, with self-planned activity providing the additional exercise sessions for a frequency equivalent to 3-times per week. The group sessions were for purposes of encouragement, motivation and support in order to maintain long-term physical activity. Participants were also shown the concept of self-monitoring using a pedometer and received help setting individual and group goals for exercise. Months four to nine consisted of less contact with the centre, through phone contacts, newsletters and mailing back activity cards to the centre on a monthly basis, as well as booster exercise sessions. Months nine to 12 were home-based activity, completely independent of the centre.	Participants engaged in three months of centre-based exercise sessions, performed three days per week.	Mixed	Analysis of the Mental Health composite scale and Vitality sub-scale yielded significant 2-way Gender x Treatment interactions (p<0.0001 and p=0.0171, respectively). For the remaining tests on sub-scales of the SF-36, there were no other significant effects or interactions by treatment arm.	Improvements in HRQoL in older adults enrolled in cardiac rehabilitation differ as a function of treatment, gender and initial mental health status.

Table 25: Details of interventions in randomised controlled trials comparing MDCR with exercise

Reference	Intervention										Comparator treatments										Population	
	Treatment	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/ counseling	Other eg music therapy, yoga	Comparator treatments	Appointed coordinator? (who?)	Medical advice	Exercise	Were exercise-based targets/ goals pre-specified?	Dietary advice	Smoking cessation	Other psychological	Life habits/ counseling	Other eg music therapy, yoga	Condition	Details of population
Brugemann, 2007 [67]	Multidisciplinary cardiac rehabilitation		Yes	Yes	Yes	Yes	No	Yes	No	Yes	Exercise therapy		No	Yes	Yes	Yes	No	Yes	No	No	Mixed	Heart surgery; CABG; PTCA (acute, recovery)
Focht, 2004 [66]	Multidisciplinary cardiac rehabilitation	No	No	Yes	No	No	No	No	No	Group therapy sessions	Exercise therapy	No	No	Yes	No	No	No	No	No	No	Mixed	Mixed/Other

Table 26: Critical appraisal of study quality (45 RCTs)

		Internal validity						Overall assessment			
Study	**Appropriate and clearly focussed question?**	**Randomised?**	**Observer blinded?**	**Allocation concealment**	**Patient groups comparable?**	**Dropouts and withdrawals described?**	**Analyses conducted in ITT population?**	**Bias minimisation ?**	**If biased, how would bias affect results?**	**Research questions answered?**	**Risk of bias**
Arthur, 2007 [95]	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Poorly addressed	++		Yes	Low
Austin, 2005 [50]	Poorly addressed	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	+		No, unclear what comparator consisted of, non-significant results possible due to lack of goals	Low
Austin, 2008 [51]	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Well covered	Well covered	+		Yes	Low
Azad, 2008 [52]	Well covered	Well covered	Adequately addressed	Not addressed	Adequately addressed	Well covered	Adequately addressed	++		Yes	Low
Blumenthal, 2005 [96]	Well covered	Poorly addressed	Poorly addressed	Poorly addressed	Adequately addressed	Adequately addressed	Not addressed	+			High
Briffa, 2005 [74]	Well covered	Well covered	Not addressed	Not addressed	Adequately addressed	Well covered	Adequately addressed	++		No	Low
Brugemann, 2007 [67]	Adequately addressed	Poorly addressed	Not addressed	Not addressed	Adequately addressed	Adequately addressed	Adequately addressed	+		Yes	High
Butler, 2009 [69]	Adequately addressed	Adequately addressed	Not addressed	Not addressed	Adequately addressed	Adequately addressed	Adequately addressed	++		Yes	Low
Corvera-Tindel, 2004 [79]	Adequately addressed	Adequately addressed	Adequately addressed	Not addressed	Adequately addressed	Adequately addressed	Poorly addressed	++		Yes	Low
Dalal, 2007 [57]	Poorly addressed	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	+		No, unclear what comparator consisted of, non-significant results possible due to lack of goals	Low
Dracup, 2007 [76]	Adequately addressed	Poorly addressed	Poorly addressed	Not addressed	Adequately addressed	Adequately addressed	Adequately addressed	+	Lack of information	No	High

		Internal validity						Overall assessment			
Study	**Appropriate and clearly focussed question?**	**Randomised?**	**Observer blinded?**	**Allocation concealment**	**Patient groups comparable?**	**Dropouts and withdrawals described?**	**Analyses conducted in ITT population?**	**Bias minimisation?**	**If biased, how would bias affect results?**	**Research questions answered?**	**Risk of bias**
									about randomisation and blinding		
Evangelista, 2006 [80]	Adequately addressed	Poorly addressed	Not addressed	Not addressed	Adequately addressed	Adequately addressed	Adequately addressed	+	Lack of information about randomisation and blinding	No	High
Flynn, 2009 [81]	Adequately addressed	Well covered	Not addressed	Not addressed	Adequately addressed	Adequately addressed	Adequately addressed	++			Low
Focht, 2004 [66]	Well covered	Poorly addressed	Not addressed	Not addressed	Not addressed	Well covered	Adequately addressed	+	Comparability of groups at baseline is not addressed and no information about randomisation given.	Yes	High
Gary, 2006 [77]	Well covered	Poorly addressed	Not addressed	Not addressed	Adequately addressed	Poorly addressed	Not addressed	-			High
Giannuzzi, 2003 [82]	Adequately addressed	Poorly addressed	Poorly addressed	Not addressed	Adequately addressed	Adequately addressed	Not addressed	+			High
Giannuzzi, 2008 [61]	Adequately addressed	Adequately addressed	Poorly addressed	Not addressed	Adequately addressed	Adequately addressed	Poorly addressed	+		Yes	Low
Hage, 2003 [94]	Adequately addressed	Adequately addressed	Not addressed	Not addressed	Not addressed	Adequately addressed	Not addressed	-	Comparability of treatment groups at baseline is not addressed and though detailed descriptions are given of the measures used for outcomes, limited study methodology is included.	Yes	High
Hambrecht, 2004 [93]	Adequately addressed	Adequately addressed	Not addressed	Not addressed	Adequately addressed	Adequately addressed	Poorly addressed	+			Low

		Internal validity						Overall assessment			
Study	**Appropriate and clearly focussed question?**	**Randomised?**	**Observer blinded?**	**Allocation concealment**	**Patient groups comparable?**	**Dropouts and withdrawals described?**	**Analyses conducted in ITT population?**	**Bias minimisation ?**	**If biased, how would bias affect results?**	**Research questions answered?**	**Risk of bias**
Hamm, 2004 [97]	Adequately addressed	Poorly addressed	Not addressed	Not addressed	Well covered	Adequately addressed	Not addressed	+	No information about the randomisation process.	No	High
Hevey, 2003 [62]	Poorly addressed	Poorly addressed	Not addressed	Not addressed	Adequately addressed	Not addressed	Not addressed	-	Lack of information about randomisation, withdrawals and small sample size of only 30 patients randomised per group.	No	High
Hirschhorn, 2008 [89]	Adequately addressed	Adequately addressed	Poorly addressed	Adequately addressed	Adequately addressed	Adequately addressed	Poorly addressed	++		Additional components to inpatient rehab after CABG do not confer additional benefits	Low
Jolly, 2009 [63]	Adequately addressed	Poorly addressed	Adequately addressed	Not addressed	Adequately addressed	Adequately addressed	Adequately addressed	++		Yes	Low
Jolly, 2009a [78]	Adequately addressed	Adequately addressed	Not addressed	Not addressed	Adequately addressed	Adequately addressed	Poorly addressed	++			Low
Karapolat, 2007 [90]	Adequately addressed	Poorly addressed	Not addressed	Not addressed	Adequately addressed	Adequately addressed	Poorly addressed	+	Lack of information about randomisation and blinding		High
Karlsson, 2007 [64]	Adequately addressed	Adequately addressed	Not addressed	Poorly addressed	Adequately addressed	Adequately addressed	Poorly addressed	++			Low
Kortke, 2005 [55]	Adequately addressed	Not addressed	Not reported	Not addressed	Adequately addressed	Adequately addressed	Not reported				High
Kovoor, 2006 [60]	Adequately addressed	Adequately addressed	Not addressed	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	++		Results of cardiac rehab	Low

		Internal validity						Overall assessment			
Study	**Appropriate and clearly focussed question?**	**Randomised?**	**Observer blinded?**	**Allocation concealment**	**Patient groups comparable?**	**Dropouts and withdrawals described?**	**Analyses conducted in ITT population?**	**Bias minimisation ?**	**If biased, how would bias affect results?**	**Research questions answered?**	**Risk of bias**
										immediately following rehab are not significantly different to simply retruning to normal activities in low risk patients	
Lear, 2006 [75]	Well covered	Well covered	Adequately addressed	Not addressed	Adequately addressed	Poorly addressed	Poorly addressed	++		Additional 4 yr intervention on top of standard cardiac rehab	Low
Liao, 2003 [58]	Poorly addressed	Poorly addressed	Not addressed	Not addressed	Adequately addressed	Not addressed	Not addressed	-	Very limited details of all aspects of the study.	No	High
Macchi, 2007	Adequately addressed	Poorly addressed	Not addressed	Not addressed	Poorly addressed	Adequately addressed	Not addressed	-		Yes	High
Marchionni, 2003 [59]	Adequately addressed	Poorly addressed	Adequately addressed	Not addressed	Adequately addressed	Adequately addressed	Not reported				High
Mittag, 2006 [68]	Adequately addressed	Adequately addressed	Not addressed	Poorly addressed	Well covered	Adequately addressed	Not addressed	++		Yes	Low
Nilsson, 2008 [83]	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed	Adequately addressed				Low
Reid, 2005 [65]	Adequately addressed	Adequately addressed	Adequately addressed	Poorly addressed	Adequately addressed	Poorly addressed	Not reported				Low
Scholz, 2006 [71]	Well covered	Adequately addressed	Not addressed	Not addressed	Adequately addressed	Poorly addressed	Poorly addressed	+	Number of patients who completed the study is reported but no information about specific	Yes	High

		Internal validity						Overall assessment			
Study	**Appropriate and clearly focussed question?**	**Randomised?**	**Observer blinded?**	**Allocation concealment**	**Patient groups comparable?**	**Dropouts and withdrawals described?**	**Analyses conducted in ITT population?**	**Bias minimisation?**	**If biased, how would bias affect results?**	**Research questions answered?**	**Risk of bias**
									withdrawals.		
van der Peijl, 2004 [88]	Well covered	Well covered	Adequately addressed	Adequately addressed	Poorly addressed	Well covered	Not addressed	++		Yes	Low
Walther, 2008 [91]	Adequately addressed	Adequately addressed	Not addressed	Not addressed	Well covered	Well covered	Adequately addressed	+	Lack of information about randomisation and treatment arms.	Yes	Low
Whellan, 2008 [85]	Adequately addressed	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported				High
Witham, 2005 [86]	Adequately addressed	Well covered	Poorly addressed	Not addressed	Adequately addressed	Well covered	Not addressed	++		No	Low
Witham, 2007 [87]	Adequately addressed	Well covered	Poorly addressed	Not addressed	Adequately addressed	Poorly addressed	Not addressed	+		No	High
Yu, 2003 [70]	Well covered	Poorly addressed	Not addressed	Not addressed	Adequately addressed	Not addressed	Not addressed	-	Lack of information about randomisation and withdrawals.	Yes	High
Yu, 2004 [72]	Poorly addressed	Poorly addressed	Poorly addressed	Not addressed	Well covered	Well covered	Not addressed	+	No information about the randomisation process.	Yes	High
Zhang, 2006 [92]	Adequately addressed	Not addressed	Not addressed	Not addressed	Not reported	Adequately addressed	Not reported				High
Zwisler, 2008 [73]	Well covered	Well covered	Well covered	Well covered	Adequately addressed	Well covered	Well covered	++		Yes	Low

Rows in green denote that the publication in question reports on the same trial as the publication above.

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2 APPENDICES: ANALYSIS OF IMA DATABASE

APPENDIX 1: NOMENCLATURE CODES USED FOR PATIENT CLASSIFICATION

Multidisciplinary Cardiac rehabilitation

Outpatient	Inpatient	Description
	771201	Individuele revalidatie, revalidatie van hartpatiënten, individuele pluridisciplinaire revalidatiezitting met minimale duur van 30 minuten
771212	771223	Individuele revalidatie, revalidatie van hartpatiënten, collectieve pluridisciplinaire revalidatiezitting met minimale duur van 60 minuten, volgend op een individueel revalidatieprogramma en, voor wat het aspect fysieke hertraining betreft, zich richtend tot een groep van maximaal acht personen

Monodisciplinary PMR

Outpatient	Inpatient	Description
558795	558806	Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) - de eerste 18 zittingen
558390	558423	Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) - van de 19e tot 48e zitting inbegrepen

Physiotherapy

Outpatient	Inpatient	Description
560011 560114 560210 560313 560534 561595 561610 561632 561654 561713 563010 563113 563216 563312 563581	561724 560501 563570 560545 561702	Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gemiddelde duur van 30 minuten heeft
515115 515130 515911 516110 516132	517985 517823 517705 515922 517904	Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een gemiddelde globale duur van 30 minuten heeft en die één of meer handelingen omvat die tot de bevoegdheid van de kinesitherapeuten behoren

516913 517016 517311 517812 517915 517930 517974	516106 515104 516924	
560033 560136 560232 560335 560556 563032 563135 563231 563334 563603	563592 560560	Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gemiddelde duur van 15 minuten heeft
515211 515233 515292 515933 516213 516235 516250 516935 516972	516946 516202 515266 515944	Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende niet gekoppeld is aan het begrip duur en die één of meer handelingen omvat die tot de bevoegdheid van de kinesitherapeuten behoren
560092 560195 560291 560394 563091 563194 563290 563393		Consultatief kinesitherapeutisch onderzoek van de patiënt
561433 561455 561470 561514 561551 561573	561562	Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende niet gekoppeld is aan het begrip duur; 2de zitting van de dag overeenkomstig de bepalingen van § 12
563076 563172 563275 563371 563474 563555		Schriftelijk verslag
515196	515200	Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid

516154 516950 517510 517856 517952		van de kinesitherapeut per rechthebbende een gemiddelde globale duur van 20 minuten heeft en die één of meer handelingen omvat die tot de bevoegdheid van de kinesitherapeuten behoren
560416 560571 563415 563496		Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een minimumduur van 20 minuten heeft
560431 560593 563430 563511		Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een minimumduur van 10 minuten heeft
516456 517414 517834 517871	516401 517845 517720	Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende niet gekoppeld is aan het begrip duur en die één of meer handelingen omvat die tot de bevoegdheid van de kinesitherapeuten behoren : 2de zitti
515712 515734 516714		Consultatief kinesitherapeutisch onderzoek van de patiënt, uitgevoerd op voorschrift van de behandelend geneesheer voordat een eventuele behandeling wordt voorgeschreven. Deze verstrekking omvat de mededeling aan de behandelend geneesheer, in een schrift
516773 516795	516821	Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een minimumduur van 60 minuten heeft en die één of meer handelingen omvat die tot de bevoegdheid van de kinesitherapeuten behoren
510016 510414	511000	Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut, per individuele rechthebbende, een gemiddelde globale duur van dertig minuten bedraagt, en die verscheidene verstrekkingen omvat, waaronder massagetechnieken e
516434 517112		Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende niet gekoppeld is aan het begrip duur en die één of meer handelingen omvat die tot de bevoegdheid van de kinesitherapeuten behoren ; 2de zitti
510053 510451	511044	Individuele kinesitherapie-akte die één van de volgende verstrekkingen omvat : - ultraviolette stralen of plaatselijk of algemeen lichtbad; - plaatselijk aanwenden van water, damp, ijs, paraffine, fango of parafango; - mineraal of medicamenteus bad, inclu
510031 510436	511022	Individuele kinesitherapiezitting, waaronder massagetechnieken en/of revalidatie door beweging (oefeningen, actieve/passieve mobilisatie, actieve/passieve bewegingen), hetzij relaxatietherapie, hetzij psychomotoriek
510252 510613	511243	Opmaken van een kinesitherapeutisch dossier, inclusief het motorisch bilan, in het raam van een individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per individuele rechthebbende een gemiddelde globale duur van de
510790		Individuele kinesitherapiezitting welke één of meer individuele kinesitherapie-akten bedoeld onder de nrs 510753 en 510775 omvat
517613		Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende niet gekoppeld is aan het begrip duur en die één of meer handelingen omvat die tot de bevoegdheid van de kinesitherapeuten behoren : 2e zittin
510274		Als de zittingen nummers 510252 en 510016 niet mogen worden geattesteerd, rekening houdende met de in par. 3, derde en vierde lid, van dit artikel vastgestelde beperkingen : Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de k

510812	Collectieve revalidatie door beweging (heilgymnastiek, al dan niet met gebruik van apparatuur), maximum 3 personen : per persoon
560254	Als de zitting 560210 niet mag worden geattesteerd, rekening houdende met de in § 10 van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale ge
510090	Individuele kinesitherapiezitting, waaronder massagetechnieken en/of revalidatie door beweging (oefeningen, actieve/passieve mobilisatie actieve/passieve bewegingen), hetzij relaxatietherapie, hetzij psychomotoriek, alsook één van de volgende verstrekking
515314	Als de zitting 515115 niet mag worden geattesteerd, rekening houdende met de in § 10 van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een gemiddelde
560151	Als de zitting 560114 niet mag worden geattesteerd, rekening houdende met de in § 10 van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale ge
516736	Consultatief kinesitherapeutisch onderzoek van de patiënt, uitgevoerd op voorschrift van de behandelend geneesheer voordat een eventuele behandeling wordt voorgeschreven . Deze verstrekking omvat de mededeling aan de behandelend geneesheer, in een schrift
510635	Als de zittingen nummers 510613 en 510414 niet mogen worden geattesteerd, rekening houdende met de in par. 3, derde en vierde lid, van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de ki
560615	Als de zitting 560571 niet mag worden geattesteerd, rekening houdende met de in § 10 van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een minimumduu
510930	Als de zittingen nummers 510915 en 510716 niet mogen worden geattesteerd, rekening houdende met de in par. 3, derde en vierde lid, van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de ki
563452	Als de zitting 563415 niet mag worden geattesteerd, rekening houdende met de in § 14 van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een minimumduu
510731	Individuele kinesitherapiezitting, waaronder massagetechnieken en/of revalidatie door beweging (oefeningen, actieve/ passieve mobilisatie, actieve/passieve bewegingen), hetzij relaxatietherapie, hetzij psychomotoriek
510075	Individuele kinesitherapie-akte, welke elektrotherapie van één of meer soorten, met uitzondering van ultraviolette stralen en lichtbaden, omvat
515970	Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende niet gekoppeld is aan het begrip duur en die één of meer handelingen omvat die tot bevoegdheid van de kinesitherapeuten behoren
516751	Individuele kinesitherapiezitting waarbij de persoonlijke betrokkendheid van de kinesitherapeut per rechthebbende een minimumduur van 60 minuten heeft en die één of meer handelingen omvat die tot de bevoegdheid van de kinesitherapeuten behoren
563253	Als de zitting 563216 niet mag worden geattesteerd, rekening houdende met de in § 14 van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale ge
517996	Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een gemiddelde globale duur van 20 minuten heeft en die één of meer handeling omvat die tot

		de bevoegdheid van de kinesitherapeuten behoren
516412		Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende niet gekoppeld is aan het begrip duur en die één of meer handelingen omvat die tot de bevoegdheid van de kinesitherapeuten behoren ; 2de zitt
515955		Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een gemiddelde globale duur van 20 minuten heeft en die één of meer handelingen omvat die tot de bevoegdheid van de kinesitherapeut behoren
516994		Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende niet gekoppeld is aan het begrip duur en die één of meer handelingen omvat die tot de bevoegdheid van de kinesitherapeuten behoren; 2de zittin
515336		Als de verstrekking 515130 niet mag worden geattesteerd, rekening houdende met de in § 10 van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een gemi
561492		Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende niet gekoppeld is aan het begrip; 2de zitting van de dag overeenkomstig de bepalingen van § 12
563533		Als de zitting 563496 niet mag worden geattesteerd, rekening houdende met de in § 14 van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een minimumduu
510716		Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut, per individuele rechthebbende, een gemiddelde globale duur van twintig minuten bedraagt, en die verscheidene verstrekkingen omvat, waaronder massagetechnieken
510495	511081	Individuele kinesitherapiezitting, waaronder massagetechnieken en/of revalidatie door beweging (oefeningen, actieve/passieve mobilisatie, actieve/passieve bewegingen), hetzij relaxatietherapie, hetzij psychomotoriek, alsook één van de volgende verstrekkin
510134		Individuele kinesitherapiezitting welke twee of meer individuele kinesitherapie-akten bedoeld onder de nrs. 510053 en 510075 omvat
510510		Individuele kinesitherapiezitting, waaronder massagetechnieken en/of revalidatie door beweging (oefeningen, actieve/passieve mobilisatie, actieve/passieve bewegingen), hetzij relaxatietherapie, hetzij psychomotoriek, alsook electrotherapie van één of meer
510112		Individuele kinesitherapiezitting, waaronder massagetechnieken en/of revalidatie door beweging (oefeningen, actieve/ passieve mobilisatie, actieve/passieve bewegingen), hetzij relaxatietherapie, hetzij psychomotoriek, alsook elektrotherapie van één of mee
560453		Als de zitting 560416 niet mag worden geattesteerd, rekening houdende met de in § 10 van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een minimumduu
510156		Collectieve revalidatie door beweging (heilgymnastiek met of zonder mobilisatie, al dan niet met gebruik van apparatuur), maximum 3 personen : per persoon
563054		Als de zitting 563010 niet mag worden geattesteerd, rekening houdende met de in § 14 van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale ge
563150		Als de zitting 563113 niet mag worden geattesteerd, rekening houdende met de in § 14 van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale ge
563356		Als de zitting 563312 niet mag worden geattesteerd, rekening houdende met de in §14 van dit artikel vastgestelde beperkingen :

	individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gem
560350	Als de zitting 560313 niet mag worden geattesteerd, rekening houdende met de in §10 van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gem
515395	Als de zitting 515196 niet mag worden geattesteerd, rekening houdende met de in §10 van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een gemiddelde
510915	Opmaken van een kinesitherapeutisch dossier, inclusief het motorisch bilan, in het raam van een individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per individuele rechthebbende een gemiddelde globale duur van tw
515992	Als de zitting 515955 niet mag worden geattesteerd, rekening houdende met de in § 10 van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een gemiddelde
509611[a]	Vast bedrag kinesitherapie in gezondheidscentra
561676	Individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gemiddelde duur van 20 minuten heeft
560055	Als de zitting 560011 niet mag worden geattesteerd, rekening houdende met de in § 10 van dit artikel vastgestelde beperkingen : individuele kinesitherapiezitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale ge

[a] Experts pointed out that this code is attributed to all patients staying in a health care centre and should therefore be removed from the analysis. However, there was only 1.98% (97) of patients classified as "physiotherapy" in this situation; as a result, this code does not have significant influence on the analytical results and consequently, it has been kept in the analysis and discussed as a limitation of the study in chapter 5.

APPENDIX 2: DESCRIPTION OF PATIENT INCLUSION AND EXCLUSION

This section further describes the methodology applied for the final selection of the patients included in the analysis. Several reasons for exclusion were determined:

- Data quality (N excluded: 336)
- Early mortality (N excluded: 1087)
- Specific nature of subgroups (N excluded: 269)

An overview of the sequential exclusion is graphically displayed in Figure 2 and is explained in detail in the following sections.

Exclusion based on data quality

Sequentially, 336 patients were removed from the database for the following reasons:

- 320 patients did not get any procedure with one of the predefined nomenclature codes in 2007
- For 16 patients, socio demographical data were missing

Exclusion due to early mortality

Because the study focuses on patients eligible for rehabilitation, patients who died during the calendar month of the index event or during the consecutive month were excluded from the analysis as their consumption of rehabilitation might be misleading in the interpretation of the results. Based on this exclusion criterion, 1087 patients were removed from the database.

Exclusion due to specific nature of subgroups

Some patients had a very specific profile that could also bias the results, namely the heart transplant patients and the patients younger than 30 years old. Hence, 269 patients have been excluded from the analysis.

2.1.1.1 *Heart transplant patients*

142 patients were identified as "heart transplants" at index date. Those patients were excluded because half of them were in fact lung or heart-lung transplantations, the latter mostly related to pulmonary disease or congenital heart disease. Moreover, heart transplantation addresses a quantitatively small and distinctive niche of younger patients (most if not all of them below 65 years of age) with a broad variety of atheromatous and non-atheromatous heart disease.

2.1.1.2 *Patients younger than 30 years old*

Patients younger than 30 old at the starting date (=date of the index cardiac procedure) were excluded, assuming that these patients most likely have congenital heart diseases. 127 additional patients have been removed based on this criterion.

APPENDIX 3: REHABILITATION SEQUENCES

Number of rehabilitation sequences

Table 2-1 is a part of the entire frequency table of patients who had a given number of rehabilitation sequences. Patients are classified according to the number of rehabilitation sequences they consumed. E.g. a patient who first received a number of physiotherapy sessions, consecutively a number of multidisciplinary rehabilitation sessions and thereafter again a number of physiotherapy sessions: this profile is considered as 3 sequences.

Table 2-1: Frequency table of patients who had a number of rehabilitation sequences

Number of sequences	Frequency	Percentage	Cumulative frequency and percentage	
1	9825	49.97	9825	49.97
2	4933	25.09	14758	75.06
3	2258	11.48	17016	86.54
4	1026	5.22	18042	91.76
5	517	2.63	18559	94.39
6	282	1.43	18841	95.82
7	150	0.76	18991	96.59
8	122	0.62	19113	97.21
9	66	0.34	19179	97.54
10	70	0.36	19249	97.90

Table 2-1 indicates that 9825 patients only had one type/sequence of rehabilitation, 4933 patients had two types/sequences of rehabilitation, etc. Since a large number of consecutive sequences (>10) is difficult to analyse, and already almost 92% of the patients are coved by 1 to 4 sequences range, it was decided to only further analyse these 18042 patients with 1 to 4 sequences.

Order of the rehabilitation

The following frequency table only reports the main orders of rehabilitations, since the complete frequency table would be incomprehensive.

Table 2-2: Frequency table of order of rehabilitation sequences

Order of sequence	Procedure type	
	PCI	**Surgery**
Multi ---- Physiotherapy	7,62%	30,28%
Physiotherapy	39,24%	12,73%
Multi	31,31%	16,32%
Physiotherapy ---- Multi ---- Physiotherapy	0,84%	8,84%
Mono	6,37%	0,89%
Physiotherapy---- Multi	1,65%	3,30%
Multi ---- Physiotherapy ---- Multi ---- Physiotherapy	0,41%	2,83%
Total (number of patients)	**87,44% (8232)**	**75,19% (6487)**

Table 2-2 indicates 31% of the patients only had multidisciplinary rehabilitation sessions, 7.5% of them had multidisciplinary rehabilitation sessions followed by physiotherapy and 6% of them only had monodisciplinary PRM sessions.

After surgery, 30% of patients had multidisciplinary rehabilitation sessions followed by physiotherapy, 16% of them only had multidisciplinary rehabilitation sessions, 13% of them only had physiotherapy and 9% of them first had physiotherapy, followed by multidisciplinary rehabilitation sessions and afterwards followed by physiotherapy again.

Please note that "all surgery patients with maximum 4 sequences" here are considered as 100% of the patients.

APPENDIX 4 REHABILITATION RELATED DATA DURING THE ENTIRE ONE-YEAR OBSERVATION PERIOD

Total duration of rehabilitation during the entire observation period

For this analysis, the entire observation period was taken into consideration, being one full year after index date.

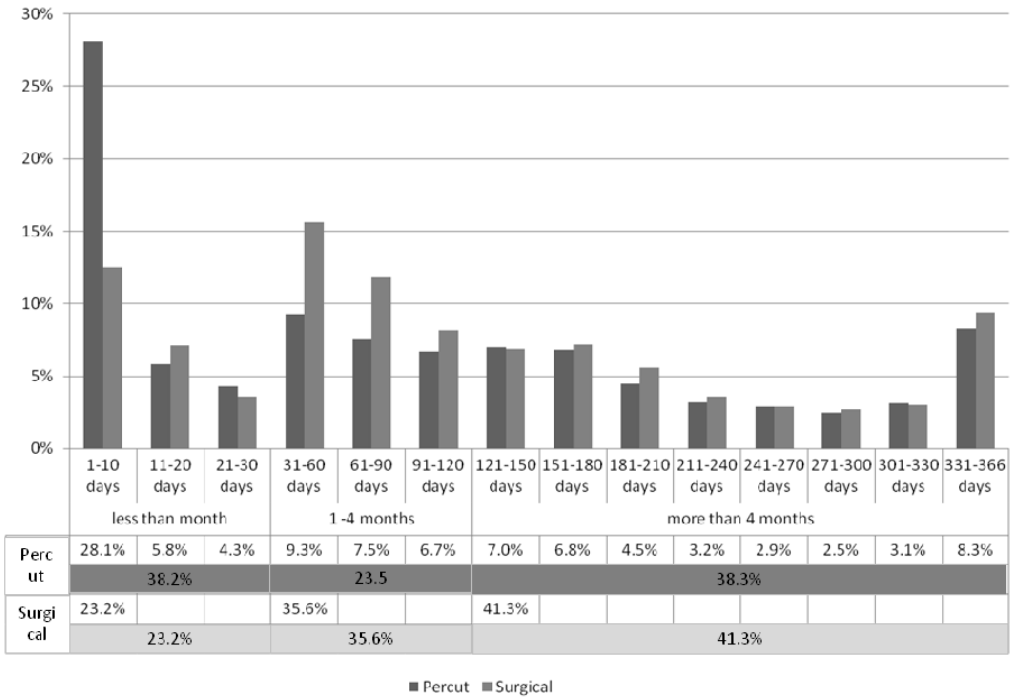
Table 2-3: Descriptive Statistics of Rehabilitation Duration during entire observation period

	PCI	Surgery	Total
N	9851	9811	19662
Mean	110.15	125.52	117.82
StdDev	114.62	111.16	113.16
Min	1	1	1
Max	366	366	366
Median	71	89	81
25% percentile	8	35	17
75% percentile	178	189	183

The average and median rehabilitation duration is longer in the surgery group, compared to the PCI group.

The evolution over time is graphically displayed in Figure 2-1.

Figure 2-1: Distribution of total duration of rehabilitation (in N of days) per procedure type for patients having at least 1 session of any kind of rehabilitation



After PCI, the duration of rehabilitation was maximum ten days for 28.1% of the patients, compared to 12.5% of the patients who underwent surgery.

The rehabilitation duration was 1 to 4 months for 23.5% of patients who had PCI compared to and 35.6% who had surgery.

Number of rehabilitation sessions

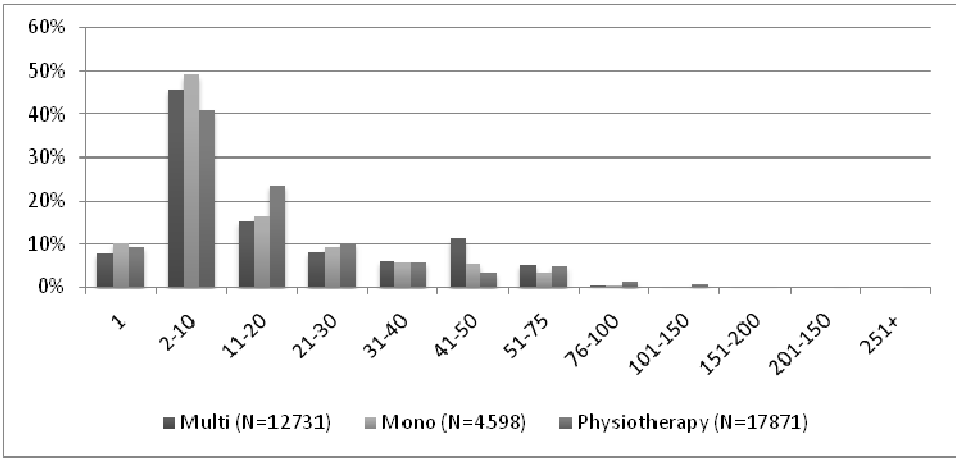
In Table 2-4, the statistics of the number of rehabilitation sessions are displayed for the total observation period of one year. Patients in the multidisciplinary group have the highest average number of sessions; while patients in the monodisciplinary group have the lowest number of sessions.

Table 2-4: Descriptive statistics of the Number of Rehabilitation Sessions of one year observation period.

	Multi-disciplinary	Mono-disciplinary	Physiotherapy	Total
N of patients	12731	4598	17871	19662
Mean N of sessions	17.88	14.33	17.57	30.90
StdDev	17.92	16.30	21.71	29.18
Min-Max	1-177	1-169	1-283	1-309
Median	9	7	10	24
25% percentile	5	3	4	9
75% percentile	29	20	21	45
Total N of sessions	227679	65912	313968	607559

The distribution of the total number of sessions over the three rehabilitation types (multidisciplinary rehabilitation, monodisciplinary PRM and Physiotherapy) is graphically represented in Figure 2-2. In each rehabilitation group, all patients are considered having received at least 1 session of this type of rehabilitation.

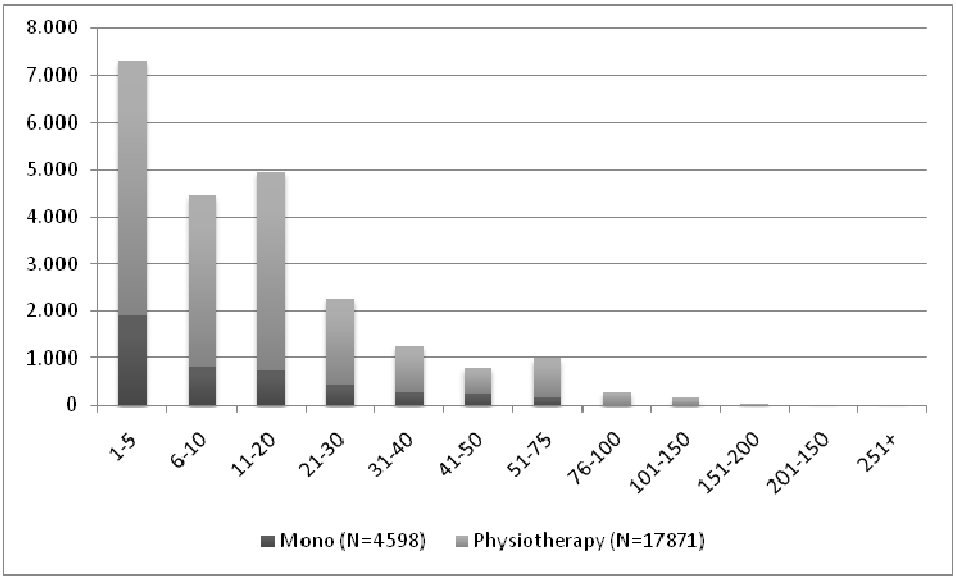
Figure 2-2: Distribution of the number of rehabilitation sessions after any cardiac procedure (surgery + PCI)



Approximatly 10% of the patients only received one sesision. Half of the patients who received at least one session of multidisiplinary rehabilitation received 2-10 sessions. 11% of patients received 41-50 multidiciplianry sessions, which is much higher than the number of sessions in the other two groups.

The histogram of the number of monodisciplinary PRM and physiotherapy sessions after any cardiac procedure (absolute values) shows that the number of patients who received monodisciplinary PRM sessions is much smaller than the number of patients who received physiotherapy sessions.

Figure 2-3: Histogram of the number of monodisciplinary PRM and exercise sessions after any cardiac procedure (Surgery + PCI)

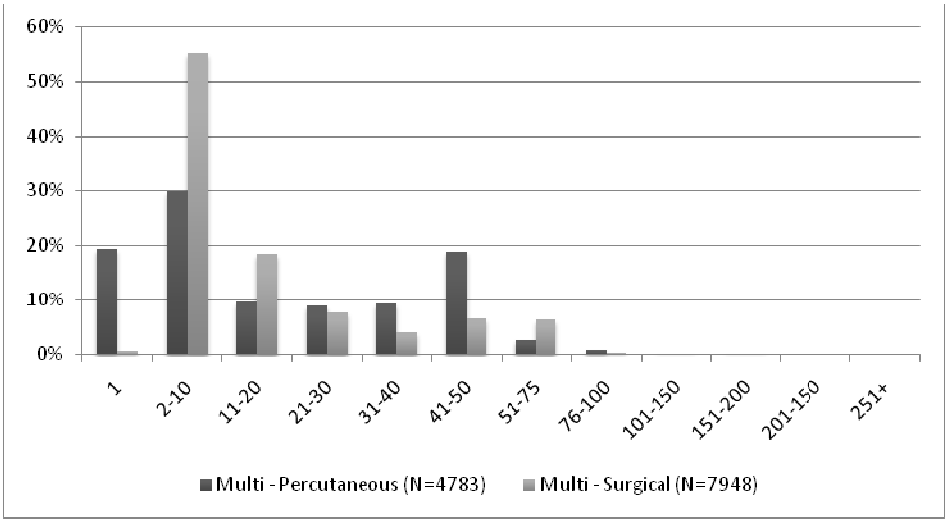


Hence, the decision was made to pool these both types of rehabilitation into one group, labelled 'Exercise with or without medical supervision'.

For both multidisciplinary and 'Exercise with or without medical supervision' sessions, a split was made between PCI and surgery patients. Results are described in the following sections.

Multidisciplinary rehabilitation

Figure 2-4: Distribution of the number of Multidisciplinary Rehabilitation sessions: PCI versus surgery



Two contrary distributions are observed when comparing the number of multidisciplinary sessions after PCI and surgery. Approximately 55% of the surgery patients who received multidisciplinary rehabilitation had 2 to 10 sessions during one year observational period. 19 % of the PCI patients only received one session of multidisciplinary rehabilitation and 10% received 2 to 10 sessions. 19% of the PCI patients and only 10% of the surgery patients received 41 to 50 sessions. The possible explanation might be that patients who underwent PCI have a much shorter hospital stay compared to the patients who underwent surgery.

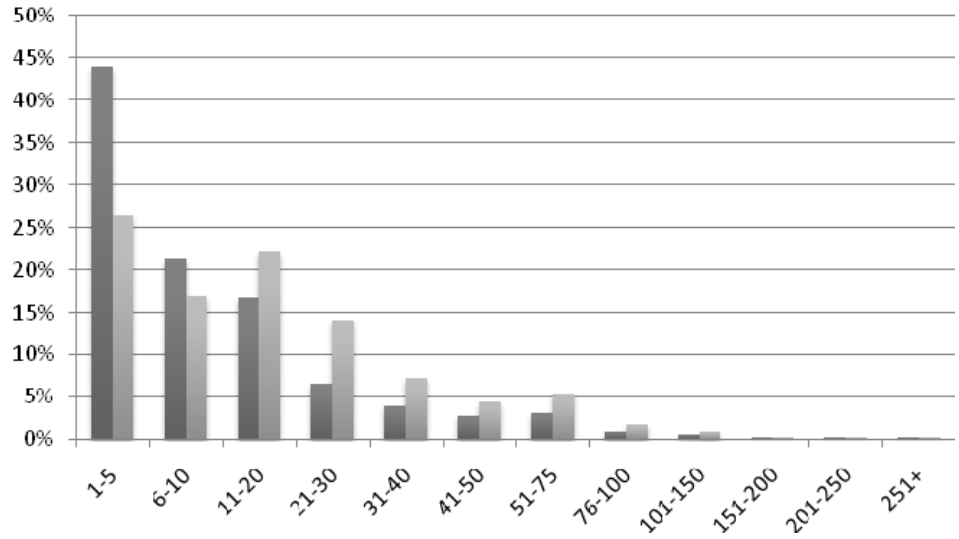
The statistics in Table 2-5 show that on average, the number of multidisciplinary rehabilitation sessions is higher after PCI than after surgery.

Table 2-5: Descriptive statistics of the number of multidisciplinary rehabilitation sessions: PCI versus surgery

	PCI	Surgery	Total
N of patients	4783	7948	12731
Mean	19.78	16.74	17.88
StdDev	19.74	16.62	17.92
Median	11	9	9
25% percentile	2	6	5
75% percentile	38	21	29

Physiotherapy with or without medical supervision

Figure 2-5 Distribution of the number of sessions of physiotherapy with or without medical supervision (monodisciplinary + Physiotherapy): PCI versus surgery



The distribution of the number of sessions of exercise with or without medical supervision is similar after PCI and after surgery.

Table 2-6 shows that after surgery, a patient has on average more exercise sessions with or without medical supervision than after PCI.

Table 2-6: Descriptive statistics of the number of sessions of exercise with or without medical supervision: PCI versus surgery

	PCI	Surgery	Total
N of patients	9008	13461	22469
Mean	15.06	18.14	16.91
StdDev	19.82	21.28	20.76
Median	9	11	10
25% percentile	3	4	4
75% percentile	18	22	21

APPENDIX 5: COST RELATED TO REHABILITATION

Unit cost for different types of rehabilitation

Table 2-7 and Table 2-8 provide an overview of the unit costs for the different types of rehabilitation from the public health care payer's perspective (PHCP) and from the patient's perspective based on the prices applicable in 2010.

Multidisciplinary rehabilitation sessions are more expensive for both PHCP and patient. The higher unit costs might explain the higher costs in the multidisciplinary outpatient group. However, rehabilitation costs include all types of rehabilitation a patient received during the pre-defined period.

Table 2-7: MDRC unit cost based on 2010 price

		PREFERENTIAL reimbursement		NON PREFERENTIAL reimbursement	
Reimbursement Number	FEES	PHCP	PATIENT	PHCP	PATIENT

771201[b] (Inpatient)	43.95	32.2	11.75	30.49	13.46
771223[c] (Inpatient)	31.66	23.25	8.41	22.06	9.6
771212[d] (Outpatient)	31.66	23.25	8.41	22.06	9.6

Table 2-8: Monodisciplinary rehabilitation unit cost (PRM) based on 2010 price

		PREFERENTIAL reimbursement		NON PREFERENTIAL reimbursement	
Reimbursement Number	FEES	PHCP	PATIENT	PHCP	PATIENT
558806[e] (Inpatient)	22.15	18.28	3.87	14.4	7.75
558795[f] (Outpatient)	22.15	18.28	3.87	14.4	7.75
558423[g] Inpatient)	16.61	13.71	2.9	10.8	5.81
558390[h] (Outpatient)	16.61	13.71	2.9	10.8	5.81

The fees for an ambulatory physiotherapy session are €20.45 and € 21.45 at home.

Rehabilitation sub-cost structure per rehabilitation

Figure 2-6 and Figure 2-7 provide a more insightful view on the rehabilitation cost structure for patients who underwent PCI and surgery respectively. For each outpatient rehabilitation group, costs are split into six sub-components, representing the actual rehabilitation type – inpatient and outpatient - consumed by patients in this group.

Figure 2-6 and Figure 2-7 indicate that the most important sub-cost for each group is the outpatient cost on the rehabilitation type used to name this group (for example, the highest sub-cost for the outpatient multidisciplinary group is outpatient multidisciplinary cost). Also noteworthy is the observation that patients in the multidisciplinary group bear more out-of- pocket expenses than those in the other three groups.

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b Inpatient - Individuele revalidatie, revalidatie van hartpatiënten, individuele pluridisciplinaire revalidatiezitting met minimale duur van 30 minuten

c Outpatient - Individuele revalidatie, revalidatie van hartpatiënten, collectieve pluridisciplinaire revalidatiezitting met minimale duur van 60 minuten, volgend op een individueel revalidatieprogramma en, voor wat het aspect fysieke hertraining betreft, zich richtend tot een groep van maximaal acht personen

d Outpatient - Individuele revalidatie, revalidatie van hartpatiënten, collectieve pluridisciplinaire revalidatiezitting met minimale duur van 60 minuten, volgend op een individueel revalidatieprogramma en, voor wat het aspect fysieke hertraining betreft, zich richtend tot een groep van maximaal acht personen

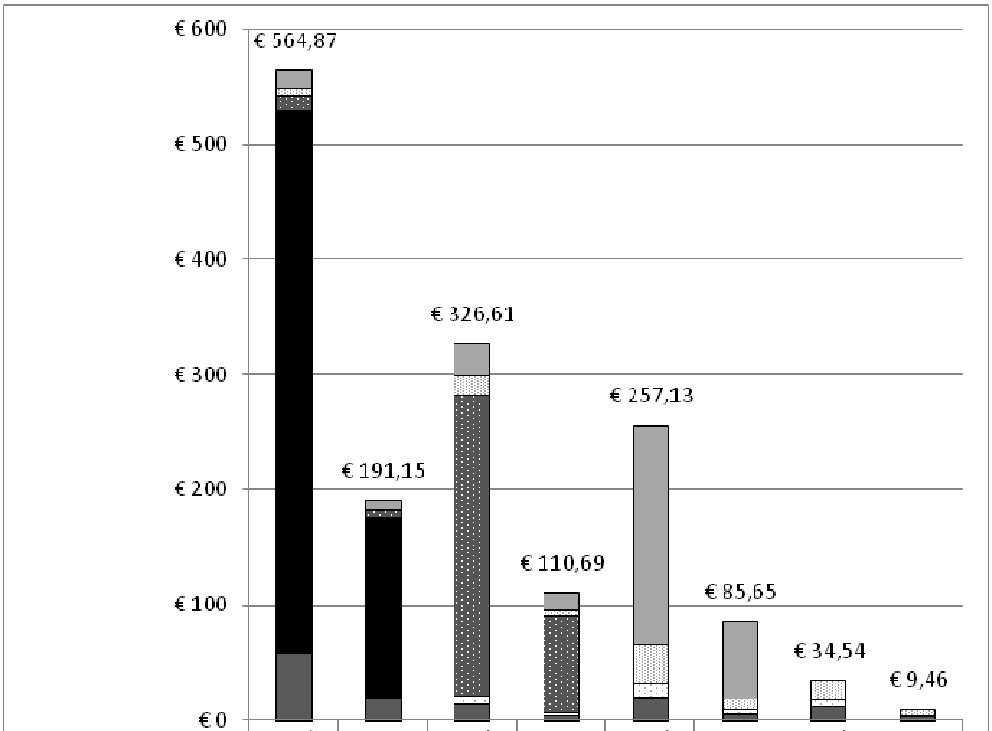
e Inpatient - Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) – **First 18 sessions**

f Outpatient - Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) **First 18 sessions**

g Inpatient - Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) – **19-48th sessions**

h Outpatient - Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) - **19-48th sessions**

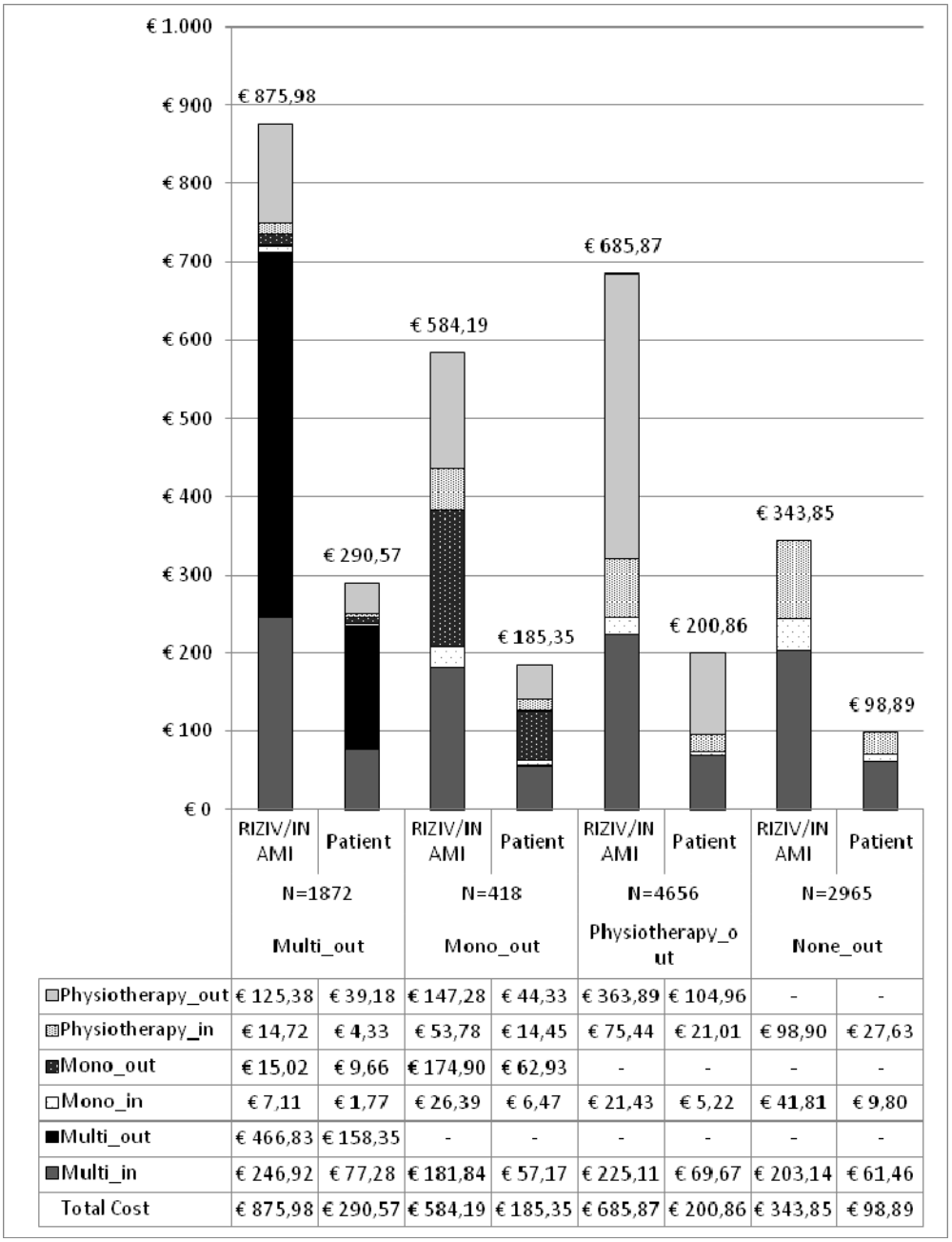
Figure 2-6[i]: Rehabilitation sub-cost structure per rehabilitation type during the 1st episode of patients in the PCI group



	RIZIV/INAMI	Patient	RIZIV/INAMI	Patient	RIZIV/INAMI	Patient	RIZIV/INAMI	Patient
	N=2658		N=606		N=2840		N=13006	
	Multi_out		Mono_out		Physiotherapy_out		None_out	
Physiotherapy_out	€ 16,20	€ 6,99	€ 27,50	€ 15,20	€ 191,98	€ 67,07	-	-
Physiotherapy_in	€ 5,21	€ 1,56	€ 16,79	€ 4,91	€ 33,59	€ 9,62	€ 16,45	€ 4,34
Mono_out	€ 13,59	€ 6,25	€ 260,68	€ 84,08				
Mono_in	€ 1,26	€ 0,29	€ 7,86	€ 2,18	€ 11,56	€ 2,74	€ 5,82	€ 1,32
Multi_out	€ 470,27	€ 157,60	-	-	-	-	-	-
Multi_in	€ 58,34	€ 18,46	€ 13,78	€ 4,32	€ 20,00	€ 6,22	€ 12,77	€ 3,80
Total Cost	€ 564,87	€ 191,15	€ 326,61	€ 110,69	€ 257,13	€ 85,65	€ 34,54	€ 9,46

[i] According to the outpatient classification, a patient is included in the multidisciplinary outpatient group if he/she ever had one outpatient multidisciplinary rehabilitation session. For example, if a patient never had a multidisciplinary or monodisciplinary outpatient rehabilitation session, but he has at least one outpatient physiotherapy, he is classified as outpatient physiotherapy group; therefore, no costs related to multidisciplinary or monodisciplinary outpatient cost are observed for this patient. However, this patient may have had any type of inpatient rehabilitation before he started outpatient rehabilitation; consequently, there is a cost of inpatient rehabilitation for this group of patients.

Figure 2-7[i]: Rehabilitation sub-cost structure per rehabilitation type during the 1st episode of patients in the surgery group

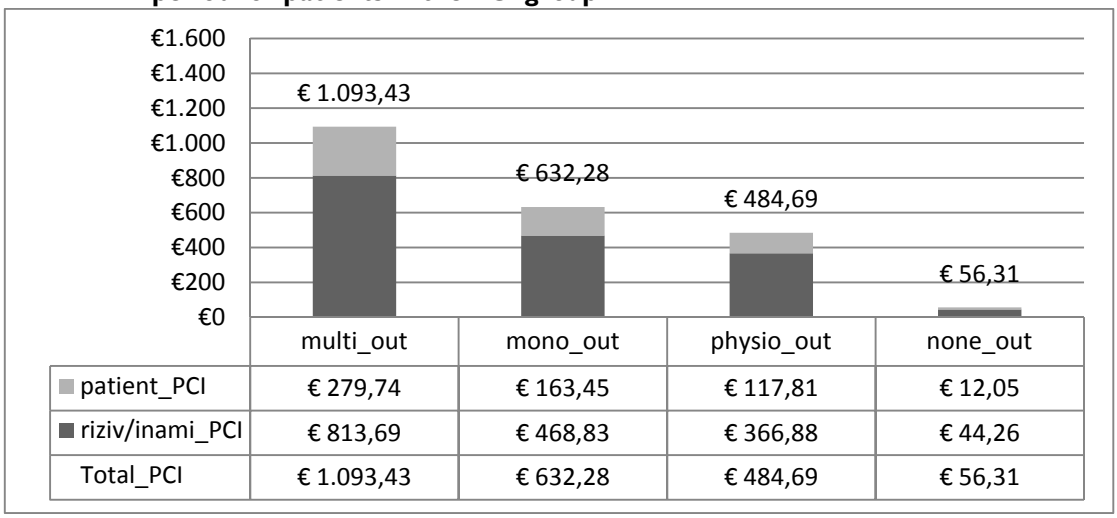


	RIZIV/INAMI	Patient	RIZIV/INAMI	Patient	RIZIV/INAMI	Patient	RIZIV/INAMI	Patient
	N=1872 Multi_out		N=418 Mono_out		N=4656 Physiotherapy_out		N=2965 None_out	
Physiotherapy_out	€ 125,38	€ 39,18	€ 147,28	€ 44,33	€ 363,89	€ 104,96	-	-
Physiotherapy_in	€ 14,72	€ 4,33	€ 53,78	€ 14,45	€ 75,44	€ 21,01	€ 98,90	€ 27,63
Mono_out	€ 15,02	€ 9,66	€ 174,90	€ 62,93	-	-	-	-
Mono_in	€ 7,11	€ 1,77	€ 26,39	€ 6,47	€ 21,43	€ 5,22	€ 41,81	€ 9,80
Multi_out	€ 466,83	€ 158,35	-	-	-	-	-	-
Multi_in	€ 246,92	€ 77,28	€ 181,84	€ 57,17	€ 225,11	€ 69,67	€ 203,14	€ 61,46
Total Cost	€ 875,98	€ 290,57	€ 584,19	€ 185,35	€ 685,87	€ 200,86	€ 343,85	€ 98,89

Cost related rehabilitation over one year observational period

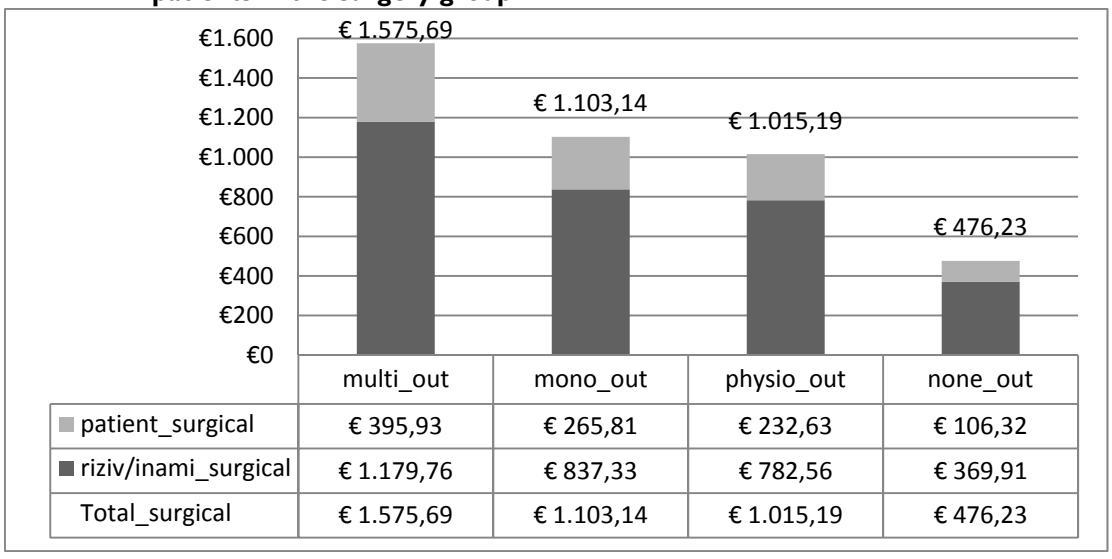
Rehabilitation related costs over one year (the entire observation period) is reported in this section. Cost overview and cost comparison among the four outpatient rehabilitation groups (Figure 2-8 and Figure 2-9) and cost structure (Figure 2-10 and Figure 2-11) are presented here as in section 3.2.4.2 of the report. The reader should pay attention to the vertical axis limits into the entire figure in this section, as they are different from the figures showing first episode cost in section 3.2.4.2 of the report**Error! Reference source not found.**.

Figure 2-8: Average rehabilitation cost over the entire one year observation period for patients in the PCI group



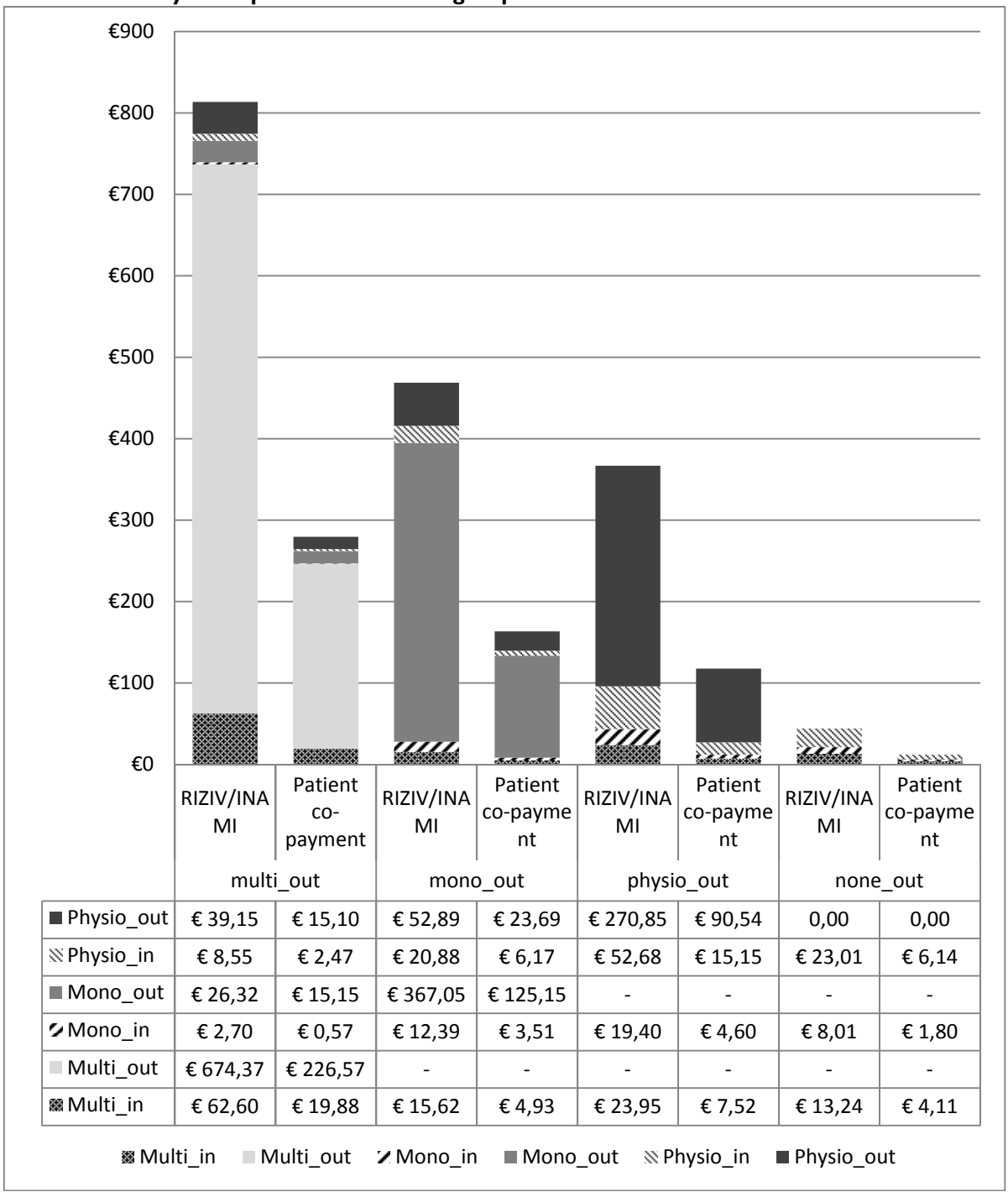
	multi_out	mono_out	physio_out	none_out
patient_PCI	€ 279,74	€ 163,45	€ 117,81	€ 12,05
riziv/inami_PCI	€ 813,69	€ 468,83	€ 366,88	€ 44,26
Total_PCI	€ 1.093,43	€ 632,28	€ 484,69	€ 56,31

Figure 2-9: Average rehabilitation cost over one year observational period of patients in the surgery group



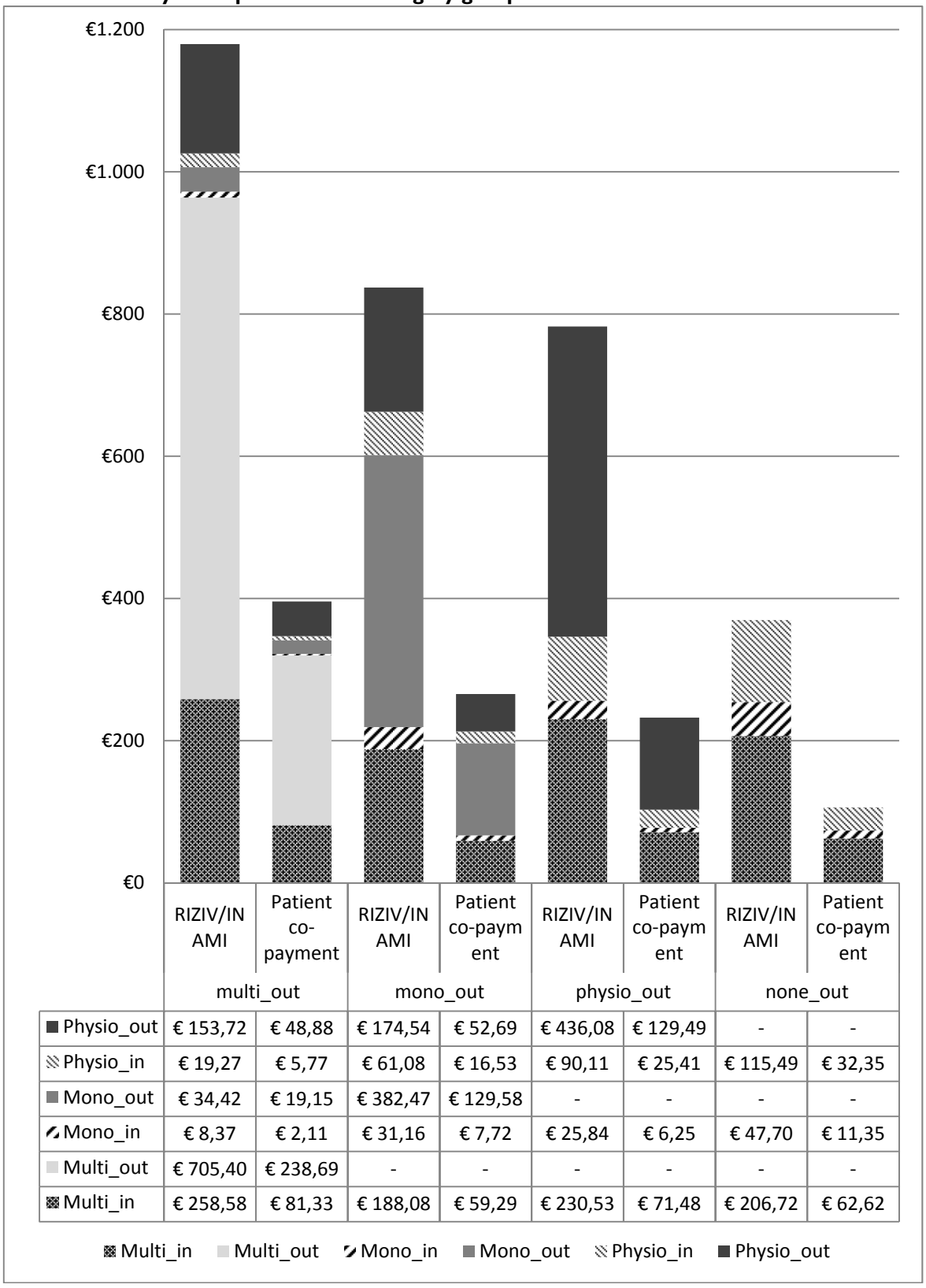
	multi_out	mono_out	physio_out	none_out
patient_surgical	€ 395,93	€ 265,81	€ 232,63	€ 106,32
riziv/inami_surgical	€ 1.179,76	€ 837,33	€ 782,56	€ 369,91
Total_surgical	€ 1.575,69	€ 1.103,14	€ 1.015,19	€ 476,23

Figure 2-10: Rehabilitation sub-cost structure per rehabilitation type over one year of patients in the PCI group



	multi_out		mono_out		physio_out		none_out	
	RIZIV/INAMI	Patient co-payment	RIZIV/INAMI	Patient co-payment	RIZIV/INAMI	Patient co-payment	RIZIV/INAMI	Patient co-payment
Physio_out	€ 39,15	€ 15,10	€ 52,89	€ 23,69	€ 270,85	€ 90,54	0,00	0,00
Physio_in	€ 8,55	€ 2,47	€ 20,88	€ 6,17	€ 52,68	€ 15,15	€ 23,01	€ 6,14
Mono_out	€ 26,32	€ 15,15	€ 367,05	€ 125,15	-	-	-	-
Mono_in	€ 2,70	€ 0,57	€ 12,39	€ 3,51	€ 19,40	€ 4,60	€ 8,01	€ 1,80
Multi_out	€ 674,37	€ 226,57	-	-	-	-	-	-
Multi_in	€ 62,60	€ 19,88	€ 15,62	€ 4,93	€ 23,95	€ 7,52	€ 13,24	€ 4,11

Figure 2-11: Rehabilitation sub-cost structure per rehabilitation type over one year of patients in the surgery group



APPENDIX 6 SOCIO-DEMOGRAPHIC PATIENT CHARACTERISTICS

Age

Table 2-9 shows the number of patients per age group, per procedure type and per rehabilitation type. The majority of patients (>60%) is over 65 years old.

Table 2-9: Distribution of the patients classified in rehabilitation groups, over age groups (PCI versus surgery)

	PCI				Surgery				
Age Groups (years)	**Multi**	**Mono**	**Physio**	**None**	**Multi**	**Mono**	**Physio**	**None**	**Total**
-55	1168	240	493	1545	912	78	138	27	**4601**
55-64	1433	262	759	2386	1798	189	252	27	**7106**
65-74	1224	352	1084	2826	2725	220	337	22	**8790**
75+	958	520	1358	2502	2513	278	371	24	**8524**
Total	**4783**	**1374**	**3694**	**9259**	**7948**	**765**	**1098**	**100**	**29021**

Table 2-10: Distribution of the patients classified in rehabilitation groups, over age groups

Age group	Multi	Mono	Physio	None	Total
-55	2080	318	631	1572	**4601**
	45.21%	6.91%	13.71%	34.17%	
55-64	3231	451	1011	2413	**7106**
	45.47%	6.35%	14.23%	33.96%	
65-74	3949	572	1421	2848	**8790**
	44.93%	6.51%	16.17%	32.40%	
75+	3471	798	1729	2526	**8524**
	40.72%	9.36%	20.28%	29.63%	
Total	**12731**	**2139**	**4792**	**9359**	**29021**
	43.87%	**7.37%**	**16.51%**	**32.25%**	

Gender

Table 2-11 shows the number of patients split by gender. The majority of the patients are male patients.

Table 2-11: Distribution of the patients classified in rehabilitation groups, over gender (PCI versus Surgery)

	PCI					Surgery					
Gender	**multi**	**mono**	**Physio**	**none**	**Total**	**multi**	**mono**	**Physio**	**none**	**Total**	**Total**
Male	3632	895	2356	6751	13634	5494	531	763	68	6856	20490
	26.6%	6.6%	17.3%	49.5%		80.1%	7.7%	11.1%	1.0%		
Female	1151	479	1338	2508	5476	2454	234	335	32	3055	8531
	21.0%	8.7%	24.4%	45.8%		80.3%	7.7%	11.0%	1.0%		
Total	4783	1374	3694	9259	19110	7948	765	1098	100	9911	29021
	25.0%	7.2%	19.3%	48.5%		80.2%	7.7%	11.1%	1.0%		

Table 2-12: Distribution of the patients classified in rehabilitation groups, over gender

Gender	Multi	Mono	Physio	None	Total
Male	9126	1426	3119	6819	**20490**
	44.5%	7.0%	15.2%	33.3%	
Female	3605	713	1673	2540	**8531**
	42.3%	8.4%	19.6%	29.8%	
Total	**12731**	**2139**	**4792**	**9359**	**29021**
	43.9%	**7.4%**	**16.5%**	**32.2%**	

APPENDIX 7 GEOGRAPHICAL SPREAD OF PATIENTS IN OUTPATIENT REHABILITATION

This section presents the geographical spread of patients in each rehabilitation group, separated by the index procedure they underwent (PCI or Surgery).

Figure 2-12: Geographical spread of patients in the outpatient monodisciplinary group after PCI

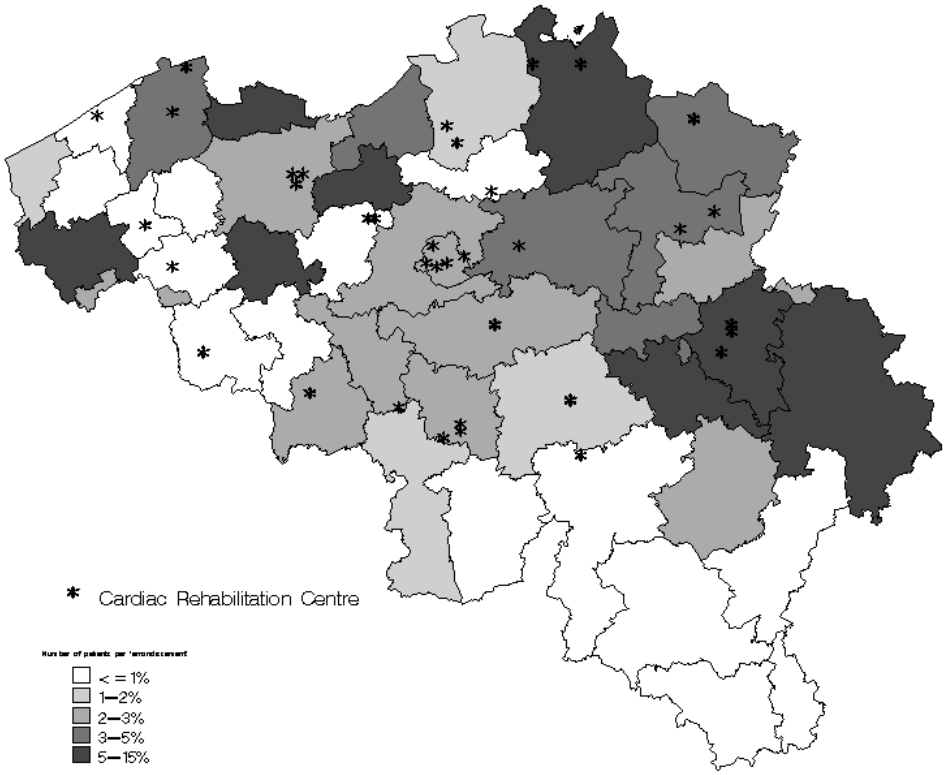


Figure 2-13: Geographical spread of patients in the outpatient monodisciplinary group after surgery

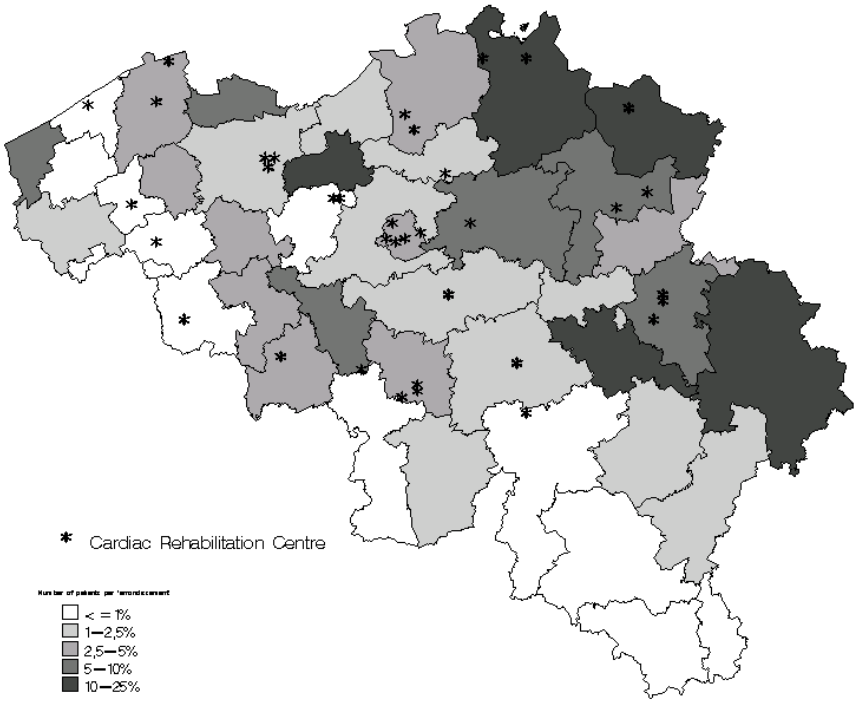


Figure 2-14: Geographical spread of patients in the outpatient physiotherapy group after PCI

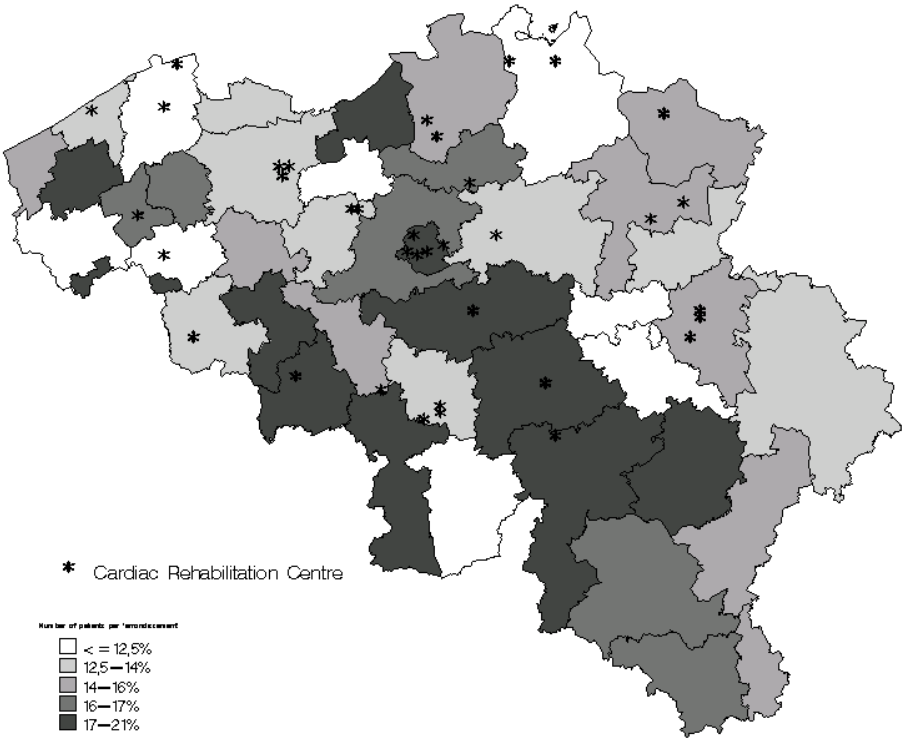


Figure 2-15: Geographical spread of patients in the outpatient physiotherapy group after surgery

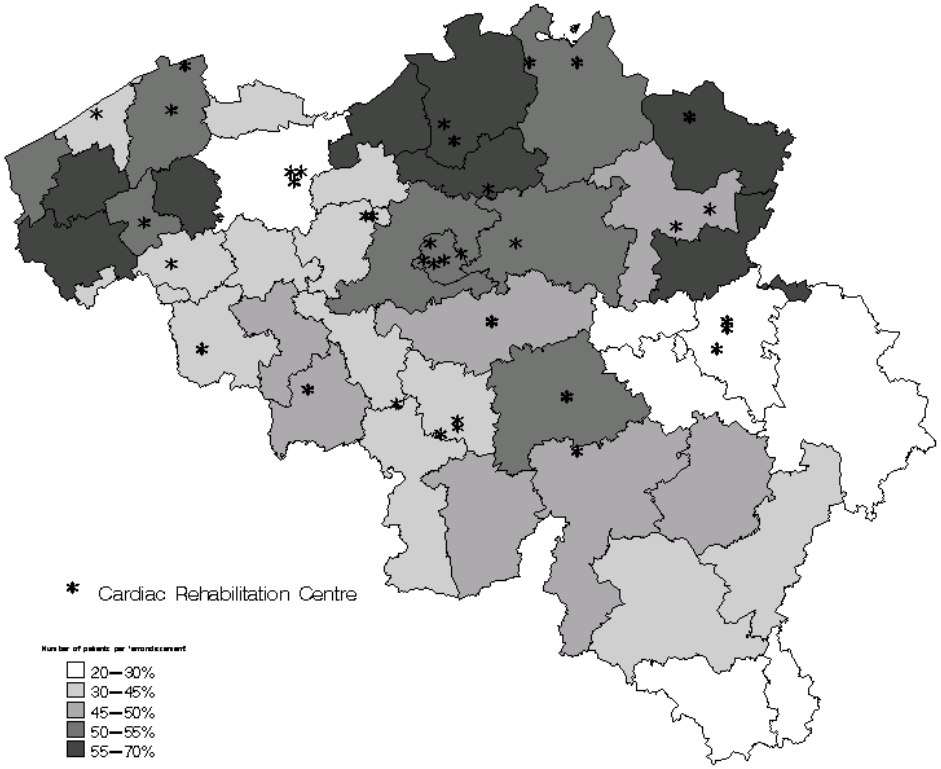


Figure 2-16: Geographical spread of patients in the outpatient no rehabilitation nor physiotherapy group after PCI

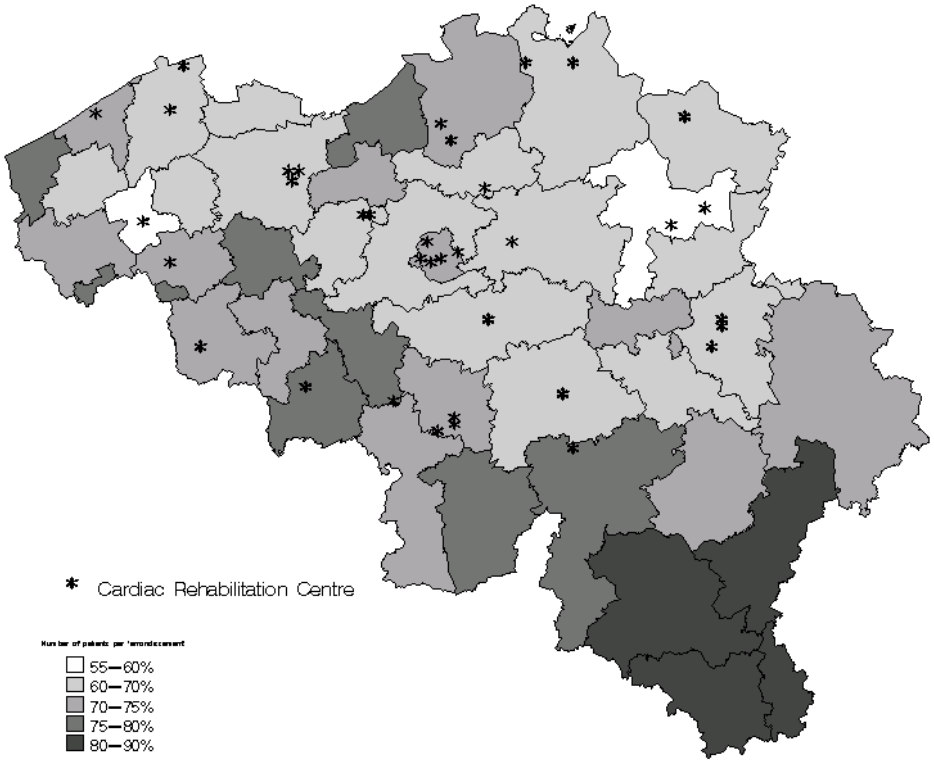
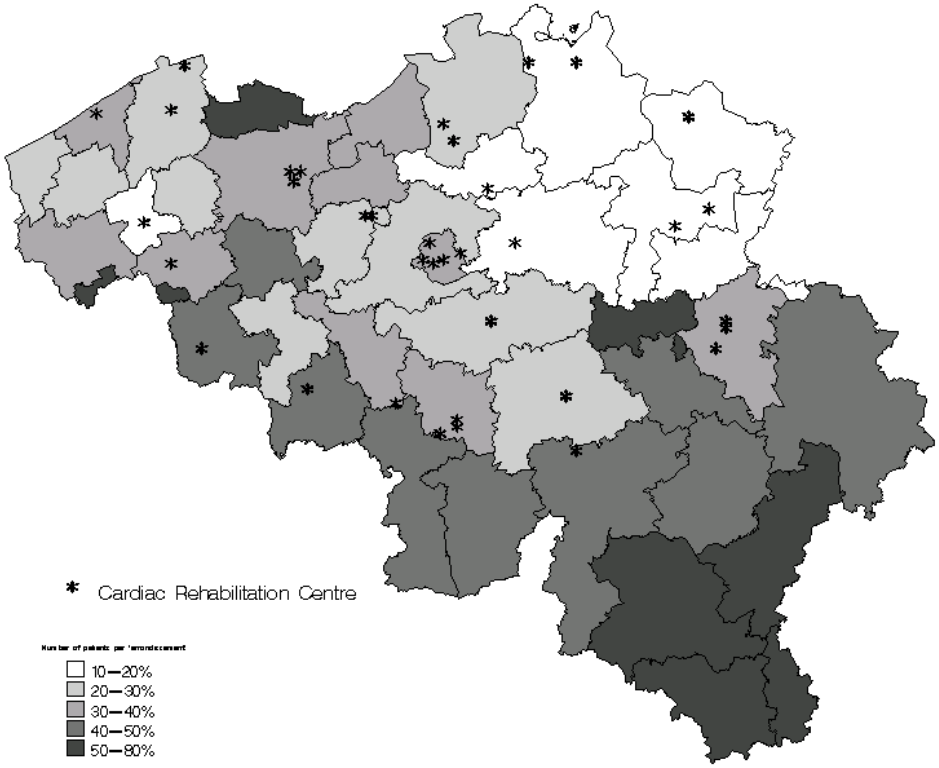


Figure 2-17: Geographical spread of patients in the outpatient no rehabilitation nor physiotherapy group after surgery



APPENDIX 8 CARDIAC DISEASE RELATED MEDICAL CARE CONSUMPTION

Table 2-13: Nomenclature codes for outpatient visit, invasive and non-invasive tests

Outpatient visit		
	Outpatient	Hospitalised
Consultation / Cardiologist visit	102093	
	102594	
Internist accredited	102034	
Internist not accredited	102550	
Diagnostic test		
Invasive tests		
Diagnostic coronarography	453110	453121
	453132	453143
	464111	464122
	464133	464144
	453095	453106
	464096	464100
Invasive monitoring	212214	212225
Invasive vascular imaging	453235	453246
	464236	464240
Non-invasive tests		
Pulmonary Function	471354	471365
	471376	417380
	471251	471262
	471310	471321
Doppler _Ultrasound_Out	460316	464320
	460331	460342
Exercise test	475812	475823
	475532	475543
	471391	471402
ECG	475075	475086
Holter	476210	476221
	476232	476243
	476254	476265
RX	452712	452723
	452690	452701
Nuclear test	442411	442422
	442396	442400
	442595	442606
	442610	442621
Monitoring	214034	214045
	214012	214023
	212015	212026
	202030	212041
Echocardiogram	460412	460423
	460456	460460
	460574	460585
EFO	476276	476280
	476291	476302

This section presents the consumption of all nine cardiac disease related non-invasive diagnostic tests in Table 2-14 and Table 2-15

Table 2-14: Non-invasive diagnostic test consumption per rehabilitation group after PCI

	Multi_out		Mono_out		Physiotherapy_out		None_out	
Patient number	2585		582		2724		12509	
	N of patients (% of total)	Average N of tests / (25-75 percentile)	N of patients (% of total)	Average N of tests / (25-75 percentile)	N of patients (% of total)	Average N of tests / (25-75 percentile)	N of patients (% of total)	Average N of tests / (25-75 percentile)
Exercise Test	2487 (96.2%)	4.31 (3-6)	532 (91.4%)	3.48 (2-5)	1847 (67.8%)	2.24 (1-3)	9005 (72.0%)	2.13 (1-3)
Pulmonary Function	687 (26.6%)	2.83 (1-4)	161 (27.7%)	4.30 (2-4)	523 (19.2%)	4.44 (2-5)	1727 (13.8%)	4.05 (2-5)
Nuclear Test	536 (20.7%)	2.04 (1-2)	140 (24.1%)	2.22 (1-3)	618 (22.7%)	1.83 (1-2)	2310 (18.5%)	1.90 (1-2)
X-Ray	990 (38.3%)	2.66 (1-3)	275 (47.3%)	3.20 (1-3)	1461 (53.6%)	3.88 (1-4)	4912 (39.3%)	3.23 (1-3)
Holter	456 (17.6%)	1.49 (1-1)	194 (33.3%)	1.27 (1-1)	504 (18.5%)	1.46 (1-1)	1891 (15.1%)	1.40 (1-1)
Monitoring	802 (31.0%)	3.09 (2-4)	244 (41.9%)	3.56 (2-5)	1067 (39.2%)	3.29 (2-4)	3733 (29.8%)	3.10 (2-4)
Doppler_Ultrasound	114 (4.4%)	1.04 (1-1)	39 (6.7%)	1.08 (1-1)	227 (8.3%)	1.06 (1-1)	720 (5.8%)	1.09 (1-1)
EFO	41 (1.6%)	1.15 (1-1)	12 (2.1%)	1.25 (1-1)	22 (0.8%)	1.27 (1-1)	141 (1.1%)	1.15 (1-1)
Echocardiogram	0 (0.0%)	0.00 (0-0)	0 (0.0%)	0.00 (0-0)	0 (0.0%)	0.00 (0-0)	4 (0.0%)	1.00 (1-1)

Table 2-15: Non-invasive diagnostic consumption per rehabilitation group after surgery

Name of resource	Multi_out		Mono_out		Physiotherapy_out		None_out	
Total number of patients per group	1781		387		4326		2612	
INVASIVE TEST	Number of patients (% of total)	Average N of tests / (25-75 percentile)	Number of patients (% of total)	Average N of tests / (25-75 percentile)	Number of patients (% of total)	Average N of tests / (25-75 percentile)	Number of patients (% of total)	Average N of tests / (25-75 percentile)
Exercise Test	1646 (92.4%)	3.71 (2-5)	309 (79.8%)	2.66 (1-3)	2402 (55.5%)	1.76 (1-2)	1280 (49%)	1.70 (1-2)
Pulmonary Function	440 (24.7%)	3.27 (1-4)	105 (27.1%)	4.22 (2-5)	609 (14.1%)	4.08 (2-5)	295 (11%)	4.11 (2-4)
Nuclear Test	248 (13.9%)	1.71 (1-2)	50 (12.9%)	1.70 (1-2)	431 (10.0%)	1.57 (1-2)	317 (12%)	1.58 (1-2)
X-Ray	837 (47.0%)	2.90 (1-3)	213 (55.0%)	3.66 (1-4)	2348 (54.3%)	3.99 (1-4)	1389 (53%)	3.96 (1-4)
Holter	279 (15.7%)	1.27 (1-1)	96 (24.8%)	1.48 (1-1.5)	740 (17.1%)	1.39 (1-1)	431 (17%)	1.32 (1-1)
Monitoring	318 (17.9%)	3.01 (1-4)	97 (25.1%)	3.61 (2-4)	976 (22.6%)	3.27 (2-4)	585 (22%)	3.21 (2-4)
Doppler_Ultrasound	42 (2.4%)	1.05 (1-1)	20 (5.2%)	1.20 (1-1)	218 (5.0%)	1.14 (1-1)	96 (04%)	1.01 (1-1)
EFO	20 (1.1%)	1.15 (1-1)	6 (1.6%)	1.00 (1-1)	24 (0.6%)	1.04 (1-1)	18 (01%)	1.28 (1-2)
Echocardiogram	0 (0.0%)	0.00 (0-0)	1 (0.3%)	1.00 (1-1)	2 (0.0%)	1.00 (1-1)	1 (00%)	1.00 (1-1)

The following tables (Table 2-16 and Table 2-17) provide the cardiac disease related medical consumption based on the total number of patients in each group. Table 2-16 and Table 2-17 show the average number of outpatient visits over the whole observation year, for patients after PCI and surgery respectively.Table 2-18 and Table 2-19 show the average number of invasive diagnostic tests for patients who underwent PCI and surgery respectively.

Finally, Table 2-20 and Table 2-21 provide the average non-invasive number of non-invasive diagnostic tests including all non-invasive diagnostic tests as mentioned in section 0

Table 2-16: Outpatient visit consumption per rehabilitation type of patients who underwent a PCI (total patient number per group)

Name of resource	Multi_out		Mono_out		Physio_out		None_out	
Total number of patients per group	2585		582		2724		12509	
Visit	Number of patients	Average N of visit / (25-75 percentile)	Number of patients	Average N of visit / (25 -75 percentile)	Number of patients	Average N of visit / (25-75 percentile)	Number of patients	Average N of visit / (25-75 percentile)
Consultation/ Cardiologist	2585	3.39 (2-4)	582	3.22 (2-4)	2724	2.42 (1-3)	12509	2.19 (1-3)
internist	2585	0.52 (0-0)	582	0.76 (0-1)	2724	0.67 (0-0)	12509	0.51 (0-0)

Table 2-17: Outpatient visit consumption per rehabilitation type of patients who underwent surgery (total patient number per group)

Name of resource	Multi_out		Mono_out		Physio_out		None_out	
Total number of patients per group	1781		387		4326		2612	
Visit	Number of patients	Average N of visit / (25-75 percentile)	Number of patients	Average N of visit / (25-75 percentile)	Number of patients	Average N of visit / (25-75 percentile)	Number of patients	Average N of visit / (25-75 percentile)
Consultation/Cardiologist	1781	3.32 (2-4)	387	2.78 (1-4)	4326	2.29 (1-3)	2612	1.96 (1-3)
internist	1781	0.63 (0-0)	387	0.47 (0-0)	4326	0.52 (0-0)	2612	0.47 (0-0)

Table 2-18: Invasive diagnostic test consumption per rehabilitation type of patients who underwent PCI (total patient number per group)

Name of resourse	Multi_out		Mono_out		Physio_out		None_out	
Total number of patients per group	2585		582		2724		12509	
INVASIVE TEST	Number of patients	Average N of tests / (25-75 percentile)	Number of patients	Average N of tests / (25-75 percentile)	Number of patients	Average N of tests / (25-75 percentile)	Number of patients	Average N of tests / (25-75 percentile)
Diagnostic_Coronarography	2585	0.53 (0-1)	582	0.51 (0-0)	2724	0.37 (0-0)	12509	0.33 (0-0)
Invasive vascular imaging	2585	0.04 (0-0)	582	0.04 (0-0)	2724	0.04 (0-0)	12509	0.03 (0-0)
Invasive_Monitoring	2585	0.02 (0-0)	582	0.01 (0-0)	2724	0.02 (0-0)	12509	0.01 (0-0)

Table 2-19: Invasive diagnostic test consumption per rehabilitation type of patients who underwent surgery (total patient number per group)

Name of resourse	Multi_out		Mono_out		Physio_out		None_out	
Total number of patients per group	1781		387		4326		2612	
INVASIVE TEST	Number of patients	Average N of tests / (25-75% percentile)	Number of patients	Average N of tests / (25%-75% percentile)	Number of patients	Average N of tests / (25%-75% percentile)	Number of patients	Average N of tests / (25%-75% percentile)
Diagnostic_Coronarography	1781	0.08 (0-0)	387	0.08 (0-0)	4326	0.03 (0-0)	2612	0.04 (0-0)
Invasive vascular imaging	1781	0.03 (0-0)	387	0.02 (0-0)	4326	0.01 (0-0)	2612	0.02 (0-0)
Invasive_Monitoring	1781	0.01 (0-0)	387	0.02 (0-0)	4326	0.01 (0-0)	2612	0.01 (0-0)

Table 2-20: Non-invasive diagnostic test consumption per rehabilitation type of patients who underwent PCI (total patient number per group)

Name of resourse	Multi_out		Mono_out		Physio_out		None_out	
Total number of patients per group	2585		582		2724		12509	
INVASIVE TEST	Number of patients	Average N of tests / (25-75 percentile)	Number of patients	Average N of tests / (25-75 percentile)	Number of patients	Average N of tests / (25-75 percentile)	Number of patients	Average N of tests / (25-75 percentile)
Exercise Test	2585	4.15 (2-6)	582	3.18 (2-4)	2724	1.52 (0-2)	12509	1.54 (0-2)
Pulmonary Function	2585	0.75 (0-1)	582	1.19 (0-1)	2724	0.85 (0-0)	12509	0.56 (0-0)
Nuclear Test	2585	0.42 (0-0)	582	0.53 (0-0)	2724	0.41 (0-0)	12509	0.35 (0-0)
X-Ray	2585	1.02 (0-1)	582	1.51 (0-1)	2724	2.08 (0-2)	12509	1.27 (0-1)
Holter	2585	0.26 (0-0)	582	0.42 (0-1)	2724	0.27 (0-0)	12509	0.21 (0-0)
Monitoring	2585	0.96 (0-1)	582	1.49 (0-2)	2724	1.29 (0-2)	12509	0.92 (0-1)
Doppler_Ultrasound	2585	0.05 (0-0)	582	0.07 (0-0)	2724	0.09 (0-0)	12509	0.06 (0-0)
EFO	2585	0.02 (0-0)	582	0.03 (0-0)	2724	0.01 (0-0)	12509	0.01 (0-0)
Echocardiogram	2585	0.00 (0-0)	582	0.00 (0-0)	2724	0.00 (0-0)	12509	0.00 (0-0)

Table 2-21: Non-invasive diagnostic test consumption per rehabilitation type of patients who underwent surgery (total patient number per group)

Name of resourse	Multi_out		Mono_out		Physio_out		None_out	
Total number of patients per group	1781		387		4326		2612	
INVASIVE TEST	Number of patients	Average N of tests / (25-75 percentile)	Number of patients	Average N of tests / (25-75 percentile)	Number of patients	Average N of tests / (25-75 percentile)	Number of patients	Average N of tests / (25-75 percentile)
Exercise Test	1781	3.43 (2-5)	387	2.12 (1-3)	4326	0.98 (0-2)	2612	0.83 (0-1)
Pulmonary Function	1781	0.81 (0-0)	387	1.14 (0-1)	4326	0.57 (0-0)	2612	0.46 (0-0)
Nuclear Test	1781	0.24 (0-0)	387	0.22 (0-0)	4326	0.16 (0-0)	2612	0.19 (0-0)
X-Ray	1781	1.36 (0-1)	387	2.02 (0-2)	4326	2.17 (0-2)	2612	2.11 (0-2)
Holter	1781	0.20 (0-0)	387	0.37 (0-0)	4326	0.24 (0-0)	2612	0.22 (0-0)
Monitoring	1781	0.54 (0-0)	387	0.90 (0-1)	4326	0.74 (0-0)	2612	0.72 (0-0)
Doppler_Ultrasound	1781	0.02 (0-0)	387	0.06 (0-0)	4326	0.06 (0-0)	2612	0.04 (0-0)
EFO	1781	0.01 (0-0)	387	0.02 (0-0)	4326	0.01 (0-0)	2612	0.01 (0-0)
Echocardiogram	1781	0.00 (0-0)	387	0.00 (0-0)	4326	0.00 (0-0)	2612	0.00 (0-0)

APPENDIX 9: MULTIVARIATE ANALYSIS

Table 2-22: overview of multivariate analysis models

		PCI			Surgery		
		Odds ratio	95% Wald Confidence Limits		Odds Ratio	95% Wald Confidence Limits	
Multi_Out	Pensioners or unemployed - pre-retired	0.939	0.806	1.094	0.887	0.717	1.097
	Invalids and handicapped	0.729	0.618	0.861	0.673	0.535	0.847
	Unemployed	0.543	0.436	0.676	0.51	0.356	0.729
	Self-employed	0.667	0.54	0.825	0.812	0.595	1.108
	Reference Category: Worker						
	Gender	0.78	0.698	0.871	0.714	0.626	0.814
	Reference Category: Male						
	Age_55_64	0.816	0.72	0.926	0.838	0.694	1.012
	Age_65_74	0.425	0.356	0.507	0.505	0.398	0.641
	Age_75plus	0.171	0.14	0.21	0.183	0.141	0.238
	Reference Category: Age_30_54						
	Centre_in_arr *	2.1	1.872	2.357	2.078	1.805	2.393
	Reference Category: No centre in arr						
	Co-payment	0.659	0.582	0.747	0.606	0.52	0.706
	Reference Category: No Co-payment						
	Education Q2	1.128	0.976	1.303	0.995	0.823	1.202
	Education Q3	1.141	0.977	1.332	1.117	0.92	1.354
	Education Q4	1.364	1.163	1.6	1.306	1.066	1.6
	Education Q5	1.3	1.085	1.558	1.677	1.345	2.092
	Reference Category: Education Q1						
	Income Q2	1.219	1.058	1.404	1.218	1.015	1.461
	Income Q3	1.308	1.131	1.513	1.378	1.143	1.66
	Income Q4	1.279	1.094	1.494	1.455	1.195	1.77
	Income Q5	1.616	1.356	1.927	1.464	1.171	1.829
	Reference Category: Income Q1						

		PCI			Surgery		
		Odds ratio	95% Wald Confidence Limits		Odds Ratio	95% Wald Confidence Limits	
No rehabilitation nor physiotherapy	Pensioners or unemployed - pre-retired	1.092	0.962	1.241	1.072	0.859	1.339
	Invalids and handicapped	1.299	1.138	1.482	1.528	1.224	1.908
	Unemployed	1.883	1.585	2.236	1.701	1.243	2.328
	Self-employed	1.982	1.648	2.385	3.964	2.937	5.349
	Reference Category: Worker						
	Gender	0.901	0.838	0.969	1.013	0.916	1.12
	Reference Category: Male						
	Age_55_64	1.178	1.061	1.308	1.142	0.948	1.376
	Age_65_74	1.668	1.449	1.919	1.4	1.11	1.765
	Age_75plus	2.19	1.895	2.531	1.647	1.304	2.08
	Reference Category: Age_30_54						
	Centre_in_arr *	0.775	0.719	0.835	0.638	0.576	0.705
	Reference Category: No centre in arrondissement						
	Co-payment	1.142	1.056	1.236	1.282	1.154	1.425
	Reference Category: No Co-payment						
	Education Q2	0.899	0.813	0.995	1.036	0.898	1.195
	Education Q3	0.893	0.801	0.995	1.091	0.939	1.268
	Education Q4	0.79	0.704	0.885	1.123	0.954	1.322
	Education Q5	0.761	0.668	0.868	1.1	0.911	1.328
	Reference Category: Education Q1						
	Income Q2	0.922	0.836	1.017	0.718	0.627	0.821
	Income Q3	0.876	0.791	0.971	0.544	0.47	0.629
	Income Q4	0.893	0.799	0.997	0.545	0.466	0.637
	Income Q5	0.874	0.767	0.997	0.498	0.412	0.603
	Reference Category: Income Q1						

Sign on 1% significance level

Sign on 5% significance level

Sign on 10% significance level

Not significant

3 APPENDIX : SURVEY

PATIENT SURVEY QUESTIONNAIRES

Table 3-1: Patient Survey questionnaires (French)

PARTIE I: QUESTIONS PERSONNELLES					
Q1. Age	_____ ans				
Q2. Sexe	homme ☐	femme ☐			
Q3. Avez-vous la nationalité belge ?	oui ☐	non ☐			
Q3.1.Si vous n'avez pas la nationalité belge, quelle est votre nationalité ?					
Q4. Etes-vous d'origine belge ?	oui ☐	non ☐			
Q4.1. Si vous n'êtes pas d'origine belge, quel est votre pays d'origine ?					
Q5. Etat civil	veuf/veuve ☐	célibataire ou divorcé(e)/séparé(e) ☐	marié(e) ou cohabitant(e) ☐		
Q6. Niveau d'éducation	pas de diplôme/école primaire ☐	école secondaire ☐	haute école / enseignement universitaire ☐		
Q7. Situation professionnelle	au foyer ☐	indépendant(e) ☐	salarié(e) ☐	chômage ☐	invalide ☐	pensionné(e) ☐

PARTIE 2: QUESTIONS CONCERNANT LA REVALIDATION CARDIAQUE		
Q8. Est-ce que votre médecin traitant vous a <u>proposé</u> la revalidation cardiaque après votre infarctus ?	oui ☐	non ☐ Dans ce cas le questionnaire s'arrête ici ! Merci
Q9. Si on vous a proposé la revalidation cardiaque, quelle est la distance approximative entre votre domicile et le centre de revalidation ou votre kinésithérapeute?	km	

Veuillez continuer à compléter le questionnaire à la page suivante

Q10. Quel <u>type de revalidation</u> cardiaque vous a été proposé par votre médecin traitant ?	
• L'accompagnement avec plusieurs intervenants (p.ex. diététicien, kinésithérapeute, psychologue, …) dans le centre de revalidation et qui consiste entre autres en conseils alimentaires, kinésithérapie, traitement médicamenteux et de soutien psychologique et social	☐
• L'accompagnement d'une seule personne dans le centre de revalidation (p.ex. kinésithérapeute)	☐
• L'accompagnement par mon médecin généraliste et un	

kinésithérapeute (indépendant du centre de revalidation)

Q11. Avez-vous <u>accepté</u> la revalidation proposée par votre médecin traitant ?

oui	non
☐	☐
Si oui, veuillez passer à la question 12	Si non, veuillez répondre à la question 11.1

Q11.1. Vous avez refusé la revalidation proposée par votre médecin. Ci-dessous un nombre de raisons sont mentionnée. Veuillez indiquer pour chacune des raisons s'il s'agissait pour vous d'une raison importante, moins importante, ou si ce n'était pas une de vos raisons pour refuser la revalidation proposée.

	Pas une raison	Raison moins importante	Raison très importante
Raisons générales			
• Je n'avais pas le temps de participer.	☐	☐	☐
• Les frais de participation étaient trop élevés.	☐	☐	☐
• Le centre de revalidation/ le kinésithérapeute était situé trop loin.	☐	☐	☐
• Je n'avais pas de transport.	☐	☐	☐
• J'avais des obligations professionnelles qui ne me permettaient pas de suivre la revalidation.	☐	☐	☐
• J'avais des obligations familiales (p.ex. ménage, enfants) qui ne me permettaient pas de suivre la revalidation.	☐	☐	☐
Raisons personnelles			
• L'offre de soins qui m'était proposée (exercice physique, diététique…) ne me tentait pas.	☐	☐	☐
• J'avais le sentiment de pouvoir guérir sans ce programme.	☐	☐	☐
• Je ne me sentais pas assez fort(e) à cause de mes problèmes cardiaques pour participer.	☐	☐	☐
• J'avais d'autres problèmes physiques qui m'empêchaient de participer.	☐	☐	☐

Veuillez continuer à compléter la question 11.1 à la page suivante

	Pas une raison	Raison moins importante	Raison très importante
• Je me sentais sans force et je n'avais pas assez d'énergie pour participer.	☐	☐	☐
• Je ne souhaitais pas qu'on me rappelle mes problèmes cardiaques.	☐	☐	☐
• Je ne me sens pas à l'aise de prendre la parole devant un groupe de gens, par exemple lors d'un accompagnement psychologique.	☐	☐	☐
• Je n'avais pas envie d'entendre les problèmes des autres pendant le programme de revalidation.	☐	☐	☐
Autres raisons ?			

- ……
  ……
  ……

- ……
  ……
  ……

Si vous avez rempli la question 11.1, ceci était votre dernière question ! Merci pour votre participation !

Q12. Avez-vous <u>arrêté prématurément</u> le programme de revalidation cardiaque ?

oui	non
☐	☐
Si oui, veuillez répondre aux questions ci-dessous	Si non, veuillez passer à la question 13

Q12.1 Après combien de semaines avez vous arrêté le programme de revalidation cardiaque ? semaines

Q12.2. Vous avez arrêté prématurément le programme de revalidation cardiaque. Ci-dessous un nombre de raisons pour arrêter le programme sont reprises. Veuillez indiquer pour chacune des raisons s'il s'agissait pour vous d'une raison importante, moins importante, ou si ce n'était pas une de vos raisons pour arrêter le programme.

	Pas une raison	Raison moins importante	Raison très importante
Raisons générales			
• Je n'avais pas le temps de participer.	☐	☐	☐
• Les frais de participation étaient trop élevés.	☐	☐	☐
• Le centre de revalidation/kinésithérapeute était situé trop loin.	☐	☐	☐
• Je n'avais pas de transport.	☐	☐	☐

Veuillez continuer à compléter la question 12.2 à la page suivante

	Pas une raison	Raison moins importante	Raison très importante
• J'avais des obligations professionnelles qui ne me permettaient pas de suivre la revalidation.	☐	☐	☐
• J'avais des obligations familiales (p.ex. ménage, enfants) qui ne me permettaient pas de suivre la revalidation.	☐	☐	☐
Raisons personnelles			
• L'offre de soins qui m'était proposée durant la revalidation (exercice physique, diététique…) ne me tentait pas.	☐	☐	☐
• Le programme de revalidation était physiquement trop lourd.	☐	☐	☐
• La durée totale du programme de revalidation était trop longue.	☐	☐	☐
• La revalidation n'était pas adaptée à ma situation.	☐	☐	☐
• J'avais le sentiment de pouvoir guérir sans ce programme.	☐	☐	☐
• Je ne me sentais pas assez fort(e) à cause de mes problèmes cardiaques pour participer.	☐	☐	☐
• J'avais d'autres problèmes physiques qui m'empêchaient de participer.	☐	☐	☐
• Je me sentais sans force et je n'avais pas assez d'énergie pour participer.	☐	☐	☐
• Je ne souhaitais pas qu'on me rappelle mes problèmes cardiaques.	☐	☐	☐
• Je ne me sentais pas à l'aise quand je prenais la parole	☐	☐	☐

devant un groupe de gens lors du programme de revalidation.			
• Je n'avais pas envie d'entendre les problèmes des autres pendant le programme de revalidation.	☐	☐	☐

Autres raisons?

- ……
- ……

Veuillez continuer à compléter (Q13 & 14) le questionnaire à la page suivante

Q13. Quels points positifs retenez-vous de votre programme de revalidation ?

Q14. Si vous avez noté des aspects négatifs, quels sont-ils ??

Nous vous remercions chaleureusement pour votre participation. Veuillez remettre à votre cardiologue le questionnaire complété sous enveloppe scellée.

Table 3-2 : Patient Survey questionnaires (Dutch)

DEEL I: PERSOONSGEBONDEN VRAGEN

V1. Huidige leeftijd _____ jaar

V2. Geslacht

man	vrouw
☐	☐

V3. Heeft u de Belgische nationaliteit?

ja	nee
☐	☐

V3.1. Indien u niet de Belgische nationaliteit heeft, welke nationaliteit heeft u dan?

V4. Bent u van Belgische herkomst?

ja	nee
☐	☐

V4.1. Indien u niet van Belgische herkomst bent, van welk land bent u dan afkomstig?

V5. Burgerlijke stand

Weduwe/ Weduwnaar	Alleenstaand of gescheiden	gehuwd of samenwonend
☐	☐	☐

V6. Opleidingsniveau

geen diploma/ lager onderwijs	secundair onderwijs	hogeschool/ universitair onderwijs
☐	☐	☐

V7. Tewerkstelling

huisvrouw/ huisman	zelfstandige	loontrekkende	werkloos	Invalide/ werkonbekwaam	gepensioneerd
☐	☐	☐	☐	☐	☐

DEEL 2: VRAGEN BETREFFENDE HARTREVALIDATIE

V8. Heeft uw behandelende arts u hartrevalidatie voorgesteld na uw hartinfarct?

ja	nee
☐	☐
	Indien nee, stopt de vragenlijst hier! Bedankt

V9. indien uw behandelende arts u hartrevalidatie voorstelde, wat was de afstand tussen uw woonplaats en het revalidatiecentrum of de kinesist waar de behandeling door zou gaan? km

Gelieve deze vragenlijst verder in te vullen op de volgende bladzijde

V10. Welk type van hartrevalidatie werd door uw behandelende arts voorgesteld?

- onder begeleiding van verschillende zorgverleners in het revalidatiecentrum en bestaande uit ondermeer voedingsadvies, bewegingstherapie, medicamenteuze behandeling en psychologische- en sociale begeleiding…. ☐
- onder begeleiding van slechts één persoon in het revalidatiecentrum (bv kinesist) ☐
- onder begeleiding van huisarts en kinesist; losstaand van het revalidatiecentrum ☐

V11. Heeft u de door uw behandelende arts voorgestelde revalidatie aanvaard?

ja	nee
☐	☐
Indien ja, gelieve naar vraag 12 te gaan	Indien nee, gelieve vraag 11.1 hieronder in te vullen

V11.1. U heeft de door uw arts voorgestelde revalidatie geweigerd. Hieronder zijn een aantal redenen voor weigering opgelijst. Gelieve voor elk van de redenen aan te vinken of deze voor u een belangrijke reden, een minder belangrijke reden of helemaal geen reden was om de voorgestelde revalidatie niet te aanvaarden.

	Dit was geen reden	Minder belangrijke reden	Zeer belangrijke reden
Algemene redenen			
• Ik had geen tijd om deel te nemen.	☐	☐	☐
• De kosten voor deelname waren te hoog.	☐	☐	☐
• Het revalidatie centrum of kinesist was te ver gelegen.	☐	☐	☐
• Ik had geen vervoer	☐	☐	☐
• Ik had verplichtingen ten opzichte van het werk waardoor ik niet in staat was de revalidatie te volgen.	☐	☐	☐
• Ik had familiale verplichtingen (bv: huishouden) waardoor ik niet in staat was de revalidatie te volgen.	☐	☐	☐

Persoonlijke redenen			
• Het aanbod (lichaamsbeweging, op voeding letten...) ligt mij niet/ spreekt me niet aan.	☐	☐	☐
• Ik had het gevoel dat ik kon genezen zonder een begeleid revalidatieprogramma.	☐	☐	☐
• Ik voelde me door mijn hartproblemen niet sterk genoeg om deel te nemen.	☐	☐	☐

Gelieve deze vragenlijst V11.1. verder in te vullen op de volgende bladzijde

	Dit was geen reden	**Minder belangrijke reden**	**Zeer belangrijke reden**
• Ik had andere fysieke problemen waardoor ik niet kon deelnemen.	☐	☐	☐
• Ik voelde me futloos en had geen energie om deel te nemen.	☐	☐	☐
• Ik wilde niet meer herinnerd worden aan mijn hartproblemen.	☐	☐	☐
• Ik voel me niet op mijn gemak als ik moet praten voor een groep, bv. tijdens de psychologische begeleiding.	☐	☐	☐
• Ik had geen zin om te luisteren naar andermans problemen tijdens het voorgestelde revalidatie programma.	☐	☐	☐
Andere redenen?			
• …… ……..			
• …… ……..			
• …… ……..			

Indien u vraag 11.1 heeft ingevuld, was dit uw laatste vraag! Hartelijk dank voor uw deelname!

V12. Bent u vroegtijdig gestopt met het hartrevalidatie programma?

ja	nee
☐	☐
Indien ja, gelieve de vragen hieronder in te vullen	Indien nee, gelieve naar vraag 13 te gaan

V12.1. Na hoeveel weken bent u gestopt met het volgen van het hartrevalidatie programma? weken

V12.2. U bent vroegtijdig gestopt met het hartrevalidatie programma. Hieronder zijn een aantal redenen voor vroegtijdig stoppen opgelijst. Gelieve voor elk van de redenen aan te vinken of deze voor u een belangrijke reden, een minder belangrijke reden of helemaal geen reden was om vroegtijdig te stoppen?

	Dit was Geen reden	**Minder belangrijke reden**	**Zeer belangrijke reden**
Algemene redenen			
• Ik had geen tijd om deel te nemen.	☐	☐	☐

Gelieve deze vragenlijst vraag 12.2. verder in te vullen op de volgende bladzijde

	Dit was Geen reden	Minder belangrijke reden	Zeer belangrijke reden
• De kosten voor deelname waren te hoog.	☐	☐	☐
• Het revalidatie centrum of kinesist was te ver gelegen.	☐	☐	☐
• Ik had geen vervoer.	☐	☐	☐
• Verplichtingen ten opzichte van het werk, waardoor ik niet in staat was het revalidatieprogramma te vervolledigen.	☐	☐	☐
• Familiale verplichtingen (bv: huishouden), waardoor ik niet in staat was het revalidatie- programma te vervolledigen.	☐	☐	☐
Persoonlijke redenen			
• Het aanbod (lichaamsbeweging, op voeding letten...) ligt mij niet/ spreekt me niet aan	☐	☐	☐
• Het revalidatieprogramma was fysiek te zwaar.	☐	☐	☐
• De totale duur van het revalidatieprogramma was te lang	☐	☐	☐
• De revalidatie was niet aangepast aan mijn situatie.	☐	☐	☐
• Ik had het gevoel dat ik kon genezen, zonder een begeleid revalidatieprogramma	☐	☐	☐
• Ik voelde me door mijn hartproblemen niet sterk genoeg om het programma verder te volgen.	☐	☐	☐
• Ik had andere fysieke problemen waardoor ik het programma niet verder kon volgen.	☐	☐	☐
• Ik voelde me futloos en had geen energie meer om te gaan.	☐	☐	☐
• Ik wilde niet meer herinnerd worden aan mijn hartproblemen.	☐	☐	☐
• Ik voelde me niet op mijn gemak als ik moest praten voor een groep tijdens het revalidatieprogramma.	☐	☐	☐
• Ik wilde niet luisteren naar andermans problemen tijdens het revalidatieprogramma.	☐	☐	☐
Andere redenen?			
• ……			
• ……			
• ……			

Gelieve de vragenlijst (V13 & V14) verder in te vullen op de volgende pagina

V13. Wat waren voor u de positieve eigenschappen van het revalidatie programma?

V14. Indien deze aanwezig waren, wat waren voor u de negatieve eigenschappen van het revalidatie programma?

Hartelijk dank voor uw deelname!!! Gelieve de ingevulde vragenlijst in bijgevoegde omslag te steken en deze toe te kleven alvorens terug te bezorgen aan uw hartspecialist!

LIST OF PARTICIPATING HOSPITALS/CENTRES

Table 3-3 list of participating hospitals/centres

Nr	Hospital	Cardiologist centre province	Region
Nr	Hospital	Centre province	Centre region
1	Citadelle de Liege	Liège	Walloon
2	AZ middelheim	Antwerpen	Flanders
3	H. Hart Roeselare	West-Vlaanderen	Flanders
4	CHWAPI	Hainaut	Walloon
5	Gezondheidszorg oostkust	West-Vlaanderen	Flanders
6	Sint Blasius	Oost-Vlaanderen	Flanders
7	St-luc Bouge	Namur	Walloon
8	St-Elizabeth	Antwerpen	Flanders
9	OLV-Aalst	Oost-Vlaanderen	Flanders
10	AZ Oudenaarde	Oost-Vlaanderen	Flanders
11	Virga Jesse	Limburg	Flanders
12	Clinique sud luxembourg	Luxemburg	Walloon
13	Ziekenhuis Maas & Kempen	Limburg	Flanders
14	Imelda	Antwerpen	Flanders
15	Clinique Notre Dame de Grace	Hainaut	Walloon
16	CHC	Liège	Walloon
17	Clinique universitaire St-Luc (UCL)	Brussel/Bruxelles	Brussels
18	Bornem	Antwerpen	Flanders
19	Eupen St-Nicolaus	Liège	Walloon

PARTICIPATING CARDIOLOGISTS

Data was collected from the 17 participating cardiologists.

Table 3-4: Main clinical activity of participating cardiologists

	Invasive cardiology	Non-invasive cardiology	Cardiac rehabilitation	Other
Main activity	4	12	6	0

Table 3-5: Descriptive statistics of cardiologists' years of activity

	Cardiologists' years of activity
Mean	15.3
Median	12
Standard Deviation	9.3
95% CI	4.2
CI+	19.5
CI-	11.1
Min - Max	3 - 36

Table 3-6: Frequency table for cardiologists' years of activity

Year of cardiac activity	Frequency	% of Total
0-14 years	10	52.6%
15 + years	7	36.8%
Unknown	2	10.5%
Total	19	100.0%

DETAILS ON PATIENTS' CHARACTERISTICS

Age and gender

Figure 3-1: Distribution of patients per age category and per patient group

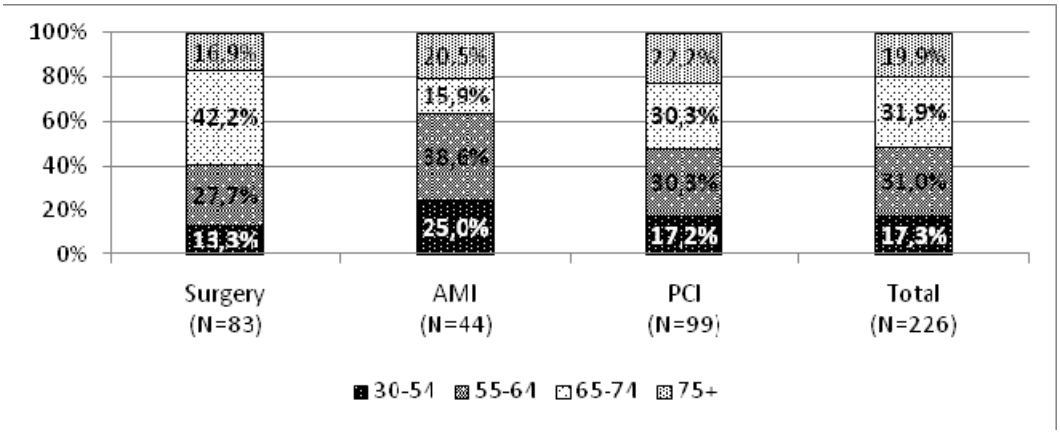
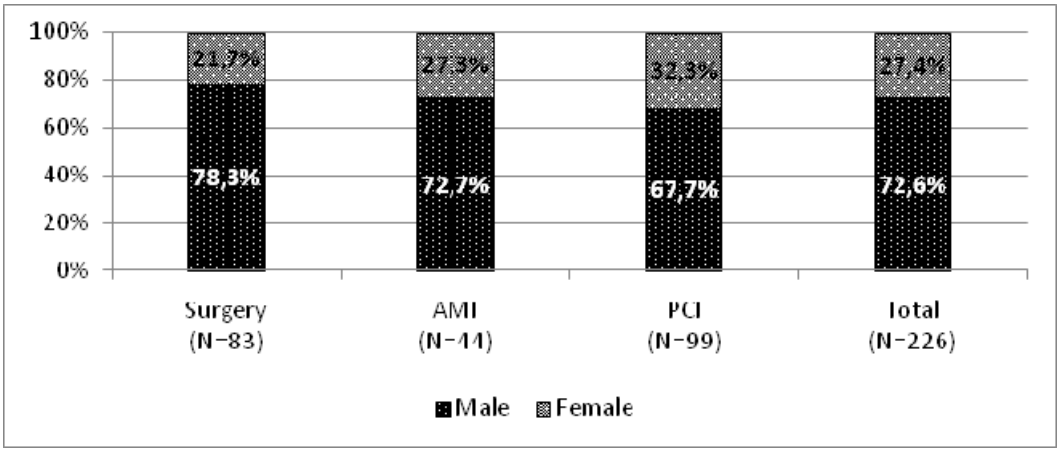
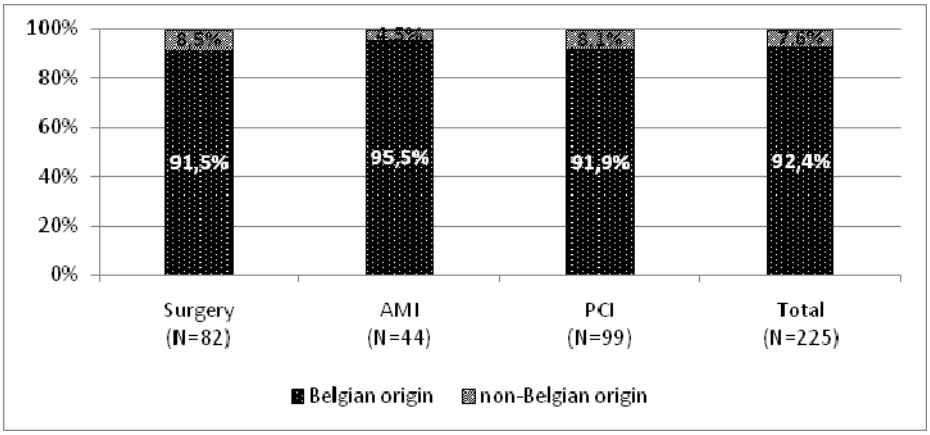


Figure 3-2: Distribution of patients per gender and per patient group



Origin and marital status



shows that most participants were ethnically of Belgian origin.

Figure 3-3: Distribution of patients per origin and per patient group

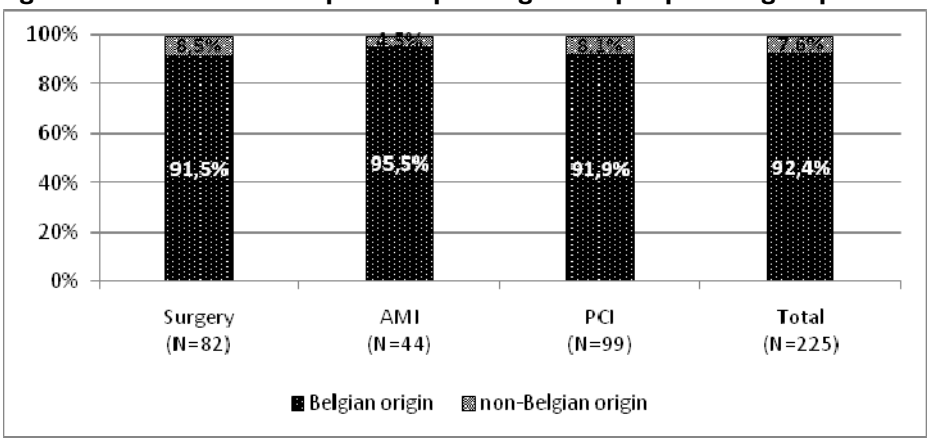
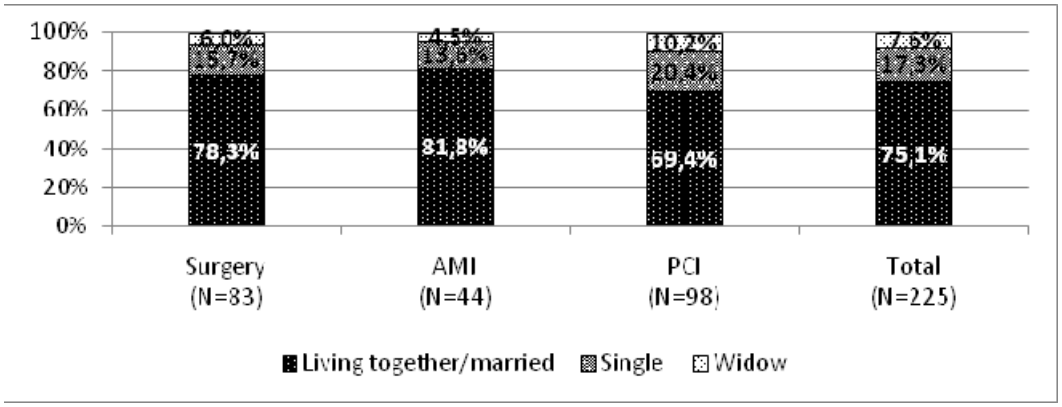


Figure 3-4 shows that most of the participants were married or had a partner.

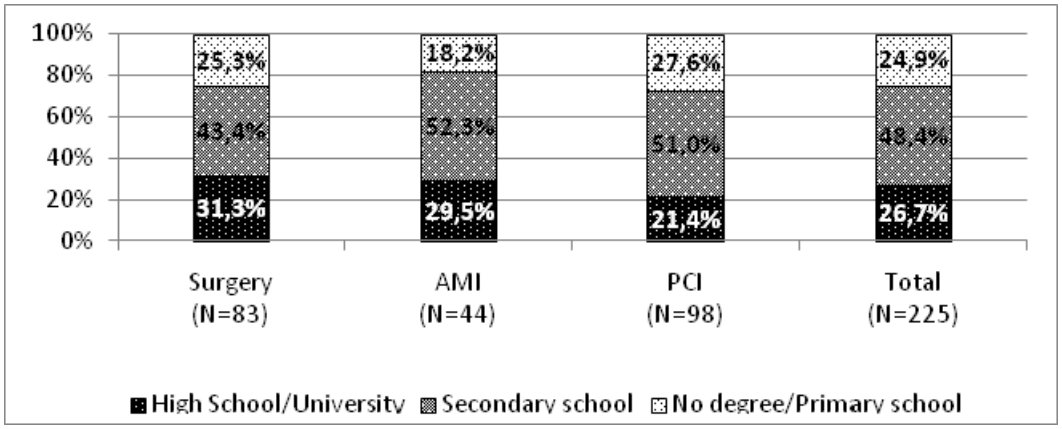
Figure 3-4: Distribution of patients per marital status[j]



Education and employment status

The two following figures present the education and the employment status of the patients.

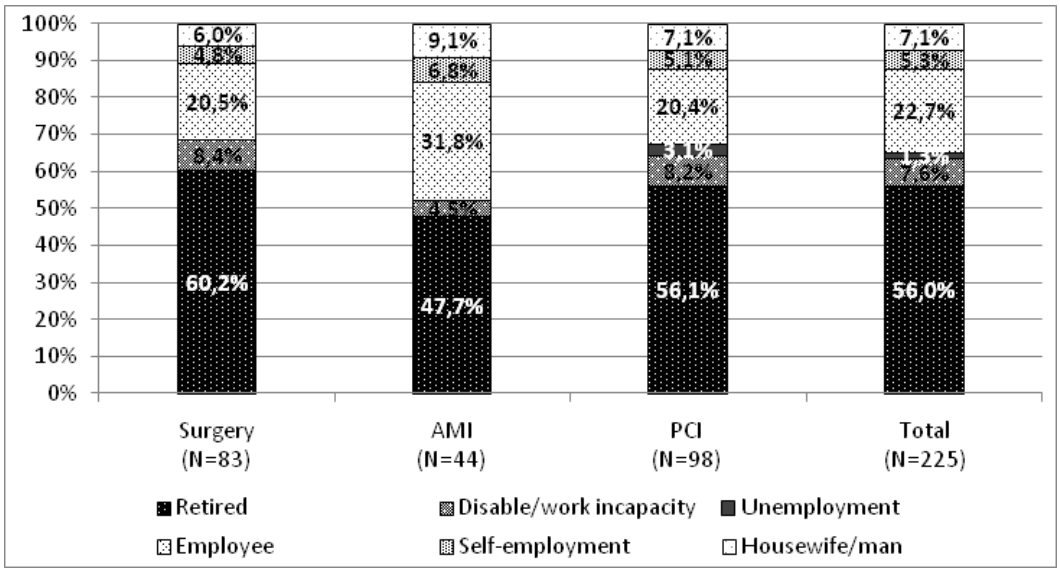
Figure 3-5: Distribution of patients per education status and per patient group[k]



j Missing value=1; one patient did not report his/her marital status

k Missing value =1; one patient did not mention his/her education status

Figure 3-6: Distribution of patients per employment status and per patient group[l]



Distance

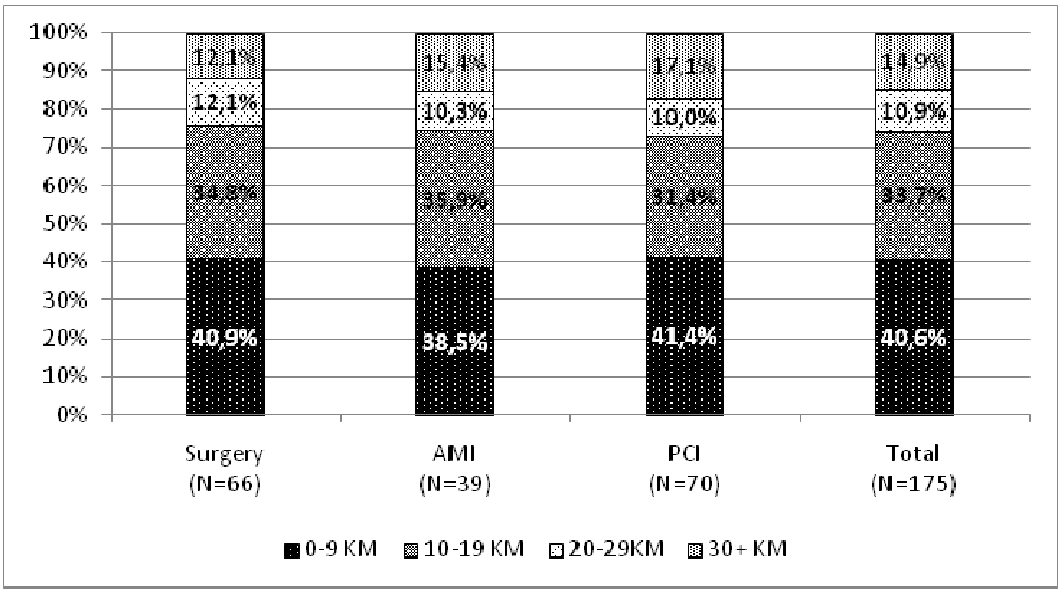
The average reported distance is 14km and almost the same in the three patient groups.

Table 3-7: Descriptive statistics of distance to cardiac rehabilitation centre

	Surgery	AMI	PCI	Overall
Number of patients reporting distance	66	39	70	175
Average distance	13.5	14.3	14.0	13.9
Stdev	10.7	10.4	10.3	10.5
Median	10	10	12	11
Min – Max	1 - 50	3 - 50	1 - 40	1 - 50
Not proposed[m]	10	1	20	31
Missing and error	12	1	7	20

Figure 3-7 shows the distance for each patient group.

Figure 3-7: Distribution of distance per category and per patient group



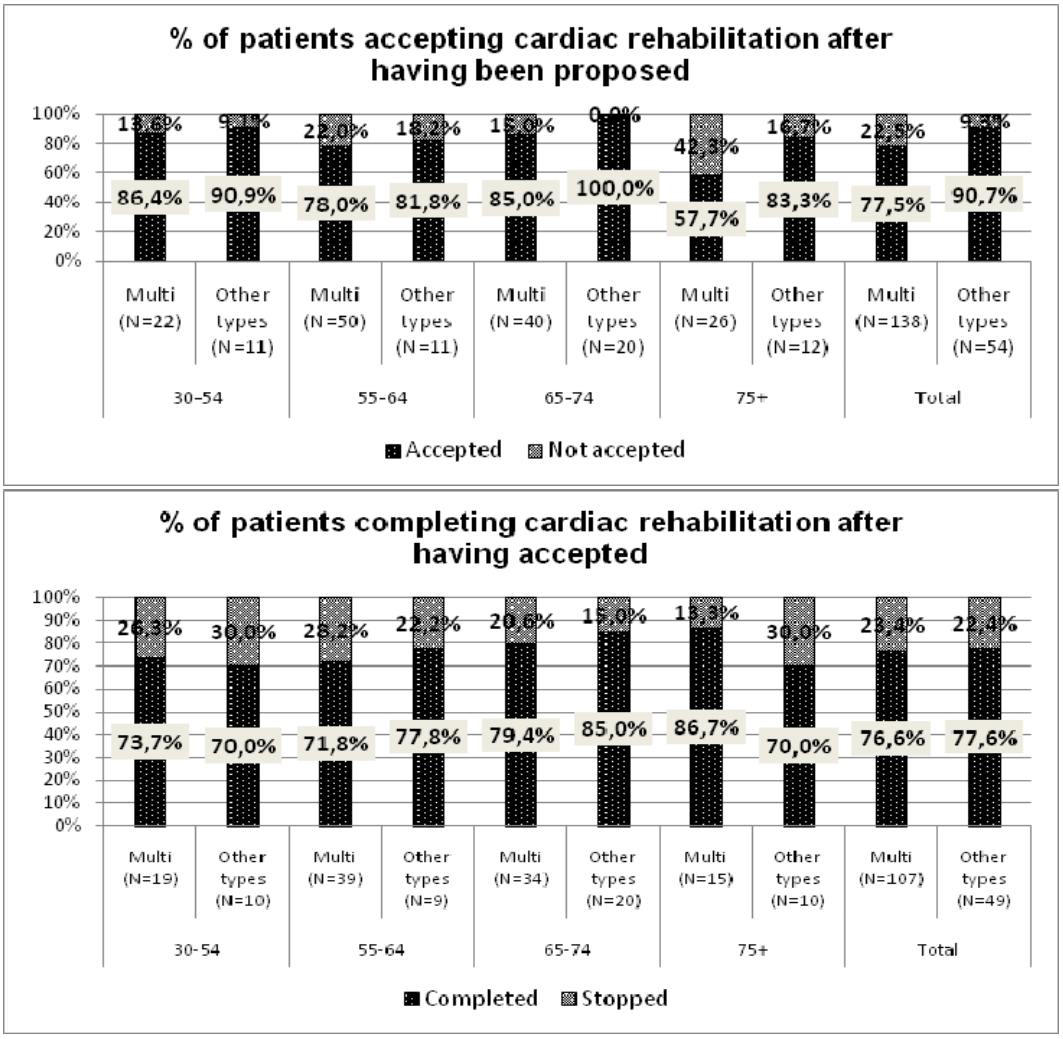
[l] Missing value=1; one patient did not report his/her employment status

[m] In case patients were not proposed for cardiac rehabilitation, the distance data was not collected

DETAILS ON THE PARTICIPATION TO THE REHABILITATION PROGRAMME

Patients who accepted and completed the proposed cardiac rehabilitation programme by age category

Figure 3-8: Percentage of patients who accepted and completed the proposed cardiac rehabilitation programme per age category[n]

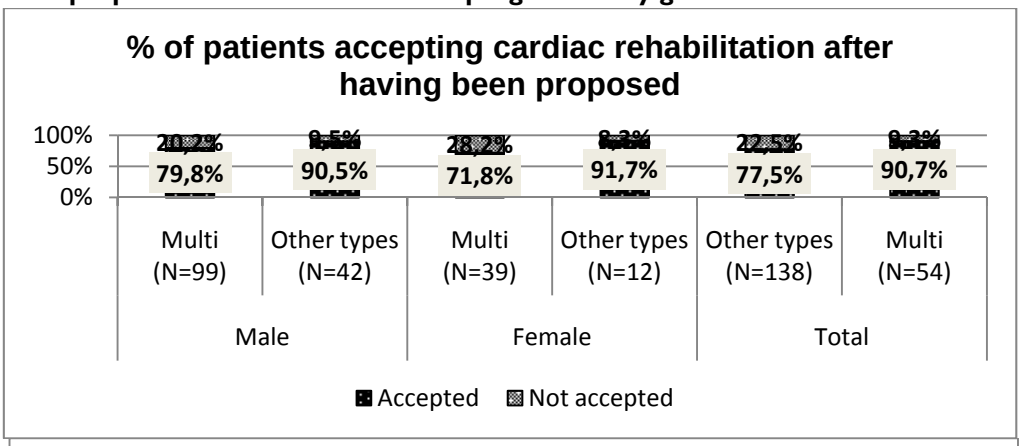


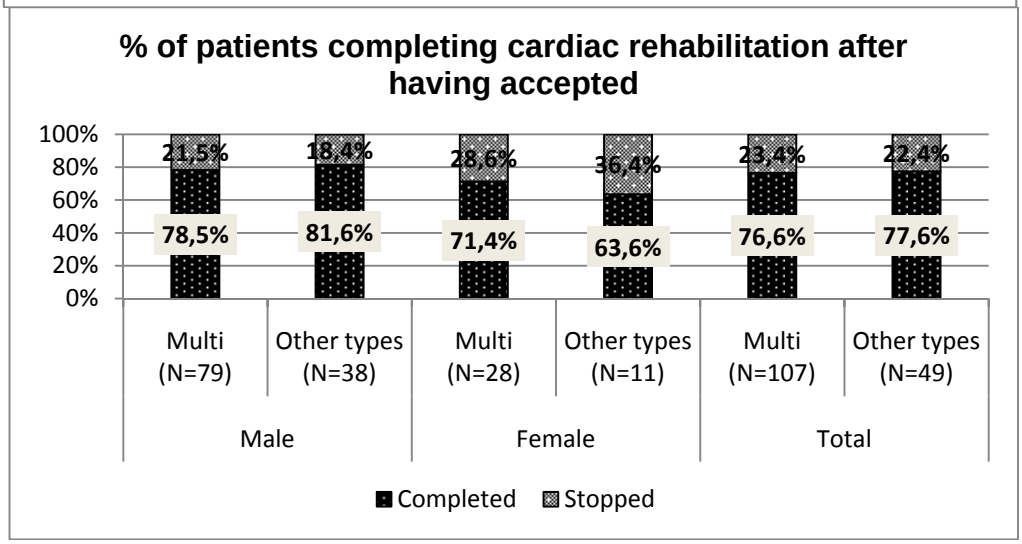
[n] Three patients did not complete the type of rehabilitation they were proposed. They were excluded from these analyses. Two of them accepted, and one rejected the rehabilitation.

Patients who accepted and completed the proposed cardiac rehabilitation programme by gender

Female patients had a higher probability to complete multidisciplinary rehabilitation than monodisciplinary PRM or physiotherapy.

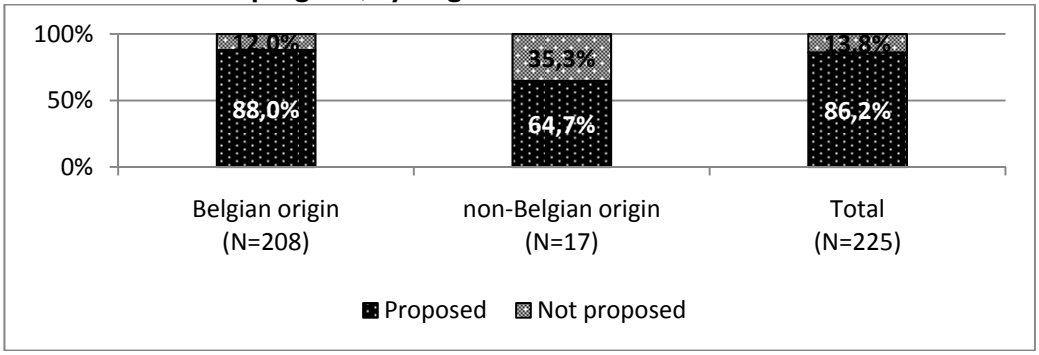
Figure 3-9: Percentage of patients who accepted and completed the proposed cardiac rehabilitation programme by gender°





Origin

Figure 3-10: Percentage of patients who were proposed cardiac rehabilitation program, by origin



° Three patients did not clarify the type of rehabilitation they were proposed. Two accepted and one completed the rehabilitation. Those three patients were excluded from the analysis.

Marital status

Figure 3-11: Percentage of patients who were proposed cardiac rehabilitation per marital status[P]

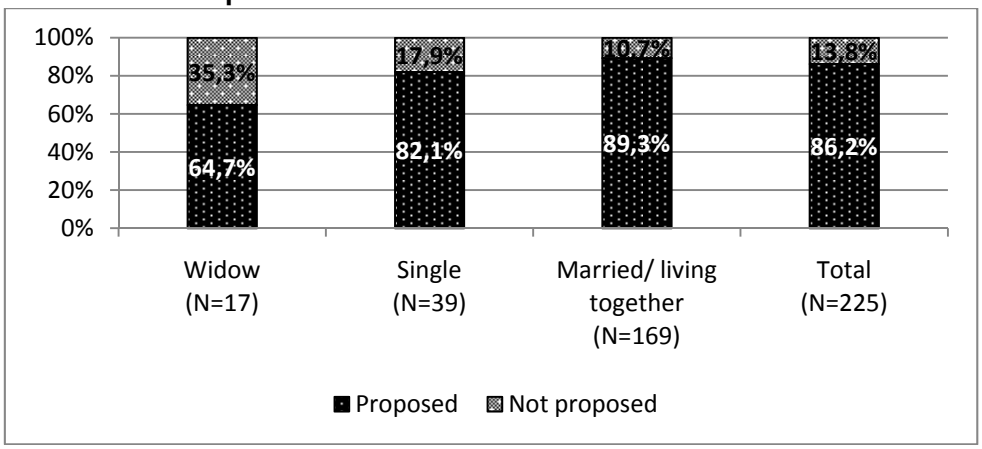
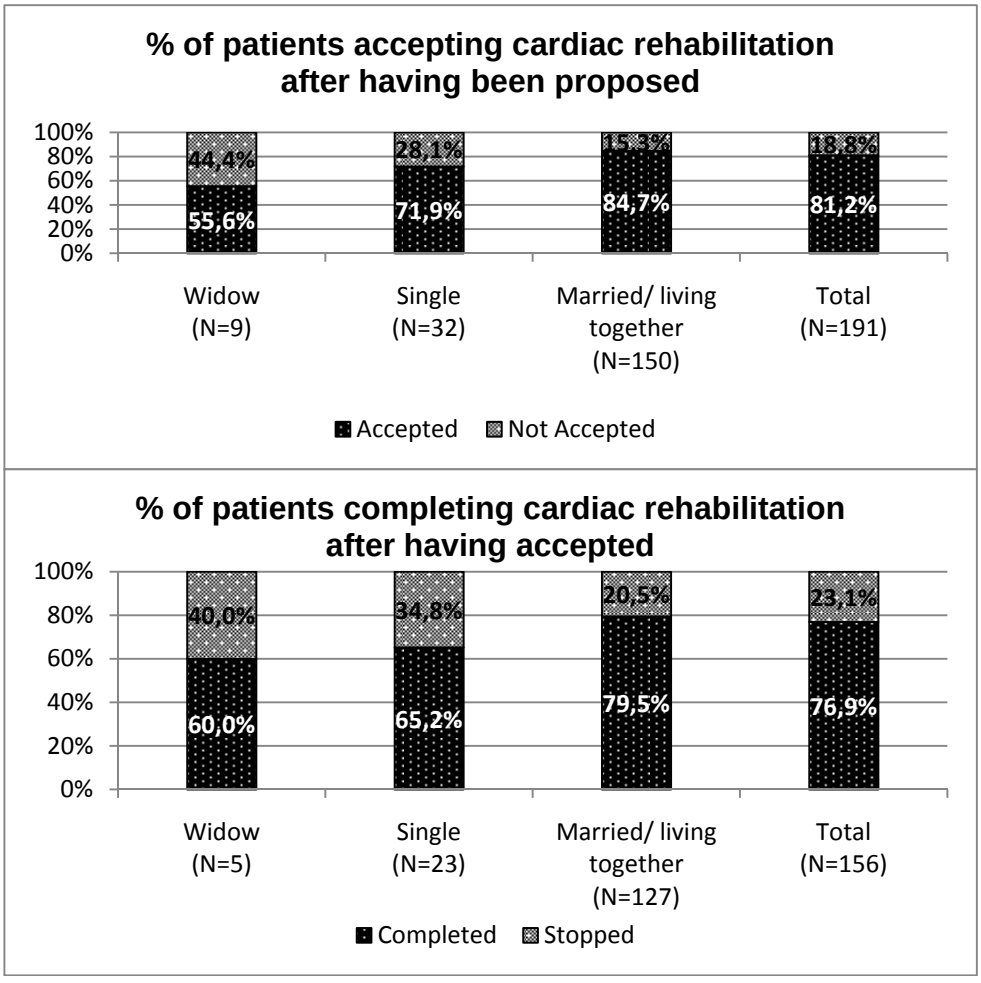


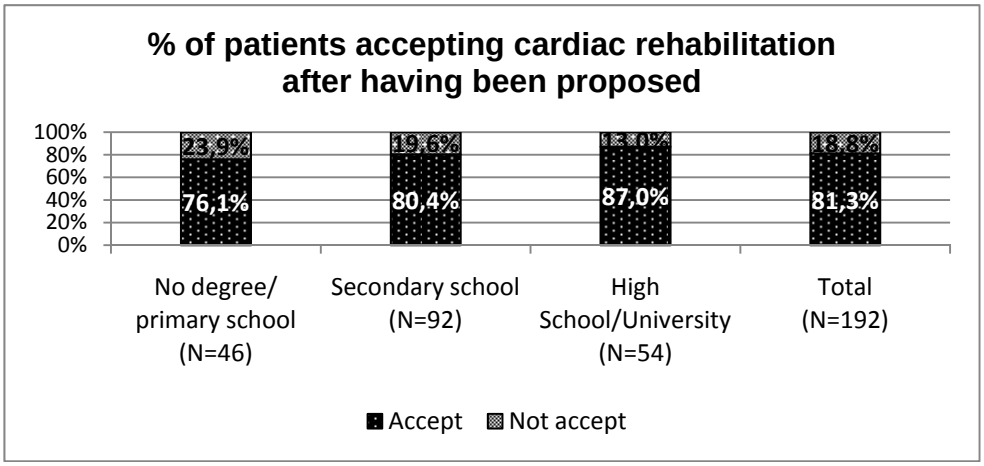
Figure 3-12: Percentage of patients who accepted and completed cardiac rehabilitation programme per marital status (all types of rehabilitation)

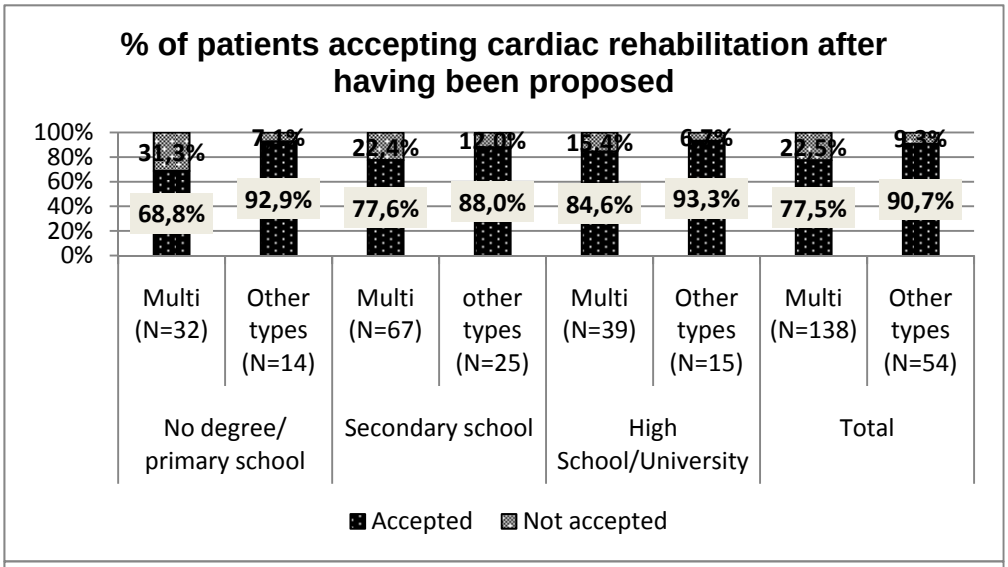


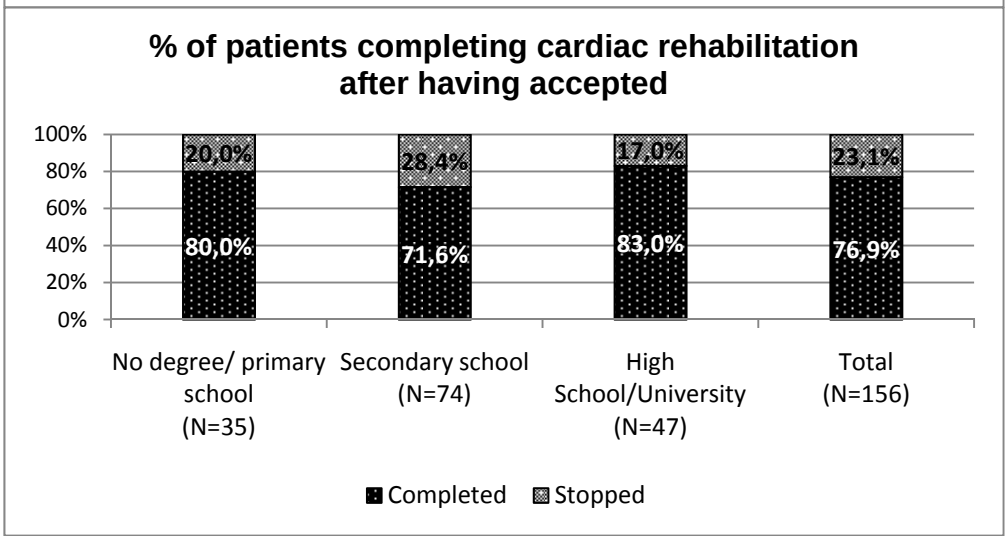
P Missing value =1, one patient did not enter his/her marital status in the questionnaire

Education level

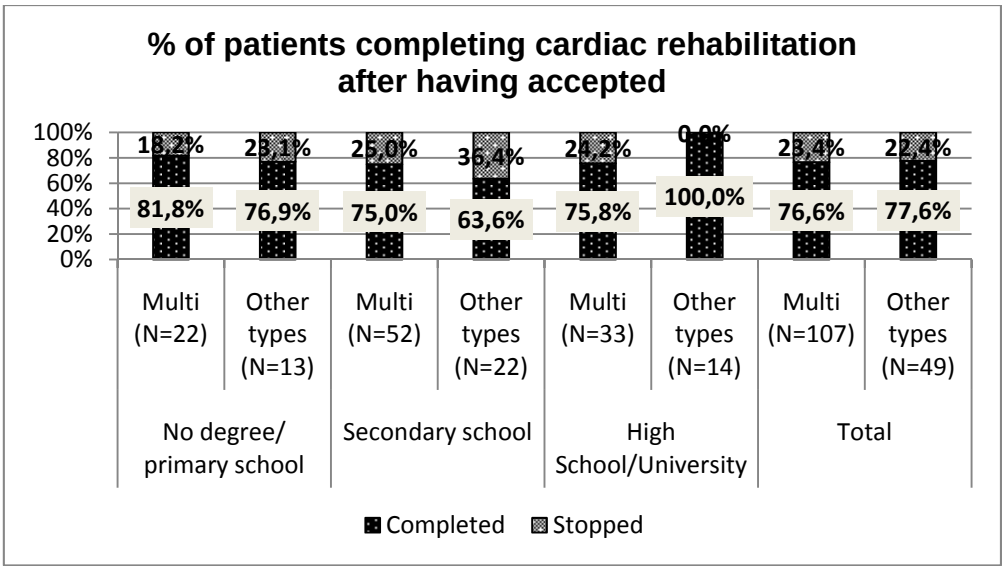
Figure 3-13: percentage of patients who accepted and completed cardiac rehabilitation per education level[qq]







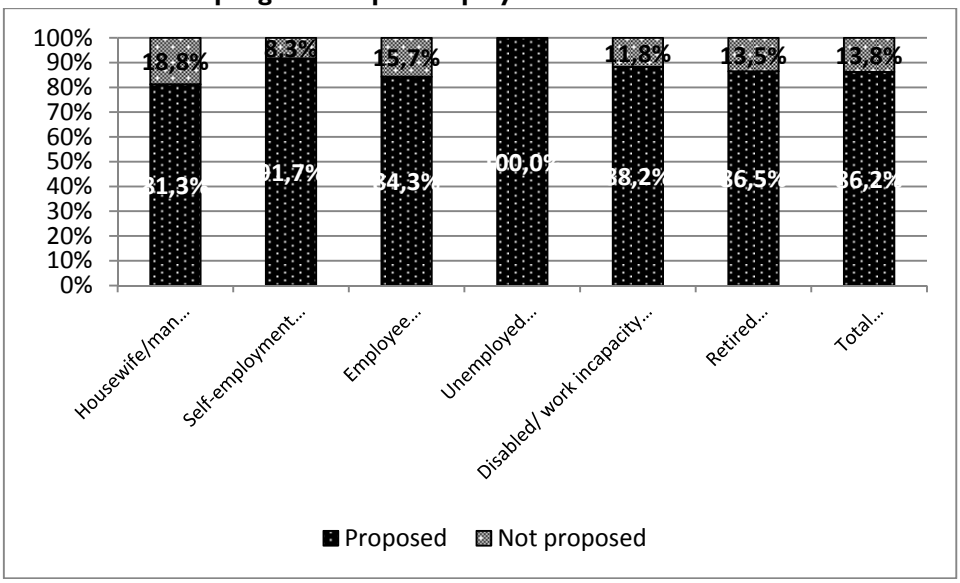
[qq] Three patients did not complete the type of rehabilitation they were proposed, they have been excluded from these analyses. Two of them accepted, and one rejected the rehabilitation



Employment status

Approximately half of participants were retired and 87% of them were proposed cardiac rehabilitation.

Figure 3-14: Percentage of patients who were proposed cardiac rehabilitation programme per employment status[r]



[r] Missing data: N=3

Figure 3-15: Percentage of patients who accepted and completed cardiac rehabilitation programme per employment status

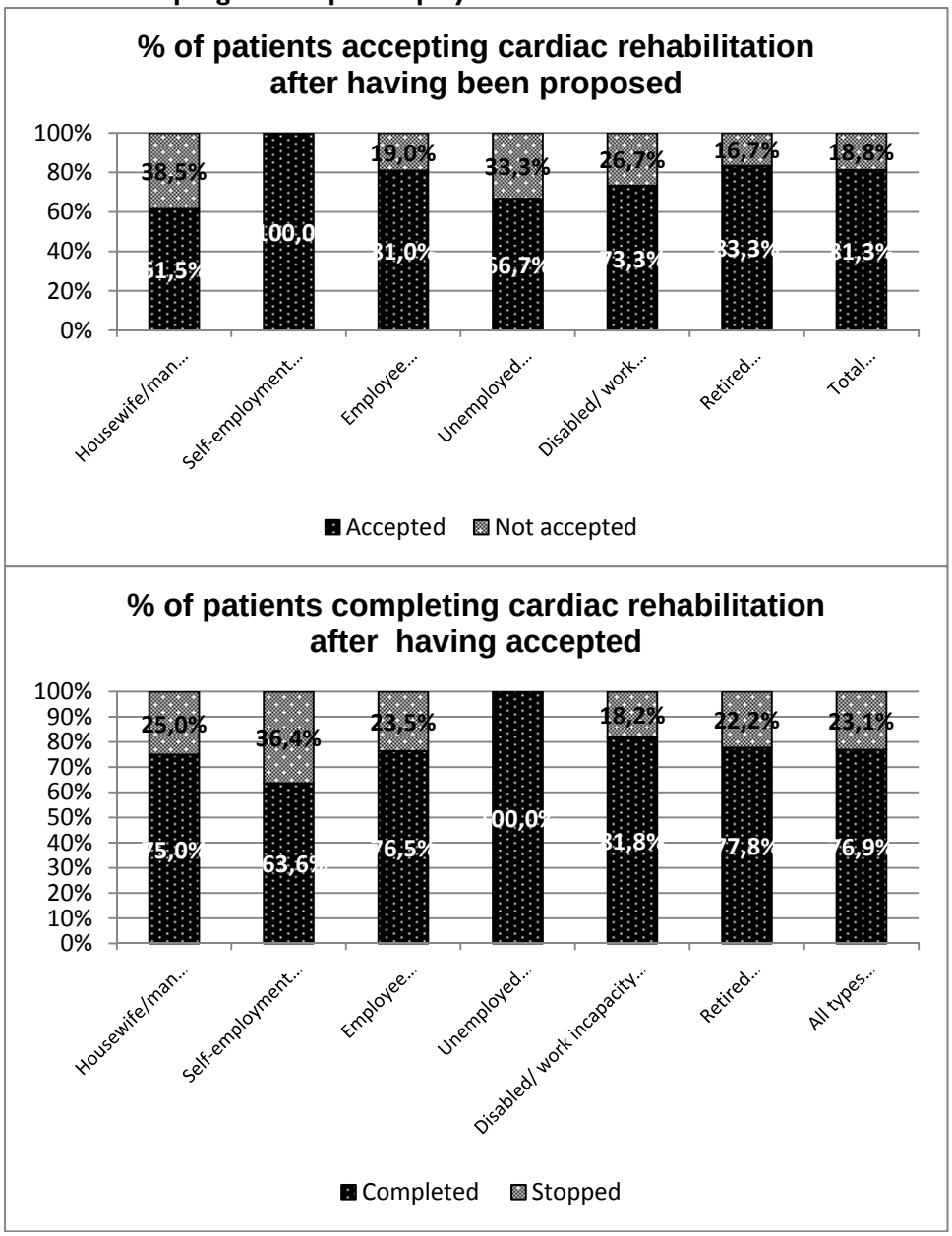
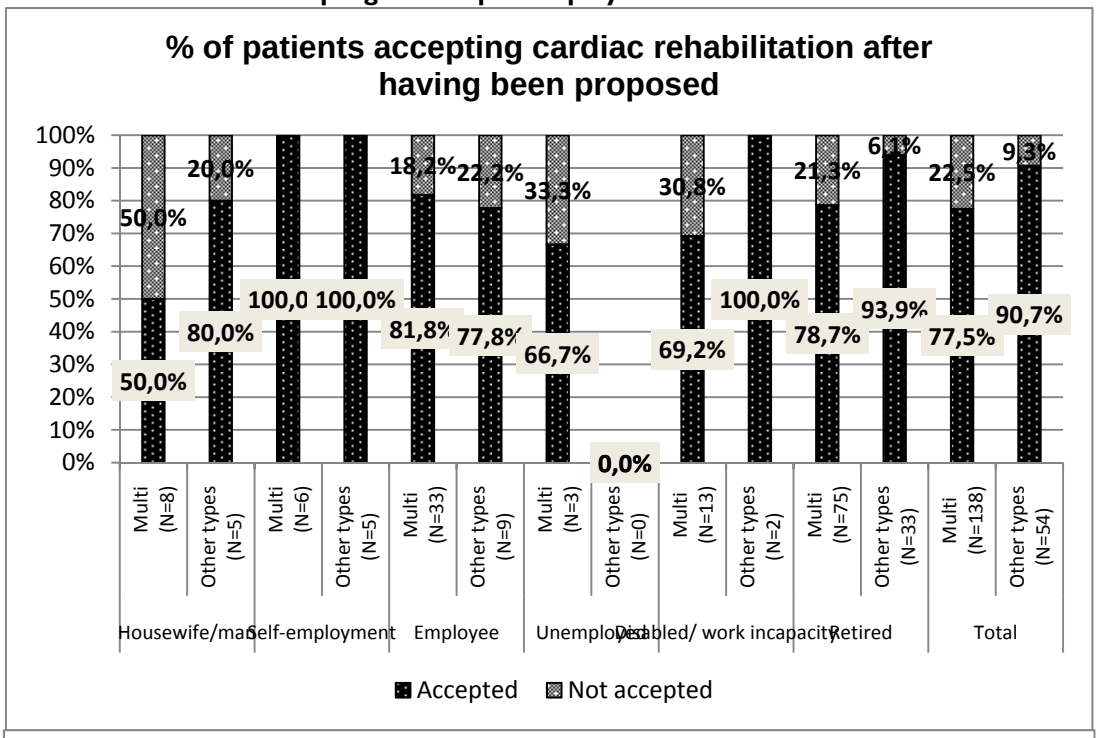
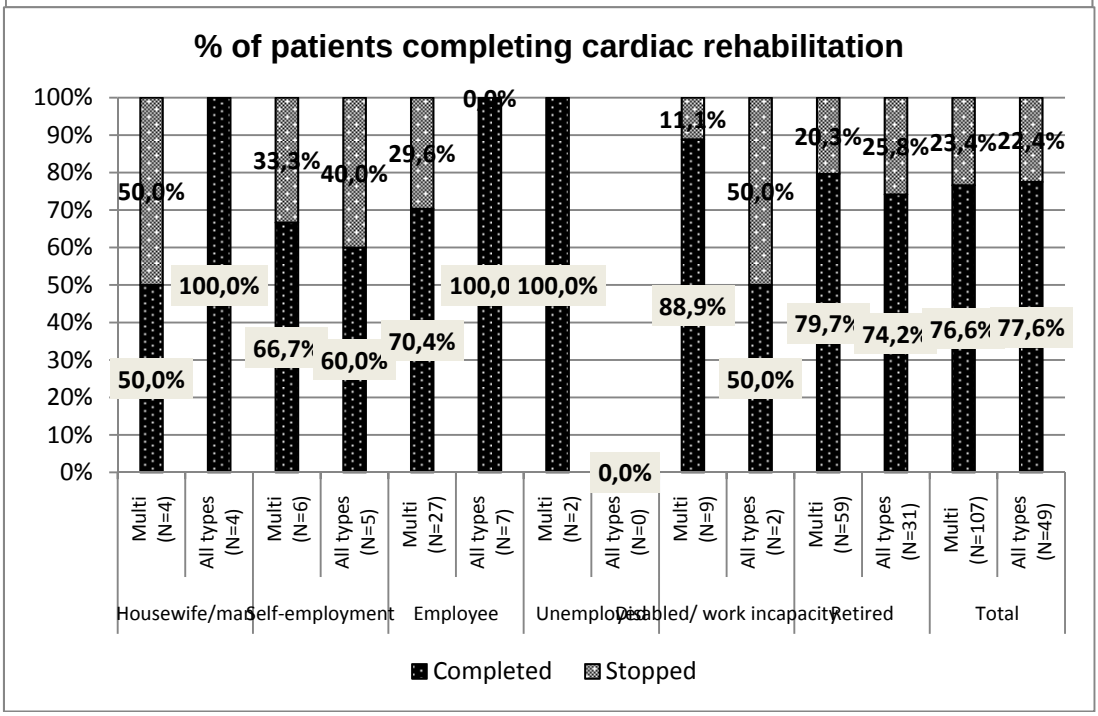


Figure 3-16: Percentage of patients who accepted and completed cardiac rehabilitation programme per employment status[ss]





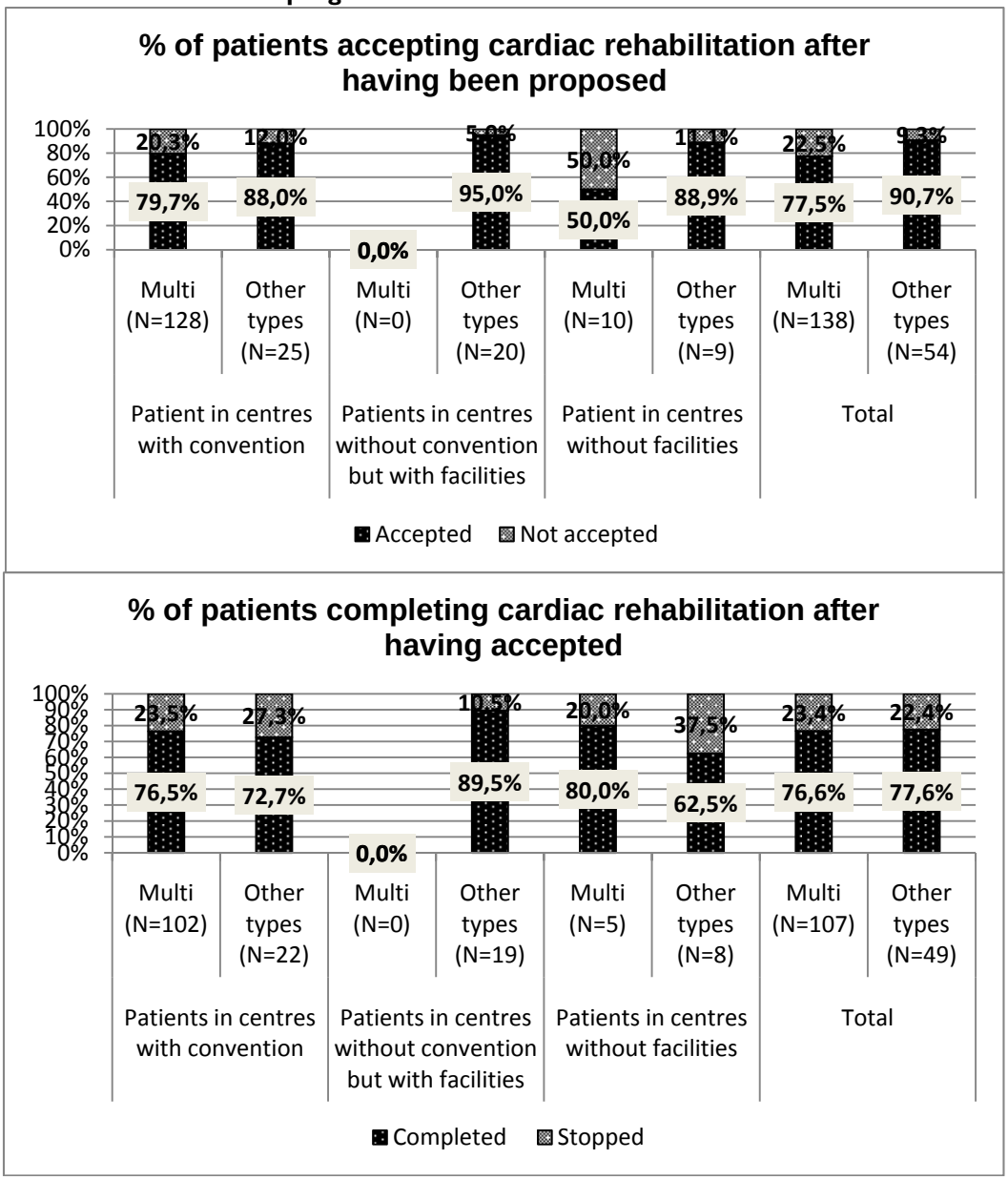
[ss] Three patients did not complete the type of rehabilitation they were proposed, they were excluded from these analyses. Two of them accepted, and one rejected the rehabilitation

Multidisciplinary cardiac rehabilitation convention and proposed, accepted and completed rates of cardiac rehabilitation programmes

Table 3-8: Overview table of centres per provinces

	N agreed to participate	% of Total	N returned questionnaires	% of Total
Antwerp	**4**	**21.1%**	**3**	**20%**
Oost-Vlaanderen	**3**	**15.8%**	**3**	**20%**
Liège	**3**	**15.8%**	**2**	**13.3%**
West-Vlaanderen	**2**	**10.5%**	**2**	**13.3%**
Hainaut	**2**	**10.5%**	**2**	**13.3%**
Limburg	**2**	**10.5%**	**1**	**6.7%**
Namur	**1**	**5.3%**	**1**	**6.7%**
Brussels/Bruxelles	**1**	**5.3%**	**1**	**6.7%**
Luxemburg	**1**	**5.3%**	**0**	**0.0%**
Total	**19**	**100.0%**	**15**	**100.0%**

Figure 3-17: Percentage of patients who accepted and completed cardiac rehabilitation programme in different centres[t]



Patient groups and proposed, accepted and completed rates of cardiac rehabilitation programmes

[t] Three patients did not complete the type of rehabilitation they were proposed, they were excluded from these analyses. Two of them accepted, and one rejected the rehabilitation

Figure 3-18: Percentage of patients who were proposed cardiac rehabilitation programme per patient group

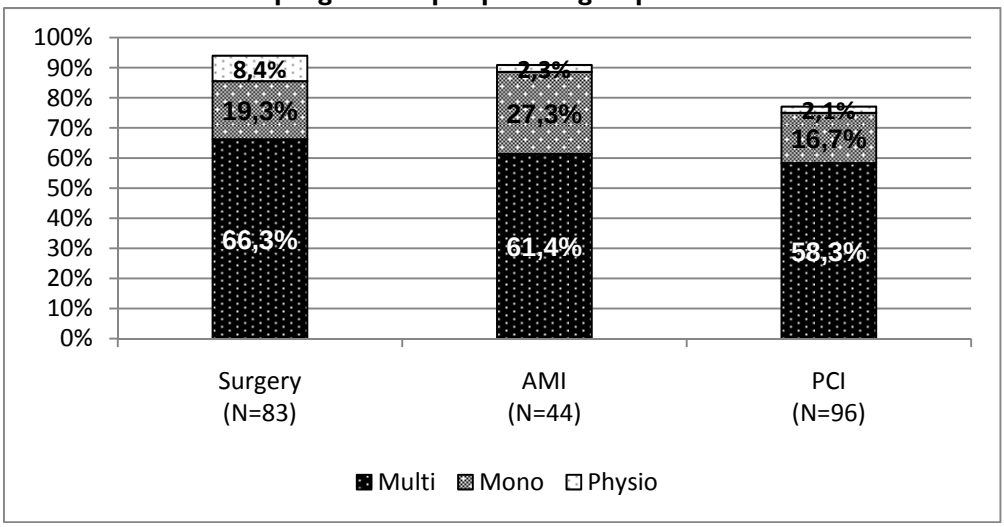
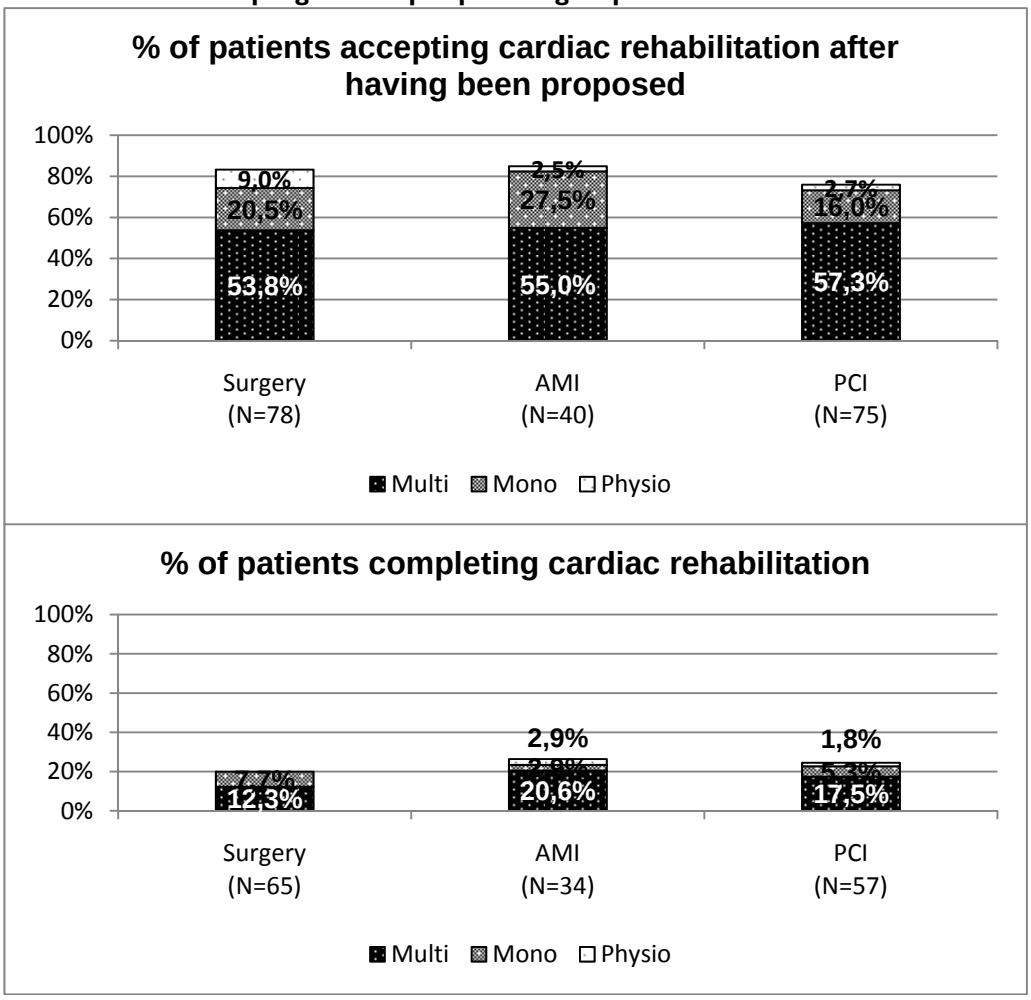
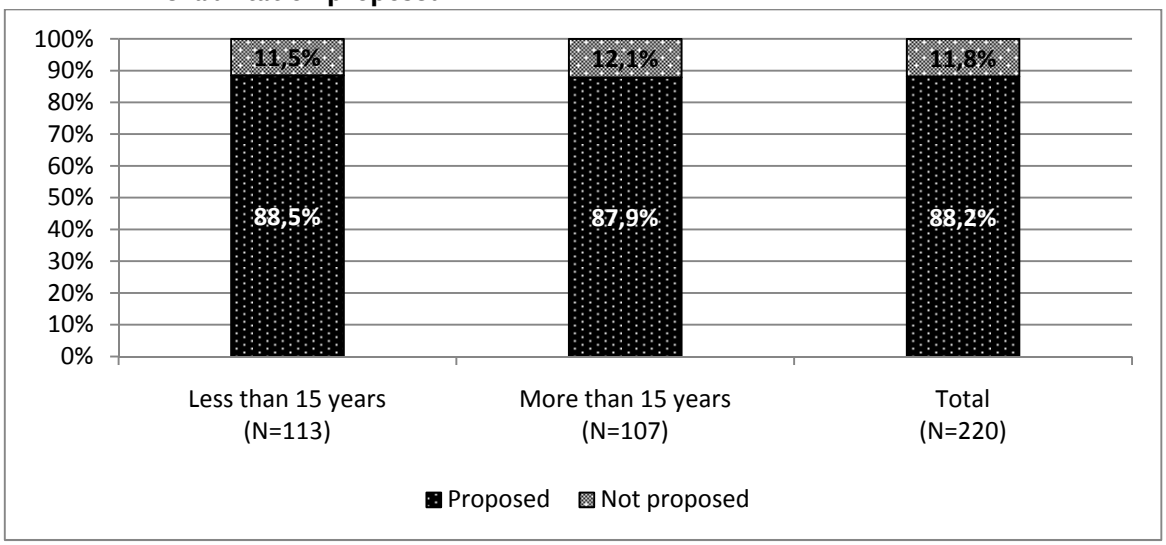


Figure 3-19: Percentage of patients who had accepted and stopped cardiac rehabilitation programme per patient group



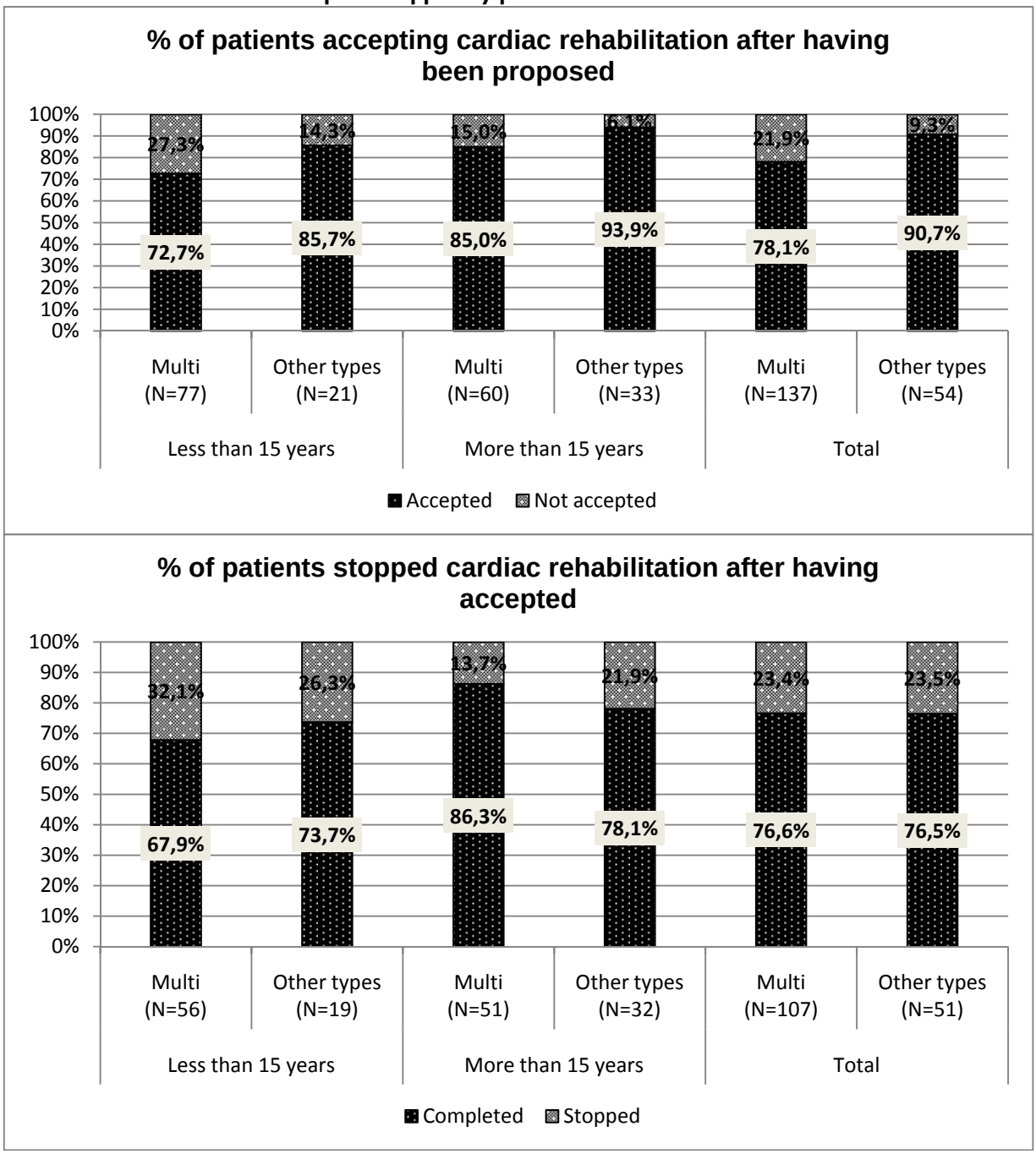
Impact of cardiologists' experience on proposed, accepted and completed rates of cardiac rehabilitation programmes

Figure 3-20: Distribution of cardiologists' year of activities and cardiac rehabilitation proposed[u]



[u] Missing value =6. Two cardiologists did not completed the years of activities, therefore, their patients were excluded in this analysis

Figure 3-21: Distribution of cardiologists' year of activities and cardiac rehabilitation accepted/stopped by patients[v]



[v] Four patients were excluded from this analysis because their cardiologists' years of activities were unknown.

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Legal depot : D/2010/10.273/68

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