Strategies to increase utilization of cardiac rehabilitation

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COURAGE LIVES HERE

International Council of Cardiovascular Prevention and Rehabilitation (ICCPR)

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- cite high impact articles JAMA Circulation (not JCCP) MAHdi

CR.CARE main manuscript intro

- CR tied to improved morbid & mortality
- including older pts
- cite Suaya - JACC Suaya - JACC ✓
- come to be std of care (standard care) - Ades NEJM (Ades. NE Jrnl)
- however have woefully low CR referral (or so abysmal)

- Jones paper on medicare 18.9% (over 65)

benefits m-a metaanalysis benefit same order of magnitude of statins, aspirin beta b

MMWR cite Beh? 34% post mi

- no 2nd thought in prescribing pharmacotherapy.
- yet "prescribing" CR not done (despite similar benefits of statins etc) - don't think about prescribing

- we did prospective in depth comparing strategies maximize

Predictors of Cardiac Rehabilitation Participation in Older Coronary Patients

(*Arch Intern Med.* 1992;152:1033-1035)

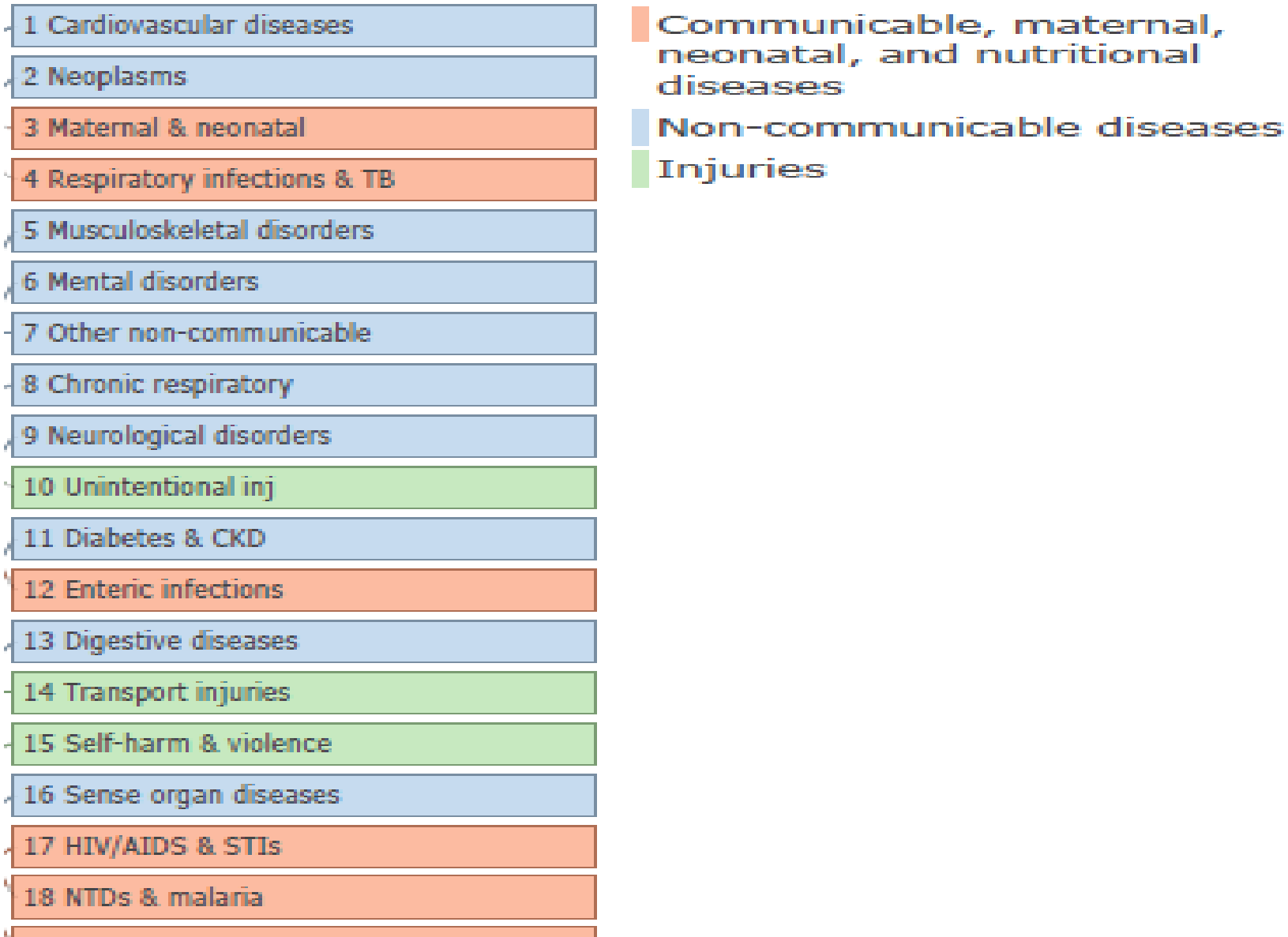
Philip A. Ades, MD; Mary L. Waldmann; William J. McCann, MS; Sheila O. Weaver, MS

Results.—**Overall cardiac rehabilitation participation rate in a population with a mean age of 70.4±6 years (range, 62 to 92 years) was 21%. By multivariate analysis, the strength of the primary physician's recommendation for participation was the most powerful predictor of cardiac rehabilitation entry. Also, significant predictors of participation included commute time, patient "denial" of severity of illness, and history of depression. Medical factors such as cardiac diagnosis and left ventricular ejection fraction did not predict participation.**

Overview

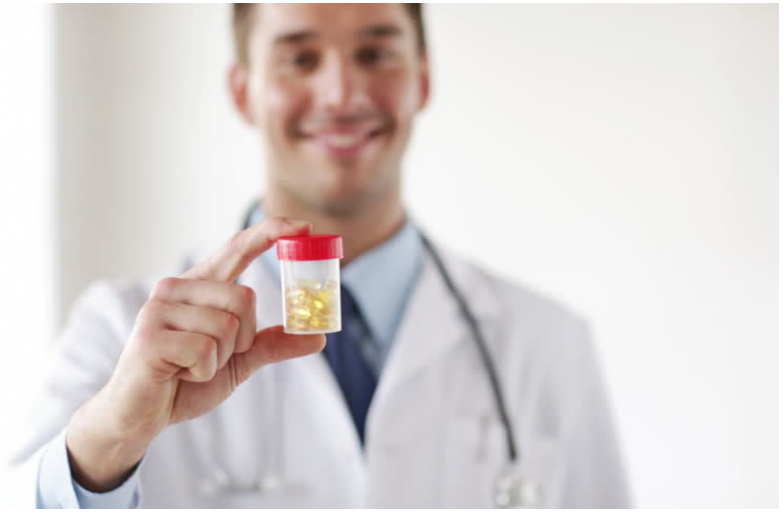
- CR: need, benefits
- CR utilization
- CR barriers
- How to increase CR use

Global DALYs per 100,000 2017 - rank



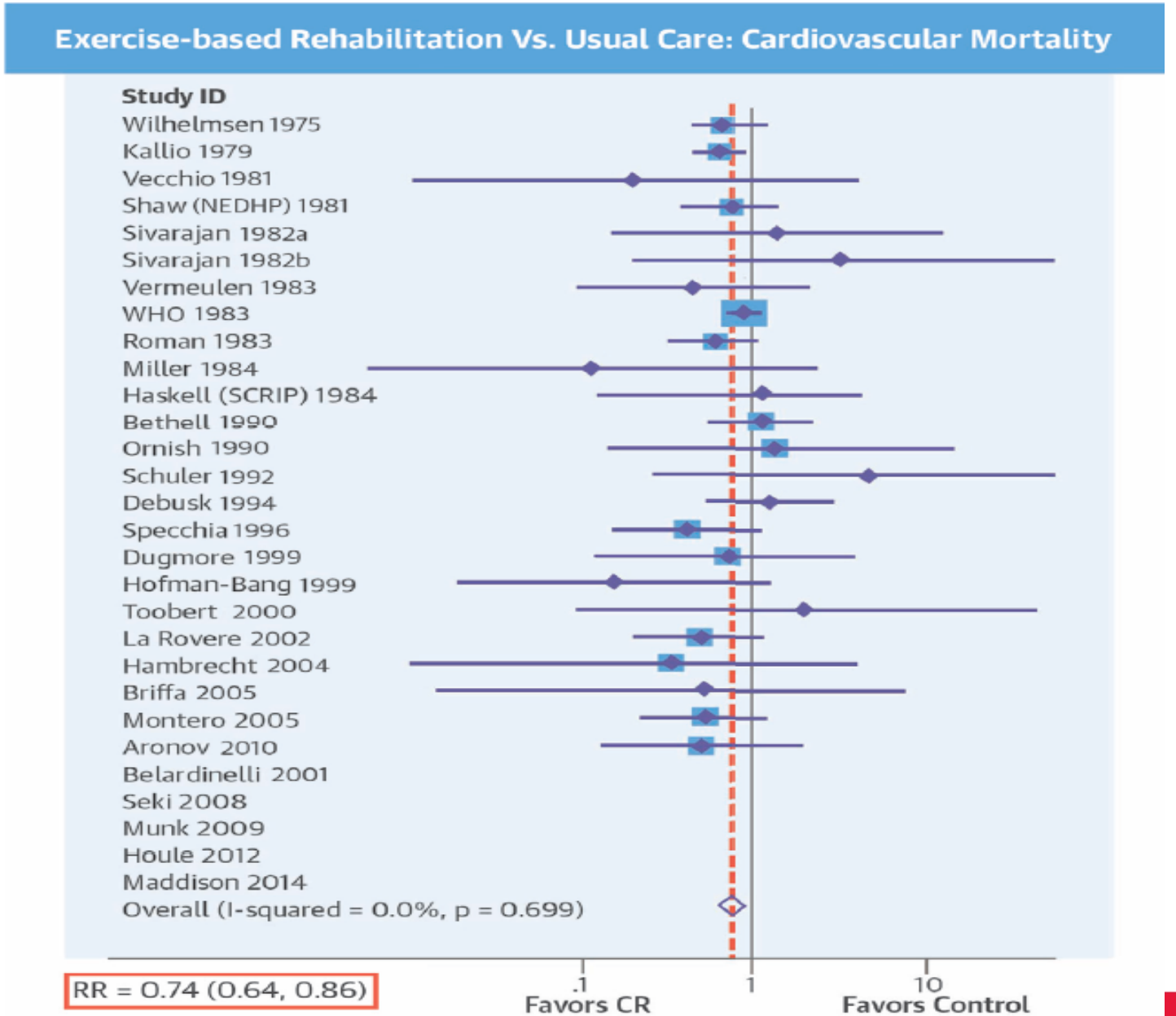
GBD IHME

Cardiac Rehabilitation (CR)



Cochrane Library

Cochrane Database of Sys



Anderson et al., JACC 2016

Guidelines with CR Referral Recommendation

2014 AHA/ACC Guideline for the Management of Patients With NSTE-ACS

1. All eligible patients with NSTE-ACS should be referred to a comprehensive cardiovascular rehabilitation program either before hospital discharge or during the first outpatient visit. *(Class I, Level of Evidence: B)*

2013 ACCF/AHA Guideline for the Management of Patients With STEMI

Exercise-based cardiac rehabilitation/secondary prevention programs are recommended for patients with STEMI. *(Class I, Level of Evidence: B)*

2013 ACCF/AHA Guideline for the Management of Heart Failure

1. Exercise training (or regular physical activity) is recommended as safe and effective for patients with HF who are able to participate to improve functional status. (*Class I, Level of Evidence:* A)

AHA/ACCF Secondary Prevention and Risk Reduction Therapy for Patients With Coronary Artery and Other Atherosclerotic Vascular Disease: 2011 Update

1. All eligible patients with ACS or whose status is immediately post coronary artery bypass surgery or post-PCI should be referred to a comprehensive outpatient cardiovascular rehabilitation program either prior to hospital discharge or during the first follow-up office visit . *(Class I, Level of Evidence: A)*

AHA Effectiveness-Based Guidelines for the Prevention of Cardiovascular Disease in Women–2011 Update

1. A comprehensive CVD risk-reduction regimen such as cardiovascular or stroke rehabilitation or a physician-guided home- or community-based exercise training program should be recommended to women with a recent acute coronary syndrome or coronary revascularization, new-onset or chronic angina, recent cerebrovascular event, peripheral arterial disease *(Class I; Level of Evidence A)* or current/prior symptoms of heart failure and an LVEF 35%. *(Class I; Level of Evidence B)*

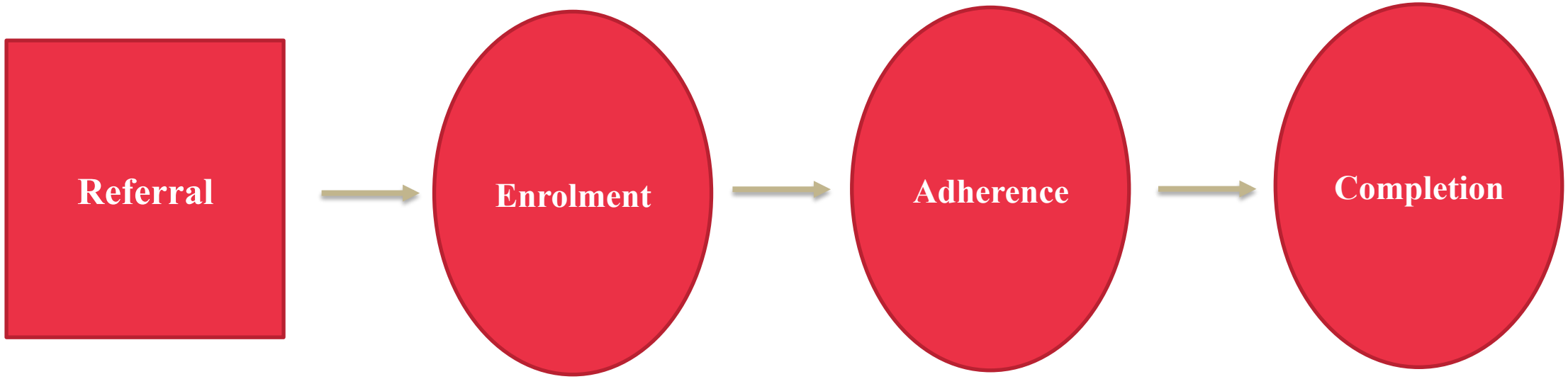
2011 ACCF/AHA Guideline for Coronary Artery Bypass Graft Surgery

1. Cardiac rehabilitation is recommended for all eligible patients after CABG . *(Class I, Level of Evidence: A)*

2011 ACCF/AHA/SCAI Guideline for Percutaneous Coronary Intervention

1. Medically supervised exercise programs (cardiac rehabilitation) should be recommended to patients after PCI, particularly for moderate- to high-risk patients for whom supervised exercise training is warranted. *(Class I; Level of Evidence: A)*

CR Utilization Indicators



official communication amongst healthcare provider, CR program and the patient that recommends participation in a CR program

patient attendance at a first CR program visit

proportion of sessions (i.e., on-site exercise sessions with education, home-based calls) completed of those prescribed

attendance at some of the CR intervention components, and formal re-assessment at the conclusion of the CR intervention

Grace et al., CJC 2014

Review: CR QIs (7)

Association (number of indicators)	AHA / ACCF / AACVPR (9)	ACRA (71)	BACPR (6)	CCS / CACPR (30)	EAPC* (1)	Japan (13)	CSANZSPWG (13)	Total (/7)
Referral	x	x	x	x	x	x	x	7
Enrollment	x	x		x				3
Adherence	x			x		x		3
Completion		x		x		x	x	4

Moghei, M.,* Oh, P., Chessex, C., & **Grace, S.L.** (in press). Cardiac rehabilitation quality improvement: narrative review. JCRP.

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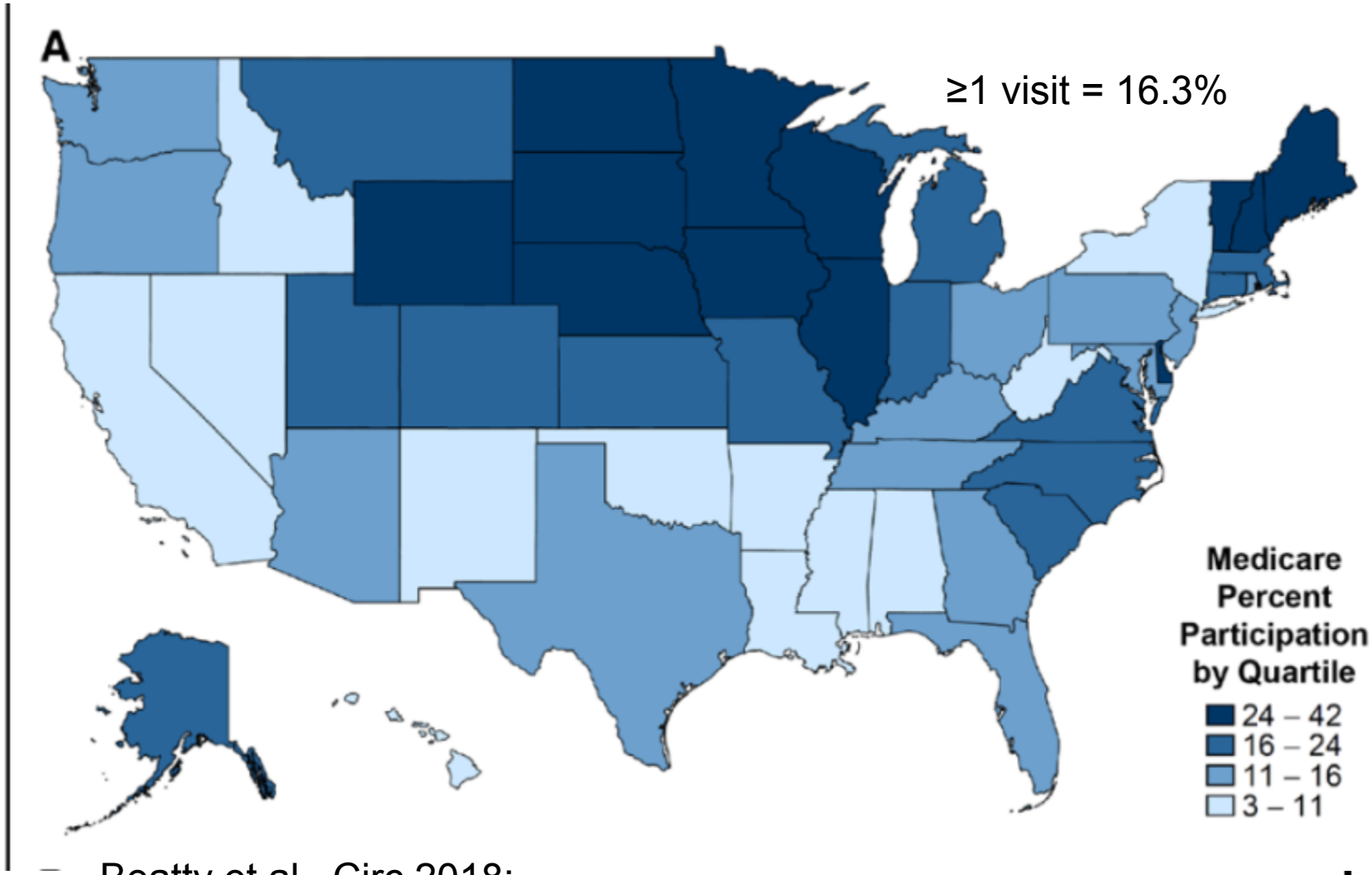
CR Use in the US (2007-11)



Beatty et al., Circ 2018;
5% Medicare N=143,756

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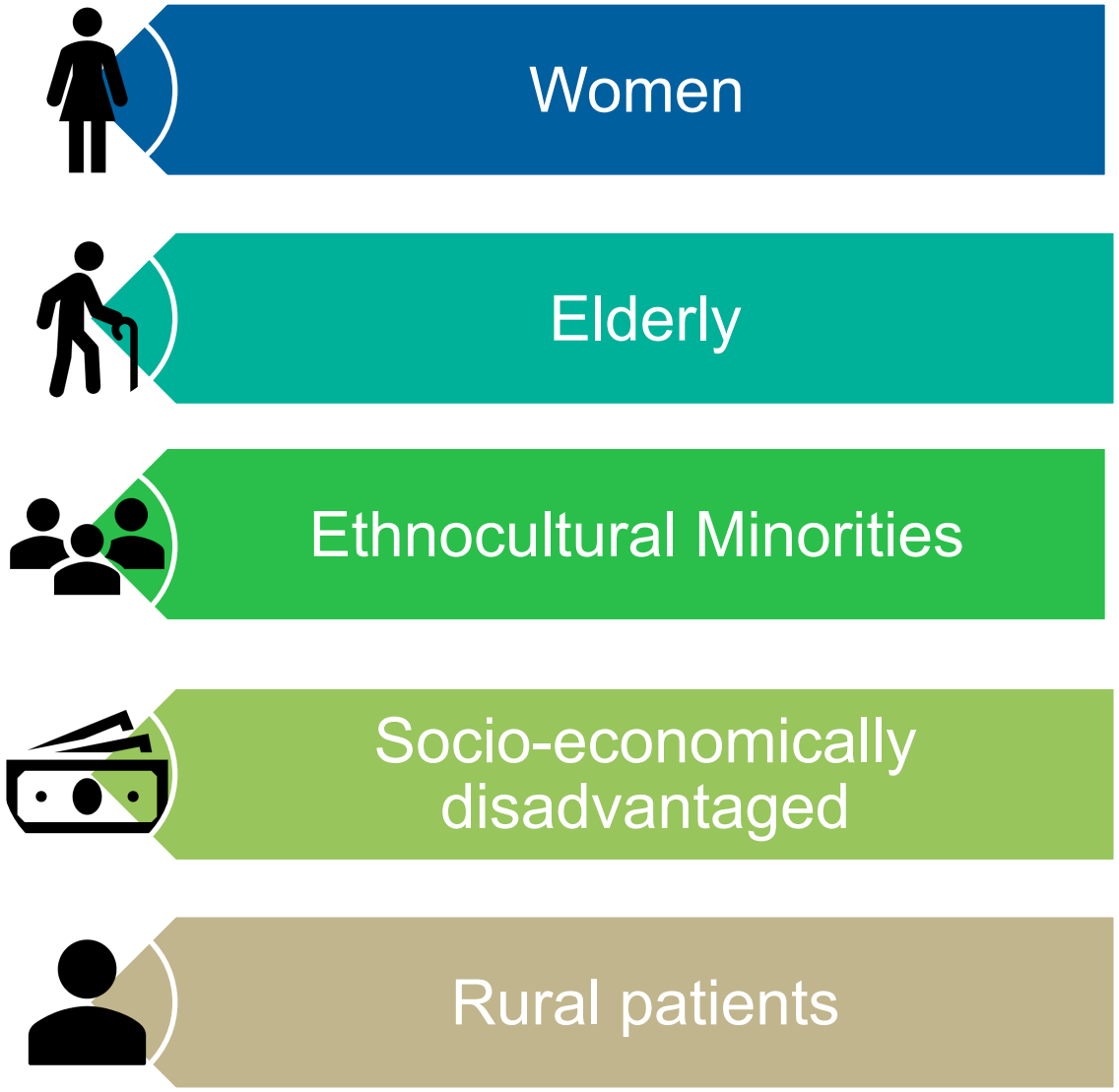
Under-represented groups: low & inequitable use



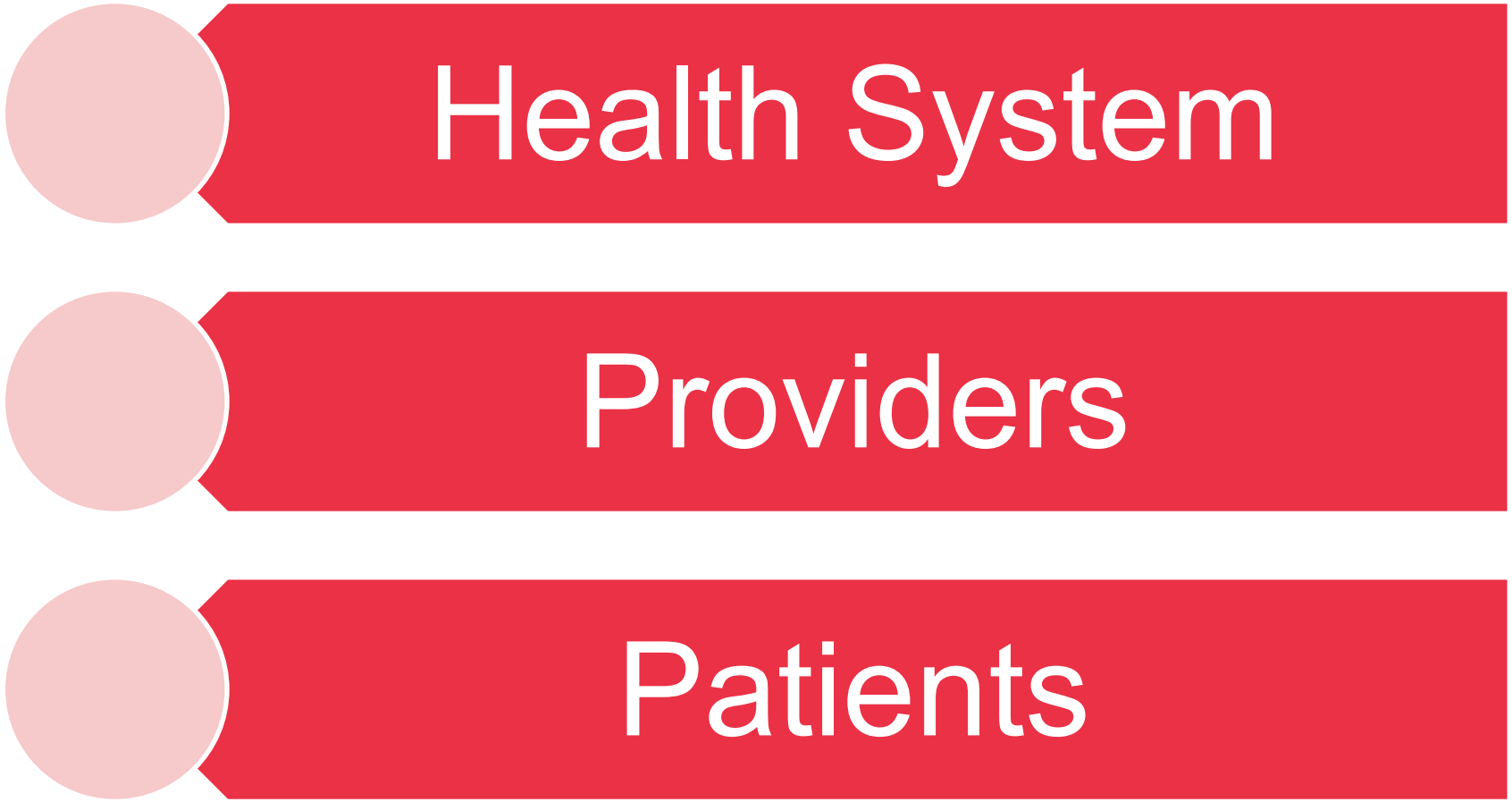
Valencia et al. JCRP, 2011

Table 2 Compliance Rates for Coronary Artery Disease Performance Measures in 8,132 Patients

Performance Measure	Unit of Assessment*	Denominator	Numerator	Compliance Rate
Beta-blocker therapy after myocardial infarction	Patients	1,782	1,540	86.4%
Blood pressure measurement	Last encounter	7,698	7,235	94.0%
Antiplatelet therapy	Patients	7,944	6,742	84.9%
Screening for diabetes mellitus	Patients	6,199	822	13.3%
Smoking query	Patients	8,132	6,812	83.8%
Smoking cessation	Patients	500	356	71.2%
Symptom and activity assessment	Patients	8,132	6,981	85.8%
ACE-I or ARB therapy	Patients	4,623	3,349	72.4%
Annual lipid profile	Patients	8,132	6,044	74.3%
Drug therapy for lowering LDL cholesterol	Patients	1,607	1,355	84.3%
Cardiac rehabilitation referral†	Patients	1,108	200	18.1%

Chan, P. S. *et al.* Cardiac performance measure compliance in outpatients: The American College of Cardiology and National Cardiovascular Data Registry's PINNACLE (Practice Innovation And Clinical Excellence) Program. *J. Am. Coll. Cardiol.* 56, 8–14 (2010).

WHY: CR Utilization Barriers



Clark et al. reviews

Key Health System Barrier: Lack of Capacity (and reimbursement)

WHO Region	1 spot per xx IHD patients
Africa	579
Americas	4
Eastern Mediterranean	89
Europe	8
South-East Asia	303
Western Pacific	17
Global	12

Turk-Adawi, Supervia, Lopez…Grace; under review (abstract in *Global Heart*)

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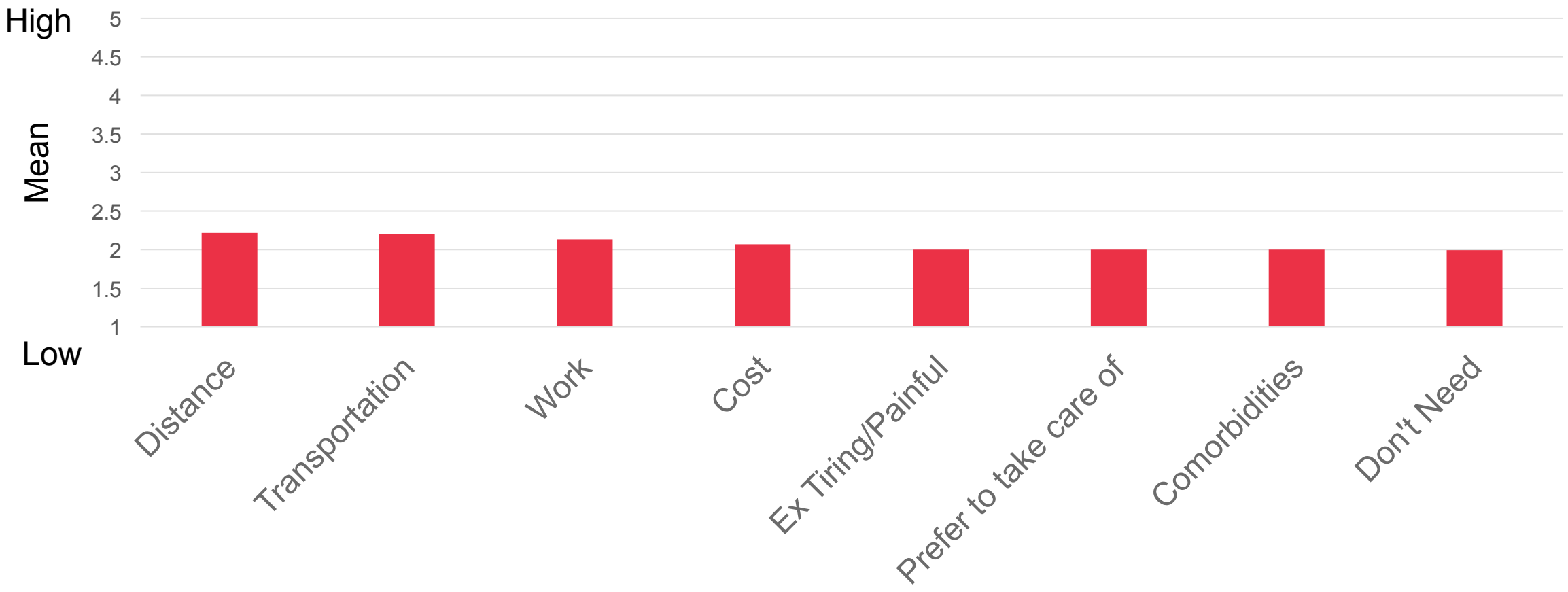
Key Provider Barriers to CR Use

- Lack of referral
- Lack of patient encouragement

- Physician Att'des Related to CR:
  - Skeptical about the benefits
  - Perceive proximate program is of poor quality
  - Bad experience with a program
  - Lack of familiarity with local programs

Ghisi.. Grace; Clin Cardiol 2013; Ghisi & Grace PACRR HL&C epub

Patient Barriers (CRBS)



Shanmugasegaram, Grace et al. Clin Cardiol 2012

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So What Can We Do About It?

Referral, Enrollment, and Delivery of Cardiac Rehabilitation/Secondary Prevention Programs at Clinical Centers and Beyond : A Presidential Advisory From the American Heart Association

Gary J. Balady, Philip A. Ades, Vera A. Bittner, Barry A. Franklin, Neil F. Gordon, Randal J. Thomas, Gordon F. Tomaselli and Clyde W. Yancy

Table 2. Methods to Facilitate Referral and Enrollment in Cardiac Rehabilitation/Secondary Prevention Programs

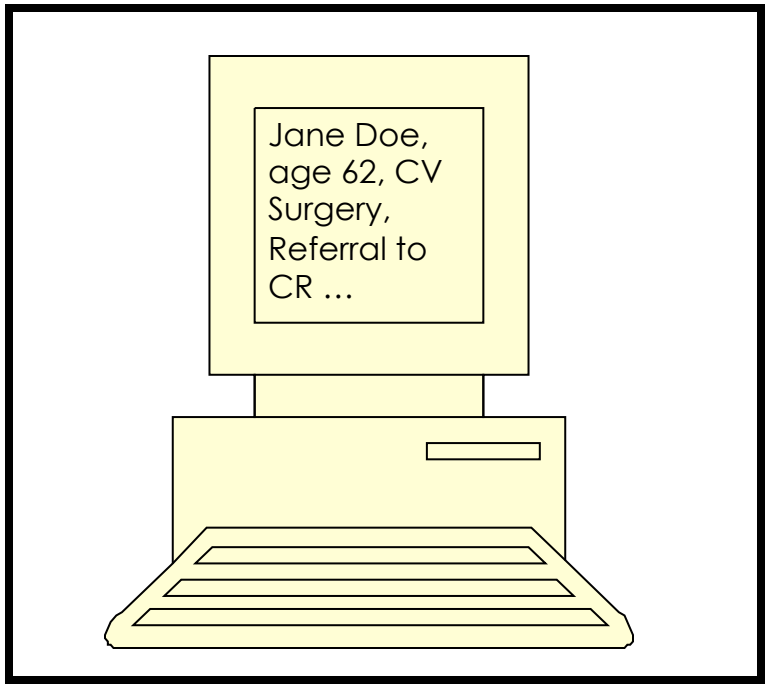
Including referral to CR/SPP in the hospital discharge plan
Automatically referring all eligible patients at the time of hospital discharge
Having ward clerks/office staff ensure that referrals are completed
Providing patients with a choice of CR/SPP to attend
Ensuring that patients are aware of and agree to the referral
Arranging personal visits from CR/SPP liaison
Providing written invitations and program brochures in multiple languages
Informing the CR/SPP of the referral and, when possible, establishing an appointment at the point of care
Making comprehensive interpreter service available if required
Providing transportation and parking assistance if required
Following up with those referred but not yet enrolled

Circ, 2011

eReferral

INPATIENT UNIT
D/C Letter
CR Option

CR SITE Queue



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CRCARE: Cardiac Rehab
Care Continuity through Automatic Referral Evaluation

ORIGINAL INVESTIGATION

Effect of Cardiac Rehabilitation Referral Strategies on Utilization Rates

A Prospective, Controlled Study

Sherry L. Grace, PhD; Kelly L. Russell, MSc; Robert D. Reid, PhD, MBA; Paul Oh, MD, FRCPC; Sonia Anand, MD, PhD, FRCPC; James Rush, PhD; Karen Williamson, PhD; Milan Gupta, MD; David A. Alter, MD, PhD, FRCPC; Donna E. Stewart, MD, FRCPC; for the Cardiac Rehabilitation Care Continuity Through Automatic Referral Evaluation (CRCARE) Investigators

Table 3. Cardiac Rehabilitation (CR) Referral, Enrollment, and Participation Rates by Referral Strategy

	Patients, No. (%)			
Referral Strategy	Referred	Enrolled	No. Enrolled of Those Referred	Prescribed CR Sessions Attended of Those Referred, Mean (SD), %,
Usual (2 wards)	94 (32.2)	83 (29.1)	71 (78.0)	83.4 (28.1)
Liaison only (6 wards)	284 (59.0)	239 (50.9)	228 (83.2)	83.2 (27.2)
Automatic only (3 wards)	382 (70.1)	321 (60.7)	310 (84.2)	83.6 (27.0)
Combined automatic and liaison (5 wards)	396 (85.3)	335 (74.0)	329 (85.7)	81.9 (27.2)
Total	**1156** (64.9)[a]	**978** (56.3)[a]	**938** (84.0)	82.9 (27.2)

[a] $P < .001$.

Arch Intern Med. 2011;171(3):235-241

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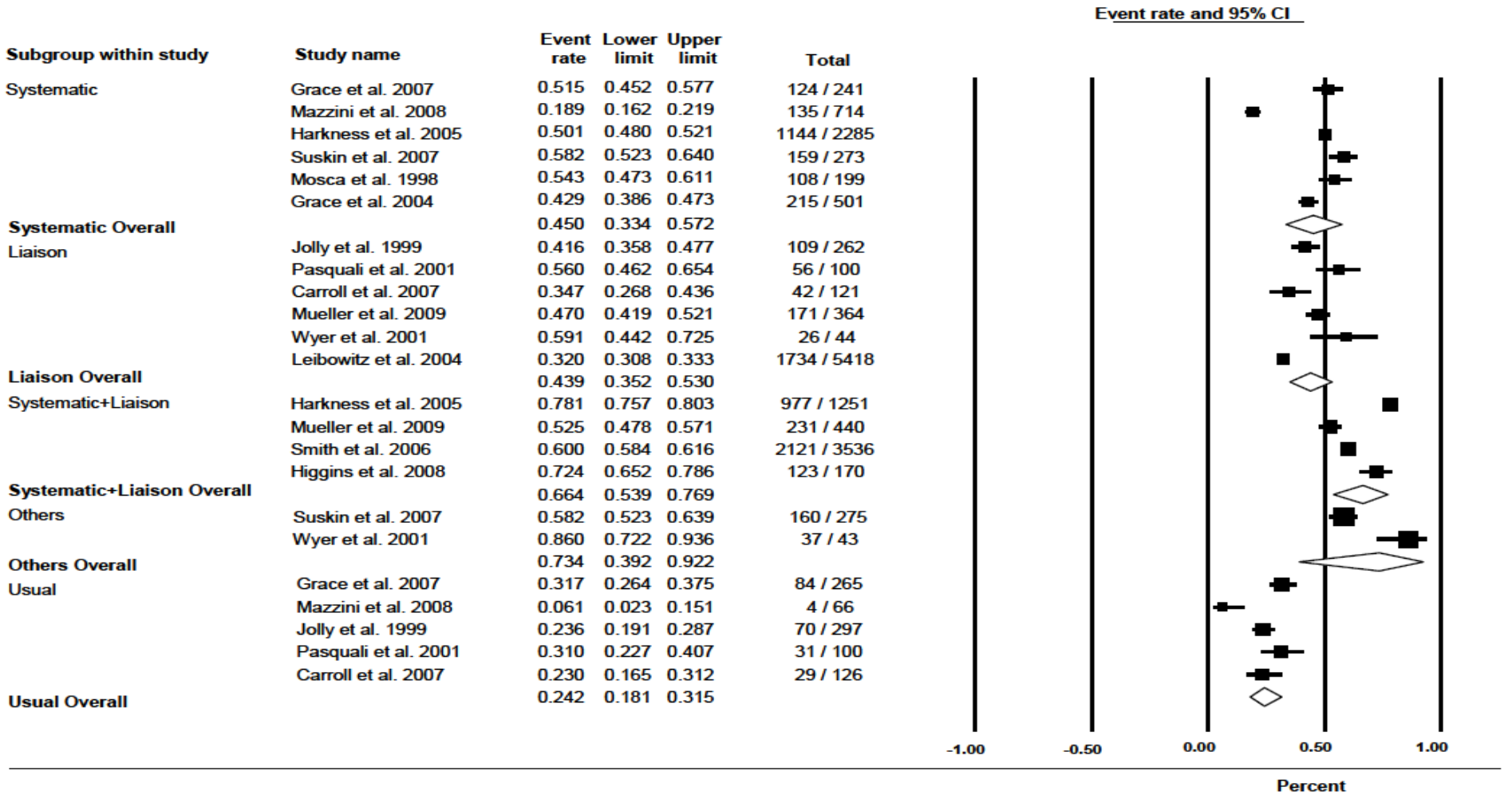
Effects of cardiac rehabilitation referral strategies on referral and enrollment rates

Shannon Gravely-Witte, Yvonne W. Leung, Rajiv Nariani, Hala Tamim, Paul Oh, Victoria M. Chan and Sherry L. Grace



Canadian Journal of Cardiology 27 (2011) 192–199

Society Position Statement

Systematizing Inpatient Referral to Cardiac Rehabilitation 2010: Canadian Association of Cardiac Rehabilitation and Canadian Cardiovascular Society Joint Position Paper

Sherry L. Grace, PhD (Chair),[a] Caroline Chessex, MD, FRCPC (Co-Chair),[b]
Heather Arthur, PhD,[c] Sammy Chan, MD,[d] Cleo Cyr, RN, BN, MHS,[e] William Dafoe, MD,[f]
Martin Juneau, MD,[g] Paul Oh, MD,[h] and Neville Suskin, MBChB[i]

- Target = 85% CR referral
- Target= 70% CR enrolment

JCRP & CJC 2011

Canadian Cardiovascular Society

CACPR
Canadian Association of Cardiovascular Prevention and Rehabilitation

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RSITÉ
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Review of CR Registries Globally (8)

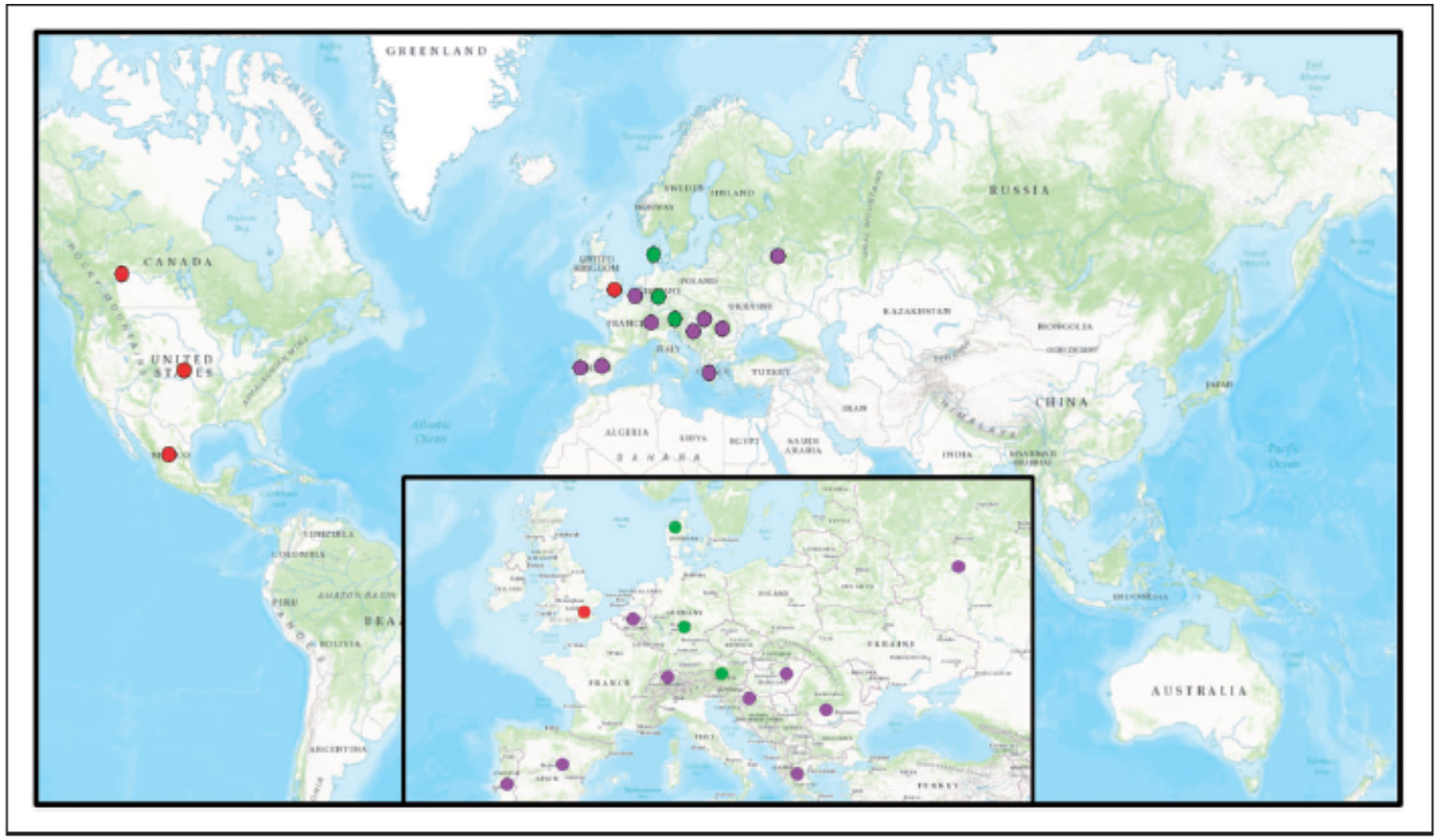

Figure 2. The location of included studies with national and international-level cardiac rehabilitation (CR) registries. Inset: Location of European CR registries. Red pin: identified national-level registries; purple pin: countries involved in the international-level EuroCaReD database; green pin: country has both a national-level CR registry and is involved in the EuroCaReD. Developed using ArcMap 10.5.

Poffley, Thomas, Grace et al., EJPC 2017

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Cochrane Library

Cochrane Database of Systematic Reviews

Promoting patient uptake and adherence in cardiac rehabilitation (Review)

Santiago Pio, C.*, Chaves, G.*, Davies, P., Taylor, R. & Grace, S.L.

2014, Issue 6. Art. No.: CD007131.
DOI: 10.1002/14651858.CD007131.pub3.

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Search Results & Citation Consideration

Records identified through database searching since last review to Apr 2018:

Total (N=8,932)

Additional records identified from hand searching
(n=7)

Studies included in previous Cochrane review
(n=25)

Screened based on title and abstract
(n=6,430)

Excluded:
(n=84)

Full-text articles assessed for eligibility
(n=102)

Trials included in the review update
(N=26)
24 for quantitative synthesis (**27** comparisons)

From previous review **(n=12)**

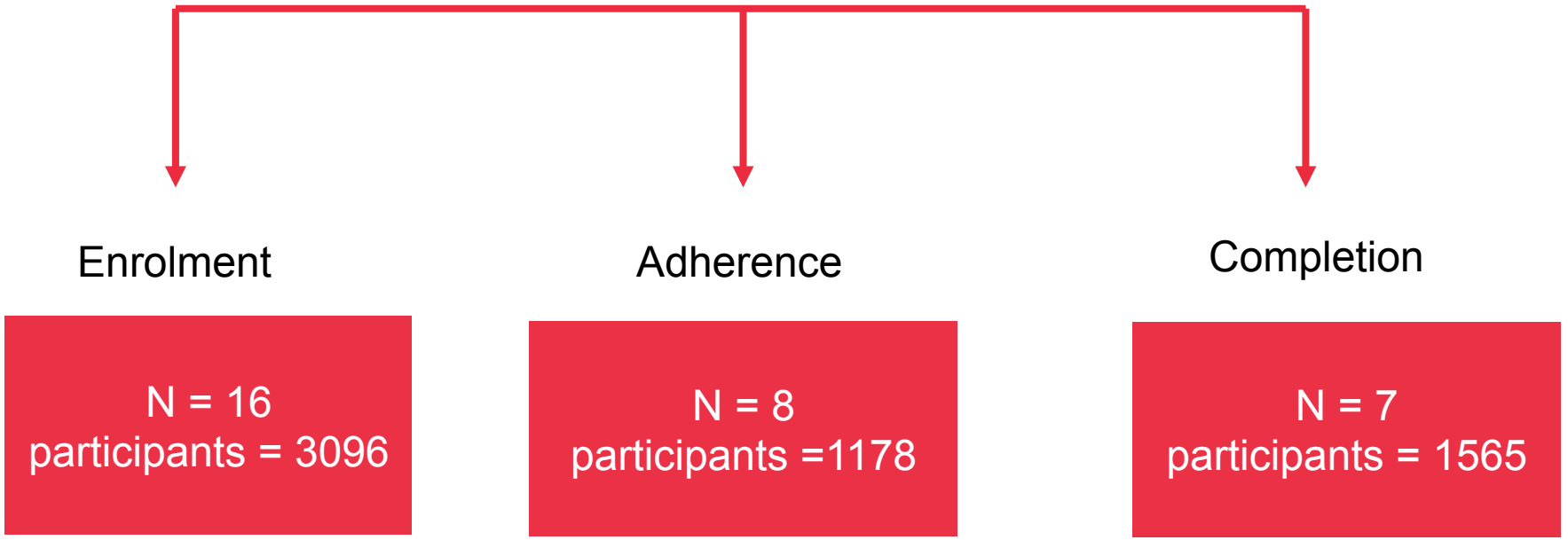
From search update **(n=14)**

Awaiting classification **(n=5)**

Ongoing **(n=4)**

Results

Number of included trials for quantitative analysis by outcome:



64% male participants, 36% included HF patients

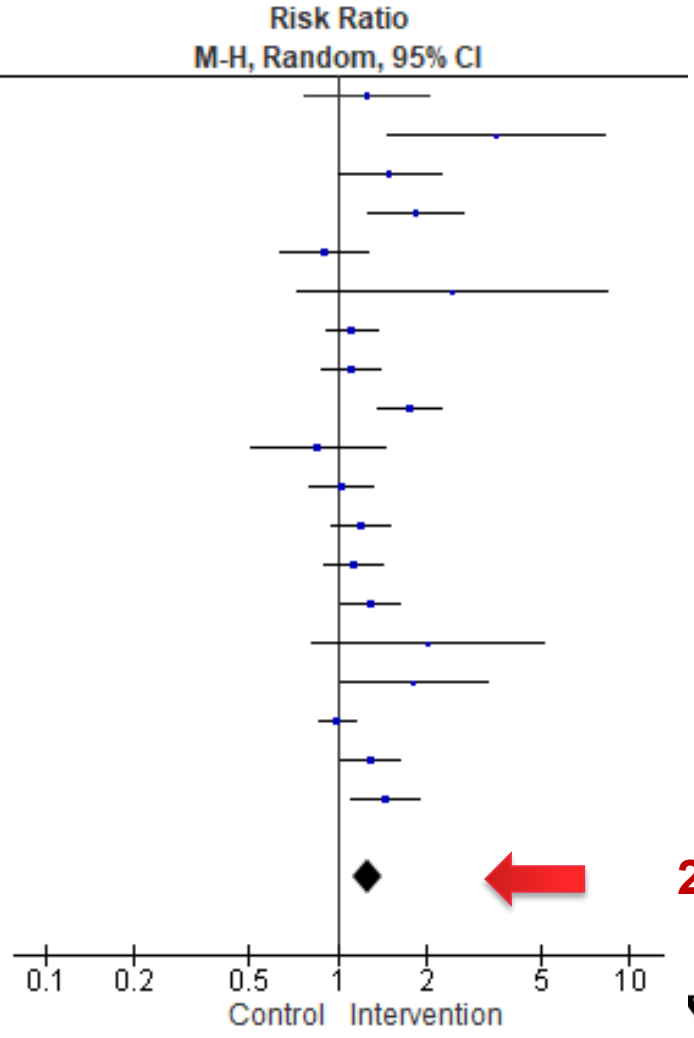
Interventions

Results: Effect of CR Utilization interventions on Enrolment

Study or Subgroup	Intervention Events	Intervention Total	Control Events	Control Total	Weight	Risk Ratio M-H, Random, 95% CI
Ali Faisal 2016	20	39	15	37	3.4%	1.26 [0.77, 2.08]
Benz Scott 2013	21	89	6	89	1.5%	3.50 [1.48, 8.26]
Carroll 2007	42	121	29	126	4.5%	1.51 [1.01, 2.25]
Cossette 2012	54	121	29	121	4.8%	1.86 [1.28, 2.71]
Dale 2015	30	61	34	62	5.3%	0.90 [0.64, 1.26]
Dolansky 2011	6	17	3	21	0.8%	2.47 [0.72, 8.45]
Grace 2016	49	55	23	29	7.6%	1.12 [0.91, 1.38]
Grace 2016	47	55	23	30	7.3%	1.11 [0.89, 1.40]
Jolly 1999	109	262	70	297	6.8%	1.77 [1.37, 2.27]
McPaul 2007	8	12	7	9	3.1%	0.86 [0.50, 1.46]
Mosleh 2014	68	92	23	32	6.9%	1.03 [0.80, 1.32]
Mosleh 2014	83	96	23	32	7.2%	1.20 [0.96, 1.52]
Mosleh 2014	74	91	23	32	7.0%	1.13 [0.89, 1.44]
Pack 2013	57	74	44	74	7.3%	1.30 [1.03, 1.62]
Parry 2009	11	45	6	50	1.3%	2.04 [0.82, 5.06]
Price 2012	19	34	11	36	2.8%	1.83 [1.03, 3.25]
Suskin 2007	160	275	159	273	8.8%	1.00 [0.87, 1.15]
Varnfield 2014	48	60	37	60	7.1%	1.30 [1.02, 1.64]
Wyer 2001	37	43	26	44	6.4%	1.46 [1.11, 1.91]
Total (95% CI)		**1642**		**1454**	**100.0%**	**1.27 [1.13, 1.42]**
Total events	943		591			

Heterogeneity: Tau² = 0.03; Chi² = 45.99, df = 18 (P = 0.0003); I² = 61%

Test for overall effect: Z = 4.14 (P < 0.0001)



27% ↑ enrolment

Under revision; Cochrane

Subgroup Analyses: Delivered F2F by HCP (both 60% ↑ enrolmt)

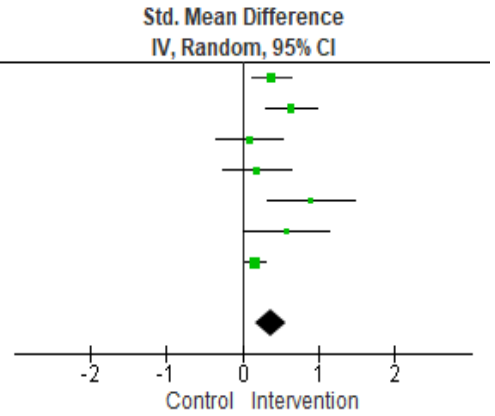
Under revision; Cochrane

Adherenc

Subgroup Analysis:
REMOTELY OFFERED

Study or Subgroup	Intervention Mean	SD	Total	Control Mean			
Beckie 2010	88.88888889		25	141	77.77777778		[0.63]
Focht 2004	90.88		22.64	73	77		[0.31, 0.97]
Grace 2016a	54.4		34.7	55			0.09 [-0.36, 0.53]
Grace 2016b	58.12		35.4	55			0.19 [-0.26, 0.64]
Hwang 2017	83.33333333		25			8.2%	0.90 [0.32, 1.48]
Kraal 2014	100				25	8.4%	0.57 [0.01, 1.14]
Lynggaard 2017	81.66666667	29			412	25.2%	0.17 [0.03, 0.31]
Total (95% CI)					**708**	**100.0%**	**0.37 [0.18, 0.57]**

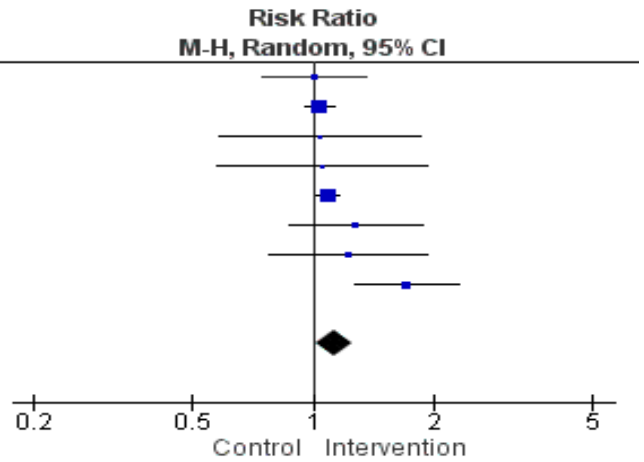
Heterogeneity: Tau² = 0.03; Ch
Test for overall effect: Z = 3.73 (F



Completion

Study or Subgroup	Intervention Events	Total	Control Events	Total	Weight	Risk Ratio M-H, Random, 95% CI
Ashe 1993	17	21	16	20	9.3%	1.01 [0.75, 1.37]
Focht 2004	65	68	68	74	31.2%	1.04 [0.96, 1.13]
Grace 2016a	21	55	11	30	3.1%	1.04 [0.58, 1.86]
Grace 2016b	20	55	10	29	2.8%	1.05 [0.57, 1.94]
Lynggaard 2017	341	413	312	412	33.3%	1.09 [1.02, 1.17]
Oldridge 1983	34	63	24	57	6.4%	1.28 [0.88, 1.87]
Pack 2013	27	74	22	74	4.6%	1.23 [0.77, 1.95]
Varnfield 2014	48	60	28	60	9.4%	1.71 [1.27, 2.31]
Total (95% CI)		**809**		**756**	**100.0%**	**1.13 [1.02, 1.25]**
Total events	573		491			

Heterogeneity: Tau² = 0.01; Chi² = 13.30, df = 7 (P = 0.07); I² = 47%
Test for overall effect: Z = 2.25 (P = 0.02)



Under revision; Cochrane

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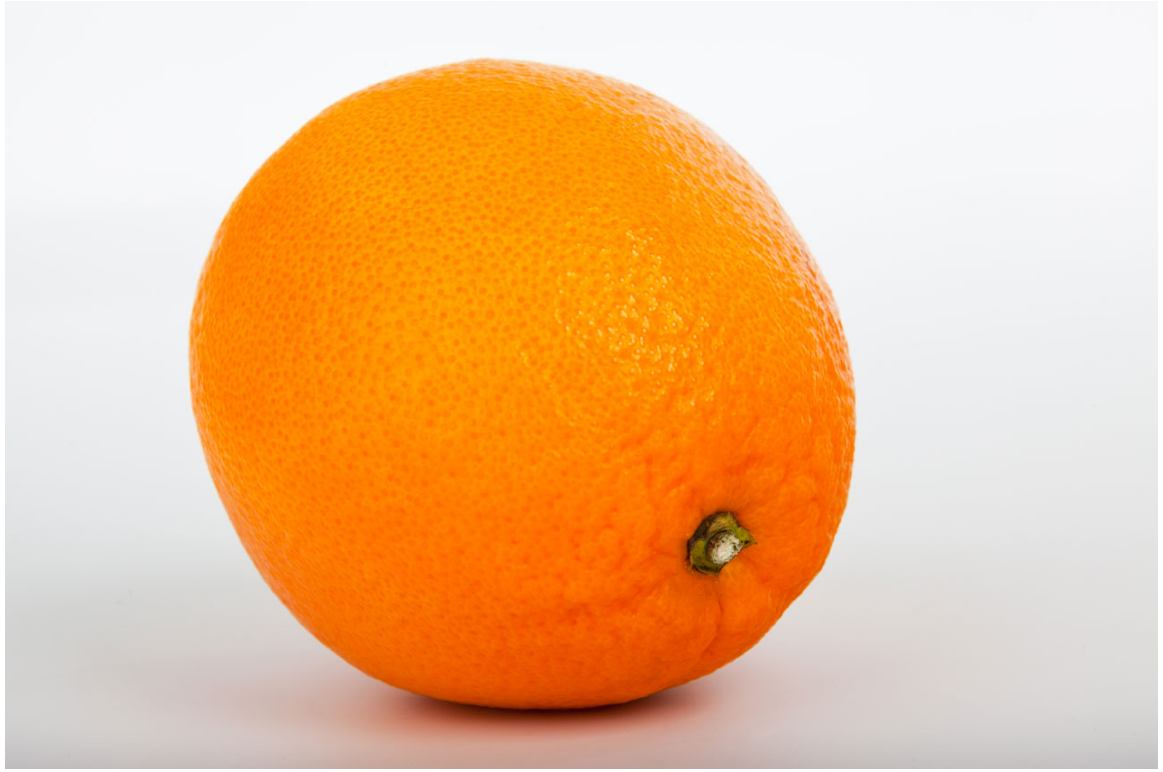

Patient CR Utilization Policy Statement Development

Convene Panel

- Stakeholders, patient partners, methodologists. Multidisciplinary, geographic representation

Draft

- Statement & recommendations, based on Cochrane evidence, AGREE II and IOM 8 Trustworthiness Stds

Rate/ Consensus

7 point scale - ≥5/7; webcall
GRADE for strength of recommendations

* **External Review**

- External panel, public comment
- All relevant associations

Disseminate

International Council of Cardiovascular Prevention and Rehabilitation (ICCPR)

CACPR

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Policy Statement Recommendations: Increasing CR Utilization

Recommendation	Quality of the Evidence (GRADE)	Strength of the Recommendations (GRADE)	Evidentiary Basis
1. CR enrolment interventions should target healthcare providers, to impact delivery to indicated patients	⊕⊕⊖⊖ LOW	Strong	Carroll et al., 2007; Cossette et al., 2012; Jolly et al., 1999; Scott et al., 2013
2. Enrolment interventions should be delivered to patients face-to-face, by a nurse, potentially in conjunction with an allied healthcare provider or peer.	⊕⊕⊖⊖ LOW	Strong	Carroll et al., 2007; Cossette et al., 2012; Jolly et al., 1999; Price et al., 2012
3. To increase adherence, interventions should be delivered remotely or at least some of the cardiac rehabilitation program should be delivered unsupervised	⊕⊕⊕⊖ MODERATE	Weak	Focht et al., 2004; Hwang et al., 2017; Kraal et al., 2014

C. Pio, T Beckie, M Varnfield, A Gagliardi, A Babu, A Mola, N Sarrafzadegan, M Supervia, J Buckley, M Heine, M. Trani, B Radi, SY Chen, S Baidya, A Abreu, J Khiong, J Sawdon, P Moffatt, SL. Grace; under public comment.

Talking to Patients About CR At Bedside

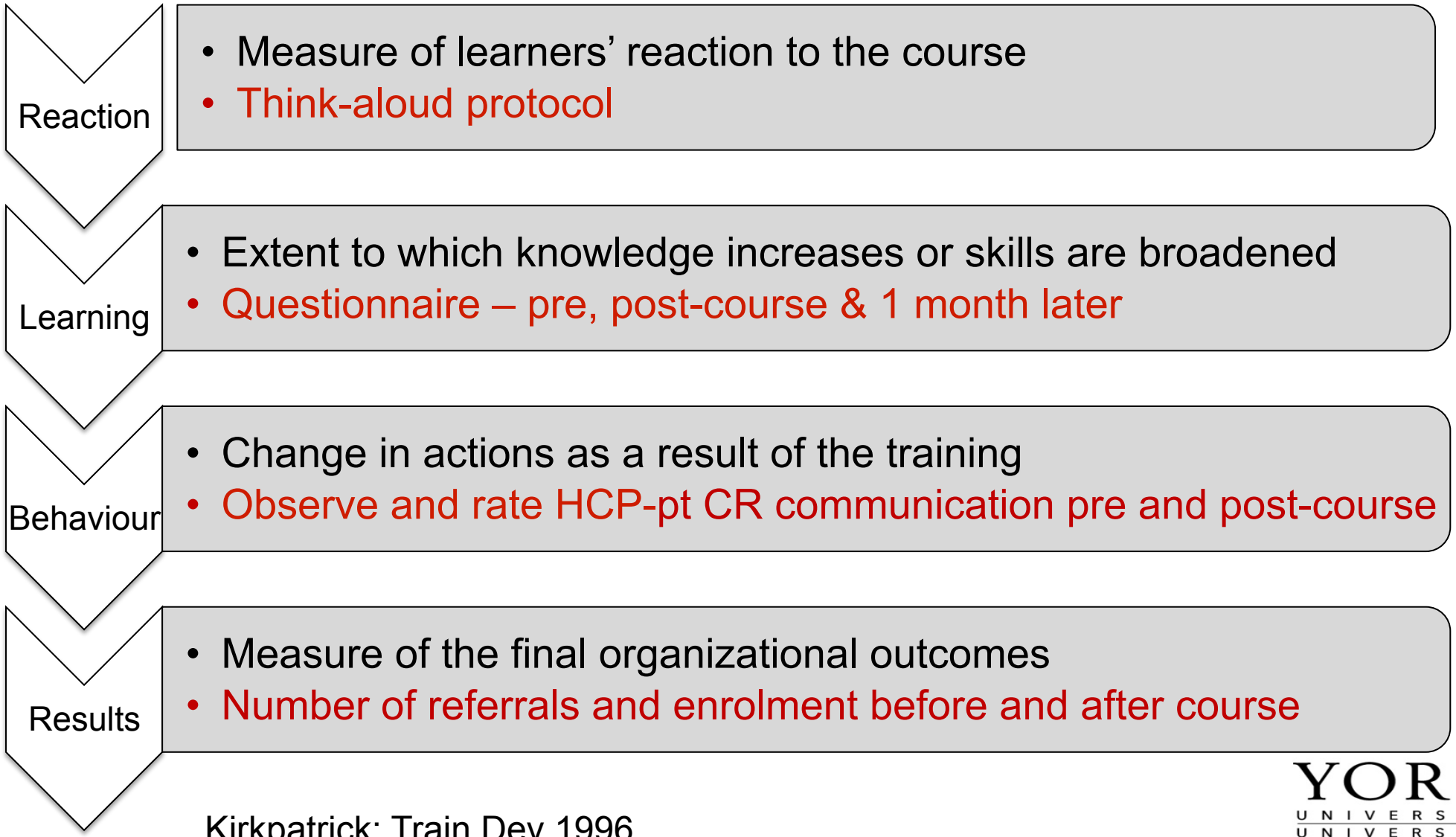
Guideline Implementation Tool

- Online course for inpatient cardiac healthcare providers regarding how to talk to patients at the bedside and promote their use of CR

- http://s3.amazonaws.com/tempshare-stage.storyline.articulate.com/sto_1cs4bke2d1o4b1pg21oa24q11d8o9/story.html

UHN eLearning  Clinical societies

Online Course Evaluation Model – 4 levels



Kirkpatrick; Train Dev 1996

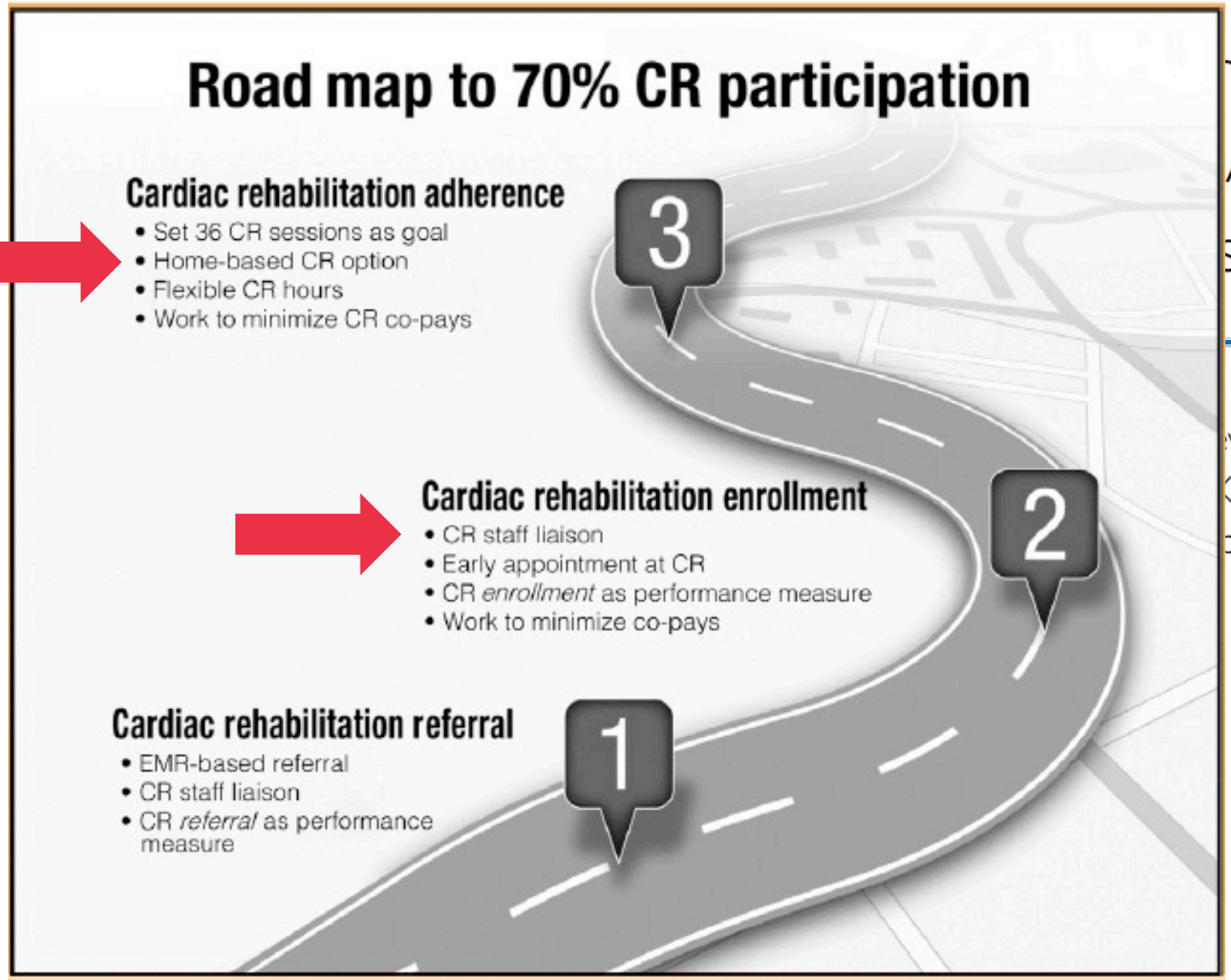


FIGURE. Conceptual framework for increasing cardiac rehabilitation (CR) participation from 20% to 70%. EMR = electronic medical record.

nabilitation Participation
A Road Map From the
s Cardiac Rehabilitation
Collaborative

-242

ven J. Keteyian, PhD; Janet S. Wright, MD;
Karen Lui, RN, MS; Kimberly Newlin, ANP;
pard, PhD; and Randal J. Thomas, MD, MS

https://millionhearts.hhs.gov/tools-protocols/action-guides/cardiac-change-package/index.html

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Conclusions

- CR works
- CR is under-used
- Strategies to increase use have been established
- The strategies have not been widely implemented
- If every patient was referred, we would have more participants and hence substantial gains in the CV health of the nation.

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