

FULL TEXT LINKS



Randomized Controlled Trial [Circ Cardiovasc Qual Outcomes](#). 2025 Mar;18(3):e010849.

doi: 10.1161/CIRCOUTCOMES.124.010849. Epub 2025 Feb 26.

Evaluating the Appropriate Use Criteria for Coronary Revascularization in Stable Ischemic Heart Disease Using Randomized Data From the ISCHEMIA Trial

James Slater ¹, David J Maron ², Philip G Jones ³, Sripal Bangalore ¹, Harmony R Reynolds ¹, Zhuxuan Fu ³, Gregg W Stone ⁴, Ruth Kirby ⁵, Judith S Hochman ¹, John A Spertus ³; ISCHEMIA Research Group

Collaborators, Affiliations

Collaborators

ISCHEMIA Research Group: Kreton Mavromatis, Jason Linefsky, Todd Miller, Subhash Banerjee, Jonathan D Newman, Robert M Donnino, Muhamed Saric, Khaled Abdul-Nour, Peter H Stone, James J Jang, Gennie Yee, Steven Weitz, Suzanne Arnold, James Henry O'Keefe Jr, Michael D Shapiro, Steven A Fein, Mikhail T Torosoff, Radmila Lyubarova, Sulagna Mookherjee, Krzysztof Drzymalski, Edward O McFalls, Santiago A Garcia, Stefan C Bertog, Rizwan A Siddiqui, Areef Ishani, Ronnell A Hansen, Michel Georges Khouri, Jonathan L Goldberg, Richard Goldweit, Ronny A Cohen, Brooks Mirrer, Victor Navarro, David E Winchester, Marvin Kronenberg, Christopher McFarren, John F Heitner, Ira M Dauber, Charles Cannan, Sriram Sudarshan, Puja K Mehta, Michael McDaniel, Stamatis Lerakis, Arshed Quyyumi, Nanette K Wenger, Chester M Hedgepeth, Heather Hurlburt, Alan Rosen, Zakir Sahul, Steve Leung, Hassan Reda, Khaled Ziada, Sampooranima Setty, Rajat S Barua, Fadi Hage, James E Davies, Massoud Leesar, Jaekyeong Heo, Amy Iskandrian, Firas Al Solaiman, Satinder Singh, Khaled Dajani, Mohammad El-Hajjar, Paul Der Mesropian, Joseph Sacco, Brian McCandless, Marisa Orgera, Mandeep S Sidhu, Imran Arif, Hanan Kerr, Jorge F Trejo Gutierrez, Gerald Fletcher, Gary E Lane, Lynn M Neeson, Pragnesh P Parikh, Peter M Pollak, Brian P Shapiro, Kevin Landolfo, Anthony Gemignani, Daniel O'Rourke, Judith L Meadows, Jason T Call, Joseph Hannan, Robert Bojar, Deepti Kumar, John Mukai, Edward T Martin, Gabriel Vorobiof, Alec Moorman, Scott Kinlay, Robert J Hamburger, Thomas P Rocco, Deepak L Bhatt, Kevin Croce, Jacquelyn A Quin, Jati Anumpa, Marco Zenati, David P Faxon, Glenn Rayos, Ashraf Seedhom, Lance Sullenberger, Gregory Kumkumian, Steven P Sedlis, Robert M Donnino, Jeffrey Lorin, Jacqueline E Tamis-Holland, Robert Kornberg, Robert Leber, Souheil Saba, Michael W Lee, Delano R Small, Wassim Nona, Patrick B Alexander, Iram Rehman, Umesh Badami, Kevin Marzo, Inga H Robbins, Howard A Levite, Sanjay Shetty, Mayuri Patel, Glenn S Hamroff, Raymond W Little, Brandi D Zimbelman, Charles Y Lui, Brigham R Smith, Daniel P Vezina, Lillian L Khor, Josephine D Abraham, David A Bull, Stephen H McKellar, David Booth, John Kotter, Ahmed Abdel-Latif, Bob Hu, Arthur J Labovitz, Michael Berlowitz, Philip Rogal, Fadi Matar, Christiano Caldeira, Fatima Rodriguez, Ingela Schnittger, William F Fearon, Prakash Deedwania, Kiran Reddy, Joseph Sweeny, Christopher Spizzieri, Claudia P Hochberg, William D Salerno, Ray Wyman, Amer Zarka, Anil V Shah, Thomas Haldis, Jeffrey A Kohn, Saket Girotra, Omar Almousalli, Mayil S Krishnam, Jeffrey C Milliken, Pranav M Patel, Arnold H Seto, Kevin T Harley, Michael A Gibson, Byron J Allen, Rita Coram, Sabu Thomas, Ronald G Schwartz, Wei Chen, Mahfouz El Shahawy, James Stafford, William B Abernethy, Andrew Zurick, Thomas M Meyer, Ronald G Morford, Bruce Rutkin, Sabahat Bokhari, Seth I Sokol, Jay Meisner, Ihab Hamzeh, Arunima Misra, Matthew Wall Jr, Veronica Lenges De Rosen, Mahboob Alam, Michael C Turner, Thomas J Mulhearn, Arnold P Good, Nicolas W Shammas, Robert Chilton, Patricia K Nguyen, Matthew Jezior, Paul C Gordon, Thomas Crain, Robert Stenberg, Ronald P Pedalino, Joseph Wiesel, George J Juang, Mohammed Al-Amoodi, David Wohns, Ellis W Lader, Michael Mumma, Lekshmi Dharmarajan, Joseph F X McGarvey Jr, Thomas R Downes, Gary J Luckasen, Benjamin Cheong, Srinivasa Potluri,

Ronald A Mastouri, Jeffery A Breall, George E Revtyak, Jonathan W Bazeley, Dayuan Li, Kenneth Giedd, Wayne Old, Francis Burt, Kozhaya Sokhon, Deepika Gopal, Uma S Valeti, Jon Kobashigawa, Sajeev Chakanalil Govindan, Rajesh Gopalan Nair, Cholenahally Nanjappa Manjunath, Nagaraja Moorthy, Satvic Cholenahally Manjunath, Suryaprakash Narayanappa, Neeraj Pandit, Ranjit Kumar Nath, S K Dwivedi, V S Narain, Sharad Chandra, Gurpreet S Wander, Rohit Tandon, Sarju Ralhan, Naved Aslam, Abhishek Goyal, G Karthikeyan, S Ramakrishnan, Sandeep Seth, Rakesh Yadav, Sandeep Singh, Ambuj Roy, Neeraj Parakh, Sunil Kumar Verma, Rajiv Narang, Sundeep Mishra, Nitish Naik, Gautam Sharma, Shiv Kumar Choudhary, Chetan Patel, Gurpreet Gulati, Sanjeev Sharma, V K Bahl, Anoop Mathew, Eapen Punnoose, Siddharth Gadage, Tapan Umesh Pillay, Santhosh Satheesh, Atul Mathur, Johann Christopher, Rajeev Menon, Nirmal Kumar, Abraham Oomman, Robert Mao, Hilda Solomon, Sajeeda Parveen Khan, Purvez Grant, Ranjan Kachru Ajit Kumar, V K Sanjay Ganapathi Jayakumar, K Harikrishnan Sivadasanpillai, Bijulal Sasidharan Kapilamoorthy, T R Praneeth Polamuri, Upendra Kaul, Keith A A Fox, Kathryn Carruthers, Ahmed Elghamaz, Sothinathan Gurunathan, Nikolaos Karogiannis, Benoy N Shah, Richard H J Trimlett, Michael B Rubens, Edward D Nicol, Tarun K Mittal, Reinette Hampson, Reto Andreas Gamma, Mark A de Belder, Jeet Thambyrajah, Thuraia Nageh, John R Davies, Steven J Lindsay, John Kurian, Haqeel Jamil, Osama Raheem, Angela Hoye, Patrick Donnelly, Bernardas Valecka, Anoop Chauhan, Craig Barr, Khaled Alfakih, Jonathan Byrne, Ian Webb, Peter Henriksen, Peter OKane, Ramesh de Silva, Dwayne S G Conway, Alexander A Sinker, Stephen P Hoole, Fraser N Witherow, Nicola Johnston, Mark Harbinson, Simon Walsh, Hanna Douglas, Matthew Luckie, Jolanta Sobolewska, Paramjit Jeetley, Niket Patel, Tushar Kotecha, Christopher Travill, Iqbal Karimullah, Mahmud Al-Bustami, Denise Braganza, Robert Henderson, Kate Pointon, Surendra Naik, Thomas Mathew, Colin Berry, Damien Collison, Giles Roditi, Andrew J Moriarty, Jason D Glover, Jiwan Pradhan, Mikhail Ghada, Darrel P Francis, Vladimir Dzavik, Ariel Diaz, Philippe Rheault, Miguel Barrero, Carl-Éric Gagné, Yanek Pépin-Dubois, Ricardo Costa, Ying Tung Sia, Catherine Lemay, Alejandro Gisbert, Pierre Gervais, Alain Rheault, Denis Carl Phaneuf, Gilbert Gosselin, Pallav Garg, Renee C Hessian, Rob S Beanlands, Richard F Davies, Asim N Cheema, Akshay Bagai, Ron Wald, Shaun Goodman, John Joseph Graham, Mark Peterson, Chi-Ming Chow, Beth Abramson, Asim Nazir Cheema, Mohammad Tariq Vakani, James Cha, Andrew G Howarth, Graham Wong, Amar Uxa, Paul Galiwango, Saleem Kassam, Ashok Mukherjee, A Joseph Ricci, Andy Lam, Shamir Mehta, Jacob Udell, Philippe Génèreux, Adnan Hameed, Ledjalem Daba, Whady Hueb, Paulo Cury Rezende, Alexandre Ciappina Hueb, Paola Emanuela Poggio Smanio, Alexandre Schaan de Quadros, Renato Abdala Karam Kalil, José Luiz da Costa Vieira, Gabriel Grossmann, Pedro Piccaro de Oliveira, Leonardo Bridi, Simone Savaris, João V Vitola, Rodrigo J Cerci, Fabio R Farias, Miguel M Fernandes, José Antonio Marin-Neto, André Schmidt, Moysés de Oliveira Lima Filho, Ricardo Mendes Oliveira, João Reynaldo Abbud Chierice, Carisi A Polanczyk, Mariana V Furtado, Luis F Smidt, Antonio Carlos Carvalho, Gustavo Pucci, Flavio Lyra, Alvaro Rabelo Alves Junior, Marianna D A Dracoulakis, Rodolfo G S D Lima, Estevo Figueiredo, Paulo Ricardo Caramori, Rogerio Tumelero, Frederico Dall'Orto, Claudio T Mesquita, Alexandre S Colafranceschi, Amarino C Oliveira Jr, Luiz A Carvalho, Isabella C Palazzo, Andre S Sousa, Expedito Eustáquio Ribeiro da Silva, Pedro Gabriel Melo de Barros E Silva, Luciana de Pádua Silva Baptista, Marcelo Jamus Rodrigues, Marcos Valério Coimbra de Resende, Jose Francisco Saraiva, Costantino Costantini, Witold Ruzyllo, Marcin Demkow, Radoslaw Pracon, Cezary Kepka, Anna Teresinska, Karolina Kryczka, Jan Henzel, Mateusz Solecki, Edyta Kaczmarek, Tomasz Mazurek, Jaroslaw Drozd, Bartosz Czarniak, Malgorzata Frach Formerly Stasiak, Konrad Szymczyk, Iwona Niedzwiecka, Sebastian Sobczak, Tomasz Ciurus, Piotr Jakubowski, Magdalena Misztal-Teodorczyk, Dawid Teodorczyk, Aleksandra Fraczak, Marcin Szkopiak, Patrycja Lebioda, Michal Wlodarczyk, Anna Plachcinska, Jacek Kusmerek, Magdalena Miller, Halina Marciniak, Karolina Wojtczak-Soska, Katarzyna Łuczak, Tomasz Tarchalski, Anna Cichocka-Radwan, Grazyna Anna Szulczyk, Adam Witkowski, Krzysztof Kukuła, Małgorzata Celińska-Spodar, Joanna Zalewska, Grzegorz Gajos, Krzysztof Bury, Piotr Pruszczyk, Marek Roik, Krystyna Łoboz-Grudzień, Leszek Sokalski, Barbara Brzezińska, Maciej Lesiak, Magdalena Łanocha, Krzysztof W Reczuch, Zbigniew Kalarus, Andrzej Swiatkowski, Mariola Szulik, Włodzimierz J Musiał, Leo Bockeria, Karen Petrosyan, Tatiana Trifonova, Alexander M Chernyavskiy, Evgeniy I Kretov, Igor O Grazhdankin, Leonid L Bershtein, Sergey A Sayganov, Anastasia M Kuzmina-Krutetskaya, Elizaveta V Zbyshevskaya, Nana O Katamadze, Elena A Demchenko, Pavel S Kozlov, Vikentiy Y Kozulin, Ekaterina I Lubinskaya, Jose Lopez-Sendon, Almudena Castro, Elena Refoyo Salicio, Gabriela Guzman, Gabriel Galeote, Silvia Valbuena, Jesús Peteiro, María Dolores Martínez-Ruiz, Ruth Pérez-Fernández,

José J Cuenca-Castillo, Xacobe Flores-Ríos, Óscar Prada-Delgado, Gonzalo Barge-Caballero, Jose Ramon Gonzalez Juanatey, Miguel Souto Bayarri, Virginia Pubull Nuñez, Raymundo Ocaranza Sanchez, Belen Cid Alvarez, Carlos Peña Gil, Amparo Martinez Monzonis, Alessandro Sionis, Montserrat Vila Perales, Josep Maria Padró, Antonio Serra Peñaranda, Joan García Picart, Antonino Ginel Iglesias, Xavier Garcia-Moll Marimon, Guillem Pons Lladó, Francesc Carreras Costa, Vicente Miro, Jose L Diez, Pilar Calvillo, F Marin Ortuño, M Valdés Chávarri, A Tello Montolliu, E Pinar Bermudez, G De La Morena, Montserrat Gracida Blancas, Jose Enrique Castillo Luena, Francisco Fernandez-Aviles, Jiyan Chen, Yongjian Wu, Yitong Ma, Yining Yang, Zheng Ji, Xinchun Yang, Wenhua Lin, Hesong Zeng, Xin Fu, Songtao Wang, Gong Cheng, Yulan Zhao, Xuehua Fang, Qiutang Zeng, Xi Su, Qingxian Li, Shao-Ping Nie, Qin Yu, Jian'an Wang, Shuyang Zhang, Zhenyu Liu, Aldo P Maggioni, Gian Piero Perna, Marco Marini, Gabriele Gabrielli, Stefano Provasoli, Edoardo Verna, Lorenzo Monti, Barbara Nardi, Antonio Di Chiara, Andrea Mortara, Marcello Galvani, Filippo Ottani, Marco Sicuro, Paolo Calabro, Tiziana Formisano, Giuseppe Tarantini, Umberto Cucchini, Anto Luigi Andres, Emanuela Racca, Carlo Briguori, Roberto Amati, William Vergoni, Aldo Russo, Raffaele Fanelli, Kian-Keong Poh, Ping Chai, Titus Lau, Joshua P Loh, Edgar L Tay, Kristine Teoh, Lynette L Teo, Ching-Ching Ong, Raymond C Wong, Poay-Huan Loh, Theodoros Kofidis, Wan Xian Chan, Koo Hui Chan, David Foo, Jason Loh Kwok Kong, Ching Min Er, Fahim Haider Jafary, Terrance Chua, Juergen Stumpf, Klaus Matschke, Gregor Simonis, Clemens T Kadalie, Udo Sechtem, P Christian Schulze, Bjoern Goebel, Karsten Lenk, Georg Nickenig, Herwig Schuchlenz, Stefan Weikl, Irene Marthe Lang, Kurt Huber, Gabriele Jakl-Kotauschek, Matyas Keltai, Andras Vertes, Albert Varga, Geza Fontos, Bela Merkely, Gabor Kerecsen, Sasa Hinic, Marija Zdravkovic, Vladan Mudrenovic, Bogdan Crnokrak, Branko D Beleslin, Nikola N Boskovic, Marija T Petrovic, Milan R Dobric, Zeljko Z Markovic, Ana S Mladenovic, Nada Cemerlic-Adjic, Goran Davidović, Rada Vučić, Milica Nikola Dekleva, Goran Stankovic, Svetlana Apostolovic, Jorge Escobedo, Rubén Baleón-Espinosa, Arturo S Campos-Santaolalla, Elihú Durán-Cortés, José M Flores-Palacios, Andrés García-Rincón, Moisés Jiménez-Santos, Joaquín V Peñafiel, José A Ortega-Ramírez, Aquiles Valdespino-Estrada, Erick Alexánderson Rosas, Deirdre Murphy, Joseph B Selvanayagam, Majo X Joseph, Suku T Thambar, Jamie Rankin Past, John F Beltrame, Graham S Hillis, Christophe Thuair, Téodora Dutoiu, Jean-Michel Juliard, Michel S Slama, Rami El Mahmoud, Eric Nicolle, Pascal Goube, Gilles Barone-Rochette, Alain Furber, Loïc Bière, Aleksandras Laucevicius, Elvin Kedhi MD, Jorik Timmer, Rik Hermanides, Eliza Kaplan, Robert K Riezebos, Pouneh Samadi, Elise van Dongen, Sander R Niehe, Harry Suryapranata, Stijn van Vugt, Duarte Cacula, Ana Santana, Antonio Fiarresga, Lidia Sousa, Hugo Marques, Lino Patricio, Luis Bernanrdes, Pedro Rio, Ramiro Carvalho, Rui Ferreira, Tiago Silva, Ines Rodrigues, Pedro Modas, Guilherme Portugal, Jose Fragata, Fausto J Pinto, Miguel Nobre Menezes, Guilhermina Cantinho Lopes, Ana Gomes Almeida, Pedro Canas Silva, Angelo Nobre, Ana Rita Francisco, Nuno Ferreira, Ricardo L Lopes, Rafael Diaz, Luis Guzman, Julio César Figal, Oscar Méndiz, Claudia Cortés, Roberto René Favaloro, Carlos Alvarez, Javier Courtis, Gabriela Zeballos, Lilia Schiavi, Mariano Rubio, Caroline Alsweller, Gerard Patrick Devlin, Raewyn Fisher, Ralph Alan Huston Stewart, Harvey Douglas White, Jocelyne Benatar, Sasko Kedev, Irena Peovska Mitevska, Elizabeta Srbinovska Kostovska, Hristo Pejkov, Claes Held, Kai Eggers, Gunnar Frostfelt, Nina Johnston, Maciej Olsowka, Axel Åkerblom, Inga Soveri, Johannes Aspberg, Rafael Beyar, Eugenia Nikolsky, Tali Sharir, Dan Elian, Arthur Kerner, Samia Massalha, Keiichi Fukuda, Shun Kohsaka, Satoshi Yasuda, Shigeyuki Nishimura, Frans Van de Werf, Kathleen Claes, Chung-Lieh Hung, Chun-Ho Yun, Charles Jia-Yin Hou, Jen-Yuan Kuo, Hung-I Yeh, Ta-Chuan Hung, Jiun-Yi Li, Chen-Yen Chien, Cheng-Ting Tsai, Chun-Chieh Liu, Fa-Chang Yu, Yueh-Hung Lin, Wei-Ren Lan, Chih-Hsuan Yen, Jui-Peng Tsai, Kuo-Tzu Sung, Mpiko Ntsekhe, Shaheen Pandie, Charle A Viljoen, Marianne De Andrade, Tiziano Moccetti, M Grazia Rossi, Magdy Abdelhamid, Ahmed Adel, Ahmed Kamal, Hossam Mahrous, Sameh El Kaffas, Hussien El Fishawy, Calin Pop, Matei Claudia, Bogdan A Popescu, Carmen Gingham, Dan Deleanu, Vlad A Iliescu, Mouaz H Al-Mallah, Ahmed Aljeeri, Hani Najm, Ali Alghamdi, Walter Enrique Mogrovejo Ramos, Srun Kuanprasert, Arintaya Prommintikul, Weerachai Nawarawong, Surin Woragidpoonpol, Thitipong Tepsuwan, Noppon Taksaudom, Chataroon Rimsukcharoenchai, Juntima Euathrongchit, Yutthaphan Wannasopha, Sukit Yamwong, Piyamitr Sritara, Suthara Aramcharoen, Krissada Meemuk, Ahmad Khairuddin, Hafidz Abd Hadi, Shaiful Azmi Yahaya, John Doan, Raven Lee, Risha Patel, So Yang Cho, Susan Milbrandt, Dawn Shelstad, Preeti Kamath, Ishita Tejani, Kirsten J Quiles, Allison Schley, Heather Golden, Hermine Osseni, Charlene Wiyarand, Peter Douglass, Hayley Pomeroy, Alexandra Craft, Bethany Harvey, Olivia Anaya, Phoebe Goold, Steven Giovannone, Lori Pritchard, Rosann Gans,

Paul Kennedy, Shobana Ganesan, David Schlichting, Aynun Naher, Wendy L Stewart, Kristin M Salmi, Debra K Johnson, Rebekah R Herrmann, Kristine Arges, Melissa LeFevre, Jennifer Tomfohr, Kimberly Ann Byrne, Taissa Zappernick, Sallie Canada, Meghana Kakade, Patricia Mieses, Stanley E Cobos, Raven R Dwyer, Dalisa Espinosa, Kirsten J Quiles, Magdalena Rantinella, Jessica Rodriguez, Olivia Mancilla, Susan Stinson, Terry Weyand, Sherron C Crook, Jean Ho, Saadat Khan, Mahmoud Mohamed, Mary R Soltau, Delsa K Rose, Rebecca J Wimmer, Kathy E Siegel, Susan Derbyshire, Michelle Dixon, Gerald Leonard, Ciarra Heard, Viviana Gabriel, Sukie Desire, Fauzia Rashid, Senait Asier, Keyur Patel, Jennifer Gillis, Megan Manocchia, Susan Moore, Elizabeth Congdon, Gail Brandt, Nora Marchelletta, Kristina Wippler, Kimberly E Halverson, Christine Roraff, Jonean Thorsen, Amarachi Ojajuni, Oni Olurinde, Kamalakar Surineni, Badhma Valaiyapathi, Carol M Kartje, Michele Rawlins, Jennifer Thomson, Mary Colleen Rogge, Julie Bunke, Kendra Unterbrink, Jacqueline Fannon, Cynthia Burman, Marcia F Dubin, Sarah Beaudry, Stephanie A Tirado, Janet Halliday, Pamela Julian, Stephanie M Lane, Jennifer L Stanford, Patricia Arsenault, Pamela Sigel, Miriam Brooks, Ladda Douangvila, Rubine Gevorgyan, Fatima Ranjbaran, Bryn Smith, Carly Ohmart, Samantha Ly, Margot C Quinn, Sara Temiyasathit, Jacquelyn Do, Desiree Tobin, Jennifer Langdon, Marcia Werner Bayer, Amanda O'Malley, Erin Orvis, Mandy Murphy, Ann Greenberg, Margaret Iraola, Leandro C Maranan, Ammy Malinay, Candice P Edillo, Ann Ostrander, Stephanie Wasmiller, Wendy Drewes, Dipti Patel, Jackie M White, Alison Hallam, Benjamin J Spooner, Linda M Hollenweger, Holly Little, Tiffany Little, Nona A Eskelson, Yvonne Taul, Caroline Rodgers, Jennifer Isaacs, Viktoria Bulkley, Renee Kaneshiro, Bonnie J Kirby, Nhi N Tran, Catherine Jahrsdorfer, Reem Yunis, Jhina Patro, Antonia Vega, Hugo Bloise-Adames, Santa Jimenez, Nicole Saint Vrestil, Reyna Bhandari, Danielle Schade, Roxanne Yost, Paula Beardsley, Denise Fine, Jana Tancredi, Patricia Arakelian, Susan Mathus, Deborah O'Neill, Joy Burkhardt, Suellen Hosino, Oksana A Lubyana, Jose D Salas, Maria Aguirre, Manu Dhawan, Diana Parra, Tri Tran, Katie Fowler-Lehman, Natalie Spitzer, Casey Riedberger, Catherine Weick, Kirsten J Quiles, Carrie Drum, Kimberly Miller-Cox, Amy Ollinger, Elizabeth Capasso-Gulve, Elaine Melanie Loehr, Marlowe Mosley, Shirin Heydari, Andrea M Lundeen, Edgar Karanjah, Wanda C Marfori, Eduardo Hernandez-Rangel, Pam Singh, Anne Marie Webb, Ellie Fridell, Heidi Wilson, Angela Kim, Patrick Wilmot, Ramona Stevens, Loriane Black, Amber B Hull, Olivia J Lim, Helen C Tucker, Natasha C Putnam, Linda L Hall, Tia Cauthren, Trish Tucker, Hollie Horton, Jan Orga, Joyce R White, Cynthia Baumann, Vidya Seeratan, Magnolia Jimenez, Cidney Schultz, Jeanne Russo, Zohra Huda, Araceli Boan, Christine R Hinton, Beth A Archer, Julia S Dionne, Cheryl A Allardyce, Lindsey N Sikora, Jennifer H Czerniak, Jennifer A Mull, Elizabeth Ferguson, Frances Laube, Gail A Shammas, Lori Christensen, Holly Park, Joan Hecht, Davis Vo, James Hirsch, Jody Bindeman, Sara Salkind, Lori-Ann Desimone, Lina Felix-Stern, Jassira Gomes, Catherine Gordon, Aimee Mann, Theresa McCreary, Kirsten J Quiles, Candace Gopaul, Karen Hultberg, Tauqir Huk, Afshan Hussain, Yesenia Zambrano, Sarah Medina Rodriguez, Trudie Milner, Abbey Mulder, Stacie Van Oosterhout, Martha Meyer, Nancy L Clapp, Heather Barrentine, Jenne M Jose, Jenne Manchery, Vera McKinney, Linda Schwarz, Scott M Kaczowski, Adam J Jaskowiak, Joel Klitch, Debra Dees, Precilia Vasquez, Elise L Hannemann, Judy Mae Foltz, Emily DeRosa, Beth Jorgenson, Joyce Riestenberg-Smith, Rebecca Bariciano, Jessica Waldron, Michelle Mayon, Gretchen Ann Peichel, Brandy Starks, Lucilla Garcia, Maria Thottam, Anjali Anand, Janitha Raj, Reshma Ravindran, V S Rajalekshmi, Nandita Nataraj, Sheromani Bajaj, Vandana Yadav, Girish Mishra, Roma Tewari, Meenakshi Mishra, Shivali Patel, Suman Singh, Baljeet Kaur, Sonika Gupta, Chandini Suvana, Binoy Mannekkattukudy Kurian, Sheetal Rupesh Karwa, Suvarna Kolhe, R J Vindhya, Peeyush Jain, Ashok Seth, Zile Singh Meharwal, Atul Verma, Mona Bhatia, Ankush Sachdeva, Thounaojam Indira Devi, Nungshi Jungla, K Manjula Rani, M Sowjanya Reddy, K Preethi, Rinu R Sidh, Vamshi Priya, Kotiboinna Preethi, Shweta Hande, Abhishek Dubey, Kavita Rawat Vineeth, Cp Manas Chacko, Suresh Babu, Sowjanya Reddy, Manjula Rani, Priyadarshani Arambam, Bebek Singh, Grace M Young, Christopher Kinsey, Raisa Kavalakkat, Jo Evans, Ikraam Hassan, Sarah Williams, Kim Holland, Karen Swan, Bev Atkinson, Swapna Kunhunni, Craig Atkinson, Carita Krannila, Manitha Vinod, Lisa Chaytor, Leanne Cox, Julie Morrow, Kay Rowe, Stephanie Kelly, Susan Regan, Dawn Turnbull, Catherine Fleming, Arijit Ghosh, Karen Gratrix, Stephen Preston, Anne Cartwright, Abigail Knighton, Katherine Martin, Laura Flint, James Harrison, Nicki Lakeman, Anja Ljubez, Judith Wright, Donna Exley, Mervyn Andiapien, Amy J Richards, Lisa Wong, Melanie J Munro, Michelle McEvoy, Caroline Brown, Thabitha Charles, Laurel Kolakaluri, Hannah Phillips, Louise Morby, Karen Hallett, Carolyn Corbett, Lynne Winstanley, Angelique Smit, Susan Gent, Nafisa Hussain, Fiona Haines, Joanne Taaffe, Jane Burton, Maria Colton, Rachel King, Ammani Brown, Andrew Docherty, Lisa McCloy, Kate Robb,

Craig Paterson, Wenda Crawford, Joanne Kelly, Lorraine McGregor, Anne Mackin, Janet P Knight, Tuhina Bose, Anna Proietti, Myriam Brousseau, Magalie Corfias, Patricia Blaise, Luc Harvey, Patricia Alarie, Linda Arcand, Isabelle Roy, Estelle Montpetit, Katia Drouin, Christine Bergeron, Christine Shelley, Christine Masson, Sandy Carr, Catherine Bone, Ermina Moga, Janetta Kourzenkova, Olga Walter, Norma Hogg, Suzanne Welsh, Mohammed Hussain, Olugbenga Bello, Ishba Syed, Khrystyna Kushniriuk, Judy Otis, Rebecca Otis, Michelle M Seib, Sandra M Rivest, Rosa Sandonato, Jackie Chow, Andrew Starovoytov, Naomi Uchida, Ngairé Meadows, Nadia Asif, Suzana Tavares, Bev Bozek, Maria Shier, Lori-Ann Larmand, Amir Janmohamed, Brenda Hart, Jane Marucci, Sharon Tai, Sonya Brons, Chris Beck, Glenda Wong, Krystal Etherington, Thippeekaa Arumairajah, Maria Aprile, Sara Karlsson, Susan Webber, Chantale Mercure, Nancy Aedy, Fran Farquharson, Anam Siddiqui, Myrthes Emy Takiuti, Leonardo Pizzol Caetano, Aline Peixoto Deiro, Alice Manica Muller, Maria Antonieta Pereira de Moraes, Bruna Maria Ascoli, Sílvia Zottis Poletti, Sandra S Zier, Vilmar Veiga, Diego Franca da Cunha, Guilherme G Rucatti, Fernanda Igansi, Mauren P Haeffner, Viviane Almeida, Gabriela Sanchez de Souza, Mayana Almeida, Viviane Dos Santos, Natalia S Oliveira, Bruna Edilena Paulino Azevedo, Marco Bizzaro Santos, Amanda Germann, Vitor Gomes, Rosa Homem, Ellen Magedanz, Rosane Laimer, Alexandre Tognon, Roberta P Santos, Mariana Yumi Okada, Ana Paula Batista, Aline Nogueira Rabaça, Larissa Miranda Trama, Talita Silva, Camila Thais de Souza Ormundo, Carla Vicente, Caroline Pinheiro, Daniele Komar, Olga Walesiak, Katarzyna Malinowska, Jakub Maksym, Karolina Wojtera, Anna Fojt, Ewa Szczerba, Marta Swiderek, Ewelina Wojtala, Jaroslaw Karwowski, Andrzej Łabyk, Agnieszka Szramowska, Olga Zdończyk, Joanna Jaroch, Adam Kolodziej, Marta Marcinkiewicz-Siemion, Olga Bockeria, Zalina Kudzoeva, Nodira Aripova, Ivan A Naryshkin, Alena Kuleshova, Dastan Malaev, Irina Subbotina, Victoria Gumerova, Olga B Nikolaeva, Virginia Fernández-Figares Pharm, Moisés Blanco-Calvo, Encarnación Alonso-Álvarez, Paula García-González, Jose Seijas Amigo, Ana Fernández Martínez, Begoña Igual, M Quintana Giner, A I Romero Anierte, J M Rivera Caravaca, Olga Cañavate, Sonia Guerrero, Silvia Riera, Maria Lasala, Maria Lorenzo, Olga Sobrino, Alexandra Vazquez, Haojian Dong, Peiyu He, Chunli Xia, Junqing Yang, Qi Zhong, Yanmeng Tian, Dongze Li, Xiaomei Li, Xiang Ma, Zixiang Yu, Qian Zhao, Chunguang Li, Lei Zhang, Yu Zhao, Bolin Zhu, Mulei Chen, Hongjie Chi, Yang Wang, Jing Zhang, Rui Jing, Jingjing Liu, Qiang Zhou, Chang Xu, Zhuxi Li, Junhua Li, Luyang Xiong, Dan Gao, Dengke Jiang, Ran Leng, Xutong Wang, Qianqian Yuan, Lili Zhang, Ziliang Bai, Jianhua Li, Jie Qi, Fei Wang, Haitao Wang, Bin Yang, Zhou Yue, Zhulin Zhang, Yumei Dong, Jiajia Mao, Bin Zhang, Xiuhong Li, Xiaowei Yao, Nier Zhong, Ning Zhou, Yaping Huang, Panpan Zhou, Wei Su, Yu Kunwu, Yudong Peng, Xin Su, Chen Wang, Yunhai Zhao, Yaming Geng, Yanfu Wang, Jing-Yao Fan, Si-Ting Feng, Xiao Wang, Yan Yan, Hui-Min Zhang, Lingping Chi, Fang Liu, Han Chen, Jun Jiang, Huajun Li, Yechen Han, Lihong Xu, Gang Chen, Rongrong Hu, Francesca Pietrucci, Anna Di Donato, Francesca Pezzetta, Valentina Casali, Chiara Attanasio, Gianpiero Leone, Francesco Pisano, Cristina Bare, Fabio Fimiani, Alberto Barioli, Federica Ramani, Fabrizio Rolfo, Cecilia Goletto, Francesca De Micco, Stefano Di Marco, Martina Tricoli, Massimo Vilella, Sik-Yin V Tan, Winnie C Sia, Audrey W Leong, Li Hai Yan, Nasrul Ismail, Min Tun Kyaw, Deborah Yip, Dorit Grahl, Franziska Guenther, Kerstin Bonin, Ina Wenzelburger, Susanne Gruensfelder, Jan-Malte Sinning, Marcel Weber, Nikos Werner, Gudrun Steinmaurer, Max-Paul Winter, Tijana Andric, Maximilian Tscharre, Claudia Wegmayrc, Bernhard Jäger, Florian Egger, Judit Sebo, Zoltan Davidovits, Laszlone Matics, Gergely Ágoston, Gabor Dekany, Andrea Bartykowszki, Agnes Jakal, Jelena Djokic, Ana D Djordjevic-Dikic, Vojislav L Giga, Jelena J Stepanovic, Lazar Velicki, Ljiljana Pupic, Stefan M Simović, Miroslav Stevo Martinovic, Gordana Stevanovic, Milan Dobric, Sonja Salinger Martinovic, Dragana Stanojevic, Ramon de Jesús-Pérez, María Fernanda Canales Brassetti, Diego Adrián Vences Anaya, María Pérez García, Isabel Estela Carvajal Juarez, Magdalena Madero Rovalo, Sau Lee, Prince Thomas, Melissa D Chaplin, Jeanette K Stansborough, Marilyn Black, Michelle M Bonner, Kim F Ireland, Clare Venn-Edmonds, Corine Thobois, Emilie Tachot, Christophe Laure, Christel Vassaliere, Helene Abergel, Axelle Fuentes, Ludvine Eliahou, Olivier Dubourg, Pierre Michaud, Sarah Hadjih, Patricia Brito, Charles Cornet, Jeremy Rautureau, Agne Juceviciene, Irma Kalibataite-Rutkauskiene, Laura Keinaite, Monika Laukyte, Gelmina Mikolaitiene, Akvile Smigelskaite, Ilona Tamasauskiene, Agne Urboniene, Ilse Bouwhuis, Lia Nijmeijer, Jeannette J M Schoep, Elisabeth M Janzen, Sandra Ahoud, Mafalda Selas, Filipa Silva, Cláudia Freixo, Inês Zimbarra Cabrita, Andreia Rocha, Francisca Patuleia Figueiras, Andreia Coelho, Marta Capinha, Maria Inês Caetano, Susana Silva, Veronica Tinnirello, Matías Nicolás Mungo, Marina Garcia, Valeria Godoy, Maria Victoria Actis, Graciela Scaro, Liz Low, Jayne Scales, Kirsty Abercrombie, Leah Howell, Cathrine Patten, Christina Björklund, Maria Andreasson, Marie Essermark, Liselotte Persson, Or Harel,

Margalit Bentzvi, Ludmila Helmer, Ikuko Ueda, Jun Fujita, Akemi Furukawa, Kanae Hirase, Toshiyuki Nagai, Fumiyuki Otsuka, Shintaro Nakano, Valerie Robesyn, Yi-Hsuan Yang, Noloyiso Mtana, Adriana Anesini, Simona Maspoli, Manuela Mombelli, Ahmed Talaat, Monica Rosca, Carmen C Beladan, Sarah Zahrani, Marco Antonio Monsalve Davila, Supatchara Khwakhong, Anong Chaiyasri, Warangkana Mekara, Supap Kulthawong, Anong Amaritakomol, Pachara Panpunuan, Noor Syamira Mokhtar, Nor Asiah Basri, Irni Yusnida, Humayrah Hashim, Jeffrey Berger, David Williams, Robert Harrington, Lixin Jiang, Renato D Lopes, C Noel Bairey Merz, William Weintraub, Erick Donato Morales Rodríguez, Pal Maurovich-Horvat, Poonam Sonawane, Rajesh Francis Ramakrishnan, T Soundarya Nayak, Stephanie C Boer, Yves Rosenberg, Christian Hamm, Malte Helm, Eric Peterson, Christie Ballantyne, Karen Calfas, Mary Ann Champagne, Jerome Fleg, Peter A McCullough, Philippe Menasche, Michael Davidson, Stephen Fremes, Robert Guyton, Michael Mack, Fred Mohr, Anupama Rao, Joe Sabik, Oz Shapira, David Taggart, James Tatoulis, Jim Blankenship, Sorin Brener, Chris Buller, Antonio Colombo, Bernard de Bruyne, Dean Kereiakes, Thierry Lefevre, Jeffrey Moses, Ken Mahaffey, Salvador Cruz-Flores, Nicholas Danchin, Eli Feen, Mario J Garcia, Paul Hauptman, Abhay A Laddu, Eugene Passamani, Ileana L Pina, Maarten Simoons, Hicham Skali, Kristian Thygesen, David Waters, Patricia Endsley, Gerard Esposito, Jeffrey Kanters, John Pownall, Dimitrios Stournaras, Matthias Friedrich, Rory Hachamovitch, Dana Oliver, Frank Harrell, Jeffrey Blume, Kerry Lee, Iftikhar Kullo, Bruce McManus, Kristin Newby, David Cohen, Raffaele Bugiardini, Deirdre Mattina, Ziad Ali, Roy Mathew, Lawrence Friedman, Jeffrey Anderson, Jessica Berg, David DeMets, C Michael Gibson, Gervasio Lamas, Nicole Deming, Jonathan Himmelfarb, Pamela Ouyang, Pamela Woodard, Samuel Nwosu, Ruth Kirby, Neal Jeffries, Jean E Denaro, Stephanie Mavromichalis, Kevin Chan, Gia Cobb, Aira Contreras, Diana Cukali, Stephanie Ferket, Andre Gabriel, Antonietta Hansen, Arline Roberts, Michelle Chang, Sharder Islam, Graceanne Wayser, Solomon Yakubov, Michelle Yee, Caroline Callison, Isabelle Hogan, Albertina Qelaj, Charlotte Pirro, Kerrie Van Loo, Brianna Wisniewski, Margaret Gilsenan, Bevin Lang, Samaa Mohamed, Shari Esquenazi-Karonika, Patenne D Mathews, Anna Naumova, Jihyun Lyo, Vincent Setang, Mark Xavier, Kevin Anstrom, Khaula Baloch, Janet Blount, Patricia Cowper, Linda Davidson-Ray, Laura Drew, Tina Harding, J David Knight, Diane Minshall Liu, Betsy O'Neal, Thomas Redick, Philip Jones, Karen Nugent, Grace Jingyan Wang, Abhinav Goyal, Holly Hetrick, Sean W Hayes, John D Friedman, R James Gerlach, Mark Hyun, Romalisa Miranda-Peats, Piotr Slomka, Louise Thomson, Francois Pierre Mongeon, Steven Michael, Judy Hung, Xin Zeng, Jane Eckstein, Bandula Guruge, Mary Streif, Maria A Alfonso, Maria P Corral, Javier J Garcia, Jennifer Horst, Ivana Jankovic, Maayan Konigstein, Mitchel B Lustre, Yolayfi Peralta, Raquel Sanchez, Reza Arsanjani, Kimberly Elmore, Millie Gomez, Niree Hindoyan, Rine Nakanishi, M Barbara Srichai-Parsia, Eunice Yeoh, Tricia Youn, Francesca Bianchini, Martina Ceseri, Andrea Lorimer, Marco Magnoni, Francesco Orso, Laura Sarti, Lilian Mazza Barbosa, Tauane Bello Duarte, Tamara Colaiácovo Soares, Julia de Aveiro Morata, Pedro Carvalho, Natalia de Carvalho Maffei, Flávia Egydio, Anelise Kawakami, Janaina Oliveira, Elissa Restelli Piloto, Jaqueline Pozzibon, Diane Camara, Neamat Mowafy, Caroline Spindler, Hao Dai, Fang Feng, Jia Li, Li Li, Jiamin Liu, Qiulan Xie, Haibo Zhang, Jianxin Zhang, Lihua Zhang, Liping Zhang, Ning Zhang, Hui Zhong, Claudia Escobar, Maria Eugenia Martin, Andrea Pascual, Paloma Moraga, Victoria Hernandez, Maria Posada, Sara Fernandez, José Luis Narro Villanueva, Rafael Selgas, Ann Luyten, Nevena Garcevic, Jelena Stojkovic, Asker Ahmed, Richa Bhatt, Nitika Chadha, Vijay Kumar, Sadath Lubna, Pushpa Naik, Shruti Pandey, Karthik Ramasamy, Mohammed Saleem, Pratiksha Sharma, Hemalata Siddaram

Affiliations

- 1 NYU Grossman School of Medicine, New York, NY (J.S., S.B., H.R.R., J.S.H.).
- 2 Department of Medicine, Stanford University School of Medicine, CA (D.J.M.).
- 3 University of Missouri - Kansas City (UMKC)'s Healthcare Institute for Innovations in Quality and Saint Luke's Mid America Heart Institute (P.G.J., J.A.S., Z.F.).
- 4 Icahn School of Medicine at Mount Sinai, New York, NY (G.W.S.).
- 5 National Heart Lung and Blood Institute, National Institutes of Health, Bethesda, MD (R.K.).

PMID: 40008421 PMCID: PMC11919559 (available on 2026-03-01)

DOI: [10.1161/CIRCOUTCOMES.124.010849](https://doi.org/10.1161/CIRCOUTCOMES.124.010849)

Abstract

Background: The appropriate use criteria for revascularization of stable ischemic heart disease have not been evaluated using randomized data. Using data from the randomized ISCHEMIA trial

(International Study of Comparative Health Effectiveness with Medical and Invasive Approaches; July 2012 to January 2018, 37 countries), the health status benefits of an invasive strategy over a conservative one were examined within appropriate use criteria scenarios.

Methods: Among 1833 participants mapped to 36 appropriate use criteria scenarios, symptom status was assessed using the Seattle Angina Questionnaire-7 at 1 year for each scenario and for each of the 6 patient characteristics used to define the scenarios. Coronary anatomy and SYNTAX(Synergy between percutaneous coronary intervention with Taxus and cardiac surgery) scores were measured using coronary computed tomography angiography. Treatment effects are expressed as an odds ratio for a better health status outcome with an invasive versus conservative treatment strategy using Bayesian hierarchical proportional odds models. Differences in the primary clinical outcome were similarly examined.

Results: The mean age was 63 years, 81% were male, and 71% were White. Diabetes was present in 28% and multivessel disease in 51%. Most clinical scenarios favored invasive for better 1-year health status. The benefit of an invasive strategy on Seattle Angina Questionnaire angina frequency scores was reduced for asymptomatic patients (odds ratio [95% credible interval], 1.16 [0.66-1.71] versus 2.26 [1.75-2.80]), as well as for those on no antianginal medications. Diabetes, number of diseased vessels, proximal left anterior descending coronary artery location, and SYNTAX score did not effectively identify patients with better health status after invasive treatment, and minimal differences in clinical events were observed.

Conclusions: Applying the randomization scheme from the ISCHEMIA trial to appropriate clinical scenarios revealed baseline symptoms and antianginal therapy to be the primary drivers of health status benefits from invasive management. Consideration should be given to reducing the patient characteristics collected to generate appropriateness ratings to improve the feasibility of future data collection.

Registration: URL: <https://www.clinicaltrials.gov>; Unique identifier: [NCT01471522](https://www.clinicaltrials.gov/ct2/show/study?term=NCT01471522).

Keywords: Bayes theorem; computed tomography angiography; conservative treatment; coronary vessels; myocardial ischemia; questionnaires; random allocation.

[PubMed Disclaimer](#)

Comment in

[Redefining the Rules of Revascularization: Lessons From ISCHEMIA for the Future of Appropriate Use Criteria.](#)

Rajkumar CA.

Circ Cardiovasc Qual Outcomes. 2025 Mar;18(3):e011579. doi: 10.1161/CIRCOUTCOMES.124.011579. Epub 2025 Feb 26.

PMID: 40008423 No abstract available.

Related information

[MedGen](#)

LinkOut – more resources

Full Text Sources

[Atypon](#)

[Ovid Technologies, Inc.](#)