THE LANCET

Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

Supplement to: COVIDSurg Collaborative. Mortality and pulmonary complications in patients undergoing surgery with perioperative SARS-CoV-2 infection: an international cohort study. *Lancet* 2020; published online May 29. https://doi.org/10.1016/S0140-6736(20)31182-X.

Mortality and pulmonary complications in patients undergoing surgery with perioperative SARS-CoV-2 infection: an international cohort study

COVIDSurg Collaborative

Appendix S1: Authorship (all co-authors PubMed citable)

Writing group: Dmitri Nepogodiev*, James C Glasbey*, Elizabeth Li*, Omar M Omar*, Joana FF Simoes*, Tom EF Abbott, Osaid Alser, Alexis P Arnaud, Brittany K Bankhead-Kendall, Kerry A Breen, Miguel F Cunha, Giana H Davidson, Salomone Di Saverio, Gaetano Gallo, Ewen A Griffiths, Rohan R Gujjuri, Peter J Hutchinson, Haytham MA Kaafarani, Hans Lederhuber, Markus W Löffler, Hassan N Mashbari, Ana Minaya-Bravo, Dion G Morton, David Moszkowicz, Francesco Pata, George Tsoulfas, Mary L Venn, Aneel Bhangu (senior author & overall guarantor).

**Joint first authors who contributed equally*

Statistical analysis: Omar M Omar (lead statistician), Dmitri Nepogodiev, Aneel Bhangu.

Operations Committee: Kwabena Siaw-Acheampong, Daoud Chaudhry, Brett E Dawson, Jonathan P Evans, James C Glasbey, Rohan R Gujjuri, Emily Heritage, Conor S Jones, Sivesh K Kamarajah, Chetan Khatri, James M Keatley, Samuel Lawday, Elizabeth Li, Siobhan C Mckay, Dmitri Nepogodiev, Gianluca Pellino, Abhinav Tiwari, Joana FF Simoes, Isobel M Trout, Mary L Venn, Richard JW Wilkin, Aneel Bhangu.

Dissemination Committee: Michel Adamina, Adesoji O Ademuyiwa, Arnav Agarwal, Ehab Alameer, Derek Alderson, Felix Alakaloko, Osaid Alser, Alexis P Arnaud, Knut Magne Augestad, Brittany K Bankhead-Kendall, Emma Barlow, Ruth A Benson, Ruth Blanco-Colino, Amanpreet Brar, Ana Minaya-Bravo, Kerry A Breen, Igor Lima Buarque, Edward J Caruana, Sohini Chakrabortee, Daniel Cox, Miguel F Cunha, Giana H Davidson, Anant Desai, Salomone Di Saverio, Thomas D Drake, John G Edwards, Muhammed Elhadi, Shebani Farik, Marco Fiore, J Edward Fitzgerald, Samuel Ford, Gaetano Gallo, Dhruv Ghosh, Gustavo Mendonça Ataíde Gomes, Ewen A Griffiths, Constantine Halkias, Ewen M Harrison, Peter J Hutchinson, Arda Isik, Michael D Jenkinson, Haytham MA Kaafarani, Angelos Kolias, Ismail Lawani, Hans Lederhuber, Sezai Leventoglu, Markus W Löffler, Janet Martin, Hassan N Mashbari, Dennis Mazingi, Symeon Metallidis, Ana Minaya-Bravo, Helen M Mohan, Rachel Moore, David Moszkowicz, Susan Moug, Joshua S Ng-Kamstra, Milagros Niquen, Faustin Ntirenganya, Oumaima Outani, Francesco Pata, Thomas D Pinkney, Peter Pockney, Dejan Radenkovic, Antonio Ramos-De la Medina, Keith Roberts, April C Roslani, Irene Santos, Andrew Schache, Andreas A Schnitzbauer, Grant D Stewart, Richard Shaw, Sebastian Shu, Kjetil Soreide, Antonino Spinelli, Sudha Sundar, Stephen Tabiri, Philip Townend, Georgios Tsoulfas, Gabrielle H van Ramshorst, Raghavan Vidya, Dale Vimalachandran, Oliver J Warren, Naomi Wright, EuroSurg, European Society of Coloproctology (ESCP), GlobalSurg, GlobalPaedSurg, ItSURG, PTSurg, SpainSurg, Italian Society of Colorectal Surgery (SICCR), Association of Surgeons in Training (ASiT), Irish Surgical Research Collaborative (ISRC), Joana FF Simoes (Chair).

Collaborators: (*denotes Local Principal Investigator)

Algeria: Faraj S Almaadany* (Établissement Hospitalier Spécialisé en Cancérologie - Centre Pierre-et-Marie-Curie).

*Azerbaijan:*Elgun Samadov*, Ilgar Namazov, Sevda Jafarova (Leyla Medical Center).

Belgium: Gabrielle H van Ramshorst*, Piet Pattyn, Liesbeth Desender (Ghent University Hospital); Charles A de Gheldere*, Nicolas Duchateau (Heilig Hart Ziekenhuis Lier).

Croatia: Jakov Mihanovic*, Nina Sulen, Tatjana Andabaka, Ivan Rakvin, Bernarda Bakmaz (Zadar General Hospital).

Denmark: Henry G Smith*, Maria L Jönsson (Bispebjerg Hospital, University of Copenhagen).

Egypt: Mohamed El Kassas*, Ahmed Tawheed (Endemic Medicine Department, Helwan University); Sameh Shehata*, Fouad M Ashoush, Ahmed S Abdelaal (Alexandria Main University Hospital); Mahmoud MA Elfiky* (Kasr Alainy Faculty of Medicine, Cairo University); Sameh H Emile*, Ahmed H Elfallal, Hossam Elfeki, Mostafa Shalaby (Mansoura University Hospital); Mahmoud M Alrahawy* (Menofiya University Hospital); Ibrahim Sallam*, Gamal Amira, , Ahmed Sherief, Mohamed Sherief, (MISR Cancer Center/MISR International Hospital).

France: Zaher Lakkis*, Alexandre Doussot, Celia Turco, Bruno Heyd, Pierre Mathieu (CHU Besançon); Alexandre Chebaro*, Katia Lecolle, Philippe Zerbib, Stéphanie Truant, Alain Saudemont, François-René Pruvot (Lille University Hospital); Alexis P Arnaud*, Damien Bergeat, Aude Merdrignac (Rennes University Hospital); Aurelien Scalabre*, Bertrand Le Roy, Ornella Perotto (CHU Saint Etienne); Stylianos Tzedakis*, Sebastien Gaujoux, Bertrand Dousset (Hôpital Cochin - AP-HP); David Moszkowicz*, Frédéric Bretagnol (Hôpital Louis-Mourier - GHU AP-HP. Nord - Université de Paris); Erik Hervieux*, Emeline Maisonneuve, Pauline Clermidi, Emmanuelle Aubry, Anne Thomin (Hôpital Trousseau - APHP); Agathe Seguin-Givelet*, Frederic Zadegan, Christel Conso, Didier Ollat (Institut Mutualiste Montsouris).

Germany: Carsten Kamphues*, Johannes C Lauscher, Christian Schineis (Charité University Medicine, Campus Benjamin Franklin); Andreas A Schnitzbauer*, Philipp Thoenissen, Hanan El Youzouri, Teresa Schreckenbach, Truong A Nguyen (Frankfurt University Hospital, Goethe University); Ali Modabber*, Frank Hölzle, Philipp Winnand (University Hospital Aachen); Alfred Königsrainer*, Markus Quante, Can Yurttas, Markus W Löffler (University Hospital Tübingen).

Greece: Konstantinos Bouchagier*, Serafeim Klimopoulos (Evangelismos General Hospital); George Tzovaras*, Ioannis Baloyiannis, Konstantinos Perivoliotis (General University Hospital of Larissa); Eftychios Lostoridis*, Paraskevi Tourountzi (Kavala General Hospital).

Ireland: Arnold DK Hill*, Joshua A De Marchi, Tony Farrell, Niall F Davis, David Kearney (Beaumont Hospital); John O Larkin*, Helen M Mohan, Brian J Mehigan, Brian A Fahey, Conor P Barry* (St. James's Hospital); Jessie A Elliott*, Gary A Bass, Tara M Connolly, Dara O Kavanagh, Ramy Elkady, Paul C Neary, Paul F Ridgway, Doireann P Joyce, Sean Tierney, Emily Boyle, Bridget Egan (Tallaght

University Hospital); Aoife J Lowery*, Chris G Collins, Aisling Hogan, Kevin L McKevitt, Éanna J Ryan, Amy L Fowler, Thomas M Aherne (Galway University Hospital).

Israel: Oded Zmora*, Nadav Kugler (Shamir Medical Center).

Italy: Maurizio Zizzo*, Giuseppe Falco, Carolina Castro Ruiz, Simone Mele, Valerio Annessi, Guglielmo Ferrari, Maria T Montella (Azienda Unità Sanitaria Locale-IRCCS di Reggio Emilia); Nicolò M Mariani*, Andrea Pisani Ceretti (ASST Santi Paolo e Carlo); Daniele Lomiento*, Lucio Taglietti, Roberto Del Giudice, Bruno Compagnoni, Sara Dester (ASST Valcamonica Ospedale di Esine); Stefano Granieri*, Christian Cotsoglou (ASST Vimercate); Tommaso Campagnaro*, Giulia Turri, Alfredo Guglielmi, Andrea Ruzzenente, Corrado Pedrazzani, Roberto Salvia*, Salvatore Paiella, Sara Nobile (Azienda Ospedaliera Universitaria Integrata di Verona); Marco V Marino*, Antonello Mirabella, Gianpaolo Vaccarella (Azienda Ospedaliera, Ospedali Riuniti Villa Sofia-Cervello, Palermo); Elisa Francone*, Sergio Gentilli, Herald Nikaj (Azienda Ospedaliero Universitaria Maggiore della Carità, Novara); Luca Morelli*, Gregorio Di Franco, Matteo Palmeri, Dario Tartaglia*, Federico Coccolini, Massimo Chiarugi (Azienda Ospedaliero Universitaria Pisana); Gabriele Anania*, Matteo Chiozza, Alessia Urbani (Azienda Ospedaliero Universitaria San'Anna, Ferrara); Mauro Podda*, Adolfo Pisanu (Cagliari University Hospital); Alberto Porcu*, Teresa Perra, Alessandro Fancellu (Cliniche San Pietro, A.O.U. Sassari); Pietro Familiari*, Giancarlo D'Andrea, Fabrizio Bàmbina (Fabrizio Spaziani Hospital, Frosinone); Marco Fiore*, Alberto Macchi, Davide Citterio, Angelo Mosca, Fabio Martinelli, Luigi Rolli, Marcello Guaglio, Lara V Comini, Vita Capizzi, Vincenzo Mazzaferro (Fondazione IRCCS Istituto Nazionale dei Tumori, Milan); Valerio Cozza*, Luca Gordini, Veronica De Simone, Federica Marzi, Angelo A Marra (Fondazione Policlinico Universitario Agostino Gemelli); Edoardo Baldini*, Luigi Conti, Marta Ribolla, Simone M Isolani, Patrizio Capelli (Ospedale "G. da Saliceto", Piacenza); Antonino Spinelli*, Michele Carvello, Francesca Di Candido, Hayato Kurihara, Enrico Marrano, Guido Torzilli, Carlo Castoro, Anna Da Roit, Giuseppe Mercante, Giuseppe Spriano, Francesca Gaino (Humanitas Clinical and Research Center – IRCCS, via Manzoni 56, 20089 Rozzano (MI) – Italy); Luigi Bonavina*, Emanuele Asti (IRCCS Policlinico San Donato, University of Milan); Carlo V Feo*, Nicoló Fabbri, Erminio Righini (Ospedale del Delta, Azienda Unità Sanitaria Locale di Ferrara, University of Ferrara); Salomone Di Saverio*, Salomone Di Saverio, Antonella Scorza, Domenico Iovino, Giulio Carcano (Ospedale di Circolo, University of Insubria, University Hospital of Varese, ASST Sette Laghi, Regione Lombardia); Caterina Baldi*, Gianluca M Sampietro, Carlo Corbellin (Ospedale Di Rho - ASST Rhodense); Paola Cellerino*, Marco A Zappa, Antonella Ardito, Elisa Galfrascoli, Giulio Iacob (Ospedale Fatebenefratelli e Oftalmico); Nicola Zanini*, Gianmarco Palini, Gianluca Garulli (Ospedale Infermi di Rimini); Michele Ballabio*, Pietro Bisagni, Paolo Pizzini, Annalisa Gagliano, Teodora Armao, Marco Longhi, Marco Madonini, Marco Luraghi, Luca Galimberti, Silvio Romano, Marco Bastazza, Francesco Trotta, Manuel Gipponi, Stefano Malabarba, Giovanna Centinaio (Ospedale Maggiore di Lodi); Sylvie Mochet*, Lucia Morelli, Antonella Usai, Manuela Grivon, Roberto Barmasse (Ospedale Regionale Umberto Parini); Andrea Sagnotta*, Luigi MP Marino Cosentino (PO San Filippo Neri - ASL ROMA 1); Raffaele Galleano*, Michele Malerba, Stefano Baldo (Ospedale Santa Corona, Pietra Ligure (SV); Massimiliano Casati*, Emmanuele Abate, Letizia Laface (Ospedale Vittorio Emanuele III, Carate Brianza); Vincenzo Lizzi*, Fernanda Vovola, Armando Arminio (Ospedali Riuniti Azienda Ospedaliera Universitaria Foggia); Roberto Vergari* (Ospedali Riuniti di Ancona); Emanuele Rausa*, Federica Bianco, Alessandro Lucianetti (Papa Giovanni XXIII Hospital); Eleonora Guaitoli* (Perrino); Enrico Pinotti*, Francesca Carissimi, Mauro Montuori, Gianluca Baronio (Policlinico San Pietro); Michela Campanelli*, Giuseppe S Sica, Leandro Siragusa (Policlinico Tor Vergata Hospital, Rome); Pierfrancesco

Lapolla*, Andrea Mingoli, Giorgio De Toma, Enrico Fiori, Filippo La Torre, Paolo Sapienza, Gioia Brachini, Bruno Cirillo, Immacolata Iannone, Martina Zambon, Ambra Chiappini, Simona Meneghini, Giovanni B Fonsi, Pierfranco M Cicerchia, Placido Bruzzaniti, Antonio Santoro, Alessandro Di Bartolomeo (Policlinico Umberto I, Sapienza University of Rome); Diego Sasia*, Marco Migliore, Andrea Gattolin (Regina Montis Regalis Hospital, Mondovì); Matteo Rottoli*, Matteo Ravaioli, Riccardo Schiavina, Piergiorgio Solli, Federico Frio (Institute of Neurological Sciences of Bologna, AUSL Bologna), Jacopo Neri, Gilberto Poggioli, Angela Belvedere, Anna P Pezzuto, Daniele Parlanti, Tommaso Violante, Valeria Tonini*, Maurizio Cervellera, Lodovico Sartarelli (Sant'Orsola Hospital, Alma Mater Studiorum University of Bologna); Marco Giacometti*, Sandro Zonta (Ospedale San Biagio, Domodossola, ASL VCO); Francesco Ferrara*, Marco Stella, Davide Gobatti (San Carlo Borromeo Hospital, ASST Santi Paolo e Carlo, Milan); Andrea Costanzi*, Marco Confalonieri, Gaia Colletti, Colomba Frattaruolo, Michela Monteleone (Ospedale San Leopoldo Mandic, Merate, ASST Lecco); Massimo Candiani*, Giulia Bonavina, Luca Valsecchi, Jessica Ottolina, Pietro Mortini, Filippo Gagliardi, Martina Piloni, Marzia Medone, Michele Carlucci, Giampiero Negri, Alessandro Bandiera, Paola De Nardi, Ugo Elmore, Pierpaolo Sileri, (San Raffaele Scientific Institute, Milan); Giorgio Lisi*, Massimo Carlini, Domenico Spoletini (Sant'Eugenio Hospital); Maria Carmela Giuffrida*, Felice Borghi, Andrea Puppo, Michele D'Agruma, Alessandra Marano, Valentina Testa, Chiara Peluso (Santa Croce e Carle Hospital, Cuneo); Fabio Barra*, Simone Ferrero, Claudio Gustavino (Unit of Obstetrics and Gynecology IRCCS Ospedale Policlinico San Martino Genoa); Gaetano Gallo*, Giuseppe Sammarco, Giuseppina Vescio (University 'Magna Graecia' of Catanzaro); Tommaso Fontana* (Vittorio Emanuele, Gela).

Jordan: Mahmoud Al-Masri*, Mohamad K Abou Chaar, Hani Al-Najjar (King Hussein Cancer Center).

Libya: Ghadah Z Alkadeeki*, Faraj S Al Maadany, Emmhamed Nasef, Fatimah Elkhafeefi, Mohammed Eljareh (Aljalaa Hospital); Ahmad EM Bouhuwaish*, Ahmed SA Taher, Farhat B Yousuf (Tobruk Medical Center); Marwa M Morgom* (Tripoli Central Hospital); Abdulrauf A Salamah*, Hiba A Salama, Mustafa R Bulugma (Zawia Teaching Hospital).

Mexico: Fernando Cordera* (ABC Medical Center).

Netherlands: Suzanne S Gisbertz*, Alexander BJ Borgstein, Mark I van Berge Henegouwen (Amsterdam UMC, University of Amsterdam, Cancer Center Amsterdam); Wouter KG Leclercq*, Martine Uittenbogaart (Máxima Medical Center); Schelto Kruijff*, Jean-Paul PM de Vries, Willemijn Y van der Plas, Pieter J Steinkamp, Pascal KC Jonker (University Medical Center Groningen, (University of Groningen); Joop Konsten*, Maarten van Heinsbergen (VieCuri Medisch Centrum);

Pakistan: Mariyah Anwer* (Jinnah postgraduate medical center).

Portugal: Hugo Santos-Sousa*, Salomé Cavaleiro, André M Leite-Moreira, André Pereira, António Pereira-Neves, Carlos S Faria, Joana M Monteiro, Jorge Nogueiro, Mafalda Sampaio-Alves, Mariana Magalhães Maia, Paula Vieira (Centro Hospital Universitário SãoJoão); André Lázaro*, Ricardo Martins, Ana Oliveira, Marta Costa, Ana C Almeida (Centro Hospitalar e Universitário de Coimbra); Pedro A Serralheiro*, Tobias Teles (Hospital de Cascais - Dr. José de Almeida); Filipe Borges*, Maria João Lima, Susana Henriques (Hospital Garcia de Orta).

Spain: Eduardo E Rubio*, Alfredo A Vivas, Viviana A Vega (12 de Octubre University Hospital); Antonio Navarro-Sánchez*, Saida Martel Lozano, Borja Camacho Fernández-Pacheco (Complejo Hospitalario Universitario Insular-Materno Infantil); Juan Carlos Bernal-Sprekelsen*, Carolina Martínez Pérez, Juan Carlos Catalá Bauset (Consorcio Hospital General Universitario); Victor Turrado-Rodriguez*, Xavier Morales, Isabel Gracia, Roger Pujol-Muncunill, F Borja De Lacy (Hospital Clinic Barcelona); Jose M Muguerza*, Jana Dziakova, Cristina Sanchez del Pueblo, Rocio B Avellana, Vanesa Catalan, Sara Picazo, Andres Garcia Fernandez, Jose L Romera, Jose L Garcia Galocha, Mikel Rojo, Antonio J Torres, Ana Munoz Rivas, Enrique Camarero, Carlos Saez, Leyre Lopez Antonanzas (Hospital Clinico San Carlos, Madrid); Beatriz De Andrés-Asenjo*, Juan Beltrán de Heredia, Andrea Vázquez-Fernández, Jeancarlos Trujillo-Díaz, María Ruiz-Soriano (Hospital Clínico Universitario de Valladolid); Ana Minaya-Bravo*, Carlos San Miguel-Mendez, Armando Galván-Pérez, Alvaro Robin-Valle, Enrique Gonzalez-Gonzalez, Enrique Calcerrada-Alises, , Miguel Angel Garcia-Ureña (Universidad Francisco de Vitoria, Hospital Universitario del Henares); Milagros Carrasco*, Clara Giménez, Esther Medina, Antonio J Fernández, Miguel Ruiz (Hospital General Universitario Reina Sofía, Murcia); Mercedes Estaire-Gomez*, Fernando Martínez-dePaz, Daniel Sanchez-Pelaez, Elisa Jimenez-Higuera, Carlos Martinez-Pinedo, Rafael Picon-Rodriguez, Angel Fernandez-Camuñas, David Padilla-Valverde (Hospital General Universitario De Ciudad Real); Cristina Rey-Valcarcel*, MD Perez-Diaz, María Fernández-Martínez, Lorena Martín-Román, María Fanjul Gómez, Javier Rio-Gomez, Manuel Tousidonis, Paula Alonso-Ortuño, Esther Ayuso-Herrera, Lorena Martin-Albo, Juan Aragon-Chamizo, Alejandro Lowy-Benoliel, Begoña Quintana-Villamandos, Coral Sanchez-Perez, Olga Mateos-Sierra (Hospital General Universitario Gregorio Marañón); Javier Corral*, Albert Caballero, Alba Zarate (Hospital Germans Trias i Pujol); Manuel M Diez-Alonso*, Fernando Mendoza-Moreno , Cristina Vera-Mansilla, Fernando Ruiz-Grande, Pilar Hernandez-Juara, Alma Blazquez-Martin (Hospital Principe De Asturias); Cristina Soto Montesinos*, Carlos J Gómez Díaz, Claudio A Guariglia, Lorena Sanchon Fructuoso, Alexander L Osorio, Roser Farré Font, Pablo Collera Ormazabal (Fundació Althaia - Xarxa Assistencial Universitària de Manresa); Ismael Mora-Guzmán* (Hospital Santa Bárbara); Javier Serrano González*, David Díaz Pérez, Miguel Ángel Hernández Bartolomé, María Gutiérrez Samaniego, Pablo Galindo Jara (Hospital Universitario de Torrejón, Facultad de Medicina, Universidad Francisco de Vitoria, Madrid); Miguel Hernandez Garcia*, Manuel Losada Ruiz, Beatriz Dieguez Fernandez, Maria Garcia-Conde Delgado, Alfredo Alonso Poza (Hospital Universitario del Sureste); Victoria Duque-Mallen*, Carlos Gracia-Roche, Antonio Martinez-German, Maria-Pilar Santero-Ramirez, Maria-Soledad Matute-Najarro, Maria-Carmen De Miguel-Ardevines, Maria-Nieves Sanchez-Fuentes, Sef Saudi-Moro, Isabel Gascon-Ferrer, Maria Herrero-Lopez, Eduardo Delgado-Oliver, Maria Sanchez-Rubio, Miguel Cantalejo-Diaz (Hospital Universitario Miguel Servet); Luis E Pérez-Sánchez*, Vanesa Concepción-Martín, Alberto Díaz-García (Hospital Universitario Nuestra Señora de Candelaria); Diego Ramos*, Alberto G Barranquero, Juan Ocaña, Jordi Núñez, Cristina Cerro (Hospital Universitario Ramón y Cajal); Francisco J Tejero-Pintor*, Baltasar Pérez-Saborido, Pablo Marcos-Santos, Ekta Choolani-Bhojwani, Fernando Acebes-Garcia, Alejandro D Bueno-Cañones, David Pacheco-Sanchez, Martin Bailon-Cuadrado (Hospital Universitario Río Hortega); Ana Senent-Boza*, Inmaculada Benítez-Linero, Irene Ramallo-Solís, Alejandro Sánchez-Arteaga, Lidia Melero-Cortés, Reyes Fernández-Marín, Virginia M Durán-Muñoz-Cruzado (Hospital Universitario Virgen del Rocio); Juan-Carlos Gomez-Rosado*, M Dolores Del Toro, Javier Valdes-Hernandez, Julio Reguera-Rosal, Fernando Oliva-Mompean (Hospital Universitario Virgen Macarena); Jorge Sancho-Muriel*, Hanna Cholewa, Blas Flor (Hospital Universitario y Politécnico La Fe); Aitor Landaluce-Olavarria*, Melania Gonzalez-De Miguel, Laura Fernández-Gomez Cruzado (Hospital Urduliz); Jaime Jimeno*, Enrique Toledo, Angela Pascual, Mariana Carrillo, Dieter Morales, Marcos

Gómez, Juan C Rodriguez-Sanjuan (Marqués de Valdecilla University Hospital); José Aguilar*, Melody Baeza (Morales Meseguer University Hospital); Juan Rey-Biel*, Lorena Pingarrón-Martín, Carmen Moliner-Sánchez, Irene Ruiz-Martin (Rey Juan Carlos University Hospital); Jorge Escartin*, Juan luis Blas Laina, Ana Nogues Pevidal (Royo Villanova); Diego T Enjuto*, Antonio Ramos-Bonilla, Marta Pérez-González, Patricia Diaz-Peña, Raúl Garcés-García, Maria Marqueta De Salas, Elima P Cagigal-Ortega (Hospital Universitario Severo Ochoa).

Sudan: Osman M Ali*, Ali A Ali karar (Al-rajhi).

Switzerland: Dimitri Christoforidis*, Michele Arigoni, Francesco Mongelli, Matteo Bernasconi, Matteo Di Giuseppe (Ente Ospedaliero Cantonale del Canton Ticino); Michel Adamina*, Georgios Peros (Kantonsspital Winterthur).

Turkey: Volkan Ozben*, Erman Aytac, Zumrud Aliyeva (Acibadem Mehmet Ali Aydinlar University, Atakent Hospital); Yasin Kara*, Mehmet A Bozkurt, Ali Kocataş (Kanuni Sultan Suleyman Training and Research Hospital); Fatih Altintoprak* (Sakarya University Faculty of Medicine), Emre Gonullu, Baris Mantoglu (Sakarya University Research and Educational Hospital); Alp Yildiz* (Yildirim Beyazit University Yenimahalle Training and Research Hospital).

United Kingdom: Richard J Davies*, James Ashcroft, Olivia J Baker, Matthew HV Byrne, Patrick A Coughlin, Alexander ZE Durst, Fanourios Georgiades, Amir Habeeb, Victoria E Hudson, Angelos Kolias, Louis Luke, Stefan Mitrasinovic, Midhun Mohan, Suzanne H Murphy, Albert WT Ngu, John R O'Neill, Joussi Ramzi, Siobhan M Rooney, Aminder A Singh, Saima Waseem, Ken Wong (Addenbrooke's Hospital); Raimundas Lunevicius*, Andrea RG Sheel, Robert P Jones, Quentin M Nunes, Jane L Hughes, Iram Haq, Nikhil Misra, Mirza MAS Baig, Matthew Sundhu (Aintree University Hospital); Catherine Rossborough, Brendan L Skelly* (Altnagelvin Area Hospital); David TA Neely*, Dimitrios Angelou, Andrew McCanny (Antrim Area Hospital); Max J Pachl* (Birmingham Children's Hospital); Sudha Sundar*, Elaine YL Leung (The Pan Birmingham Gynaecological Cancer Centre); Rajiv Vashisht*, Nur Amalina Che Bakri, Scarlet Nazarian (Bupa Cromwell Hospital); Oliver J Warren, Christos Kontovounisios, Thomas Grove (Department of Colorectal Surgery, Chelsea and Westminster Hospital NHS FT and Imperial College London); Dale Vimalachandran*, Nichola Manu, Nicola J Eardley, Emily Krishnan, Olivia L Serevina, Emmeline Martin, Meical G Povey, Andrew P Jones, Claire Smith (Countess of Chester Hospital); Syed Mannan*, Funbi A Ayeni, Roy Houston, Harry Tustin (Cumberland Infirmary); Luke J Rogers*, Gary Minto, Adrian Marchbank, Douglas Miller, Beatrice Ho, Kajal Gohil, Peter L Labib, Katy M Emslie, Ethan CS Clough, Ibrahim Enemosah, Clare Perkins, , Mariam Rela, Pedram Panahi (University Hospitals Plymouth NHS Trust); Markus P Baker*, Thomas J Holme, Sarah J Abbott, Matthew N Bence, Aisha Razik, Liza Osagie-Clouard (Epsom & St Helier University Hospitals NHS Trust); Charlotte M Holbrook*, Dorothy Kufeji, Clara Chong, (Evelina London Children's Hospital); John S Hammond*, John AG Moir, Iain McPherson, Karen Booth (Freeman Hospital); Panna K Patel*, Aaron Kler, Siddhartha Handa, Jennifer Redfern (Furness General Hospital); Richard Morgan*, Andrew Maw*, Tanzeela Gala, Mostafa Abdelkarim, Ahmad Asqalan, Reda H M Mithany, Sherif Ibrahim, Gowtham Venkatesan (Glan Clwyd Hospital); Edward J Caruana*, Adam Mohammad, Metesh Acharya, Sridhar Rathinam, Apostolos Nakas (Glenfield Hospital, Leicester); Simon Higgs*, Oliver D Brown, Matthew Boal, Sophie Stanger, Hossam Abdalaziz (Gloucestershire Royal Hospital); Ahmad Sayasneh*, Manhal Najdy, Rahul Nath, Gautam Mehra (Guy's and St Thomas' NHS Foundation Trust); Matyas Fehervari*, Duncan R Spalding, Madhava Pai (Hammersmith Hospital); David N Naumann*,

Maninder Kalkat, Arooj Syed, Ruhina Alam (Heartlands Hospital); Salim Tayeh*, Thomas JG Chase, John OO Ayorinde, Tamzin Cuming, Amir Ghanbari (Homerton University Hospital); Mahmoud Loubani*, Ahmad Aboelkassem-Ibrahim, Han Cao, Elizabeth Ross, Joshua Totty, Alex Wilkins, Louise Hitchman (Hull University Teaching Hospitals NHS Trust); Jan R Dixon*, Joel Dunning, Yirupaiahgari KS Viswanath, Madan Jha Shane Lester (James Cook University Hospital); Giles Bond-Smith*, Mariam Lami, Giovanni D Tebala, Sarah C Tucker*, Abigail V Shaw, Stuart C Winter*, Cristina Cernei, Ali Qureshi, Elizabeth Belcher*, Kate Wallwork, Dionisios Stavroulias, Francesco Di Chiara, Oliver Dare, Deva S Jeyaretna*, Mario Ganau*, Swathikan Chidambaram, Sanskrithi Sravanam, Sanjay Sinha*, Robert Smillie, Karishma Shah, Sushma Shankar, (Oxford University Hospitals NHS Foundation Trust; Matt Dunstan*, Philip Beak, Ioannis Gerogiannis* (Kingston Hospital NHS Foundation Trust); Alexander P Boddy*, Tanvir Hossain, Christopher Ashmore, Seethalakshmi Annamalai, Amar Kourdouli (Leicester Royal Infirmary); Bilal H Kirmani*, Michael J Shackcloth, Amer Harky (Liverpool Heart and Chest Hospital); Nicholas A Stylianides*, Mutwakil OM Abdalla, Katy Newton (Manchester Royal Infirmary); Oreoluwa M Bajomo*, Sana Rizvi, Ebenezer Darko, Abdel Rahman Saad (Medway Maritime Hospital); Zoe Li*, Dema Motter, Libor Hurt, Richard Egan, Rhiannon Harries (Morriston Hospital, Swansea); Mina MG Youssef*, Luke Evans (Norfolk and Norwich University Hospital); Jigar Shah*, James Anthoney, Rabbia Amjad, Joseph Harrison, Islam Mabrouk, Bethany Hebblethwaite, Oliver Emmerson (North Manchester General Hospital); Karen D Bosch*, Venugopala Kalidindi, Varvara Bashkirova (North Middlesex University Hospital); John G Edwards*, Jagan N Rao, David N Hopkinson, Govind Chetty, Stefano Forlani, Soumya Guha, Mohamed Sherif, Anna-Victoria Giblin, George Lye, Emma Whitehall, Chris M Blundell, Alex Ward, Daniel Tadross, Fiona Wells, Lawrence Majkowski (Northern General Hospital, Sheffield); David N Townshend*, Sarah J Mills, Keith Seymour, Amy Shenfine, Nicola McLarty (Northumbria NHS Hospital Trust); Florence Kashora*, Sophia E Lewis, Harmony K Ubhi, Rebecca Exley, Abhinav Singh, Amedra Basgaran, Anne-Marie Bartsch, Valentine Okechukwu, Amr Basha, Christina Barmpagianni, Phoebe Gallagher, Umul Khan, Afnan Maqsood, Preena Shah, Shobhit Saxena, Kapil Sahnan, Noman Zafar (Northwick Park Hospital); Rebecca A Rollett*, Michelle L Collins, Muhammad S Tamimy, Harjoat Riyat, Jason Neil-Dwyer, Jiaxin Wen, Nathan Burnside*, Helen Weaver, Mohammad Hawari, Emmanuel Addae-Boateng, John P Duffy (Nottingham City Hospital); Benjamin JF Dean*, Catriona R Luney (Nuffield Orthopaedic Centre); Janahan Sarveswaran*, Sangram Patil, Sharanya Ravindran, Lucy Scott, Martin Michel (Pinderfields Hospital); Simon Toh*, Yousra Ahmed* (Portsmouth Hospital NHS Trust); Vardhini Vijay*, Taner Shakir, Raashad Hasan, Rosamond Tansey (Princess Alexandra Hospital); Mahul Patel*, Amanda Shabana, Samuel Paisley (Brighton and Sussex NHS Trust, Princess Royal Hospital); Jim S Khan* (Queen Alexandra Hospital); Ewen A Griffiths*, Aaron P Kisiel, Mona Kamal, Liam D Cato, Alessandro Parente, Rugved Kulkarni, Samerah A Saeed, Jason Mak (Queen Elizabeth Hospital Birmingham); Ignatius Liew*, Ahmad Al-Sukaini, Dolly Saxena, Saniya Mediratta, Inthekab Ali Mohamed Ali (Queen Elizabeth Hospital King's Lynn); Andrew Smith*, Adam Fell, Camilla English, Sverrir Kristinsson, Giles Goatly, Constantine Halkias, Jessica Evans (Queen Elizabeth the Queen Mother Hospital Margate); Paul Glen*, Marwa Al-Azzawi, Emma Aitken (Queen Elizabeth University Hospital); Samrat Mukherjee*, Shailendra Singh, Christopher Smith, William English, Paul Vulliamy, Edward Karam, Karen Chui, Ahmer Mansuri, Sriharan Sivayoganathan, Mahmoud A Aaraj, Abess El-Ali (Queen's Hospital, Romford); Abeed H Chowdhury*, Dawit Worku (Queen’s Medical Centre, Nottingham University Hospitals NHS Trust); Matthew Hampton* (Rotherham District General Hospital); Joanna Manson*, Laura Findlay, Agata Majkowska, Genevieve Brixton, Ryan Potter (Royal Bournemouth Hospital); Anthony C De Souza*, Melissa Rochon, Marina Cannoletta (Royal Brompton Hospital); Ashish Bhalla*,

Prita Daliya, Zoe Chia (Royal Derby Hospital); Joerg M Pollok*, Dimitri A Raptis, Brian R Davidson, Giuseppe K Fusai, Souzana E Xyda, Fiammetta Soggiu, Nikolaos Machairas (Royal Free Hospital); David C Bosanquet*, Alethea M Tang, Andrew J Beamish, Heeam Nassa, Claire Price, Gethin Williams, Drew Magowan, Francesca Solari (Royal Gwent Hospital); Emma J Davies*, Ondrej Ryska, Paul Hawkin, Thomas Raymond (Royal Lancaster Infirmary); Ryan D Baron*, Peter Szatmary, Sukhpreet Gahunia, Amy J Thomas, Declan FJ Dunne, George E Nita, Dana Sochorova (Royal Liverpool University Hospital); Rajesh Sivaprakasam*, Mary L Venn, Catrin Sohrabi, Frances SJ Ledesma, Mohamed A Thaha, Tom BB Sullivan (The Royal London Hospital); James T Parry*, Rachel Baumber (Royal National Orthopaedic Hospital); Robbie Stewart*, Ramzan Ullah, Lara Armstrong, Mark Jones*, Firas Aljanadi, Nader Moawad (Royal Victoria Hospital); Henry JM Ferguson*, Sean Ramcharan, Danylo Yershov (South Warwickshire NHS Foundation Trust); James C Hopkins*, Matthew J Doe, Graeme K Ambler, Emilie Lostis, Samuel Lawday (Southmead Hospital); Bheemanakone H Babu*, Aloka S D Liyanage, Chamindri K Weerasinghe, Iain Blake (Southport and Formby District General Hospital); Julie Sanders*, Teofila Bueser, Miles Curtis, Aung Y Oo (Department of Cardiothoracic Surgery, St Bartholomew's Hospital); Tom EF Abbott*, Sibtain Anwar, Catrin Sohrabi (St Bartholomew's Hospital); Katherine J Williams*, Eric A Chung, Robert Hagger, Ahmed Karim, Alison J Hainsworth, Michael Flatman, Caroline B Hing, Alex Trompeter (St George's Hospital); Terence Lo*, Ryckie G Wade, Grainne Bourke, Joshua R Burke, Alastair L Young, Joshua JS Wall, Jack Johnstone, Adam Peckham-Cooper, Hannah Elkadi, Mikolaj R Kowal, Cecilia Pompili, Michael WS Ho (Leeds Teaching Hospitals NHS Trust, Leeds); James Kinross*, Mohamed AH Ibrahim, Ala Abuown, Max Denning, Simon Ereidge, Seema Yalamanchili, Guy Martin (St Mary's Hospital); Claire Hall*, James RW Hall (Stepping Hill Hospital); Alexander J Baldwin*, Emanuele Gammeri, Raha West, Justin CR Wormald, Andrew B Catton, Søren Kudsk-Iversen, Spyros Marinos Kouris (Buckinghamshire Healthcare NHS Trust); Michael Nugent*, Daniel J Lin, Chong Kang, Rachel J Scurrah, Amarkumar D Rajgor, Ben Steel (Sunderland Royal Hospital); Andrew Day*, Ajay P Belgaumkar, Bankole Oyewole, Catherine Gilbert (Surrey and Sussex Healthcare NHS Trust); David Ford* (The Robert Jones and Agnes Hunt Orthopaedic Hospital); Sarah Duff*, Azam Khan, Peter Asaad, Francisco S Moura, Benjamin C Brown (Manchester University NHS Foundation Trust, Wythenshawe Hospital); Michael D Jenkinson*, Rasheed Zakaria, Tarek Elmoslemany (The Walton Centre NHS Foundation Trust); Chetan Parmar*, Simon J McCluney, Sujay Shah (The Whittington Hospital); Nicholas Kalavrezos*, Deepti Sinha (University College London Hospital); Nilanjana Tewari*, Naomi JM Dunne, William J Carlos, Charn K Gill, Chintamani Godbole, Kathryn E Dickson, Apoorva Khajuria, Hannah Connolly, Pradyumna Naredla, Diwakar R Sarma, Stuart Robertson (University Hospitals Coventry and Warwickshire); Chris Morris*, Tomos Richards, Jared Torkington, Matthew Williams, Michael Shinkwin, Ullas Jayaraju (University Hospital of Wales); Rabindra P Singh*, Raiyyan Aftab, David Warwick (University Hospital Southampton); Mohamed A Khalefa*, Fahad S Hossain, Khabab Osman (Walsall Manor Hospital); Stefano M Andreani*, Michael F Bath, Arun Sahni, Nicholas Judkins, Laurie R Springford, Catrin Sohrabi (Whipps Cross University Hospital); Martin S Wadley*, Jayne Tyler, Laura Wild, Rosemary Wall, Edward Jenner, Stephanie Chamberlain, Jessica Thrush, Jessie Brain, Catherine Townsend, Sally Stringer, Lisa Breckles, Ian Flindall, George Phenix, Kane Thomas (Worcestershire Acute Hospitals NHS Trust); Richard Young*, Luisa MacDonald, Susanna Green, Victor Miu, Kelda Sheridan, Lavinia Onos (York Teaching Hospitals NHS Trust).

United States: John RT Monson* (AdventHealth Orlando); Frederick T Drake*, Maha H Haqqani (Boston Medical Center); Zara Cooper*, Ali Salim, Sameer A Hirji, Allison K Brown, Choyin Chung,

Laura Hansen, Barbara U. Okafor, Vanessa I Roxo (Brigham and Women's Hospital); Henry E Rice*, E. Shelley Hwang, Dan G Blazer III, Bria J Hall, Steven A Olson (Duke University Medical Center); Deepika Nehra*, Joseph Cuschieri, Giana H Davidson, Andrew M Walters (Harborview Medical Center, University of Washington); Rachel M Nygaard*, Emily T Colonna, Frederick W Endorf (Hennepin Healthcare); Ashley D Meagher*, Gabriel Kinnaman (IU Health Methodist Hospital); Katherine McKenzie*, Kenneth R Fretwell, Jeffrey Chan, William C Nugent III, David Chen (Jamaica Hospital); Kent A Stevens*, Eric W Etchill, Hillary E Jenny (Johns Hopkins Hospital); Ahmed Dehal* (Kaiser Permanente Panorama City Medical Center); Haytham MA Kaafarani*, Kerry A Breen, Brittany K Bankhead-Kendall, Osaid Alser, Hassan N Mashbari, George C Velmahos (Massachusetts General Hospital); Grace Chang*, Dustin Dehart, Jared Ourieff (Mount Sinai Hospital); Stephen Merola*, Anita Volpe (New York Presbyterian Queens); Dina Podolsky*, Natasha L Coleman, Miriam Callahan (NewYork-Presbyterian / Columbia University Medical Center); Collin EM Brathwaite*, Helen H Liu, Patrizio Petrone, Gerard Baltazar, Hazim Hakmi, Amir H Sohail (NYU Langone Health - NYU Winthrop Hospital); Joshua P Hazelton*, Anna E Ssentongo, Paddy Ssentongo (Pennsylvania State University); Tahir Jamil*, Somya Al-Embideen, Sara Seegert (ProMedica Toledo Hospital); Alfonso Torquati*, Anuradha R Bhama (Rush University Medical Center); Walter L Biffl*, Kathryn B Schaffer, Christopher L Marsh (Scripps Memorial Hospital); Matthew M Philp*, Howard Ross, Thomas Santora, Abhijit Pathak, Joseph M Sewards, Michael Pontari, Jamie L Engel (Temple University Hospital); Emmanouil Giorgakis*, Avi V Bhavaraju, Kyle J Kalkwarf, Matthew Roberts, Ronald Robertson (University of Arkansas for Medical Sciences); Rachael A Callcut*, Michaela E Canova, Avni Suri (University of California Davis Health, Department of Surgery); Catherine G Velopulos*, Heather Carmichael, Robert C McIntyre, Franklin L Wright, Shane Urban (University of Colorado Hospital); Robert CG Martin*, Neal Bhutiani (University of Louisville Hospital and Norton Hospital); Jose J Diaz*, Hossam Abdou, Lindsay B O'Meara, Michael Richmond (University of Maryland Medical Center); Murad Almasri*, Hisham Marwan, Mohammad Q Mehdi (University of Texas Medical Branch); Vin Shen Ban*, Salah G Aoun, H. Hunt Batjer (University of Texas Southwestern).

Data Monitoring and Ethics Committee: Deborah S Keller, Neil J Smart

Supplementary Table 1: Countries contributing data to the study

Country	Number of hospitals	Number of patients
Algeria	1	1
Azerbaijan	1	1
Belgium	2	8
Croatia	1	3
Denmark	1	1
Egypt	6	12
France	8	20
Germany	4	6
Greece	3	8
Ireland	4	18
Israel	1	1
Italy	44	181
Jordan	1	1
Libya	3	4
Mexico	1	1
Netherlands	4	6
Pakistan	1	1
Portugal	4	16
Spain	29	170
Sudan	1	1
Switzerland	2	7
Turkey	4	11
United Kingdom	82	484
United States	27	167

Supplementary Table 2: Procedures included by the study stratified by urgency of surgery

	Elective		Emergency		Total
	Minor	Major	Minor	Major	
Breast surgery	**1**	**2**	**0**	**0**	**3**
Breast biopsy	1				1
Mastectomy		4			2
Cardiac Surgery	**0**	**15**	**3**	**33**	**51**
Aortic valve surgery		5		8	13
Coronary artery bypass graft		5		7	12
Mitral valve surgery		3		15	18
Other procedure		2		2	4
Other valvular surgery			3	1	4
Gastrointestinal and general surgery	**7**	**76**	**122**	**165**	**373**
Adhesiolysis (laparoscopic)			2		3*
Adhesiolysis (laparotomy)				24	24
Appendicectomy	1		42		43
Colostomy - formation		2		5	7
Colostomy - refashioning or resiting		1			1
Colostomy - reversal		3			3
Diagnostic laparoscopy			4		4
Diagnostic laparotomy			14		14
Drainage of superficial haematoma			1		1
Feeding gastrostomy				1	1
Feeding jejunostomy		1		1	2
Formation of ileostomy		2			2
Hernia repair - femoral			3		3
Hernia repair - incisional	2		3		5
Hernia repair - inguinal	2		6		8
Hernia repair - other			6		6
Hernia repair - umbilical	2		2		4
Ileostomy - reversal				1	1
Left hemicolectomy		5		9	14
Miscellaneous proctology			5		5
Neck wound exploration			2		2
Other colorectal procedure		1		3	4
Other gastric procedure		1		1	2
Other oesophageal procedure				1	1
Other small bowel procedure				5	5
Pyloroplasty				1	1
Repair of perforated duodenal ulcer				3	3
Repair of perforated peptic ulcer				8	8
Resection - abdominoperineal resection		5		1	6
Resection - anterior resection		19		6	25
Resection - ileocaecal resection		2		6	8
Resection - oesophagectomy		4		1	5

Resection - right hemicolectomy		13		30	43
Resection - sigmoid hemicolectomy		4		26	30
Resection - small bowel resection				19	20*
Resection - subtotal colectomy		2		3	6*
Resection - total colectomy				6	6
Resection - total or partial gastrectomy		6		2	8
Sleeve gastrectomy		3		1	4
Splenectomy		1		2	3
Superficial abscess drainage (not perianal)			16		16
Transanal endoscopic microsurgery		1			1
Wound exploration & washout			15		15
Gynaecology	**2**	**7**	**4**	**7**	**21**
Hysterectomy - abdominal		6		3	10*
Hysterectomy - vaginal		1			1
Other procedure	2		4		6
Repair of uterus				1	1
Salpingectomy				3	3
Head & Neck surgery	**7**	**14**	**13**	**6**	**40**
Excision of salivary gland	1				1
Neck dissection		2			2
Other procedures on mandible		6		3	9
Pharynx procedures other than excision	1				1
Procures on the mouth	1				1
Procures on the tongue	4				4
Reduction and/or fixation of mandible		1		2	3
Tracheostomy			13		13
Thyroidectomy		5		1	6
Hepatobiliary surgery	**0**	**34**	**0**	**28**	**62**
Cholecystectomy		4		18	22
Hepatectomy		10			10
Liver transplant		1		3	4
Other biliary tract procedure		1		1	2
Other hepatic procedure		1		2	3
Other pancreatic procedure				2	2
Pancreatectomy		5		1	6
Pancreaticoduodenectomy		12		1	13
Neurosurgery	**1**	**12**	**3**	**23**	**39**
Excision of pituitary gland		1			1
Biopsy of lesion of brain tissue	1		1		2
Craniotomy		2		2	4
Drainage of extradural space				1	1
Drainage of lesion of tissue of brain			2		2
Drainage of subdural space		1		6	7
Excision of tissue of brain		4		1	5
Other procedure		2		5	7

Procedures on the meninges		1		4	5
Procedures on the ventricles				1	1
Repair of cranium		1		2	3
Repair of dura				1	1
Obstetrics	**1**	**7**	**1**	**42**	**51**
Caesarean section		7		42	49
Evacuation of contents of uterus	1		1		2
Opthalmology	**4**	**0**	**0**	**0**	**4**
Other ophthalmic procedurs	1				1
Phacoemulsification	3				3
Orthopaedics	**2**	**18**	**19**	**262**	**302**
Amputation of foot				3	3
Amputation of leg		1		21	22
Amputation of toe			10		10
Arthroscopy (diagnostic)			2		2
Bursa procedures	1		1		2
Closed reduction and external fixation of fracture				2	2
Closed reduction and internal fixation of fracture				15	15
Closed reduction of dislocation of joint			1		1
Debridement and irrigation of joint				13	13
Decompression or excision of intervebral disc		5		3	8
Dynamic hip screw		1		48	49
Hemiarthroplasty		1		65	66
Knee arthroscopy - therapeutic				4	4
Knee replacement		3		2	5
Open reduction and extramedullary fixation of fracture				12	12
Open reduction and intramedullary fixation of fracture		1		36	37
Open reduction, no fixation of fracture			2		2
Other procedures on limbs		2		5	7
Other spinal procedure		1		9	10
Other upper limb procedures				1	1
Removal of implant	1		4		5
Revision of total hip replacement		2		11	13
Shoulder replacement				1	1
Spinal cord procedures		1		1	2
Tendon procedures				3	4*
Total hip replacement				6	6
Other procedures	**11**	**6**	**9**	**0**	**26**
Biopsy of skin	1				1
Block dissection of lymph nodes		4			4
Central venous catheter insertion	1		2		3
Dental extraction			1		1

Lymph node biopsy	4		1		5
Miscellaneous	4	1	3		8
Multiorgan resection		1			1
Suture of skin of head or neck	1				1
Vacuum dressing application			2		2
Plastic surgery	**0**	**1**	**1**	**1**	**3**
Free flap				1	1
Local flap			1		1
Split skin graft		1			1
Thoracic surgery	**2**	**17**	**12**	**4**	**35**
Bronchoscopy, therapeutic	2				2
Chest tube insertion			6		6
Lobectomy		16			16
Lung transplant				1	1
Procedures on bronchus				1	1
Resection of chest wall tumour		1			1
Thoracoscopy			6		6
Thoracotomy				2	2
Urology	**3**	**14**	**13**	**7**	**37**
Cystectomy		2		1	3
Diagnostic cystoscopy			3		3
Diagnostic uretoscopy	2				2
Kidney transplant		2		3	5
Nephrectomy		6		2	8
Orchiopexy			1		1
Other bladder procedure			1		1
Other procedures for kidney stones		1			1
Procedures on penis		1			1
Prostatectomy		2			2
Replantation of ureter				1	1
Scrotal procedures			1		1
Transurethral resection of bladder tumour	1		2		3
Ureteric stent insertion			5		5
Vascular surgery	**1**	**3**	**8**	**33**	**45**
Bypass of femoral artery				5	5
Embolectomy / thombectomy				10	10
Femoral artery endarterectomy		1		2	3
Formation of arterio-venous fistula		1		2	3
Other procedure	1		8	10	19
Repair of abdominal aorta aneurysm		1		2	3
Repair of femoral artery aneurysm				2	2
Missing procedure/ surgical grade details					**36**

*Urgency of surgery data missing for one patient who underwent small bowel resection, one who underwent laparoscopic adhesiolysis, one patient who underwent subtotal colectomy, one who underwent abdominal hysterectomy and one who underwent tendon repair

Supplementary Table 3: Unadjusted and adjusted models of predictors for 30-day mortality

	N (%)	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)	p-value
Age				
<70 years	512 (49.4)	1	1	
≥70 years	525 (50.6)	3.12 (2.31 to 4.22)	2.30 (1.65 to 3.22)	<0.0001
Sex				
Female	477 (46.0)	1	1	
Male	560 (54.0)	1.82 (1.35 to 2.44)	1.75 (1.28 to 2.40)	<0.0001
ASA grade				
1-2	356 (34.3)	1	1	
3-5	659 (63.6)	3.45 (2.41 to 4.94)	2.36 (1.58 to 3.53)	<0.0001
Unknown	22 (2.1)	2.73 (1.01 to 7.35)	2.42 (0.86 to 6.82)	0.094
Comorbidities				
None	108 (10.4)	1	1	
1	216 (20.8)	2.75 (1.24 to 6.13)	1.72 (0.75 to 3.97)	0.201
≥2	713 (68.8)	5.36 (2.56 to 11.21)	2.12 (0.95 to 4.71)	0.066
WCC ($x10^9$/L)	10.4 (6.6)	1.00 (0.98 to 1.02)	1.00 (0.98 to 1.03)	0.811
Surgical diagnosis				
Benign/ Obstetric	584 (56.3)	1	1	
Malignant	239 (23.1)	1.35 (0.95 to 1.90)	1.55 (1.01 to 2.39)	0.046
Trauma	214 (20.6)	1.57 (1.11 to 2.23)	0.97 (0.65 to 1.45)	0.890
Urgency				
Elective	251 (24.2)	1	1	
Emergency	786 (75.8)	1.43 (1.01 to 2.02)	1.67 (1.06 to 2.63)	0.026
Grade of surgery				
Minor	233 (22.5)	1	1	
Major	804 (77.5)	1.83 (1.26 to 2.66)	1.52 (1.01 to 2.31)	0.047
SARS-CoV-2 diagnosis	279 (26.9)	1	1	
Preoperative	758 (73.1)	1.28 (0.92 to 1.78)	0.94 (0.65 to 1.36)	0.753
Postoperative				

The adjusted model included 1037 patients with complete data; 7 patients who died up to 30 days, and 84 patients who did not die were excluded due to missing data.

ASA: American Society of Anesthesiologists grade; CI: confidence interval; Severe acute respiratory syndrome coronavirus 2; WCC: white cell count

Supplementary Table 4: Unadjusted and adjusted models of predictors for 7-day mortality

	N (%)	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)	p-value
Age				
<70 years	512 (49.4)	1	1	
≥70 years	525 (50.6)	2.11 (1.18 to 3.80)	1.68 (0.89 to 3.20)	0.111
Sex				
Female	477 (46.0)	1	1	
Male	560 (54.0)	1.61 (0.92 to 2.84)	1.70 (0.93 to 3.08)	0.083
ASA grade				
1-2	356 (34.3)	1	1	
3-5	659 (63.6)	3.35 (1.58 to 7.11)	2.52 (1.10 to 5.77)	0.029
Unknown	22 (2.1)	4.36 (0.83 to 22.98)	4.27 (0.78 to 23.31)	0.094
Comorbidities				
None	108 (10.4)	1	1	
1	216 (20.8)	3.37 (0.73 to 15.59)	2.92 (0.60 to 14.21)	0.184
≥2	713 (68.8)	4.01 (0.94 to 17.10)	2.70 (0.58 to 12.66)	0.206
WCC ($x10^9$/L)	10.4 (6.6)	1.04 (1.01 to 1.07)	1.02 (0.99 to 1.06)	0.128
Surgical diagnosis				
Benign/ Obstetric	584 (56.3)	1	1	
Malignant	239 (23.1)	1.17 (0.60 to 2.29)	1.84 (0.85 to 4.00)	0.122
Trauma	214 (20.6)	1.63 (0.77 to 3.46)	1.11 (0.50 to 2.44)	0.802
Urgency				
Elective	251 (24.2)	1	1	
Emergency	786 (75.8)	3.44 (1.42 to 8.33)	2.58 (0.93 to 7.16)	0.070
Grade of surgery				
Minor	233 (22.5)	1	1	
Major	804 (77.5)	1.86 (0.86 to 4.03)	2.20 (0.95 to 5.08)	0.065
SARS-CoV-2 diagnosis	279 (26.9)	1	1	
Preoperative	758 (73.1)	0.30 (0.17 to 0.52)	0.25 (0.13 to 0.46)	<0.0001
Postoperative				

The adjusted model included 1037 patients with complete data.

ASA: American Society of Anesthesiologists grade; CI: confidence interval; Severe acute respiratory syndrome coronavirus 2; WCC: white cell count

Supplementary Table 5: Unadjusted and adjusted models of predictors of pulmonary complications

	N (%)	Unadjusted Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)	p-value
Age				
<70 years	509 (49.5)	1	1	
≥70 years	520 (50.5)	1.52 (1.13 to 2.04)	1.09 (0.78 to 1.52)	0.627
Sex				
Female	475 (46.2)	1	1	
Male	554 (53.8)	1.63 (1.22 to 2.16)	1.45 (1.07 to 1.96)	0.016
ASA grade				
1-2	355 (34.5)	1	1	
3-5	653 (63.5)	3.12 (2.25 to 4.34)	2.74 (1.89 to 3.99)	<0.0001
Unknown	21 (2.0)	3.87 (1.30 to 11.49)	3.73 (1.25 to 11.19)	0.019
Comorbidities				
None	108 (10.5)	1	1	
1	212 (20.6)	2.18 (1.24 to 3.84)	1.75 (0.97 to 3.16)	0.065
≥2	709 (68.9)	3.08 (1.84 to 5.13)	1.62 (0.91 to 2.87)	0.101
WCC ($x10^9$/L)	10.4 (6.5)	1.01 (0.99 to 1.03)	1.01 (0.99 to 1.03)	0.445
Surgical diagnosis				
Benign/ Obstetric	579 (56.3)	1	1	
Malignant	238 (23.1)	1.12 (0.78 to 1.60)	1.13 (0.72 to 1.76)	0.596
Trauma	212 (20.6)	1.07 (0.71 to 1.61)	0.92 (0.58 to 1.43)	0.698
Urgency				
Elective	250 (24.3)	1	1	
Emergency	779 (75.7)	1.02 (0.72 to 1.43)	1.16 (0.75 to 1.82)	0.504
Grade of surgery				
Minor	231 (22.4)	1	1	
Major	798 (77.6)	1.33 (0.94 to 1.87)	1.22 (0.83 to 1.78)	0.318
SARS-CoV-2 diagnosis				
Preoperative	276 (26.8)	1	1	
Postoperative	753 (73.2)	1.51 (1.08 to 2.11)	1.41 (0.97 to 2.05)	0.076

The adjusted model included 1029 patients with complete data; 19 patients who developed pulmonary complications and 80 patients who did not develop pulmonary complications were excluded due to missing data.

ASA: American Society of Anesthesiologists grade; CI: confidence interval; Severe acute respiratory syndrome coronavirus 2; WCC: white cell count

Supplementary Table 6: Sensitivity analysis with adjusted models of predictors for 30-day mortality and pulmonary complications, in laboratory proven SARS-CoV-2 infected patients

	30-day mortality		Pulmonary complications	
	Adjusted Odds Ratio (95% CI)	p-value	Adjusted Odds Ratio (95% CI)	p-value
Age				
<70 years	1	<0.001	1	
≥70 years	2.38 (1.65 to 3.43)		0.94 (0.65 to 1.35)	0.734
Sex				
Female	1	<0.001	1	
Male	1.86 (1.32 to 2.61)		1.38 (1.00 to 1.91)	0.052
ASA grade				
1-2	1		1	
3-5	2.14 (1.38 to 3.32)	0.001	2.70 (1.80 to 4.05)	<0.0001
Unknown	2.14 (0.69 to 6.65)	0.188	3.47 (1.05 to 11.48)	0.041
Comorbidities				
None	1		1	
1	1.77 (0.68 to 4.61)	0.240	1.76 (0.90 to 3.43)	0.100
≥2	2.20 (0.89 to 5.47)	0.089	1.81 (0.95 to 3.45)	0.072
WCC (x10^9/L)	1.00 (0.97 to 1.02)	0.839	1.01 (0.99 to 1.04)	0.327
Surgical diagnosis				
Benign/ Obstetric	1		1	
Malignant	1.68 (1.05 to 2.69)	0.032	1.04 (0.64 to 1.69)	0.862
Trauma	1.07 (0.70 to 1.62)	0.759	0.95 (0.59 to 1.51)	0.823
Urgency				
Elective	1		1	
Emergency	1.84 (1.13 to 3.00)	0.015	1.19 (0.74 to 1.93)	0.470
Grade of surgery				
Minor	1		1	
Major	1.35 (0.86 to 2.11)	0.188	1.28 (0.85 to 1.93)	0.240
SARS-CoV-2 diagnosis	1		1	
Preoperative	0.94 (0.63 to 1.42)	0.779	1.21 (0.80 to 1.83)	0.368
Postoperative				

The adjusted models included 901 patients with complete data for mortality and 893 with complete data for pulmonary complications.

ASA: American Society of Anesthesiologists grade; CI: confidence interval; Severe acute respiratory syndrome coronavirus 2; WCC: white cell count.

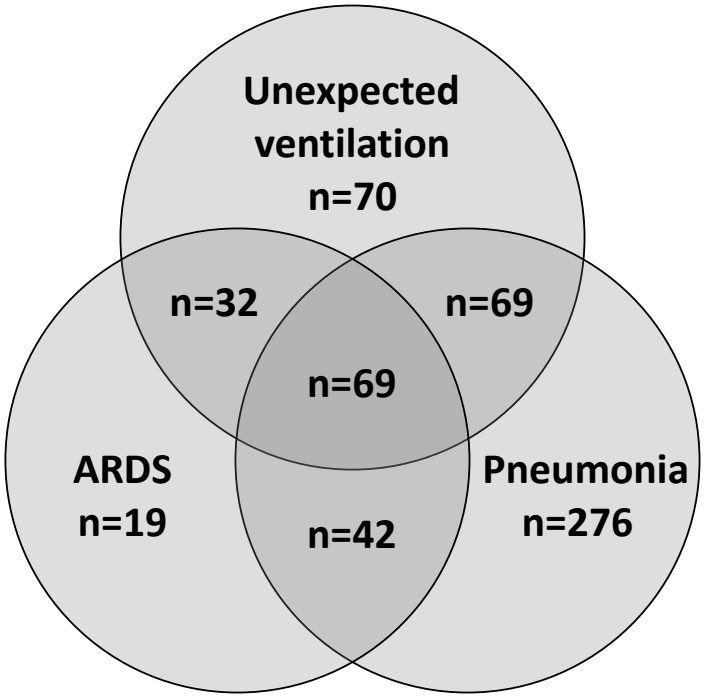
Supplementary Table 7: Sensitivity analysis with adjusted models of predictors for 30-day mortality and pulmonary complications, in patients diagnosed with SARS-CoV-2 pre-operatively

	30-day mortality		Pulmonary complications	
	Adjusted Odds Ratio (95% CI)	p-value	Adjusted Odds Ratio (95% CI)	p-value
Age				
<70 years	1		1	
≥70 years	1.83 (0.86 to 3.88)	0.116	0.97 (0.39 to 2.38)	0.946
Sex				
Female	1		1	
Male	2.37 (1.21 to 4.66)	0.012	2.06 (1.00 to 4.28)	0.051
ASA grade				
1 to 2	1		1	
3 to 5	4.67 (1.76 to 12.42)	0.002	9.78 (3.24 to 29.50)	<0.0001
Unknown	8.19 (1.03 to 65.30)	0.047	2.92 (0.23 to 36.96)	0.408
Comorbidities				
None	1		1	
1	1.55 (0.40 to 5.99)	0.526	1.81 (0.60 to 5.42)	0.289
≥2	2.73 (0.81 to 9.24)	0.105	0.79 (0.27 to 2.33)	0.668
WCC ($x10^9$/L)	1.03 (0.99 to 1.07)	0.131	1.06 (1.00 to 1.12)	0.062
Surgical diagnosis				
Benign/ Obstetric	1		1	
Malignant	0.52 (0.17 to 1.59)	0.251	1.60 (0.45 to 5.69)	0.467
Trauma	1.03 (0.40 to 2.63)	0.950	2.13 (0.61 to 7.38)	0.235
Urgency				
Elective	1		1	
Emergency	1.54 (0.28 to 8.40)	0.620	2.09 (0.47 to 9.24)	0.333
Grade of surgery				
Minor	1		1	
Major	1.99 (0.91 to 4.35)	0.084	1.66 (0.69 to 3.99)	0.260

The adjusted models included 279 patients with complete data for mortality and 276 with complete data for pulmonary complications.

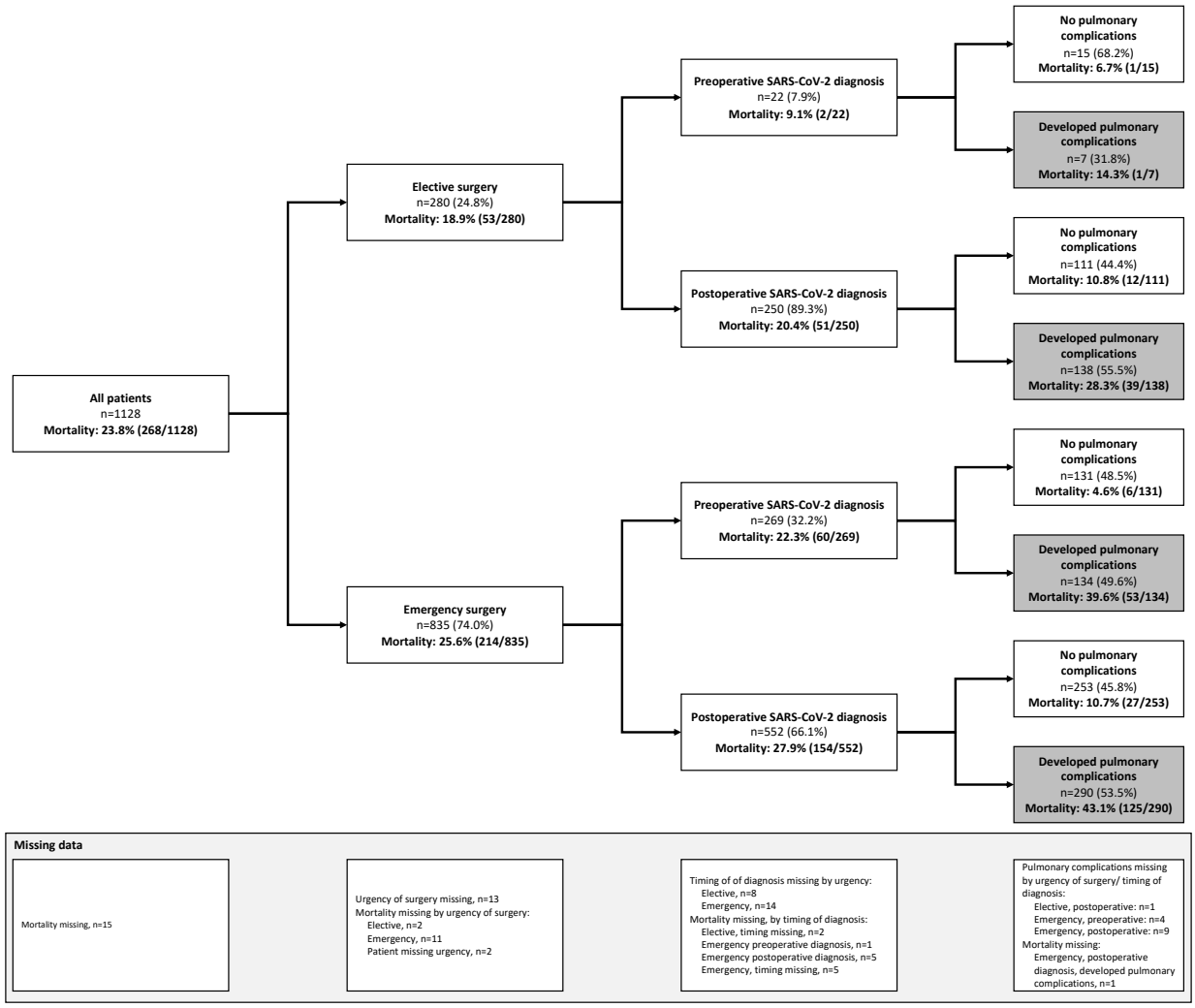
ASA: American Society of Anesthesiologists grade; CI: confidence interval; Severe acute respiratory syndrome coronavirus 2; WCC: white cell count

Supplementary Figure 1: Relationship between pulmonary complications



ARDS: acute respiratory distress syndrome.

Supplementary Figure 2: 30-day mortality rates stratified by timing of surgery and development of pulmonary complications including information on missing data



SARS-CoV-2: Severe acute respiratory syndrome coronavirus 2.

Pulmonary complications defined as pneumonia, acute respiratory distress syndrome, and/or unexpected postoperative ventilation.

† Procedure and indication information was available for 20 of the 22 elective patients with preoperative diagnosis of SARS-CoV-2. 50% (10/20) underwent cancer resections, 15% (3/20) underwent obstetric procedures, 10% (2/10) underwent surgery for injuries, and 25% (5/20) undergoing surgery for benign pathology.