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Supplementary appendix

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SUPPLEMENTARY MATERIAL

Outcomes after surgery for children in Africa A fourteen-day prospective observational cohort study (ASOS-Paeds)

The ASOS-Paeds Investigators

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- Boakye-Yiadom, Kwaku _
- Boye, Jeffrey _
- Brown, George Darko _
- Collison, Carol _
- Darko, Kwadwo Opoku _
- Darko, Kwadwo Opoku _
- Djagbletey, Robert -
- Entsua-Mensah, Kow -
- Etwire, Victor -
- Essuman, Vera Adobea

- Gawu, Victoria Sena
- Glover-Addy, Hope
- Hillah, Ayayi
- Honny, Dorothy
- Kankpeyeng, Lawrence
- Kargbo, Mohamed Alieu
- Kotey, Emily
- Kutor, Jasper
- Larvie, Prince
- Nsaful, Josephine
- Ntumy, Michael Yao
- Nutsuklo, Prudence
- Nyame, Clement Agyekum
- Nyamekye, Evelyn
- Nyankah, Eunice
- Obeng-Adjei, Grace-Imelda
- Ohemeng-Mensah, Elvis
- Osei, Fred
- Osei-Nketiah, Samuel
- Owoo, Christian*
- Owoo, Precious
- Owusu Boamah, Matthew
- Quarcoopome, Cornelia
- Quarshie, Amanda
- Quashie-Sam, James
- Sarpong, Pokua
- Searyoh, Kafui
- Sepenu, Perez
- Siriboe, Esme
- Smart-Yeboah, Awo
- Sottie, Daniel

Princess Marie Louise Hospital

- Glover-Addy, Hope
- Boateng, Joseph
- Neizer, Margaret
- Etwire, Victor
- Nyarko, Mame Yaa*

Guinea

National Leader: Donamou Joseph

Hôpital national Donka:

- Diallo, Thierno Sadou
- Camara, M'mah Lamine
- Donamou, Joseph

Hopital national Ignace Deen:

- Fofana, Naby
- Touré, Abdoulaye *

Kenya

National Leader: Andrew Ndonga

AIC Kijabe Hospital

- Bethleen Waisiko
- Dimingo Gomez
- Britney L. Grayson*
- J. Matthew Kynes*
- Rebecca Dufe

Mater Misericordiae Hospital

- Andrew Ndonga *
- John Wamwaki
- Sophy Opiyo

Tenwek Hospital

- Eglah Chepkoech
- Eric Irungu*
- Linda Thuer
- Mike Ganey
- Violet Otoki
- Robert K. Parker*

Kenyatta National Hospital

- Antony P. Gatheru
- Aziz Munubi*
- Caroline M. Mwangi
- Francis Omondi Osawa
- Francisca Syovata Munyalo
- Julius M. Muriithi
- Lessan Joel
- Patrick R. Olang
- Peter Mwirichia Mwika
- Timothy M. Mwiti
- Timothy Mwai Jumbi
- Thomas M. Chokwe*
- Vernon M. Gacii
- Zipporah Ngumi

Libya

National Leader: Muhammed Elhadi

AboSleem Hospital

- Hind Alameen*
- Ameerah Hasan
- Sara Alhudhairy

Albayda Medical Center (Al-Thawra Teaching Hospital)

- Ahmed Milad *
- Majduldeen Alhlafi
- Asmaa Almujreesi
- Maryam Husam Shihab
- Nada Loae

AlFouad Cardiac Centre:

- Asmma Aldieb *

Alghout El shaal Specialized

- Mohamed J Jubail *
- Alaa Ahmed Alragheai
- Duaa Eisa Omar
- Sara Abdel Hamid Elamesh

Alkhalil

- Rayet Al Islam ben Jouira *
- Ibrahim Zbida
- Hasan Ahmed Maghur
- Khawla Almelyan
- Kusay Ayad

- Abdalrahem Zubi

Alkhadra

- Bahaeddin Ben Hamida *
- Rema Hassan Otman
- Rania Khairi
- Batool Abdalkarim

Almarj Isolation

- Emad Amkhatirah *

Almikhily General

- Mohamed Gamal Amnaina *
- Hayfa Faraj Alhaddad

Benghazi Children

- Nageia Younis *
- Mona Alaogaly
- Abeer Eltegani Abdalla
- Rasha Elhadad
- Anwar Gusibat
- Sara Bin Ateeqa

Benghazi Medical Center:

- Wafa Aldressi *
- Tarik Darat Darat
- Mohamed Fathi Al Gharyani
- Abtisam Alharam
- Marwa Alzwai
- Issa A Abuzeid

Crown Health Care Clinical:

- Hamida El Magrahi *
- Abir ben Ashur
- Mohsen El Mejrab
- Salem Ali

Cyrene Teaching

- Mohammed Abugilah *
- Fatimaalzahraa Abdullah
- Milud Alawami

Gheryan Central

- Akram Alkaseek *
- Hiba Baliad Bakeer
- Osama Salem
- Osama Khalifa Ali Ebrahem
- Asma Ali

Ghout El shaal Specialized Hospital

- Mohamed J Jubail *
- Alaa Ahmed Alragheai
- Duaa Eisa Omar
- Sara Absel Hamid Elamesh

Ibn Sina Teaching Hospital

- Qamrah Alhadad *
- Basmah Alhouwasi

Misrata Medical Center:

- Husayn Aween *

- Abdulmunem Belkhair
- Amna Safar
- Mohamed Assalhi
- Enas Ali
- Halima Heelan
- Abulnasir Alshareef
- Aml Badi

Nalut Central

- Ayman Almugaddami *
- Mona Alazabi
- Amin Egdeer
- Ghada Birqeeq
- Basma Masaud Alazabi

Sabha Medical center:

- Mohammed Abdelkabir *
- Abdulla SIRAJALDIN
- Saedah Abdeewi
- Marwa Suliman Khalifa
- Awrayit AHMED
- Salmin Matoug
- Mabroukah Ezbeida
- Aliya Alhadi
- Darine Eltaub
- Khetam Mohamed Saleh

Sabrata Clinic:

- Daria Omar M Srir *

Sabrata Teaching
- Mohamed Ashfersh *

Taqwa Clinic:

- Ismail Ali Saleh *
- Seham Ahmed Altomy
- Ahmed Fattah
- Mohammed Abu
- Ali Faraj

Tripoli Central

- Eman Abdulwahed *
- Noora Faraj
- Mohamed Karghul
- Fathia Mahmoud
- Marwa Biala
- Sarah Aljamal
- Enas Soula
- Eman Othman
- Dawoud Amhimmid Saeid
- Muhannud Binnawara
- Khawla Derwish
- Entisar Alshareea
- Reem Ghmagh

Tripoli Eye

- Amani Alsayd Abdulsalam Othman *
- Abubaker Affan
- Mohamed Ahmed Jroush
- Karima Omar Ahmed Farhat
- Ahlam ali Abuagila
- MOHAMED FUAD ELMAJRI

- Aya Alhamali

Tripoli University Hospital (Tripoli Medical Center):

- Ahmed Msherghi *
- Mohamed Alsori
- Arwa Haidar
- Reyam Naana
- Ahmed Elhadi
- Fatima Gjam
- Laila Elgherwi
- Sarah Abdulrazik
- Jomana Azouz
- Malak Ghemmied
- Fatima Salem
- Laila Turshan
- Rehab Alarabi
- Hadeel Al-zletni
- Husayn Mohammed Eifeetouri Albdulrraziq

Zawia Teaching

- Sumayyah Bahroun *
- Samah Alkoni
- Eman Younes
- Nouran musbah Shuiap
- Reyad Almokhtar Ekhmaj
- Nuha Miftah Alwaer

Zliten Medical Center

- Hayat Ben Hasan*
- Najat Ben Hasan
- Salema Subhi Bin wali
- Bashir Abobaker Albakosh
- Areej Mohammed Isbayqah
- Eenas Mohammed Isbayqah
- Manar Salim Dalaf
- Eissa Khalifa
- Siham Moftah Mohsen
- Ghada Fathi Bani

Madagascar

National Leaders: Vaonandianina Ravelojaona, Lalatiana Andriamanarivo, Arsitide Romain Raherison, Mamy Richard Randriamizao

Centre Hospitalier Universitaire Joseph Ravoahangy Andrianavalona (CHU JRA):

- Aurélia Rakotondrainibe
- Mamy Lalatiana Andriamanarivo*
- Aristide Romain Raherison
- Harifetra Mamy Richard Randriamizao

CHU de Tanambao I Antsiranana:

- Corinne Eulalie Solo*

Malawi

National Leaders: Wakisa Mulwafu, Emma Thomson

Kamuzu Central Hospital - Amarylis Mapurisa*

Mzuzu Central Hospital

- Creamy Chilango

- Peter YC Chaziya*
- Lister Nkhata

Queen Elizabeth Central Hospital

- Tiyamike Kapalamula*
- Wakisa Mulwafu*
- Lyness Mhone
- Pempho Damson
- Emma Thomson

Mali

National Leader: Youssouf Coulibaly, Yacaria Coulibaly

CHU Gabriel Touré

- Benoi Kamate *
- Yacaria Coulibaly *

Centre Hospitalier Universitaire Le Luxembourg de Bamako - Diakaridia Traoré*

L'hôpital du Mali

- Sidibe Souleymane *

Mauritius National Leader: Kushal Ramkalawan

AG Jeetoo Hospital

- Nitish Fokeerah
- Hemanshu Rambhojan Beeharry*

Dr Bruno Cheong Hospital

- Ashveen Puryag
- Shanjugsing Beeharry*

Jawaharlal Nehru Hospital

- Bibi Waardanaaz Deelawar
- Shehzaad Joomye*
- Brinda Ramdawon
- Veekash Gobin
- Ritish Woodun

Queen Victoria Hospital

- Girish Chummun
- Mohammad Jeelani Maudarbocus
- Kenny Ng How Tseung*

SSRN Hospital

- Chaya Juggoo
- Luckshmanraj Mungur*
- Yeswant Ramkaun

WELLKIN Hospital - Subha Shita Devi Gaya*

Morocco National Leader: Ahmed Rhassane El Adib

Ajial Pediatric Hospital - Badreddine HMAMOUCHI* - Sifeddine NEJMI

- IJLAL ATIQUI

Children's Hospital of Rabat

- Alae El Koraichi*
- Hiba Et-taghy
- Hamza Faida
- Narjiss Aji

Hopital Mere et enfant du CHU Hassan II de Fes

- Mohamed Adnane BERDAI*
- Haitam El YOUBI

Namibia

National Leader: Sarah Shalongo

Engela District Hospital - Matti Kandjimi*

Gobabis District Hospital - Simon Lebereki*

Intermediate Hospital Oshakati - Petrus IITULA*

Katima Mulilo State Hospital (KMSH) - Tongo Douglas Musewu*

Keetmanshoop Hospital

- Desire Gurure*
- Garai Shava

Khorixas District Hospital - Ali T Mbuyi*

Luderitz District Hospital - Hilka Nghidinwa*

Mariental District Hospital - Divine Oase*

Opuwo Hospital - Mugisha Barongo*

Otjiwarongo District hospital

- Shiwana Lineekela Omwene Amesho*

- Dilona Hamukwaya

- Paidamoyo Mandundzo

Outapi District Hospital - Haziel Pindukai Mavesere*

Rundu Intermediate Hospital - Etuuva Iindongo*

St Mary's Hospital, Rehoboth - DV Manyere* Swakopmund District Hospital

- David Tjiyokola*
- Edwina Simon
- Frieda Idipo
- Alexandro Gorelyk
- Tsumeb District Hospital
- Norman Kufonya*

Windhoek Central Hospital - Katature State Hospital - Sudene van Zvl*

- Namene Timotews
- Windhoek Hospital Complex Windhoek Central Hospital
- Sarah Shalongo* (National Leader, Hospital Leader)

- Helena Shitakumuna

- Nelago Amaambo

Niger National Leader: Maman Sani Chaibou

Hôpital National de Niamey

- DADDY, Hadjara
- GAGARA, Moussa
- SANOUSSI, Nanzir Moctar

Clinique Noma, Hopital la Maggia

- HAMADY OUSMANE, Issa*
- KABIROU, Mourtala
- KARADJI, Souleymane*

Hôpital Amirou Boubacar Diallo de Niamey - RAMATOU, Sabo

Hôpital de reference de MARADI -MAIKASSOUA, Mamane

Hôpital National de Zinder - ADAMOU, Harissou - LAWAL, Hassane Maman

Nigeria

National Leaders: Adesoji O Ademuyiwa, Babatunde Babasola Osinaike

Ahmadu Bello University Teaching Hospital

- Musliu Adetola Tolani*
- Saidu Yusuf Yakubu*
- Tunde Talib Sholadoye
- Yakubu Alfa
- Oluseyi Ogunsua
- Yunus A. Abdulghaffar
- Mohammad El-Amin Idris
- Tasiu Saadu
- Abdulkadir Muhammad Kabiru
- Babangida Mohammed Salahu
- Rabiu Isah Mohammed
- Lucy O. Ejuma
- Ganiyat R. Olagunju
- Yunusa Y. Ali
- Hamisu Yakubu

- Euphemia M. Ugwu
- Abdullahi Sheidu Owuda
- Lawal Ibrahim Ibrahim
- Aliyu Mohammed Salele
- Maimuna Abubakar

Barau Dikko Teaching Hospital Kaduna State University

- Stephen Kache*
- Ifeanyi Aghadi*

Federal Medical Centre, Katsina

- Ibrahim Salisu*
- Akeem Ibiyemi*
- Naziru Garba Shu'aibu
- Aliyu Umar Farinyaro
- Suleiman Baba

Federal Medical Centre, Umuahia

- Isaac Chukwu*
- Uchechukwu Obiora Ezomike
- Chidi Samuel Ekpemo
- Nmesomachi Enyidiya Kalu
- Leonard Nduka Okonkwo
- Chukwudi Chukwuemeka Uchendu

Federal Medical Centre, Owerri (Now, Federal University Teaching Hospital Owerri, Imo State)

- Chimaobi Nnaji*
- Emmanuel Nwangwu
- Ikenna Ngene

Lagos University Teaching Hospital

- Olumide Elebute*
- Ibironke Desalu*
- Christopher Bode
- Motunrayo Oladimeji
- Kolawole Asiyanbi
- Olutayo James
- Orimisan Belie
- Felix Alakaloko
- Manuella Timo
- Kareem Musa
- Justina Seyi-Olajide
- Israel Akinmokun
- Omotayo Ojo
- Babatunde Bamigboye
- Oluwakemi Olayinka
- Emmanuel Williams
- Christianah Oyegbola

Our Lady of Apostles Catholic Hospital

- Olakayode Olaolu Ogundoyin*
- Paul Aderemi Adegoke
- Amos Okedare
- Dare Isaac Olulana
- Adedoyin Ojo
- Samuel Ideyonbe Eseile
- Ayodeji Akinniyi

University of Benin Teaching Hospital

- Peter Agbonrofo*
- Nkechi Okojie
- Osayomwanbo Osaheni

- Morrison E. Edena
- Ewomazino U. Evi Parker
- Samuel C. Okenwa
- Emeka J. Asoegwu
- Azeez Kehinde Lateef
- Osasumwen T. Osagie
- Stanley K. Nte
- Godwin E. Alegbeleye

University of Ilorin Teaching Hospital

- Abdul-Rahman Lukman Olajide*
- Olanrewaju Oyedepo*

Federal Teaching Hospital Iddo-Ekiti:

- Abiodun Idowu Okunlola*
- Shuaib Kayode Aremu
- Adedayo Idris Salawu
- Olakunle Fatai Babalola
- Tesleem Olayinka Orewole
- Adewale Timothy Olajide
- Adebayo Augustine Adeniyi
- Adewumi Bakare
- Cecilia Kehinde Okunlola

Lagos State University Teaching Hospital

- Omolara Williams*
- Oluwafunmilayo Ikotun*
- Omolara Faboya
- Chinonso Onyeka
- Samuel Akinyemi
- Saidat Smith

Nnamdi Azikiwe University Teaching Hospital

- Okechukwu Hyginus Ekwunife*
- Jideofor Okechukwu Ugwu
- Victor Ifeanyichukwu Modekwe
- Chuka A Ugwunne
- Sylvester Obiechina
- Stanley Ugochukwu Ezidiegwu

Obafemi Awolowo University Teaching Hospitals Complex

- Dr. Collins Chijioke Adumah*
- Adewale O Adisa
- Sarat Abolore Badmus
- Chizoba Linda Umeh
- Azeezat Aderounmu
- Adekunle Adeyemo
- Ogochukwu Chidi Ejiofor
- Uvie Onakpoya
- Olugbenga Olalekan Ojo
- Abayomi Oguns
- Afolabi Owojuyigbe
- Olurotimi Idowu Aaron
- Lilian Ogechi Adumah
- Oluwatobiloba Micheal Fagbayimu
- Ikechukwu Ethelbert Ugwu
- Akin Taofeek Akinniyi
- Rapheal Azuka Njokanma
- Oludayo Adedapo Sowande
- Ademola Olusegun Talabi
- Iniofon Clement Akpaette

University College Hospital

- Taiwo Lawal*
- Rukiyat Abdus-Salam
- Afieharo Michael
- Ajibola Oladiran
- Augustine Takure
- Bolutife Olusanya
- Oluwabukade Ojediran
- Dare Olulana
- Olubukola Ojediran
- Mathias Orji
- Babatunde Osinaike
- James Balogun
- Kelvin Egbuchulem
- Adekunle Daniel
- Sikiru Adebayo
- Olakayode Ogundoyin
- Monisola Sonaike
- Olusola Idowu
- Timothy Aladelusi
- Tinuola Adigun
- Mary Ugalahi

University of Abuja Teaching Hospital*

- Samson Olori*
- Felicia Dele Asudo
- Olabisi Osagie
- Idoko Monday Ogaji
- Amina Ibrahim Abubakar
- Eniola Sefiu Bolarinwa
- Philip Mari Mshelbwala
- Vinishe Yakubu Sabo
- Terungwa Jacob Akuma
- Joseph Orinya Obande
- Yusuf Davou Dawang
- John Yola Chinda
- Titus Sunday Ibekwe
- Aminu Muhammed Umar
- Terkaa Atim
- Godwin Idoko
- Olumide Adeleke Akitoye
- David Zumnan Songden
- Enoch Auta Dahilo
- Livingfaith Jighjigh Tsegha

Abubakar Tafawa Balewa University Teaching Hospital

- Kefas John Bwala*
- Stephen Yusuf
- Olabisi Ogunleye
- Oloko Nasirudeen Lanre
- Anthony Sabo Ezekiel
- Abubakar Saidu Kadas
- Haruna Usman Liman
- Abdullahi Musa Kirfi
- Auwal Adamu
- Ibrahim Shaphat
- Muhammad Adamu
- Mohammed Bashir Rabiu

Aminu Kano Teaching Hospital Kano

- Lofty-John Chukwuemeka Anyanwu*
- Abubakar Bala Muhammad
- Abdurrahman Abba Sheshe

- Sani Ali Aji
- Atiku Mamuda
- Raphael Avidime Attah
- Alhassan Datti Mohammad
- Aminu Mohammad Mohammad
- Idris Usman Takai
- Mahmoud Kawu Magashi
- Saminu Muhammad
- Mustapha Ibrahim Usman
- Oseni Oyediran Ganiyu
- Ayuba Rabiu
- Misbahu Haruna Ahmad
- Abdul-Rasheed Suleiman
- Lawal Barau Abdullahi
- Kabir Musa Adamu
- Muzammil Abdullahi
- Abdullahi Mustapha Miko
- Sadiq Hassan
- Sulaiman Muhammad Daneji
- Callistus Uchenna Nwachukwu

Federal Medical Center, Lokoja

- Edith Agu*
- Taibat Ibiyeye
- Williams Adeyemi
- Taiwo Jones
- Nnaemeka Nwafulume
- Temitope Odi
- Tolushe Abe
- Osele Raphael

Federal Teaching Hospital Gombe

- Khalifa Ibrahim Abdulsalam*
- Ayodeji Olawale Afolayan
- Sani Adamu
- Hajara Aminu Galadima
- Oladeji Raheem Quadri

Irrua Specialist Teaching Hospital

- Irene Akhideno*
- William Akerele
- Tochukwu Nneji-Akazie
- Mojolaoluwa Adeaga
- Martins Ehimhantie
- Kelvin Salami

Jos University Teaching Hospital

- Abdullahi Aliyu Musa
- Adariku Godwin Oko
- Andrew H. Shitta
- Dido Dung
- Henry Embu*
- Thomas Kefas Malau

University of Calabar Teaching Hospital

- Abraham I. Obri
- Gabriel U. Udie
- John A. Ashindoitiang
- Joseph E. Udosen
- Sifonobong Ekpa
- Stella A. Eguma
- Usang Usang *

- Ukpabio E.I. Ukpabio

Plateau State Specialist Hospital, Jos

- Barminas Kahansim
- Gloria Ille
- Samuel Nuhu*

University of Nigeria Teaching Hospital

- Christopher C Amah
- Elochukwu P Nwankwo
- Ijeoma Obianyo
- Nene E Obianyo
- Sampson Aliozor
- Sebastian Ekenze*
- Uchechukwu O Ezomike*

Irrua Specialist Teaching Hospital

- Irene Akhideno*
- Mojolaoluwa Adeaga
- Tochukwu Nneji-Akazie
- William Akerele
- Kelvin Salami
- Kelechi Ifiala

Rwanda

National Leaders: Paulin Banguti, Kara Neil, Miliard Derbew

King Faisal Hospital

- Paulin Banguti (National Leader)
- Kara Neil (National Leader)
- Yayehyirad Mekonnen Ejigu*
- Richard Nduwayezu
- Roda UWAYESU

Senegal

National Leader: Mamadou Mour Traore

Hopital d'enfant Albert Royer

- Mamadou Mour Traore* (National Leader)

Hopital enfants Diamniadio

- Amadou Diaw Diop*
- Joëlle Sandra Youssa Nanda
- Khadim Rassoul Gueye
- Mouhamedoun Sall

Hospitalier national cheikh ahmadoul khadim de touba

- Mactar Dieng*
- Mamadou Tall
- Cheikh Fall SAMB
- Ndèye Fatou SECK
- Mansour DIENE

Hopital Regional de Thies

- Françoise Ndiaye*
- Thérèse YENYI AHUKA LONGOMBE
- Cheikh Ahmed Tidiane NDIAYE

Hopital Regional de St Louis -Joseph Ndiame SARR*

Hopital Dalal Jam

- Fatoumata Yakhie Bah*
- Alain NDIAYE
- Ibrahima GAYE
- Khady FALL

HOPITAL MILITAIRE DE OUAKAM - Mbaye Diaw*

Seychelles

National Leader: Marvin Fanny

Seychelles Hospital - Marvin Fanny*

Sierra Leone

National Leader: Isaac Smalle

Connaught Hospital - Isaac Smalle*

Somalia

National Leader: Mohamed Abdinor Omar

Kalkaal Hospital, Mogadishu

- Sakariye Abdullaahi Hassan
- Timothy Kiprotich Kimutai
- Joseph Ekudo
- Suleyman Abdullahi Mohamed*

Mogadishu Somalia - Turkey Recep Tayyıp Erdoğan Training and Research Hospital - Abdullahi Said Hashi*

Somaliland

National Leaders: Shukri Dahir, Mubarak Mohamed, Hassan Ali Daoud

BURAO REGIONAL HOSPITAL - Ahmed Jama Ali*

Borama Regional Hospital

- Hassan Ali Daoud*

- Abdirahman Wacays

Edna Adan University Hospital (Somaliland) - Shukri Dahir* - Mubarak Mohamed

HARGEISA GROUP HOSPITAL (Somaliland) - Hassan Daoud*

- Mohamed Maygag *

South Africa

National Leader: Heidi Meyer

Addington Hospital

- Usha Singh*
- Sebe Sikhakhane *
- Alishka Naidoo
- Nqobile Zulu

Dora Nginza Hospital

- Ashley van der Byl*

General Justice Gizenga Mpanza Regional Hospital (GJGMRH) (Stanger Hospital)

- Roel Matos-Puig*
- Verushka Naidoo
- Ushir Jaganath
- Nthabiseng Precious Ntsie
- Hendrik Petrus van Schalkwyk

Grey's Hospital

- Chantal Rajah* (Provincial Lead)
- Natalie Hendricks
- Nosisi Mzoneli
- Lieze Geldenhuys
- Kudzai Zingoni
- Nobuhle Nkosi
- Hansie Mangray
- Pieter Mare
- Thubelihle Zenda

Harry Gwala Hospital

- Jonathan Invernizzi*
- Mariette Grobbelaar
- Matthew ONeil
- Chandra Kotagiri

Livingstone Tertiary Hospital

- Lorenzo Boretti*

Nelson Mandela Academic Hospital (NMAH)

- Mohamed S I Khattab*
- Busisiwe Mrara (Provincial Lead)
- Siyasanga Folokwe
- Thandokazi Ngcelwane
- Tony Usenbo

Pelonomi Hospital

- Nelia Wessels*

Port Elizabeth Provincial

- Meera Abraham*

Universitas Hospital

- Nelia Wessels (Provincial Lead)*
- Edwin Turton
- Zanele Hoko
- Doors Fonternel
- Dineo Theko
- Veneshree Govender
- Carla Taute
- Ruary Thompson

- Toni Motseoile
- Pieter van der Linde
- Ettiene Earl
- Deepika Dhilraj

Inkosi Albert Luthuli Central Hospital

- Jenna Taylor*
- Larissa Cronje
- Suleen van Vuuren
- Thuli Biyase
- Sivuyisiwe Solala
- Timothy Hardcastle
- Aritha du Bruyn
- Gcina Mngoma
- M Sheik Gaffoor
- Janice Sewlall
- Basil Enicker
- Nomusa Shezi
- Warren Kuhn
- Manogran Moopanar
- Kirushin Moodley
- Sanvir Maharaj
- Neville Perumal

King Edward VIII

- Sandhya Jithoo*
- Chantal Chellan
- Leresse Pillay

Ladysmith Hospital

- Gladmore Madombwe*
- Nonhlanhla Zulu
- Nompumelelo Gasa
- Nokuzola Kanjana-Zondo
- Philisiwe Makhoba
- Trevor Msibi
- Sebenzile Nkosi
- Nompilo Mlambo

Madadeni Hospital

- Marcin Kopieniak*
- Mzamo Mnguni
- Salem Bobaker
- Londiwe Mjadu
- Thandeka Dube

Ngwelezane Hospital

- Yvonne Seilbea*
- Physician Myeni
- Masoud Nezam-Parast
- Christo Botha
- Rowena Ungen
- Ravi Mishra
- Nonhlanhla Mbatha
- Cebile Ntshingila
- Nhlanhlenhle Simelane
- Zama Mncwango
- Nkosinathi Mdlalose
- Chad Young
- Qinisile Hlela
- Benjamin Van Aswegen
- Phindile Khumalo
- Sonela Mashaya

- Bongekile Sibeko

Northdale Hospital

- Dela Maiwald*
- Msizi Ndlovu*

Barberton Hospital

- Megan Prowling*

Dr George Mukhari Hospital

- Mabitsela Matlou
- Mthelebofu Branny
- Thys Human*
- Tisana Carol
- Tlhapane Mathinya
- Yoli Hawu
- Mammie Motiang

Kalafong Hospital

- Jenitha Dairam*
- Mbeki Tseli*
- Jonathan Odingo

Letaba Hospital

- David Ntsoane*
- Shiluva Shai

Manguzi Hospital

- Dias Salomao Tembe
- Stephan van der Walt
- Tumelo Kwena Matlala*

Mankweng Hospital

- Alexander Bogoslovskiy
- Cecilia Nyoka-Mokgalong
- George Frederik Stegmann* (Provincial Lead)Hundzukani Rikhotso
- Mogammad Ebrahim Martin
- Sewela Grace Makinita*

Polokwane Hospital

- Bridget Florence Khumalo
- George Frederik Stegmann* (Provincial Lead)
- Kishan Dayal
- Korowe Rose Voncil Mahlare
- Makwati Moloisi
- Nyajane Thomas Nkhuna
- Sewela Grace Makinita

Port Shepstone Hospital

- Vaugn Moses*
- Juniata Panday
- Naledi Fodo
- Nokonwaba Mkhontwana

Pretoria Oral/Dental Hospital

- Tinus Dippenaar*

Rob Ferreira Hospital

- Caroline Robertson* (Provincial Lead)
- Christia Benade

- Monique Fischer

Shongwe Hospital - David Haywood*

Steve Biko Academic Hospital

- Leanne Frankish*

- Mandisa Kalipa

Tintswalo Hospital - Ruth Mathebula*

Tshilidzini Hospital

- Tshilidzi Godfrey Mamathuntsha*

- Patience Busisiwe Masilela

Charlotte Maxeke Joburg Academic Hospital

- Gontse Leballo*
- Nana Fening
- Palesa Motshabi
- Zainub Jooma

Chris Hani Baragwanath Hospital

- Tristan Leonard*
- Alexis Oosthuizen
- Cara Redelinghuys
- Kena Mogotsi
- Lindsey Strauss
- Maria Fourtounas
- Palesa Mogane (Provincial Lead)

Eerste River Hospital

- Adele de Goede*
- Razeena Kaskar

Groote Schuur Hospital

- Estie Cloete*
- Ricky Ginsburg
- Simphiwe Gumede

Helderberg Hospital

- Adele de Goede*
- Estee Struwig

Khayelitsha Hospital

- Charme van Tonder
- Ilyas Parker
- Mehboob Joosab
- Mikhail Swartz
- Razeena Kasker*
- Sarwat Hameed-Ikram*
- Warren Brown
- Ilhaam Gabier
- Sayed Javed

Maitland Cottage Children's Orthopaedic Hospital

- Gregory Leeb
- Lelanie Lambrechts*
- Simphiwe Gumede
- Thozama Siyothula*

Mitchell's Plain Hospital

- Abbaas Allie
- John Roos*
- Robyn Pretorius

Nelson Mandela Children's Hospital - Nezisa Nongqo*

Rahima Moosa Mother and Child Hospital

- Janri van Wyk
- Kerryn Davidson
- Shafeeqa Mayet*

Red Cross War Memorial Children's Hospital

- Gregory Leeb
- Lelanie Lambrechts*
- Margot Flint
- Simphiwe Gumede
- Thozama Siyotula*

Tygerberg Hospital

- Alex Spytko
- Celeste Cilliers* (Provincial lead)
- George Wolfaardt
- Guigui Sikwete
- Kirthi Ramdhani
- Mari Thiart
- Marianne Johnson
- Siobhan Oelofsen
- Zahier Ebrahim

Victoria Hospital

- Abigail Davies
- Charles Pryce
- Rudhir Jaga*
- Ziyaad Limalia
- Romy Schnaubelt

Sudan

National Leaders: Tarig Fadalla, Bareeq Abdallah

Africa specialist Hospital - Khartoum

- Nidal Youseef Altaher Aboh Ahmed*

Almoalem Medical Centre - Haytham Hamid*

..

- Alnao Teaching Hospital - Alaa Osman
- Alg Naser
- Manal Rahma
- Maha Abdelkarim*

Alshuhada Hospital

- Mona Babiker
- Oman Eladani
- Tasneem Hassan*

Elobied Teaching Hospital - Mohamed Abdelmoneim Mohamedkheir

- Safa Merghani*

Gezira Traumatology Center

- Amin Awad Alamin Mohamed
- Mohammed Eltayeb Zainelabdean Eltayeb*
- Mosaab Abdelhafiz Ebrahim Musa
- Rayan Badran Hamed Al Bashir

Hajj-Almardi Teaching Hospital

- Mohamed Abdelkarim*
- Rubaa Ahmed*

Ibrahim Malik Teaching Hospital

- Abubaker Abdalla
- Hawazen Saleh
- Linda Ahmed
- Mohamed Elhassan
- Mohanad Elamien
- Mohammed Osman Ahmed*
- Muhanned Mohammed
- Mazin Abdelnassir
- Mutwakil Ali
- Moheyaldien Ahmed Elamin Elnour

The National Ribat University Hospital

- Tarig Fadalla*
- Alshaima A. Koko
- Arwa A.R. Alhaddad
- Esra S. Abdalgadir
- Isam A. Sangak
- Mazin Suliman
- Mohamed Alameen Moheyaldeen
- Mohammed Yahia*
- Almuaz Ali

Kassala Teaching Hospital [ME1]

- Fatima Mohammed Sabir Yassin*
- Abdallah Motasim Ahmed Ali
- Mohamed Abubaker Ahmed Abdallah
- Moataz Hashim Hussain Kona
- Tarig Yousuf Ibrahim Younus
- Nusiba Bushra Ahmed Adam
- Sarah Omer Osman Suliman
- Mohammed Ali Ismael Alamin Salih

Soba University Hospital

- Hammad A. Fadlalmola*
- Khansaa Abdelgader
- Doaa Mohammedosman
- Maria Mohamed

Wad Medani Teaching Hospital

- Abdulrahman Mohammed
- Asmaa Daoud
- Eiman Hussain
- Elmustafa Alkhalifa*
- Fatima Zaki
- May Othman
- Rehab Mohammed
- Waffa Abdelgadir
- Zeinab Hassan

Tunisia National Leader: Nahla Kechiche

Pediatric University Hospital Bechir Hamza Dept A

- Yosra KERKENI*

- Senda Houidi
- Riadh JOUINI

Pediatric University Hospital Bechir Hamza Dept B

- Yosra Ben Ahmed*
- Hajer Drissi
- Said Jlidi

University Hospital Hédi Cheker (Sfax)

- Hayett Zitouni*
- Riadh Mhiri

University Hospital Habib Thameur

- Cyrine Saadi*
- Nejib Kaabar

University Hospital of Monastir

- Nahla Kechiche*
- Bochra Aziza
- Salma Mani
- Rachida Lamiri
- Lassaad Sahnoun

Uganda

National Leaders: Adam Hewitt-Smith, Mary T Nabukenya, Ronald Bisegerwa

CoRSU Hospital

- Agnes Wabule*
- Juliana Nanimambi
- Mary Juliet Nampawu
- CURE Children's Hospital
- Betty Nantongo*
- Alice Gertrude Atai
- Fred Musana
- Esther Nambi

Emergency Children's Surgical Hospital

- Luisa Napolitano*
- Marcello Succi
- Molhema Eltaib Elamin Mohamed
- Beatrice Percivale

International Hospital Kampala

- Elizabeth Namugaya Igaga*
- Peter Okoth
- Lausa Asasira

Jinja Regional Referral Hospital

- Ruth Muhindo*
- Eziron Walithandia
- Mathew Okurut
- Tonny Otim

Lubaga Hospital - Gladys Nabukenya*

Mengo Hospital

- Gorret Nampiina*

Mulago National Referral Hospital

- Stuart Agaba
- Ronald Bisegerwa*
- Moses Arinaitwe
- Peter Kayima
- Janat Tumukunde*
- Albino Kiboonwa Misuutwa

Nakasero Hospital

- Anne Mbiya Kapinga*
- Margaret Awori Achani
- Faith Kasobya

St Mary's Hospital Lacor

- Paul Otim*
- Douglas Sanya
- Hudson Onen

Holy Innocent Children's Hospital - Baluku Moris*

- AHEREZA GILES

Kyabirwa Surgical Center - Arthur Emoru*

Masaka Regional Referral Hospital

- Lawrence Ssebuguzi
- Mary Juliet Nampawu*
- Sarah Harriet Ndibarekera

Mbale Regional Referral Hospital

- Emmanuel Bua*
- Hasifah Namutebi
- Nicholas Wataaka
- Richard Gamubaka
- Rita Mbatudde

Mbarara Regional Referral Hospital

- Caroline Nakyanzi
- Christine Tumuhimbise
- Jacob Gerald Nawezo
- Joshua Muhanguzi
- Rachel Alum Aguma*

Urocare Hospital

- George Kateregga*
- Solomon Mafabi

Zimbabwe

National Leader: Pisirai Ndarukwa

Chitungwiza Central Hospital - Pisirai Ndarukwa* (National Leader and Hospital Leader)
Marondera Provincial Hospital - Celestino Dhege* - Joseph Hanzi

Sally Mugabe Central Hospital - Kudzayi Sarah Munanzvi*

Supplementary Material S1. Broadcasting document (infographic and word document)





Information about your surgery may explain why some children get better faster.



This information will be recorded from your hospital charts but will not include your name or address.



The information about your operation may help children in the future get better faster.

IMPORTANT PATIENT INFORMATION



A research study is being conducted at (NAME) Hospital.

The research is being done by (Lead Investigator name) from (start date) to (completion date)

Why is this research study being done?

To understand what complications children have during and after having an operation.

Why are we telling you about this study?

All patients less than 18 years of age having an operation in this hospital are part of the study. It is a requirement that some details pertaining to your child's clinical care are entered into a trial folder. Information from this folder will be used anonymously to see if any complications occur during or after your child's surgery.

Will this study affect my care while I am in hospital?

No. Your care will not change while you are in hospital.

Will my name or any personal details be recorded in this study?

No. Your name and personal details will not be recorded as part of this study. All information from the notes will be kept strictly confidential.

Are there any risks or benefits associated with this study?

No.

May I withdraw from this study?

Every patient has the right to withdraw from this study. If you would like to withdraw from the study, please contact the lead investigator listed below.

Who should I contact if I have any questions or concerns?

Please contact (Name of lead investigator) on telephone

If you have questions about your rights or welfare as a research participant, please contact the UCT Faculty of Health Sciences Human Research Ethics Committee on +27 (0)21 406 6338.

Supplementary Material S2. Hospital data record form

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HOSPITAL DATA	RECORD FORM		
Thank you for your participation!			
Name			
Surname			
Initials			
Please state your institutional affiliation, aca	demic position and postgraduate		
qualifications	(As it would		
appear in a paper for publication)			
Do you have a GCP certification? \Box Yes \Box	No		
•			
Have you been confirmed as:			
National Lead Investigator			
Provincial /Regional Lead Investigator			
□ Hospital Lead Investigator			
□ Hospital Investigator			
(Check ALL that apply)			
(ee.,			
Country name:			
Name of the regulatory approval committee:			
Name of the province/ state:			
Tune of the province, state.			
Full name of hospital:			
GPS Co-ordinates of Hospital (Degrees Min	utes Seconds format):		
\circ , \circ , \circ , \circ , \circ	"		
·	_·		
Level of Hegnitel Care (see definition below	\.		
Even of Hospital Care (see definition below).		
Table: Definitions of Levels of Hospital Care			
Level of care	Alternative terms commonly found in the literature		
First-level hospitals: Few specialties-mainly internal medicine,	Primary-level hospital		
obstetrics and gynecology, pediatrics, and general surgery; often	District hospital		
practitioner; limited laboratory services available for general but	Rural hospital		
not specialized pathological analysis; from 50 to 250 beds.	Community hospital		
	General hospital		
Second-level hospitals: More differentiated by function with as	Regional hospital		
many as 5 to 10 clinical specialties; from 200 to 800 beds.	Provincial hospital (or equivalent administrative area such as		
	county)		

General hospital *Third-level hospitals:* Highly specialized staff and technical equipment—for example, cardiology, intensive care unit, and specialized imaging units; clinical services highly differentiated by function; could have teaching activities; from 300 to 1,500 National hospital Central hospital Academic or teaching or university hospital beds.

Is this hospital:

Government-funded
 Privately funded
 NGO/Mission/Charity facility
 University hospital

Number of hospital beds:

(Check ALL that apply)

Number of operating rooms:

How many operating lists are done per week?

How many surgical cases in total are done on average per month in your hospital? How many surgical cases in patients <18 years are done on average per month in your hospital?

Does your hospital administration capture data on surgical volume? \Box Yes \Box No Does your hospital administration capture variables that can be used to determine perioperative mortality?

Number of paediatric critical care beds allowing invasive ventilation:

Number of paediatric critical care beds not allowing invasive ventilation:

Number of full-time specialist paediatricians:

Number of full-time specialist surgeons:

Number of full-time specialist anaesthesiologists:

Do any of the specialist anaesthesiologists do paediatrics only? \Box Yes \Box No If yes, how many?_____

Is there a hospital protocol for paediatric preoperative fasting? \Box Yes \Box No

Are blood transfusions performed at this facility? \Box Yes \Box No

Does the hospital have a blood bank on site? \Box Yes \Box No

Medication availability

Have you had atropine available to you every time you have needed it?
□ Always □ Sometimes □ Never
Have you had fentanyl available to you every time you have needed it?
□ Always □ Sometimes □ Never
Have you had epinephrine available to you every time you have needed it?
□ Always □ Sometimes □ Never

Equipment

Are your operating rooms adequately equipped to safely perform:

Anaesthesia in: Surgery in:	 Neonates (0-28 Infants (29 days) Children 2-5 yea Children 6-1yea Adolescents 13- Neonates (0-28 Infants (29 days) Children 2-5 yea Children 6-12 yea Adolescents 13- 	days) -1 year) ars -17 years days) -1 year) ars ears -17 years		
Do you have a relial	ole electricity suppl	y?	🗆 Always 🗆	Sometimes 🗆 Never
Do you have a relial	ole oxygen supply?	□ Alw	ays 🗆 Some	times 🗆 Never
Do you have function Do you have function	oning incubators?	Yes □ N t warmin	lo g devices? [🛛 Yes 🗆 No
Is there a dedicated Yes □ No	Paediatric Emergen	icy Airwa	y trolley in t	he operating complex? \Box
Is there a hospital pr	otocol for paediatri	ic emerge	ncy airway r	nanagement? □Yes □No
Factors which may a	affect patient throug	ghput dur	ing the study	period
Are there any nation If yes, how many da	al holidays during ys?	the study	period?	🗆 Yes 🗆 No
Are there any schoo If yes, how many da Any other potential study period? e.g. b Please describe	l holidays during th ys? issues which you be uilding renovations	e study p elieve ma s, equipm	eriod? y affect patie ent issues etc	□ Yes □ No ent throughput during the
Local ethics approva Name of ethics com	al confirmed mittee	□ Yes	🗆 No	
Local data governar Name of data gover	ce approval confirm nance committee	ned	🗆 Yes 🗆 No	
Other local regulato Name of local regul committee	ry approval confirm atory	ned	□ Yes □ No	
I confirm this above	information is corr	rect		

Supplementary Material S3. Case record form

African Surgical Outcomes Study in Paediatric patients (ASOS-Paeds)

Intraoperative case record form

Patient information:	ASOS-Paeds uniq	ue patient ID:
Age:(days)(months) (yea	rs) Gender: 🗌 Male	Female Weight:kg
Date of first presentation://	(DD/MM/YYYY) H	ome town
Healthcare facility of first presentation name	:	
Date of admission:/ (DD/M	M/YYYY)	
Date of surgery:/ (DD/MM/	YYYY)	
Haemoglobin:g/L (no more	e than 28 days before s	surgery)
COVID-19 Diagnosis confirmed Previou	us (>7 wks pre-op)	Recent (1-7wks pre-op)
Perioperative (<1wk pre-op to 30 days po	ost-op) 🗌 None	Not tested
COVID-19 Symptoms Yes No C	OVID-19 Vaccination	Yes No
Comorbid disease: (tick <i>all</i> that apply):		
Cardiac disease Chronic Respirato	ry disease 🗌 Neurolo	ogical disorder 🗌 HIV/AIDS
Cancer Current respiratory	ract infection	
Urgency of surgery: Elective	Expedited	Urgent Immediate
Severity of surgery: Minor	Intermediate	Major
Primary indication for surgery:		
Non-communicable disease	Traumatic injury	Infective Congenital
Type of surgery:		
Neurosurgery Cardiac	Gynae	Thoracic ENT
Hepatobiliary Orthopaedic	Maxillofacial/ denta	I 🔲 Gastrointestinal
Kidney/ Urology Ophthalmology.	Plastics/cutaneous	Burns Other
Anaesthesia induction: Time: (hh:mm; 24h) After hours? Yes No		
Surgical checklist used (e.g., WHO check	list)? 🗌 Yes 🗌 No	Duration of surgery:min
Personnel: Most senior personnel preser	nt in operating room	
Anaesthetist: Specialist	n-specialist physician	Nurse Non-physician
Surgeon: Specialist Nor	n-specialist physician	Nurse Non-physician
Intraoperative Severe Critical Incidents:		
Laryngospasm Aspiration	Bronchospasm	Severe hypoxia
Difficult bag mask ventilation	Difficult intubation	Failed intubation
Anaphylaxis Cardiac arrest	Bradycardia	Cardiovascular instability
Temp < 36 Low glucose	Drug error	Death (on table)
ASOS-Paeds case record form v2	2.0	Page 1 of 2
×		
Patient name:	ДОВ	d d m m y y y y
Patient hospital number :	ASOS-Paeds uni	que patient ID: -

African Surgical Outcomes Study in Paediatric patients (ASOS-Paeds) <u>Postoperative case record form</u>

ASOS-Paeds unique patient ID:	-
-------------------------------	--------------

Postoperative Follow up:

Level of care immediately post-op:

□ Ward □ High care □ Critical care

Postoperative complications:				
Infection				
Superficial surgical site Infection	☐ Mild	Moderate	Severe	None None
Deep surgical site Infection	Mild	Moderate	Severe	🗌 None
Body cavity infection	Mild	Moderate	Severe	None
Bloodstream infection	Mild	Moderate	Severe	None
Pneumonia	Mild	Moderate	Severe	None
Other infection	☐ Mild	Moderate	Severe	☐ None
<u>Cardiovascular</u>				
Cardiac arrest				
Arrhythmia	☐ Mild	Moderate	Severe	☐ None
<u>Other</u>				
Bleeding	Mild	Moderate	Severe Severe	None
Acute kidney injury	☐ Mild	☐ Moderate	Severe	☐ None
Other complications	🗌 Mild	Moderate	Severe	🗌 None
Re-operation				
Days in hospital after surgery				
Date of discharge://		(YYY)		
Status at hospital discharge or 30 th postoperative in-hospital day Alive Dead				
ASOS-Paeds case record	form v2.0		Page 2	2 of 2
<i>∝</i> Patient name:		DOB [v v v
Patient hospital number :		ASOS-Paeds uniqu	e patient ID:	-

Supplementary Material S4. African Surgical Outcomes Study in Paediatrics (ASOS-Paeds) definitions

Definitions for preoperative and surgical data

Date of first presentation

This is the date the patient first presented to a healthcare facility for the condition or problem which the surgery is for.

Healthcare facility of first presentation

This is the hospital or clinic where the patient first presented for the condition or problem which has resulted in them having surgery.

Home town

The village, city, or town nearest to where the patient lives.

American Society of Anesthesiologists (ASA) physical status score

		Paediatric examples including but not limited to:
ASA I	A normal healthy patient	Healthy (no acute or chronic disease), normal BMI percentile for age
ASA II	A patient with mild systemic disease which does not limit physical activity	Asymptomatic congenital cardiac disease, well controlled dysrhythmias, asthma without exacerbation, well controlled epilepsy, non-insulin dependent diabetes mellitus, abnormal BMI percentile for age, mild/moderate OSA, oncologic state in remission, autism with mild limitations
ASA III	A patient with severe systemic disease which limits physical activity	Uncorrected stable congenital cardiac abnormality, asthma with exacerbation, poorly controlled epilepsy, insulin dependent diabetes mellitus, morbid obesity, malnutrition, severe OSA, oncologic state, renal failure, muscular dystrophy, cystic fibrosis, history of organ transplantation, brain/spinal cord malformation, symptomatic hydrocephalus, premature infant PCA <60 weeks, autism with severe limitations, metabolic disease, difficult airway, long term parenteral nutrition. Full term infants <6 weeks of age.
ASA IV	A patient with severe systemic disease that is a constant threat to life	Symptomatic congenital cardiac abnormality, congestive heart failure, active sequelae of prematurity, acute hypoxic-ischemic encephalopathy, shock, sepsis, disseminated intravascular coagulation, automatic implantable cardioverter-defibrillator, ventilator dependence, endocrinopathy, severe trauma, severe respiratory distress, advanced oncologic state.
ASA V	A patient who is not expected to survive for 24 hours without the operation	Massive trauma, intracranial hemorrhage with mass effect, patient requiring ECMO, respiratory failure or arrest, malignant hypertension, decompensated congestive heart failure, hepatic encephalopathy, ischemic bowel or multiple organ/system dysfunction.

What should I do if some important medical co-morbidities are not included on the case record form (CRF)?

We realise that some patients may have important data which we have not asked for. The CRF has been designed to request only the most important patient data.

Co-morbid disease

We have not made definitions for all these diseases. We simply want doctors to give what they believe are the most appropriate answers. If the patient probably has the disease, then tick the box. If they probably do not have the disease, then leave it blank.

We have defined the following:

Cardiac disease: any cardiac disease including pulmonary hypertension

Chronic respiratory disease: any chronic disease of the lungs/airways

Current respiratory tract infection: currently on treatment for or has active signs of an upper or lower respiratory tract infection e.g. tonsillitis, sinusitis, common cold, pneumonia, bronchitis, bronchopneumonia

Duration of surgery

Duration of surgery is calculated from 'anaesthetic induction time' until 'the end of surgery'. We realise that some patients will have regional techniques prior to general anaesthesia, and possibly in a 'block room' prior to transfer to the operating room. The 'anaesthetic induction start time' should be taken from the time of the first anaesthetic intervention i.e. if it is in a remote 'block room' then this is the anaesthetic start time. The 'end of surgery' is defined as the time at which the patient leaves the operating room.

Urgency of surgery

Elective: Intervention planned or booked in advance of routine admission to hospital. Timing to suit patient, hospital and staff.

Expedited: Patient requiring early treatment where the condition is not an immediate threat to life, limb or organ survival. Normally within days of decision to operate.

Urgent: Intervention for acute onset or clinical deterioration of potentially life-threatening conditions, for those conditions that may threaten the survival of limb or organ, for fixation of many fractures and for relief of pain or other distressing symptoms. Normally within hours of decision to operate.

Immediate: Immediate life, limb or organ-saving intervention – resuscitation simultaneous with intervention. Normally within minutes of decision to operate.

Life-saving

Other e.g. limb or organ saving

Severity of the surgery

This is the category of surgery which indicates a combination of complexity and amount of tissue injury. Minor surgery would include procedures lasting less than 30 minutes performed in a dedicated operating room which would often involve extremities or body surface or brief diagnostic and therapeutic procedures . Examples include examination under anaesthesia, cystoscopy without intervention, removal of small cutaneous tumour, biopsy of small lesions, tenotomies, interventional radiology etc.

Intermediate procedures are more prolonged or complex that may pose the risk of significant complications or tissue injury. Examples include insertion of k-wires, tonsillectomy, inguinal hernia repair, appendicectomy, tendon repair of hand, cleft lip and palate repair, ventriculoperitoneal shunts, strabismus surgery etc. Major surgical procedures are expected to last more than 90 minutes and include major abdominal surgery, cardiac surgery, thoracotomy, procedures involving free flap to repair tissue defect, amputation, craniofacial surgery, craniotomy, cystectomy, resection of liver lesions, nephrectomy, transplant surgery, spinal surgery, osteotomy etc.

Primary indication for surgery

This is the underlying initiating disease/ event which ultimately resulted in the need for surgery. For example, should a patient present with a fractured humerus after a minor fall, but is found to have a malignant tumour at the fracture site, then the primary indication for surgery is 'non-communicable disease' i.e. cancer, and not 'traumatic injury' i.e. trauma, as the tumour preceded the fall. Another example is a patient presenting with an abscess for incision and drainage who is a diabetic. The underlying disease is diabetes and therefore the primary indication is "non-communicable". An inguinal hernia requiring inguinal herniorrhaphy in a neonate is a congenital condition.

Traumatic injury as the primary indication for surgery

Injury is defined as damage or harm to the body resulting in impairment of health whether unintentional or intentional. It can result from exposure to thermal, mechanical, electrical, or chemical energies. The World Health Organization defines 'Violence' as the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, which either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation (World Health Organization, 2002). Unintentional injuries may include near drowning, falls, burns, motor vehicle accidents, poisonings, sports injuries and traumatic brain injury amongst others. Intentional injuries (or violence) may include assault,

parasuicide, etc. Therefore 'traumatic injury' would include all intentional and unintentional injuries which were primarily responsible for surgery.

Neurosurgery

Neurosurgical procedures are defined as involving the brain and cervical spine. Surgery on the thoracic and lumbar spine is defined as orthopaedic surgery.

Anaesthesia and Surgical providers

We have decided to ask about the most senior staff member who is involved in the case and are present in the operating room. The most senior surgeon may not perform the operation themselves but watch a junior colleague do this. However, they are still the most senior surgeon in the operating room and could, for example, assist if something went wrong. The most senior surgeon may not be present in the operating room throughout the entire procedure. The same principles apply to anaesthetists.

Physician (specialist) anaesthesiologist/surgeon: A graduate of medical school who has completed a *nationally recognized* specialist anaesthesia/surgery training program/residency

Non-specialist physician anaesthetist/surgeon: A graduate of medical school who has not completed a specialist training program/residency in anaesthesia/surgery but has undergone some formal anaesthesia/surgery training

Nurse anaesthetist/surgeon: A graduate of a nursing school who has also completed a *nationally recognized* nurse anaesthetist/ nurse surgeon training program

Non-physician, non-nurse anaesthetist: An anaesthesia/surgery provider with no nursing degree, but who has completed a *nationally recognized* anaesthetist/surgery training program

Definitions of intra-operative severe anaesthesia-related critical events

The following definitions are provided for guidance where the nature of a possible complication during anaesthesia is uncertain. These include any events which take place from the start of anaesthesia until discharge from PACU.

Anaphylaxis

The occurrence of any suspected IgE or non-IgE mediated severe allergic reaction leading to cardiovascular instability and/or severe bronchospasm and requiring immediate resuscitation (fluid resuscitation and adrenaline).

Aspiration

Regurgitation or vomiting of gastric contents which has passed through the larynx into the trachea or tracheobronchial tree.

Bradycardia

Defined as heart rate below lowest normal value for age

AGE	Normal HR bpm
Newborn – 3 months	80 - 205
3 months - 2 years	75-190
2 - 10 years	60-140
>10 years	50-100

Bronchospasm

Bronchospasm is defined as an increased respiratory effort, especially during expiration, and wheeze on auscultation. If the patient is ventilated, bronchospasm may also be considered if a significant increase in peak inspiratory pressure (under volume controlled ventilation) or significant decrease in tidal volume (under pressure controlled ventilation) are observed. In all cases, any episode of airway constriction requiring the administration of a bronchodilator will be included. (ref)

Cardiac arrest

Cardiac arrest associated with the induction or maintenance of general anaesthesia, regional anaesthesia or airway manipulation.

Cardiac arrest is defined as the cessation of cardiac mechanical activity, as confirmed by the absence of signs of circulation. ECG changes may corroborate the incidence of cardiac arrest.

Cardiovascular instability

The occurrence of any of the following:

Arrhythmia

Electrocardiograph (ECG) evidence of cardiac rhythm disturbance severe enough to require treatment (e.g. antiarrhythmic agents, vasoactive agents, intravenous fluid, etc.). This includes arrhythmias occurring following regional analgesia and requiring

intervention. For example: bradycardia requiring atropine, supraventricular tachycardia, atrial or ventricular tachyarrhythmia, torsade de Pointe, etc.

Severe hypotension

A reduction in blood pressure more than 30% below normal baseline for age

AGE	NORMAL SYSTOLIC	NORMAL DIASTOLIC
	PRESSURE	PRESSURE
Neonate	67 - 84	35 - 53
- 12 months	72 - 104	37 - 56
1-2 years	86 - 106	42 - 63
3 - 5 years	89 - 112	46 - 72
6 - 9years	97 - 115	57 - 76
10 – 11 years	102 - 120	61 - 80
12 – 16 years	110 - 131	64 - 83

Bleeding

Bleeding resulting in hypotension and necessitating unanticipated and unpredicted blood transfusion.

Cardiovascular instability despite anticipated bleeding and transfusion (e.g.: liver transplant, scoliosis surgery...)

Difficult BMV (Bag mask ventilation)

When it is not possible for the anaesthesiologist to provide adequate ventilation because of one or more of the following problems: inadequate mask seal, excessive gas leak, or excessive resistance to the ingress or egress of gas. (ASA)

Difficult intubation

Tracheal intubation that requires multiple attempts

Drug Error

Drug error is defined as the administration of a wrong drug, or a wrong dose given by any route, or a wrong site of administration, that has led to either respiratory/cardiac/neurological consequence or to an unplanned admission to the ICU.

Failed intubation

Failure to place the endotracheal tube after multiple intubation attempts.

Laryngospasm

Laryngospasm is defined either as complete airway obstruction associated with rigidity of the abdominal and chest walls and leading to unsuccessful ventilation of the patient, or glottic closure associated with chest movement but silent unsuccessful respiratory efforts and unsuccessful assisted ventilation of the patient, unrelieved in both situations with simple jaw thrust and CPAP manoeuvres and requiring the administration of medication (propofol, suxamethonium, lignocaine spray on vocal cords etc.) and/or tracheal intubation.

Low Glucose

Levels below the following blood glucose levels; First 24 hours of life <1.65 mmol/l Neonates (>24hours old) <2.5mmol/l

Severe hypoxia

Hypoxia with a peripheral saturation of <80% on pulse oximetry, or clinical impression of hypoxia in the absence of a pulse oximeter.

Definitions and grading of surgical complications

The following definitions and grading are provided for guidance where the nature and severity of a possible complication following surgery is uncertain. Specific definitions are also provided below.

Select the complication and indicate if it is severe.

The degrees of severity describe the degree of impact on the patient. The definition of severe is taken from the more complicated Clavien-Dindo (CD) classification and is a composite of grades III to V, unless otherwise specified. (See table below)

GRADE	Equivalent to Clavien-Dindo Grade	Definition
ASOS-Paeds mild grade	Ι	Any deviation from normal postoperative course without the need for pharmacological treatment or surgical, endoscopic and radiological interventions. Allowed therapeutic regimens are: drugs as anti- emetics, antipyretics, analgesics, diuretics and electrolytes and physiotherapy. This grade also includes wound infections opened at the bedside.
ASOS-Paeds moderate grade	Π	Requiring pharmacological treatment with drugs other than such allowed for grade I complications. Blood transfusions and total parenteral nutrition are also included.
ASOS-Paeds severe grade	III	Requiring surgical, endoscopic or radiological intervention IIIa) intervention not under general anesthesia IIIb) intervention under general anesthesia
	IV	Life-threatening complication (including CNS complications) requiring IC/ICU-management IVa) single organ dysfunction (including dialysis) IVb) multi organ dysfunction
	V	Death of a patient

Acute Kidney Injury (AKI)

Acute Kidney Injury (AKI) Stage	AKIN	KDIGO
Mild	Stage 1 Increase in creatinine of ≥50% or absolute increase in creatinine of 0.3mg/dl	Stage 1 Increase in creatinine of ≥50% or absolute increase in creatinine of 0.3mg/dl

Moderate	Stage 2 Increase in creatinine of ≥100%	Stage 2 Increase in creatinine of ≥100%
Severe	Stage 3 Increase in creatinine of ≥200%	Stage 3 Increase in creatinine of ≥200% or eGFR ≤35ml/min per 1.73m ² (if age < 18 yr) or Renal Replacement Therapy

Guidance:

Estimate eGFR (estimated glomerular filtration rate) using the Schwartz method. (eGFR = 0.413 x (height/serum creatinine) if height is in cm)

Baseline serum creatinine should have been measured before surgery but an estimated value can be used if the patient does not have chronic kidney disease.

Severity grading

As per the table above.

Arrhythmia

Electrocardiograph (ECG) evidence of cardiac rhythm disturbance.

ASOS- Paeds Severity grading

See categories and definitions on page 10

Cardiac arrest

The cessation of cardiac mechanical activity, as confirmed by the absence of signs of circulation. ECG changes may corroborate the incidence of cardiac arrest.

Tick on CRF if Yes

Bloodstream infection

An infection in the blood stream which may or may not be related to infection at another site and which meets at least one of the following criteria:

Patient has a recognised pathogen cultured from blood cultures which may or may not related to an infection at another site.

Patient has at least one of the following signs or symptoms: fever (>38°C), chills, or hypotension and at least one of the following:

common skin contaminant cultured from two or more blood cultures drawn on separate occasions

common skin contaminant cultured from at least one blood culture from a patient with an intravascular line, and a physician starts antimicrobial therapy

positive blood antigen test

ASOS-Paeds Severity grading

See categories and definitions on page 10

Other infection Any other type of infection

ASOS-Paeds Severity grading

See categories and definitions on page 10

Pneumonia

Child with a cough or difficulty breathing, coarse crackles, reduced breath sounds or bronchial breathing on auscultation, fever, lower chest wall indrawing, nasal flaring, grunting or head nodding.

Chest radiographs with new or progressive and persistent infiltrates, or consolidation, or cavitation, or clinical diagnosis with severity below:

Pneumonia Severity grading:

Pneumonia	Equivalent to earlier WHO staging	Definition
Mild	Fast breathing pneumonia	Fast breathing with a respiratory rate of ≥ 60 breaths/minute in children < 2months old; ≥ 50 breaths/minute in children 2- 11 months old; ≥ 40 breaths/minute in children 1- 5 years old; ≥ 35 breaths/minute in children 5-15 years old Crackles, reduced breath sounds or bronchial breathing on auscultation.
Moderate	Chest indrawing pneumonia	Cough or difficulty breathing plus any one of the following: Chest indrawing Nasal flaring Grunting (in young infants)
Severe	General danger signs pneumonia	Cough or difficulty breathing plus any one of the following: Central cyanosis Severe respiratory distress (head nodding) Not being able to drink Convulsions lethargy or unconsciousness

Postoperative bleed

Blood loss occurring within 72 hours after the end of surgery which would normally result in transfusion of blood according to your unit protocol.

ASOS-Paeds Severity grading

See categories and definitions on page 10

Surgical site infection (superficial)

Infection involving only superficial surgical incision which meets the following criteria:

Infection occurs within 30 days after surgery and

Involves only skin and subcutaneous tissues of the incision and

The patient has at least one of the following:

purulent drainage from the superficial incision

organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision and at least one of the following signs or symptoms of infection: pain or tenderness, localized swelling, redness, or heat, or superficial incision is deliberately opened by surgeon and is culture positive or not cultured. A culture-negative finding does not meet this criterion.

diagnosis of an incisional surgical site infection by a surgeon or attending physician

ASOS-Paeds Severity grading

See categories and definitions on page 10

Surgical site infection (deep)

An infection which involves both superficial and deep parts of surgical incision and meets the following criteria: Infection occurs within 30 days after surgery if no surgical implant is left in place or one year if an implant is in place and

The infection appears to be related to the surgical procedure and involves deep soft tissues of the incision (e.g. fascial and muscle layers) and

The patient has at least one of the following:

purulent drainage from the deep incision but not from the organ/space component of the surgical site a deep incision spontaneously dehisces or is deliberately opened by a surgeon and is culture-positive or no cultures were taken whilst the patient has at least one of the following signs or symptoms of infection: fever (>38°C) or localized pain or tenderness. A culture-negative finding does not meet this criterion.

an abscess or other evidence of infection involving the deep incision is found on direct examination, during surgery, or by histopathologic or radiologic examination

diagnosis of a deep incisional surgical site infection by a surgeon or attending physician

ASOS-Paeds Severity grading

See categories and definitions on page 10

Surgical site infection (body cavity/organ/space)

An infection which involves any part of the body excluding the fascia or muscle layers and meets the following criteria:

Infection occurs within 30 days after surgery and

The infection appears to be related to the surgical procedure and involves any part of the body, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure and The patient has at least one of the following:

purulent drainage from a drain that is placed through a stab wound into the organ/space

organisms isolated from an aseptically obtained culture of fluid or tissue in the organ/ space

an abscess or other evidence of infection involving the organ/space that is found on direct examination, during reoperation, or by histopathologic or radiologic examination

diagnosis of an organ/space surgical site infection by a surgeon or attending physician

ASOS-Paeds Severity grading

See categories and definitions on page 10

Hospital resource use after surgery

We will collect some basic data to describe the treatment resources patients received after surgery. Level of care would be the level of care patient entered immediately after surgery.

High Care

A postoperative ward which is dedicated to providing increased postoperative care, when compared to the normal postoperative surgical ward.

Critical Care

We have defined a critical care unit as a facility routinely capable of admitting patients who require single or multiple organ support such as invasive ventilation overnight.

Days in hospital after surgery: Total number of days in hospital from the day of surgery to the day the patient leaves your hospital. This will not be adjusted for delays relating to provision of social care

Status at hospital discharge or 30th postoperative in-hospital day: The survival status of the patient at hospital discharge, or at the 30th in-hospital day (if the patient had not yet been discharged following surgery). The study is censored at the 30th in hospital postoperative day. All patients are followed until hospital discharge or for thirty days after surgery whichever is the shortest.

Abbreviations List:

AIDS : Acquired Immunodeficiency Syndrome ASA: American Society of Anaesthesia BMV : bag mask ventilation BP : blood pressure Critical Care CC: CVS: cardiovascular system DOB : date of birth ENT: Ear Nose and Throat ETT: endotracheal tube Gender : M = male F = femaleGIT : gastrointestinal system HIV : Human Immunodeficiency Virus RRT: renal replacement therapy URTI : upper respiratory tract infection WHO : World Health Organisation Y: Yes N: No

Supplementary Material S5. ASOS-Paeds Frequently Asked Questions

Frequently asked questions (FAQs) listed on the study website for Patient CRFs

What if a patient had previous operations OUTSIDE the recruitment period

If a patient had a previous operation **before** recruitment started, they are recruited to the study and the operation counts as the first surgery, but if they came back for a subsequent surgery in the recruitment period then it is not included.

What if there are previous complications existing before surgery

If patients came in with a complication, it is not recorded. Only new complications are reported. For example, if a patient comes in with an infection it doesn't count, but if they get a new infection then it is counted as a complication of this surgery.

If a patient had to go for a second surgery INSIDE the recruitment period

You should not complete a new CRF form if a patient comes back for surgery if they have already been included in the study. If they had to have a second operation, the option "re-operation" is selected on the postoperative follow up CRF. Any postoperative complication needs to be recorded as appropriate.

Under what 'type of surgery' is an umbilical or inguinal hernia repair

Please list umbilical and inguinal hernia operations under 'other' category for 'type of surgery'

What is the meaning of "After Hours" on the patient CRF form?

After hours refers to what is considered after hours at your hospital. Everyone has different work patterns so after hours could be different in different places.

What to select under co-morbid disease

We have not made definitions for all these diseases. We simply want doctors to give what they believe are the most appropriate answers. If the patient probably has the disease, then tick the box. If they probably do not have the disease, then leave it blank.

Supplementary Material S6. ASOS-Paeds Statistical Analysis Plan

Recruitment description

Site and patient recruitment and description will be presented as follows:

• Strobe flow diagram including i) countries (excluded and included), ii) number of eligible patients, iii) patients included and excluded,

- The patient and surgical characteristics of the cohort will be presented in a Table, and
- The number of participating hospitals and patients at each level will be reported

Categorical variables will be described as proportions and will be compared using chi-square tests. Continuous variables will be described as mean and standard deviation if normally distributed or median and inter-quartile range (IQR) if not normally distributed. No comparisons between groups will be performed at a univariate level. Data completeness will be reported as the frequency of missing data.

Objectives

Primary objective

To determine the incidence of in-hospital postoperative complications up to 30 days post-surgery in paediatric surgical patients <18 years in Africa

Statistical analysis plan for primary objective

We will present the number and proportion for these data. Complications will be reported as total, and mild, moderate and severe complications. The absolute incidence of complications will also be reported for i) Infective, ii) Cardiovascular and iii) Other. 'All complications' will be defined as patients with any reported complication. Patients with 'complications' data fields with missing data will not be used in determining the presence or absence of 'all complications'.

Secondary objectives

In paediatric surgical patients < 18 years in Africa:

- 1. To determine the in-hospital peri-operative mortality rate up to 30 days post-surgery,
- 2. To determine the incidence of intraoperative severe critical incidents,

3. To determine the association between pre-operative, intra-operative and facility factors with postoperative complications and death.

Statistical analysis plan for secondary objectives

1. To determine the in-hospital peri-operative mortality rate up to 30 days post-surgery

We will present the number and proportion for these data for i) mortality on the day of surgery, and ii) mortality in hospital within 30 days of surgery.

2. To determine the incidence of intraoperative severe critical incidents,

We will present the number and proportion for these data, including individual severe critical incidents, and the categories of respiratory, cardiovascular, metabolic, drug error and death. (Severe critical incidents will be presented in a secondary paper)

3. To determine the association between pre-operative, intra-operative and facility factors with postoperative complications and death.

The following risk factors will be entered into the model: i) Patient factors: i.e. age, gender, ASA, comorbidities, and ii) Surgical risk factors: i.e. urgency, severity, surgical discipline, surgery out of hours, surgery duration. The model outcomes will be: i) all complications, and ii) death.

The models will only include patients with complete outcome data (i.e. patients who are still in hospital receiving therapy, and have not reached the outcome definition of death, discharge, or in-hospital at 30 days will be excluded). Generalized linear mixed models using a logit link will be used to identify independent risk factors for the binary outcome of mortality. We will use a three-level generalized mixed model, with patients being at the first level, hospital at the second and country at the third level, to account for the expected correlation in outcomes within hospitals and countries. We will exclude patients with missing values for potential risk predictors, and only use a complete case analysis if there are <5% of the dataset with incomplete potential clinical risk predictors. All risk factors will be entered into the model, unless the number of reported deaths is insufficient to provide 10 events (deaths) per variable. Should the events per variable be <10, then variables with a univariate association of p<0.05, and variables with biological plausibility and a low rate of missing data will be used.

Collinearity will be assessed using the variance inflation factor. If collinearity is detected, then variables will either be excluded or combined. The model fit will be evaluated.

Results of the logistic regression will be reported as adjusted odds ratios (OR) with 95% confidence intervals (CI). The models will be assessed through the use of sensitivity analyses to explore possible interacting factors and examine any effect on the results.

Univariate and multivariate statistical analyses will be performed using the Statistical Package for the Social Sciences (SPSS) version 28.0.1.1 (SPSS Inc., Chicago, IL, USA).

Sensitivity analyses will be conducted for the primary outcome, which will include:

- 1. Elective surgical cohort only,
- 2. Emergency surgical cohort only and

3. A cohort excluding patients with a current or recently diagnosed Covid-19 infection (defined as confirmed Covid-19 infection from 7 weeks preoperatively to 30 days postoperatively).

Results will be reported as adjusted odds ratios (OR) with 95% confidence intervals.

Country	n	(%)
Algeria	457	5.3
Burkina Faso	159	1.8
Cameroon	50	0.6
Congo	24	0.3
Democratic Republic of the Congo	79	0.9
Egypt	1229	14.2
Ethiopia	369	4.3
Gambia	101	1.2
Ghana	245	2.8
Guinea	48	0.6
Kenya	120	1.4
Libya	737	8.5
Madagascar	74	0.9
Malawi	137	1.6
Mali	76	0.9
Mauritius	65	0.8
Morocco	385	4.5
Namibia	140	1.6
Niger	252	2.9
Nigeria	557	6.5
Rwanda	19	0.2
Senegal	127	1.5
Seychelles	17	0.2
Sierra Leone	16	0.2
Somalia	57	0.7
Somaliland	48	0.6
South Africa	1870	21.7
Sudan	265	3.1
Tunisia	349	4.0
Uganda	510	5.9
Zimbabwe	43	0.5
Total	8625	100

Supplementary Material S7. Patient recruitment per country

Operating rooms and equipment for safe surgery	n (%)
The operating rooms were considered safe for:	
Neonate anaesthesia	121/223 (54.3%)
Infant anaesthesia	147/223 (65.9%)
Children 2-5 anaesthesia	188/223 (84.3%)
Children 6-12 anaesthesia	204/223 (91.5%)
Adolescents 13-17 anaesthesia	204/223 (91.5%)
Neonate surgery	121/223 (54.3%)
Infant surgery	149/223 (66.8%)
Children 2-5 surgery	189/223 (84.8%)
Children 6-12 surgery	203/223 (91.0%)
Adolescents 13-17 surgery	204/223 (91.5%)
Blood transfusions are performed at the facility	219/222 (98.6%)
The hospital has a blood bank on site	170/222 (76.6%)
Presence of a reliable electricity supply	
Always	174/221 (78.4%)
Sometimes	47/221 (21.2%)
Never	1/221 (0.5%)
Presence of a reliable oxygen supply	
Always	179/221 (81.0%)
Sometimes	42/221 (19.0%)
Never	0/221 (0%)
Sites with functioning incubators	173/221 (78.3%)
Sites with functioning electric patient warming devices	148/221 (67.0%)
Sites with a dedicated Paediatric Emergency Airway trolley in the operating complex	124/221 (56.1%)
Medication availability	
Atropine availability	
Always	195/221 (88.2%)
Sometimes	26/221 (11.8%)
Never	0/221 (0%)
Fentanyl availability	
Always	173/221 (78.3%)
Sometimes	41/221 (18.6%)
Never	7/221 (3.2%)
Epinephrine availability	
Always	188/221 (85.1%)
Sometimes	31/221 (14.0%)
Never	2/221 (0.9%)
Protocols and administrative data collection	
Hospital administration captures variables to determine perioperative mortality	138/221 (62.4%)
A hospital protocol for paediatric preoperative fasting	145/221 (65.6%)
A hospital protocol for paediatric emergency airway management	96/221 (43.4%)

Supplementary Material S8. Operating room preparedness, equipment, drugs and protocols necessary for safe paediatric surgery

Data are n/N (%). Denominators vary with the completeness of the data.

Hospital categories	Number of hospitals (n %)	Number of patients (n %)	Complications (n %)	No complications (n %)	Died (n %)	Survived (n %)
Hospital level*						
First level	41/240 (17.1%)	957/8709 (11.0%)	98/1445 (6.8%)	543/6584 (8.2%)	15/184 (8.2%)	632/7899 (8.0%)
Second level	52/240 (21.7%)	1250/8709 (14.4%)	134/1445 (9.3%)	801/6584 (12.2%)	15/184 (8.2%)	923/7899 (11.7%)
Third level	147/240 (61.3%)	6502/8709 (74.7%)	1213/1445 (83.9%)	543/6584 (8.2%)	154/184 (83.7%)	6344/7899 (80.3%)
Hospital funding						
Government-funded	169/213 (79.3%)	5751/8233 (69.9%)	972/1198 (81.1%)	4482/5663 (79.1%)	131/146 (89.7%)	5360/6765 (79.2%)
Privately funded	22/213 (10.3%)	807/8233 (9.8%)	130/1198 (10.9%)	676/5663 (11.9%)	9/146 (6.2%)	797/6765 (11.8%)
NGO/Mission/Charity facility	22/213 (10.3%)	614/8233 (7.5%)	96/1198 (8.0%)	505/5663 (8.9%)	6/146 (4.1%)	608/6765 (9.0%)
University hospital	69/249 (27.7%)	2986/8233 (36.3%)	623/1466 (42.5%)	2337/6707 (34.8%)	81/189 (42.9%)	2903/8038 (36.1%)

Supplementary Material S9. Postoperative outcomes by facility level in the African Surgical Outcomes Study in Paediatric patients (ASOS-Paeds)

Data are n/N (%). Denominators vary with the completeness of the data. *NGO non-governmental organisation

***Definitions of hospital levels**

Level of care	Alternative terms commonly found in the literature
First-level hospitals: Few specialties—mainly internal medicine, obstetrics and gynaecology, paediatrics,	Primary-level hospital
and general surgery; often only one general practice physician or a nonphysician practitioner; limited laboratory services available for general but not specialized pathological analysis; from 50 to 250 beds.	District hospital
	Rural hospital
	Community hospital
	General hospital
Second-level hospitals: More differentiated by function with as many as 5 to 10 clinical specialties; from	Regional hospital
200 to 800 beds.	Provincial hospital (or equivalent administrative area such as county)
	General hospital
Third-level hospitals: Highly specialized staff and technical equipment—for example, cardiology,	National hospital
intensive care unit, and specialized imaging units; clinical services highly differentiated by function; could	Central hospital
have teaching activities; from 500 to 1,500 beds.	Academic or teaching or university hospital

Supplementary Material S10. Data missingness for the generalised linear mixed model

	Missing (n)	Missing (%)	Valid (n)
Mortality	29	0.3%	8596
Complications	110	1.3%	8515
Anaesthesia induction after hours	119	1.4%	8506
Duration of surgery	76	0.9%	8549
ASA Physical Status	46	0.5%	8579
Indication for surgery	35	0.4%	8590
Age category	34	0.4%	8591
Severity of surgery	31	0.4%	8594
Gender	25	0.3%	8600
Type of surgery	25	0.3%	8600
Elective or emergency surgery	21	0.2%	8604
Cardiac disease	13	0.2%	8612
Chronic respiratory disease	13	0.2%	8612
Neurological disorder	13	0.2%	8612
HIV/AIDS	13	0.2%	8612
Cancer	13	0.2%	8612
Current respiratory tract infection	13	0.2%	8612
Other comorbidity	13	0.2%	8612

ASA American Society of Anesthesiology; HIV/AIDS human immunodeficiency virus/ acquired immunodeficiency syndrome

Supplementary Material S11. Generalised linear mixed model factors independently associated with postoperative complications. Sensitivity analysis: elective surgery only.

Model Term	Odds Ratio	2·5% confidence limit	97·5% confidence limit	P-value
Intercept (odds)	0.037	0.017	0.08	<0.001
Age 0-28 days	1.968	1.043	3.714	0.037
29-364 days	0.938	0.635	1.385	0.746
1-3 years	0.792	0.56	1.119	0.185
4-12 years	0.692	0.503	0.953	0.024
Age 13-<18 years	Reference			
Female	1.099	0.894	1.35	0.37
Male	Reference			
ASA 4 and 5	10.891	3.273	36.236	<0.001
ASA 3	1.869	1.203	2.904	0.005
ASA 2	1.23	0.94	1.608	0.131
ASA 1	Reference			
Cardiac disease	0.749	0.37	1.513	0.42
Chronic respiratory disease	2.435	1.379	4.298	0.002
Neurological disorder	1.775	1.036	3.042	0.037
HIV/AIDS	0.753	0.16	3.534	0.719
Cancer	2.379	1.216	4.655	0.011
Current respiratory tract infection	2.695	1.622	4.479	<0.001
Other	1.093	0.614	1.944	0.763
Major	1.594	1.139	2.232	0.007
Intermediate	1.196	0.933	1.533	0.158
Minor	Reference			•
Congenital	1.044	0.806	1.352	0.742
Infective	1.496	1.015	2.206	0.042
Traumatic	1.754	1.162	2.647	0.008
Non-communicable	Reference	•	•	•
Other	1.516	0.716	3.209	0.277
Burns	1.196	0.396	3.611	0.751
Plastics/cutaneous	1.698	0.815	3.541	0.158
Ophthalmology	0.398	0.137	1.156	0.09
Kidney/urology	1.886	0.946	3.763	0.072
Gastrointestinal	1.631	0.819	3.25	0.164
Orthopaedic	1.354	0.653	2.81	0.415
Hepatobiliary	1.359	0.402	4.593	0.621
Ear nose and throat	1.282	0.621	2.646	0.502
Thoracic	8.135	2.427	27.271	<0.001
Gynae	0.946	0.243	3.684	0.936
Cardiac	3.39	1.221	9.41	0.019

Neurosurgery	1.455	0.634	3.338	0.376
Maxillofacial and dental	Reference			
Surgery after hours	1.553	1.084	2.224	0.016
Surgery not after hours	Reference			
Duration of surgery (per minute increase)	1.006	1.005	1.008	<0.001

ASA American Society of Anesthesiology; HIV/AIDS human immunodeficiency virus/ acquired immunodeficiency syndrome

Supplementary Material S12. Generalised linear mixed model factors independently associated with postoperative complications. Sensitivity analysis: emergency surgery only.

Model Term	Odds Ratio	2.5% confidence	97.5% confidence	P-value
Intercept (odds)	0.082	0.031	0.213	<0.001
Age 0-28 days	2.153	1.304	3.554	0.003
29-364 days	1.538	1.044	2.265	0.029
1-3 years	1.354	0.951	1.927	0.093
4-12 years	1.21	0.909	1.61	0.191
Age 13-<18 years	Reference			•
Female	1.009	0.826	1.234	0.927
Male	Reference	•	•	•
ASA 4 and 5	6.679	3.99	11.182	<.001
ASA 3	3.135	2.257	4.354	<.001
ASA 2	1.558	1.189	2.041	0.001
ASA 1	Reference	•	•	•
Cardiac disease	1.627	0.855	3.096	0.138
Chronic respiratory disease	1.428	0.726	2.807	0.302
Neurological disorder	1.886	1.122	3.17	0.017
HIV/AIDS	0.185	0.036	0.963	0.045
Cancer	1.626	0.867	3.048	0.129
Current respiratory tract infection	1.927	1.217	3.052	0.005
Other	2.36	1.351	4.121	0.003
Major	2.992	2.038	4.392	<0.001
Intermediate	1.723	1.252	2.371	<0.001
Minor	Reference			
Congenital	1.018	0.712	1.455	0.922
Infective	1.523	1.116	2.08	0.008
Traumatic	1.216	0.832	1.776	0.313
Non-communicable	Reference			
Other	0.733	0.281	1.91	0.524
Burns	1.766	0.649	4.807	0.266
Plastics/cutaneous	1.431	0.55	3.723	0.462
Ophthalmology	0.137	0.036	0.524	0.004
Kidney/urology	0.639	0.251	1.626	0.348
Gastrointestinal	0.645	0.272	1.528	0.319
Orthopaedic	0.508	0.209	1.234	0.135
Hepatobiliary	1.006	0.283	3.582	0.992
Ear nose and throat	0.592	0.226	1.551	0.286
Thoracic	0.64	0.229	1.794	0.396

Gynae	0.579	0.176	1.899	0.367
Cardiac	0.423	0.119	1.499	0.183
Neurosurgery	0.53	0.207	1.356	0.185
Maxillofacial and dental	Reference			•
Surgery after hours	1.115	0.883	1.406	0.36
Surgery not after hours	Reference			
Duration of surgery (per minute increase)	1.003	1.002	1.005	<0.001

ASA American Society of Anesthesiology; HIV/AIDS human immunodeficiency virus/ acquired immunodeficiency syndrome

Supplementary Material S13. Generalised linear mixed model factors independently associated with postoperative complications. Sensitivity analysis: excluding recent Covid-19 infections.

Model Term	Odds Ratio	2·5% confidence limit	97.5% confidence limit	P-value
Intercent (odds)	0.038	0.021	0.07	<0.001
Age 0-28 days	2.303	1.587	3.341	<0.001
20 364 days	1.249	0.952	1.630	0.108
29-304 days	1.007	0.932	1.009	0.456
1-5 years	0.075	0.787	1.399	0.430
4-12 years	0.975	0.787	1.208	0.819
Age 13-<18 years	Reference			•
Female	1.052	0.912	1.214	0.484
Male	Reference	•	•	•
ASA 4 and 5	6.058	3.827	9.59	<0.001
ASA 3	2.658	2.056	3.437	<0.001
ASA 2	1.455	1.205	1.758	<0.001
ASA 1	Reference			
Cardiac disease	1.136	0.72	1.79	0.584
Chronic respiratory disease	1.851	1.2	2.854	0.005
Neurological disorder	1.828	1.266	2.639	0.001
HIV/AIDS	0.382	0.123	1.192	0.097
Cancer	1.89	1.201	2.974	0.006
Current respiratory tract infection	2.183	1.556	3.063	<.001
Other	1.486	1.006	2.196	0.047
Emergency	1.419	1.192	1.69	<.001
Elective	Reference	•	•	•
Major	2.117	1.657	2.704	<.001
Intermediate	1.405	1.161	1.701	<.001
Minor	Reference	•	•	•
Congenital	0.962	0.786	1.176	0.703
Infective	1.559	1.241	1.959	<.001
Traumatic	1.375	1.048	1.805	0.022
Non-communicable	Reference	•	· ·	•
Other	1.196	0.666	2.146	0.549
Burns	2.299	1.171	4.514	0.016
Plastics/cutaneous	1.739	0.983	3.076	0.057
Ophthalmology	0.327	0.144	0.746	0.008
Kidney/urology	1.388	0.807	2.387	0.236
Gastrointestinal	1.191	0.701	2.024	0.517
Orthopaedic	0.982	0.564	1.71	0.949
Hepatobiliary	1.507	0.644	3.529	0.344
Ear nose and throat	0.936	0.53	1.656	0.821
Thoracic	1.809	0.884	3.702	0.105

Gynae	1.031	0.444	2.395	0.943
Cardiac	1.452	0.665	3.169	0.349
Neurosurgery	1.016	0.555	1.86	0.959
Maxillofacial and dental	Reference			•
Surgery after hours	1.189	0.982	1.44	0.076
Surgery not after hours	Reference			
Duration of surgery (per minute increase)	1.005	1.004	1.006	<0.001

ASA American Society of Anesthesiology; HIV/AIDS human immunodeficiency virus/ acquired immunodeficiency syndrome

Supplementary Material S14. Generalised linear mixed model factors independently associated with postoperative complications. Sensitivity analysis: excluding the Egyptian and South African cohorts.

Model Term	Odds Ratio	2.5% confidence	97.5% confidence	P-value
			limit	
Intercept (odds)	0.049	0.023	0.104	<0.001
Age 0-28 days	2.17	1.392	3.383	<0.001
29-364 days	1.191	0.85	1.67	0.309
1-3 years	1.17	0.867	1.58	0.305
4-12 years	1.019	0.782	1.328	0.89
Age 13-<18 years	Reference			
Female	0.982	0.822	1.173	0.838
Male	Reference			
ASA 4 and 5	4.17	2.28	7.627	<0.001
ASA 3	2.72	1.972	3.752	<0.001
ASA 2	1.281	1.015	1.615	0.037
ASA 1	Reference		•	•
Cardiac disease	1.223	0.648	2.307	0.535
Chronic respiratory disease	2.158	1.175	3.964	0.013
Neurological disorder	2.426	1.463	4.023	<0.001
HIV/AIDS	0.311	0.03	3.213	0.327
Cancer	2.014	1.095	3.707	0.024
Current respiratory tract infection	2.204	1.428	3.4	<0.001
Other	1.942	1.184	3.185	0.009
Emergency	1.455	1.168	1.811	<0.001
Elective	Reference			
Major	2.553	1.881	3.465	<0.001
Intermediate	1.602	1.246	2.058	<0.001
Minor	Reference			
Congenital	0.838	0.653	1.076	0.167
Infective	1.329	1.004	1.759	0.047
Traumatic	1.055	0.752	1.48	0.755
Non-communicable	Reference			
Other	0.938	0.441	1.996	0.868
Burns	2.291	0.916	5.726	0.076
Plastics/cutaneous	1.182	0.56	2.492	0.661
Ophthalmology	0.369	0.139	0.976	0.045
Kidney/urology	0.957	0.477	1.92	0.901
Gastrointestinal	0.952	0.481	1.883	0.887
Orthopaedic	1.187	0.581	2.425	0.638
Hepatobiliary	1.143	0.379	3.448	0.812

Ear nose and throat	0.658	0.313	1.384	0.27
Thoracic	1.956	0.792	4.834	0.146
Gynae	1.094	0.407	2.94	0.859
Cardiac	1.204	0.413	3.508	0.733
Neurosurgery	0.857	0.395	1.857	0.696
Maxillofacial and dental	Reference			
Surgery after hours	1.132	0.898	1.428	0.294
Surgery not after hours	Reference			
Duration of surgery (per minute increase)	1.005	1.004	1.007	<0.001

ASA American Society of Anesthesiology; HIV/AIDS human immunodeficiency virus/ acquired immunodeficiency syndrome

Supplementary Material S15. Generalised linear mixed model factors independently associated with postoperative complications. Sensitivity analysis: hospital level.

Model Term	Odds Ratio	2.5% confidence limit	97·5% confidence limit	P-value	
Intervent (adda)	0.045	0.022	0.004	-0.001	
	0.045	0.022	0.094	<0.001	
Age 0-28 days	2.128	1.456	3.111	<0.001	
29-364 days	1.026	0.921	1.591	0.170	
1-3 years	1.036	0.810	1.325	0.777	
4-12 years	0.936	0.755	1.161	0.547	
Age 13-<18 years	Reference	•	•	•	
Female	1.086	0.940	1.254	0.265	
Male	Reference	•	•	•	
ASA 4 and 5	6.425	4.048	10.198	<0.001	
ASA 3	2.606	2.013	3.373	<0.001	
ASA 2	1.438	1.188	1.741	<0.001	
ASA 1	<u>Reference</u>				
Cardiac disease	1.162	0.742	1.822	0.511	
Chronic respiratory disease	1.835	1.192	2.825	0.006	
Neurological disorder	1.692	1.170	2.447	0.005	
HIV/AIDS	0.369	0.119	1.149	0.085	
Cancer	1.890	1.195	2.989	0.006	
Current respiratory tract infection	2.017	1.437	2.832	<0.001	
Other	1.475	·987	2.204	0.058	
Emergency	1.513	1.269	1.803	<0.001	
Elective	<u>Reference</u>				
Major	2.139	1.671	2.739	<0.001	
Intermediate	1.394	1.152	1.688	<0.001	
Minor	<u>Reference</u>	•		•	
Congenital	0.965	0.787	1.183	0.733	
Infective	1.574	1.252	1.979	<0.001	
Traumatic	1.375	1.046	1.808	0.022	
Non-communicable	Reference				
Other	1.139	0.639	2.029	0.659	
Burns	2.010	1.028	3.931	0.041	
Plastics/cutaneous	1.605	0.911	2.830	0.102	
Ophthalmology	0.321	0.141	0.732	0.007	
Kidney/urology	1.251	0.731	2.141	0.415	
Gastrointestinal	1.043	0.617	1.763	0.874	
Orthopaedic	0.877	0.506	1.519	0.639	
Hepatobiliary	1.320	0.566	3.079	0.521	
Ear nose and throat	0.838	0.476	1.473	0.539	
Thoracic	1.427	0.697	2.924	0.331	
Gynae	0.825	0.355	1.915	0.654	
Gynae	0.823	0.333	1.913	0.034	

Cardiac	1.273	0.587	2.760	0.541
Neurosurgery	0.891	0.488	1.628	0.708
Maxillofacial and dental	Reference			
Surgery after hours	1.163	0.957	1.414	0.128
Surgery not after hours	<u>Reference</u>			
Duration of surgery (per minute increase)	1.005	1.004	1.006	<0.001
Third level hospital	1.038	0.628	1.714	0.885
Second level hospital	1.002	0.553	1.817	0.994
First level hospital	Reference	•	•	•

ASA American Society of Anesthesiology; HIV/AIDS human immunodeficiency virus/ acquired immunodeficiency syndrome

Supplementary Material S16. Generalised linear mixed model factors independently associated with postoperative complications. Sensitivity analysis: Anaesthesia and surgical provider level.

Model Term	Odds Ratio	2·5% confidence limit	97·5% confidence limit	P-value
Intercept (odds)	0.044	0.024	0.079	0.000
Age 0-28 days	2.257	1.562	3.262	<0.001
29-364 days	1.253	0.959	1.638	0.098
1-3 years	1.053	0.828	1.340	0.673
4-12 years	0.949	0.768	1.172	0.626
Age 13-<18 years	Reference	•	•	•
Female	1.062	0.922	1.223	0.407
Male	Reference	•	•	•
ASA 4 and 5	6.088	3.899	9.507	<0.001
ASA 3	2.608	2.026	3.357	<0.001
ASA 2	1.440	1.194	1.736	<0.001
ASA 1	Reference			
Cardiac disease	1.116	0.713	1.747	0.632
Chronic respiratory disease	1.873	1.227	2.860	0.004
Neurological disorder	1.692	1.179	2.429	0.004
HIV/AIDS	0.368	0.119	1.142	0.084
Cancer	1.894	1.211	2.963	0.005
Current respiratory tract infection	2.109	1.513	2.939	<0.001
Other	1.554	1.060	2.278	0.024
Emergency	1.496	1.258	1.779	<0.001
Elective	Reference			
Major	2.038	1.599	2.596	<0.001
Intermediate	1.381	1.143	1.669	<0.001
Minor	Reference			
Congenital	0.959	0.786	1.171	0.681
Infective	1.517	1.210	1.902	<0.001
Traumatic	1.316	1.006	1.722	0.045
Non-communicable	Reference			
Other	1.168	0.657	2.076	0.597
Burns	2.347	1.205	4.570	0.012
Plastics/cutaneous	1.658	0.944	2.912	0.079
Ophthalmology	0.308	0.136	0.698	0.005
Kidney/urology	1.339	0.785	2.284	0.285
Gastrointestinal	1.141	0.678	1.922	0.619
Orthopaedic	0.952	0.551	1.643	0.859
Hepatobiliary	1.416	0.609	3.294	0.420
Ear nose and throat	0.892	0.510	1.562	0.690
Thoracic	1.663	0.821	3.368	0.158
Gynae	0.870	0.375	2.018	0.746
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Cardiac	1.405	0.653	3.025	0.384
Neurosurgery	0.967	0.533	1.755	0.913
Maxillofacial and dental	Reference			
Surgery after hours	1.225	1.012	1.484	0.037
Surgery not after hours	Reference			
Duration of surgery (per minute increase)	1.005	1.004	1.006	<0.001
Most senior anaesthetist				
Non-physician	1.108	0.697	1.759	0.665
Nurse	0.969	0.657	1.428	0.873
Non-specialist physician	0.856	0.686	1.069	0.170
Specialist	Reference ·	•	•	•
Most senior surgeon				
Non-physician	0.849	0.290	2.485	0.764
Nurse	2.576	0.994	6.679	0.052
Non-specialist physician	0.877	0.707	1.087	0.230
Specialist	Reference			

ASA American Society of Anesthesiology; HIV/AIDS human immunodeficiency virus/ acquired immunodeficiency syndrome

Supplementary Material S17. Generalised linear mixed model factors independently associated with postoperative complications. Sensitivity analysis: use of the surgical safety checklist.

Model Term	Odds Ratio	2.5% confidence	97.5% confidence	P-value	
			IIIIIt		
Intercept (odds)	0.038	0.021	0.069	0.000	
Age 0-28 days	2.309	1.599	3.336	<0.001	
29-364 days	1.267	0.970	1.655	0.083	
1-3 years	1.073	0.844	1.365	0.566	
4-12 years	0.957	0.775	1.182	0.684	
Age 13-<18 years	Reference			•	
Female	1.062	0.922	1.223	0.405	
Male	Reference			•	
ASA 4 and 5	6.198	3.969	9.678	<0.001	
ASA 3	2.634	2.046	3.392	<0.001	
ASA 2	1.441	1.195	1.737	<0.001	
ASA 1	Reference				
Cardiac disease	1.130	0.723	1.768	0.591	
Chronic respiratory disease	1.900	1.244	2.904	0.003	
Neurological disorder	1.683	1.172	2.416	0.005	
HIV/AIDS	0.374	0.121	1.159	0.088	
Cancer	1.964	1.258	3.067	0.003	
Current respiratory tract infection	2.074	1.488	2.892	<0.001	
Other	1.550	1.056	2.273	0.025	
Emergency	1.471	1.238	1.747	<0.001	
Elective	Reference				
Major	2.073	1.629	2.639	<0.001	
Intermediate	1.384	1.147	1.671	<0.001	
Minor	Reference			•	
Congenital	0.976	0.799	1.192	0.813	
Infective	1.526	1.218	1.912	<0.001	
Traumatic	1.328	1.015	1.739	0.039	
Non-communicable	Reference				
Other	1.174	·662	2.085	0.583	
Burns	2.287	1.176	4.447	0.015	
Plastics/cutaneous	1.633	0.931	2.864	0.087	
Ophthalmology	0.311	0.138	·705	0.005	
Kidney/urology	1.326	0.778	2.260	0.300	
Gastrointestinal	1.133	0.673	1.907	0.638	
Orthopaedic	0.948	0.550	1.635	0.848	
Hepatobiliary	1.418	0.609	3.305	0.418	
Ear nose and throat	0.897	0.513	1.568	0.702	

Thoracic	1.689	0.834	3.421	0.146
Gynae	0.865	0.373	2.004	0.735
Cardiac	1.457	0.677	3.138	0.336
Neurosurgery	0.948	0.523	1.719	0.861
Maxillofacial and dental	Reference		•	
Surgery after hours	1.198	0.991	1.448	0.061
Surgery not after hours	Reference		•	
Duration of surgery (per minute increase)	1.005	1.004	1.006	<0.001
Surgery checklist	1.159	0.953	1.409	0.140
No checklist	Reference			

ASA American Society of Anesthesiology; HIV/AIDS human immunodeficiency virus/ acquired immunodeficiency syndrome

Supplementary Material S18. Generalised linear mixed model factors independently associated with postoperative complications. Sensitivity analysis: Middle- and low-income country classification.

Model Term	Odds Ratio	2·5% confidence limit	97·5% confidence limit	P-value		
Intercept (odds)	0.040	0.022	0.074	0.000		
Age 0-28 days	2.291	1.587	3.307	<0.001		
29-364 days	1.257	0.963	1.642	0.093		
1-3 years	1.063	0.836	1.352	0.616		
4-12 years	0.951	0.770	1.174	0.638		
Age 13-<18 years	Reference	•		•		
Female	1.061	0.921	1.222	0.410		
Male	Reference					
ASA 4 and 5	6.142	3.934	9.588	<0.001		
ASA 3	2.619	2.034	3.371	<0.001		
ASA 2	1.441	1.195	1.737	<0.001		
ASA 1	Reference					
Cardiac disease	1.137	0.727	1.780	0.573		
Chronic respiratory disease	1.917	1.254	2.932	0.003		
Neurological disorder	1.707	1.190	2.448	0.004		
HIV/AIDS	0.379	0.122	1.175	0.093		
Cancer	1.958	1.254	3.056	0.003		
Current respiratory tract infection	2.078	1.491	2.896	<0.001		
Other	1.575	1.073	2.312	0.020		
Emergency	1.477	1.244	1.755	<0.001		
Elective	Reference					
Major	2.064	1.621	2.629	<0.001		
Intermediate	1.384	1.146	1.670	<0.001		
Minor	Reference					
Congenital	0.967	0.792	1.180	0.739		
Infective	1.514	1.209	1.896	<0.001		
Traumatic	1.317	1.006	1.723	0.045		
Non-communicable	Reference:					
Other	1.173	0.660	2.083	0.587		
Burns	2.313	1.190	4.499	0.013		
Plastics/cutaneous	1.655	0.943	2.904	0.079		
Ophthalmology	0.310	0.137	·703	0.005		
Kidney/urology	1.337	0.784	2.280	0.287		
Gastrointestinal	1.137	0.675	1.915	0.629		
Orthopaedic	·956	0.554	1.649	0.871		
Hepatobiliary	1.437	0.617	3.345	0.401		
Ear nose and throat	0.900	0.514	1.575	0.711		
Thoracic	1.677	0.828	3.396	0.151		

Gynae	0.885	0.382	2.055	0.777
Cardiac	1.451	0.673	3.128	0.342
Neurosurgery	0.965	0.532	1.750	0.908
Maxillofacial and dental	Reference			
Surgery after hours	1.185	·980	1.431	0.079
Surgery not after hours	Reference			
Duration of surgery (per minute increase)	1.005	1.004	1.006	<0.001
Low income country	1.125	0.760	1.666	0.557
Middle income country	Reference			

ASA American Society of Anesthesiology; HIV/AIDS human immunodeficiency virus/ acquired immunodeficiency syndrome

Supplementary Material S19. Search strategy for perioperative mortality in paediatric surgery meta-analysis

1	(death* or mortalit* or survival*).ab,ti.
2	(anesth* or anaesth* or peri-anesth* or perianesth* or peri-anaesth* or perianaesth* or post-anesth*
	or postanesth* or post-anaesth* or postanaesth* or post-operat* or postoperat* or intraoperat* or
	intra-operat* or perioperat* or peri-operat* or surg* or operating room).ab,ti.
3	(paediatric* or pediatric* or child* or infant* or schoolchild* or boy* or girl* or youth* or
	adolescen* or teen* or juvenil* or kid or kids).ab,ti.
4	1 and 2 and 3
5	Limit 4 to "all child (0 to 18 years)"
6	Limit 5 to yr= "2012-Current"
7	(paediatric* or pediatric* or child* or infant* or schoolchild* or boy* or girl* or youth* or
	adolescen* or teen* or juvenil* or kid or kids).ti.
8	4 and 7
9	Limit 8 to yr= "2012-Current"
10	6 or 9
11	Limit 10 to case reports
12	"case report*".ti
13	10 and 12
14	11 or 13
15	10 not 14

Databases used in the literature search:

MEDLINE via Ovid (ab,ti), Embase via Ovid (ab,ti), Global Index Medicus – World Health Organisation (tw).

Search date:

5th July 2022.

Meta-Analysis Protocol:

PROSPERO CRD42022357658

A post-hoc decision was made to exclude studies from our analysis which (i) report mortality with a follow up period >30 days, or do not clearly state the follow up period for mortality, and (ii) report only a single surgical specialty/ procedure type. This was done to improve comparability to the ASOS-Paeds cohort, which censors perioperative mortality at 30 days and includes multiple surgical specialties/ procedure types.

For the meta-analysis, proportions were combined using a random effects model (DerSimonian and Laird) with confidence interval estimated using the exact method.

Supplementary Material S20. PRISMA diagram for perioperative mortality in paediatric surgery meta-analysis



Supplementary Material S21. Perioperative mortality in paediatric surgery metaanalysis



Study ID	Region	Country	Sites	Cohort type	Recruitment period (years)	Age (years)	Female (%)	Perioperative mortality outcome censored at (days)	Perioperative deaths (n)	All patients in cohort (n)	Were types of complication reported?	Was the complication rate reported?	Were consecutive patients recruited?	Proportion of missing data/loss to follow up
ASOS-Paeds 2023	Africa	Continental	Multi-centre	Prospective	2022-2023	6·1 (4·9)	34%	30	199	8596	Yes	Yes	Yes	Less than 5%
Meyer 2017 ¹	Africa	South Africa	Single-centre	Prospective	2015-2015	-	-	30	47	8493	No	No	Yes	Less than 5%
Newton 2020 ²	Africa	Kenya	Multi-centre	Prospective	2014-2016	-	38.02	7	77	4595	No	No	Yes	More than 5%
Talabi 2021 ³	Africa	Nigeria	Single-centre	Prospective	2019-2020	3 (0·8-7·8)*	26.79	30	17	502	No	No	Yes	Less than 5%
Tarekegn 2021 ⁴	Africa	Ethiopia	Single-centre	Prospective	2018-2020	-	37-22	7	19	735	No	No	Yes	More than 5%
Torborg 2019 ⁵	Africa	South Africa	Multi-centre	Prospective	2017-2017	5·86 (0-15·9)**	39.70	30	22	2024	Yes	Yes	Yes	Less than 5%
Habre 2017 ⁶	Europe	Continental	Multi-centre	Prospective	2014-2015	6·35 (4·5)	38-91	30	30	30874	Yes	Yes	Yes	Less than 5%
Alzubaidi 20227	North America	USA	Multi-centre	Prospective	2013-2017	-	43.35	30	1475	432063	Yes	Yes	Yes	Less than 5%
Kannampallil 2021 ⁸	North America	USA	Single-centre	Retrospective	2013-2018	6.56 (2.65- 12.53)*	43-47	30	171	78321	Yes	Yes	Yes	Less than 5%
Valencia 20199	North America	USA	Single-centre	Prospective	2017-2018	-	43-81	30	29	13530	No	No	Yes	Less than 5%

Supplementary Material S22. Perioperative mortality in paediatric surgery meta-analysis summary table

Mean (SD); Median (IQR)*; Mean (range)**

Supplementary Material S23. Perioperative mortality in paediatric surgery meta-analysis reference list

- Meyer HM, Thomas J, Wilson GS, de Kock M. Anesthesia-related and perioperative mortality: An audit of 8493 cases at a tertiary pediatric teaching hospital in South Africa. Veyckemans F, editor. Pediatr Anesth. 2017 Oct;27(10):1021–7.
- 2. Newton MW, Hurt SE, McEvoy MD, Shi Y, Shotwell MS, Kamau J, et al. Pediatric Perioperative Mortality in Kenya: A Prospective Cohort Study from 24 Hospitals. Anesthesiology. 2020;132(3):452–60.
- 3. Talabi AO, Ojo OO, Aaron OI, Sowande OA, Faponle FA, Adejuyigbe O. Perioperative mortality in children in a tertiary teaching hospital in Nigeria: a prospective study. World J Pediatr Surg. 2021 Mar 23;4(1):e000237.
- 4. Tarekegn F, Seyoum R, Abebe G, Terefe M. Perioperative pediatric mortality in Ethiopia: A prospective cohort study. Ann Med Surg. 2021;67:102396.
- 5. Torborg A, Cronje L, Thomas J, Meyer H, Bhettay A, Diedericks J, et al. South African Paediatric Surgical Outcomes Study: a 14-day prospective, observational cohort study of paediatric surgical patients. Allopi K Diyelela-Ndwandwa P, Nongqo N, Ravid B, Anamourlis P, Coetzee G, Dlamini M, Foster C, Mogane P, Nel D, Oosthuizen A, Redford L, Murray R, Basson C, Joubert J, Tshifularo N, Els T, Kluyts H, Orrock J, Muthambi M, Matebesi T, Tshukudu G, Maela D, SU, editor. Br J Anaesth. 2019;122(2):224–32.
- 6. Habre W, Disma N, Virag K, Becke K, Hansen TG, Johr M, et al. Incidence of severe critical events in paediatric anaesthesia (APRICOT): a prospective multicentre observational study in 261 hospitals in Europe. Klimscha W Luntzer R, Morawk-Wintersperger U, Neiger F, Rustemeyer L, Breschan C, Frey D, Platzer M, Germann R, Oeding J, Stoegermuller B, Ziegler B, Brotatsch P, Gutmann A, Mausser G, Messerer B, Toller W, Vittinghoff M, Zangl G, Seidel-Ahyai N, Hochhol KR, editor. Lancet Respir Med. 2017;5(5):412–25.
- Alzubaidi AN, Karabayir I, Akbilgic O, Langham MR. Network Analysis of Postoperative Surgical Complications in a Cohort of Children Reported to the National Surgical Quality Improvement Program. Ann Surg. 2022 Jun;275(6):1194–9.
- 8. Kannampallil T, Lew D, Pfeifer EE, Sharma A, Abraham J. Association between paediatric intraoperative anaesthesia handover and adverse postoperative outcomes. BMJ Qual Saf. 2021 Sep;30(9):755–63.
- Valencia E, Staffa SJ, Faraoni D, DiNardo JA, Nasr VG. Prospective External Validation of the Pediatric Risk Assessment Score in Predicting Perioperative Mortality in Children Undergoing Noncardiac Surgery. Anesth Analg. 2019 Oct;129(4):1014–20.

Supplementary Material S24. Hospitals requiring informed consent

South Africa: Pelonomi Hospital Universitas Hospital Charlotte Maxeke Joburg Academic Hospital Chris Hani Baragwanath Hospital Nelson Mandela Children's Hospital Rahima Moosa Mother and Child Hospital

Malawi: Queen Elizabeth Central Hospital