





# Systematic review of low-income and middle-income country perceptions of visiting surgical teams from high-income countries

Lotta Velin <sup>1</sup>, Adam Lantz,<sup>2</sup> Emmanuel A. Ameh <sup>3</sup>, Nobhojit Roy,<sup>4,5</sup> Desmond T. Jumbam <sup>6</sup>, Omolara Williams,<sup>7</sup> Alex Elobu,<sup>8,9</sup> Justina Seyi-Olajide <sup>10</sup>, Lars Hagander<sup>11</sup>

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For numbered affiliations see end of article.

**Correspondence to**

Lotta Velin; [lotta.velin@liu.se](mailto:lotta.velin@liu.se)

## ABSTRACT

**Background** The shortage of surgeons, anaesthesiologists and obstetricians in low-income and middle-income countries (LMICs) is occasionally bridged by foreign surgical teams from high-income countries on short-term visits. To advise on ethical guidelines for such activities, the aim of this study was to present LMIC stakeholders' perceptions of visiting surgical teams from high-income countries.

**Method** We performed a systematic review according to Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines in November 2021, using standardised search terms in PubMed/Medline (National Library of Medicine), EMBASE (Elsevier), Global Health Database (EBSCO) and Global Index Medicus, and complementary hand searches in African Journals Online and Google Scholar. Included studies were analysed thematically using a meta-ethnographic approach.

**Results** Out of 3867 identified studies, 30 articles from 15 countries were included for analysis. Advantages of visiting surgical teams included alleviating clinical care needs, skills improvement, system-level strengthening, academic and career benefits and broader collaboration opportunities. Disadvantages of visiting surgical teams involved poor quality of care and lack of follow-up, insufficient knowledge transfers, dilemmas of ethics and equity, competition, administrative and financial issues and language barriers.

**Conclusion** Surgical short-term visits from high-income countries are insufficiently described from the perspective of stakeholders in LMICs, yet such perspectives are essential for quality of care, ethics and equity, skills and knowledge transfer and sustainable health system strengthening. More in-depth studies, particularly of LMIC perceptions, are required to inform further development of ethical guidelines for global surgery and support ethical and sustainable strengthening of LMIC surgical systems.

## INTRODUCTION

Over 5 billion people worldwide lack timely access to safe and affordable surgical care

### WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ There is a large unmet need of surgical disease in many low-income and middle-income countries (LMICs), occasionally bridged by visiting surgical teams from high-income countries (HICs).
- ⇒ Most of the literature on visiting surgical teams describe positive experiences of HIC participants, although recent studies indicate that this positive impact may be overestimated. The perspectives of LMIC stakeholders are less well-known.

### WHAT THIS STUDY ADDS

- ⇒ This systematic review identified 30 articles exploring LMIC perceptions of visiting surgical teams.
- ⇒ Through a meta-ethnographic approach, advantages and disadvantages of visiting surgical teams were identified; advantages included alleviating clinical care needs, skills improvement, system-level strengthening, academic and career benefits and broader collaboration opportunities; disadvantages involved poor quality of care and lack of follow-up, insufficient knowledge transfers, dilemmas of ethics and equity, competition, administrative and financial issues and language barriers.
- ⇒ A significantly larger number of disadvantages reported among studies of 'surgical missions' compared with studies of 'combined clinical and teaching visits'.
- ⇒ Despite the focus on 'LMIC perceptions', most studies were led by HIC affiliates, and only seven studies had 'LMIC ownership'.

### HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE AND/OR POLICY

- ⇒ Visiting surgical teams can cause unintended harm to the local health system; efforts should be made to develop new and/or revise existing ethical guidelines for international surgical work.
- ⇒ Future research should consider LMIC-led mixed methods or qualitative approaches, where all involved stakeholders have opportunity to provide input.

and anaesthesia when needed, with the greatest unmet need of surgical care endured in low-income and middle-income countries (LMICs).<sup>1</sup> A major barrier to accessing surgery in LMICs is the shortage of surgeons, anaesthesiologists and obstetricians,<sup>2-4</sup> further impacted by migration of specialists to high-income countries (HICs).<sup>5</sup> This surgical workforce gap is occasionally bridged by visiting surgical teams from HICs but, while addressing an unmet need of disease burden in areas where workforce is limited, recent studies indicate that the positive impact of short-term visits from visiting surgical teams may be overestimated,<sup>6-8</sup> including reports of low cost-effectiveness, insufficient follow-up care and a lack of sustainability,<sup>7-9</sup> and neocolonial patterns in global surgery.<sup>10 11</sup>

While an overshadowing majority of the literature on visiting surgical teams elaborate on the overall positive experiences of HIC participants, the more nuanced perspectives of LMIC counterparts are much less clear. We hypothesised that a systematic review of published literature on this topic would identify relatively few publications written by LMIC stakeholders, and that visiting surgical teams in certain instances also would be perceived to be associated with disadvantages. To advise on ethical guidelines, the aim of this study was to present LMIC perceptions of visiting surgical teams from HICs.

## METHODS

We performed a systematic review according to Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines.<sup>12</sup> First, we included all studies involving visiting surgical teams from HICs working short-term in LMICs. All studies were identified searching PubMed/Medline (National Library of Medicine), EMBASE (Elsevier), Global Health Database (EBSCO), Global Index Medicus and controlled vocabulary terms (Medical Subject Headings, Emtree, Global Health thesaurus terms) when available (full search strategy in [box 1](#)) in January 2020 and rerun in November 2021. Complementary hand searches were run in African Journals Online and Google Scholar. No language restrictions were applied.

All studies were then screened and assessed for eligibility in Covidence<sup>13</sup> by two independent investigators (LV and AL) using inclusion and exclusion criteria to reflect LMIC perceptions of visiting surgical teams from HICs ([table 1](#)). In case of disagreement, the decision was discussed with a third investigator (LH). The following quantitative variables were extracted from included articles: first and senior author country affiliation (used to categorise the authorship as ‘no LMIC involvement’, ‘LMIC involvement’ (LMIC coauthors but not as first and/or senior author) and ‘LMIC ownership’ (LMIC first and/or senior author), country of study including categorisation by World Bank Group income classification<sup>14</sup> and WHO region,<sup>15</sup> type of surgical visits studied, surgical field studied, study year, type of study. ‘Visiting surgical teams’ is a broad and deliberately inclusive term, and in

this review two types of surgical visits were categorised: ‘surgical missions’ and ‘combined clinical and teaching visits’.

A meta-ethnographic approach was used to qualitatively assess the data.<sup>16</sup> The primary outcome was to assess LMIC perspectives, including both patients and host staff, of visiting surgical teams from HICs. Extracted data were organised in broad groups of advantages (‘pros’) and disadvantages (‘cons’) and then further categorised into convergent concepts. Citations were included to exemplify results. Study characteristics were presented using descriptive statistics, and the Mann-Whitney U test was used to assess the number of reported advantages/disadvantages between articles with different levels of LMIC involvement and type of surgical visit, with  $p < 0.05$  considered statistically significant. No meta-analysis or risk of bias assessment was done due to the large heterogeneity of the included studies and non-quantitative characteristics of the primary outcome.

## RESULTS

Of 3867 studies identified, 30 were included for detailed analysis ([figure 1](#)). One study was in French; all other manuscripts were in English. All studies were published between 2009 and 2021 with an increasing publication trend over time. Included studies represented 15 different countries from three different WHO regions ([table 2](#)), of which 10 were middle-income countries and 5 were low-income countries. Additionally, one article surveyed host surgeons and perioperative staff from 51 different LMICs<sup>17</sup> and one viewpoint piece discussed sub-Saharan Africa at large.<sup>18</sup> Most commonly, included articles used qualitative methodologies (n=10), followed by cross-sectional studies based on surveys (n=10). All but seven of the included articles were first and senior authored by a HIC researcher, and one-third (n=10, 33%) were written without LMIC involvement. The articles with LMIC ownership had the highest relative number of presented disadvantages (60%), followed by articles with no LMIC involvement (57%), and LMIC involvement 53%), although these differences were non-significant. Fifteen articles described ‘surgical missions’, 13 ‘combined clinical and teaching visits’ and 3 were categorised as describing both of the aforementioned categories. Articles describing ‘surgical missions’ reported significantly more disadvantages compared with studies describing ‘combined clinical and teaching visits’ (71% vs 43%,  $p = 0.015$ ). Emerging concepts based on the perceptions of visiting surgical teams are summarised in [table 3](#).

### Advantages of visiting surgical teams

Twenty-five studies (83%) described advantages with visiting surgical teams,<sup>17 19-42</sup> further subgrouped into skills improvement, immediate clinical patient care, system-level strengthening, academic and career benefits and broader collaboration opportunities.

One of the most reported benefits of visiting surgical teams related to skill transfers (n=16, 53%)<sup>19-22 24-27 30 32-38</sup>

**Box 1 Full search strings, tabulated by search engine.**
**PubMed (NLM):**

("Surgeons"[Mesh] OR "Specialties, Surgical"[Mesh] OR "Anesthesiology"[Mesh] OR anaesthesiologist\*[(tiab)] OR anaesthetist\*[(tiab)] OR anesthesiologist\*[(tiab)] OR anesthetistanaesthetist\*[(tiab)] OR gynecologistgynaecologist\*[(tiab)] OR gynaecologist\*[(tiab)] OR neurosurg\*[(tiab)] OR obstetrician\*[(tiab)] OR ophthalmologist\*[(tiab)] OR otolaryngologist\*[(tiab)] OR surgeon\*[(tiab)] OR urologist\*[(tiab)]) AND ("Developing Countries"[Mesh] OR developing countr\*[(tiab)] OR under developed countr\*[(tiab)] OR Imic\*[(tiab)] OR ((less developed[(tiab)] OR low income[(tiab)] OR lower income[(tiab)] OR low and middle income[(tiab)] OR low middle income[(tiab)] OR resource poor[(tiab)] OR resource constrained[(tiab)] OR low resource[(tiab)] OR limited resource\*[(tiab)] OR resource limited[(tiab)])) AND (country[(tiab)] OR countries[(tiab)] OR region[(tiab)] OR regions[(tiab)] OR setting\*[(tiab)] OR area[(tiab)] OR areas[(tiab)])) OR "Africa South of the Sahara"[Mesh] OR "Central America"[Mesh] OR "South America"[Mesh] OR "Latin America"[Mesh] OR "Caribbean Region"[Mesh] OR "Mexico"[Mesh] OR "Asia"[Mesh:NoExp] OR "Asia, Central"[Mesh] OR "Asia, Northern"[Mesh] OR "Asia, Southeastern"[Mesh] OR "Asia, Western"[Mesh] OR "China"[Mesh] OR "Korea"[Mesh] OR "Mongolia"[Mesh] OR "Afghanistan"[Mesh] OR "Africa[(tiab)] African[(tiab)] OR "Algeria\*[(tiab)] OR "American Samoa\*[(tiab)] OR "Angola\*[(tiab)] OR "Argentina\*[(tiab)] OR "Bangladesh\*[(tiab)] OR "Barbad\*[(tiab)] OR "Belorussian[(tiab)] OR "Beliz\*[(tiab)] OR "Benin\*[(tiab)] OR "Bhutan\*[(tiab)] OR "Bolivia\*[(tiab)] OR "Botswan\*[(tiab)] OR "Brazil\*[(tiab)] OR "Burkina Faso"[(tiab)] OR "Burkinabe[(tiab)] OR "Burund\*[(tiab)] OR "Cambodia\*[(tiab)] OR "Cameroon\*[(tiab)] OR "Cape Verde"[(tiab)] OR "Cape Verdean"[(tiab)] OR "Central African Republic"[(tiab)] OR "Chad"[(tiab)] OR "Chile"[(tiab)] OR "China[(tiab)] OR "Chinese[(tiab)] OR "Colombia"[(tiab)] OR "Comoros[(tiab)] OR "Comorian[(tiab)] OR "Congo[(tiab)] OR "Congolese[(tiab)] OR "Costa Rica\*[(tiab)] OR "Côte d'Ivoire"[(tiab)] OR "Ivory Coast"[(tiab)] OR "Ivorian[(tiab)] OR "Croatia\*[(tiab)] OR "Croat[(tiab)] OR "Cuba"[(tiab)] OR "Djibouti\*[(tiab)] OR "Dominica\*[(tiab)] OR "Dominican Republic"[(tiab)] OR "Ecuador\*[(tiab)] OR "Egypt\*[(tiab)] OR "El Salvador"[(tiab)] OR "Salvadorian[(tiab)] OR "Equatorial Guinea"[(tiab)] OR "Guinean[(tiab)] OR "Eritrea\*[(tiab)] OR "Ethiopia\*[(tiab)] OR "Fiji\*[(tiab)] OR "Gabon\*[(tiab)] OR "Gambia\*[(tiab)] OR "Gaza[(tiab)] OR "Gazan[(tiab)] OR "Ghana[(tiab)] OR "Ghanaian[(tiab)] OR "Grenad\*[(tiab)] OR "Guatemala\*[(tiab)] OR "Guinea[(tiab)] OR "Guyan\*[(tiab)] OR "Haiti\*[(tiab)] OR "Hondura\*[(tiab)] OR "Hungar\*[(tiab)] OR "India[(tiab)] OR "Indian[(tiab)] OR "Indonesia\*[(tiab)] OR "Iran\*[(tiab)] OR "Iraq\*[(tiab)] OR "Jamaica\*[(tiab)] OR "Jordan\*[(tiab)] OR "Kenya[(tiab)] OR "Kenyan[(tiab)] OR "Kiribati[(tiab)] OR "Korea\*[(tiab)] OR "Kyrgy\*[(tiab)] OR "Laos[(tiab)] OR 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"Samoa\*[(tiab)] OR "Sao Tome\*[(tiab)] OR "Principe[(tiab)] OR "Senegal\*[(tiab)] OR "Seychell\*[(tiab)] OR "Sierra Leon\*[(tiab)] OR "Solomon Island\*[(tiab)] OR "Somali\*[(tiab)] OR "South Africa\*[(tiab)] OR "Sri Lanka\*[(tiab)] OR "Saint Kitts"[(tiab)] OR "St Kitts"[(tiab)] OR "Saint Lucia"[(tiab)] OR "St Lucia"[(tiab)] OR "Saint Vincent" [(tiab)] OR "St Vincent"[(tiab)] OR "Sudan\*[(tiab)] OR "Suriname\*[(tiab)] OR "Swaziland Or Swazi[(tiab)] OR "Syria\*[(tiab)] OR "Tajik\*[(tiab)] OR "Tanzania\*[(tiab)] OR "Thailand[(tiab)] OR "Thai[(tiab)] OR "Timor Leste"[(tiab)] OR "Togo\*[(tiab)] OR "Tonga\*[(tiab)] OR "Trinidad[(tiab)] OR "Trinidadian[(tiab)] OR "Tobago[(tiab)] OR "Tobagonian[(tiab)] OR "Tunisia\*[(tiab)] OR "Turkey[(tiab)] OR "Turkish[(tiab)] OR "Uganda\*[(tiab)] OR "Uruguay\*[(tiab)] OR "Vanuat\*[(tiab)] OR "Venezuela\*[(tiab)] OR "Vietnam\*[(tiab)] OR "West Bank"[(tiab)] OR "Yemen\*[(tiab)] OR "Zambia\*[(tiab)] OR "Zimbabwe\*" AND ("International Cooperation"[Mesh:NoExp] OR "Internationality"[Mesh:NoExp] OR "Medical Missions"[(Mesh)] OR "Developed Countries"[(Mesh)] OR "International Educational Exchange"[(Mesh)] OR "Altruism"[(Mesh)] OR "Relief Work"[(Mesh:NoExp] OR "Volunteers"[(Mesh)] OR altruism[(tiab)] OR charitable[(tiab)] OR charity[(tiab)] OR educational exchange\*[(tiab)] OR global surgery[(tiab)] OR high income countr\*[(tiab)] OR higher income countr\*[(tiab)] OR humanitarian[(tiab)] OR industrializedindustrialised countr\*[(tiab)] OR industrializedindustrialised nation\*[(tiab)] OR institutional collaboration\*[(tiab)] OR international aid\*[(tiab)] OR international assistance[(tiab)] OR international co-operation\*[(tiab)] OR international collaboration\*[(tiab)] OR international cooperation\*[(tiab)] OR international education\*[(tiab)] OR international exchange\*[(tiab)] OR internationality[(tiab)] OR mission\*[(tiab)] OR partnership\*[(tiab)] OR relief work[(tiab)] OR surgical exchange\*[(tiab)] OR volunteer\*[(tiab)] OR voluntour\*[(tiab)]) NOT "Case Reports" [(Publication Type)]

**EMBASE (Elsevier access, Embase.com):**

'surgeon'/exp OR 'anesthesiologist'/de OR 'gynecologistgynaecologist'/exp OR 'obstetrician'/exp OR 'ophthalmologist'/de OR 'otolaryngologist'/de OR 'urologist'/de OR  
 OR  
 (anaesthesiologist\* OR anaesthetist\* OR anesthesiologist\* OR anesthetistanaesthetist\* OR gynecologistgynaecologist\* OR gynaecologist\* OR neurosurg\* OR obstetrician\* OR ophthalmologist\* OR otolaryngologist\* OR surgeon\* OR urologist\*):ab,ti  
 AND  
 ('international cooperation'/de OR 'developed country'/de OR 'high income country'/de OR 'altruism'/de OR 'relief work'/de OR 'volunteer'/exp)  
 OR  
 (altruism OR charitable OR charity OR 'educational exchange\*' OR 'global surgery' OR 'high income countr\*' OR 'higher income countr\*' OR humanitarian OR 'industrializedindustrialised countr\*' OR 'industrializedindustrialised nation\*' OR 'institutional collaboration\*' OR 'international aid\*' OR 'international assistance' OR 'international co-operation\*' OR 'international collaboration\*' OR 'international cooperation\*' OR 'international education\*' OR 'international exchange\*' OR internationality OR mission\* OR partnership\* OR 'relief work' OR 'surgical exchange\*' OR volunteer\* OR voluntour\*):ab,ti  
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Box 1 Continued

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 OR  
 ‘Africa south of the Sahara’/exp OR ‘South and Central America’/exp OR ‘Caribbean Islands’/exp OR ‘Mexico’/exp OR ‘Asia’/de OR ‘Middle East’/exp OR ‘South Asia’/exp OR ‘China’/exp OR ‘Korea’/exp OR ‘Mongolia’/de OR ‘Philippines’/exp  
 OR  
 (Afghan\* OR Africa OR African OR Algeria\* OR ‘American Samoa\*’ OR Angola\* OR Argentin\* OR Bangladesh\* OR Barbad\* OR Belorussian OR Beliz\* OR Benin\* OR Bhutan\* OR Bolivia\* OR Botswan\* OR Brazil\* OR ‘Burkina Faso’ OR Burkinabe OR Burund\* OR Cambodia\* OR Cameroon\* OR ‘Cape Verde’ OR ‘Cape Verdean’ OR ‘Central African Republic’ OR Chad\* OR Chile\* OR China OR Chinese OR Colombia\* OR Comoros OR Comorian OR Congo OR Congolese OR ‘Costa Rica\*’ OR ‘Côte D ivoire’ OR ‘Ivory Coast’ OR Ivorian OR Croatia\* OR Croat OR Cuba\* OR Djibouti\* OR Dominica\* OR ‘Dominican Republic’ OR Ecuador\* OR Egypt\* OR ‘El Salvador’ OR Salvadorian OR ‘Equatorial Guinea’ OR Guinean OR Eritrea\* OR Ethiopia\* OR Fiji\* OR Gabon\* OR Gambia\* OR Gaza OR Gazan OR Ghana OR Ghanaian OR Grenad\* OR Guatemala\* OR Guinea OR Guyan\* OR Haiti\* OR Hondura\* OR Hungar\* OR India OR Indian OR Indonesia\* OR Iran\* OR Iraq\* OR Jamaica\* OR Jordan\* OR Kenya OR Kenyan OR Kiribati OR Korea\* OR Kyrgy\* OR Laos OR Laotian\* OR Lebanon OR Lebanese OR Lesotho OR Liberia\* OR Libya\* OR Macedonia\* OR Madagasca\* OR Malawi\* OR Malaysia\* OR Maldives OR Maldivian OR Mali OR Malian\* OR ‘Marshall Islands’ OR Mauritania\* OR Mauritius OR Mauritian OR Mayotte OR Mexic\* OR Micronesia\* OR Moldov\* OR Mongolia\* OR Morocc\* OR Mozambique OR Mozambican OR Myanmar OR Namibia\* OR Nepal\* OR Nevis OR Nicaragua\* OR Niger\* OR ‘Northern Mariana Islands’ OR Oman\* OR Pakistan\* OR Palau\* OR Panama\* OR ‘Papua New Guinea’ OR Paraguay\* OR Peru\* OR Philippine\* OR Filipino\* OR Poland OR Polish OR Rwanda\* OR Samoa\* OR ‘Sao Tome\*’ OR Principe OR Senegal\* OR Seychell\* OR ‘Sierra Leon\*’ OR ‘Solomon Island\*’ OR Somali\* OR ‘South Africa\*’ OR ‘Sri Lanka\*’ OR ‘Saint Kitts’ OR ‘St Kitts’ OR ‘Saint Lucia’ OR ‘St Lucia’ OR ‘Saint Vincent’ OR ‘St Vincent’ OR Sudan\* OR Suriname\* OR Swaziland OR Swazi OR Syria\* OR Tajik\* OR Tanzania\* OR Thailand OR Thai OR ‘Timor Leste’ OR Togo\* OR Tonga\* OR Trinidad OR Trinidadian OR Tobago OR Tobagonian OR Tunisia\* OR Turkey OR Turkish OR Uganda\* OR Uruguay\* OR Vanuat\* OR Venezuela\* OR Vietnam\* OR ‘West Bank’ OR Yemen\* OR Zambia\* OR Zimbabwe\*):ab,ti

**Global Health Database (EBSCO):**

DE “surgeons”  
 OR  
 In TITLE OR ABSTRACT OR SUBJECTS: anaesthesiologist\* OR anaesthetist\* OR anesthesiologist\* OR anesthetistanaesthetist\* OR gynecologistgynaecologist\* OR gynaecologist\* OR neurosurg\* OR obstetrician\* OR ophthalmologist\* OR otolaryngologist\* OR surgeon\* OR urologist\* NOT DE “case reports”  
 AND  
 DE “Developing Countries” OR DE “Least Developed Countries” OR DE “Afghanistan” OR DE “Algeria” OR DE “American Samoa” OR DE “Angola” OR DE “Anguilla Island” OR DE “Argentina” OR DE “Aruba” OR DE “Bahamas” OR DE “Bahrain” OR DE “Bangladesh” OR DE “Barbados” OR DE “Belize” OR DE “Benin” OR DE “Bermuda” OR DE “Bhutan” OR DE “Bolivia” OR DE “Bonaire” OR DE “Botswana” OR DE “Brazil” OR DE “British Virgin Islands” OR DE “Brunei Darussalam” OR DE “Burkina Faso” OR DE “Burundi” OR DE “Cambodia” OR DE “Cameroon” OR DE “Cape Verde” OR DE “Cayman Islands” OR DE “Central African Republic” OR DE “Chad” OR DE “Chile” OR DE “China” OR DE “Christmas Island” OR DE “Cocos Islands” OR DE “Colombia” OR DE “Comoros” OR DE “Congo Democratic Republic” OR DE “Congo” OR DE “Cook Islands” OR DE “Costa Rica” OR DE “Cote d’Ivoire” OR DE “Crozet Islands” OR DE “Cuba” OR DE “Curacao” OR DE “Cyprus” OR DE “Djibouti” OR DE “Dominica” OR DE “Dominican Republic” OR DE “Easter Island” OR DE “Ecuador” OR DE “Egypt” OR DE “El Salvador” OR DE “Equatorial Guinea” OR DE “Eritrea” OR DE “Ethiopia” OR DE “Falkland Islands” OR DE “Federated States of Micronesia” OR DE “Fiji” OR DE “French Guiana” OR DE “Gabon” OR DE “Gambia” OR DE “Gambier Islands” OR DE “Ghana” OR DE “Grenada” OR DE “Guadeloupe” OR DE “Guam” OR DE “Guatemala” OR DE “Guinea” OR DE “Guinea-Bissau” OR DE “Guyana” OR DE “Haiti” OR DE “Honduras” OR DE “India” OR DE “Indonesia” OR DE “Iran” OR DE “Iraq” OR DE “Jamaica” OR DE “Jordan” OR DE “Kenya” OR DE “Kerguelen Archipelago” OR DE “Kiribati” OR DE “Korea Democratic People’s Republic” OR DE “Korea Republic” OR DE “Kuwait” OR DE “Laos” OR DE “Lebanon” OR DE “Lesotho” OR DE “Liberia” OR DE “Libya” OR DE “Madagascar” OR DE “Malawi” OR DE “Malaysia” OR DE “Maldives” OR DE “Mali” OR DE “Marquesas Islands” OR DE “Marshall Islands” OR DE “Martinique” OR DE “Mauritania” OR DE “Mauritius” OR DE “Mayotte” OR DE “Mexico” OR DE “Midway Islands” OR DE “Mongolia” OR DE “Montserrat” OR DE “Morocco” OR DE “Mozambique” OR DE “Myanmar” OR DE “Namibia” OR DE “Nepal” OR DE “New Britain” OR DE “New Caledonia” OR DE “New Ireland” OR DE “Nicaragua” OR DE “Niger” OR DE “Nigeria” OR DE “Niue” OR DE “Northern Mariana Islands” OR DE “Oman” OR DE “Pakistan” OR DE “Panama” OR DE “Papua New Guinea” OR DE “Paraguay” OR DE “Peru” OR DE “Philippines” OR DE “Puerto Rico” OR DE “Qatar” OR DE “Reunion” OR DE “Rwanda” OR DE “Saba” OR DE “Saint Helena” OR DE “Saint Kitts and Nevis” OR DE “Saint Lucia” OR DE “Saint Vincent and the Grenadines” OR DE “Samoa” OR DE “Sao Tome and Principe” OR DE “Saudi Arabia” OR DE “Senegal” OR DE “Seychelles” OR DE “Sierra Leone” OR DE “Singapore” OR DE “Solomon Islands” OR DE “Somalia” OR DE “South Africa” OR DE “Sri Lanka” OR DE “Sudan” OR DE “Suriname” OR DE “Swaziland” OR DE “Syria” OR DE “Tahiti” OR DE “Tanzania” OR DE “Thailand” OR DE “Togo” OR DE “Tokelau” OR DE “Tonga” OR DE “Trinidad and Tobago” OR DE “Tuamotu” OR DE “Tuvalu” OR DE “Uganda” OR DE “Vanuatu” OR DE “Yemen” OR DE “Zambia”  
 OR  
 Title/Abstract/Subject:  
 Afghan\* OR Africa OR African OR Algeria\* OR “American Samoa\*” OR Angola\* OR Argentin\* OR Bangladesh\* OR Barbad\* OR Belorussian OR Beliz\* OR Benin\* OR Bhutan\* OR Bolivia\* OR Botswan\* OR Brazil\* OR “Burkina Faso” OR Burkinabe OR Burund\* OR Cambodia\* OR Cameroon\* OR “Cape Verde” OR “Cape Verdean” OR “Central African Republic” OR Chad\* OR Chile\* OR China OR Chinese OR Colombia\* OR Comoros OR Comorian OR Congo OR

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## Box 1 Continued

Congolese OR "Costa Rica\*" OR "Côte d'Ivoire" OR "Ivory Coast" OR Ivorian OR Croatia\* OR Croat OR Cuba\* OR Djibouti\* OR Dominica\* OR "Dominican Republic" OR Ecuador\* OR Egypt\* OR "El Salvador" OR Salvadorian OR "Equatorial Guinea" OR Guinean OR Eritrea\* OR Ethiopia\* OR Fiji\* OR Gabon\* OR Gambia\* OR Gaza OR Gazan OR Ghana OR Ghanaian OR Grenad\* OR Guatemala\* OR Guinea OR Guyan\* OR Haiti\* OR Hondura\* OR Hungar\* OR India OR Indian OR Indonesia\* OR Iran\* OR Iraq\* OR Jamaica\* OR Jordan\* OR Kenya OR Kenyan OR Kiribati OR Korea\* OR Kyrgy\* OR Laos OR Laotian\* OR Lebanon OR Lebanese OR Lesotho OR Liberia\* OR Libya\* OR Macedonia\* OR Madagasca\* OR Malawi\* OR Malaysia\* OR Maldives OR Maldivian OR Mali OR Malian\* OR "Marshall Islands" OR Mauritania\* OR Mauritius OR Mauritian OR Mayotte OR Mexic\* OR Micronesia\* OR Moldov\* OR Mongolia\* OR Morocc\* OR Mozambique OR Mozambican OR Myanmar OR Namibia\* OR Nepal\* OR Nevis OR Nicaragua\* OR Niger\* OR "Northern Mariana Islands" OR Oman\* OR Pakistan\* OR Palau\* OR Panama\* OR "Papua New Guinea" OR Paraguay\* OR Peru\* OR Philippine\* OR Filipino\* OR Poland OR Polish OR Rwanda\* OR Samoa\* OR Sao Tome\* OR Principe OR Senegal\* OR Seychell\* OR "Sierra Leon\*" OR "Solomon Island\*" OR Somali\* OR "South Africa\*" OR "Sri Lanka\*" OR "Saint Kitts" OR "Saint Lucia" OR "St Lucia" OR "Saint Vincent" OR "St Vincent" OR Sudan\* OR Suriname\* OR Swaziland OR Swazi OR Syria\* OR Tajik\* OR Tanzania\* OR Thailand OR Thai OR "Timor Leste" OR Togo\* OR Tonga\* OR Trinidad OR Trinidadian OR Tobago OR Tobagonian OR Tunisia\* OR Turkey OR Turkish OR Uganda\* OR Uruguay\* OR Vanuat\* OR Venezuela\* OR Vietnam\* OR "West Bank" OR Yemen\* OR Zambia\* OR Zimbabwe\*

NOT DE "case reports"

AND

DE "international cooperation" OR DE "Developed Countries" OR DE "altruism" OR DE "volunteers" OR DE "voluntary services"

OR

TITLE/ABSTRACT/SUBJECT altruism OR charitable OR charity OR "educational exchange\*" OR "global surgery" OR "high income countr\*" OR "higher income countr\*" OR humanitarian OR "industrializedindustrialised countr\*" OR "industrializedindustrialised nation\*" OR "institutional collaboration\*" OR "international aid\*" OR "international assistance" OR "international co-operation\*" OR "international collaboration\*" OR "international cooperation\*" OR "international education\*" OR "international exchange\*" OR internationality OR mission\* OR partnership\* OR "relief work" OR "surgical exchange\*" OR "surgical partnership\*" OR volunteer\* OR voluntour\*

NOT DE "case reports" unchecked: apply equivalent subjects

Source types: Academic Journal

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including both surgical techniques of advanced procedures, non-technical skills including 'personal professionalism', decision-making and a positive 'cultural change',<sup>19 22 25 26 31</sup> which was emphasised by an attending surgeon in Ethiopia:

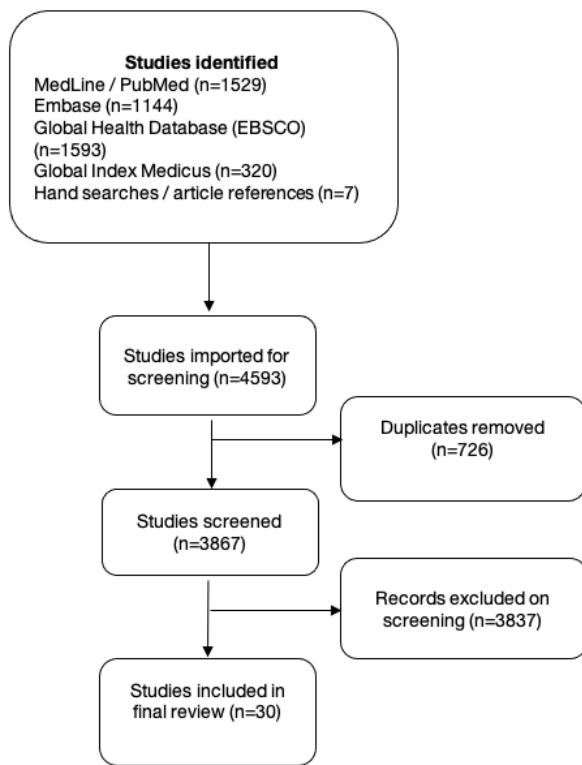
"Our trainees should see advanced surgery. They shouldn't limit their expectations to what they are seeing in the country now. They should adjust themselves to international norms."<sup>26</sup>

"...there are really a high level of doctors coming, so it's an honor for me to have these kind of people and work with them, and with my practice, help the patient have a better care with their expertise. It's a good opportunity for the hospital, the Haitian population and for me as a doctor."<sup>36</sup>

Ten studies (33%) mentioned interest in broader collaboration with visiting surgical teams, including integration of educational efforts such as didactic lectures and workshops in the visits,<sup>17 20 23 25 27 29 31 34 36 39</sup> continuous

**Table 1** Inclusion and exclusion criteria of the systematic review

Inclusion criteria	Exclusion criteria
Studies pertaining to surgery, obstetrics or anaesthesia.	Studies pertaining to non-operative specialties.
Studies about physicians from HICs doing clinical work in LMICs.	Studies describing LMIC situations, not including visiting teams; studies about research or policy work; studies about work in countries that are not LMICs; studies pertaining to surgical care in humanitarian or military settings.
Studies presenting original data on the perspective of LMIC stakeholders affected by or participating in these programmes.	Clinical case-reports of individual surgical patients; studies only describing HIC perspective.
HICs, high-income countries; LMICs, low-income and middle-income countries.	



**Figure 1** Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram demonstrating the study selection process for the systematic review.

learning beyond short-term visits including educational online rounds<sup>20 39</sup> and wishes for bilateral collaboration including opportunities to attend surgical training in HICs.<sup>25 29 39</sup> One example of collaboration beyond short-term visits was a US-Peruvian partnership consisting of multiple on-site visits and regular remote learning sessions, where a prospective study found the two strategies to be complementary with ‘on-site missions’ preferentially building capacity for diagnosis, repair technique and intraoperative decision-making, whereas remotes sessions preferentially helped develop understanding of operative design and anatomy (all  $p < 0.005$ ).<sup>34</sup>

Eight studies (27%) expressed the importance of visiting surgical teams in helping alleviate the immediate need for surgical care, especially to marginalised communities who may not be able to afford or access care in other ways.<sup>21 28 32 36 38 40 41 43</sup> This was reported both by local healthcare providers and patients.

Six (20%) studies highlighted increasing academic and/or career opportunities,<sup>17 21 22 25 26 31</sup> including supporting local research capacity-building,<sup>26 31</sup> improving chances of a new job due to newly acquired skills<sup>22</sup> and better salaries when working in association with short-term missions.<sup>21</sup> In Guyana, 78% of interviewed residents and faculty expressed that the academic opportunities had increased as a result of the collaborative programme, and six Guyanese surgeons had the opportunity to present

research papers at the international Bethune Round Table conference in Canada.<sup>31</sup>

System-level improvement was reported in 17% (n=5) of studies<sup>20 21 30 31 41</sup> and included improved reputation from the community, opportunities to strengthen the local residency based on pearls shared from visiting surgical trainees<sup>17</sup> and infrastructure through donated supplies. For example:

“Money is not the solution—that disappears and doesn’t get to the patients. But, if volunteers leave something behind for the local physician, such as equipment, medications, operative instruments, or supplies that the physician could continue using when the volunteer group leaves, that benefits us and our patients.”<sup>41</sup>

### Disadvantages of visiting surgical teams

Potential areas of contention associated with visiting surgical teams were highlighted in 22 (73%) studies.<sup>17 18 21 22 25–27 29 31 33 35–46</sup> These were further subgrouped as ethical dilemmas and inequity, insufficient knowledge transfers, poor quality of care, administrative and financial issues, competition and language barriers.

The most common potential controversy involved administrative and financial issues (n=15, 50%),<sup>17 18 25 26 29 31 35 36 38–43 45</sup> such as poor coordination with hospital duty schedules,<sup>25 26 29</sup> lack of needed resources to do planned surgeries,<sup>31</sup> overlapping ‘missions’,<sup>26</sup> or failure to notify host staff of planned mission<sup>36</sup> and visits being too short.<sup>17 25 29 46</sup> Another example of administrative shortcoming was HIC surgeons failing to adhere to regulations regarding registration of planned visits to local authorities<sup>41</sup> or reporting outcomes.<sup>42</sup>

Another administrative challenge was navigating the political landscape, where visiting surgical teams reduced the incentive to invest more in surgical care<sup>18 38 41</sup> or may cause a further divide between local providers and the public system:

“Communication problems become particularly difficult when visiting surgeons develop a closer relationship with, for example, the Ethiopian government than with the local surgeons, a practice that undermines the control of local surgeons within their own working environment.”<sup>26</sup>

‘The government only considers the number of existing healthcare services already in the area, regardless of the quality of services provided’. Thus, the presence of multiple NGO health projects in the area may actually impede development of the area’s public healthcare infrastructure.”<sup>41</sup>

Similarly, there were financial controversies with the local hospital having to bear the brunt of the costs of the visiting team including increased hospital running costs such as gas expenditure, and costs of postoperative care of patients operated on during the visit.<sup>36 43 45</sup> Some local providers also argued that patients would ‘take more responsibility for their own care’ if a small symbolic fee was charged.<sup>41</sup> Margolick *et al* also identified the cost of flights, meal and accommodation as a financial barrier

**Table 2** Overview of all studies included in the systematic review.

Study	First author affiliation	Country studied	Type of surgical visit	Study type	Surgical specialty
Okonta <i>et al</i> <sup>32</sup>	Nigeria	Nigeria	Surgical missions+combined clinical and teaching visits	Research letter	Cardiac surgery
Roberts <i>et al</i> <sup>17</sup>	USA	51 LMICs	Combined clinical and teaching visits	Cross-sectional study (survey)	Orthopaedic surgery
Billig <i>et al</i> <sup>33</sup>	USA	Vietnam†	Combined clinical and teaching visits	Qualitative study	Plastic surgery
Vyas <i>et al</i> <sup>34</sup>	USA	Peru†	Combined clinical and teaching visits	Prospective study	Plastic surgery
Margolick <i>et al</i> <sup>39</sup>	Canada	Mexico†	Combined clinical and teaching visits	Cross-sectional study (survey)	General surgery (acute care rotation)
Nwafor <i>et al</i> <sup>35</sup>	Nigeria	Nigeria†	Surgical missions+combined clinical and teaching visits	Retrospective study	Cardiac surgery
Chaus <sup>36</sup>	USA	Haiti†	Surgical missions	Qualitative study	Mixed SAO specialties
Munabi <i>et al</i> <sup>19</sup>	USA	Rwanda*	Combined clinical and teaching visits	Cross-sectional study (survey)	Plastic surgery
Cheok <i>et al</i> <sup>20</sup>	Singapore	Cambodia†	Combined clinical and teaching visits	Qualitative study	Plastic surgery
Woolley <i>et al</i> <sup>37</sup>	Haiti	Haiti†	Surgical missions	Viewpoint	Orthopaedic surgery
Alassani <i>et al</i> <sup>38</sup>	Togo	Togo*/Benin†	Surgical missions	Retrospective study	Mixed SAO specialties
Close <i>et al</i> <sup>40</sup>	UK	Benin†	Surgical missions	Qualitative study	Mixed SAO specialties
Coughran <i>et al</i> <sup>21</sup>	USA	Guatemala†	Surgical missions	Qualitative study	Mixed SAO specialties
Munabi <i>et al</i> <sup>22</sup>	USA	Rwanda*	Combined clinical and teaching visits	Pre-intervention and post-intervention surveys	Plastic surgery
Worden <i>et al</i> <sup>23</sup>	USA	Vietnam†	Combined clinical and teaching visits	Cross-sectional study (survey)	Otolaryngology
Schoenbrunner <i>et al</i> <sup>44</sup>	USA	Mexico†	Surgical missions	Cross-sectional study (survey)	Plastic surgery
Roche <i>et al</i> <sup>43</sup>	USA	Guatemala†	Surgical missions	Qualitative+cross-sectional study (survey)	Mixed SAO specialties
Hayton <i>et al</i> <sup>24</sup>	USA	Malawi*	Combined clinical and teaching visits	Cross-sectional survey	General surgery
Cook <i>et al</i> <sup>25</sup>	USA	Tanzania†	Combined clinical and teaching visits	Pre-intervention and post-intervention surveys	Mixed SAO specialties
Roche and Hall-Clifford <sup>42</sup>	USA	Guatemala†	Surgical missions	Qualitative study	Mixed SAO specialties
Berry <sup>45</sup>	Canada	Guatemala†	Surgical missions	Qualitative+descriptive study	Mixed SAO specialties
Cadotte <i>et al</i> <sup>26</sup>	Canada	Ethiopia*	Combined clinical and teaching visits	Qualitative study	Neurosurgery
Elobu <i>et al</i> <sup>27</sup>	Uganda	Uganda*	Combined clinical and teaching visits	Cross-sectional study (survey)	Mixed SAO specialties
Kavolus <i>et al</i> <sup>28</sup>	USA	Guatemala†	Surgical missions	Cross-sectional study (survey)	Orthopaedic surgery

Continued

Table 2 Continued

Study	First author affiliation	Country studied	Type of surgical visit	Study type	Surgical specialty
Cadotte <i>et al</i> <sup>29</sup>	Canada	Ethiopia*	Combined clinical and teaching visits	Retrospective+qualitative study	Mixed SAO specialties
Mitchell <i>et al</i> <sup>46</sup>	USA	Tanzania†	Surgical missions	Viewpoint	Mixed SAO specialties
Haglund <i>et al</i> <sup>30</sup>	USA	Uganda*	Combined clinical and teaching visits	Retrospective study	Neurosurgery
Cameron <i>et al</i> <sup>31</sup>	Canada	Guyana†	Combined clinical and teaching visits	Cross-sectional study	General surgery
Nthumba <sup>18</sup>	Kenya	Sub-Saharan Africa	Surgical missions	Viewpoint	Mixed SAO specialties
Green <i>et al</i> <sup>41</sup>	USA	Guatemala†	Surgical missions	Qualitative study	Mixed SAO specialties

\*Low-income countries.  
†Middle-income countries.  
LMIC, low-income and middle-income country; SAO, surgery, anaesthesia and obstetrics.

to reciprocity in potential twinning programmes with the HIC partner institution.<sup>39</sup>

Twelve studies described ethical concerns and inequity (40%).<sup>17 18 21 27 35–37 41 42 44 45</sup> Inequity was exemplified as lack of local involvement in associated research endeavours<sup>27</sup> and local surgeons being set to undertake administrative tasks such as translations and booking of patients for HIC surgeons<sup>21</sup> and project coordinators receiving the tasks of acting as ‘a tour guide’,<sup>41</sup> while ‘giving up’ operative slots to visiting surgeons.<sup>29</sup> In one study that assessed host perceptions of visiting US residents, the relationship was described as ‘the positives of such exchanges, in our experience, is one-way and extremely short-lived (lasts as long as the resident needs the host institution to provide for their interests)’.<sup>17</sup> Due to the skewed power dynamics, LMIC-based non-governmental organisations felt unable to enforce restrictions that would benefit the organisation, such as requiring minimal language skills, due to risk of losing the partnership entirely.<sup>43</sup>

Examples of unethical practices included usage of expired medications on ‘missions’,<sup>36</sup> limited contact between patients and visiting surgical teams with patients not being aware of who had conducted their surgery or exactly what procedure had been performed,<sup>43</sup> and creating dependency which could not be sustained when the short-term visit is over.<sup>18 38</sup>

Seven articles described insufficient knowledge transfers,<sup>17 18 21 22 27 35 36</sup> including a lack of training on usage of donated equipment,<sup>21 27</sup> how to manage complications after the visiting team has left<sup>36</sup> and not being actively involved in operative cases.<sup>35</sup> For example, during 7 years of cardiac surgical visits in Nigeria, no local surgeon led an open-heart surgery case, and the most common role was third assistant.<sup>35</sup> In one study, trainees reported that international groups had a neutral or negative impact on patient care (40%) and on their training (25%).<sup>27</sup>

“The groups were not very interested in teaching either, because they needed to do numbers. Numbers to be able to bring to their sponsors and to say to them: ‘I operated on 50 children in ten days’, instead of saying to them, ‘I operated on five and I taught a surgeon’.”<sup>21</sup>

Potential competition between visiting surgical teams and local surgical providers was also described (n=8, 27%),<sup>17 21 26 29 40–43</sup> where local providers expressed that visiting teams may divert surgical cases from local healthcare providers including local trainees<sup>17 21 29 41</sup> or that surgeons from HICs could precipitate emigration of LMIC surgeons to HICs.<sup>29</sup> Similarly, visiting surgical teams were believed to sometimes infringe on local healthcare providers’ authority towards patients, instilling a sense of distrust of local providers.<sup>40</sup>

“White volunteers are called the ‘blan’, and when the ‘blan’ comes, the staff cannot tell patients anything because they only believe what the ‘blan’ says. Several frontline workers expressed poor standards of care when visiting teams worked independently of the local team. This situation portrays a negative image to the local population, who may perceive the local staff as incompetent if volunteers ignore them.”<sup>36</sup>

Fears that visiting surgical teams would ‘funnel patients away from their private practices’<sup>21</sup> was reported as a major challenge for non-governmental organisations in ‘convincing local surgeons to operate alongside’ visiting surgeons.<sup>42</sup> This was also expressed by patients who stated that they preferred to deter seeking care until the visiting surgical team would come and they could get the surgery for free.<sup>40 43</sup>

Eight (27%) articles described poor quality of care and postoperative complications,<sup>18 21 36 37 42–44 46</sup> including lack of postoperative planning, limited ability to monitor patients postoperatively, accompanying trainees performing unsupervised procedures above their level of





**Table 3** Emerging concepts regarding perceptions of visiting surgical teams by low-income and middle-income country (LMIC) stakeholders.

Study	Advantages				Disadvantages				Language barriers	
	Skills improvement	System-level strengthening	Immediate clinical care	Academic/ Career benefits	Broader collaboration opportunities	Poor quality of care	Insufficient knowledge transfers	Concerns of ethics/equity		Administrative and financial issues
<b>LMIC ownership</b>										
Ke <i>et al</i> <sup>32</sup>	x		x							
Mitchell <i>et al</i> <sup>46</sup>					x					
Woolley <i>et al</i> <sup>37</sup>	x				x		x			
Alassani <i>et al</i> <sup>38</sup>	x		x					x		
Nthumba <sup>18</sup>					x	x	x	x		
Nwafor <i>et al</i> <sup>35</sup>	x					x	x	x		
Elobu <i>et al</i> <sup>27</sup>	x				x	x	x	x		
<b>LMIC involvement</b>										
Munabi <i>et al</i> <sup>22</sup>	x			x			x			
Cheok <i>et al</i> <sup>20</sup>	x	x			x					
Cadotte <i>et al</i> <sup>26</sup>	x			x				x		x
Kavolus <i>et al</i> <sup>28</sup>			x							
Cadotte <i>et al</i> <sup>29</sup>					x			x		x
Munabi <i>et al</i> <sup>19</sup>	x									
Roberts <i>et al</i> <sup>17</sup>		x			x	x	x	x		x
Margolick <i>et al</i> <sup>39</sup>					x			x		x
Roche <i>et al</i> <sup>43</sup>			x			x		x		x
Hayton <i>et al</i> <sup>24</sup>	x			x						
Cook <i>et al</i> <sup>25</sup>	x				x			x		x
Roche and Hall-Clifford <sup>42</sup>						x		x		
Haglund <i>et al</i> <sup>30</sup>	x									
<b>No LMIC involvement</b>										
Berry <sup>45</sup>								x		
Vyas <i>et al</i> <sup>34</sup>	x				x					
Billig <i>et al</i> <sup>33</sup>	x									x
Chaus <sup>36</sup>	x		x		x	x	x	x		x
Cameron <i>et al</i> <sup>31</sup>	x			x	x	x		x		x
Worden <i>et al</i> <sup>23</sup>					x					
Schoenbrunner <i>et al</i> <sup>44</sup>						x		x		

Continued

**Table 3** Continued

Study	Advantages					Disadvantages					
	Skills improvement	System-level strengthening	Immediate clinical care	Academic/Career benefits	Broader collaboration opportunities	Poor quality of care	Insufficient knowledge transfers	Concerns of ethics/equity	Administrative and financial issues	Competition	Language barriers
Green <i>et al</i> <sup>41</sup>		X	X					X	X		X
Close and Christie-de Jong <sup>40</sup>			X						X		X
Coughran <i>et al</i> <sup>21</sup>		X	X	X		X	X	X			X

competence and lack of accountability for the management of complications.

"Sometimes I wonder: if something happens, where can I go [for help]? Because those people who were here [the visiting medical team] are no longer here. So I don't know where I'd be able to go for help in the case of some kind of emergency."<sup>43</sup>

In seven studies (23%), language and communication barriers were described as a challenge preventing maximal training benefits and hindering visiting surgeons from working independently.<sup>17 25 29 31 33 36 39</sup> Limited language skills were also associated with missing chart documentation,<sup>36</sup> potentially negatively impacting follow-up and outcomes. One suggestion to overcome this issue was to ensure availability of medical interpreters during the visits,<sup>36</sup> to prevent local staff from having to aid with extensive documentation in addition to pre-existing tasks.

**DISCUSSION**

In this systematic review, a multitude of benefits and opportunities of well-structured and well-managed foreign surgical team visits were expressed by LMIC stakeholders. Such visits were perceived to help provision of standard surgical care and advanced surgical procedures to patients in need, with the key to a successful visit being the integration of skills and knowledge transfers to host staff. However, concerns including ethical dilemmas, inequitable practices, poor clinical care and lack of management of postoperative complications were also voiced, as well as language barriers and administrative and financial issues hindering the success of these visits. Despite the focus on LMIC perspectives, only 7 out of 30 studies included had LMIC ownership (a first or senior LMIC-affiliated author), with most studies led by the HIC institutions affiliated with the 'visiting surgical teams' studied. This likely implies a bias and is suggestive of voices from the host perspective still being scarce in these conversations, hindering a holistic and reliable interpretation of LMIC perspectives of visiting surgical teams. This limitation also includes a publication bias where some stakeholders are less likely to be in a position to publish articles in peer-reviewed publications, for example, perioperative nurses.

Ethical guidelines for foreign medical teams have previously been developed in global health<sup>47</sup>; and in global surgery, the 'Guidelines for Surgeons on Establishing Projects in Low-Income Countries' developed by Grimes *et al* with the International Development Committee, Association of Surgeons of Great Britain and Ireland; West African College of Surgeons; College of Surgeons of East, Central and Southern Africa; Operation Hernia Foundation and International Federation of Surgical Colleges<sup>48</sup> (online supplemental file 1). In these guidelines, 'monitoring the quality of surgery' and 'managing postoperative complications' are recommended. This corresponds to issues highlighted in the 'seven sins of humanitarian medicine',<sup>45</sup> which includes 'leaving a mess behind' and 'failing to

have a follow-up plan', which are also reoccurring themes in our systematic review.<sup>21 42 44</sup> This has previously been explored in a systematic review by Martiniuk *et al*, where <25% of studies reported postoperative follow-up at 6 months' time.<sup>49</sup> Among those reporting follow-up, the follow-up rate was 56%, and a 22% complication rate. In a Mexican study, more than half of the surgeons who had encountered patients operated on by 'surgical missions' reported having performed corrective surgeries because of complications from visiting surgical teams, where >70% of the local surgeons were never paid for these corrective surgeries.<sup>44</sup> This is in line with our analysis which indicates a significantly larger number of disadvantages reported among studies of 'surgical missions' compared with studies of 'combined clinical and teaching visits'. As indicated by studies of short-term missions in Central America,<sup>21 44 45</sup> poorly conducted work may leave scars that take a long time to heal—both for the patients and for local partners whose trust in visiting surgical teams is tainted.<sup>44</sup> To address this issue, further accountability measures may be needed. Ibrahim *et al* have previously suggested the development a framework of monitoring and evaluation of international surgical initiatives in LMICs including establishment of LMIC databases to inform monitoring and evaluation, longitudinal and contextual assessments of initiatives and encompassing the wider community in evaluation strategies.<sup>50</sup> In the ethical guidelines by Grimes *et al*, it is recommended that any accompanying surgical trainees should be able to teach and train or be adequately supervised.<sup>48</sup> Ministries of Health, and HIC institutions sending visiting surgical teams, could expand on this concept by implementing credentialing criteria to ensure that those coming or being sent to provide this short-term care are qualified to do so.

Another potential point in the ethical guidelines by Grimes *et al*<sup>48</sup> worth further scrutiny is 'identifying a local partner'. To mitigate areas of contention such as administrative and financial burden on local staff and the risk of competition, it can be preferable to work directly with local surgeons to organise outreaches instead of government. To ensure more local ownership, less disruption of the existing surgical system, better planning for follow-up of patients and proper understanding of local needs and resources, we emphasise the deliberate inclusion of skills acquisition training into short-term missions based on areas of need identified by LMIC stakeholders before the trip, including ability to follow-up and address potential postoperative complications.

Another 'sin of humanitarian medicine' is 'doing the right thing for the wrong reasons'.<sup>51</sup> One such example was shared by Coughran *et al*, where LMIC stakeholders perceived visiting teams as primarily interested in 'getting large numbers' of patients, so they could raise more money.<sup>51</sup> However, what the 'right reasons' for partaking in a surgical mission is a question that yet remains to be answered. It can also be seen as an altruistic act reflective of a growing global health interest, yet, despite possibly noble intentions, altruism is only true when it correctly recognises

and meets the need of the recipient of the benevolence. Many HIC surgeons may also see 'surgical aid work' as an opportunity to broaden their clinical exposure or to get more training opportunities.<sup>52 53</sup> However, these trips can arguably be considered exploitative if visiting surgical teams benefit more than the local health system and/or patient, or, worse, if the visiting surgeon benefits whereas the patient and/or local staff is harmed.

The heterogeneity of perspectives indicates that there is no *one* way for HIC surgical teams to approach clinical work in LMICs. However, the importance of mutually beneficial and just collaborations was a recurring theme in the studies identified in this review; to achieve this, imbalanced power dynamics must be considered. One example from our systematic review was patients and government officials being more willing to trust 'foreign' doctors,<sup>21 36</sup> potentially leading to feelings of frustration, isolation or helplessness among LMIC surgeons. This can be additionally problematic when regarded considering power dynamics potentially hindering LMIC staff from sharing critical perspectives of visiting surgical teams as it may threaten continued inflow of foreign aid through the partner organisation. Similarly, visiting surgical teams were sometimes found to impede continued training or regular duties of LMIC surgeons, who were deferred to menial tasks such as administration or translation to facilitate the work of visiting teams while giving up their operative slots.<sup>21 41</sup> The success of a surgical mission must therefore be interpreted on the background of the cost to the local system.

Inequity appears to persist also in research endeavours associated with visiting surgical teams, yet this is not explored in the current ethical guidelines.<sup>48</sup> In one of the included studies in this review, only one-third of Ugandan surgical trainees surveyed, believed that research projects undertaken by visiting surgical teams were done with sufficient local collaboration and only 15% felt they responded to high-priority issues, and none of the trainees surveyed had been a coauthor on a research paper produced in association with the foreign team visit.<sup>27</sup> This should be seen in the wider global health context, where many international research collaborations have been found to be devoid of transfer of research skills, local staff excluded from research or authorship or tokenistic inclusion.<sup>54 55</sup> Contrastingly, global surgery research appears to be authored predominantly by LMIC affiliates<sup>56</sup>; however, this pattern, as evidenced by this review, is not reflected in literature in association with visiting surgical teams. In response to the limitations to current guidelines highlighted above, we recommend the development of new ethical guidelines for visiting surgical teams. Such new guidelines should also consider the inclusion of ethical research practices, where LMICs should be seen as equal partners in all aspects of the projects from project ideation to implementation to publication. Beyond inclusion as authors, LMIC partners should be mentored and supported with appropriate resources to initiate, develop and execute research initiatives.

## Limitations

Ironically, this review and the majority of included studies in it are first-authored by a HIC affiliate, and most included studies therefore have been conducted by researchers affiliated with the surgical visits investigated. This may imply a power dynamic that could impact the results presented, where LMIC stakeholders may be inclined to answer in certain ways to ensure that good relations and continued collaboration are maintained. Although it is important that HIC groups and NGOs evaluate their efforts and take steps towards critical self-reflection, further research efforts that are independent from such power relations should also be conducted.

Due to the heterogeneity of the studies, a structured risk of bias assessment could not be completed, causing uncertainty regarding the quality of evidence and publication bias. Despite the lack of a formal assessment of the quality of evidence, it is evident that some of the included articles, for example, viewpoints and research letters, lack robust methodology and that many of the cross-sectional studies have only small samples surveyed. However, these articles were purposefully included as a measure to mitigate publication bias where LMIC researchers may be less likely to have time and/or funding to conduct formal studies on the issue. Despite the lack of rigour, the collated findings demonstrate clear patterns which may guide future research and efforts to revising existing ethical guidelines for international surgical work. Future research should consider mixed methods approaches where all involved stakeholders have opportunity to provide input. In addition, high-quality LMIC-led qualitative research to explore this issue in-depth is desirable to fully understand the dynamics of the situation.

## CONCLUSION

Surgical short-term visits from HICs are insufficiently described from the perspective of LMICs, yet such perspectives are crucial. Visiting surgical teams provide opportunities for skill and knowledge transfer and system and patient care improvement, however, when conducted poorly, such visits are also worthy of considerable criticism and steps should be taken to ensure bilateral and equitable partnerships. The documentation of LMIC perspectives of HIC visiting surgical teams should encourage contextual appraisal of local needs and the expectations of HIC providers to ensure equitable collaborations and inform further development of ethical guidelines for global surgery.

### Author affiliations

<sup>1</sup>Department of Biomedical and Clinical Sciences, Linköping University, Centre for Teaching and Research in Disaster Medicine and Traumatology, Linköping, Sweden

<sup>2</sup>Department of Clinical Sciences in Lund, Orthopedic Surgery, Helsingborg Hospital, Faculty of Medicine, Lund University, Lund, Sweden

<sup>3</sup>Department of Surgery, National Hospital Abuja, Abuja, Federal Capital Territory, Nigeria

<sup>4</sup>WHO Collaborating Centre for Research on Surgical Care Delivery in LMICs, Mumbai, India

<sup>5</sup>The George Institute for Global Health, New Delhi, India

<sup>6</sup>Department of Policy and Advocacy, Operation Smile, Virginia Beach, Virginia, USA

<sup>7</sup>Department of Surgery, Lagos State University College of Medicine, Ikeja, Lagos, Nigeria

<sup>8</sup>Gastrointestinal Surgery, Mulago Hospital, Kampala, Uganda

<sup>9</sup>Institute of Digestive Diseases, Kampala, Uganda

<sup>10</sup>Paediatric Surgery Unit, Department of Surgery, Lagos University Teaching Hospital, Surulere, Lagos, Nigeria

<sup>11</sup>Department of Clinical Sciences in Lund, Pediatric Surgery, Skåne University Hospital in Lund, Faculty of Medicine, Lund University, Lund, Sweden

**Twitter** Lotta Velin @VelinLotta and Desmond T. Jumbam @desmondtanko

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### ORCID iDs

Lotta Velin <http://orcid.org/0000-0002-1929-6011>

Emmanuel A. Ameh <http://orcid.org/0000-0003-2386-3039>

Desmond T. Jumbam <http://orcid.org/0000-0002-3062-2519>

Justina Seyi-Olajide <http://orcid.org/0000-0003-4481-8528>

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## SUPPLEMENTARY MATERIALS

### Supplement 1. Recommendations in the “Guidelines for Surgeons on Establishing Projects in Low-Income Countries” by Grimes *et al* (38).

Recommendation	Detailed description
Identifying partners	Individuals seeking placements should identify appropriate placements that match their skill set using existing programmes
Understanding local needs and resources	The trip must be responsive to local needs. There must be adequate contact prior to the trip between the visiting team and the local medical staff. Identify the local resources available especially for postoperative care such as availability of blood transfusion, colostomy bags, laboratory facilities, radiological services, diathermy and type of anaesthesia available especially in rural areas. Avoid using complex technology in rural settings to ensure sustainability
Training of local health providers and ensuring sustainability	A significant proportion of any trip should be on training local health providers. There should be time set aside to train these staff in patient selection, pre-operative care, the operative technique, post-operative care and monitoring together with the recognition and management of complications. There is a need to ensure training of other medical staff involved in patient care. Consideration should be given as to whether the trip should be multidisciplinary.
Use of appropriate technologies and skills	Focus on training in basic surgical skills, basic trauma skills and perioperative management. Avoid complex procedures in rural areas. Consider designing post-operative protocols using local resources. Surgical trainees accompanying such trips should be able to teach and train or be adequately supervised. The training of local health providers should take priority
Monitoring the quality of surgery	Outcomes must be monitored. Ideally these should not just be clinical but should involve measures of quality of life
Management of postoperative complications	
Costs	Consideration for the financial impact on the host institution should be taken into account and all efforts should be taken to remove this burden, in order to maintain sustainability
Sustainability	There should be regular trips to the same institution over a number of years to ensure capacity building and sustainability. Surgeons should make an effort to understand and interact with local communities and local medical staff in order to gain a better cultural understanding, enhance relationships and develop a true awareness of local need
Working with local and regional training programs	Surgical initiatives should work in conjunction with and in support of local and regional training programmes