

Global Overview of Response Rates in Patient and Health Care Professional Surveys in Surgery

A Systematic Review

Vincent Maurice Meyer, MD,*✉ Stan Benjamins, Bsc,† Mostafa El Mounni, MD, PhD,†
Johan F. M. Lange, MD, PhD,† and Robert A. Pol, MD, PhD†

Objective: Identify key demographic factors and modes of follow-up in surgical survey response.

Summary Background Data: Surveys are widely used in surgery to assess patient and procedural outcomes, but response rates vary widely which compromises study quality. Currently there is no consensus as to what the average response rate is and which factors are associated with higher response rates.

Methods: The National Library of Medicine (MEDLINE/PubMed) was systematically searched from January 1, 2007 until February 1, 2020 using the following strategy: (((questionnaire) OR survey) AND “response rate”) AND (surgery OR surgical). Original survey studies from surgical(-related) fields reporting on response rate were included. Through one-way analysis of variance we present mean response rate per survey mode over time, number of additional contacts, country of origin, and type of interviewee.

Results: The average response is 70% over 811 studies in patients and 53% over 1746 doctor surveys. In-person surveys yield an average 76% response rate, followed by postal (65%) and online (46% web-based vs 51% email) surveys. Patients respond significantly more often than doctors to surveys by mail ($P < 0.001$), email ($P = 0.003$), web-based surveys ($P < 0.001$) and mixed mode surveys ($P = 0.006$). Additional contacts significantly improve response rate in email ($P = 0.26$) and web-based ($P = 0.041$) surveys in doctors. A wide variation in response rates was identified between countries.

Conclusions: Every survey is unique, but the main commonality between studies is response rate. Response rates appear to be highly dependent on type of survey, follow-up, geography, and interviewee type.

Keywords: email, postal, questionnaire, response rate, survey, telephone

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Surveys are often conducted in the field of surgery, where they represent a valuable means of gaining insight into a topic of interest (operative technique, quality of life, complications, expert opinion) from a wide-ranging selection of people (surgeons, patients, residents, students). This robust sampling method provides useful information when the sample selected is representative of the population and its design reliable, unbiased, and discriminatory.^{1–3}

The quality of a survey is mostly threatened by a lack of response (nonresponse bias, incomplete questionnaires) or an undesired response (social desirability bias, poor test-retest reliability, satisficing). Significant research has been done on the latter by Krosnick, who introduced the theory of “satisficing” in survey methodology.⁴ Krosnick states that it involves a significant amount of cognitive work to select the optimal answer to a question and (some) respondents would want to minimize that burden. Weak or strong satisficing, a portmanteau of *satisfy* and *suffice*, then reflects the act of shortcutting cognitive processes to alleviate the burden of choosing. The respondent answers the questions at hand sufficiently, but with the least effort. This will manifest in selecting “don’t know” options, random answers, and socially desirable answer options. The degree of satisficing depends on the motivation of the respondent and task difficulty.⁵

In the lack of response, the items themselves are hugely important; shorter questions and surveys, engagement to the subject, personalization of the questionnaire, and yes/no questions will attribute to a higher response rate.^{6–9} Survey mode, number and type of follow up, type of interviewee, and geographic variance also significantly impact response rate.^{10–13} These measurable aspects of response rate comprise a considerable, but only a part, of the puzzle. A low participation rate will introduce nonresponder selection bias (random sampling variability), which impairs validity of the researchers’ results and as such is often noted as a study weakness by peer reviewers.^{3,14}

A tremendous effort is therefore made toward increasing response rates to surveys. A 2009 Cochrane systematic review examined 121 different strategies to improve response rate in 481 postal and 32 electronic surveys showing that a monetary incentive, personalization, and shortening of the survey improves response rate.^{15,16} However, it does not state what a “good” or “acceptable” response rate is. Although often critiqued and with >500 studies reporting on interventions to enhance response rates, we still lack a consensus as to what an ideal or even average response rate is.^{1,17–19}

Through a global systematic review of the literature we aim to provide objective data on response rates in survey studies in the field

From the *Department of Surgery, Isala Hospital, The Netherlands; and †Department of Surgery, University Medical Centre Groningen, University of Groningen, The Netherlands.

✉ vincentmeyer@gmail.com.

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of surgery. We will present the average response rate per type of survey and follow-up, country, and type of interviewee thereby providing researchers with a tool for individual study design.

MATERIALS AND METHODS

Search Strategy

Data collection and analysis were performed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement.²⁰ The National Library of Medicine (MEDLINE/PubMed) was systematically searched from January 1, 2017 until February 1, 2020 as follows: *((questionnaire) OR survey) AND "response rate" AND (surgery OR surgical)*. The review process was discussed in detail with all authors beforehand. Studies were independently screened by 2 authors (V.M. and S.B.). Studies were marked if one of the authors doubted suitability and were subsequently checked by the first author to ensure uniform reporting. In case of disagreement, consensus was reached through discussion with all authors.

Studies reporting in English on response rates to questionnaires in surgical and surgery-related fields of medicine were included. When studies reported response rates on multiple types of interviewees or modes of survey, these sub results were included separately. Studies reporting multiple surveys over time were excluded due to possible bias. Reviews, conference abstracts, case reports, and studies reporting solely from nonsurgical (or related) fields of medicine, paramedicine, or nursing were also excluded. Primary end point was mean response rate per type of survey. Secondary outcomes were response rate over time and per type of follow up, country of origin, and type of subject. Subjects were either patients or health care professionals (doctors). All identified articles were extracted to an Excel sheet in a predefined format containing Pubmed ID, title, authors, country, field of surgery, no. of interviewees that responded, response rate, no of interventions, type of interventions, mandatory nature, and responder reward. Surveys were divided in person (face to face or telephone), postal, email, or web-based surveys in case of an online questionnaire. The miscellaneous group entails mixed-mode surveys.

Follow-up was recorded as none, once, twice or >3. Follow-up could consist of a different mode of survey, that is, a telephone call after a letter was sent. Data were analyzed using IBM Statistics software SPSS 19 (2010).²¹ Descriptive statistics were obtained. Student *t* test was used to compare between health care professionals and patients. One-way analysis of variance analysis was performed for response rate over time and per follow-up contact. Countries with <10 survey studies were grouped under continent.

RESULTS

Literature Search

The initial search resulted in 5693 potential studies. After screening of the abstracts 1435 articles were excluded, leaving 4258 articles for full-text assessment. After a detailed examination, 1679 articles were excluded for various reasons (see online supplement PRISMA Flow Chart, <http://links.lww.com/SLA/C247>). The final selection yielded 2579 surveys matching the inclusion criteria.

Response Rates Relative to Type of Survey

The average response rate of the 2579 included studies is $58.6\% \pm 24.0\%$ (mean \pm SD), which is $70.0\% \pm 18.4\%$ over 811 studies in patients and $53.3\% \pm 24.5\%$ over 1746 health care professionals' surveys.

Figure 1 shows the average response rate per mode of survey of patients and health care professionals. In-person studies yielded the highest average response rate: $77.8\% \pm 18.0\%$ and $74.5\% \pm 18.7\%$ for patients and health care professionals, respectively. Postal studies average a $68.0\% \pm 17.0\%$ and $60.4\% \pm 18.1\%$ response rate. Email studies give an average response rate of $68.0\% \pm 17.1\%$ for patients and $50.5\% \pm 23.3\%$ for health care professionals. Web-based surveys offer an average response rate of $59.3\% \pm 18.9\%$ and $45.8\% \pm 25.0\%$ for patients and health care professionals, respectively. In the mixed methods group the average response rate for patients is $68.7\% \pm 20.0\%$ and for health care professionals $62.0\% \pm 23.0\%$.

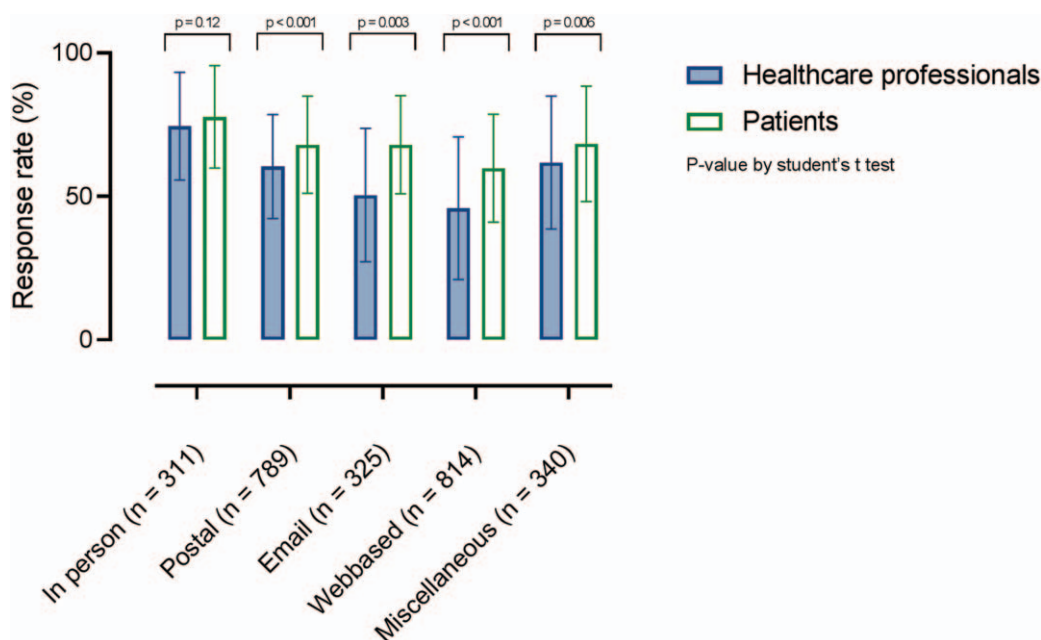


FIGURE 1. Mean response rate and standard deviation per mode of survey for patients and healthcare professionals.

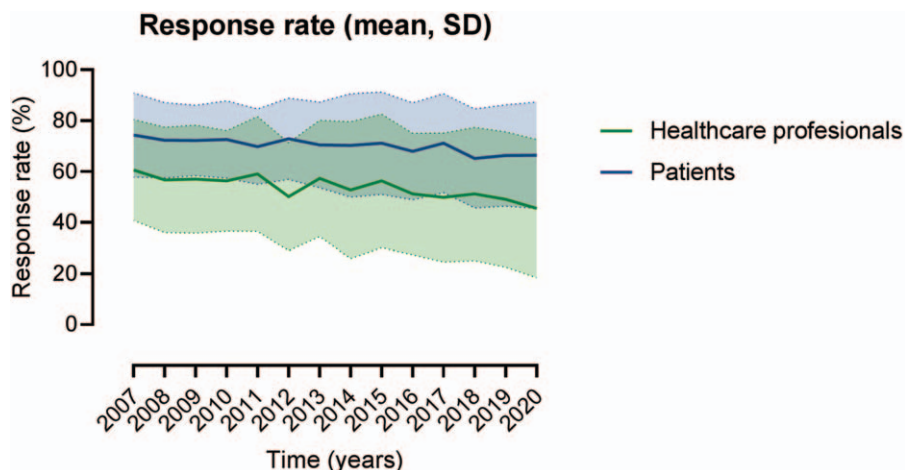


FIGURE 2. Response rate per type of interviewee (patient or health care professional) over a thirteen-year interval.

No statistically significant difference in response rate between health care professionals and patients was found in “in person” surveys ($P = 0.12$). Patients respond significantly more often than health care professionals to surveys by mail ($P < 0.001$), Email ($P = 0.003$), web-based surveys ($P < 0.001$), and mixed mode surveys ($P = 0.006$). This effect is consistent over the whole study inclusion period (Fig. 2).

Response Rates Relative to Follow-Up

Figures 3 and 4 show the response rate per mode of survey according to number of interventions, for patients and health care professionals, respectively. The Email and web-based surveys are mostly directed at health care professionals (312 vs 789 studies, respectively) and less at patients (13 vs 30 studies). Additional contacts significantly improve response rate in email ($P = 0.26$) and web-based ($P = 0.041$) surveys in health care professionals. A similar trend is seen for 1 and 2 follow-up contacts in email

and web-based studies in patients, although overall follow-up is not statistically significant in the Email ($P = 0.22$) and web-based ($P = 0.46$) group. Online surveys with follow-up are not often used for patients (3 Email and 15 web-based studies). Follow-up has a significant negative effect in “in person” studies ($P = 0.013$), where sample size is also small for ≥ 2 follow-up contacts (8 studies).

For the survey studies distributing questionnaires to patients by person ($P = 0.76$) or by mail ($P = 0.65$) and for surveys given to health care professionals by mail ($P = 0.936$), there is no significant difference in response rate with or without follow-up.

Geographical Differences

Figure 5 shows response rates (mean, SD) per country of origin. Patients partake more often than health care professionals in survey studies around the world.

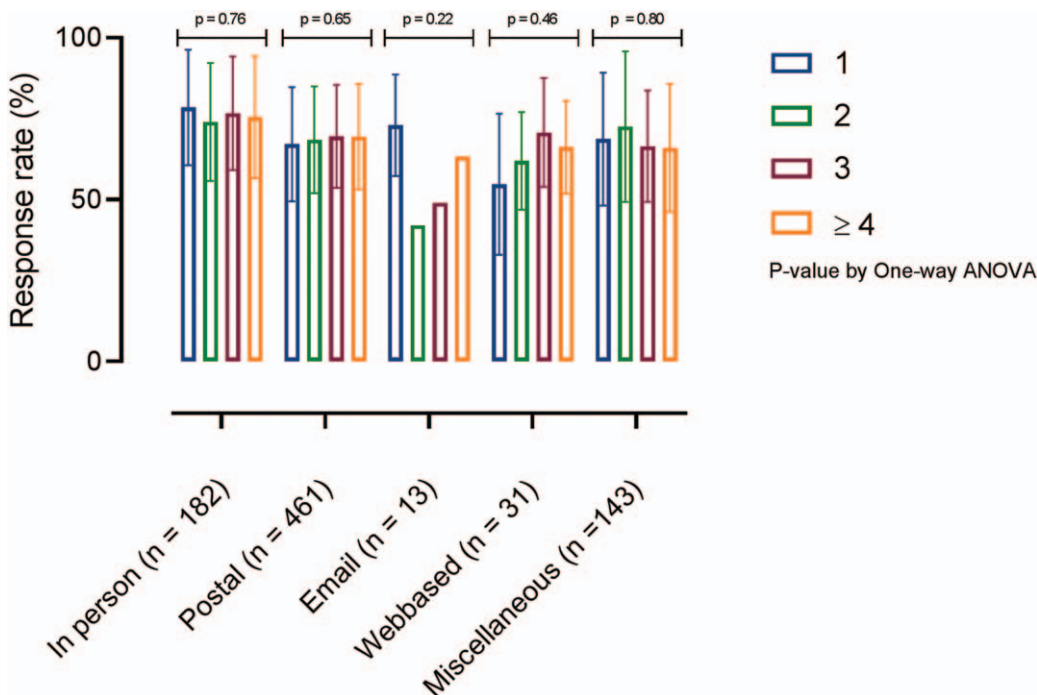


FIGURE 3. Response rate per number of contacts per mode of survey for patients.

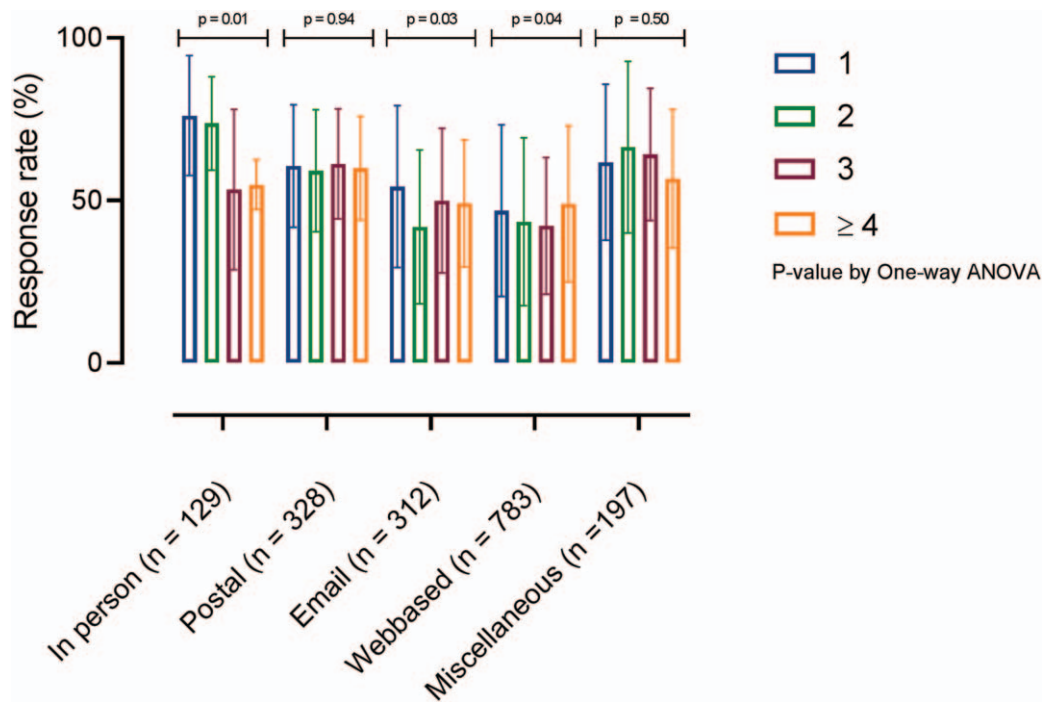


FIGURE 4. Response rate per number of contacts per mode of survey for healthcare professionals.

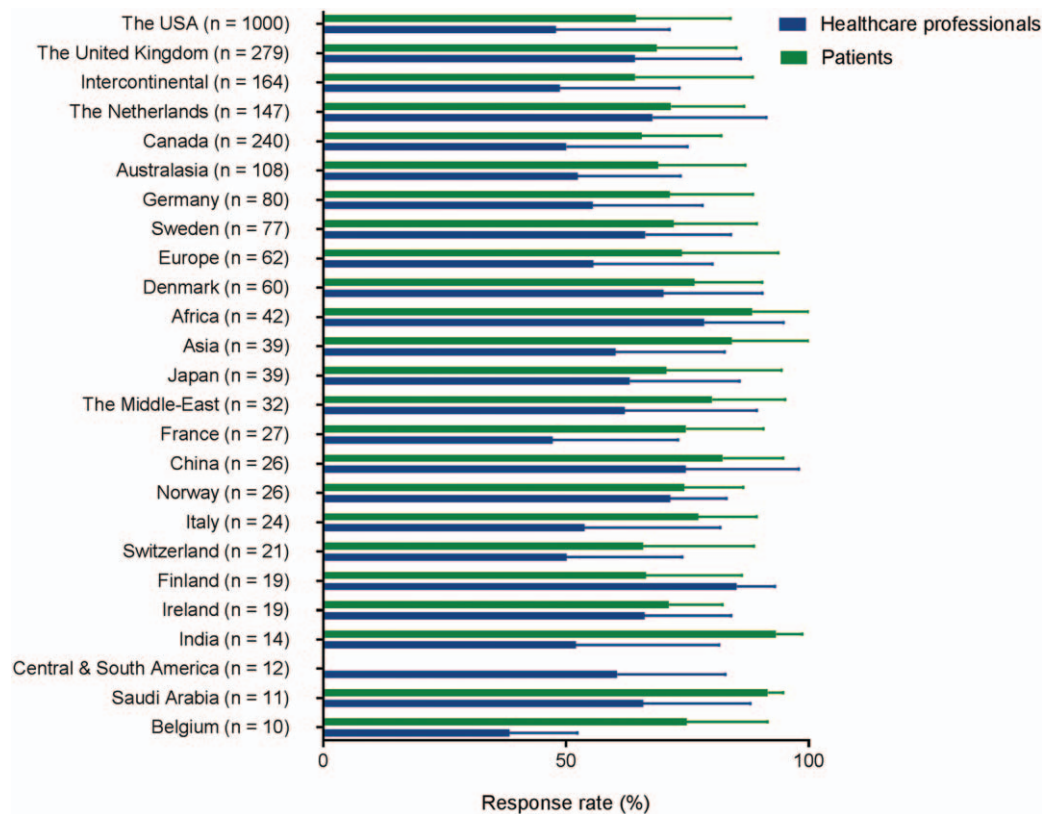


FIGURE 5. Response rate and standard deviation per country, region, or continent of origin.

The high patient response rate in Africa (88.1% ± 12.0%), Asia (83.9% ± 16.4%), Middle-East (80.1% ± 15.0%), China (82.3% ± 12.4%), India (93.3% ± 5.4%), and Saudi-Arabia (89.4%) reflects solely postal and in-person questionnaires. The United States has the lowest average respondent score over 225 patient surveys (64.2% ± 19.5%), with a high proportion of Email and web-based studies.

The highest response rates for health care professionals were found in Finland (85.2% ± 7.9%), Africa (77.5% ± 16.0%), China (74.7% ± 23.3%) and Norway (71.5% ± 11.6%), with only Norway reporting on Email and web-based surveys. Lowest response rates for health care professionals are found in Belgium (38.4% ± 14.0%), France (47.3% ± 25.8%), United States (48.0% ± 23.3%), and Intercontinental studies (48.8% ± 24.9%). Intercontinental studies (91%), Belgium (80%), United States (78%), and France (57%), mainly report email and webbased studies.

DISCUSSION

Our analysis is a global representation of survey studies in the surgical field and the largest systematic review to date in this field. We found an average response rate of 70.0% ± 18.4% (mean ± SD) in 811 patient surveys and 53.3% ± 24.5% in 1746 health care professional surveys. Health care professionals were found to have lower response rates, which has been reported before.^{12,22–24} Our review confirms that health care professionals participate less often in postal and online surveys than patients do, which is consistent over time. Health care professionals are probably a very specific group prone to satisficing, where time spent and a lack of benefit are key factors. Lowering both effort and time can be achieved in a variety of ways such as shortening a survey, shortening the questions or offering yes/no options, allowing the health care professional to decide when to fill it in (postal vs face to face), pre-stamping the return envelope, and/or providing an online survey option.^{12,22}

Our analyses show that in-person surveys yield an average 76% response rate, where postal (65%) and online (46% webbased vs 51% email) survey response is lower on average. We therefore suggest to appraise response rate on type of survey, that is, a 65% response rate in an in-person survey represents a below average statistic for reviewers. However, a 65% response rate in a postal study parallels the average for that type of survey and should be aimed for when attempting a postal survey.

These results are in line with studies from other nonsurgical medical fields where usually a higher response rate is reported for in-person versus postal and for postal versus online surveys.^{11,13,25–26} Real-time data tracking, immediate survey delivery, and low costs have led to a rise in online surveys, but response rates tend to be lower and methodologies questionable.^{27,28} Nowadays, with the general overflow of Email contact, respondents' willingness to partake in email surveys or satisficing could be negatively affected. It is a general consensus that a more personal face-to-face or telephone interview will reach a higher response rate, but such surveys weigh more heavily on time and resources.^{15,17,18,26,9–31}

Additional contacts are frequently used to generate a higher response rate. Extensive research by Dillman et al has shown that great administrative detail for survey personalization, including additional mailing, boosts response rates.^{7,32–40} Our study shows that additional contacts do not significantly raise response rates compared to a single questionnaire in postal and in-person surveys, contradicting the findings of Dillman et al.²⁷ This difference could be explained by a general trend of declining response rates around the turn of the century.^{10,41–43} The method used by Dillman et al, however, encompasses more than just a reminder letter. The total design method includes a series of personal approach measures resulting in better response rates.^{8,10,27,44} Hence, additional contacts in postal or in-person surveys by themselves

do not enhance response rates. However, mailings as part of a personalization process could be beneficial.³⁰

Interestingly, for health care professionals we do see a significant effect of additional contacts on response rates in Email and web-based surveys. A systematic review of 69 Internet-based surveys of health care professionals in 48 studies also reported a significant increase in response rates after sending reminder Emails.¹¹ Notably, no additional contact appears to generate the highest response rate in our comprehensive analysis. This could be due to selection bias where researchers achieving a high response rate are less inclined to send follow-up Emails. There is also a heterogeneity in this group because of likely nonreporting of reminder Emails, so there might be a (stronger) beneficial effect on response rates from reminder emails for online or email questionnaires which we cannot identify. In our series, follow-up negatively impacts response rate in "in person" patient surveys. This is possibly an effect of the very small sample size and thereby more pronounced survey-specific factors.

Although guidelines exist, survey study methodology is often still questionable or at least not reported. The American Association for Public Opinion Research (AAPOR) has published a code of ethics and minimum disclosures for researchers.⁴⁵ A separate checklist for internet surveys (CHERRIES) was presented by the Journal of Medical Internet Research.⁴⁶ The "Strengthening the Reporting of observational studies" (STROBE) statement does offer checklists for epidemiological cross-sectional studies, but these do not offer reporting characteristics unique to surveys.⁴⁷ There is considerable literature in the social sciences on study design and reporting, but a considerable amount of surveying attempts do not adhere to these guidelines.⁴⁸ For example, even response rate itself is reported ambiguously. Does one include all the returned questionnaires or only the completed ones? A 2011 review showed that 154 of 165 journals do not provide guidance on survey reporting, whereas 82% have published survey research.⁴⁹ These results show that, although separate guidelines exist, there is little control on survey reporting and the need for a well-developed widely adopted reporting guideline is there.

Our analysis presents a unique global overview of reported response rates in surgical survey studies and shows what response rates depend on and are influenced by. In-person surveying has the best results, but is time-consuming and relatively expensive. Postal surveying delivers consistent response rates but is more rigid, depends on accurate mailing lists, offers less certainty about who completed the survey, and is more susceptible to literacy bias.^{50,51} Ubiquitous digital connectivity promises fast, low-cost, real-time monitored surveying but is seriously threatened by low response rates and often flawed survey design.

In the era of high patient awareness and increasing demand from government and insurance carriers, the need for quality control has pushed the limits of survey attempts and will continue to do so. Expert consultation should be sought before attempting a survey. Well-defined questions, survey composition, and sample selection can add much needed value to conclusions drawn from survey studies. The variance in reported response rates, signifying the heterogeneity in survey response, shows that it is imperative to reach each interviewee personally and in the right manner. Mixed-mode designs (ie, an email followed by a telephone call) tailored to the targeted population (ie, student vs old age pensioner) will improve response rates significantly.^{23,44,52–54} Finally, a clear study design and description will help compare survey attempts and identify key influencing factors on survey outcome.

This study has a few shortcomings that need to be addressed. Our search algorithm revealed a vast amount of studies, although we realize that surveys could have been missed. Second, choosing to reply to a survey is rather personal and depends on several variables. Many aspects of survey design that influence response rates are

difficult to reproduce such as wording, length and number of questions, and personalization of a cover letter.^{6,8–10} Salience is one of the key factors to influence response rates.^{55–62} No review can account for these factors, and to maximize response rates future studies should consider that. We identified those aspects of survey design that can be monitored and reproduced. Finally, surveys often lack a properly defined methodology, which hinders objective comparison of outcomes. The type of questionnaire or follow-up is not always mentioned. Our analysis is limited by its data, which is heterogeneous at best. Uniform reporting of outcomes will help improve the predictive value of future survey study analysis.

In conclusion, the quality of a survey depends on how its questions are answered and how often it is replied to. Response rate is measurable and is influenced by many amendable factors. Overall, patients partake more often in surveys than health care professionals regardless of country, survey mode, or follow-up. Follow-up appears to improve response rate in online surveys aimed at health care professionals, whereas effect on patient surveys remains unclear. Personal and postal surveys do not seem to benefit from follow-up. Our global review provides a first overview of surgical survey response rate and can be used as a quality reference in peer review. This review will aid researchers in future survey study design; it is up to the surveyor to choose depending on their specific goals and resources.

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