

# Interest in a national research network in surgery in Switzerland

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## Summary

**BACKGROUND:** Networks are known to improve performance and create synergies. A research network can provide a significant advantage for all parties involved in research in surgery by systematically tracking the outcome of a huge number of patients over a long period of time. The aim of the present study was to investigate the experiences of surgeons with respect to research activities, to evaluate the opinions of surgeons with regard to the development of a national network for research in the field of surgery in Switzerland and to obtain data on how such a network should be designed.

**METHODS:** An anonymous postal survey of board-certified surgeons practising in Switzerland was conducted during summer 2007. The questionnaire included questions related to research activities, the desire to develop a national research network and the design and potential advantages of such a network. Qualitative analyses were performed using Mayring's content analysis.

**RESULTS:** A total of 337 out of 749 (45%) questionnaires were returned. In all, 156/337 (46.3%) surgeons were engaged in research activities. During the past five years, 212/337 (62.9%) of the participants had participated at least in one multi-centre study. Out of 337, 88 (26.1%) surgeons were members of an established research association in Switzerland. Interest in a national surgical research network was reported by 266 (78.9%) participants. The reported advantages were "power" (53.1%), "teamwork effects" (23.7%), "efficiency" (12.2%) and "quality aspects" (8.0%). The most frequently named design proposal was based on a clinic for coordinating research, while the younger participants also suggested a web-based platform.

**CONCLUSIONS:** Due to the significant interest of participants, the establishment of a national research network should be considered. An established clinic for coordinating research alongside an additional web-based platform to target young surgeons could function as an umbrella organisation.

**Key words:** research; network; synergies; multi-centre studies; surgery

## Introduction

Our life, politics and business are marked by different types of network which are useful in a globalised and busy world, but at times ominous instruments. Networks have several effects, but the positive effects of networks are more obvious, as the following example demonstrates: the more people own mobile phones, the more valuable a mobile is to each user; more users mean more potential interactions and an increase in the flexibility of each participant. This may result in an improved performance and create synergies, and the network participants may appear as an entity. In contrast, the negative effects of networks are not as obvious, and could result from restricted resource allocation due to the clumsiness of the organisation or the absence of competition: the  $n+1$  participant might overtax the capability of a network if there is no additional provision of resources. The linkage of geographically and economically distinct units with the aim of building a research network seems to be worthwhile in medicine, and offers enormous advantages, like the ability to systematically track the outcome of a huge number of patients over time. This may provide a systematic understanding of the epidemiology of a disease [1], allow researchers to monitor unexpected adverse therapy-related events [2] or to create the required power of a study to answer a specific research question [3]. Data from this kind of research network might be more generalisable. An uniform and highly standardised data format across the different data systems of the network participants and rigorous compliance with data security regulations and patient confidentiality, as well as the implementation of network governance, are the preconditions to obtain meaningful results [4, 5]. In Switzerland, several established research groups and associations of surgical researchers exist and operate more or less independently, creating different scientific outputs [6–11].

When population size is taken into consideration, Switzerland is one of the most prolific countries with regard to sci-

entific contributions to the field of surgery [12] and other areas of medicine [13]. The data which form the basis of an assessment of surgeons' interest in a national surgical research network in Switzerland are currently unavailable. The aim of the present study was to investigate the experiences and opinions of surgeons with respect to research activities and involvement in clinical trials, to evaluate the opinions of board-certified surgeons with regard to the development of a national network for research in the field of surgery in Switzerland and to obtain data on how such a network should be designed.

## Materials and methods

### Participants

An anonymous postal survey of board-certified surgeons practising in Switzerland was conducted during summer 2007 in order to evaluate interest in a research network. Eligible participants were identified from the database of the Swiss Surgical Society (2006: 1178 members), and board-certified surgeons practising in Switzerland were identified from the listings of the Swiss Medical Association (FMH) [14]. After the exclusion of 50 doctors working outside Switzerland, 10 pre-test participants, 14 members who did not practise clinical surgery, 228 who were retired, 28 who were not board-certified members, 99 members who could not be found in the database of the FMH, a total of 749 surgeons remained eligible. In order to ensure the participants' anonymity, the returned questionnaires were identified by a code only, and the participants sent their responses to an independent administration office.

### Survey instrument

The questionnaire included nine questions which were related to the participants' own research activities (research activity yes/no, time spent on research, kind of research, previous participation in multi-centre studies) and membership of a research association. One question related to the desire to develop a national research network and two items were free-response items which were embedded in the multiple-choice question section and addressed the design and potential advantages of such a network. Another nine questions related to the participants' experience of multi-centre studies, including two free-response items which addressed their positive and negative experiences of multi-centre studies. The participants' overall satisfaction with their participation in multi-centre studies was evaluated using a visual analogue scale, ranging from 0 to 100, where 0 indicated "extreme dissatisfaction" and 100 "maximum satisfaction". Additional information was assessed, including the participants' socio-demographic and work-related characteristics. The initial questionnaire was developed in German and two independent translations in Italian and French were done by professional translators. The cantonal ethical committee of Graubunden stated that this study did not require ethical approval.

### Statistical analysis

Continuous data with a normal distribution were expressed using the mean (standard deviation, s.d.) and compared us-

ing a paired t-test. Comparisons of dichotomous data were analysed using the  $\chi^2$  test. Qualitative analyses were carried out using Mayring's content analysis by an experienced researcher with particular interest in qualitative data analysis, first by transcribing the handwritten arguments, second by defining the level of abstraction for the inductive formation of categories, and third by performing a stepwise inductive formulation of content categories and generating a code manual [15]. After this, a formative check of reliability and finally a summative check of reliability were performed. A random sample of 20% of the surgeons' responses was analysed by an additional researcher to test inter-rater reliability and to minimise bias. Cohen's Kappa was 0.82. A significance level of  $\alpha = 0.050$  was used for all tests. All P values were two-sided. Statistical calculations were performed using SAS<sup>®</sup> statistical software version 9.1 (SAS Institute, Cary, North Carolina, USA).

## Results

After the questionnaire was sent out for the first time and following one reminder, 337/749 (45%) of surgeons responded to the survey (n = 315 males, 93.5%; n = 21 females, 6.2%; one missing value). The mean age was 49 (range 30–75) years. Most of the respondents (256; 76.0%) were working in teaching hospitals. On average, the respondents had graduated from medical school 21 (range 6–47) years prior to the survey. The participants' characteristics are shown in table 1.

### Research activity

At the time of the survey, 181 (53.7%) surgeons were not engaged in any regular ongoing research activities at all, 150 (44.5%) spent between 10 and 25%, and 6 (1.8%) spent more than 25% of their total working time on research. Of these 156 surgeons who engaged in research activities, 76 (48.7%) spent time on research both during and after their regular work, 15 (9.6%) during, and 65 (41.7%) spent time on research exclusively after their regular work. In all, 75/156 (48.1%) mostly carried out retrospective studies, while 25/156 (16.0%) worked mainly on prospective studies, 42/156 (26.9%) spent time on basic research and the remainder (14/156; 9.0%) were involved in other types of studies. During the past five years, 139/337 (41.2%) of the participants had participated in one multi-centre study, 60/337 (17.8%) had participated in between two and five and 13/337 (3.9%) had either participated in more than five or had never participated in such studies (125 participants, 37.1%). Out of 337, 88 (26.1%) surgeons were members of an established research association in Switzerland.

### Experience with multi-centre studies

With regard to multi-centre studies, the overall score for the satisfaction of the 212/337 (62.9%) participants with experience of at least one multi-centre study during the last five years was 56.8 (s.d. 22.5) on the visual analogue scale, which ranged from 0 to 100. When asked about their experience of multi-centre studies, the 212 participants with at least one participation gave a total of 773 responses in terms of both positive (400 responses) and negative (373

responses) experiences. The content analysis [15] of the answers regarding multi-centre studies resulted in six categories with positive and negative arguments (table 2). There were significant differences in positive arguments in the category “Interpersonal experience” for surgeons who engaged in their own research activity (105/270 statements [38.9%] vs. 33/130 statements [25.4%] without own research activity,  $P = 0.008$ ) and the category “Personal experience” for surgeons with private practices and surgeons who did not engage in research activity; more positive entries were given in this category than by other surgeons (9/48 [19%] vs. 32/346 [9.3%] for hospital-based surgeons,  $P = 0.012$  (6 missing statements), and 22/130 [16.9%] vs. 20/270 [7.4%] of surgeons who engaged in their own research activity,  $P = 0.004$ , respectively). With regard to the negative arguments, there were significant differences in the category “Interpersonal experience” for older surgeons (7/21 [33.3%] vs. 50/352 [14.2%] for younger surgeons, split at the median age,  $P = 0.010$ ) and in the category “Publications” for junior staff and surgeons who engaged in their own research activity; more negative entries were given in this category than by other surgeons (8/82 [9.8%] vs. 6/267 [2.2%] for senior staff,  $P = 0.048$  (24 missing

statements), and 14/240 [5.8%] vs. 1/133 [0.8%] without research activity,  $P = 0.017$ , respectively). Of the surgeons who had never participated in a multi-centre study ( $n = 125$ ), two-thirds stated that they had never been asked to participate in a study of this kind; only 6 (5%) surgeons indicated an absence of interest as a reason for their lack of participation. A large proportion of the participants (158; 47%) wanted to be involved in the planning phase of a multi-centre study; surgeons working at university hospitals, junior staff, surgeons who were teaching-qualified, surgeons who engaged in their own research activity and surgeons with experience in multi-centre studies placed more value on this aspect ( $P < 0.001$ ; table 3), as well as that of co-authorship, than others ( $P < 0.001$ ; table 4).

The content analysis of the surgeons’ arguments to the question “What are the preconditions to your participating (again) in a multi-centre study?” resulted in 13 categories. The difference in the proportion of arguments for participation according to willingness to participate (probably participate vs. participate) was not statistically significant. The top-ranking statements were in the category “Development of study design” (96/337; 28.5%), followed by “Formulation of a research question” (77/337; 22.8%) and “Code-

**Table 1:** Participants’ characteristics ( $n = 337$  participants).

| Characteristic                                                                                                                                                                                    | No. of respondents (%) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| <b>Gender</b>                                                                                                                                                                                     |                        |
| Men                                                                                                                                                                                               | 315 (93.5)             |
| Women                                                                                                                                                                                             | 21 (6.2)               |
| Not defined, missing value                                                                                                                                                                        | 1 (0.3)                |
| Total                                                                                                                                                                                             | 337 (100)              |
| <b>Hospital category</b>                                                                                                                                                                          |                        |
| Type U                                                                                                                                                                                            | 48 (14.2)              |
| Type A                                                                                                                                                                                            | 90 (26.7)              |
| Type B3                                                                                                                                                                                           | 48 (14.2)              |
| Type B2                                                                                                                                                                                           | 44 (13.1)              |
| Type B1                                                                                                                                                                                           | 27 (8.0)               |
| Practice                                                                                                                                                                                          | 66 (19.6)              |
| Other (Industry, research institute, maternal leave, sabbatical)                                                                                                                                  | 14 (4.2)               |
| Total                                                                                                                                                                                             | 337 (100)              |
| <b>Hierarchical position</b>                                                                                                                                                                      |                        |
| Junior medical staff (without leading function)                                                                                                                                                   | 68 (20.2)              |
| Senior medical staff (with leading function)                                                                                                                                                      | 178 (53.0)             |
| Surgeon in practice                                                                                                                                                                               | 66 (19.6)              |
| Other (e.g., vice-chief, researcher, manager)                                                                                                                                                     | 24 (7.2)               |
| Not defined, missing value                                                                                                                                                                        | 1 (0.3)                |
| Total                                                                                                                                                                                             | 337 (100)              |
| <b>Speciality</b>                                                                                                                                                                                 |                        |
| General surgery                                                                                                                                                                                   | 253 (75.7)             |
| Thoracic surgery                                                                                                                                                                                  | 14 (4.2)               |
| Traumatology                                                                                                                                                                                      | 14 (4.2)               |
| Vascular surgery                                                                                                                                                                                  | 19 (5.7)               |
| Hand surgery                                                                                                                                                                                      | 8 (2.4)                |
| Other (visceral surgery, pediatric surgery, plastic and reconstruction surgery, cardiac surgery)                                                                                                  | 26 (7.8)               |
| Not defined, missing values                                                                                                                                                                       | 3 (0.9)                |
| Total                                                                                                                                                                                             | 337 (100)              |
| <b>Academic degree</b>                                                                                                                                                                            |                        |
| Non-habilitated (nonteaching-qualified)                                                                                                                                                           | 245 (72.7)             |
| Habilitated (teaching-qualified)                                                                                                                                                                  | 76 (22.6)              |
| Habilitating (becoming teaching-qualified)                                                                                                                                                        | 16 (4.7)               |
| Total                                                                                                                                                                                             | 337 (100)              |
| Type U: university hospitals, Type A: large referral centres, Type B3: regional or specialised hospitals, Type B2/B1: small regional surgical departments (classified according to the FMH) [14]. |                        |

termination" (57/337; 16.9%). Eleven surgeons had no pre-conditions for participation.

### Interest in a national research network

In total, 266/337 (78.9%) of the participating surgeons indicated that they were interested in a national surgical research network. Surgeons with own research activities and extended experience of multi-centre studies ( $\geq 5$  multi-centre studies) indicated significantly more interest than the surgeons who did not engage in research activity and those with no experience of multi-centre studies (131/156 (84.0%) vs. 135/180 (75.0%),  $P = 0.043$  (1 missing value); and 13/13 (100%) vs. 86/124 (69.4%),  $P = 0.003$  (1 missing

value), respectively). The 266 surgeons who declared an interest in a national research network gave 377 responses regarding the design and 262 responses regarding the advantages of such a network. The content analysis of the design proposals yielded nine categories (table 5), and the content analysis of the advantages resulted in four categories, ordered according to frequency distribution: "Power" (139/262; 53.1%); "Teamwork effects" (62/262; 23.7%); "Efficiency" (32/262; 12.2%) and "Quality aspects" (21/262; 8.0%). Eight non-distinctive statements were assigned as being non-codifiable. There were significant differences concerning the design for statements in the categories "Administration office" and "Established institution"; more

**Table 2:** Frequency distribution of positive arguments (n = 400 responses) and negative arguments (n = 373 responses) regarding experience with multi-centre studies, ranked by positive arguments.

| Category                                              | Positive arguments<br>N (%) | Negative arguments<br>N (%) |
|-------------------------------------------------------|-----------------------------|-----------------------------|
| Interpersonal experience in professional relationship | 138 (34.5)                  | 57 (15.3)                   |
| Efficiency of the study                               | 86 (21.5)                   | 94 (25.2)                   |
| Quality of the study                                  | 75 (18.8)                   | 108 (29.0)                  |
| General study-related effects                         | 45 (11.3)                   | 46 (12.3)                   |
| Personal experience in day-to-day research life       | 42 (10.5)                   | 44 (11.8)                   |
| Publications                                          | 0 (0)                       | 15 (4.0)                    |
| Non-codifiable                                        | 14 (3.5)                    | 9 (2.4)                     |
| Total                                                 | 400 (100)                   | 373 (100)                   |

**Table 3:** Interest in an active involvement in the planning phase of a multi-centre study.

| Participants                                      | Interested<br>(n = 158)<br>n (%) | Not interested<br>(n = 179)<br>n (%) | P      |
|---------------------------------------------------|----------------------------------|--------------------------------------|--------|
| Institution                                       |                                  |                                      | <0.001 |
| University                                        | 37/48 (77)                       | 11/48 (23)                           |        |
| Non-university                                    | 121/289 (42)                     | 168/289 (58)                         |        |
| Hierarchical position, one missing value          |                                  |                                      | <0.001 |
| Junior medical staff                              | 40/68 (59)                       | 28/68 (41)                           |        |
| Other                                             | 118/268 (44)                     | 151/268 (56)                         |        |
| Academic degree                                   |                                  |                                      | <0.001 |
| Teaching-qualified or becoming teaching-qualified | 68/92 (74)                       | 24/92 (26)                           |        |
| Nonteaching-qualified                             | 90/245 (37)                      | 155/245 (63)                         |        |
| Research activities                               |                                  |                                      | <0.001 |
| Yes                                               | 121/156 (78)                     | 35/156 (22)                          |        |
| No                                                | 37/181 (20)                      | 144/181 (80)                         |        |
| Participated in a multi-centre study              |                                  |                                      | <0.001 |
| $\geq 1$ participation                            | 133/212 (63)                     | 79/212 (37)                          |        |
| Never participated                                | 25/125 (20)                      | 100/125 (80)                         |        |

**Table 4:** Interest in a co-authorship in multi-centre studies (64 missing values).

| Participants                                      | Interested in a co-authorship<br>(n = 172)<br>n (%) | Not interested in a co-authorship<br>(n = 101)<br>n (%) | P      |
|---------------------------------------------------|-----------------------------------------------------|---------------------------------------------------------|--------|
| Institution                                       |                                                     |                                                         | <0.001 |
| University                                        | 36/37 (97)                                          | 1/37 (3)                                                |        |
| Non-university                                    | 136/236 (58)                                        | 100/236 (42)                                            |        |
| Hierarchical position                             |                                                     |                                                         | <0.001 |
| Junior medical staff                              | 49/56 (88)                                          | 7/56 (12)                                               |        |
| Other                                             | 123/217 (57)                                        | 94/217 (43)                                             |        |
| Academic degree                                   |                                                     |                                                         | <0.001 |
| Teaching-qualified or becoming teaching-qualified | 60/69 (87)                                          | 9/69 (13)                                               |        |
| Nonteaching-qualified                             | 112/204 (55)                                        | 92/204 (45)                                             |        |
| Research activities                               |                                                     |                                                         | <0.001 |
| Yes                                               | 115/138 (83)                                        | 23/138 (17)                                             |        |
| No                                                | 57/135 (42)                                         | 78/135 (58)                                             |        |
| Participated in a multi-centre study              |                                                     |                                                         | <0.001 |
| $\geq 1$ participation                            | 132/192 (69)                                        | 60/192 (31)                                             |        |
| Never participated                                | 40/81 (49)                                          | 41/81 (51)                                              |        |

entries were given by participants who were teaching-qualified in the category “Administration office” than by others (16/71 [23% vs. 38/285 [13.3%];  $P = 0.022$ ) and by those who were members of a research association in the category “Established institution” (12/101 [11.9%] vs. 8/276 [2.9%],  $P = 0.001$ ). Participants aged 30–39 years old gave significantly more statements for the “Web-based platform” category than participants aged 50–65 years (9/66 [14%] vs. 3/141 [2.1%],  $P = 0.010$ ).

## Discussion

The results of the present report show that three-quarters of participants are interested in a national surgical research network. The reported advantages include power, teamwork effects, efficiency and quality aspects. The most frequently named design proposal was based on a clinic for coordinating research, while the younger participants also suggested a web-based platform.

The fact that almost half of the board-certified surgeons were engaged in ongoing research activities is in accordance with studies among surgical residents in New England [16].

Accordingly to Souba et al. [17], chairpersons and surgical residents see basic scientific research as a necessary pre-requisite for a successful academic career in surgery, whereas the motivation for entering the laboratory is a genuine interest in research. We found that one-quarter of board-certified surgeons in Switzerland participate in basic research projects, which follows on from the previously-noted interest in research among surgical residents as well as the 10 percent of young physicians in Switzerland who aspire to an academic career [18].

It is remarkable that almost two-thirds of the respondents had participated in multi-centre studies. On the other hand, it is surprising that not even one-fifth had participated more than once, even though three-quarters of the surgeons would participate again and multi-centre studies are known to enable researchers to answer specific research questions [3]. Surgeons aspiring to an academic career have to be successful researchers in addition to standing out due to their excellent clinical performance [19]. Publications are one of the key elements of successful research [18]. As surgeons working in the field of research can presumably be regarded as the driving force behind multi-centre studies, these facts have to be taken into account in future stud-

ies. More than three-quarters of the board-certified surgeons indicated an interest in a national surgical research network. This percentage was distinctly higher than that of surgeons who were engaged in ongoing research activity. The greatest advantage, namely the power of this kind of network, is obvious. In order to reduce the time taken by data collection and to improve statistical power in countries with smaller individual hospital admission rates, research networks are essential [20]. For patients, the Internet is an important source of healthcare information, with the use of the world-wide web expanding exponentially over the last decade [21]. Medical researchers who were involved in biomedical computation were involved as network users and experimenters almost from the very beginning of the Internet, but with limited influence [22]. It is therefore not surprising that the younger participants in particular, who grew up with the Internet, suggested a web-based platform as a basis for a national research network. However, the largest proportion of the surgeons suggested a clinic for coordinating research as an umbrella organisation. A large number of the surgeons involved in research could also imagine an established institution like the Swiss Surgical Society taking a leading role. Surgeons would like well-known high-quality institutions they can rely on to be involved, but they do not want the responsibility for the entire project to lie in the hands of one research clinic.

This study was most limited by the nature of an observational study, which cannot be used to determine a causal relationship between variables. No statement can be made regarding the surgeons who did not participate in the study. Second, due to the delay from data collection to publication the results might not be representative anymore at a time of rapidly changing priorities in the health care system. Third, the response rate of 45%, while less than optimal, was comparable to other surveys among physicians [23]. The numbers of responses considered in the analyses are therefore limited and the findings have to be read with caution. Due to the high rate of 55% non-respondents the interest in a research network might even be weaker. Finally, the declaration of interest in a research network does not implicate an a priori participation. The main strength of this study is that it was conducted with an unselected sample of surgeons in a variety of working arrangements and cultural regions, which covered all of the surgical specialisms in the Swiss Surgical Society.

**Table 5:** Frequency distribution of design proposals (n = 377 responses) for a national research network in surgery given by 266 surgeons; multiple responses were allowed.

| Category                                        | N (%)     |
|-------------------------------------------------|-----------|
| Coordinating research clinic (not fix)          | 95 (25.2) |
| Administration office (not clinic-associated)   | 54 (14.3) |
| List for inscription                            | 47 (12.5) |
| Newly-built association (umbrella organisation) | 31 (8.2)  |
| Informal association, voluntary participation   | 29 (7.7)  |
| Leading research clinic (fix)                   | 27 (7.2)  |
| Web-based platform (electronic pinboard)        | 27 (7.2)  |
| Established institution (e.g., SSS*)            | 20 (5.3)  |
| Research centre (not clinic-based)              | 19 (5.0)  |
| Non-codifiable                                  | 28 (7.4)  |
| Total                                           | 377 (100) |

\*SSS = Swiss Surgical Society

## Conclusions

The benefits of a research network (e.g., improved statistical power) are recognised by Swiss surgeons; due to the significant interest of participating board-certified surgeons, the establishment of a national research network should be considered. An established clinic for coordinating research alongside an additional web-based platform to target young surgeons could function as an umbrella organisation.

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**Authors' contributions:** AB, RK, CS, MF and PV participated in the study concept and design, and its coordination and helped to draft the manuscript and discuss the results. AB, CS, MF and PV analysed the data and critical revised the manuscript for important intellectual content. AB and PV obtained administrative, technical and material support. PV has supervised the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. All authors read and approved the final manuscript.

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