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Research to policy and practice change: is capacity building in operational research delivering the goods?

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Abstract

OBJECTIVES Between 2009 and 2012, eight operational research capacity building courses were completed in Paris (3), Luxembourg (1), India (1), Nepal (1), Kenya (1) and Fiji (1). Courses had strict milestones that were subsequently adopted by the Structured Operational Research and Training InitiaTive (SORT IT) of the World Health Organization. We report on the numbers of enrolled participants who successfully completed courses, the number of papers published and their reported effect on policy and/or practice.

DESIGN Retrospective cohort study including a survey.

METHODS Participant selection criteria ensured that only those proposing specific programme-related and relevant operational research questions were selected. Effects on policy and/or practice were assessed in a standardised manner by two independent reviewers.

RESULTS Of 93 enrolled participants from 31 countries (14 in Africa, 13 in Asia, two in Latin America and two in South Pacific), 83 (89%) completed their courses. A total of 96 papers were submitted to scientific journals of which 89 (93%) were published and 88 assessed for effect on policy and practice. There was a reported effect in 65 (74%) studies including changes to programme implementation (27), adaptation of monitoring tools (24) and changes to existing guidelines (20).

CONCLUSION Three quarters of published operational research studies from these structured courses had reported effects on policy and/or practice. It is important that this type of tracking becomes a standard component of operational research and research in general.

keywords research, impact, capacity building, Structured Operational Research and Training IniTiative, Médecins sans Frontières, Union

Introduction

A few years ago, Iain Chalmers and Paul Glaszio published a viewpoint in the Lancet entitled 'Avoidable waste in the production and reporting of research evidence' making the staggering claim that as much as 85% of research investment was being wasted (Chalmers & Glasziou 2009). This was followed by a five-paper series in the January 2014 issue of the same journal with a commentary on 'How should medical science change?' – change in the sense of reducing waste and increasing the value of conducted research (Kleinert & Horton 2014). A consistent theme in this series was that medical research is wasteful if it is not completed and, in particular, if it does not contribute to an improvement in the effectiveness of the health care interventions studied. In practice, the latter is seldom monitored; tracking the effects of research on policy, practice and programme performance beyond publication rarely occurs (Zachariah *et al.* 2012a,b).

The International Union Against Tuberculosis and Lung Disease (The Union) and Médecins sans Frontières (MSF) started a programme of operational research capacity building in 2009, and 4 years later joined in a partnership with the Special Programme for Research and Training in Tropical Diseases (TDR), hosted at the World Health Organization. This partnership is called the Structured Operational Research and Training IniTiative (SORT IT) and targets participants from or working in low- and middle-income countries (LMICs) and teaches the practical skills of conducting and publishing operational research (Harries & Zachariah 2012). Between April 2009 and January 2014, we initiated 18 training courses, enrolling 212 participants. As part of our targets, we systematically monitor the outputs from each course. These include the number of enrolled participants who successfully complete the course and reach the publication milestone. Additionally and importantly, we go beyond publication to monitor if there has been any change in policy and/or practice as a result of the research. This has been done for the first eight completed courses (Ford & Maher 2013).

We report on the outputs of participants enrolled on these eight courses – the number who successfully completed the training programme, the number of papers published and their reported effect(s) on policy and/or practice.

Box 1 Selection criteria for candidates of operational research and capacity-building programmes run in Europe, Africa, Asia and the South Pacific from April 2009 to November 2012†

- Active involvement within a national programme or of a public health institution or in a non-governmental organisation
- Written commitment to attend all three workshops of the training
- Formal commitment to return to the programme or institution after the course and implement the knowledge gained at the programme level
- Supervisors' signed and written endorsement that time and opportunity will be given to the participant to carry out research and publish
- A stated and acceptable mentor at country level (if available)
- Candidate has completed a Masters in Public Health or equivalent or is strongly recommended proven competency in English language and conversant in the use of a computer
- A statement that research funding, if needed, can be acquired through independent sources other than the course budget
- Submission of a one-page summary of a programme/health system problem and a research question that may be developed into a research protocol. This must accompany the application form
- Participants are usually only selected if routine data from government or non-governmental health facilities are already available for collection, cleaning and analysis

Adapted from Bissell *et al.*
†This included eight courses run in Paris (3), Luxembourg (1), Africa (1), Fiji (1) and Asia (2).

Methods

Design and participants

This was a retrospective cohort study including a survey. Study participants were all those enrolled in the first eight courses conducted in Europe (Paris and Luxembourg), Asia (India and Nepal), Africa (Nairobi) and the South Pacific (Fiji). The courses were conducted between April 2009 and November 2012.

The capacity building programme and overall costs

The modular and standardised approach of the courses has been described previously (Zachariah *et al.* 2011; Bissel *et al.* 2012; Harries & Zachariah 2012). There are strict criteria for selecting participants (Box 1) and a committee selects a maximum of 12 participants per course. Individuals from programme settings are favoured, with particular attention placed on the relevance of the operational research question and use of routinely collected programme data. Participants receive a full scholarship, which includes transport, accommodation and per-diems.

The course is conducted over a period of 10–12 months, and there are three modules: Module 1 on protocol development, leading to Module 2 on data collection and analysis andfinally leading to Module 3 on scientific paper writing. Each module takes 5–6 days and includes formal lectures, one-to-one mentoring of participants and group plenary and iterative sessions where participants present their evolving work. There are specific milestones that need to be achieved at each module to proceed to the next module (Box 2). All protocols developed on the courses are submitted for ethics approval to institutional and/or national ethics review boards.

The total cost for eight complete training courses was 603 000 Euros. The average cost for one training course involving three modules with 12 participants and associated faculty was 75 000 Euros. This included the following: the cost of travel, accommodation and living costs for participants and faculty; the venue; training materials; and open-access publication fees. The salaried costs of

Box 2 Milestones for operational research and capacity-building programmes in Europe, Africa, Asia and the South Pacific from April 2009 to November 2012†

Milestone	Action required
Milestone 1	Submission of the research protocol and the completed ethics application form to the course coordinator and ethics committee within 3 weeks of the end of module 1
Milestone 2	Submission of a data documentation sheet, EpiData triplet files (qes, rec and chk files) and dummy tables (indicating an analysis plan) to the course coordinator within 2 weeks of the end of module 2
Milestone 3	Submission of proof of completion of data collection to the Workshop 2 facilitators and course coordinator 6 weeks before start of module 3
Milestone 4	Submission of a paper to a peer-reviewed journal within 4 weeks of the end of module 3: copy of the submitted paper and email electronic confirmation of receipt of the submitted paper by the journal both to be sent to the course coordinator and ethics review board

†This included eight courses run in Paris (3), Luxembourg (1), Africa (1), Fiji (1) and Asia (2).

faculty and faculty time are not included in these calculations.

Course completion and publication outputs

All participants who start the course are assessed according to whether (or not) they have completed all milestones including the final submission of a paper to a peer-reviewed journal: hence a binary outcome, success or failure (Box 2). Milestones are closely monitored and reported after each module by four programme coordinators (those responsible for Europe, Africa, Asia and the South Pacific).

Publication outputs are assessed every 3 months in line with quarterly reports and are considered an indicator of successful completion of a research study. All publications arising directly from courses are recorded including original research conducted by participants as well as viewpoints and perspective articles developed by course faculty and participants during the courses. Cumulative publication outputs were assessed for the first eight courses, completed between March 2010 and November 2012, and censored on 31st January 2014.

Effect on policy and/or practice

The effects of completed research on policy and/or practice were assessed for both original research publications and viewpoint and perspective papers using a pre-tested questionnaire developed by course coordinators, an experienced qualitative researcher and a number of lay individuals. This was sent out via e-mail to all participants and the corresponding author of viewpoint and perspective articles. Non-responders were sent follow-up emails and contacted by telephone. A dedicated person was allocated to this activity between July and November 2013.

Responses were graded as (i) no response; (ii) no effect on policy and practice; or (iii) reported effects on policy and/or practice. The latter were categorised into different groups as previously described (Zachariah *et al.* 2012a) and included one or more of the following: a change in routine implementation of a local or national programme, local or national data monitoring being adapted, a new monitoring tool being introduced, existing training guidelines being updated, an influence on national strategic policy, a change to institutional, national or international guidelines or a direct effect in commissioning further similar studies. For each reported effect, a description of the specific attributed effect was requested. Categorisation was done by two independent reviewers and differences of opinion were reconciled through discussion.

The Ethics Advisory Group of The Union determined that ethics clearance was not required for this study.

Results

Characteristics of study participants

There were 294 candidates who applied for the eight courses, of whom 93 were selected including 36 (39%) women. Selected participants came from 31 countries (14 in Africa, 13 in Asia, two in Latin America and two in the South Pacific) and included doctors (48), clinical officers (12), nurses (5), data managers (11) research officers (7), laboratory technicians (3), nutritionists (2), a pharmacist (1), a public health officer (1), a teacher (1), a social scientist (1) and a health economist (1). All participants were

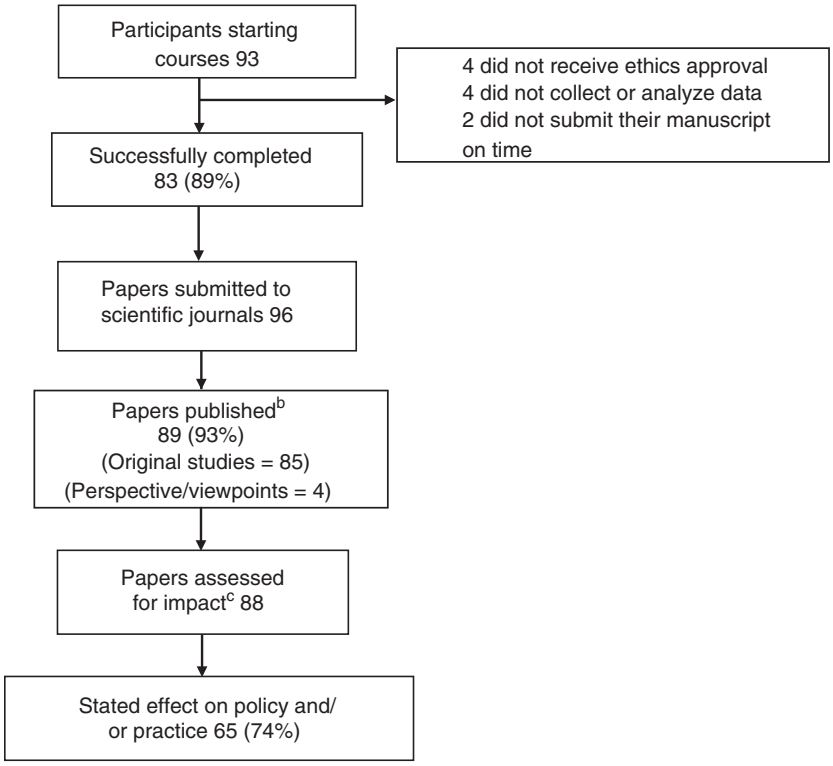

Figure 1 Programme outputs from eight completed operational research programmes run in Europe, Africa, Asia and the South Pacific from April 2009 to November 2012[a]. [a]The eight courses were run in Paris (3), Luxembourg (1), Africa (1), Fiji (1) and Asia (2). [b]By 31st January 2014. [c]One published paper could not be assessed for effect on policy and/or practice.

working in the public health sector (national programmes or non-governmental organisations).

Course completion and publication outputs

Course and publication outputs from the eight courses are shown in Figure 1. Of 93 enrolled participants, 83 (89%) completed all milestones ('success') while ten participants could not. Reasons for non-completion were the following: no ethics clearance received (4); failure to collect or analyse data;(4) change in jobs; illness or unclear; or not having submitted a paper on time to a peer-reviewed journal (2).

The 83 successful participants submitted 92 original research papers to peer-reviewed journals, of which 85 (92%) had been published by the time of completing the survey. Four additional viewpoint or perspective papers were submitted as part of course outputs and all were published. In summary, of the 96 submitted papers, 89 (93%) had been published by the time of the survey. Publication themes included tuberculosis (TB) and drug resistant TB (30), health systems (22), antiretroviral treatment (5), maternal and child health (7) and a diverse group of domains (25) including rational drug use, non-communicable diseases, nutrition, malaria, electronic medical records, vital registration, tobacco control, gender-based violence, neglected diseases and operational research capacity building.

Effects of published papers on policy and/or practice

Replies about the effects on policy and practice were received for 88 of the 89 published papers (84 of 85 of the original papers and all four of the perspective/viewpoint papers). Of the 84 original research papers, participant responses from the survey provided information for 83 papers, while information on one published paper (where there was no response from the participant) was given by MSF headquarters.

Of the 88 published papers where replies were received on the effects on policy and practice, there were reported effects in 65 (74%) studies (Figure 1). The types of research effects are shown in Table 1. Some studies had more than one type of effect. Table 2 gives examples of original research studies and their reported effect on policy and/or practice while Table 3 shows the effects of the four perspective/viewpoint publications.

Discussion

This is one of the first studies to assess the added value of operational research studies linked to a structured capacity

Table 1 Types of impact/effect of published studies on policy and/or practice from eight completed operational research courses run from April 2009 to November 2012†

Indicator	Number (%)
Number of published papers	89
Number assessed for impact on policy and practice	88‡
Stated impact on policy and practice§	65 (74)
Change in routine implementation of a local programme	14
Change in routine implementation of a national programme	13
Local data monitoring was adapted (data recording and/or consistency)	9
National data monitoring was adapted (data recording and/or consistency)	12
A new monitoring tool was introduced	3
Existing training guidelines were updated	4
There was a change in institutional or NGO guidelines	4
Influenced national strategic policy and/or national guidelines	11
Influenced international guidelines	1
Had a direct effect in commissioning similar studies	4
No stated impact on policy and practice	23 (26)

Categorisation adapted from reference Zachariah R *et al.* 2012.
NGO, non-governmental organization.
†The eight courses were run in Paris (3), Luxembourg (1), Africa (1), Fiji (1) and Asia (2).
‡One publication could not be assessed for effect on policy and practice.
§Some studies had an effect in more than one area.

building programme; it showed that three quarters of the published studies led to changes in policy and/or practice. We have tracked the 'journey to success' from participant enrolment to course completion to the effect on policy and/or practice (Zachariah *et al.* 2012a,b). Almost nine in ten participants completed their course and a similar proportion published papers. This is encouraging considering that the majority of participants were implementers without any previous research background. The majority of published studies had some effects on policy and/or practice. This finding is unique in that research institutions seldom, if at all, measure and report on what happens beyond publication. Since operational research is about more than just publishing – it is a step to better health care – this is of particular relevance.

We attribute our high course completion and publication outputs to a number of factors: the standardised approach which facilitates course implementation; strict participant selection criteria which favour the most motivated participants; selection of participants whose topics are potentially feasible to study; the presence of strict timelines and milestones; and close 'on-the-job' mentorship by experienced facilitators. Our high publication output is in stark contrast to two other recent studies in the literature. One study, which assessed all participants attending an international training course between 2001 and 2007 at the Research Institute of Tuberculosis in Japan, found that only 40% of enrolled participants started planned research studies and none published a scientific paper (Ohkado *et al.* 2010). The main cited reasons for failure to implement and complete studies were lack of time, lack of funds, lack of approval from supervisors and lack of writing skills. Our programme was moulded to successfully avoid such unfavourable factors. A second study assessing 3668 research projects funded by the European Union's (EU's) Framework Programmes for Research and Technological Development (one of the world's most prolific funders of academic output) revealed a publication rate of only 44%. The reasons for this relatively low output were not highlighted (Galsworthy *et al.* 2012). Although the studies and contexts were not similar, the cost per published paper for EU-funded research was estimated at 225 000 Euros while with the SORT IT course, this amounted to about 6800 Euros (603 000 Euros for 89 published papers) (Galsworthy *et al.* 2012).

Assessing research impact is important as it is closely related to reducing research waste and increasing the added value of research to the end beneficiaries (Kleinert & Horton 2014). A time lag of 17 years has been reported as being common for research evidence to influence clinical practice (Morris *et al.* 2011). In contrast, we demonstrate an effect on policy and/or practice within a relatively short time-frame of a few years. We are also of the strong opinion that there is an ethical requirement for operational researchers to advocate for the implementation of appropriate policy and practice changes where study findings indicate a need.

Possible reasons that foster this relatively rapid translation of research knowledge into practice include: participant selection that favours programme staff, studies being focused on health care delivery; research questions being of direct programme relevance; early engagement and buy-in of programme managers and/or policy makers; and inclusion of stake-holders as co-authors on publications (Zachariah *et al.* 2013). A number of years ago Walley *et al.* (2007) in their paper 'How to get research into practice: first get practice into research' highlighted the importance of these elements as key to influencing practice. In addition, the focus on retrospective data (in

Table 2 Examples of published studies and their effect on policy and/or practice from eight completed operational research courses run from April 2009 to November 2012†

First author and country	Study description	Main findings	Effect on policy and practice
Influenced institutional and/or national strategic documents or guidelines			
Kumar *et al.* (2011), India	Cross-sectional study evaluating the extent to which adoption of the 2010 WHO ART guidelines for patients with TB and HIV infection would increase the demand for ART services in India	ART could be extended to all HIV-Infected TB patients with relatively little additional burden on the national ART programme	HIV-TB policy in India changed with adoption of the 2010 WHO ART guidelines with ART being offered to all HIV-infected TB patients country-wide
Tayler-Smith *et al.* (2012), Liberia	Cross-sectional study assessing the characteristics of survivors of sexual violence and the package of care offered to them	The care package was only focused on women and not adapted to the context where there were many minors and male survivors	The sexual violence guidelines have been revised to improve the management of minors and male survivors Institutional guidelines on sexual violence were updated
Change in routine implementation of a local or national programme			
Gadabu *et al.* (2011), Malawi	Cross-sectional study to verify if transcription of data on antiretroviral treatment from electronic to paper-based registers was accurate and reliable	Showed that electronic medical records (EMR) systems are robust, easier to use and less time consuming than paper records in busy health facilities	Baobab Health Trust expanded EMR systems for ART to 29 government clinics and for diabetes mellitus to three central hospitals in Malawi
Nagaraja *et al.* (2012), India	Retrospective audit of patient and laboratory registers to assess incremental yield of a second sputum for monitoring MDR-TB patients	Showed that one sputum specimen was as good as two specimens for the follow-up of MDR-TB patients	The National TB programme in India adopted a single sputum specimen policy for monitoring MDR-TB patients while on treatment
Change in routine monitoring tools or introduction of a new tool			
Kilale *et al.* (2013), Tanzania	Nine year audit of country-wide data to determine if sputum samples of retreatment tuberculosis are reaching the reference laboratories	A major shortfall was observed between notified retreatment cases and numbers of sputum samples received in the laboratories	A new system was introduced country-wide to track sputum samples from health facilities to the reference laboratories
Van Wyk *et al.* (2010), South Africa 2	Cohort study evaluating the routine delivery and monitoring system for Isoniazid Preventive Therapy (IPT) to children in an urban setting	Only one in five IPT eligible children had documented IPT delivery and no standardised IPT management tools existed	An IPT register was developed and introduced and there was a subsequent improvement in IPT delivery. Use of this register was scaled up to other similar clinics

IPT, isoniazid preventive therapy; ART, antiretroviral reatment; TB, tuberculosis; GFATM, Global Fund for AIDS TB and Malaria; WHO, World Health Organization; MDR-TB, multi-drug-resistant tuberculosis; EMR, electronic medical records; LLIN, long-lasting insecticide-treated bednets.
†The eight courses were run in Paris (3), Luxembourg(1), Africa (1), Fiji (1) and Asia (2).

Table 3 Examples of perspective and viewpoint articles and the impact on policy and/or practice from eight completed operational research courses run from April 2009 to November 2012†

First author and course	Paper title/description	Effect on policy and practice
Zachariah *et al.* (2012a,b)) (Paris 2011)	Language in tuberculosis services: can we change to patient-centred terminology and stop the paradigm of blaming the patients?	Was supported by several patient and activist groups and led the WHO STOP-TB partnership to conduct a global consultation on use of language in TB services and the development of a language handbook for TB The words defaulter and suspect were removed from WHO guidelines and the Indian RNTCP also adapted the new terminology in 2013
Kumar *et al.* (2013a,b). (Asia 2012)	Operational research capacity building in Asia: innovations, successes and challenges of a training course	Helped formal endorsement of many of the innovations and lessons learnt in subsequent courses in Asia, Africa and Europe
Kumar *et al.* (2013a,b)) (Asia 2012)	Efficient, quality-assured data capture in operational research through innovative use of open-access technology	A new model of quality-assured data capture using multiple open-access technologies (EpiData, Dropbox, TeamViewer) is being taught in subsequent courses and used in OR studies in Asia and Africa
Zachariah *et al.* (2013) (Africa 2012)	Applying the ICMJE authorship criteria to operational research in low-income countries: the need to engage programme managers and policy makers	Led to debate with journal editors. Helped formally endorse and legitimize an approach where all course participants and partners are taught to engage programme managers and policy makers early in their studies and include them as co-authors

WHO, World Health Organization; RNTCP, Revised National Tuberculosis Control Programme; ICMJE, International Committee of Medical Journal Editors.
†The eight courses were run in Paris (3), Luxembourg (1), Africa (1), Fiji (1) and Asia (2).

contrast to prospective study designs) reduced study implementation time.

The strengths of this study are that milestones and publication outputs were systematically documented on a quarterly basis and reported effects on policy and practice could be assessed rigorously in all but one published study. However, there were a number of limitations. First, the follow-up time for studies was different for the various courses and we may have underestimated the publication rate and potential effect on policy and practice for the later courses. This potential problem will be avoided in future by instituting a cohort approach with systematic audits being done
15–18 months after course completion.

Second, the reported effects on policy and practice were self-reported and the possibility of responder bias needs to be considered. Although self-report poses a limitation, the reported effects in this study were usually directly related to programme-generated research questions and thus readily confirmed. Assessment of effects at national or international levels was more difficult and complex, and currently lacks standardised methodologies. However, this was a first step and we intend to improve the validity of further reporting through independent field verification and cross-checking new or amended monitoring tools and or getting copies of amended guidelines. Third, we did not assess the impact of the policy change on programme performance and health outcomes among populations as this will require different study designs and assessments on a longer term. Although we measured outputs of operational research based on what we previously proposed in the literature (Zachariah *et al.* 2012a,b), the lack of standard definitions and methodologies for assessing effect/impact on policy and practice is a gap area in the literature and needs attention.

In conclusion, this study shows that a well-organised operational research training course can not only produce a high success rate of publication, but that the publications led to a significant number of effects both in programmes and at a wider level. This is a way forward in being accountable not only in the production and reporting of research evidence, but also in terms of added value on the ground (Charlesworth *et al.* 2011; Glasziou *et al.* 2014).

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