



CROWDSOURCING IN HEALTH AND HEALTH RESEARCH: A PRACTICAL GUIDE



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CROWDSOURCING IN HEALTH AND HEALTH RESEARCH: A PRACTICAL GUIDE



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Crowdsourcing in health and health research: a practical guide

TDR/STRA/18.4

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LIST OF ABBREVIATIONS

| | |
|----------------|--|
| CBO: | Community-based organization |
| CDC: | Centres for Disease Control and Prevention |
| DNA: | deoxyribonucleic acid |
| HIV: | human immunodeficiency virus |
| MSM: | men who have sex with men |
| PLHIV: | person living with HIV |
| PWID: | person who injects drugs |
| UN: | United Nations |
| UNAIDS: | Joint United Nations Programme on HIV/AIDS |
| WHO: | World Health Organization |

EXECUTIVE SUMMARY

The purpose of this guide is to provide practical advice on designing, implementing, and evaluating crowdsourcing activities for health. In some settings, a group of diverse individuals can solve problems that individuals alone are unable to solve. Crowdsourcing is the process of having a large group, including experts and non-experts, solve a problem and then share the solution with the public. Challenge contests are one tool for crowdsourcing. These contests issue open calls to solicit new ideas, images, or strategies from the public. Many contests have focused on improving health, but there is little guidance in this area.

In designing this guide, a global challenge contest was used to solicit descriptions of contests for health. Independent judges evaluated each contest on pre-specified criteria. Descriptions of 70 challenge contests were received. Twenty (29%) descriptions scored at least 7 out of 10 points and received a commendation. These selected submissions were used to develop this guide on organizing, implementing, and evaluating challenge contests for health programme managers, researchers, and policy-makers.

Challenge contests for health are described, each stage is examined, evaluation methods are considered, and suggestions are made for what is needed to organize a challenge contest for health.



INTRODUCTION

INTRODUCTION TO CROWDSOURCING AND CHALLENGE CONTESTS

Crowdsourcing for health challenges allows a group to solve a problem; solutions are then shared with the public.¹ This type of crowdsourcing differs from others because it explicitly focuses on generating public benefit.² By tapping into the vast wealth of public creativity, crowdsourcing shifts traditionally individual tasks to large groups through challenge contests, hackathons, and other methods.³ For the purposes of this guide, crowdfunding or other aspects related to crowdsourcing are not discussed.

This guide focuses on challenge contests for health and health research in which the public responds to an open call for suggestions. The organization of such contests involves six stages: organizing a steering committee, soliciting entries, promoting the contest, judging entries, recognizing excellent entries, and sharing entries.

Challenge contests are increasingly used to improve public health. A small but growing body of literature demonstrates their effectiveness.⁴ For example, contests have been used to develop more locally-responsive sexual health messages and create participatory services for accelerating emergency responses. A systematic review of crowdsourcing contests identified two overarching categories: 1) process-oriented contests focused on community mobilization and mass engagement in a health topic; and 2) outcome-oriented contests focused on creating high-quality outputs.⁴ Challenge contests may help to generate more creative and people-centered health services. By including the public at multiple stages (for instance, on steering committees, judging panels, and as contributors), challenge contests provide an opportunity for increasing health equity and community engagement.

There are few resources describing the methodology of challenge contests for health and health research. Methods are important because this field is relatively new and there have been many divergent approaches to organizing contests. This practical guide should help organizers to design and evaluate crowdsourcing contests to improve health.



DEVELOPING THIS GUIDE USING A CHALLENGE CONTEST

Challenge contests draw on the wisdom of local communities. Recognizing the value of community insights in challenge contests, an open call was issued for individuals and groups to submit descriptions of challenge contests for health and health research. A multi-sectoral steering group distributed the call for entries using email, social media, and in-person events. Individuals who organized or evaluated contests provided a brief (500 word) description. A total of 70 entries were received in response to the call. Each entry was evaluated independently by two individuals for eligibility, and then all eligible entries were evaluated by four members of a judging committee. Judges were thirteen individuals with expertise in public health, challenge contests, and health research. Mean scores were calculated and entries with higher variation were discussed among all judges. Each entry was scored from 1-10 based on the following criteria: description of the challenge contest; public health effectiveness or impact; capacity to promote equity and inclusiveness; and potential for learning. A brief description of commended entries is in Table 1, with exceptional case studies summarized on pages 20 and 21.

The following sections are organized around six central questions:

- 1 **WHY USE CHALLENGE CONTESTS FOR HEALTH AND HEALTH RESEARCH?**
- 2 **HOW ARE CHALLENGE CONTESTS CONDUCTED?**
- 3 **WHAT ARE THE RISKS ASSOCIATED WITH CHALLENGE CONTESTS?**
- 4 **IN WHAT SETTINGS SHOULD CHALLENGE CONTESTS BE USED?**
- 5 **HOW ARE CHALLENGE CONTESTS EVALUATED?**
- 6 **WHAT IS NEEDED TO ORGANIZE A CHALLENGE CONTEST?**

ORGANIZING CHALLENGE CONTESTS

1. WHY USE CHALLENGE CONTESTS FOR HEALTH AND HEALTH RESEARCH?

Challenge contests used to improve health have many advantages, including leveraging networks, sharing data, and expanding community engagement (see Figure 1).



Figure 1. Advantages of challenge contests to improve health

Challenge contests often save money compared to conventional public health approaches.⁵ Biologists at the University of Washington hosted an open contest to map the structure of an HIV protein that had troubled experts for over a decade and had cost millions in scientific research grants. In just ten days, gamers were able to successfully decipher the structure of the retroviral protease.⁶ Similarly, two randomized controlled trials in China demonstrated that a crowdsourcing approach cost substantially less than a social marketing approach for developing sexual health messaging.^{7,8}

Crowdsourcing through challenge contests can also be effective at leveraging networks. In the field of brain imaging, which is notorious for its costliness and the limited data-sharing within the field, over 100 researchers collaborated and pooled data for the first time; in doing so, they identified genes responsible for brain size and memory.⁹ These entries helped Enigma, the largest collaboration of brain researchers around the world, receive US \$32 million in funding from the National Institutes of Health.¹⁰

Challenge contests have the potential to bring together otherwise disparate communities, actively engaging key sectors of the population who may not always be heard. For example, to inform global HIV policy, UNAIDS used an online challenge contest to solicit opinions from youth around the world. This youth feedback ultimately shaped global HIV policy, including strategies for enhancing youth participation in HIV policy development. This process allowed policy-makers to better understand the need for youth-led HIV policy development.¹¹

2. HOW ARE CHALLENGE CONTESTS ORGANIZED?

A successful challenge contest can be broken down into a six-stage process that includes assessing, organizing, engaging, evaluating, recognizing, and sharing (see Figure 2).

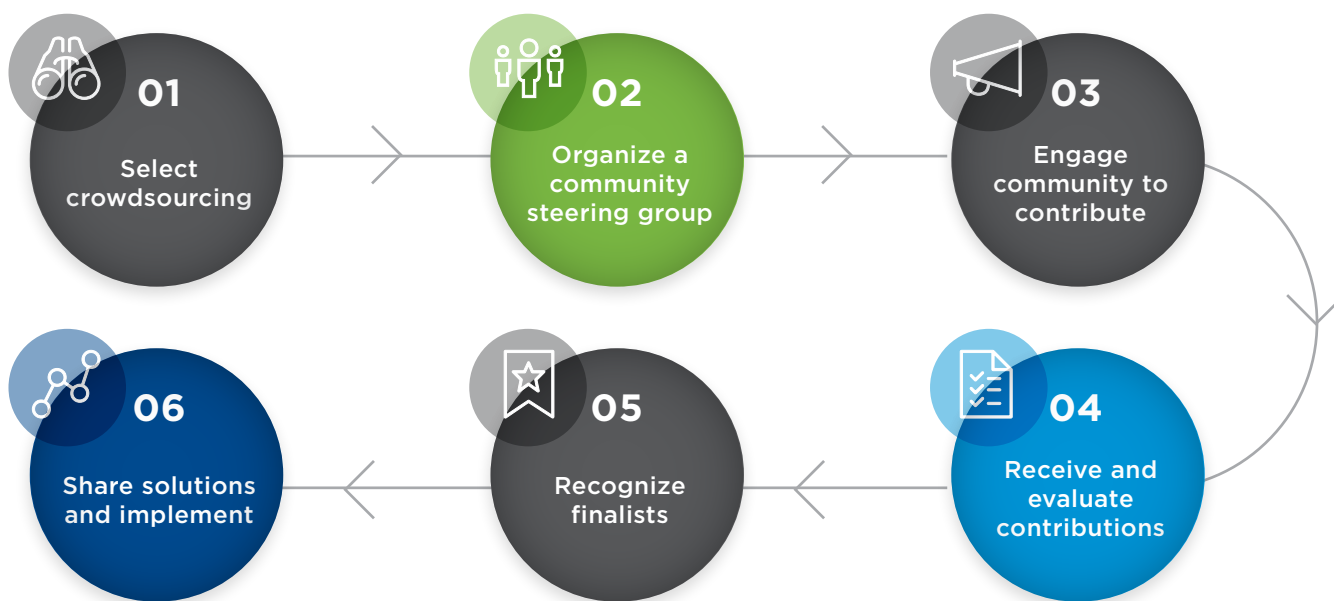


Figure 2. Stages of a challenge contest

A checklist of essential elements at each stage is provided on page 14.

ASSESSING APPROPRIATENESS OF CHALLENGE CONTESTS

Considering whether a challenge contest is an appropriate method for solving a task is an important first step. James Surowiecki suggests four elements are needed for crowds to be wise:

-  **DIVERSITY OF OPINIONS**
Each participant bases his or her opinion on private information
-  **INDEPENDENCE OF IDEAS**
Opinions are formed separately from others
-  **DECENTRALIZATION OF INFORMATION**
Specialists are from a variety of fields
-  **AGGREGATION**
A mechanism exists for aggregating private judgments into a collective decision

Settings in which each of these four elements are present would be more appropriate for a challenge contest. This report's global contest data suggest that challenge contests may be more commonly used in some settings related to specific diseases such as HIV and hepatitis; topics where behavioral or social context are important such as sexual health; and issues where the public could be expected to make a meaningful contribution (see Table 1 for a list of the health conditions and diseases involved in this global contest).

ORGANIZING A COMMUNITY STEERING COMMITTEE

Once the suitability of a challenge contest has been established, a steering committee should be organized. This committee, which would provide leadership and guidance, could include local community members, health professionals, community-based organization (CBO) leaders, or private sector leaders. Importantly, committee members should not all be from the same field or contribute a similar knowledge base. Furthermore, including individuals with direct, personal experience with the problem (such as patients or at-risk groups) on the steering committee is essential. An individual with experience organizing contests can facilitate the planning process.

The steering committee establishes contest rules and creates a call for entries. Examples of call for entries from selected challenge contests are included in Table 1. The steering committee decides the contest rules, including the overall purpose and criteria for evaluating entries. Contest rules should delineate entry requirements, such as word limits or video file size limits. However, the steering committee should be careful not to give examples of successful entries or topic ideas, as doing so often undermines the creativity of submissions and results in entries that are similar to the example provided. Selecting an appropriate prize structure is important for spurring participation.¹² Commendations and mentorship opportunities are often more useful than cash prizes (see Figure 3). The steering committee should produce a detailed call for entries that clearly describes the selection criteria and the contest timeline. A brief (2-3 minute) video can be useful for clarifying the rules and expectations of the contest.

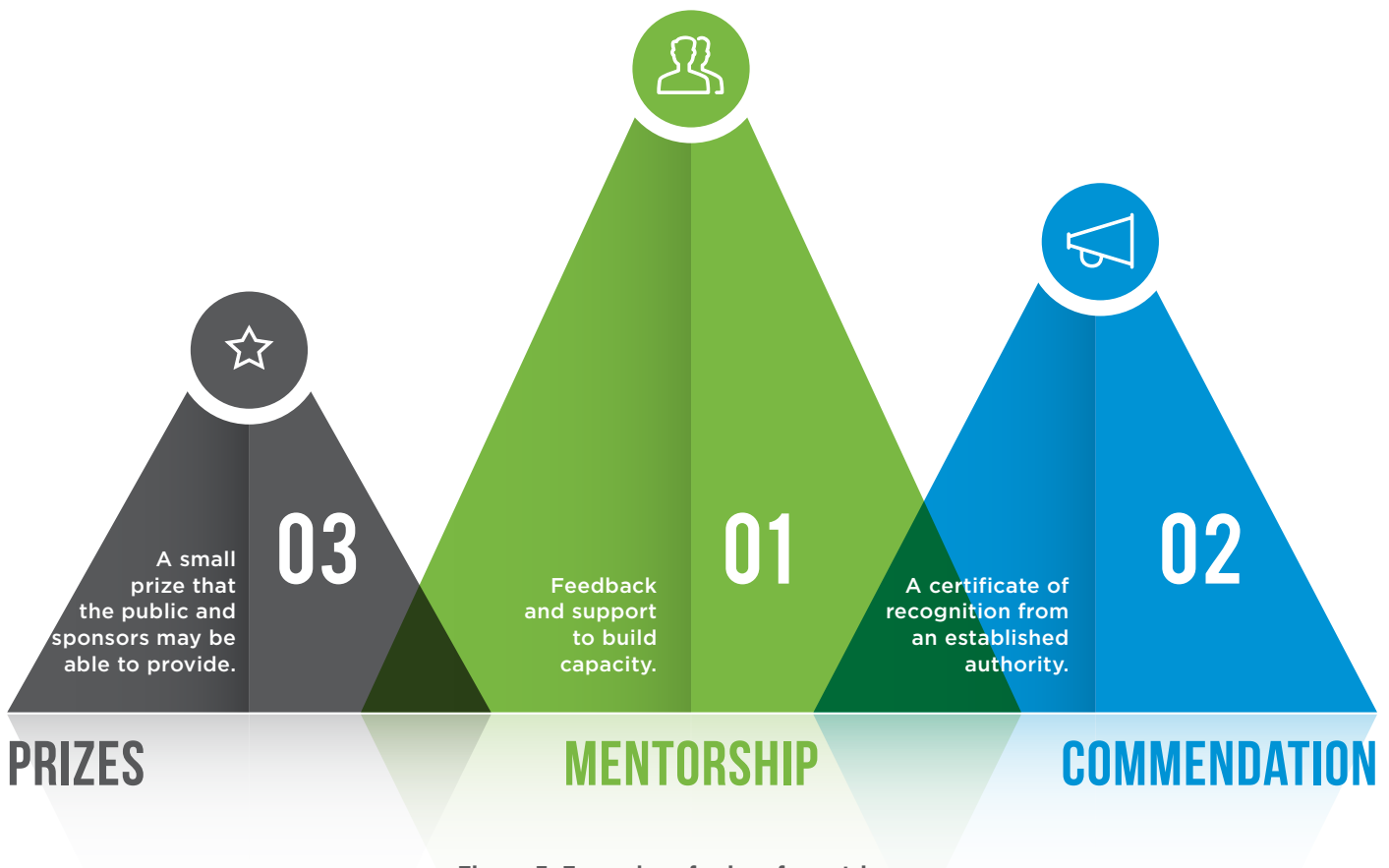


Figure 3. Examples of prizes for entries

ENGAGING THE COMMUNITY TO CONTRIBUTE

Most people are unfamiliar with challenge contests and will need a clear description of the purpose, expectations, and rules. Promoting the contest through engagement is critical to clarifying these aspects and mobilizing communities. The process of community engagement typically involves the development of a social media announcement and in-person activities. These activities – such as educational workshops at local universities or feedback sessions for individuals developing entries – are essential for many challenge contests, and particularly for process-oriented contests.^{13,14} In-person events build trust in the contest, clarify the format, and encourage individuals to submit.

RECEIVING AND EVALUATING ENTRIES

After the submission deadline has passed, entries will be evaluated. For contests with mass engagement greater than 200 entries, the judging process can be conducted in three phases: eligibility screening, crowd judging, and panel judging (Figure 4). In phase 1, at least two independent judges examine all entries and assess for eligibility. These judges evaluate each entry based on pre-specified criteria. In phase 2, the crowd judging phase, a group of lay people evaluates each entry. This could be limited to individuals with the disease or another key stakeholder group but should be diverse. In phase 3, a panel of experts and non-experts individually judges each remaining entry. This panel can consist of the community steering committee, in addition to additional key stakeholders. Judges who have a conflict of interest on a particular submission should recuse themselves from evaluating that submission. Each entry should be evaluated independently by at least two, and preferably three, judges. While this framework is preferred for a rigorous evaluation process, if fewer than 200 entries are received, a two-phase process consisting of eligibility screening and panel judging should suffice.

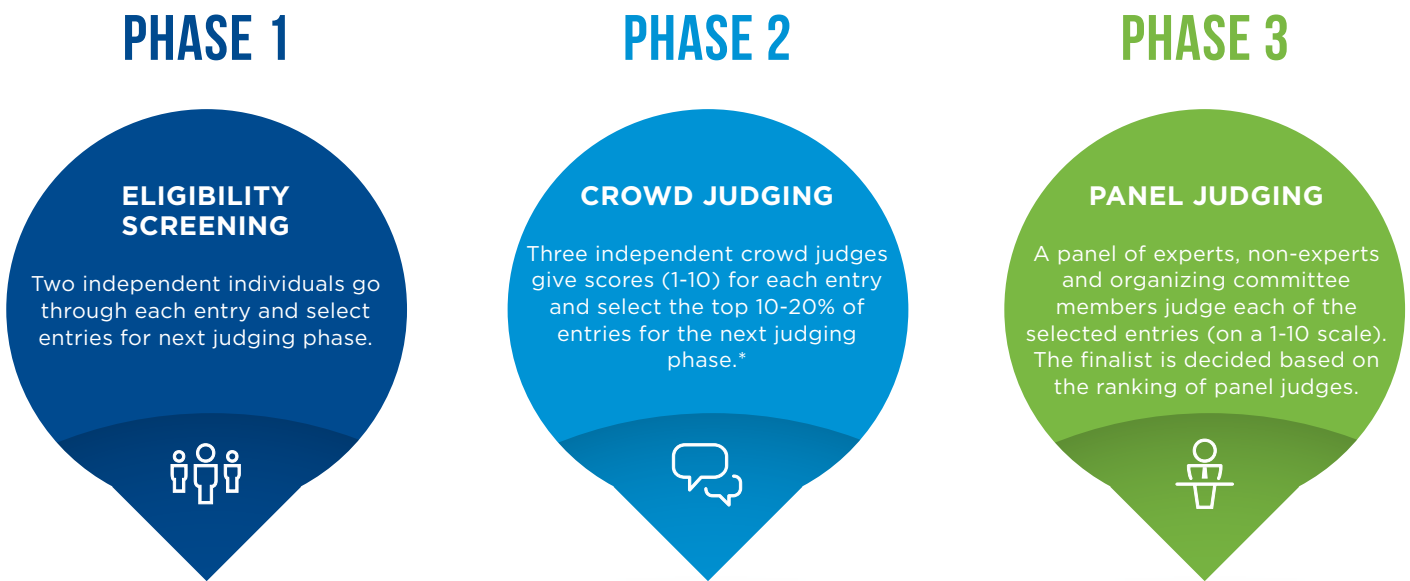


Figure 4. Phases of the judging process

**This phase is particularly useful in contests with greater than 200 entries*

RECOGNIZING FINALISTS

Once entries have been ranked based on the panel judge scores, a qualitative summary consisting of feedback and comments of the finalists should be collated and presented to the larger steering committee. Ultimately, the steering committee will make the final selections, notifying each participant about the decision regarding their submission and making a public announcement of the selected submissions. Social media networks and other networks should be utilized to celebrate finalists. To encourage future participation, terms such as “winner” and “losers” should be avoided. Delayed announcements should also be avoided.

SHARING SOLUTIONS AND IMPLEMENTING IDEAS

Often overlooked after the official contest has ended, sharing solutions with local or national agencies and implementing exceptional ideas within communities is vital. Finalist submissions should be archived online and entries should be distributed through networks as widely as possible. Best practices and key takeaways can be presented at academic conferences, forums, and other public platforms.

Some contests are designed to directly inform health guidelines. For example, a hepatitis testing innovation contest solicited descriptions of case studies that were then included as best practice cases in the 2017 World Health Organization Hepatitis Testing Guidelines.¹⁵ For other contests, the goals can include actionable plans to be locally implemented.¹⁶

3. WHAT ARE THE RISKS ASSOCIATED WITH CHALLENGE CONTESTS?

Although the potential advantages of contests are many, there are also risks associated with challenge contests, and pitfalls can occur at any of the six stages.² For example, avoid only using a single platform for distribution, limiting the contest to a specific group of people, restricting the submission period for entries to a short time period, or having a call for entries around a holiday. Figure 5 describes how four health challenge contests failed and presents potential risk mitigation strategies.



Figure 5. Risks associated with challenge contests

DUREX CONDOM CONTEST

Durex organized a contest where couples could obtain emergency contraception in a rush delivery service. In a Facebook campaign called “SOS Condoms,” users voted on the city in which they would like the service to be made available. Internet pranksters chose Batman, the capital of a conservative Muslim province in southeast Turkey, over cities such as Singapore, Paris, and London. Contest organizers could have mitigated the risk of this online contest by forming a steering committee responsible for screening cities and making final decisions.

GERMAN CIRCUMCISION CONTEST

In 2012, Germany’s Pirate Party decided to crowdsource its platform instead of determining it internally. It targeted the population of North Rhine-Westphalia, a region with 18 million inhabitants, in which the party had garnered less than 8% of the votes cast in the last local election. However, only 20 people responded.¹⁷

BOATY MCBOATFACE

In 2016, in an online contest to name a British polar research vessel in honor of David Attenborough, the British public overwhelmingly suggested Boaty McBoatface. One year later, in November 2017, a Sydney ferry was named Ferry McFerryface after local officials hosted a public contest to determine naming. In both instances, failure to develop an appropriate judging framework led to the dilemma of choosing between embarrassment and adherence to stipulated rules.

GOOGLE FLU TRENDS

Google Flu Trends is a case in which vulnerability to using seasonal terms unrelated to the flu led to an ill-performing algorithm. Ultimately, low accuracy and poor predictive ability¹⁸ resulted in Google shutting down the project. Greater transparency and collaboration between public and private institutions may have resulted in better models. Such models are being explored by the US Centers for Disease Control and Prevention in its annual “Predict the Influenza Season Challenge,” a public contest that encourages researchers from around the world to predict timing, peak, and intensity of a flu season using social media and routine surveillance systems data.¹⁹

4. IN WHAT SETTINGS SHOULD CHALLENGE CONTESTS BE USED?

Challenge contests can be used in several different settings, including the following:



STRATEGIC POLICY PLANNING

To inform policy development in the future



FORMATIVE RESEARCH

To better understand community attitudes, behaviors, and beliefs



COMMUNITY ENGAGEMENT

To foster trust and cooperation between health leaders and the local community



INTERVENTION DEVELOPMENT

To inform the development of more culturally acceptable and locally relevant public health interventions

Policy-makers can use challenge contests to solicit diverse community opinions about potential future local, regional, or national health policies.²⁰ Contests have identified case studies of successful programmes that merit greater resources and scale-up.¹⁵ From a research perspective, challenge contests can be used as formative work to better understand social and behavioural contexts related to health.¹³ Contests have also been used to enhance community engagement related to ongoing or planned clinical trials.²¹ Finally, challenge contests can create components of a public health intervention, including logos, images, and strategies.

5. HOW ARE CHALLENGE CONTESTS EVALUATED?

A systematic review of crowdsourcing in health identified 86 studies from a wide range of disciplines, including randomized controlled trials (RCTs) and other types of research.²² RCTs are the gold standard for evaluating the effectiveness of a crowdsourcing contest. Several RCTs have evaluated the effectiveness of challenge contests, including in condom use promotion, HIV testing, and out-of-hospital cardiopulmonary resuscitation.^{7,8,23} However, RCTs generally require a substantial amount of time and resources. Several studies have compared clinical algorithms developed through crowdsourcing challenge contests to existing algorithms.

Qualitative research methodologies have the advantage of adaptability and responsiveness to local contexts and may incorporate structured interviews to obtain greater detail from participants.^{13,21, 24-26} Additionally, social media analyses may complement qualitative methods and are particularly suitable when contests are conducted online and data can be obtained from social media platforms.²⁷⁻²⁹

Measuring the extent of community engagement may also be important for challenge contests. Metrics include the number of individuals who viewed the contest announcement, the number of contributions, and the quality of contributions. In-person and social media promotion can also be measured. Examining the diversity in sex, gender, and ethnicity of participants should be considered.



IMAGE CREDIT: JEAN BARCENA, SIHI 2018

6. WHAT IS NEEDED TO ORGANIZE A CHALLENGE CONTEST?

Challenge contests can be organized with minimal resources in many settings. This report's challenge contest experience and other evidence suggests that the following components are needed:



HUMAN PERSONNEL

Administrative staff to assist with communications and coordination



DIVERSE NETWORKS

A wide range of individuals to help guide and implement the contest



CHAMPIONS OF THE CAUSE

People living with or affected by the cause who can help

A contest coordinator can help to achieve the administrative and logistical needs of the challenge contest. While many companies provide similar services online, hiring a company is not essential. A part-time communications staff or event organizer who is already familiar with the cause of the challenge can be effective.

Diverse networks are important for creating a strong steering committee, widely distributing the call for entries, and sharing solutions. This includes health-focused individuals in the public sector, but also a wider range of fields (education, communications, computer science) and sectors (community-based organizations, government, private sector).

Including champions of the cause is important. Champions are individuals who deeply believe in the cause. Champions can nurture trust in the contest and serve as core members of the steering committee.

The following section includes some practical resources for organizing challenge contests for health and health research.

PRACTICAL RESOURCES FOR CHALLENGE CONTESTS

CHECKLIST FOR CHALLENGE CONTESTS

The following elements are not meant to be exhaustive but should be considered when organizing challenge contests.



ASSESSING APPROPRIATENESS OF CHALLENGE CONTESTS

Organizers have identified a rationale for using a challenge contest, either because of problems that have social/behavioural origins or a need for strong community engagement.

Organizers have identified a problem that can draw on crowd wisdom: the idea can solicit a diversity of responses (each participant bases his or her opinion on private information); ideas are independently formed, separately from others; information is decentralized (specialists are from a variety of fields); a mechanism exists for aggregating private judgments into a collective decision.



ORGANIZING A COMMUNITY STEERING COMMITTEE

Organizers form a community steering committee composed of local community members, health professionals, community-based organization (CBO) leaders, or private sector leaders.

The steering committee has a clear challenge purpose and well-defined criteria for evaluating entries, both of which are articulated in the call for entries.

The steering committee creates a prize structure to recognize exceptional entries.

Organizers avoid providing examples as much as possible to spur creativity.



ENGAGING THE COMMUNITY TO CONTRIBUTE

The steering committee organizes appropriate in-person activities to promote and clarify the challenge contest, such as classroom instruction at schools, feedback sessions in public spaces, or community-driven activities decided by community leaders.

The steering committee organizes appropriate online activities to promote and clarify the challenge contest, such as short videos, live discussions, and banner advertisements.



RECEIVING AND EVALUATING ENTRIES

Sufficient judges are identified to evaluate entries for eligibility (phase 1) and content (phase 2), allowing each entry to be evaluated by three independent individuals.

A set of judges (potentially some steering committee members) evaluates the eligibility of all entries based on entry requirements, such as being focused on the topic and having the appropriate format.

Either the crowd (when larger numbers of entries) or a panel of judges (when fewer entries) evaluate eligible entries on the pre-specified criteria.



RECOGNIZING FINALISTS

Judges provide feedback and the steering committee provides commendations to a subset of individuals who submitted exceptional entries (often those scoring at least 7 on a scale of 1 to 10).

Recognition of finalists is encouraged online, in person, and at special events, professional conferences and awareness days such as the World AIDS Day.



SHARING SOLUTIONS AND IMPLEMENTING IDEAS

The steering committee disseminates the ideas and/or evaluates the ideas.

The public, including and beyond those who participated in the contest, receives some benefit.

RESOURCES FOR CHALLENGE CONTESTS FOR HEALTH AND HEALTH RESEARCH

CONTESTS FOR HEALTH

- Creative contributory contests (CCC) to spur innovation in sexual health: Two cases and a guide for implementation
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4610177/>
- Systematic review of innovation design contests for health: Spurring innovation and mass engagement
<http://innovations.bmj.com/content/3/4/227>

GENERAL CONTESTS

- Challenge Prizes: A Practice Guide
<https://www.nesta.org.uk/toolkit/challenge-prizes-a-practice-guide/>
- The craft of incentive prize design
<https://www2.deloitte.com/insights/us/en/topics/social-impact/the-craft-of-incentive-prize-design.html>
- “And the winner is...”: Philanthropists and governments make prizes count
<https://www.mckinsey.com/industries/social-sector/our-insights/and-the-winner-is-philanthropists-and-governments-make-prizes-count>
- US Health and Human Services Open Innovation. 2017
<https://www.hhs.gov/idealab/competes>

FREQUENTLY ASKED QUESTIONS ABOUT CHALLENGE CONTESTS

WHY USE CHALLENGE CONTESTS FOR HEALTH AND HEALTH RESEARCH?

By drawing on the wisdom of community input, challenge contests promote the development of creative and innovative solutions to improve public health. These simple, inclusive contests are effective in leveraging networks, sharing data, and engaging communities to solicit community feedback on health.

WHAT ARE THE NECESSARY ELEMENTS NEEDED TO ORGANIZE A CHALLENGE CONTEST?

Past challenge contests suggest the need for three main components for organizing a successful challenge contest: 1) A contest coordinator to organize the logistical and administrative needs of the contest. Communications staff or an event organizer may be useful. 2) Diverse networks are necessary for organizing contests. Such networks aid in the creation of a strong steering committee, distributing the call for entries, and sharing solutions widely. 3) Individuals who are champions of the cause are necessary, as they promote trust in the contest and can serve as key members of the steering committee.

WHAT KINDS OF TASKS HAVE CHALLENGE CONTESTS ADDRESSED?

Challenge contests have been used to solicit solutions for a variety of issues related to public health. Examples include promoting HIV testing among MSM in China, collecting images for an anti-stigma campaign about HIV, identifying descriptions of hepatitis approaches, soliciting logo designs for a worldwide HIV conference, deciphering the structure of an HIV retroviral protease, and recruiting DNA samples for undiagnosed genetic conditions.

WHAT GROUPS ARE TYPICALLY THE TARGET AUDIENCE OF A CHALLENGE CONTEST?

The target audience of a challenge contest is typically broad. For example, a contest intended to solicit images promoting HIV testing among youth would engage youth, but not be limited to youth.

FOR WHICH DISEASES HAS A CHALLENGE CONTEST APPROACH BEEN USEFUL IN SOLICITING SOLUTIONS?

Many past challenge contests focused on solutions relating to HIV or hepatitis B or C. However, contests have also been used for innovation in drug addiction, maternal and child health, and genetic diseases.

WHAT IS THE PURPOSE OF A STEERING COMMITTEE IN ORGANIZING A CHALLENGE CONTEST?

A steering committee provides leadership and guidance for the challenge contest. This committee decides the purpose of the contest, outlines the rules and requirements for entries, develops a call for entries and selects a prize structure. In some cases, it might be useful to have a smaller group within the steering committee that is more focused on the organization and implementation of the project.

WHICH GROUP IS MOST APPROPRIATE TO ORGANIZE A CHALLENGE CONTEST?

Host organizations need to have diverse networks and some communications capacity. Previous health-focused challenge contests have been organized by universities, WHO or other UN agencies, and nongovernmental organizations.

WHAT ARE SOME EXAMPLES OF IN-PERSON EVENTS USED TO PROMOTE CHALLENGE CONTESTS?

In-person events are more intensive sessions to promote engagement. These events are especially useful for incorporating preferences and ideas from those who will not participate online. In-person events can include community-based introductions to the contest, educational workshops at local universities, interactive feedback sessions, and community-driven events.

HOW CAN SOCIAL MEDIA BE USED TO PROMOTE A CHALLENGE CONTEST?

Social media can be used to distribute the call for entries through digital networks. This could include banner advertising on mobile apps, short text messages for registered users, announcements on social media applications (such as Facebook and Twitter), and email announcements forwarded through listservs.

HOW MANY SUBMISSIONS DOES A CHALLENGE CONTEST NEED IN ORDER TO BE A “WISE” CROWD?

There is no simple threshold for predicting how many submissions are needed. It is important to consider both the quality and quantity of submissions when assessing the overall response. Both of these aspects are typically evaluated one week prior to the contest deadline in order to consider extending the deadline.

HOW CAN CONTEST ENTRIES BE EVALUATED?

Evaluating submitted entries is a key stage of a challenge contest. For a rigorous judging process, all entries should be initially evaluated by at least two independent judges for relevance and eligibility based on pre-specified criteria. In the second phase of judging, a diverse group of laypeople and experts can evaluate the entries.

HOW CAN ORGANIZERS OF A CHALLENGE CONTEST ENSURE A FAIR JUDGING PROCESS?

The steering committee needs to decide the judging criteria as part of the call for entries. Including multiple phases of judging can also be useful. Judges with a conflict of interest should recuse themselves.

DURING THE JUDGING PROCESS, CAN RAW SCORES BE USED OR SHOULD SCORES BE ADJUSTED TO ACCOUNT FOR JUDGING DIFFERENCES?

Evaluation of the judging processes from past contests suggests that there is no need to adjust scores to account for differences in judging, and that using mean raw scores is sufficient.

WHAT ARE SOME EXAMPLES OF AN APPROPRIATE PRIZE STRUCTURE FOR A CHALLENGE CONTEST?

In many cases, mentorship from experts and training opportunities are highly valued by participants, compared to monetary prizes. However, depending on the purpose of the challenge contest, other prizes may be more appropriate.

ARE THERE RISKS ASSOCIATED WITH CHALLENGE CONTESTS?

There are numerous reasons why a challenge contest might fail to reach its goals at any point throughout the process. By forming a steering committee, engaging with communities, developing an appropriate judging framework, and collaborating between institutions, contest organizers can avoid some of these risks. Notable cases which failed to follow one or more of these protocols can be seen in Figure 5.

HOW HAVE SOLUTIONS AND IDEAS FROM PAST CHALLENGE CONTESTS BEEN SHARED WIDELY AND IMPLEMENTED BY POLICY-MAKERS?

Best practices, excellent entries, and key takeaways have been presented at academic conferences, forums, and other platforms. Other contests, like a hepatitis testing innovation contest, solicited descriptions of case studies that were included in the 2017 World Health Organization Hepatitis Testing Guidelines.

CONCLUSION

CONCLUSION

Challenge contests are simple, inclusive, and inexpensive ways to solicit community feedback on health. This guide should not be used as a rigid guidebook, but rather as a set of principles to inspire further contests. Only through iterative implementation will the science and practice of crowdsourcing for health and health research improve.

The succeeding pages provide the list of 20 commended challenge contests for health and health research in 2017, with two of these explained in more detail.



CASE STUDY 1. HEPTEST CONTEST



An innovation contest to solicit descriptions of hepatitis B and C testing

Social Entrepreneurship to Spur Health (SESH) is a partnership between the University of North Carolina–Project China and the Southern Medical University Dermatology Hospital in Guangzhou, China to design creative, equitable, and effective health services through crowdsourcing contests.

The purpose of the HepTest Contest was to identify descriptions of hepatitis B and C approaches to support local programmes and inform the WHO 2017 Hepatitis Testing Guidelines. The contest was organized in partnership with the World Health Organization (WHO), hepatitis community-based organizations, public health authorities, communications experts, and implementers. The call for entries was distributed in all six languages of the WHO.

The contest received 64 entries from 27 countries. A total of 16 (25%) submissions were deemed of sufficient quality to be included directly in the WHO 2017 Guidelines for hepatitis testing. Five contest participants were invited and supported to present their cases at international conferences on liver disease. The entries covered testing in different populations. Numbers of those involved include primary care patients (5), people who inject drugs (4), pregnant women (4), general populations (4), high-risk groups (3), relatives of people living with hepatitis B and C (2), migrants (2), incarcerated individuals (2), workers (2), and emergency department patients (2). A variety of different testing delivery approaches were employed, including integrated HIV-hepatitis testing (12), integrated testing with harm reduction and addiction services (9), use of electronic medical records to support targeted testing (8), decentralization (8), and task shifting (7).

The contest promoted equity through a diverse steering committee, extensive promotion, simplified submission requirements, and standardized judging. People living with hepatitis were included on the steering committee and throughout each stage of the contest. Promotion efforts were coordinated through the steering committee in order to ensure broad geographic participation. Social media metrics from the contest website provided real-time feedback to the steering committee on participation. Finally, a scoring rubric for each submission was evaluated by all judges.

This innovation contest provided a wide range of lessons about designing, implementing, and evaluating contests. The contest was implemented over a four-month period with limited resources, suggesting the broad applicability of the contest design. From an implementation perspective, the use of social media analytics helped to focus promotion through networks in regions with fewer website viewers. From an evaluation perspective, the standard deviation around mean submission scores was low, suggesting that panel judging is effective. Finally, this contest demonstrated that global contests to solicit case studies may be useful to inform the development of global guidelines.

Reference: Tucker JD "The HepTestContest: a global innovation contest to identify approaches to hepatitis B and C testing". BMC Infect Dis. 2017 Nov 1;17(Suppl 1):701. doi:10.1186/s12879-017-2771-4.

CASE STUDY 2. CAMTECH HACKATHONS



Consortium of Affordable Medical Technologies

CAMTech is a global network of academic, clinical, corporate, government and non-profit partners that uses hackathons and related activities to drive health innovation. A hackathon is a two-day event that brings together engineers, clinicians, entrepreneurs, and end-users to develop disruptive health innovations. Over five years, CAMTech has organized 17 hackathons and convened a global network of 4 377 innovators, 831 innovations, and 659 mentors.

An analysis of the first 12 hackathons found that hackathon ideas resulted in 22 patents and 15 companies. Approximately 30% of the teams that met at hackathons continued to work on other health challenges afterwards, building local capacity.

CAMTech-X was launched as an innovation contest consisting of three stages: five simultaneous hackathons, a 100-day post-hackathon Demo Day, and acceleration support for the winning team. The CAMTech-X hackathon served as an open-innovation platform to co-create innovations over 48 hours.

Over 500 engineers, clinicians, entrepreneurs, designers and public health innovators convened to respond to one of the most pressing public health challenges in India: improving healthcare access for the urban poor. Exceptional teams, representing the best innovations from each of the five sites, received mentorship through the CAMTech network and an opportunity to present innovations at the CAMTech-X Demo Day. Teams that were not selected were still eligible to apply to participate in Demo Day through a 100-day post-hackathon contest. Teams were given an incentive of having excellent ideas being presented to partners and investors on Demo Day.

CAMTech awarded a cash prize and six months of acceleration support through the CAMTech Accelerator Program to RespirAid, a low-cost mechanical ventilation assistance device. The accelerator programme provides teams with coaching, project management services to assist in product development and commercialization efforts, marketing and publicity. With the support of CAMTech activities, RespirAid has conducted feasibility studies, raised further funds, and launched a company.

Challenge contests like CAMTech-X, along with funding and acceleration support, yield innovations designed for commercialization and impact. CAMTech has held challenges in Uganda, India, and other locations.

Reference: Olson KR, et al. Health hackathons: theatre or substance? A survey assessment of outcomes from healthcare-focused hackathons in three countries. BMJ Innov 2017; 3(1): 37-44. Available at: <http://innovations.bmj.com/content/early/2017/01/04/bmjinnov-2016-000147> (Accessed 5 June 2018).

TABLE 1. COMMENDED CHALLENGE CONTESTS FOR HEALTH AND HEALTH RESEARCH IN 2017

This table includes the 20 submissions that received a ranking of at least 7 out of 10 possible points for this report's challenge contest. There were 70 submissions in total.

| STUDY TITLE | YEAR | DISEASE | ENTRY | GEOGRAPHIC REGION | PURPOSE | MORE INFORMATION |
|--|-----------|------------------|---|---|--|---|
| Innovations for acceleration for 2017 World Hepatitis Summit | 2017 | Hepatitis B or C | Descriptions of creative programmes, products, or policies (<500 words) | International, entries from all 6 WHO regions | Strengthen community participation and innovation at a large-scale health policy conference for hepatitis. | WHO news: News from the World Hepatitis Summit - day 3 http://www.who.int/hepatitis/news-events/world-hepatitis-summit-2017-day3/en/ |
| HepTest contest | 2015-2016 | Hepatitis B or C | Descriptions | International | Identify descriptions of hepatitis approaches to support local programmes and inform WHO guidelines on hepatitis B and C testing. | WHO news: WHO highlights hepatitis testing innovations at The International Liver Congress http://www.who.int/hepatitis/news-events/testing-innovation-winners/en/ The HepTestContest: a global innovation contest to identify approaches to hepatitis B and C testing https://bmcinfectdis.biomedcentral.com/articles/10.1186/s12879-017-2771-4 WHO Guidelines on hepatitis B and C testing http://www.who.int/hepatitis/publications/guidelines-hepatitis-c-b-testing/en/ |
| Hepatitis B and C testing innovation challenge | 2017 | Hepatitis B or C | Images, videos | China | Solicit images and videos to incorporate into World Hepatitis Day activities across China, including at the Great Hall of the People in Beijing. | Fitzpatrick T, et al. "A crowdsourced intervention to promote hepatitis B and C testing among men who have sex with men in China: study protocol for a nationwide online randomized controlled trial" <i>BMC ID</i> . In press. |
| HIV testing among MSM in Yantai | 2016 | HIV | Short messages | China | Increase HIV testing in a Chinese city through collaboration between the local CDC, CBO, university and MSM populations. | SESH Study Group and Tucker, J.D. "Crowdsourcing to promote HIV testing among MSM in China: study protocol for a stepped wedge randomized controlled trial." <i>Trials</i> . 2017. https://trialsjournal.biomedcentral.com/articles/10.1186/s13063-017-2183-1 |
| HIV testing among MSM in Qingdao | 2017 | HIV | Short messages, performance exhibition | China | Improve HIV testing services in local CBOs, and strengthen training of youth volunteers and VCT. | SESH Study Group and Tucker, J.D. "Crowdsourcing to promote HIV testing among MSM in China: study protocol for a stepped wedge randomized controlled trial." <i>Trials</i> . 2017. https://trialsjournal.biomedcentral.com/articles/10.1186/s13063-017-2183-1 |
| HIV testing among MSM in Shenzhen | 2017 | HIV | Stories, flash fictions | China | Increase HIV testing through widespread dissemination of entries through social media and in-person events. | SESH Study Group and Tucker, J.D. "Crowdsourcing to promote HIV testing among MSM in China: study protocol for a stepped wedge randomized controlled trial." <i>Trials</i> . 2017. https://trialsjournal.biomedcentral.com/articles/10.1186/s13063-017-2183-1 |

| STUDY TITLE | YEAR | DISEASE | ENTRY | GEOGRAPHIC REGION | PURPOSE | MORE INFORMATION |
|---|--------------|---------|--|-------------------|---|---|
| 2BeatHIV HIV crowdsourcing contest | 2015-2016 | HIV | Videos, drawings, paintings, poetry, music, and images | United States | Solicit creative pieces about HIV cure through education, social justice, and stigma reduction. Participants were primarily African Americans 18-35 years old. | <p>Mathews A, et al. "Crowdsourcing and community engagement: a qualitative analysis of the 2BeatHIV contest". <i>Journal of Virus Eradication</i>. 2018. 4(1):30-36.</p> <p>Mathews A, et al. "HIV Cure Research Community Engagement in North Carolina: A Mixed Methods Evaluation of a Crowdsourcing Contest". <i>Journal of Virus Eradication</i> 2017. 3(4): 223-228.</p> <p>TED TALK: Dr. Allison Mathews – "Community-based Solutions to HIV Cure's Ethical Challenges"</p> <p>http://2beathiv.org/2017/11/ted-talk-dr-allison-mathews-community-based-solutions-to-hiv-cures-ethical-challenges/</p> |
| HIV testing among MSM in Jinan | 2016-2017 | HIV | Short messages | China | Strengthen cooperation among grassroots groups and build capacity for HIV prevention in Jinan. | <p>SESH Study Group and Tucker, J.D. "Crowdsourcing to promote HIV testing among MSM in China: study protocol for a stepped wedge randomized controlled trial." <i>Trials</i>. 2017.</p> <p>https://trialsjournal.biomedcentral.com/articles/10.1186/s13063-017-2183-1</p> |
| Guangzhou HIV testing contest | 2016 | HIV | Short messages, stories | China | Encourage sharing of HIV testing stories among MSM in the local community, as well as encourage other MSM peers to test. | <p>SESH Study Group and Tucker, J.D. "Crowdsourcing to promote HIV testing among MSM in China: study protocol for a stepped wedge randomized controlled trial." <i>Trials</i>. 2017.</p> <p>https://trialsjournal.biomedcentral.com/articles/10.1186/s13063-017-2183-1</p> |
| A day with HIV | 2010-Present | HIV | Photographs | United States | Collect photos about HIV on the autumnal equinox for an anti-stigma campaign about HIV. | <p>A day with HIV website</p> <p>http://www adaywithhiv.com/</p> |
| HIV cure crowdsourcing contest in China | 2016-2017 | HIV | Images, text descriptions | China | Collect and share stories or pictures from key populations (MSM, PLHIV, PWID) and local residents on what an HIV cure would mean in their lives. | <p>What Would an HIV Cure Mean to You? Qualitative Analysis from a Crowdsourcing Contest in Guangzhou, China</p> <p>https://www.ncbi.nlm.nih.gov/m/pubmed/28891318</p> |
| 18th International AIDS Conference logo contest in Melbourne, Australia | 2014 | HIV | Logos | Global | Solicit logo designs, allowing people most affected by HIV to play a prominent role in designing a logo for the largest HIV conference in the world. | <p>AIDS 2014 Conference logo design competition</p> <p>www.aids2014.org/logo_competition.aspx</p> <p>Wisdom of the Crowds: Crowd-Based Development of a Logo for a Conference Using a Crowdsourcing Contest.</p> <p>https://www.ncbi.nlm.nih.gov/pubmed/28876322</p> |
| Videos to promote HIV testing in China | 2013 | HIV | 1-minute videos | China | Promote HIV testing in China through 1-minute video submissions by CBOs in China. Crowdsourced videos were cost-effective compared to a health marketing video developed by the Guangzhou Center for Disease Control. | <p>Crowdsourcing HIV Test Promotion Videos: A Noninferiority Randomized Controlled Trial in China</p> <p>https://www.ncbi.nlm.nih.gov/pubmed/27129465</p> |

| STUDY TITLE | YEAR | DISEASE | ENTRY | GEOGRAPHIC REGION | PURPOSE | MORE INFORMATION |
|---|--------------|---------------------------|---|------------------------------|---|---|
| Crowdsourcing designathon for HIV testing | 2017 | HIV | Pitch, images, concepts, logos | China | Select promising HIV testing campaigns and sustain engagement through a 72-hour designathon that was hosted at a university campus in Guangzhou, China. | SESH Study Group and Tucker, J.D. "Crowdsourcing to promote HIV testing among MSM in China: study protocol for a stepped wedge randomized controlled trial." <i>Trials</i> . 2017. https://trialsjournal.biomedcentral.com/articles/10.1186/s13063-017-2183-1 |
| Recovery from drug addiction in Vietnam | 2016-2017 | Drug addiction | Descriptions | Viet Nam | Promote understanding of recovery from addiction and create a forum where drug users, family members, and service providers share experiences. | Vietnam - HIV Addiction Technology Transfer Center: http://vhattc.org.vn/en-GB |
| CLARITY challenge | 2013, 2015 | Genetic diseases | Medical information, DNA samples | International | Recruit families with individuals affected with undiagnosed genetic conditions to provide DNA samples for genome sequencing. | An international effort towards developing standards for best practices in analysis, interpretation and reporting of clinical genome sequencing results in the CLARITY Challenge https://genomebiology.biomedcentral.com/articles/10.1186/gb-2014-15-3-r53 |
| SIHI - Makerere University Health Solutions Contest | 2017 | Maternal and child health | Solutions: descriptions of programmes | Uganda | Solicit five solutions in Uganda to improve maternal and child health. | SIHI Website: https://socialinnovationinhealth.org/hubs/makerere-university |
| Foldit online gaming platform | 2015-2018 | Protein folding | Engagement in online video game | International | Engage non-scientists to solve difficult prediction problems through a multiplayer online game. | "Predicting protein structures with a multiplayer online game" https://www.ncbi.nlm.nih.gov/pubmed/20686574 "Algorithm discovery by protein folding game players" www.pnas.org/content/108/47/18949.abstract Foldit Standalone: a video game-derived protein structure manipulation interface using Rosetta https://academic.oup.com/bioinformatics/article/33/17/2765/3803439 |
| CAMTech | 2017 | All | Device, Pitch | International, India, Uganda | Identify clinical challenges through summits, source promising innovations through hackathons, and develop technologies through its accelerator. | "Principles of EHealth and MHealth to Improve Quality of Care" https://mitpress.mit.edu/books/global-health-informatics |
| DREAM Challenges | 2006-Present | All | Data analysis, prediction, manuscript editing | International | Evaluate model predictions and pathway inference algorithms in systems biology and medicine. | Publications in <i>Nat Methods</i> , <i>JAMA Oncology</i> , and <i>Science</i> in 2017 http://dreamchallenges.org/publications/ |

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