

Nov 10

Educational interventions to improve primary and secondary school students' ability to make informed health choices

A roundtable discussion

What have we learned about how to help schools teach students to think critically about health claims, evidence, and choices?

Developers and evaluators of six educational interventions will discuss their experiences, what they have learned, and what advice they would give to others.



Date and time

Thursday, 10 November 2022
11:00 – 12:30 Central European Time

Location

Online – Zoom
Hosted by the Health Research Board Trials Methodology Research Network

About this event

Information about the six educational interventions and developers can be found below. During the discussion, the developers will interact with each other and the audience. There will not be presentations. The discussion will address questions such as: Where did the ideas for these educational interventions come from? How were they developed? What are the strengths and weaknesses of the different approaches that were used? What lessons can be learned from this work? How can we scale up efforts to teach primary and secondary school students to think critically about what to believe and what to do for their health and the health of others?

We will take questions from the audience via chat. You can [submit questions in advance of the event here](#).

There will not be presentations during the event. Information about the six educational interventions is provided below. The discussion will be facilitated by Tammy Hoffmann (Professor, Institute for Evidence-Based Healthcare, Faculty of Health Sciences and Medicine, Bond University, Australia) and Andy Oxman (Research director, Centre for Epidemic Interventions Research, Norwegian Institute of Public Health).

How to join

[Register here](#) to join the event.

The discussion will be recorded.

Be Health **INFORMED**

“ If you find yourself having a strong emotional reaction to something online about your health, don't forget to pause and take a step back. ”



LESSON HOST
Dr. Melissa Clarke




Be Health Informed Checkology® lesson - An online module that features narration by a subject matter expert, accompanied by animation and visuals to explain and illustrate key concepts and terms. Throughout the module, students apply their learning in formative assessments featuring real-world examples. They are given immediate feedback based on their answers. For middle school, high school, and higher education. [Read more . . .](#)

Pamela Brunskill, USA

Senior Manager of Education Design, News Literacy Project



BE SMART about HEALTH MENU

Be smart about your health
Think critically, make smart choices



BLACKBOARD LESSONS PROJECTOR LESSONS TEACHERS' GUIDE

Be Smart about your Health - The Be smart about your health resources are for helping secondary school students learn how to think critically about health actions: things that people do to care for their health and the health of others. The resources include 10 lesson plans, published in two formats: “Blackboard” for use in a classroom equipped with a blackboard or flip chart, and “Projector” use in a classroom equipped with a projector. [Read more . . .](#)

Sarah Rosenbaum, Norway

Designer and researcher, Centre for Epidemic Interventions Research, Norwegian Institute of Public Health



Ebm@school - Evidence-based decision making – Six modules on critical health literacy for secondary school students, based on the concept of evidence-based medicine (EBM). The modules include PowerPoint presentations, videos, manuscripts, worksheets, and decision aids, self-directed learning, and role playing - taught by PhD students and post docs who were well educated in evidence-based medicine methods. [Read more . . .](#)

Anke Steckelberg, Germany

Professor, Institute of Health and Nursing Science, Martin Luther University





Health H.A.C.C. – How to Assess Claims Critically - These resources were developed to improve high school students' critical thinking skills, particularly their ability to critically assess health claims and detect false claims. It covers fundamental information about research methods and processes for testing health interventions and explains the key concepts needed for appraising claims about health interventions. [Read more . . .](#)

Leila Cusack, Australia

PhD student, Centre for Research in Evidence-Based Practice, Faculty of Health Sciences and Medicine, Bond University



Informed Health Choices (IHC) primary school resources – These resources aim to help late primary school children (10- to 12-year-olds) learn to make better choices for their health by thinking carefully about treatments. The resources include a guide for teachers, a book for children, and an exercise book. *The Health Choices Book* for children includes a comic, exercises, and instructions for classroom activities. [Read more . . .](#)

Allen Nsangi, Uganda

Researcher, Makerere University College of Health Sciences

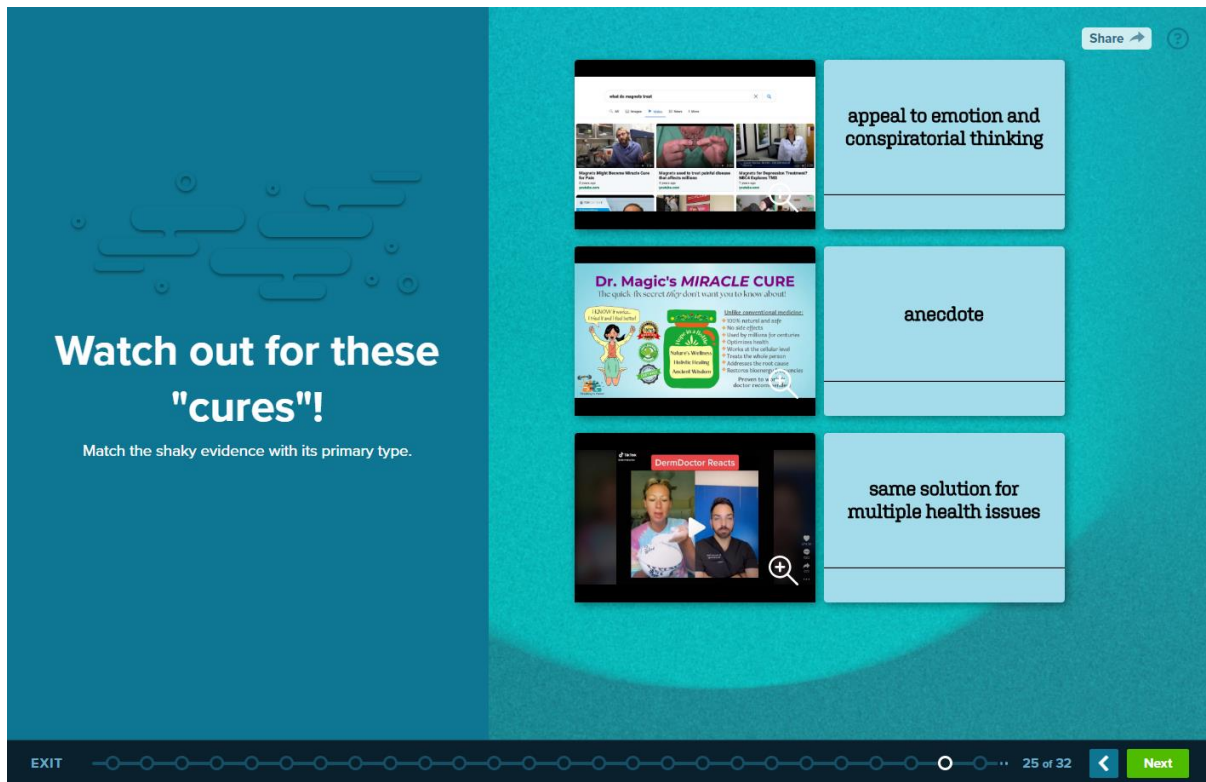


START (Schools Teaching Awareness of Randomised Trials) – The START competition invites primary school students in 4th-6th classes to create their very own randomised trial, following the resources provided. They can report the findings in any way they like, as a podcast, video, collage, or poster. The purpose of the competition is to help students become aware of the randomised trial process and become the scientists of tomorrow and the critical thinkers of today. [Read more . . .](#)

Declan Devane, Ireland

Professor, Health Research Methodology and Deputy Dean of the College of Medicine, Nursing and Health Sciences, University of Galway, Ireland





<p>Theory</p>	<p>As a stand-alone resource, the lesson relies on a cognitive theoretical approach for students to gain health and news literacy. Many news literacy and related approaches to addressing misinformation (e.g., prebunking) rely on inoculation theory, which suggests that exposing people to warnings about the potential for misinformation and to the tactics used to spread misinformation should equip people with knowledge and skills needed to recognize and reject misinformation when they encounter it.</p>
<p>Learning objectives</p>	<ul style="list-style-type: none"> • Evaluate health and wellness information. • Explain why people are vulnerable to health misinformation. • Describe key characteristics of quality health information. • Describe common red flags to watch for when encountering health misinformation.
<p>Materials</p>	<p>The lesson can be previewed on Checkology.org. Once educators register for a free Checkology account, they can view the whole lesson in the “Content” tab or assign it as part of their Checkology class course. See “Getting started with Checkology” in the Help Center for more information on how to register and set up a class.</p>
<p>Educational strategies</p>	<p>“Be Health Informed” is an online module that features narration by a subject matter expert, accompanied by animation and visuals to explain and illustrate key concepts and terms. Throughout the module, students apply their learning in formative assessments featuring real-world examples. They are given immediate feedback based on their answers.</p>
<p>Who provided</p>	<p>The News Literacy Project developed the lesson. Dr. Melissa Clarke, a practicing board-certified emergency physician and CEO of the Be Health Empowered (BHE) Group, is the subject matter expert. Several additional experts on our advisory committee provided initial survey input as well as feedback on our script. They include:</p> <ul style="list-style-type: none"> • The American Medical Association • Julia Belluz, M.Sc., Vox senior health correspondent • Bradley Crocker, M.A., BS.c., McGill University • Jennifer B. Nuzzo, DrPH., S.M., professor of epidemiology, Brown University School of Public Health • Andrew Oxman, M.D., research director, Centre for Epidemic Interventions Research (CEIR), Norwegian Institute of Public Health • Brian Southwell, Ph.D., senior director, Science in the Public Sphere, RTI International, and adjunct professor, Duke University

	<ul style="list-style-type: none"> • Chris Voegeli, Ph.D., M.P.H., Insights Unit Lead, Centers for Disease Control and Prevention • Jamie L. Wood, Ph.D., assistant professor of the Practice of Medical Education, Duke University School of Medicine; co-director, Duke Program on Medical Misinformation, Duke Center for Community and Population Health Improvement <p>This resource is part of a series of lessons (currently 18) on our Checkology platform. We measure the platform’s efficacy through a pre- to post-survey. Educators create a course of study for each of their classes, so not every learner completes all lessons on the platform.</p> <p>We use survey data to evaluate growth in learning outcomes. For example, in the 2021-2022 school year, the percentage of students who correctly identified the five freedoms in the First Amendment jumped 37.9 percentage points, from 37.3% on the pre-assessment to 75.2% on the post-assessment. Our data is analyzed twice a year by researchers Emily Vraga, Ph.D., associate professor in the Hubbard School of Journalism and Mass Communication at the University of Minnesota, and Melissa Tully, Ph.D., associate professor in the School of Journalism and Mass Communication at the University of Iowa.</p> <p>Educators who use this lesson do not need to receive any additional training, although many participate in our online webinars and professional learning offerings.</p>
Incentives	None.
Delivery	<p>Checkology is a free e-learning platform that requires the following:</p> <ul style="list-style-type: none"> • A laptop, desktop computer or tablet (Checkology is not optimized for smartphones). • An up-to-date operating system. • An up-to-date browser. • Enough network bandwidth to stream video. • Access to one of these streaming providers: Wistia, Vimeo, or YouTube. <p>Checkology lessons, including “Be Health Informed,” can be used synchronously and asynchronously as well as remotely and in-person.</p>
Where	Checkology lessons are typically delivered in school classroom learning environments.
When and how much	<p>“Be Health Informed” is a brand-new resource this school year that takes an estimated 60 minutes on the platform to complete. It is designed to be a one-time classroom experience for students, with the opportunity to review and retake as needed.</p> <p>“Be Health Informed” can be combined with a series of lessons addressing news literacy more broadly. Students complete a pre- and post-survey to measure learning outcomes.</p>
Tailoring	The Checkology virtual classroom is used primarily with middle and high school students and has been used in college classrooms as well. Educators can tailor the experience to fit their students’ abilities, resources, and schedules, electing to implement the platform’s lessons as they see fit.





Claims about the effects of health actions are everywhere.



Theory

These resources are based on the *Informed Health Choices (IHC) Key Concepts* framework. The framework includes concepts (principles) that people should understand and apply when deciding whether to believe a claim about the effects of health actions (things that people do to care for their health or the health of others) and what to do.^{1,2} The framework is based on evidence of the importance of the included concepts, logic, feedback, other relevant frameworks, and adaptation of the IHC Key Concepts to other types of interventions such as educational, environmental, and policing interventions.¹⁻³

The resources were developed by the investigators between 2020 and 2022 using human-centred design methods.⁴ This includes idea generation and prototyping, piloting with observation, user-testing with teachers and students, and feedback from networks of teachers, students, and curriculum developers in Kenya, Rwanda, and Uganda. The aim of the design process is to ensure that teachers and students find the learning resources to be engaging, useful, and easy to use.

The teaching strategies used in the resources are based in part on an overview of systematic reviews of teaching strategies,⁵ and draw on several educational theories. These include social constructivist theory (that posits learning can be maximized through well-designed, intentional social interaction with other learners),⁶ the theory of active student response (that posits learning is enhanced by high levels of active student response),⁷ and the elaborative retrieval hypothesis (that posits the search for correct answers on practice tests or quizzes results in multiple retrieval routes which aid later recall).⁸

Learning objectives

The primary learning goal is for students to have a basic ability to think critically about health actions and understand why this is important for them. They should be able to recognise claims about the effects of health actions and assess some of those claims. They should understand why it is important for them that researchers study the effects of health actions and be able to recognise two key features of reliable comparisons of health actions. They should recognise that health actions can have both advantages and disadvantages and understand the importance of weighing both when deciding what to do, both in the context of individual decisions and community decisions.

The resources focus on nine IHC Key Concepts that were prioritised by curriculum developers, teachers, and researchers in Kenya, Rwanda, and Uganda.⁹ The concepts are:

- Health actions may be helpful, but also harmful or wasteful.
- Obvious effects of health actions are rare.
- Most claims about the effects of health actions that are only based on personal experiences or something being new or old are not reliable.
- It is impossible to know what would have happened without a health action if it is not compared to taking a different action or to taking no action.
- If the groups of people in a comparison between health actions are too small, any difference between what happens to the groups may be random and not because of the different health actions.

	<ul style="list-style-type: none"> • If the groups of people in a comparison between health actions are different at the start, any difference between what happens to the groups may be because the groups were different at the start and not because of the different health actions. • When deciding what to do, it is important to weigh the advantages against the disadvantages of health actions.
Materials	<p>Besmarthealth.org</p> <p>The resources are published in an open access website and include:</p> <ul style="list-style-type: none"> • <i>10 lesson plans</i>, published in two formats: “Blackboard” for use in a classroom equipped with a blackboard or flip chart, and “Projector” use in a classroom equipped with a projector • <i>Teacher’s guide</i> • <i>Extra resources</i> <p>The website is designed for use with smart phones or laptops in contexts with poor/unstable internet connections (i.e., offline functionality, use of small file sizes, and optional printouts). Projector lesson plans are downloadable Google slide presentations that are optimized for projector screen viewing in daylight classrooms. No log-in or registration is necessary.</p> <p>Each lesson plan includes:</p> <ul style="list-style-type: none"> • <i>Lesson</i> (quiz question to review and reinforce what was learned in the previous lesson, lesson content involving small group activities, wrap-up section to reinforce the learning goals for the lesson) • <i>Overview</i> (learning goals, key terms introduced in the lesson, the main teaching strategies used in the lesson, and optional printouts) • <i>Background</i> (explanations of the Key Concepts, including examples and common misunderstandings) <p>The teacher’s guide includes introduction, overview of the lesson plans, how to use the resources (including the offline functionality, tips for preparation), links to the Background section of each lesson (describing what each lesson is about), how the resources were developed and evaluated, and links to other related resources.</p> <p>Extra resources include glossary, printouts, teacher training materials, description of the underlying principles for all lessons.</p> <p><i>Also not yet published but under development:</i> a collection of examples that can be used to illustrate the Key Concepts and information about the teaching strategies that are used (based on an overview of systematic reviews).</p>
Educational strategies	<p>Key strategies used across lessons include guided note taking, quizzes (using response cards⁷), small group activities, and collecting and concept mapping claims about the effects of health actions as homework. Other strategies used in some of the lessons include concept cartoons, inquiry-based instruction, and role play.</p>
Who provided	<p>In the trial evaluating the resources, the headteacher at each participating school has selected teachers of relevant subjects (e.g., biology) for year-1 or year-2 of lower secondary school. The teachers were invited to a 3-day training workshop. The content of training included: why it is important to think critically about health actions, overview of the lessons (focusing on the learning goals), introduction to the learning resources, teaching strategies, how to use and edit slides, scheduling and preparing for lessons, and information about the trial.</p>
Incentives	<p>Teachers at schools without Internet access will be reimbursed for the cost of downloading the learning resources and any other costs related to participation in the trial. They will not be paid for participating in the trial and there will be no other financial incentives for the schools, head teachers, teachers, or students. The evaluation administered at the end of the school term will not count towards the students’ school marks or assessment of the teachers or schools.</p>
Delivery	<p>The 10 lessons were delivered by the teachers during regular classroom time. Depending on what equipment was available to the teachers, they delivered the lessons using only a blackboard or using a projector and presentations that are included in the digital resources. The students worked together in groups of three to six. The number of students in a class varied.</p> <p>Teachers were allowed to modify how they teach and the resources they use to fit their context.</p>

Where	Representative samples of schools were recruited, including rural and urban schools. The conditions in the schools varied.
When and how much	The 10 lessons are designed to be taught in a single term. Each school decides how to fit the lessons into the term timetable. Each lesson is designed to take a single period (40 minutes). The students are encouraged to collect and assess claims about the effects of health actions outside of class and to discuss claims with their families and friends. The teacher needs up to 30 minutes to prepare for each lesson.
Tailoring	<i>Designed for adaptation:</i> Each lesson is built on a transparent structure of underlying principles and learning goals. This makes possible for teachers or curriculum developers to make changes without losing the main gist of the lesson. <i>Teacher's tailoring:</i> Teachers can modify lessons, for instance by employing other teaching strategies or introducing different or additional examples. They can download google slides presentations or printouts and change these as needed. <i>Translation:</i> We have published the resources on a digital platform that is set up to facilitate future translations. <i>Tailoring the curriculum mapping:</i> Before designing the resources, we mapped the Key Concepts to the curricula in Kenya, Rwanda, and Uganda in context analyses, ¹⁰⁻¹² and included a description of that mapping for each country in the Teacher's Guide. Any national adaptations could/should include this kind of mapping for their setting so that the connection to the relevant curriculum is visible.
Modifications	<i>Pending process evaluation:</i> Teachers will be asked to complete an evaluation form after each lesson, including information about changes they made to the lesson plan, and each teacher will be observed for one lesson. We will not give feedback to the teachers during the trial.
Attendance	<i>Pending process evaluation:</i> The teacher will record attendance for each lesson. Students will be encouraged to attend all lessons by telling them when the next lesson will be and the learning goals. The resources are being designed to appeal to students and to make clear the relevance and importance of the learning goals.
How well – planned (fidelity)	<i>Pending process evaluation:</i> We will explore the extent to which the lessons were delivered as planned in a process evaluation, based on the evaluation forms completed by teachers after each lesson, our observations, and interviews with teachers and students.
How well – actual (fidelity)	<i>Pending process evaluation:</i> The teachers will be asked to record when each lesson was taught, the duration of each lesson, and whether all the lesson were completed as planned.

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Ebm@school – a curriculum of critical health literacy for secondary school students: results of a pilot study

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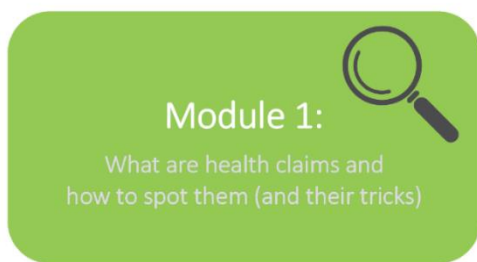
Theory	<ul style="list-style-type: none">• Kern et al. Development and evaluation of medical curricula• Problem-based learning
Learning objectives	Examples: <ul style="list-style-type: none">• Participants gain an overview of evidence-based decision-making and reflect on their own practice.• Participants understand the difference between association and causality and that randomised controlled trials (RCTs) are designed to establish a causal relationship.• Participants are able to interpret the results of RCTs and critically appraise them. See Table 1 below.
Materials	PowerPoint presentations, videos, manuscripts, work sheets, decision aids (in German)
Educational strategies	Face-to-face format including lectures, self-directed learning, and role playing
Who provided	The team of instructors were PhD students and post docs who were well educated in the methods of evidence-based medicine.
Incentives	None.
Delivery	Pilot testing face-to-face with 25 participants.
Where	secondary schools
When and how much	Piloting comprised two face-to face courses over 5 days.
Tailoring	According to the UK Medical Research Council framework, we explored needs and preferences of the target group as part of the development process.
Modifications	The pilot study comprised an iterative process to optimize the intervention. We asked for feedback after every module and integrated participant observation.
Attendance	

How well – planned (fidelity)	The intervention was delivered by members of the team that developed the intervention.
How well – actual (fidelity)	The pilot study aimed to achieve high fidelity. We aimed to identify barriers in order to find solutions.

Table 1. Objectives of the modules.

Modules	Objectives
Module 1: Fallacies and misinterpretations of data representation: observational studies versus randomized controlled trials (RCT) – What are the differences?	(1) to differentiate between expert based and evidence based information, (2) to know misleading representation of health related information and consequences, (3) to know the fallacies of medical / health issues, (4) to be able to reconstruct study designs to generate evidence regarding the effectiveness of interventions, (5) to be able to define methodological and statistical terms, (6) to differentiate between absolute and relative risk reduction, (7) to calculate risk reductions.
Module 2: Critical appraisal of RCT's	(1) to acquire original articles (in German language) and scientific vocabulary, (2) to be able to define incidence, prevalence, bias, confounder, relative risk, absolute risk, p-value, confidence interval, correlation, odds, (3) to know the difference between surrogate parameters and patient relevant outcomes, (4) to know different examples of framing of data, (5) to understand relative risk reduction (RRR), absolute risk reduction (ARR) and number needed to treat (NNT), (6) to be able to formulate questions used in medical practices and information offices, (7) to know ethical criteria for clinical research.
Module 3: Informed choice in diagnostic tests	(1) to know possible test results (positive / false-positive; negative / false negative), (2) to be able to explain quality criteria of diagnostic tests (sensitivity, specificity, positive and negative predictive values), (3) to know the influence of prevalence on predictive values, (4) to be able to define precision and accuracy of diagnostic tests, (5) to be able to formulate questions used in medical practices and information offices (6) to know the ethical aspects of screening (7) to get to know benefit and lack of benefit and harm of screening, (8) to know about the framing of data in information on diagnostic tests.
Module 4: Understanding systematic reviews	(1) to know the methods and aims of systematic reviews, (2) to learn how to access systematic reviews, (3) to know criteria for analyzing systematic reviews.
Module 5: Searching the Internet and databases	(1) to search the internet and the MedPilot database, (2) to know and apply operators (AND, OR, NOT, NEAR), (3) to know and be able to apply limits, truncations, thesaurus and free text, (4) to draft a research question.
Module 6: Appraising Patient Information	(1) to know criteria for EBM information, (2) to be able to critically appraise patient information, (3) to know where to get EBM information, (4) to be able to differentiate between primary and secondary literature, (5) to learn where to access secondary literature, (6) to know about the benefit and limits of quality codes

Health H.A.C.C. – How to Assess Claims Critically



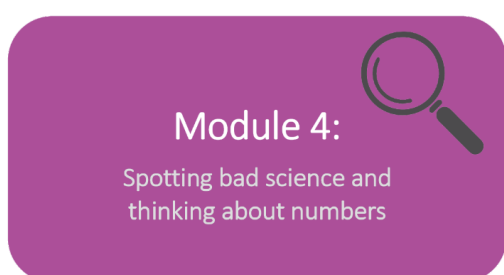
Module 1:
What are health claims and how to spot them (and their tricks)

What are health claims?

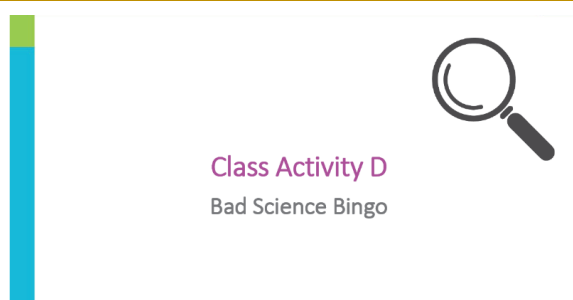
- Health claims include a **statement** about an **intervention** and an **outcome**

Please note: the "health claims" we refer to in this educational program, are defined above, and have no connection to health insurance.

Theory	The program includes elements of the VARK (visual, auditory, reading/writing, and kinaesthetic) model and some aspects from the Experiential Learning Theory (ELT) which focuses on learning by doing.
Learning objectives	To be able to identify and appraise health claims.
Materials	The educational intervention includes a teacher's guide, student booklet, laminated health advertisements, and PowerPoint presentations. The materials are available at https://iebh.bond.edu.au/education-services/research-tools
Educational strategies	The program is packaged into 4 modules. The delivery of the intervention uses a combination of didactic and interactive approaches, with examples provided to illustrate points. The program provides class discussion points, and activities in the student handbook, some of which are designed to be completed in small groups or as a class.
Who provided	High school teachers provide the intervention during class and require no specific training. While the intervention could be relevant to several disciplines, the intervention was mostly delivered during science class in our trial.
Incentives	None.
Delivery	Face-to-face delivery. Approximately 25 students/learners per teacher/instructor.
Where	High school classroom.
When and how much	The program was estimated to be ~4 hours long. The delivery was determined at each intervention school's discretion: some schools taught 1 module (total 4) during one class session (~50 mins) each week over 4 weeks, while other schools taught the 4 modules in 4 sessions in one week.
Tailoring	Decisions were made about presentation of the intervention details to encourage student interest and engagement – bright colours, pictures, and relevant examples.
Modifications	None made.
Attendance	Attendance was based on school attendance. No strategies were used to facilitate attendance.
How well – planned (fidelity)	Teachers completed a questionnaire after delivering the intervention.
How well – actual (fidelity)	Of the available feedback from intervention teachers, the program was delivered completely most of the time, but many felt they had to rush to teach all the content within the estimated timeframes.

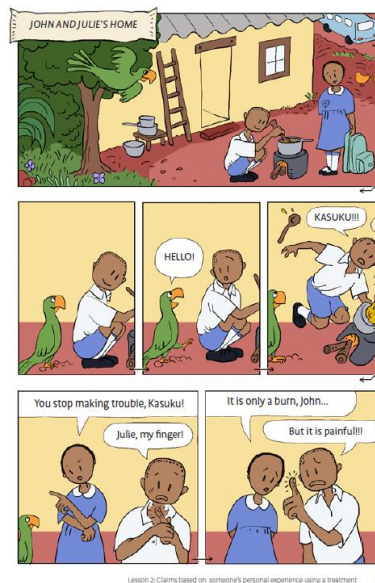
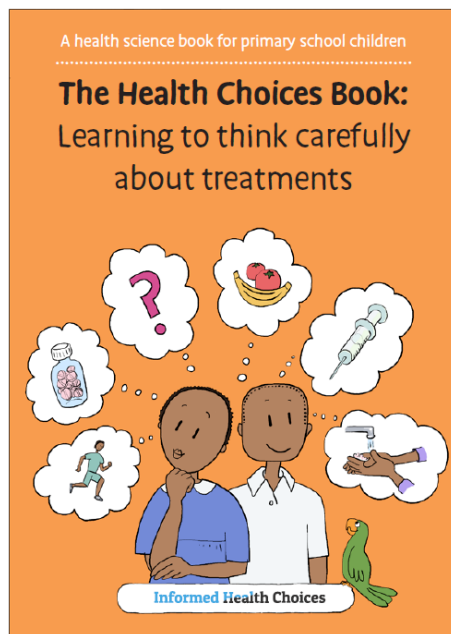


Module 4:
Spotting bad science and thinking about numbers



Class Activity D
Bad Science Bingo

Informed Health Choices (IHC) primary school resources



Theory	<p>The IHC primary school resources were developed by the investigators between 2013 and 2015 employing user-centred design methods. This included idea generation and prototyping, piloting with observation, user-testing with teachers and learners, and teacher's network feedback in Uganda. Piloting and user-testing were also carried out in Kenya, Rwanda, and Norway. The aim of the design process was to ensure that teachers and children found the learning resources to be engaging and useful.</p>
Learning objectives	<p>The objectives were for children to understand and be able to apply key concepts¹ for assessing claims about the effects of treatments (any action intended to improve the health of individuals or communities) and for making informed health choices.</p>
Materials	<p>Teachers in the intervention schools attended a two-day introductory workshop. We gave them a teachers' guide prior to participation in the workshops. We gave the intervention schools textbooks and exercise books for the children, activity cards for one of the activities in the textbook and teachers' guide, and a poster with a checklist summarising the 12 key concepts covered by the book. We gave them a song (Think Carefully about Treatments) with lyrics that are another reminder on MP3 players for the final lesson. The textbooks included a story told in a comic book format, instructions for classroom interactive activities, exercises, the checklist, a glossary, and a gameboard on the back of the book for another classroom activity. The textbook included nine chapters with exercises and an activity for each. Two of the investigators took the teachers through each chapter during the introductory workshops. All the materials can be accessed on the IHC website http://www.informedhealthchoices.org/primary-school-resources/.</p>
Educational strategies	<p>We designed the materials to be used interactively in the classroom by reading each chapter aloud, doing the activity and, if time allowed, giving the children time to do the exercises. The exercise books could be taken home, if there was not time to do the exercises in the classroom. Educational strategies that we used included repetition of key messages, extensive examples familiar to the children, visual presentation (comic format), messages embedded in a narrative, defining new vocabulary where it is introduced and translating words to Luganda and Swahili, activities that require interaction between students, a highly structured timetable for teachers, additional explanations and examples for teachers.</p>
Who provided	<p>The teachers were year-5 teachers. Most (80%) were science teachers. Only 12% had a university degree.</p>
Incentives	<p>Teachers provided a positive learning environment for the children generally, and specifically during the IHC lessons. The evaluation administered at the end of the school term did not count towards the children's school marks or assessment of the teachers or schools.</p> <p>The head teacher in each participating school selected the teachers. The teachers were reimbursed for travel costs for the introductory workshop and received meals and refreshment. They were not paid for participating in the workshop and there were no financial incentives for the schools, head teachers,</p>

	teachers, or children. Support of the school leadership and conducive working conditions, as well as feeling that the IHC lessons were important, were sufficient incentives for teaching the IHC lessons.
Delivery	The nine lessons were delivered in the classroom. The average number of children in each class was 72.
Where	The primary schools were in the Central region of Uganda. Most (68%) were in an urban area. Half were public and half were private schools. All the schools were poorly resourced with respect to space (crowded classrooms with too few benches), equipment (little or no access to computers or other electronic equipment), and supplies.
When and how much	<p>There was one lesson for each chapter. The nine lessons were taught in a single school term lasting 10 to 12 weeks. Each school decided how to fit the lessons into the term, for the most part they taught one lesson per week.</p> <p>A double period (80 minutes) was recommended for each lesson, so that the total amount of class time was nine double periods (12 hours). The amount of time that the children spent on the lessons outside of class varied, but for the most part was little if any, since most teachers did not allow the children to take the textbooks home and most of the exercises were done during the double periods, in most schools. We suggested that the teachers should spend about 20 minutes preparing for each lesson.</p>
Tailoring	The teachers' guide included options for the teachers, such as different ways of reading the text aloud and different ways of marking the exercises and giving the children feedback.
Modifications	Each teacher was observed by the research team for one lesson, but no feedback was given to the teachers. Some of the teachers improvised their own activities.
Attendance	Attendance varied. The intervention did not include any strategies for improving attendance.
How well – planned (fidelity)	Teachers completed an evaluation form for each lesson, the research team observed each teacher teaching a lesson, and we interviewed head teachers, teachers, and children in six schools. Analysis of these data has not been completed.
How well – actual (fidelity)	Nearly all the teachers in the trial were able to complete all nine lessons, but not always to their satisfaction. Most of the children confirmed that they attended all nine lessons, but some children did not have enough time to complete the exercises and classroom activities. Attendance resulting from the parents' failure to pay the school fees on time was a common problem.

1. Oxman AD, Chalmers I, Dahlgren A, Informed Health Choices Group. Key Concepts for Informed Health Choices: a framework for enabling people to think critically about health claims (Version 2022). IHC Working Paper. 2022. <http://doi.org/10.5281/zenodo.6611932>



START (Schools Teaching Awareness of Randomised Trials)



Theory	The Theory of Experiential Learning underpins START. This theory suggests that learning occurs when people are involved personally in the learning experience.
Learning objectives	Encourages primary school students to become aware of the trial process and gain insights into the processes needed to conduct a fair comparison.
Materials	Suite of resources and materials including step-by-step guide for teachers available at START Competition • Help your students become the scientists of tomorrow
Educational strategies	Teachers and students are asked to identify a suitable research question they can answer scientifically using the resources provided on the website. Teachers and students use a wide variety of strategies to design, conduct and share their trial findings.
Who provided	Primary school teachers and 4th, 5 th , and 6 th class students (9-12 years approx.) Resources to support teachers available on website as above
Incentives	Biggest incentive is that teachers have told us that START provides a vehicle for teaching science in a fun way. It also maps key aspects of the current school's curriculum (i.e., Maths, Science, Social, Personal and Health education (SPHE), English/Irish, Visual arts, Information & Communication Technology (ICT)).
Delivery	Face-to-face Teachers tend to do this with a class of students of between 20-30 students.
Where	Primary schools in Ireland.
When and how much	'How' teachers operationalise START varies substantially based on how the teachers and the students integrate START into their school curriculum. This seems to be a strength of the program.
Tailoring	Please see above.

Modifications	
Attendance	A qualitative evaluation has been undertaken:
How well – planned (fidelity)	Biesty, L., Galvin, S., Finucane, E. et al. Can learning about trials be child's play? A qualitative exploration of the 'Schools Teaching Awareness of Randomised Trials' (START) initiative. <i>Trials</i> 21, 208 (2020). https://doi.org/10.1186/s13063-020-4130-9
How well – actual (fidelity)	



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