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**Understanding communication of health information: a lesson in health  
literacy for junior medical and physiotherapy students**

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## **Abstract**

Healthcare professional students should be engaged in best practice regarding communication with patients, including using good quality patient information leaflets (PILs) on health behaviours. A cross-sectional survey of 337 junior medical and physiotherapy students investigated the readability, health psychology theory content, and quality and reliability ratings of nine international PILs on smoking. Estimates of readability, theory content and quality/reliability ratings varied considerably across PILs. Importantly, additional theory-based content, as proposed by students, had no detrimental effect on readability scores. Results are discussed with regard to their potential for improving interactions between future healthcare providers and service users.

Keywords: Communication; health promotion; health education; smoking

## **Introduction**

Communicating health information is a core skill required of all health care professionals. Communication skills training is now a core component of curricula across the healthcare professions, from medicine and nursing to physiotherapy and pharmacy. Communication skills are listed as a key clinical competency in literature focussed on defining core learning outcomes for medical graduates (e.g. Simpson et al., 2002; General Medical Council, 2002)). The focus of such training is on upskilling and improving the communication skills of the individual student as future health professionals. However, the ability of the recipient to understand the information provided is critical (Baker, 2006), yet receives relatively less attention in health professional teaching and training. Health literacy is a set of individual capacities that allow an individual to acquire and use new information on health (Baker, 2006). It has been defined as “the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions” (p. 20, U.S. Department of Health and Human Services, 2000). The issue of health literacy is an important component of the communication skills “armoury” and thus is a concept that students need to understand when developing their own communication skills.

The most commonly used method of communicating health information to patients and the general public is through use of patient information leaflets (PILs) (Pander Maat and Lentz, 2010). There are a wide range of PILs available, from explaining medication use that are regulated in terms of their presentation within the European Union (European Commission, 1998; Co-ordination Group for Mutual Recognition

and Decentralized Procedures—Human (CMD(h)), 2006); to providing instruction on post-operative recovery – for example from total hip replacement surgery; to PILs aimed at health promotion, such as promoting screening uptake, or promoting health behaviour change, such as quitting smoking or increasing exercise uptake. PILs aimed at health promotion often rely on theories of health behaviour, for example the Health Belief Model (HBM), the Theory of Planned Behaviour (TPB) and the Transtheoretical Model (TTM; see Armitage and Conner, 2000; Glanz and Maddock, 2000; Kok et al., 2004). These theories or their components are used to formulate PIL content in such a way as to not only maximise the motivational effect of the PIL, but also to provide practical assistance, with the aim of encouraging the reader to adhere to the PIL's recommendations for behaviour change, screening uptake, etc.

However, for the PIL to have the intended outcome, readability is key. Ensuring that the average reader can read and comprehend PIL content is achieved by setting the reading age of a PIL at a sufficiently low level that will enable the content to be understood by a majority of the population (Williamson and Martin, 2010).

Established methods exist which can be used to quantify the accessibility of information for comprehension by the general population. These include Flesch Reading Ease (Flesch, 1948) and Flesch-Kincaid grade level formulae (Kincaid et al., 1975). Furthermore, while PILs may be readable, they may not always be accurate, or contain enough detail, or may be biased by companies who sponsor the information (Charnock et al., 1999; Garner et al., 2011; Nicholls et al., 2009; Cummins et al., 2003). The overall evaluation of such PILs by health professionals is therefore important, to ensure that patients are receiving optimal information, and a number of ways exist to evaluate these. For example, the DISCERN tool was

developed to enable patients and healthcare professionals rate the quality of written information, and has been shown to be reliable and valid for judging the reliability of information and overall quality of PILs (Charnock et al., 1999).

Students of the healthcare professions will become future users of PILs in patient interactions. In order for them to be confident that patients can read and understand PILs, and maximise their benefit, the future health professional needs to understand health literacy, the practical use of health psychology theory, and the quality of the information that should be provided to patients. Such understanding should serve to improve interactions between these future healthcare providers and health service users, especially in cases where healthcare professionals are asked to write the PILs. We therefore describe a student project that requires engagement with indices of readability, theory content and DISCERN ratings of PILs on smoking.

The Psychology Department at the Royal College of Surgeons in Ireland (RCSI) is involved in teaching Health Psychology modules in an interdisciplinary setting to first year students in medicine and physiotherapy. In the first semester of first year, students complete an assignment focussed on health literacy in which they analyse a PIL aimed at health behaviour change. Students first receive teaching input on health behaviour theories and their importance in communicating health information. They are then provided with PILs aimed at promoting smoking cessation and they select one for detailed analysis. This detailed analysis involves the students conducting five tasks:

1. Assessing PIL readability using the Flesch Reading Ease formula;
2. Identifying the health behaviour theories used to communicate the PIL information and motivate the reader to change their behaviour;
3. Suggesting a (theory-driven) way to improve the content of the PIL, not to exceed 100 words;
4. Reapplying the Flesch Reading Ease formula to assess improvements/disimprovements in readability of the PIL following the student's modification; and
5. Reporting a DISCERN rating (Charnock et al., 1999), indicating the quality of the PIL in terms of the health information provided.

This paper provides data on the students' assessment of these PILs and recommendations as to the utility of this approach in medical education.

## **Methods**

### Sample

Of the class total of 357 medicine and physiotherapy students, 337 provided full informed consent (94%). Mean age was 20.2 (SD 1.8), 50% were women, and 92% were studying medicine, 8% were current smokers with 3% ex-smokers (longer than six months). Nationality was varied, and so was grouped by World Health Organisation region (16 did not report nationality): Australia 1.2%; East Asia and the Pacific 0.9%; Eastern Europe and central Asia 0.6%; Latin America/Caribbean 2.6%; North African and the Middle East 18.4%; North American 11.7%; South and south-east Asia 33.3%; Sub-Saharan Africa 2.9%; Western Europe 23.7%.

## PILs

A total of 10 PILs on smoking were used – 2 each from Canada, Ireland, Malaysia, UK and USA – see Table 1. However, only 5 students chose to answer questions on the second USA PIL, so this was excluded from subsequent analyses. PILs were chosen to meet the following criteria:

- focussed on smoking
- written in English
- no more than 2-4 pages long, or not more than 1500 words
- available online, with an available live url link

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Insert Table 1 about here

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## Flesch scores

The Flesch readability index is a widely used formula (e.g., Beauchamp et al., 2010) which assesses structural elements of the text (e.g., number of sentences, words, syllables etc.) and provides an index of reading difficulty (Flesch, 1948). Higher scores indicate easier readability, and scores range from 0-100. Scores less than 30 are considered to indicate readability at university level; with scores above 90



suitable for children aged 10-11 years. Students were told to paste their chosen PIL into Microsoft Word and use its readability tool to obtain the Flesch score.

### Psychological theory

Students received two lectures on health psychology models, focussing in particular on the HBM, TPB and TTM (Armitage and Conner, 2000), and one on learning theories (operant and classical conditioning) (Klein and Mowrer, 2001). These models are also integrated into other lectures throughout this first semester module.

### DISCERN

The DISCERN instrument was developed to enable patients and healthcare professionals rate the quality of written information on treatments (Charnock et al., 1999). DISCERN has shown acceptable levels of agreement among 15 expert panel members in its original development (Charnock et al., 1999), and substantial agreement for overall ratings between two independent raters of over 31 different PILs for prostate cancer treatment options (Rees et al., 2002). DISCERN does not require specialist health knowledge (Charnock et al., 1999). The instrument consists of 16 Likert items in total, ranging from 1 – 5, with higher scores indicating better quality leaflets. This consists of 1 overall quality rating item; 8 items on reliability; and 7 items on treatment choices. Average scores for these subscales are reported.

### Procedure

The RCSI Research Ethics Committee provided approval for the study protocol, which was provided to students. Students were given a brief didactic introduction to the project. They were informed that they were required as part of their coursework to appraise a PIL for psychological theory content, readability, and overall quality rating (DISCERN), and try to modify the PIL to incorporate information based on psychological theory. They then chose one of the provided PILs for appraisal and subsequent modification, with a re-assessment of readability, in order to determine whether theory-driven modifications had a positive or detrimental impact on Flesch score. They also completed the DISCERN and other questions on the RCSI virtual learning environment (Moodle). Students submitted an 850-word appraisal of the PIL under the following headings (Overview; Current areas on the leaflet which use components of psychological theory; PIL improvements; Overall appraisal of changes to PIL). Participants indicated their consent to be involved in the research project on Moodle.

### Statistical analyses

Mean and standard deviations or proportions are reported as appropriate. A dependant t-test was used to determine if student modification changed the Flesch readability score.

## **Results**

### Flesch scores

Mean Flesch scores pre- and post-modification are shown in Fig 1:

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Insert Fig 1 about here

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Mean scores ranged from 52.8 to 79.7, indicating a broad range of readability. A dependent t-test demonstrated no difference in mean Flesch scores after the addition of extra theory-based content for all PILs (67.6 (SD=7.8) v 68.0 (SD=8.3);  $t=-1.66$ ,  $df=333$ ,  $p=.097$ ).

### Theory content

The proportion of students who identified various theories in their chosen PILs is shown in Fig 2:

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Insert Fig 2 about here

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Components of the HBM were most frequently identified by students (84-98%), followed by TPB (65-88%) and TTM (37-86%) components. Interestingly, other

theories, not addressed in the module, e.g. Health Action Process Approach, Protection Motivation Theory (e.g. see Armitage and Conner, 2000), were also identified by 5-22% of students across all PILs.

### DISCERN ratings

DISCERN ratings are shown in Fig 3:

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Insert Fig 3 about here

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Overall ratings were variable, with a range from 2.72-3.95, as were quality and reliability ratings. Quality ratings were consistently lower than overall or reliability ratings. The Canada 2 PIL had the highest ratings, whereas the Malaysia 2 PIL had the lowest.

### **Discussion**

The described student project acts as a learning opportunity to increase awareness of health literacy in a group of first year medical and physiotherapy students. The specific aspects of health literacy targetted were increasing awareness of the importance of health information readability, practical use of health psychology theory, and quality rating of information provided to patients. Students were required

to engage with these issues in a manner which should lead to a greater understanding of health literacy issues and an appreciation of the usefulness of health psychology to guide communication of health information. In summary, the results showed that estimates of readability, theory content and DISCERN ratings were variable across PILs. Importantly, however, additional theory-based content, as proposed by students, had no detrimental effect on readability scores. However, many students reported a slight decrease in readability after adding text to the PIL which they thought would improve it. In this regard, students commented on the difficulties of communicating information which they consider to be clear, which they then see decreases readability, thus highlighting to them the challenges of communicating health information effectively.

The results of this study are based on self-report and students may have erred in the calculation of Flesch scores (e.g. when pasting the PIL text and not reformatting appropriately), the identification and application of theory, and even misinterpreted DISCERN ratings. However, this limitation does not detract from the project, as its purpose was to provide an integrative learning opportunity for students to use and apply these factors in the area of health literacy and communication. It is known that similar projects provide vital integrative learning opportunities for students (see (Higgs, 2008; Huber and Hutchings, 2004), and have even been shown to improve self-reported health behaviours (Doyle et al., 2011). It is therefore possible that such tasks would serve to improve interactions between these future healthcare providers and health service users. In hindsight, too many PILs were included, and this led to the exclusion of one PIL from the analyses due to the lack of responses. Future work should look at a narrower range of PILs to ensure a large enough number of ratings.

Student reported mean Flesch readability scores indicated that most PILs scored in the standard range, as has been found in researcher ratings of coronary heart disease leaflets (Redfern et al., 2006). Malaysia 1 scored as more difficult, and USA 1 scored as fairly easy . The fact that USA 1 scored in this range, yet scored relatively well on theory content and DISCERN ratings, shows that it should be possible for other PILs to achieve better readability without compromising the quality of content. Probably more importantly overall, however, was that when students added their own suggested theory-driven content, the Flesch scores did not increase. This further indicates that it is possible to provide applied theory content without compromising readability. It should also be noted, however, that not all changes suggested by students would compromise readability – for instance the addition of graphics to the PIL (e.g. shocking images to enhance perceived severity) was often suggested. Furthermore, although on average readability did not change, for a proportion of students readability did decrease post-modification. This then reinforced the challenge of reaching standards of effective and clear communication.

Unsurprisingly, the identified theories were mainly those which had been didactically taught to the class. While students were easily able to identify theory, they were less able to operationalize it in some instances. Faculty provided written feedback on the project, and used this as an opportunity to correct misconceptualisations or reinforce excellent applications of theory, thereby providing further learning opportunities (Huber and Hutchings, 2004; Higgs, 2008; Doyle et al., 2011). What was also encouraging was not only the identification of learning theories, but also the

identification of theories that are not covered in lectures. This again shows that a proportion of students engaged with the project beyond a superficial level (Higgs, 2008; Huber and Hutchings, 2004). Future research could involve a more detailed analysis of components of theory most easily identified or proposed as additions.

The DISCERN overall ratings showed that the PILs were of variable quality. Interestingly, students consistently rated the quality of the PILs as being lower than their reliability scores. This is because PILs scored poorly (i.e., rated as less than 3 - 'Partially') in terms of information production and sources, and in referring to areas of uncertainty (data not shown). Given the nature of smoking cessation, and the possibility of quitting without pharmacological intervention, the DISCERN questions on descriptions of how treatment works and the risks of treatment become less relevant than with other medical treatments. These items were rated poorly in the quality subscale (data not shown). As outlined previously, DISCERN does not require specialist health knowledge (Charnock et al., 1999). Therefore, engaging students in its use provided an appropriate mechanism for engaging them in estimating PIL quality – a skill that they will need to develop throughout their careers. The DISCERN ratings appear similar to scores reported for PILs on coronary heart disease (Redfern et al., 2006), again highlighting the appropriate use of the instrument.

In conclusion, we have described a project that aims to promote awareness of health literacy issues and the practical use of health psychology theory among future healthcare professionals. The techniques used required full engagement and

integrative learning, and therefore have the potential to improve interactions between healthcare providers and service users. Intervening with students at this very early stage in their training as healthcare professionals maximises the learning potential of an important issue that will be built on through their learning of clinical competencies throughout the remainder of their curriculum.

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Table 1: Details of chosen PILs

<b>Label</b>	<b>Authors</b>	<b>Number of students who assessed PIL</b>	<b>Title/Comments</b>
Canada 1	(Heart & Stroke Foundation, 2011)	60	“Just Breathe: Becoming and remaining smoke free” Focus on heart disease and stroke
Canada 2	(Government of Ontario, 2011)	44	“Quit: You have it in you. Tips to make quitting easier.” Tries to get smokers to help friends quit also.
Ireland 1	(Irish Heart Foundation, 2008)	52	“Stopping smoking for a happy and healthy heart” Heart disease focus
Ireland 2	(Irish Cancer Society, 2011)	34	“Smoking: Get help, get unhooked” Targets younger audience
Malaysia 1	(Government of Malaysia, 2011b)	31	“Secondhand smoke harms children” Contains grammar and spelling errors.
Malaysia 2	(Government of Malaysia, 2011a)	18	“Cigarettes cause impotency” Contains grammar and spelling errors.
UK 1	(Bolton Council, 2006)	41	“Smoking – the facts” Targets younger people
UK 2	(Cancer Research UK, 2003)	40	“Smoking & cancer: Beat the addiction” Mainly focused on cancers
USA 1	(Marquette General Health System, 2001)	22	“Smokers guide to better health” Emphasises on how to avoid weight gain.
USA 2	(American College of Chest Physicians, 2002)	5	“How to quit using tobacco” Focuses on pharmacological treatments

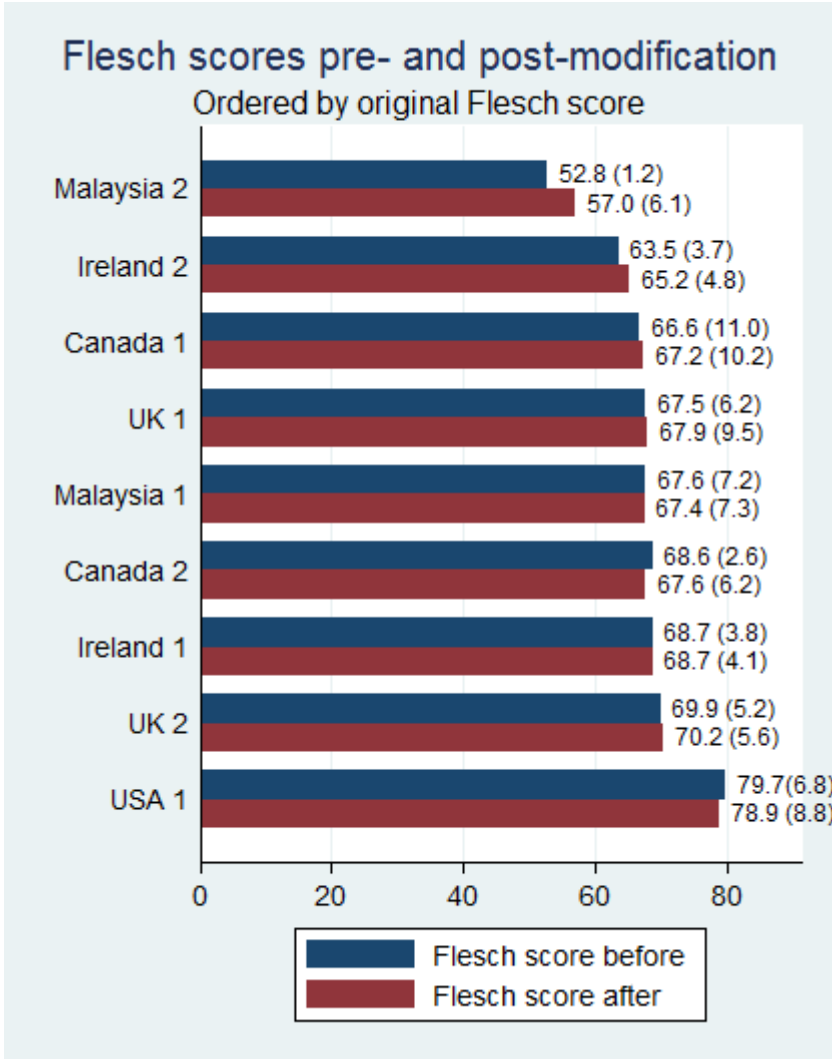


Fig 1: Mean (SD) Flesch scores pre- and post-modification

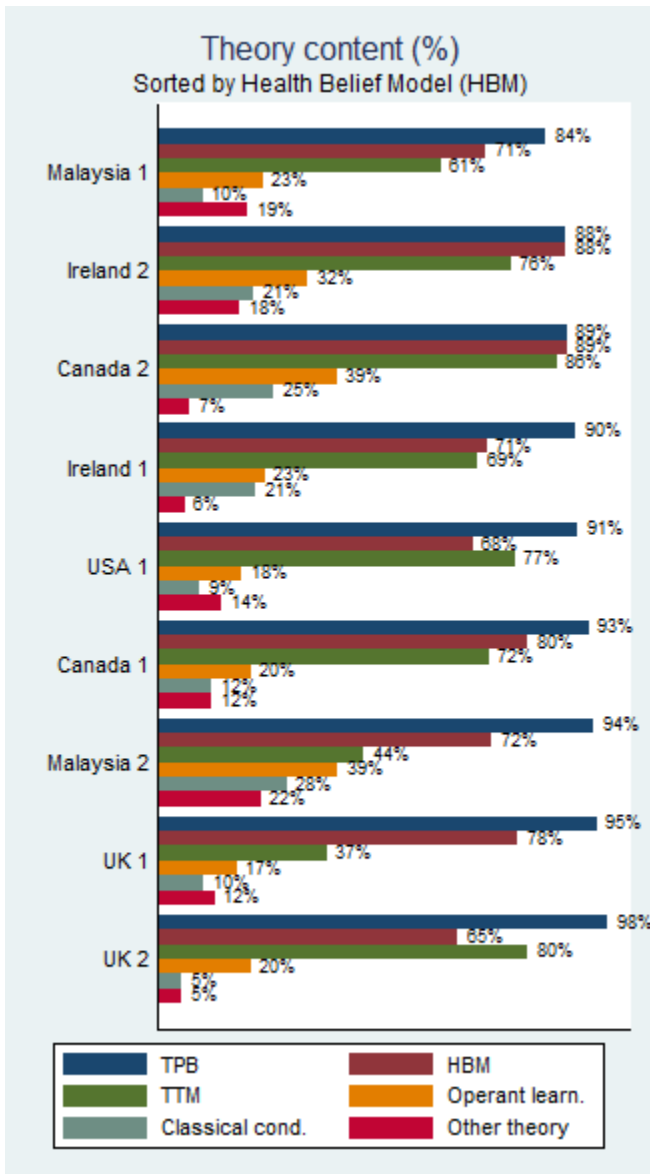


Fig 2: Student identified psychological theory within each PIL

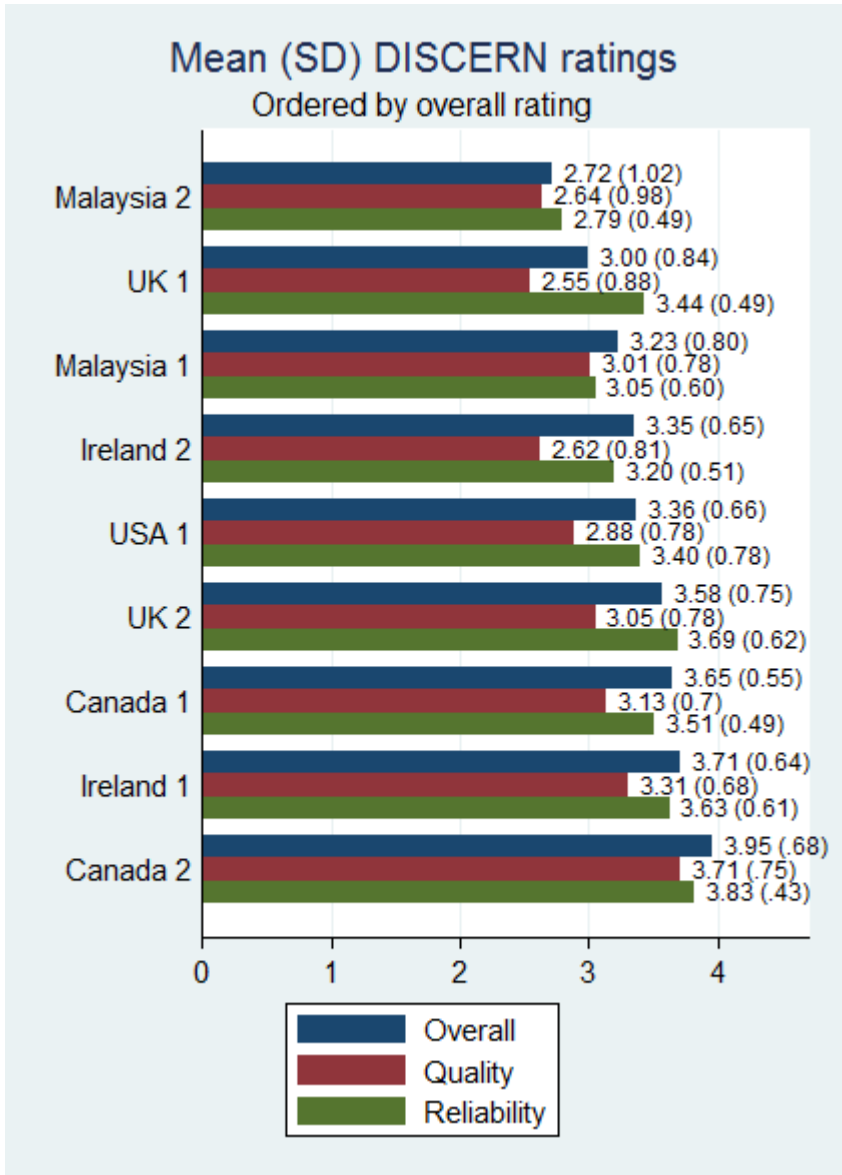


Fig 3: Mean DISCERN ratings of 9 PILs, ordered by overall rating.