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Design and evaluation of an interdisciplinary health disparities research curriculum

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Abstract

Background—Disparities in health and healthcare are widely documented for underrepresented racial and ethnic populations across a spectrum of diseases and care settings. An evidence base for addressing racial and ethnic disparities in health and healthcare requires investigators trained to conduct health disparities research.

Objective—To increase knowledge, stimulate interest, teach skills to evaluate and conduct, and foster collaborations in health disparities research.

Design—We designed, implemented and evaluated a Health Disparities Research Curriculum (HDRC).

Participants—were early-stage investigators.

Intervention—HDRC included twelve monthly sessions during 2015–2016. Instructors were mostly HDR investigators. Sessions combined didactic presentations, discussions, small group activities, and participant presentations.

Measures—Pre- and post-surveys to assess participants' perceptions of knowledge and skills.

Results—Of 21 enrollees, 13 were from under-represented groups and 14 were women. Four reported some prior training in HDR, and 12 reported currently conducting HDR. Among the 12 participants who completed both the pre and post HDRC survey, initially the most commonly cited barriers to pursuing HDR were lack of knowledge (N= 6) and funding (N= 7). In the post-survey,

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the number citing lack of knowledge decreased (N=2) and the number listing lack of funding increased (N=9). There were increases in the number of participants reporting increased knowledge of HDR methods (pre-post: 4 vs. 8) and competence to design (3 vs. 7) and implement (2 vs. 9) HDR research.

Conclusions—The Duke HDRC augments efforts to reduce health disparities by providing training in HDR for young investigators. Our data indicate that the course was feasible, well-received, and increased perceived knowledge and competence. HDRC and similar courses may increase the quantity, quality and scope of HDR and thus move us closer to health equity.

Keywords

health disparities; research; curriculum

1. Introduction

Disparities in health and healthcare are widely documented for underrepresented racial and ethnic populations, compared to non-Hispanic white populations, across a spectrum of diseases and care settings.^{1,2} An evidence base for eliminating these disparities is a national priority.^{3,4} Developing the evidence base with which to address widespread health and health care disparities requires a research workforce specifically trained to study disparities.

To establish the evidence base needed to eliminate disparities and achieve health equity, we need investigators who have interest, knowledge and skills to conduct high-quality disparities research. Therefore, our Clinical and Translational Science Award (CTSA) education core established two programmatic priorities. First, we sought to diversify the research workforce by selecting at least half of the recipients of our CTSA-sponsored student (TL1) and young investigator (KL2) career development awards from underrepresented racial and ethnic groups. A diverse collection of scholars is conducive to new ideas, broad research agendas and transformative science, all of which are essential to eliminating health disparities.⁵

Second, we sought to increase the pool of investigators across the translational spectrum that is well-versed in the principles and practice of health disparities research (HDR). Many medical schools and healthcare institutions are implementing curricula in cultural competence and community engagement.^{6,7} However, there are only a few programs offering research training for addressing disparities, and those that exist tend to focus on a single clinical area, such as cardiovascular disease⁸, cancer^{9,10}, or methodology (e.g., community-based participatory research)^{11,12}. Although we suspect that not all efforts are published, it appears that there is limited framework and data supporting the feasibility and impact of a general disparities research curriculum. Consequently, we created the Duke Health Disparities Research Curriculum (HDRC).

2. Materials and Methods

At our research-intensive academic medical center, we designed, implemented and evaluated a Health Disparities Research Curriculum (HDRC) for junior research faculty.

2.1. Participants

Participation in HDRC was required for Duke CTSA-sponsored KL2 scholars (authors KSJ and LPS lead the KL2 program), and other early-stage investigators with interest in HDR were invited to join. The final composition of the class included junior faculty in Duke's School of Medicine and School of Nursing. Given the potential for discussion of sensitive material and to facilitate interactive discussion, we limited enrollment to 21 individuals. Participants were expected to attend and actively participate in at least 75% of sessions.

2.2. Course description

We focused on research concerning racial/ethnic disparities in these subgroups. However, we made efforts to demonstrate when the methods being discussed could also apply to other groups (e.g., defined by sex, age, geography, socioeconomic status).

HDRC was designed to: 1) increase knowledge and awareness of the impact of racial and ethnic health disparities; 2) stimulate interest in conducting disparities research; 3) provide early-stage investigators with skills to critically evaluate, design and implement disparities research across the clinical and translational spectrum; and 4) foster collaborations among health disparities researchers.

To evaluate the feasibility of developing and implementing a course designed to achieve these goals and to assess its potential impact, a pilot version of this curriculum was implemented in 2015–2016.

2.2.1. Curriculum—The structure and content of HDRC were informed by a literature review of existing curricula^{8,13} and curriculum development framework¹⁴, discussion with course directors of HDR curricula at other institutions, consultation with experts in curricular design and evaluation, and input from the Duke CTSA education core.

The HDRC syllabus (Table 1) covers key concepts in HDR (nomenclature, extent, causal factors)¹⁵ and illustrates a range of common research methodologies applied to health disparities. Examples included observational studies describing a disparity, clinical trials testing interventions to alleviate a disparity, and mechanistic studies to explore possible biological basis for differential outcomes as a function of ancestry. A broad range of clinical areas in adult and pediatric medicine was addressed. The curriculum was approved for Continuing Medical Education (CME) credit.

Curriculum instructors were Duke investigators with expertise in both the clinical content area being discussed and the relevant disparities data. Most were conducting disparities research themselves. Instructors each spent approximately 4 hours preparing and conducting the session and received nominal compensation.

2.2.2. Instructional format

2.2.2.1. Seminars: The curriculum included twelve 1.5 hour seminar sessions, approximately monthly. The sessions included didactic presentations, discussion time, small group activities, and participant presentations. Instructors provided HDRC participants with session objectives, relevant readings, and information about any planned group activity.

Sessions were held in a small conference room facilitating an informal atmosphere conducive to discussion/active learning. Participants could attend remotely (by phone and/or webinar), but were encouraged to attend in person.

2.2.2.2. Colloquium: In addition to the sessions listed in Table 1, as part of the HDRC curriculum, we organized a campus-wide all-day Health Disparities Research Colloquium. The Colloquium was supported by the Dean of the School of Medicine through an Interdisciplinary Colloquium Award. The agenda can be found in Appendix 1. In addition to HDRC enrollees, over 100 individuals registered, from across Duke University campus. The Colloquium included: (1) a keynote presentation by the Deputy Director of the National Institute on Minority Health and Health Disparities (NIMHD); (2) research presentations from senior investigators at Duke describing HDR across the translational spectrum; (3) presentations by junior investigators at Duke selected through a competitive process; and (4) “speed-dating” style (5-minute) presentations by investigators across the campus to highlight the breadth of disparities research at Duke and facilitate potential collaborations. Although this colloquium was an important component within the HDRC curriculum, it was designed for and attended by a wider audience; therefore, we do not provide data on its evaluation.

2.2.2.3. Participants’ presentation: One session was reserved for participant presentations. Each participant was asked to use the “population-intervention-comparison-outcome” (PICO) framework (15) to design a health disparities study in their content area. For some participants, this involved reporting on their current research. For others, it involved approaching their content area from a disparities perspective for the first time. Assignments were submitted in advance and reviewed by the course directors, who provided feedback to each participant. Three projects were selected for presentation and classroom discussion.

2.3. Measures

2.3.1. Data collection—All data described below were initially collected for evaluation use only; IRB approval was obtained retroactively and all participants provided informed consent. We evaluated the feasibility, content, and impact of the curriculum based on the following data:

2.3.1.1. Participant characteristics: Prior to the first session of the HDRC, participants provided demographic and professional information as well as information on prior training in and experience conducting HDR.

2.3.1.2. Attendance: Participants signed in at the beginning of each session. Those attending by phone or webinar were recorded as attending remotely.

2.3.1.3. Survey: A baseline survey (“pre”) asked participants to rate their familiarity with HDR in their focus area, including knowledge and competence designing and implementing HDR. After completion of the course, questions were repeated to assess change, and some new “post” questions were added to retrospectively assess impact. See Appendix 2 for pre and post surveys.

2.3.1.4. Debrief session: The final class session was an informal debriefing led by one of the course directors (KSJ). Another course director (LPS) and a staff assistant took notes. The discussion focused largely on the structure and logistics of HDRC. In addition, participants were asked to discuss the most and least useful aspects of the curriculum and to suggest changes to content or format.

2.4. Data analysis

Data were analyzed using SAS Version 9.3. Given our small sample size and goals, we report simple frequencies for participant characteristics and qualitative survey responses.

3. Results and Discussion

3.1. Participant characteristics

Table 2 shows characteristics of the 21 enrollees, of whom 13 were URM, 14 were women. Seventeen had MD or MD-PhD degrees and 4 were PhDs or PhD candidates. Additionally, 8 of the participants had other degrees or credentials, including a certificate in health policy (N=1), masters in business administration (N=1), masters in health science (N=5), and masters in public health (N=1). Several clinical departments were represented, with the majority from the Department of Medicine (DoM). Nine enrollees were KL2 scholars.

Of the 21 participants, 4 reported some prior training in HDR as part of a degree granting program, lecture series, or summer career development program. Over half reported currently conducting HDR or planning to do so. Areas of focus included racial disparities in hypertension, kidney disease, obesity, diabetes mellitus, liver disease and transplantation, cardiovascular disease, and infectious diseases. All 21 participants completed the pre-survey. Twelve of the enrollees completed both the pre and post survey; the characteristics of this subgroup are also shown in Table 2.

3.2. Participant assessment: Pre and post survey results

Of the 12 individuals completing both pre and post surveys, 2 who were already conducting HDR at baseline reported changing the methods, scope, or other components of their research as a result of participating in HDRC. One participant with no prior experience conducting HDR started a disparities research project during HDRC and one reported plans to seek an opportunity to integrate some aspects of HDR into his current research agenda.

Comparing pre and post responses to the survey (Table 3) reveals that initially, the most commonly cited barriers to pursuing a research career in health disparities were lack of knowledge (6 responded “a lot” and 5 responded “some”) and lack of funding (reported by 7 respondents). In contrast, in the post-survey, lack of knowledge as a barrier was identified by only 2 respondents, but the number listing lack of funding increased to 9. Consistent with these changes, most respondents reported that HDRC had addressed lack of knowledge as a potential barrier to conducting HDR (“a lot” for 6 and “some” for 5 respondents). In contrast, only one person responded that HDRC addressed issues regarding lack of funding “a lot” while 5 reported “not at all”.

Other potential barriers on the survey were identified by no more than 1 participant and did not notably change from pre to post; these barriers included lack of interest, relevance to participant's research focus, departmental support, mentor support, and concerns about consent or outreach. [Data not shown]

The pre-post survey comparison did not indicate that HDRC increased the likelihood of participants conducting HDR in the next 3–5 years (9 pre and 10 post). However, there was a notable pre-post increase in perceived preparedness: 6 participants reported that HDRC increased their knowledge of HDR “a lot”, 4 reported that it had increased their competence in designing a HDR project “a lot”, and 5 reported a similar increase in competence to conduct HDR. Consistent with these changes, the number who reported being knowledgeable about HDR methods increased from 4 to 8, and the number reporting competence in designing and conducting HDR increased from 3 to 7 and from 2 to 9, respectively.

3.3. Program evaluation

3.3.1. Session Attendance—There were 12 sessions, including the final debriefing. The number of participants at each session ranged from 6 to 16 with an average of 10 attendees per session. Participants attended an average of 7 sessions (range 1–10), and 14 participants attended at least 50% of the sessions. An average of 9% of enrollees per session participated remotely.

3.3.2. Program evaluation survey—Participants rated the program very highly. All 12 of those completing the post-survey were satisfied or very satisfied with the class size, length and number of sessions, topics covered, speakers, course directors, atmosphere for discussing sensitive issues, and the focus on disparities in race and ethnicity. Two participants reported being dissatisfied with the time of day sessions were held and the ease of access to web-based participation. All indicated that they would recommend HDRC to others.

3.3.3. Debrief session—Eleven participants attended the debrief session. Most reported that the course had been valuable for them. Many reported that classroom discussion with instructors was the most valuable aspect of the experience. Other highlights included the all-day Health Disparities Research Colloquium and the opportunity to meet and interact with each other and with senior disparities investigators. Participants offered several suggestions for change, including broadening the availability of HDRC to others, providing access to online course materials, increasing dedicated session time for discussion, providing opportunities for review of and feedback on their own research, and providing additional information on logistics of HDR (e.g., sources of funding).

4. Discussion

The National Institutes of Health, the Institute of Medicine, and many academic medical centers have prioritized the elimination of health disparities. Indeed, the Federal Government's Healthy People 2020 initiative sets an aspirational deadline 3 years hence to “achieve health equity, eliminate disparities, and improve the health of all groups.”⁴ In order

to achieve this goal, the research workforce needs to be well-versed in the evaluation, design and conduct of research that creates the evidence base for eliminating health disparities. Specific knowledge is needed and research skills need to be adapted to address disparities research questions. Our overall goal is to equip the research community with curricular materials that can provide this essential knowledge and skills, and to increase interest in addressing these critical research needs.

We consider HDRC to be an addition to (not a substitute for) existing training. Based on published reports, most existing training addresses cultural competence in clinical care^{6,7}, community engagement in research^{11,12,16}, or disparities research addressing a single clinical area^{8–10}. Each of these approaches is potentially valuable in the ultimate elimination of health disparities; in addition, we believe that another potentially valuable approach is comprehensive training in HDR. The most comprehensive research-oriented approach is provided by the National Institute of Minority Health and Health Disparities¹⁷, which offers an intensive, total immersion course requiring on-site commitment for two weeks. In addition, Estape et al reported on the creation of a multi-institutional HDR course delivered on-line.¹³ Despite these important examples, currently there is no clear best practice or widely-used curriculum for training in HDR. To expand the evidence base and serve our institution's needs, we created a single-center longitudinal curriculum; the process and evaluation of this course may be useful to other institutions and ultimately in the development of a standard curriculum that can be widely implemented.

In our evaluation of HDRC, there are three important caveats to bear in mind: First, the number of participants was small and the course was given once; it is unknown whether additional iterations of HDRC will bring other challenges and limitations to light. Second, only 57% (12/21) participants completed both pre and post surveys and 14 of 21 attended more than 50% of the sessions (with 4 participants missing the last 3 sessions), potentially limiting the strength of our conclusions. However, the survey completers were comparable to the total group with regard to degrees (for example, 17% vs 19% were PhDs; 58% vs 52% were Black; and 50% vs 43% KL2 scholars). Third, we did not survey the course instructors to determine their satisfaction and sense of the program's value. However, we solicited their feedback on the course structure and logistics. Almost all instructors were invited to return to lead a session in year two, and all agreed to do so. The fourth caveat is that the participants may have been inhibited from providing honest feedback: all were junior faculty providing feedback to senior faculty running the course, and many were KL2 scholars providing feedback to the KL2 program directors. However, all data (other than the debrief session) were collected anonymously, and the extent to which participants provided suggestions in the session evaluations, surveys and debrief session indicates to some extent that they felt comfortable providing an honest evaluation.

With these caveats in mind, our pilot experience demonstrates the feasibility of designing and implementing a HDR curriculum. Specifically, we successfully engaged many accomplished investigators at Duke to teach the course, and enrollee attendance averaged 50%. All participants stated they would recommend the course to others.

Our evaluation suggests that there are alternative structural elements that may improve feasibility and acceptability. For example, participants expressed interest in an on-line version of the course. Although implementing this suggestion would facilitate convenience and dissemination, it must be counterbalanced against the perceived value (by us and the participants) of direct interaction with the faculty and with each other. Participants also encouraged us to open the course to a broad range of researchers. While one of our goals is to disseminate HDRC both within Duke and to other institutions, increasing class size would certainly have an impact on the intimate group atmosphere and lively engagement of all participants in the classroom discussions.

In addition to feasibility, one of our goals was to stimulate new interest in HDR. Although many participants were either conducting or interested in conducting HDR at baseline, two individuals expressed the intent to address disparities *de novo*, one of whom (a KL2 scholar) added a HDR aim to his research agenda and made notable progress in achieving that aim during the course. This finding suggests that HDRC may be effective at stimulating new interest in HDR. This goal may have been facilitated by the fact that the course was aligned with and endorsed by the Duke CTSA and was taught by highly-respected senior faculty.

Another critical goal of HDRC was to provide junior investigators with knowledge, skills and resources to conduct HDR. Although these variables were not measured objectively, nonetheless, perceived mastery of information and skill and self-confidence and self-efficacy in applying them are likely predictors of successful future conduct of HDR. Our data suggest small but positive impact on these variables. For example, the number of participants who considered lack of knowledge to be a barrier to conducting HDR fell, while the increase in the number identifying lack of funding as a barrier may indicate increased knowledge and realism about the current funding challenges.

We were gratified to see collaborations and informal mentoring relationships develop among participants and between them and the course instructors. Given the focus of the course instructors on HDR, we anticipate that these relationships will encourage and facilitate future HDR among course participants.

5. Implications

In summary, the Duke CTSA-sponsored HDRC adds to the growing efforts to reduce health disparities by providing training in the evaluation, design and conduct of HDR across the translational spectrum. Although rigorous measurement of long-term impact is impossible at this time, there are indications that the course was feasible, well-received, increased self-confidence and self-efficacy, and led 2 of 21 participants to embrace HDR for the first time. Future evaluation of HDRC (now in its second year) will need to address a broader group of enrollees, variations in content and structure, and assessment of its impact on participants' research trajectory. Ultimately HDRC and similar courses can increase the quantity, quality and scope of health disparities research and thus move us closer to health equity.

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In addition to the authors (KJ and KT), course instructors included:

Instructor(s)	Title (all at Duke University)
Gary G. Bennett PhD	Professor of Psychology and Neuroscience
Karen Chiswell PhD	Statistician, Duke Clinical Research Institute
Emily O'Brien PhD	Assistant Professor, Duke Clinical Research Institute
Victoria Parente MD	Instructor in Pediatrics
Steven Patierno PhD	Professor of Medicine/Oncology
Benjamin Reese PhD	Vice President for Institutional Equity, Duke University
Kevin Schulman MD	Professor of Medicine and Business Administration
Karen Steinhauser PhD	Associate Professor of Medicine/General Internal Medicine

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Table 1**HDRC Syllabus**

Session	Topic	Overall Goal	Objectives
1	Framing the conversation	Discuss key terms and provide an overview of health disparities	<ol style="list-style-type: none"> 1 Define race and ethnicity as specified by government and funding agencies 2 Define health disparities and differences as a function of race and ethnicity 3 Discuss importance of understanding and eliminating racial/ethnic disparities in health 4 Discuss landmark Institute of Medicine Report —Unequal Treatment: Confronting Racial and Ethnic Disparities in Healthcare 5 Review historical context for existence of health disparities
2	The three pillars of disparities: patient, provider, and health system	Discuss factors that may explain disparities in health outcomes.	<ol style="list-style-type: none"> 1 Discuss patient, provider, and health system factors that may explain disparities in health outcomes 2 Formulate research questions and discuss methodological approaches to understand causes of health disparities and test interventions to reduce disparities
3	Disparities research colloquium	Educate scholars on disparities research across the translational spectrum and foster collaborations	<ol style="list-style-type: none"> 1 Describe the prevalence, causes and severity of health disparities 2 Describe the relationship between racial and cultural attitudes and quality of care 3 Review existing HDR literature 4 Review skills needed to incorporate HDR into research agendas
4	Implicit associations	Explore the impact of unconscious bias on assessment of patients and its potential impact on clinical decision-making.	<ol style="list-style-type: none"> 1 Describe the role that unconscious bias can play in health and health care 2 Review clinical studies that have elicited the impact of subconscious bias on health care services 3 Apply education and research models designed to address the role of unconscious bias in health care
5	Translational/basic science research	To foster an appreciation of the dynamic interplay between race as a socio-cultural construct and resulting social determinants of health, with human genetic, biological and disease-related heterogeneity.	<ol style="list-style-type: none"> 1 Describe human disease-related biological heterogeneity as a function of the human diaspora 2 Describe population-level, individual-level, and disease tissue-level genetic and biological heterogeneity as function of both self-identified race and ancestral genotype 3 Describe the role of trans-disciplinary research across the full biomedical research continuum, from cells to society, in eliminating health disparities
6	Q/I research	Recognize equality as a fundamental pillar of high-quality healthcare	<ol style="list-style-type: none"> 1 Describe equality as a fundamental pillar of quality 2 Recognize the potential effects of quality improvement on health disparities

Session	Topic	Overall Goal	Objectives
			<p>3 Describe guiding principles to incorporate health disparities initiatives into quality improvement efforts</p> <p>4 Describe the importance of addressing health disparities within the context of healthcare reform efforts to improve quality nationally</p>
7	Qualitative research	Understand uses of qualitative methods in health disparities research	<p>1 Identify the goals of qualitative research</p> <p>2 Identify qualitative methods appropriate for health disparities research</p> <p>3 Describe key steps in rigorous qualitative research, including qualitative comparable approaches (i.e., quality, rigor, thrustworthiness) to reliability and validity</p> <p>4 Participate in an exercise to apply key features of qualitative methodology to a health disparities research question</p>
8	Randomized trials	Review issues related to the design and implementation of randomized controlled trials in health disparities research	<p>1 Review implementation challenges when using RCT design for HDR</p> <p>2 Critically review RCT methods utilized in published HDR studies</p> <p>3 Explain when alternative designs may be superior to RCT in HDR</p>
9	Community engaged research	Enhance understanding of patient engagement in health disparities research and identify strategies for optimal engagement	<p>1 Describe the importance of patient engagement in health disparities research</p> <p>2 Identify ongoing patient partnership approaches in clinical outcomes research</p> <p>3 Address current challenges to optimal patient engagement in disparities research</p> <p>4 Identify opportunities to enhance patient engagement in future disparities research</p>
10	Statistical issues in HDR	Describe statistical issues potentially encountered in HDR	<p>1 Explain statistical concepts and identify how they may impact design, analysis and interpretation of HDR studies</p> <p>2 Participate in an exercise to identify key statistical issues in a published HDR study</p>
11	Participant presentations	Review and illustrate principles of developing questions and matching questions to appropriate study design in health disparities research.	<p>1 Discuss and illustrate the use of PICO (population, intervention, comparison, outcome) in health disparities research in your field</p> <p>2 Discuss and illustrate pros and cons of different study designs to address questions in health disparities research</p>
12	Debrief session		Wrap-up, feedback, celebration

Table 2

Characteristics of HDRC enrollees. Cells = N.

Item	All participants (N=21)	Participants who completed pre and post survey (N = 12)
Race		
Asian	2	2
Black	11	7
Multiple races	1	1
White	4	2
Other	1	0
Not specified	2	0
Hispanic	2	1
Female	14	9
Degree		
MD	15	9
MD-PhD	2	1
PhD	4	2
Professional Title		
Assistant professor	8	6
Instructor *	6	3
Fellow	5	1
Other junior faculty	2	2
Department		
Anesthesiology	1	1
Community and Family Medicine	2	0
Duke Global Health Institute	1	1
Internal medicine	12	7
Obstetrics-Gynecology	1	0
Pediatrics	2	2
Psychiatry	2	1
KL2 scholar	9	6
Received prior HDR training	4	2
Conducted prior/current HDR	12	6

*"Instructor" is an entry-level faculty appointment in clinical departments.

Table 3

Survey findings for the 12 HDRC participants who completed both pre and post survey (N)

Item	Pre-survey	Post-survey
Most Commonly Identified Barriers to Conducting Health Disparities Research		
Lack of funding	7	9
Lack of knowledge	6	2
Lack of technical skills	4	3
Time constraints	4	5
Concerns about enrollment	3	0
Self-Report of Knowledge and Skills Related to Health Disparities Research		
Likely or very likely to address health disparities in my research over the next 3–5 years.	9	10
Familiar or very familiar with health disparities research in my focus area.	7	8
Knowledgeable about the methods used in health disparities research.	4	8
Competent or very competent to DESIGN a health disparities research study.	3	7
Competent or very competent to IMPLEMENT a health disparities research study.	2	9
Perceptions of Impact of HDRC		
HDRC increased my:		
Familiarity with health disparities research in my focus area “a lot”.	-	5
Knowledge of health disparities research methods “a lot”.	-	6
Competence in DESIGNING a health disparities research project “a lot”.	-	4
Competence in DESIGNING a health disparities research project “a lot”.	-	5