The Representation and Practice of Interdisciplinarity in Health Policy and Systems Research: A Systematic Review

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DECLARATION

I, Kim Elizabeth MacQuilkan (MCQKIM), hereby declare that the work in this dissertation is based on my original work (except where acknowledgements indicate otherwise) and has not, in whole or in part, been submitted towards another degree, at this University or elsewhere. I empower the University of Cape Town to reproduce for the purpose of research either the whole or any portion of the contents in any manner whatsoever.

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Dr. Kim Elizabeth MacQuilkan

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ABSTRACT

The emerging field of Health Policy and Systems Research (HPSR) developed from a variety of disciplines, orientated around the common research agenda of strengthening health systems, which are understood to be both complex and dynamic. The diversity of contributing disciplinary, influences is a core feature of HPSR and hence the field is clearly defined as 'interdisciplinary'. However there has been a paucity of research conducted on interdisciplinarity within HPSR, with a lack of clarity on its conceptualisation and practice.

This study explores the representation of interdisciplinarity, and interdisciplinary practices within HPSR, utilising scoping and systematic review approaches.

It is revealed that the term 'interdisciplinarity' (and its variations) has suffered from misuse and confusion. In particular, there is limited practice of an 'integrationist' interdisciplinary perspective and practice within HPSR – despite key HPSR authors supporting the integrationist approach due to its alignment with the HPSR scope of study to address complex health system problems.

Over the last ten years, there has been a significantly increased output referenced as part of the HPSR field, however there is a scarcity of interdisciplinary research examples that have intentionally integrated multiple disciplinary influences. This research shows that current HPSR literature mainly reflects a 'generalist' interdisciplinary perspective (which only requires the presence of multiple disciplinary influences) rather than the integrationist perspective (which require intentional integration of influences). As a result, we propose improved approaches to framing, funding, and teaching interdisciplinary HPSR.

ACRONYMS AND ABBREVIATIONS

AHPSR	Alliance for Health Policy and Systems Research
CASP	Critical Appraisal Skills Program
CHESAI	Collaboration for Health Systems Analysis and Innovation
ENTREQ	the enhancing and transparency in reporting the synthesis of qualitative research
HPSR	Health Policy and Systems Research
HSG	Health Systems Global
ID	Interdisciplinarity
IDR	Interdisciplinary Research
IDRC-Canada	International Development Research Centre (Canada)
LMIC	Low- and Middle Income Country
MDGs	Millennium Development Goals
QR2	quality and rigour in qualitative research
SHaPeS	Social Science Approaches for Research and Engagement in Health Policy and Systems (an HSG Thematic Working Group)
WHO	World Health Organisation

GLOSSARY OF KEY TERMS

Aggregative systematic review	A style of systematic review that aims to collate empirical research and find best evidence.
Complex Adaptive System	A collection of individual agents with freedom to act in ways that are not always totally predictable, and whose actions are interconnected so that one agent's actions alters the context for other agents. Furthermore individual agents form a collective whole which continually adapts to internal and external changes.
Configurative systematic review	A style of systematic review which aims to synthesise all literature in order to advance theory.
Discipline	A branch of knowledge
Generalist interdisciplinarian perspective	A point of view which considers any interaction between disciplines as representative of interdisciplinarity regardless of the extent of that interaction. This is in contrast to the **integrationist interdisciplinarian perspective** (see below).
Health Policy and Systems Research	An interdisciplinary research field encompassing a variety of disciplines orientated around context-specific and policy-relevant, health systems issues.
Integrationist interdisciplinarian perspective	A point of view which considers only an interaction that comprises intentional integration of different disciplinary influences as representative of interdisciplinarity. This is in contrast to the generalist interdisciplinarian perspective (see above).
Interdisciplinary/ interprofessional healthcare teams	Healthcare teams that collaborate together to provide coordinated and integrated clinical care.
Interdiscipline	A new specialisation of knowledge formulated between disciplines which has become institutionalised.
Interdisciplinarity (ID)	A term utilised to describe the concept and approach of analysing, synthesising and harmonising links between disciplines into a coordinated and coherent whole.
Interdisciplinary field	An interdisciplinary field is established when researchers from more than one discipline unite to study a particular subject area or group of phenomena.
Interdisciplinary Research (IDR)	IDR describes interdisciplinarity (see above) as a research approach, whereby concepts, methodology, perspectives and ideas from more than one different discipline are integrated to form innovative research which will provide a more comprehensive explanation of the phenomenon.
Interdisciplinary studies	Interdisciplinary studies is the field dedicated to strengthening ID and IDR
Integration	A process relating to the evaluation and combination of different concepts, theories or methodology into a new, more comprehensive whole which is greater than the sum of its contributory parts.

Interprofessional/interdisciplinary teams	Collaboration of different professionals to provide co-ordinated and integrated health care.
Mixed-Methods Research	A common health sciences research practice which attempts to integrate perspectives and methodology from the qualitative and quantitative paradigms.
Multidisciplinarity	Referring to the concept and approach of juxtaposing (but not integrating – see above integration) influences from different disciplines.
Multiple disciplinary	Term utilised to describe any interaction between disciplines, when extent of the collaboration is unknown and cannot be further classified as multi-, inter-, or transdisciplinary.
Scoping review	A scoping review or study is the synthesis and analysis of a wide range of research and non-research material to provide greater conceptual clarity about a specific topic or field of evidence.
Systematic review (Campbell style)	A research methodology which synthesises the results of research studies in order to find the best available research on a specific question. Campbell review particularly includes grey literature to prevent publication bias.
Transdisciplinarity	The concept and approach of not only integrating influences from different disciplines (see integration and interdisciplinarity) but transcending disciplinary boundaries. Additionally transdisciplinarity should involve collaboration between researchers and extra-scientific actors.
Team science and the science of team science	Team science initiates involve the collaboration of multiple researchers to address a complex phenomenon. Working across different professions and disciplines is not a pre-requisite for team science however, is promoted. The science of team science is the field dedicated to studying these initiatives.
Thematic analysis	A data analysis process whereby qualitative data is descriptively analysed for important and recurrent themes.

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PART A: PROTOCOL

Exploring Interdisciplinarity in Health Policy and Systems Research

Introduction

Health Policy and Systems Research (HPSR) is a relatively young sub-field of public health. The field emerged from a growing need to address health problems from a holistic health system perspective, rather than from isolated, intervention-driven approaches. HPSR combines the research interest areas of health policy and health systems, as well as related disciplines into one research field (Gilson 2012). HPSR is currently defined as:

> 'A field that seeks to understand and improve how societies organize themselves in achieving collective health goals, and how different actors interact in the policy and implementation processes to contribute to policy outcomes. ***By nature, it is interdisciplinary***, a blend of economics, sociology, anthropology, political science, public health and epidemiology ***that together draw*** a comprehensive picture of how health systems respond and adapt to health policies, and how health policies can shape - and be shaped by – health systems and the broader determinants of health' (AHPSR 2015 – emphasis mine).

The failure of many of the health-related Millennium Development Goals (MDGS) has been attributed to a lack of focus on health systems (Travis ***et al***. 2004). Subsequently, strengthening health systems has been promoted as an essential consideration in order to produce effective, efficient and equitable health care (Uneke ***et al***. 2010; WHO 2007). Health systems are complex, unpredictable and dynamic which subsequently lead to complex issues (Gilson 2012). It is becoming more widely accepted that solutions to complex problems are not found within any single field or discipline (Repko 2008). Thus interdisciplinarity (ID), as a defining

characteristic and approach, is an essential consideration in HPSR in order to develop innovative research and solutions to complex problems.

Background

Defining interdisciplinarity

There has been previous debate regarding the definition of ID as a concept and as an approach (see Huutoniemi ***et al***. 2010; Lattuca 2001; Salter and Hearn 1997). Multiple terms such as multi- or transdisciplinarity are commonly used interchangeably with ID resulting in further challenges (Razzaq ***et al***. 2013). According to a systematic review conducted by Choi and Pak (2006), ID 'analyses, synthesises and harmonizes links between disciplines into a coordinated and coherent whole'. Interdisciplinary research (IDR) is the term often utilised to describe ID as an approach. Aboelela ***et al***. (2006) developed the following a definition for IDR through a systematic review:

> 'Interdisciplinary research (IDR) is any study or group of studies undertaken by scholars from two or more distinct scientific disciplines. The research is based upon a conceptual model that links or integrates theoretical frameworks from those disciplines, uses study design and methodology that is not limited to any one field, and requires the use of perspectives and skills of the involved disciplines throughout the multiple phases of the research' (Aboelela ***et al***. 2006).

A core principle underlying ID is that of 'integration' (see Razzaq ***et al***. 2013). The term integration suffers from the same ambiguity as ID, however the following definition by Repko (2008) is useful and will be utilised for this study. Integration is defined as "the cognitive activity of critically evaluating and creatively combining ideas and knowledge to form a new

whole" – where something more comprehensive is gained from the collaboration than the simple addition of isolated contributions (Repko 2008).

Interdisciplinarity in health policy and systems research

HPSR does not limit its scope of research by discipline or method therefore lending itself to multi- and interdisciplinarity.

> 'The State of HPSR in terms of methodological sophistication and advances results both from independent contributions of discrete traditions of enquiry, as well as from the mixing of disciplinary influences – it is simultaneously, therefore, a multidisciplinary and interdisciplinary field' (Sheik ***et al***. 2011).

HPSR has at times been critiqued for having "fuzzy boundaries" (see Gilson 2012). However HPSR researchers argue that an openness to other disciplines, perspectives and methods is required for improving health systems and finding solutions to the complex problems found in health systems (Gilson 2012). The World Health Organisation (WHO) further confirms the importance of multiple disciplinary approaches for HPSR in a core strategy document, entitled "Changing Mindsets: Strategy on Health Systems and Policy Research" (WHO 2012). The report asserts that unification of research disciplines and knowledge is vital to create significant change in health systems.

The field of HPSR comprises researchers from different disciplines including disciplines with potentially opposing perspectives and epistemologies (such as positivists versus relativists). For example, certain disciplines such as epidemiology possess the underlying assumption that there are objective facts or truth that can be discovered by testing a hypothesis. The social science disciplines such as anthropology often have a more relativist perspective, that there is

no one 'truth' and that reality is determined by subjectivity. The influences from disciplines encompassing both the above opposing perspectives makes HPSR inherently interdisciplinary, and integration often challenging (Gilson *et al*. 2011). The increased inclusion of social science research in HPSR has been promoted to prevent disciplinary capture and maintain the multi- and interdisciplinary nature of HPSR. Integrating methods from diverse knowledge paradigms can be difficult due to conflicting methodology choices and practices (Bennett *et al*. 2011). However, often the perspectives of researchers in HPSR do not reach the end extremes of positivist or relativist poles, thus finding common ground for interdisciplinary integration is more conducive (Gilson *et al*. 2011). Additionally, many HPSR researchers possess similar attributes required for ID research and engagement such as: openness to other perspectives, thinking holistically, love of diversity and reflexivity (Bennett *et al*. 2011; Repko 2008).

Although HPSR is defined as interdisciplinary and promotes ID strongly as an approach and philosophy, how this is understood and represented in the field is currently not clear. The concept of ID is confused by various overlapping definitions (Aboelela *et al*. 2006; Choi and Pak 2006), and the practice of ID within HPSR is not well clarified. Evaluating and identifying ID is already complex due to the involvement of more than one discipline (Klein 2006). Each discipline possesses unique perspectives, concepts, theories and ways of practice which determines how research is conducted, evaluated and disseminated (Becher and Trowler 2001).

A defining feature of a discipline or field is its discourse. There are key materials that signify discourse and which represent the shared values, concepts, perspectives and beliefs. Texts (written, read, spoken or listened to) constitute these key materials (Klein, 1990). ID in the context of academia, often relates to the combination of aspects from two or more disciplines in four areas; knowledge, education, theory and research (Nissani 1997).Therefore although ID

may be difficult to evaluate, the discourse of HPSR can reveal how ID is represented and understood in that field.

On first glance, there are very few examples in HPSR of research that are obviously stated as interdisciplinary. HPSR lacks a standard framework for conducting IDR in HPSR and it has been acknowledged that the field requires more comprehensive methods to facilitate the integration of diverse perspectives and promote understanding across disciplines (Gilson ***et al***. 2011). However there may be examples of ID in the HPSR that are not overtly stated as such, but have developed organically over time. Another contributor to the lack of 'intentional' IDR in HPSR may be due to an omission of IDR in HPSR training curricula. Conducting IDR is complicated therefore formal instruction on IDR methodology is important in promoting IDR within a field. A recent report conducted by Tancred ***et al***. (2015) mapped the global extent of HPSR courses and training which concentrate on low and middle-income countries (LMICs). The assessment found that universally, course content lacked the methodological range required by HPSR.

A systematic and comprehensive review of relevant HPSR materials, exploring how ID is 'talked, taught and written about', is required to develop a cohesive understanding of how ID as a concept and approach is represented and practiced in HPSR. Developing and formalising defining concepts, such as ID within HPSR, is necessary to strengthen the identity of the emerging field of HPSR and to the further development of methodology frameworks. As HPSR is orientated around complex health system issues, the lack of such frameworks and guidance may be hindering potentially valuable research, most suitably addressed by IDR.

Research question

How is 'interdisciplinarity' as a concept and approach currently represented, understood and practiced in the emerging field of HPSR?

The research objectives are to:

- Explore ID in HPSR as a concept and philosophy;
- Find examples of IDR (ID as an approach) in key HPSR journals and conference abstracts;
- Explore how ID is viewed within HPSR (key informants and conferences); and
- Formulate recommendations for future study on conducting IDR and promoting ID in HPSR

Methods

Theoretical framework

Each discipline possesses unique concepts and ways of practice (Becher and Trowler 2001), therefore the certain terms utilised in this study have specific definitions relevant to the field of HPSR (see glossary of key terms). However ID by nature can be applied to any discipline or field and has its own field of dedicated study, interdisciplinary studies (Repko 2008). Therefore this study aims to explore and possibly integrate any relevant insights (from any discipline) in order to gain a full understanding of ID. Consequently ID is an underpinning approach as well as subject of study.

A defining feature of ID and IDR is 'integration' and could involve the combination of; knowledge, methods, perspectives, concepts, and/or theories from different disciplines (National Academy 2005). IDR may also comprise collaboration between researchers or individuals from; different sectors, public and private organisations, practitioners and

academics (Choi and Pak 2006; Jahn *et al*. 2012). However the collaboration between disciplines (interdisciplinarity) as a concept (ID) and research approach (IDR) will be the primary focus of this study.

Outline of research strategy

The purpose of this study is explorative as it aims to investigate how ID is currently represented and practiced in HPSR. The study will be flexible and conducted at macro level as it is investigating ID within a global context and encompasses the entire HPSR field (or parts thereof, see below). The study will comprise two stages:

(1) An initial **scoping review** in order to formulate key themes of ID in HPSR which will inform the systematic review. The scoping review will in turn comprise two components, a general literature search and a crowd-sourcing survey that supports that general literature search; and

(2) **A systematic synthesis** (configurative systematic review including qualitative evidence – see glossary of terms) consisting of four systematic steps: (a) search strategy; screening; critical appraisal; and thematic synthesis.

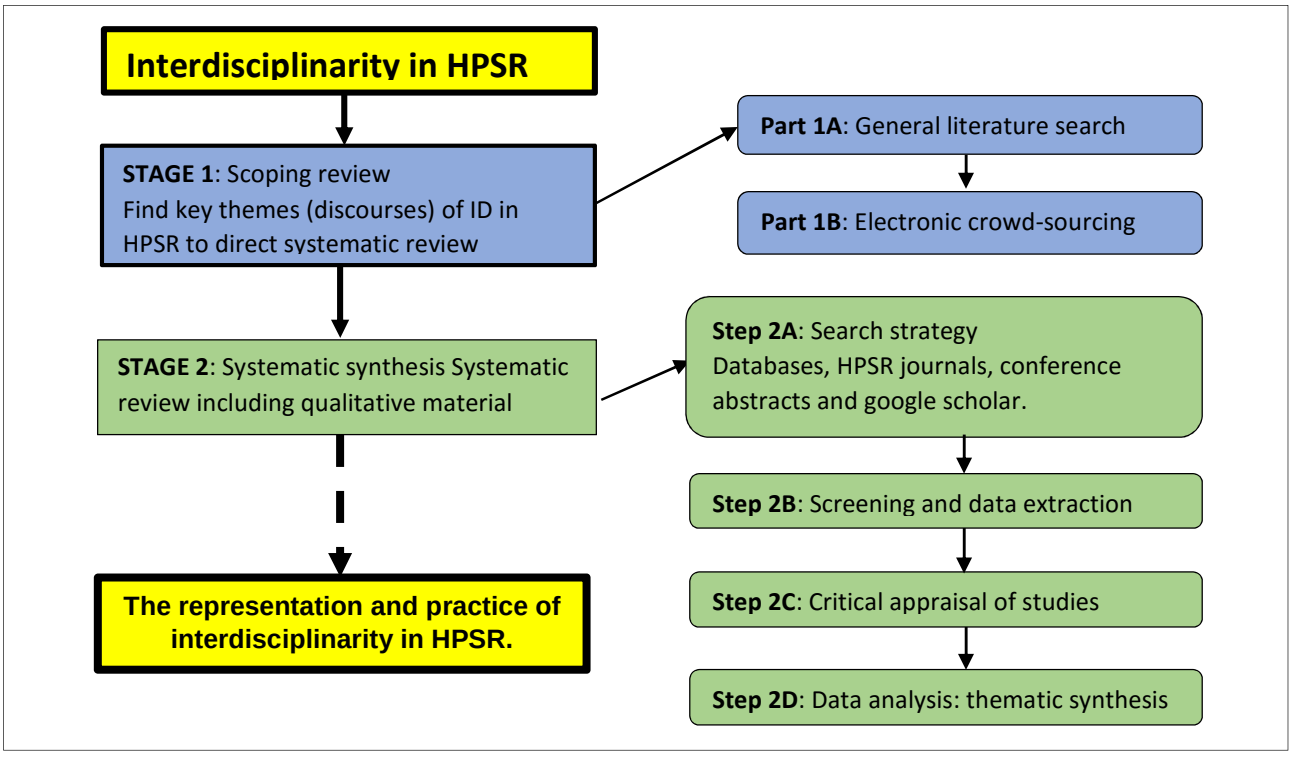
Stage one: scoping review

A scoping review or study is the "synthesis and analysis of a wide range of research and non-research material to provide greater conceptual clarity about a specific topic or field of evidence" (Davis *et al*. 2009). As HPSR is an emerging field, and this is an explorative study into a topic which suffers from much ambiguity and confusion, a scoping review is required to provide clarity on the search terms and direction to be utilised for the systematic review (Choi

and Pak 2006; Gilson 2011). A scoping review is a required step to be performed prior to systematic review in order to formulate the appropriate search terms and period (Roehrich *et al*. 2014).

The scoping review will comprise primarily of a standard literature review conducted in an iterative fashion until conceptual saturation has been achieved. A wide range of literature will be evaluated: journal articles from a variety of HPSR-relevant journals, textbooks and other academic literature; as well as grey literature such as conference reports, websites and reports of relevant organisations and policy briefs. The scoping review will be open to and include any relevant disciplinary influence.

Figure 1: Diagrammatic representation of research strategy



A voluntary crowd-sourcing survey will aid the literature review and provide further guidance for the systematic review.[1] Crowd-sourcing can be defined as "the practice of obtaining needed services, ideas, or content by soliciting contributions from a large group of people and especially from the online community rather than from traditional employees or suppliers" (Merriam-Webster 2015). Traditionally the term crowd-sourcing is interpreted in terms of outsourcing tasks to individuals through an online platform for remuneration (Ganthade and Gupta 2014). However for the purposes of this study, the term 'crowd-sourcing survey' is utilised to indicate that an online platform (SurveyMonkey), will manage and distribute the surveys to a broad group of individuals (SurveyMonkey 2015). Participation is voluntary and no remuneration will be received. For ethical purposes, this is not to be considered a 'survey' (this study remains quintessentially a literature review), but is rather an increasingly common practice for extending scoping literature reviews and ensuring capture of key literature from stakeholders in the field (in this case HPSR).

A short electronic survey will be distributed (with relevant permission obtained from the list managers) to voluntary subscribed members of selected Health System Global (HSG) thematic working groups, for example, SHaPeS (social science approaches for research and engagement in health policy and systems) and Medicine in Health Systems. HSG is an organisation dedicated to promoting health systems research, and is the main representative body of HPS researchers internationally. One of the 10 thematic working areas of the SHaPeS thematic working group is 'Working Across Discipline' and thus has a membership which could provide valuable information on ID and IDR with HPSR (HSG 2015).[2] Care will be taken to gain a

[1] Note, the crowd-sourcing survey was conducted as described, and its results fed in a general way into the scoping review and analysis. However, responses were too limited and slow to act as a basis for this thesis project. We therefore do not report on this crowd-sourcing survey here, and will publish its findings separately (after a second round has been pursued).

[2] The supervisor and PI of this study (Olivier) is currently the thematic lead of this sub-group within SHaPes

balanced ID perspective (for example, the SHaPeS group is likely to have a large proportion of social scientists in that particular membership group, care must be taken not to make substantive conclusions of the nature of ID in HPSR from that particular clustering). The survey will be created utilising the online software tool, SurveyMonkey and will comprise questions related to the participant's perspective of ID in HPSR and personal experience of ID. The web-based survey will be sent to approximately 500 participants – with an anticipated 'low' response rate of around 50 responses. The crowd-sourcing activity is seen to supplement and inform the scoping review activity in this first stage, and in turn support the framing of Part B.

Stage two: systematic review

An underlying aim of the study is to support the field-building activity within HPSR - and therefore a comprehensive, iterative and systematic review of the field is required to provide the most inclusive exploration of the phenomenon under examination. ID is a complicated topic, with applications in diverse disciplines and consequently there are much variation in definition and application (Aboelela ***et al***. 2006; Choi and Pak 2006). HPSR is also a field that deals with complex phenomena, so there is additional need for framing and systematic work. Although the scoping review is necessary to understand the scope and range of issues most relevant, a systematic review of a more tightly framed issue is more likely to be useful and have broader application within HPSR.

Systematic reviews of qualitative research have sometimes been disregarded due to the fundamental epistemological assumptions of qualitative work (Saini and Shlonsky 2008). Qualitative research aims to provide further in-depth insights into a phenomenon that is beyond quantifiable figures. This can cause difficulties in synthesising findings utilising to traditional systematic review methods (Jones 2004; Saini and Shlonsky 2008; Spencer ***et al***. 2003).

Qualitative research by nature is very context specific, with findings argued to be analytically as opposed to statistically generalisable (McDermott *et al*. 2004). It is therefore strongly recommended that synthesis of qualitative evidence should not be conducted in the exact same manner as quantitative systematic reviews but in the most applicable method for the research question (Jones 2004; McDermott *et al*. 2004).

This study involves one context, that of the field of HPSR, and aims to explore how ID is understood collectively (or commonly) within the field. Therefore synthesis is applicable in this instance and indeed the most appropriate method for the research question. In the last few decades, methods developed exclusively for the synthesis of qualitative research have been developed such as meta-narrative analysis, meta-ethnography, thematic synthesis; grounded theory and critical interpretative analysis (Barnett-Page and Thomas 2009). These methods have emerged as a result of; the increasing body of qualitative research available, the growing acknowledgement of the value of qualitative research, and the need for tailored synthesis methods (Saini and Shlonsky 2008; Sandelowski and Barosso 2007).

Although qualitative systematic review methods benefit from a flexible and individual approach, it is vital that key rigorous and systematic aspects of traditional review methods be included (Saini and Shlonsky 2008). The Alliance for Health Policy and Systems Research (AHPSR) defines systematic review according to the Campbell Collaboration - and there are indeed examples of both Cochrane and Campbell style reviews commonly found in HPSR (AHPSR 2011; AHPSR 2014).

According to the Campbell Collaboration (2014), a systematic review must include four steps: 1) Literature search consisting of a scoping review (stage one above) followed by systematic

search; (2) Screening with inclusive and exclusion criteria (2 levels) and data extraction; (3) Critical appraisal of included studies (meta-analysis and only if possible); and (4) Synthesis of selected studies (McDermott ***et al***. 2004; Saini and Shlonsky 2008).

The first three steps will be according to a traditional Campbell style systematic review for quantitative studies (McDermott ***et al***. 2004; Saini and Shlonsky 2008). However the critical appraisal tool selected for step three will be appropriate for qualitative studies. Step four will involve a type of synthesis more appropriate for qualitative studies and thematic synthesis will be discussed further under data analysis.

Step one: search strategy

The scoping review which comprises the first part of the literature search is discussed above under stage one. The second part of the search will comprise a systematic search of HPSR literature. Multiple databases will be searched due to the multi- and interdisciplinary field of HPSR and the complexity of the topic for example: JSTOR, Scopus, Pubmed, and AfricanWide. Additionally prominent HPSR journals identified during the scoping review will be searched as well as conference abstracts from the last three dedicated global HPSR conferences. Academic publications are the culmination of social practices within a field and are the most "concrete, accessible and realisation of these practices" (Hyland 2004). Therefore journal articles are one of the most important representations of the extent of a practice in a field. Prominent journals of HPSR identified during stage 1 will be searched utilising the refined search terms as well as hand searched for examples of empirical and conceptual research related to ID in the field (Saini and Shlonsky 2008). There have been three global symposia for health systems research (2010, 2012, and 2014). Valuable information regarding new research conducted, with interdisciplinary characteristics, may be gained from reviewing

the themes and abstracts from the three conferences. This data will be searched utilising the refined search terms as well as hand searched. An online search will also be conducted with Google Scholar.

The following search terms will be employed: "interdisciplinarity AND HPSR"; "interdisciplinarity AND health systems"; "interdisciplinarity AND health"; "interdisciplinary research in HPSR"; "multiple disciplinary research in HPSR"; "crossing AND disciplines AND health systems"; "HPSR AND disciplines"; and "mixed method AND HPSR". Additional search techniques such as footnote chasing (perusal of references) of good quality articles will be employed (Saini and Shlonsky 2008).

Step two: screening strategy

Screening will consist of two levels of screening based on predetermined inclusion and exclusion criteria. The first level will involve a quick screening based on broader criteria such as the presence of:

- Multiple disciplinary concepts or methods (inter-, multi- and transdisciplinary); AND
- Health science related disciplines or fields.

The second level of screening will involve detailed searching of full text and refined criteria developed from the scoping review will be applied.

Data will be extracted from selected studies utilising a data extraction form (Appendix C). Managing data with a data extraction form is an essential part of a systematic review and provides a framework for analysis (Whyle 2015). However these are preliminary forms and will be further refined by the scoping review. Expected categories based on the literature review

for this protocol include: ID as a concept (theoretical), ID as an approach (theoretical), examples of IDR, inter-, multi-, and transdisciplinarity.

Step three – critical appraisal

In the last decade there has been an increasing acceptance of qualitative research findings as evidence and subsequent development of qualitative systematic review methods. As a result, several critical appraisal tools to assess quality of qualitative studies have been formulated (Spencer *et al*. 2003; Thomas and Harden 2008). Some examples include: CASP - Critical Appraisal Skills Program; ENTREQ - The Enhancing of Transparency in Reporting the synthesis of qualitative research; and QR2 - Quality and Rigour in Qualitative Research (Saini and Shlonsky 2008; Satink *et al*. 2013; Tong *et al*. 2012). The CASP tool for quality research (Appendix D) will be utilised as it is one of the most widely used critical appraisal tool for systematic reviews, is easily available and user-friendly (Chan *et al*. 2012; Newton *et al*. 2012). Although all articles will be assessed for quality with this checklist, only articles with insurmountable flaws will not be included. As this study is about how ID is represented in HPSR, all relevant articles should be included as even articles of poorer quality still represent the topic in field.

Step four - data analysis/ thematic synthesis

The aim of qualitative synthesis is "to achieve greater understanding and attain a level of conceptual or theoretical development beyond that achieved in any individual empirical study" (Campbell *et al*. 2003). The study aims to enhance and develop the concept of ID in HPSR. The concept will be explored in order to produce a comprehensive understanding of the topic in the field. A traditional qualitative data analysis approach of thematic analysis will be adopted. Thematic analysis involves evaluating a wide variety of data for cross-cutting themes

in order to develop an overall representation of a topic. Thematic synthesis has been utilised in a wide variety of systematic reviews for qualitative synthesis (see Chan *et al*. 2012; McDermott *et al*. 2004; Newton *et al*. 2011; Satink *et al*. 2013; Thomas and Harden 2008).

Thematic analysis allows for synthesis of data from different sources based on a common topic (Lucas *et al*. 2007). A comprehensive description of ID will be formulated by analysing recurring themes across data sources. 'The purpose of the method is to develop analytical themes through a descriptive synthesis and find explanation relevant to a particular review question' (Ring *et al*. 2011). Thematic synthesis consists of three stages: free line-by-line coding; organisation of codes into descriptive themes; and lastly the development of analytical themes. The first stage involves analysing each line of the data extracted for each document and comparing to the line that follows. New codes will constantly be formed and refined with irrelevant codes deleted when necessary. Codes will be grouped together to form descriptive themes in stage two. Stage three involves connecting themes to form an interpretation relevant to the research question thus creating analytical themes. This interpretation aims to explore beyond the mere categorisation of themes and provide an in-depth insight into the phenomenon (Thomas and Harden 2008). This process will be aided with concept mapping, discussion, and back checking with the research supervisor (see Satink *et al*. 2013).

Rigour

Due to the flexible study design of the research study, the researcher will ensure that transparency of the research process is maintained through strict record keeping and detailed explanation at all stages of the research. The prevention of bias is attempted through the use of a systematic exhaustive literature search and data extraction forms. All data will be analysed twice by the researcher and the research supervisor will assist the researcher in the final

formulation of the data extraction forms to promote internal validity. The research supervisor will additionally review the analytical themes derived from the descriptive themes to check validity of interpretation. Reflexivity will be maintained by the researcher through the meticulous note taking and reflection. In particular, disciplinary bias will be closely reviewed (that is, whether the researchers' own disciplinary background and perspectives might be influencing the research and analysis). A careful consideration will be made of any disciplinary influence that may be relevant to the study. Confirmability will be ensured by thorough documentation and reporting of the methodology utilised for the study enabling other researchers to duplicate the study process (Barbour 2006; Malterud 2001).

Ethical considerations

As a systematic review, this study is of low risk. The minor supporting method of 'crowd-sourcing' (see above explanation) will follow all ethical considerations. Relevant permission will be obtained to conduct the electronic crowd-sourcing survey (see participant information form, Appendix A, and questionnaire, Appendix B). Informed consent will be obtained electronically and participation will be voluntary. As discussed above, the survey will be distributed to members of purposively selected HSG thematic working groups with relevant permission obtained. The purposively selected, HSG thematic working groups consist of key HPSR stakeholders who have voluntarily subscribed. Participation is completely controlled by the participant as the response to the survey is voluntary and flexible with regards to time. SurveyMonkey respondents remain anonymous to each other, unlike other crowd-sourcing tools (SurveyMonkey 2015). All participants will therefore remain anonymous and communication will be channelled through a secure server. The review will consist of secondary analysis of published data and grey literature and cited accordingly. It is not anticipated that any further primary data will be sought.

Study limitations and benefits

As discussed under the background section of this protocol, ID suffers from much ambiguity in terms of definition, and we anticipate that ID will often not be explicitly (intentionally) mentioned in the HPSR texts (which is part of the hypothesis presented above). Therefore there may be only limited source documents found through initial review which clearly meet inclusion criteria. In that case, broader methods might be necessary to seek out related terms that 'imply' ID, although not utilising that term. The crowd-sourcing survey may not yield sufficient results with regards to breadth and quantity. Thus the survey may be reported on and incorporated into a follow-up study. Additionally a review of HPSR curricula could provide valuable information, however these materials are not often open-access and a comprehensive investigation to acquire the necessary documents was not deemed possible given time limitations. Therefore this avenue of ID is also be designated to a later investigation.

The potential benefit of this study is the promotion of ID in HPSR which is considered necessary for finding solutions for complex problems beyond the scope of one discipline (Repko 2008). As discussed above (see above under ***Interdisciplinarity in HPSR***), the lack of clarity around ID as concept and approach may be hindering the advancement of HPSR. This study may potentially lead to further investigations and strengthening of IDR guidelines and methodology in HPSR teaching and practice.

Timeline

Table 1: Timeline for study

Subject	Activity	Dates
Part A: Protocol	Topic formulation, supervisor appointment	February-April 2015
	Drafts	May-September 2015
	Submission	End of September 2015
Part B: Literature review	Scoping review	February-August 2015
	Drafts	October-December 2015
Part C: Journal Article	Systematic review	October-December 2015
	Thematic analysis	December 2015
	Drafts	December 2015-January 2016
	Submission	1st March 2016

Budget

This study is supported by a *Health Policy and Systems Division Thesis Award* (funded through the CHESAI Collaborative and IDRC-Canada). A summary of the anticipated budget for the study is tabulated below.

Table 2: Budget

No.	Budget Line	Description	Cost
A.	**Necessary Expenses**		
1	**Stationary**	Consumables (pens, workbook)	**R 100**
2	**Printing**	Consumables (paper, ink cartridges)	**R 500**
		Professional printing & binding of dissertation	**R 500**
3	**Petrol**	Travelling to university campus for research (round trip 80kms, R150 x 12 months)	**R 1 800**
4	**Internet**	Monthly internet fee (R100 x 12 months)	**R 1 200**
B.	**Optional Expenses**		
5	**Contribution**	Presentation at HSG 2016 conference, (Canada)	**R 10 000**
		TOTAL	**R 14 100**

Dissemination

This research study is of important relevance to the field of HPSR. The findings are hoped to be published in a prominent HPSR journal. The findings may be presented at the next Health Systems Global conference being held in Canada in 2016. The findings will be distributed through the HSG thematic working groups and other HPSR related networks.

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PART B: SCOPING LITERATURE REVIEW

Interdisciplinarity in HPSR, Health Sciences Research and Interdisciplinary Studies

Introduction

Interdisciplinarity (ID) as a concept and research approach (interdisciplinary research - IDR) is an important consideration for the field of Health Policy and Systems Research (HPSR). The field is defined as interdisciplinary, and encompasses researchers from a variety of disciplines (Bennet *et al*. 2011). It has been asserted that the field's advanced research methodology results from a blending of multiple disciplinary influences (Sheikh *et al.* 2011). However, the full representation of this topic as a concept and approach in HPSR is unclear. Academically, ID has been confused by multiple definitions and complicated frameworks. A comprehensive understanding of ID is required to enable the successful exploration of ID in the discourse of HPSR. Therefore a scoping review was conducted on the topic of ID in relation to HPSR, health sciences literature and interdisciplinary studies to provide clarity regarding ID terminology, theory and practice.

Methods

Due to the ambiguous and complex nature of the subject of interdisciplinarity (ID), we conducted a scoping review to gain a clearer and more comprehensive understanding. A scoping review aggregates and explores literature on a specific topic from a variety of diverse sources with the aim of achieving better clarity (Davis *et al*. 2009). The scoping review was conducted over a four week period during October and November 2015. The scoping review followed a traditional review format and was conducted iteratively, in order to achieve

conceptual saturation. A wide variety of formal and grey literature were included in the search; journal articles, conference reports, academic textbooks, policy briefs, reports of relevant organisations and internet websites. Multiple databases and search platforms were utilised such as Scopus, Web of Science, EbscoHost, PubMed and Google Scholar. No time period or geographical location limit was set, however there was a more intensive focus on documents produced in the last two decades, and only English-language literature was reviewed in detail.

In appreciation of ID, this study has considered the concept of ID not only as its research topic, but its research methodology and theoretical grounding.[1] Thus although the search initially explored ID in HPSR, the search was broadened to literature within Health Sciences, and the field of interdisciplinary studies, ultimately encompassing any relevant disciplinary source or influence. Due to the complicated theoretical nature of the topic of ID, specific authors, emerging from the initial search, with a substantial volume of contributing work towards ID, underwent further searches (namely: Klein, Repko, Kessel, Boix-Mansilla, and Rosenfield). Although this search strategy produced a large amount of literature, a broad understanding of ID was required to successfully explore how the topic is represented in HPSR. Relevant literature was deductively categorized as follows: ID in HPSR; ID in Health Sciences; and HPSR in General Academia. Thereafter inductive thematic analysis was utilised. The utilisation of both inductive and deductive thematic analysis techniques enabled structure as well as flexibility, which is appropriate for a scoping review (Knight *et al*. 2014). The process was an iterative one, therefore the review was only finalised once conceptual saturation was achieved. Conceptual saturation was deemed to be achieved once new themes stopped emerging and we were satisfied that an adequate clarity and comprehensive integrated

[1] It is worth noting that there as a layer of complexity to this study – which is in effect an interdisciplinary study of interdisciplinarity within HPSR

understanding had been achieved *from any relevant disciplinary influence*. Essentially that an interdisciplinary understanding was accomplished.

Interdisciplinarity in health policy and systems research

There are two aspects of ID reflected in HPSR that warrant further exploration: firstly the notion of an interdisciplinary field; and secondly the concept of ID as a practice or approach and its connection to complexity theory.

Health policy and systems research as an interdisciplinary field

HPSR is a field dedicated to researching health policy and systems issues. The field emerged in response to the growing acknowledgment of the importance of health systems strengthening, and to fill the research gap created by previous neglect. Thus HPSR developed not as a discipline, but as a wider interdisciplinary field of study encompassing many different disciplines orientated around a common research agenda (Gilson 2012; Sommer 2000). A distinction needs to be made between an interdisciplinary field and an interdiscipline. The term 'interdiscipline' is utilised to describe a new specialisation of knowledge formulated between disciplines, which has become institutionalised. An interdisciplinary field is established when researchers from more than one discipline unite to study a particular subject area or group of phenomena (Sommer 2000). A field of study is inherently multidisciplinary encompassing multiple disciplines with a shared body of knowledge (Flood *et al*. 2004). HPSR can be understood to be an interdisciplinary field, in the process of becoming an 'interdiscipline'. However, forming a discipline often involves tightening disciplinary boundaries which may be at odds with HPSR's aim to select the most relevant methodology for the research question (and subsequently incorporate any applicable disciplinary influence). Therefore a careful

consideration is needed to balance the production of rigorous research while maintaining disciplinary openness.

The ID of a field and/or how an interdisciplinary field has progressed over time, can be evaluated using bibliometric tools, which assess the extent of multiple disciplinary influences in research output (Leydesdorff and Rafols 2011; Porter ***et al.*** 2008). Research outputs can be analysed utilising various quantitative, interdisciplinary indicators ranging from, simple co-authorship analysis, to more complex statistical and visualisation methods (Porter ***et al***. 2008). An approach developed by Porter and Rafols (2009) combines several techniques to provide a comprehensive analysis of the extent of interdisciplinarity in a particular field. The approach employs a bibliometric tool, the Rao-Stirling diversity index, which assesses: the number of different disciplines referenced in an article; how many times each discipline is cited; and how similar the disciplines cited are to each other (Porter and Rafols 2009).

ID as a practice in HPSR

Beyond the mere description of HPSR as an interdisciplinary field, some HPSR literature describes ID as a practice or approach. Sheikh ***et al***. (2011), asserts that HPSR encompasses cross-disciplinary collaboration and drawing upon different disciplinary influences, in a multidisciplinary (influences remain isolated), as well as in an interdisciplinary (influences are integrated) manner. Influences from multiple disciplines and innovative approaches (such as ID) are often promoted to address complex problems (Gilson 2012; Repko 2008). Indeed, the concept of complexity is central to ID and HPSR (see Adam and de Savigny 2012; Gilson 2012; Klein 2004; Newell 2001; Repko 2007; Sheikh ***et al***. 2014). Complexity, like ID, is fraught with diverse influences and interchangeable terms (Newell 2001). A full review of the concept is somewhat beyond the scope of this review - however, complexity, complex systems

thinking and complex adaptive systems are important to the field of HPSR. For example, within HPSR, health systems are understood as complex due to their dynamic, unpredictable nature, fluid boundaries and network of multiple, non-linear, interrelated relationships (Gilson 2012; Kannampallil *et al*. 2011; Plsek and Greenhalgh 2001). Therefore health systems are often described as complex adaptive systems. (Plsek and Greenhalgh 2001; Sturmberg and Martin 2009; Tan *et al*. 2005). According to Plsek and Greenhalgh (2001), a complex adaptive system (CAS) is 'a collection of individual agents with freedom to act in ways that are not always totally predictable, and whose actions are interconnected so that one agent's actions changes the context for other agents'. Thus, often the issues confronting health systems are highly complex and context specific requiring a complex systems thinking approach (Adam and de Savigny 2009; Gilson 2012; Strumberg and Martin 2009). The most significant difference in complex systems thinking, as opposed to traditional systems thinking, is viewing a system as an unpredictable, living organism instead of a predictable machine. Table 3 below tabulates the differences between complex adaptive system and traditional system approaches.

Table 3: Comparison of organisational system characteristics

Complex Adaptive Systems	**Traditional Systems**
Are living organisms	Are machines
Are unpredictable	Are controlling and predictable
Are adaptive, flexible, creative	Are rigid, self-preserving
Tap creativity	Control behaviour
Embrace complexity	Find comfort in control
Evolve continuously	Recycle

Source: Adapted from Centre for the study of Healthcare Management 2003

An ID approach is of particular importance to those who seek to assess health systems as complex and adaptable, as the assessment of such systems necessitates the drawing upon of multiple tools and theoretical frameworks (Gilson 2012; Repko 20008).

Despite the calls for ID as a practice and approach, the field needs to develop a stronger culture of cross-disciplinary understanding, especially across the social science and biomedical science perspectives. The inclusion of more social sciences influences is advocated for in HPSR as important to understanding the complexity of systems – and in an effort to avoid disciplinary capture within the field by more positivist orientated disciplines (Gilson *et al*. 2011). This could be facilitated by advancing research methods and embarking on good quality mixed-methods research (discussed below – see ID in Health Sciences Research). The bibliometric tools discussed above can also be utilised to reveal the extent of social science influences in a field, and whether there has been an increase of social science influences over time.

Interdisciplinarity in health sciences research

Broadening our lens to Health Sciences research revealed that a significant use of the concept of ID (as well as multi- and transdisciplinary) can be found in health research, in particular health services research and clinical research (Batterman *et al*. 2008; Giacomini 2003; Kessel and Rosenfield 2008; Kessel *et al*. 2008; Nair *et al*. 2008; Slatin *et al*. 2004). ID is expressed in several ways, stemming from the multiple variations in definition (which will be discussed in detail below – see clarifying ID terminology). The term 'interdisciplinarity' could represent a concept, approach and teamwork, with collaboration ranging from, juxtaposition of disciplinary contributions (multidisciplinary), to fully integrated methodology or theory with multiple stakeholders (transdisciplinary). The following manifestations of ID in health sciences will be discussed in more detail: interprofessional health care teams; team science; science of

team science; and efforts to include more social science influences in health sciences research (in particular mixed-methods research and Rosenfield's transdisciplinary approach).

Interprofessional healthcare teams

A common representation of ID in health services is in health care teams (also known as interprofessional teams) and networks (Bridges ***et al***. 2013; Garman ***et al***. 2006; Hansmann 2013; Minetti 2011). Healthcare teams collaborate together to provide coordinated and integrated clinical care (Bridges ***et al.*** 2011). This approach stems from the promotion of patient centred care and the realisation that patients often do not receive optimal care due to lack of co-ordination of health care providers (Bridges ***et al***. 2013; Garman ***et al***. 2006; Minetti 2011). Although integrated service delivery is an important topic for HPSR, research about health care teams tend to emphasise synchronisation and teamwork rather than integration of disciplinary insights – and therefore does not serve the scope of work requiring ID in HPSR.

Team science and the science of team science

Another abundant representation of ID in health sciences is in the form of team science initiatives and the field dedicated to studying them, the 'science of team science' (Hall ***et al***. 2012; Kessel ***et al***. 2008; Stokols ***et al***. 2008). Team science initiates involve the collaboration of multiple researchers to address a complex phenomenon. Working across different professions and disciplines is not a pre-requisite for team science, however is promoted (Fiore 2008). The extent of cross-disciplinary engagement is categorized according to degree of integration, multi-, inter- and transdisciplinary (Hall ***et al***. 2012) (See Glossary). The impracticality and difficulty of working with multiple researchers and/or across disciplines has often been cited as a barrier to ID and team science (Fiore 2008; Nair et al. 2008). The science

of team science field is dedicated to investigating how this barrier can be overcome (Fiore 2008; Stokols *et al*. 2008).

Efforts to include for social science influences

In the last few decades there has been a concerted effort to increase the contribution of social sciences to health sciences research (Mabry *et al*. 2008; Rosenfield 1992; Viseu 2015). Insights gained from social and behavioural sciences research can aid in providing: important contextual information; and the 'why' and 'how' of a phenomenon or process (Creswell *et al*. 2011). However, often social science influences, perspectives or results are included in a tokenistic manner or as a convenient after thought (Hesse-Biber and Burke Johnson 2015; Reich and Reich 2006; Reidpath *et al*. 2011; Viseu 2015). Integrating knowledge between disciplines from different paradigms is especially difficult thus the collaboration often remains more multidisciplinary in nature with researchers contributing isolated parts. This can be observed in examples of mixed method research which attempts to integrate perspectives of broadly different epistemologies, the qualitative and quantitative paradigms (O'Cathain *et al*. 2007).

Much mixed method research has been criticised due to lack of transparency and failure to integrate components (Hesse-Biber and Burke Johnson 2015; O'Cathain *et al*. 2007). It is proposed that the intention of integration should be present from the onset, to prevent qualitative and quantitative findings potentially contradicting each other due to their differing epistemological approaches (O'Cathain *et al*. 2007). Integration of findings and methodologies may be facilitated by structuring the study in such a way that researchers from both backgrounds are able to address potential differences throughout the research process and formulate suitable methodological framework (Bryman 2007). Another potential limitation in

the structure of the research process is if one component has more importance or informs the other. This may lead to the one component having to be framed by the other, which is often the case with qualitative research - and subsequently caused it to be termed the 'handmaiden' of quantitative research (Hesse-Biber and Burke Johnson 2015). Integration and ID may present in certain study designs of mixed-method research such as, embedded (nested) or convergent study designs. An embedded study design involves one component being integrated into the other for data collection in order to provide further insights. In a convergent design, qualitative and quantitative components are collected simultaneously and findings are integrated (Creswell *et al*. 2011).

Rosenfield (1992), proposed a transdisciplinary approach for enabling more meaningful collaboration between the social and health sciences. The approach requires *long-term* engagement by team members from different disciplines whereby sufficient knowledge can be transferred and integration is facilitated. Thus, leading to a unified research process methodology and theory. The length of time should additionally provide sufficient information about the particular research context. The research should incorporate all factors affecting health, as well as consider cross-sectoral aspects and different stakeholders (Rosenfield 1992). The aim of this approach is to provide long-term solutions that are novel, context rich, policy relevant and applicable across multiple sectors (Hirsch *et al.* 2008; Klein 2006a; Rosenfield 1992; Stokols *et al.* 2008). In the few decades, there has been a large increase in team science initiatives addressing complex health issues (Stokols *et al*. 2008). Kessel *et al*. (2008) published a collection of interdisciplinary research case studies judged as successfully integrating health and social sciences with the aim of providing practical guidelines for effective interdisciplinary collaborations. The authors noted in this second edition of the book, firstly published in 2003, that there had been a substantial growth in team science initiatives bridging social and health

sciences since the first edition. There are useful lessons from this broader experience in the health sciences, which could more actively inform the many new research collaborations emerging in HPSR.

Interdisciplinary studies

As stated previously, ID is confused by many definitions and interchangeable terms which have sprung from the application of ID in different formats, to many different contexts and subject areas. Additionally ID is sometimes represented as dedicated field in its own right: interdisciplinary studies (IDS). Thus scoping the concept is difficult due to the large volume of relevant literature. Additionally, the concept of ID is constantly evolving. By nature, ID can be applied to and influence any discipline or field. In turn, the concept of ID would be consequently influenced and altered by the disciplines or fields it is applied to. Therefore before we further explore ID in the context of HPSR, it is important to clarify our understanding of ID. We therefore review the essential theory underpinning IDS and explore what aspects are most relevant or valuable to HPSR.

History of interdisciplinary studies

The idea of synthesising knowledge is not new and can be traced back in history as far as Plato. Philosophy was promoted to be a unified science and a philosopher as one capable of integrating knowledge. The concept continued to be observed in writings of modern science (Klein 1990). A scholar was praised for an understanding of a wide breadth of knowledge, however over time the idea of specialisation in the form disciplinarity began to be favoured (Nissani 1997). The notion of disciplines originally arose during the late 15th Century in response to societal and governmental demands for professionalism. However during the 19th Century specialisation advanced due to pressure and progression within academia (Klein

1990). Despite the proliferation of disciplines, proponents for unification of knowledge remained active (Krishnan 2009).

The modern concept of ID started to develop in the early 20th Century (Klein 2006a). The approach was further influenced by the emerging theories of complexity and the growing consensus that complex problems could not be solved by one discipline alone (Klein 2004; Repko 2008). By the 1950s many interdisciplines and interdisciplinary fields had been established, interdisciplinary curricula began to appear in the 1960's and interdisciplinary studies was formally recognised in the 1970's (Choi and Pak 2006; Klein 2004; Sokolova 2013; Sommer 2000). However as ID became more established, the concept and approach was subjected to increasing scrutiny and critique.

Interdisciplinarity has been criticised as: being overcomplicated and impractical; producing 'jack of all trades' researchers that sacrifice too much disciplinary knowledge depth for breadth; and diverting critical funding away from established disciplines (Sokolova 2013). In defence, Nissani (1997) proposed ten reasons for pursuing ID. A few of the most important of these state that often researchers familiar with multiple disciplines can provide a valuable addition to the discipline, as well as notice mistakes often overlooked within a discipline. Additionally certain important research topics may not receive adequate attention if they fall between the boundaries of conventional disciplines. Lastly many complex, cross-sectoral and practical problems necessitate an interdisciplinary perspective, method or collaboration. Szostak (2007) additionally asserts that ID is *not* in competition with disciplinarity, or proposing superiority. In fact many argue that ID is completely dependent on solid disciplinary foundations (Boix-Mansilla 2005). We do not take sides in these battles - all these arguments have relevance to assessing ID practice (and training) within HPSR.

Clarifying 'interdisciplinarity' terminology

The term 'interdisciplinarity' has been plagued by conflicting definitions and differing applications (Aboelela 2006; Choi and Pak 2006). Most definitions of 'interdisciplinarity' begin with separating the term into its prefix and root ('inter' and 'discipline'). A discipline is most commonly defined as "a branch of knowledge" (Choi and Pak 2006). Academic disciplines are acknowledged as difficult to define due to their diversity and constant evolution (Krishnan 2009). However certain features are consistent in that disciplines: are coordinated around a specific area of research; have an associated body of specialized knowledge which incorporates unique terminology, concepts and theories; possess well-defined methodology based on disciplinary knowledge and theory; and are institutionalised within organised education structures in order to cultivate the discipline (Krishnan 2009; Repko 2008). Disciplines, as stated above, are continuously evolving and occasionally specialisations within disciplinary boundaries occur, named sub-disciplines, which comprise their own training and experts (Sommer 2000).

The prefix ***inter*** is defined as 'between, among, in the midst,' or 'derived from two or more'. Therefore interdisciplinary essentially can be defined as between, across or derived from two or more disciplines (Repko 2007). However this definition has led to multiple interpretations and representations of the concept of ID. Therefore ID could: refer to the ***space between*** disciplines (an interdiscipline or cross-sectoral engagement); or describe the ***interaction between*** disciplines (cross-disciplinary engagement); or relate to something ***derived from two or more*** disciplines (a new theory, method, interdiscipline or interdisciplinary field) (Repko 2007; Sommer 2001). Subsequently the term 'interdisciplinarity' has been utilised to describe the concept, process and product of collaboration. Additionally the term has been further confused by the interchangeable utilization of the terms 'multidisciplinarity' and

'transdisciplinarity' which are often used interchangeably. A summary of these definitions and analogies for understanding these terms and are tabulated below (Table 5). The systematic review conducted by Choi and Pak (2006) additionally concluded that the generic term 'multiple disciplinary' should be utilised in future literature when; referring to all forms of cross-disciplinary interaction; or the extent of collaboration is unclear. According to many definitions ID sometimes incorporates (and transdisciplinarity should include) influences from other stakeholders (Repko 2007).

Table 4: Definitions and analogies

TERM	**Definition by Choi and Pak 2006**	**Food analogy by Repko 2008**	**Mathematical analogy by Choi and Pak 2006**
Discipline	*"Branch of knowledge"*	Single Fruit	Single number
Multidisciplinarity	*"The drawing of knowledge from different disciplines but staying within their boundaries"*	Fruits Salad Fruit still remains isolated	2 + 2 = 4 Simple addition
Interdisciplinarity	*"Analysing, synthesising and harmonizing links between disciplines into a coordinated and coherent whole"*	Fruit Smoothie Fruit has been completely *integrated* (emphasis mine)	2 + 2 = 5 Answer is larger than sum of its parts
Transdisciplinarity	*"Transdisciplinary approaches to human health are defined as approaches that integrate the natural, social and health sciences in a humanities context, and in so doing transcend each of their traditional boundaries*	Fruitcake Fruit has been completely transformed into something new	2 + 2 = yellow Something completely has been formed from the process

The wide variety in definitions of ID can be usefully clarified for use within HPSR by exploring two different styles of interdisciplinarians namely; 'generalist' and 'integrationist' (Repko 2007; Solovoka 2013). Generalist interdisciplinarians would recognise any interaction between two or more disciplines as ID, with or without the presence of integration. This is captured in the broad definition by Moran (2002), which describes ID as 'any form of dialogue or interaction between two or more disciplines' (Repko 2007). However Moran does state that ID

comprises many different levels of interaction; distinguishes between multidisciplinary and interdisciplinary; and ascertains that ID should be 'knowledge generating' (Moran 2002). Nevertheless generalists might argue that teamwork and/or the types of research question should be the determining factors in ID and not integration. In contrast, integration and synthesis of multiple disciplinary insights is a central part of integrationist-authored definitions of ID. Integrationist interdisciplinarians argue that integration should be the core objective of ID in order to solve complex problems. Additionally, formulating a research process which intentionally facilitates integration is imperative for integrationists (Repko 2007).

The term 'interdisciplinarity' has been referenced in HPSR according to both generalist and integrationist perspectives (Chigudu *et al*. 2014[1]; Sheikh *et al*. 2011[2]). However , in our reading of the parallel bodies of literature (ID and HPSR), the integrationist perspective more closely reflects certain fundamental HPSR theory such as: complexity; the desire to intentionally include more social science influences; advancement of methodology facilitating collaboration across disciplines; and the integration of any disciplinary influence most suitable to address the research question). To repeat an earlier statement – many complex, cross-sectoral and practical problems necessitate an interdisciplinary approach – but importantly an interdisciplinary approach with ***intentional integration.*** We therefore now focus on aspects of ID from an integrationist perspective in closer detail.

[1] **Chigudu et al. 2011**, recommend future interdisciplinary research, however no source reference is given and it is not indicated what type of interaction is meant by this statement (i.e. involving integration) therefore one can only assume that the authors utilised the term 'interdisciplinary' to describe any form of research conducted with multiple disciplinary members and/or influences. **Thus representing the generalist perspective.**

[2] **Sheikh *et al.* 2011**, refers to HPSR blending disciplinary influences in a multi- (influences remain separated) and interdisciplinary (influences are integrated) manner. Distinguishing between the two and in particular with regards to integration is **representative of a integrationist perspective**

Defining (integrationist) interdisciplinary research

A definition of IDR that suits an integrationist perspective is, for example, one formulated through a systematic review by Aboelela (2006),

> "Interdisciplinary research is any study or group of studies undertaken by scholars ***from two or more distinct scientific disciplines***. The research is based upon a conceptual model that links or ***integrates*** theoretical frameworks from those disciplines, uses study design and methodology that is not limited to any one field, and requires the use of perspectives and skills of the involved disciplines ***throughout*** multiple phases of the research process" (emphasis – mine).

The core characteristic of ID, in the view of integrationist interdisciplinarians, is ***integration*** (Wolfe and Haynes 2003). However reconciling multiple disciplinary influences especially from diverse disciplines or different paradigm can be challenging and therefore requires, finding common ground and a clear intention to facilitate this from the onset of the collaboration (Newell 2001; Repko 2007). Of course, the term integration similarly suffers from ambiguity, however Repko (2008) offers the following definition as: 'the cognitive activity of critically evaluating and creatively combining ideas and knowledge to form a new whole'. As discussed in the mathematical analogy in Table 4, an (integrationist) ID research finding should represent a new whole, more than the sum of its parts – and where something more comprehensive was gained from the collaborative interactive than the simple addition of isolated contributions (see Aboelela ***et al***. 2006; Choi and Pak 2006; Repko 2008). In this view, without integration, research remains disciplinary or multidisciplinary, and has less likelihood of achieving success or of solving complex practical problems. Therefore integration is the identifying marker for IDR from an integrationist perspective. It is also worth noting that interdisciplinary integration does not involve the combining of things that are identical, but

rather the merging of diverse assumptions, concepts and theories from different discipline (Wolfe and Haynes 2003).

The aim is therefore not to eradicate differences but rather to create a common ground from which to formulate the most appropriate research approach or understanding (Repko 2007). The concept of common ground is said to have risen from cognitive psychology and is considered a crucial step for integration (Repko 2007). Disciplines can also be described as cultures – in which case, interaction between them requires a certain 'cultural competence'. Proponents of this metaphor advocate for researchers from contributing cultures (disciplines) to collaborate in a heterachal (unranked, without hierarchy) rather than hierarchal manner. Disciplinary superiority can lead to tokenism with the simple addition of a disciplinary influence without active or meaningful integration (Bauer 1990; Becher and Trowler 2001; Kessel and Rosenfield 2008; Reich and Reich 2006). In order to find common ground within ID practice, researchers would attempt to find a common vocabulary (Klein 1990) and then search for disciplinary aspects that are; shared or overlapping, similar, compatible, and negotiable (Repko 2008).

However, finding common ground is a difficult task, therefore researchers attempting to integrate different and often conflicting insights, often require certain characteristics and skills (Gebbie *et al*. 2008). Repko (2008) argues that researchers embarking on IDR should ideally possess the following attributes: an understanding and openness of other's perspectives; a love of diversity; ability to work well with others; humility; reflexivity; innovativeness; acceptance of uncertainty and contradiction characteristic of complex situations. In addition to the above attributes, the researcher should be able to think logically but creatively; and abstractly as well as holistically (Repko 2008). Common ground also becomes important in research design –

where it has been argued that due to the challenges of reconciling disciplinary conflicts it is important to design a research strategy that intentionally facilitates finding common ground (and subsequently integration) between multiple disciplinary influences repeatedly ***throughout*** the research process (Aboelela 2006; Strang and McLeish 2015).

Intentionality in IDR is two-fold. It encompasses both the aim to integrate multiple disciplinary influences from the beginning of the research study as well as the objective to actively engage with those influences throughout the research process (Aboelela 2006; Lyall ***et al*** 2011). 'Interdisciplinary research should be purposeful…not an end in itself but a means to explain phenomena, advance categorisations, create methods and instruments, craft products, find solutions, pose new questions' (Boix-Mansilla 2006). As discussed above, the mere inclusion of multiple perspective and members does not necessarily result in interdisciplinary research or collaboration (Lyall ***et al***. 2011). In order to facilitate this, frameworks for conducting IDR and evaluating IDR are required. There are currently no such frameworks visible in the HPSR literature – and therefore a review of relevant frameworks sourced from interdisciplinary studies would be beneficial.

Frameworks for conducting and evaluating IDR

Disciplines have very well defined criteria for conducting and evaluating research however these often cannot be appropriately applied to IDR (see Boix Mansilla 2006; Newell 2001; Strang and McLeish 2015; WHO 2012). There are few clear practical frameworks for how to conduct and evaluate good quality IDR (Jacobs and Frickel 2009; Lyall ***et al.*** 2011). Consequently identifying good examples of empirical IDR is challenging. Additionally frameworks are complicated by the generalist versus integrationist interdisciplinarian split (in that assessment frameworks would be assessing different key aspects, based on their differing

interpretations of ID). Frameworks developed by followers of integrationist ID tend to consider intentionality and the whole research process (Boix-Mansilla 2005; Repko 2007). Other frameworks more congruent with generalist interdisciplinarians focus on the presence of multiple disciplinary influences in the product of the research and tend to be more quantitative in nature thereby often utilising bibliometric tools (as discussed briefly above). As we have argued, we view integrationist perspectives as more immediately relevant for HPSR – therefore, we focus on frameworks congruent with this perspective.

Repko (2006) developed a comprehensive operational framework for conducting IDR by co-ordinating previous efforts by the integrationist interdisciplinarians: Klein, Newell, and Szostak (see Table 5 below).

Table 5: Interdisciplinary research framework

Part A: Drawing on disciplinary insights	
1.	Define the problem for formulate the focus question
2.	Justify using an interdisciplinary approach
3.	Identify relevant disciplines
4.	Conduct a literature search
5.	Develop adequacy in each relevant discipline
6.	Analyse the problem and evaluate each insight into it
Part B: Integrating insights and producing an interdisciplinary understanding	
7.	Identify conflicts between insights and their sources
8.	Create or discover common ground
9.	Integrate insights
10.	Produce an interdisciplinary understanding of the problem and test it

Source: Repko 2006

The framework comprises ten steps divided into two parts. Part A (drawing on disciplinary insights) consists of six steps and Part B (integrating insights and producing an ID understanding) entails four steps. The process is non-linear and each step could be reconsidered at any point along the research path.

Boix-Mansilla (2005) is a proponent of the integrationist perspective and formulated a qualitative framework for evaluating student interdisciplinary work based on 'interdisciplinary understanding'. Interdisciplinary understanding is defined in the framework as 'the capacity to integrate knowledge and modes of thinking drawn from two or more disciplines to produce a cognitive advancement—for example, explaining a phenomenon, solving a problem, creating a product, or raising a new question—in ways that would have been unlikely through single disciplinary means' (Boix-Mansilla 2005). This evaluation framework comprises three dimensions, entrenched in three central questions, to assess interdisciplinary understanding: disciplinary grounding (asking, is the work grounded in carefully selected and adequately employed disciplinary insights?); integrative leverage (asking, are disciplinary insights clearly integrated so as to leverage researcher understanding?); and critical stance (asking, does the work exhibit a clear sense of purpose, reflexivity and self-critique) (Boix-Mansilla 2005). We would argue that these kinds of questions (and evaluative frameworks) could be usefully applied to HPSR research.

Enablers and constrainers to conducting IDR

One of the main identified constraints to successful ID collaboration is insufficient time to facilitate successful engagement, to find common ground or integrate insights (Aagaard-Hansen and Ouma 2002). For example, depending on the size of the collaboration, numerous meetings and other platforms for engagement are necessary to assist this process. Many

research projects are bound by deadlines that inhibit this kind of IDR process. Therefore the intentionality of ID, appropriate time horizon and estimated time required from researchers should be negotiated in research and funding proposals before the onset of the study (Aagaard-Hansen and Ouma 2002).

Another common constrainer to ID is disciplinary hierarchy – and the balance between disciplinary influences can be difficult to reconcile. Power dynamics across disciplines may guide which influences are utilised, despite what is most applicable or useful for the research project. It is vital that researchers enter an ID collaboration with at least the aim of maintaining (or establishing) a heterachal platform where all disciplines are regarded equally (see Aagard-Hansen and Ouma 2002; Kessel and Rosenfield 2008; Nair *et al*. 2008). This can be enabled when researchers embarking on ID projects possess the skills and attributes discussed above (see finding common ground). However, research projects do not exist in isolation and are often affected by institutional and organisational factors. The majority of academic and other research organisations still operate within rigid disciplinary boundaries constraining collaboration (Jones 2009). These constraints are strongly visible within HPSR (see discussion above and below on the role of social science in HPSR).

The lengthier time horizon, extent of researcher input and difficult research process can be limiting factors for sponsors and researchers. Therefore funding can be a constraining factor for ID. However there has been a substantial increase in funding in the last twenty years, enabling interdisciplinary collaborations (see Giacomini 2003; Frickel *et al*. 2016; Kessel and Rosenfield 2008; Nair *et al*. 2008; Slatin *et al*. 2004). Publishing and disciplinary ownership of research are other academic constrainers to embarking on IDR. However there has been an

establishment of journals dedicated to IDR and an increase in journals self-identifying as multiple disciplinary in nature (Kessel and Rosenfield 2008; Klein 2006b; Slatin *et al*. 2004).

Discussion and conclusion

Interdisciplinarity is an important consideration for HPSR. The concept has been discussed in HPSR literature in reference to its nature as an interdisciplinary field as well as a separate collaborative practice or research approach. A concerted effort to include social science influences in HPSR is currently being promoted by some to maintain the interdisciplinary nature of the field. The progression of HPSR as an interdisciplinary field and the extent of social sciences influences could be assessed utilising bibliometric tools. The presence of multiple disciplinary influences detected by these tools would satisfy the definition of interdisciplinary from a generalist interdisciplinarian perspective which considers any interaction or influence between disciplines as interdisciplinary. However how ID is discussed as a practice and approach (IDR) in HPSR, is more congruent with the integrationist perspective, which advocates intentional integration. Proponents of the integrationist perspective debate that complex problems necessitate an ID approach, therefore complexity theory is often intertwined with ID, as it is with HPSR. The field often considers health systems as complex, producing context specific and multifaceted problems. Therefore innovative methodology and intentional cross-disciplinary collaboration are promoted. An integrationist approach to evaluating IDR could involve a search for examples of intentional ID and assessing the degree of integration of contributing influences. Interdisciplinarity is strongly advocated in health sciences research and is represented in a variety of forms. Some of these such as; mixed-methods research with intentional integration, and team science initiatives, could similarly be present in HPSR. Although the theory asserted by Repko (2007) regarding differing perspectives on ID (generalist and integrationist), is not presented in the majority of IDS

literature, it provides a useful point of reference from which to evaluate how ID is conveyed in HPSR. An analysis of key ID sources (generalist or integrationist), cited in a field's literature could unpack some of how ID is understood and practiced by those authors.

There are many core challenges to effective ID practice namely: academic institutional constraints; difficult and lengthy research process; and limitations related to publication and funding. However these challenges can be overcome with the following enablers: detailed research plan for facilitating integration; the trend of increased funding for ID projects; and researchers embodying personal characteristics such as flexibility and willingness to learn.

In summary the representation of ID in a field provides useful indicators of its practice – and can be evaluated by various means available within the world of IDS. An interdisciplinary field could be assessed for its degree and progression of interdisciplinarity over time as well as increased inclusion of social sciences influences. The perspective (generalist, integrationist or mixed) from which ID is conveyed could be evaluated by assessing literature sources. A field's empirical research could be examined for examples of clear intentional IDR with integration. Although integrationist ID is more applicable to HPSR in theory, it is currently unclear which ID perspective (generalist, integrationist or both), and in what forms ID is commonly expressed within HPSR. Therefore a systematic review, utilising the information clarified in this review and techniques discussed above, can usefully illuminate the representation and practice of ID in HPSR.

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PART C: JOURNAL ARTICLE MANUSCRIPT

The Representation and Practice of Interdisciplinarity in Health Policy and Systems Research

Journal Targeted: *Health Policy and Planning (HPP)*

Kim MacQuilkan[1]

Abstract

Interdisciplinarity (ID) in Health Policy and Systems Research (HPSR) can be observed in the definition of HPSR as an interdisciplinary field, and the promotion of ID as a practice or research approach (interdisciplinary research, IDR). The field advocates the inclusion of social science influences and cross-disciplinary collaboration to maintain the interdisciplinary nature of the field. However, the full representation and practice of ID is unclear, thus a systematic review and a small case study was conducted to explore this further. Based on our findings we recommend that HPSR advances beyond its definition as an interdisciplinary field, and actively pursue ID (with integration) as an intentional collaborative practice and research approach. This can be facilitated by: researchers employing appropriate definitions and referencing when utilising ID terminology; developing practical frameworks for conducting, teaching and evaluating IDR; and addressing challenges relating to funding, capacity and disciplinary hierarchy which often constrain interdisciplinary collaborations.

Keywords Interdisciplinarity; interdisciplinary field; health system; health policy and systems research; systematic synthesis

[1] For the purpose of this thesis, the student is the sole and first author of this article.

KEY MESSAGES

- Interdisciplinarity is expressed in Health Policy and Systems Research (HPSR) in its definition as an interdisciplinary field, and as a separate practice and research approach (interdisciplinary research).
- The concept of interdisciplinarity is strongly promoted in HPSR however, the term 'interdisciplinarity' (and its variations) has been utilised in a variety of ways confusing its representation in HPSR.
- There has been an increase in the inclusion of social science influences in HPSR journal articles over the last ten years, further demonstrating the interdisciplinary nature of the field. However, there are few examples of interdisciplinary research with multiple disciplinary insights that have intentionally been integrated and the field is still dominated by the science paradigm.
- HPSR acknowledges complexity and a focussed intention is required to facilitate the innovative methodology and cross-disciplinary collaboration, necessitated by complex health system problems.
- To enable the pursuit of interdisciplinarity as a practice and research approach, more guidelines and frameworks need to be developed for teaching, conducting and evaluating IDR.

Introduction

Health Policy and Systems Research (HPSR) can be defined as an interdisciplinary field as it encompasses researchers from a variety of disciplines, orientated around a common research agenda (see AHPSR 2015; Sommer 2000). In addition to the mere presence of researchers from multiple disciplines and the natural blending of insights that would occur as a result of this arrangement, the concept of interdisciplinarity (ID) as a distinct research approach

(interdisciplinary research – IDR) has also been expressed in HPSR (Gilson *et al*. 2011; Sheikh *et al*. 2011). The field of HPSR appreciates the complexity of health systems and recognizes that the problems which arise in health systems are accordingly complex and context specific involving multiple actors. Thus HPSR promotes innovative and context specific research, which considers health system issues from a holistic perspective (Gilson 2012; Sheikh *et al*. 2014; WHO 2009). Additionally, many complex, cross-sectoral and practical problems necessitate an interdisciplinary approach (Nissani 1997; Repko 2008). Therefore collaboration across disciplines is strongly promoted to address health system issues (Sheikh *et al*. 2011; WHO 2012).

However, the term 'interdisciplinarity' and in fact, IDR practice, is confused by multiple definitions and differing perspectives (Choi and Pak 2006; Repko 2007). Interdisciplinary studies (IDS) is the dedicated research field for ID and can provide clarification on this matter (Repko 2008). We find a useful distinction can be made between generalist and integrationist interdisciplinarians (Repko 2007). Generalist interdisciplinarians might utilise the term 'interdisciplinarity' to describe any interaction between disciplines, regardless of the presence of *integration*. Integration can be defined as 'the cognitive activity of critically evaluating and creatively combining ideas and knowledge to form a new whole' (Repko 2008). The new whole provides a greater understanding more than the sum of its parts (see Aboelela *et al*. 2006; Choi and Pak 2006; Repko 2008). In contrast integrationists might only recognize collaboration where multidisciplinary insights have been intentionally integrated. Ergo integration is an 'intention' from the onset of the interaction or project and integration is the core characteristic of ID[1]. Integrationists use multidisciplinarity to describe projects where contributions by

[1] Integration is facilitated by **finding common ground**. In order to find common ground within ID practice, researchers would attempt to find a common vocabulary (Klein 1990) and then search for disciplinary aspects that are; shared or overlapping, similar, compatible, and negotiable (Repko 2008).

different disciplines remain isolated (the whole is equal to the sum of its parts) (Repko 2007; Sokolova 2013). It has already been argued that ID is an important consideration for HPSR to address complex, context specific health system problems. However, we assert further that ID from an integrationist perspective is more reflective of certain fundamental HPSR theory: complexity; the desire to intentionally include more social science influences; advancement of methodology facilitating collaboration across disciplines; and the integration of any disciplinary influence most suitable to address the research question (see Gilson *et al*. 2011; Gilson 2012; Sheikh *et al*. 2011; WHO 2012).

Interdisciplinarity can also be described by the diversity of the disciplinary influences integrated. Collaborations between disciplines closely related such as sociology and anthropology would be considered 'narrow ID' whereas interactions between disciplines from differing paradigms such as epidemiology and political sciences would be characteristic of 'broad ID' (Huutoniemi *et al*. 2010). Furthermore ID is complicated by overlapping concepts and variations in its application such as complexity, interprofessional team practice, team science, and mixed methods research (Nair *et al*. 2008; Newell 2001; Kessel and Rosenfield 2008; O'Cathain 2007).

Although HPSR is defined as an interdisciplinary field and ID is advocated for as a practice and research approach, how it is fully expressed in the field is unknown (Bennet *et al*. 2011). We present the findings of a small case example and systematic review utilised to explore the representation and practice of ID in HPSR.

Methods

Due to the complexity of the topic, a preceding scoping review was conducted to inform and refine the small case example and systematic review process. From this, a small case example has been developed (and is reported immediately below) to unpack HPSR in terms of its nature as an interdisciplinary field and its development over the last decade. Building from this, a systematic review was then conducted on HPSR literature to explore ID as a practice in HPSR. The research design was flexible and conducted at macro level as it investigated ID within a global context.

Method: case example – progression of HPSR as an interdisciplinary field

A broader scoping review was conducted, assessing interdisciplinary frameworks and perspectives common in HPSR, health sciences and interdisciplinary studies. Bibliometric tools are often utilised to evaluate interdisciplinary fields or the extent of ID expressed in a field or discipline (Porter *et al*. 2008). Building from this, a small sample of journal articles were purposively selected from two HPSR relevant journals (namely *Health Policy* and *Health Policy and Planning*), publication range October 2005 and October 2015. It is worth noting that both the journals selected have a particular policy focus in contrast to other HPSR relevant journals such as *Health Economics* – so represent a particular sample and perspective within HPSR. The journals were selected due their multidisciplinary classification in Web of Science (2016) as representative of the social sciences and sciences paradigms. The subject categories assigned to both journals are 'Health care sciences and services (SCIENCES)" and "Health policy and services (SOCIAL SCIENCES)". Journal selection was also based on availability of full-text articles and that every article title could be found on the WOS database. This excluded other HSPR relevant journals such as *Health Research Policy and Systems*, *Health Affairs* or *Health Services Research and Policy*.

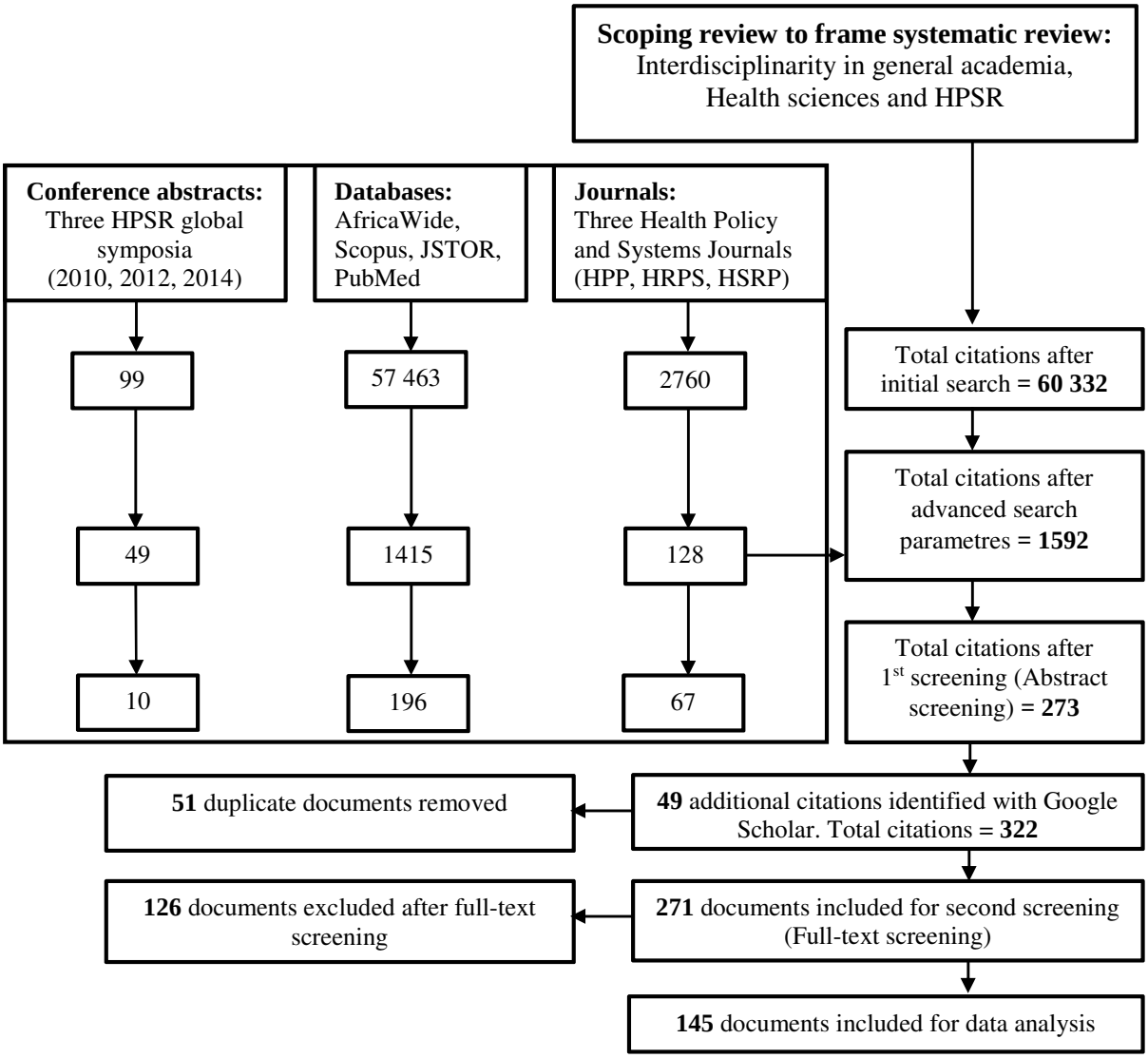
A basic framework for analysing the number and variety of disciplinary influences over time was derived from more complicated bibliometric frameworks (Porter *et al*. 2008; Porter and Rafols 2009). The framework relied on comparison, hence the selection of two months 10 years apart. Although a larger study sample and more intricate framework for analysis would have been preferable, due to research constraints, a small case example was deemed sufficient for this exploratory phase – to be enhanced and adapted in future research. Articles were stored in an EndNote library and later transferred to Excel to facilitate analysis. Articles were searched for on WOS then references for each article were classified according to WOS subject categories. Subject categories were additionally grouped into epistemological paradigms (social science, science or both). The number of different journal articles referenced, the number of different subject categories referenced, and the ratio of references belonging to each paradigm was captured for each article and then averaged for each month.

Method: systematic review of HPSR literature

The basic framework for systematic synthesis (see Figure 2 below) was based on the Campbell style review methods, which are commonly utilised in HPSR and allow for inclusion of qualitative studies and grey literature (AHPSR 2014; Campbell Collaboration 2014). The review method comprised four steps (1) literature search; (2) Screening strategy (based on step 1 and involved abstract screening); (3) critical appraisal (full-text screening for topic relevance); (4) thematic synthesis. The design of the review was configurative as opposed to aggregative in nature. Aggregative systematic reviews synthesise empirical literature with the aim of finding the best evidence. Configurative systematic reviews synthesise all literature with the aim of developing concepts and theory (Gough *et al*. 2012). HPSR is an emerging field and there is a paucity of information available on the topic of interdisciplinarity, therefore the review aimed to develop theory rather than find best evidence. Subsequently literature was

selected for inclusion based on relevance and not subjected to traditional critical appraisal tools for quality, in order to provide an overall representation and practice of ID in HPSR.

Figure 2: Systematic review process



The search for academic literature included:

A) A search of four relevant databases: JSTOR, Scopus, Pubmed, and African-Wide;

B) Three HPSR associated journals namely Health Policy & Planning, Health Research Policy & Systems, and Health Services Research & Policy;

C) A hand search of conference abstracts from the three Global Symposiums for Health Systems Research (2010, 2012, and 2014); and
D) A search with Google Scholar.

The search was open to any country and aimed to include all literature available. Search terms were based on the scoping review and searches consisted of Boolean operators and MeSH terms were utilised only when a more narrowed search was required. In such cases the search terms "health" AND "systems" were replaced by the MeSH term "health care systems" and the search terms "health" AND "policy" substituted by the MeSH term "health policy". A full list of search terms is included in Appendix F. The initial search (with no search limiters) resulted in an output of 60 322 documents (databases – 57 463; journals - 2760; conference abstracts – 99). Advanced search parameters differed according to each source (Appendix A), however all advanced searches were limited by the time period 2005 – 2015 and restricted to English (or a published English translation of a document in another language). The exclusion of other languages is a limitation of the study, however inclusion of other languages was not possible due to time and budget constraints. Results were additionally narrowed to include only health relevant documents if subject filters were available.

The application of advanced search parameters resulted in a refined output of 1592 documents (databases – 1415; journals – 128; conference abstracts – 49). Documents were then subjected to the first screening phase which involved a basic abstract search to exclude any obviously non-health or cross-disciplinary related documents and resulted in 273 documents (databases – 196; journals – 67; conference abstracts – 10). A search on Google Scholar resulted in a further 49 documents for inclusion and an abstract search for duplicates revealed 51 documents for removal, therefore 271 documents were added to a EndNote Library to undergo further

screening. The second screening phase (and critical appraisal step) entailed a full text screen of the documents to evaluate relevance to health systems and cross-disciplinary collaboration (123 documents removed). Mixed methods research articles as well as documents relating to team science and interprofessional teams were included for further evaluation. Ultimately, 144 documents were included for analysis. The 144 documents were organised deductively into two categories; examples of interdisciplinary research (category A – 51 documents) and conceptual documents (category B – 93 documents).

Documents grouped under Category A, included examples of: multiple disciplinary research (multi-, inter-, and transdisciplinary research); mixed-methods research; and research related to interprofessional teams and team science. The examples were analysed based on a framework developed from an integrationist perspective, which classifies only research with the presence of intentional integrated insights as ID (see introduction). We developed our own framework due to the lack of clear practical frameworks for how to conduct and evaluated good quality IDR (Lyall ***et al.*** 2011). Disciplines have very well defined criteria for evaluating research however, these cannot be applied to interdisciplinary fields which need to establish their own relevant and integrated criteria (WHO 2012). Therefore based on the scoping review, a framework for identifying and classifying ID was developed from two sources; the definition of ID by Aboelela ***et al***. (2006); and the criteria for identifying integration by Lattuca (2001).

Due to the small number of potential examples of IDR, influences from more intricate frameworks such as the one formulated by Huutoniemi ***et al.*** (2011) have been excluded.
As argued above, initial analysis found the 'integrationist' interdisciplinarian perspective to be most relevant for HPSR – and we therefore focused on this in this systematic analysis. This, in particular, means that 'integration' is understood as a key identifying factor for ID. Three

aspects of research can be assessed for the presence and extent of integration: the research question; the research process and the final product (Lattuca 2001). Furthermore integration should be an intentional consideration throughout the collaboration process (Boix-Mansilla 2007). The definition by Aboelela (2006) based on a systematic review is congruent with this perspective:

> "Interdisciplinary research is any study or group of studies undertaken by scholars ***from two or more distinct scientific disciplines.*** The research is based upon a conceptual model that links or ***integrates*** theoretical frameworks from those disciplines, uses study design and methodology that is not limited to any one field, and requires the use of perspectives and skills of the involved disciplines ***throughout*** multiple phases of the research process" (emphasis – mine).

Therefore documents were assessed according to the following inclusion criteria:

(1) Research question states intention to combine influences from two or more disciplines;
(2) Concepts, theories and methods from two or more disciplines have been integrated; and
(3) Research findings contribute something more valuable than the simple combination of isolated disciplinary components.

If the document does fulfil the above criteria it will be classified as an example of interdisciplinary research, and if not as an example of multidisciplinary research accordingly. Mixed-Methods research examples will also be assessed for extent of intentional integration, utilising the above criteria as classified as either; mixed-methods research with integration, or mixed-methods research without integration. Mixed-methods research examples with the presence of integration would be considered examples of broad ID (see introduction). Examples of interprofessional practice and team science will be classified under those two

headings respectively, and assessed according to the criteria to potentially find more examples of IDR.

Documents in Category B included any potential theory building documents pertaining to ID in HPSR, as well any documents promoting the use of ID or MD as concept or approach. The documents were then thematically analysed deductively and inductively. Due to the confusion in terminology relating to ID, it is important to explore how the term 'interdisciplinarity' has been applied in the documents. Therefore each document was analysed to assess which source, pertaining to ID, authors selected and which notion of ID (generalist or integrationist interdisciplinarian) is being expressed. The documents were thus deductively categorized as reflecting the generalist, integrationist or an undetermined perspective. All documents, regardless of perspective, were further analysed inductively to reveal important conceptual themes expressed in the discourse of HPSR about ID.

Results

Case example – progression of HPSR as an interdisciplinary field

Eleven (October 2005) and 13 (October 2015) articles were sourced from the journal Health Policy. Eight (October 2005) and 12 (October 2015) articles were sourced from the journal Health Policy and Planning. Each article was searched for on the WOS database. Once an article is located, the journal references cited in the article (and which have been categorised according to WOS subject categories) can be analysed. The number of references cited in an article could vary considerably, for example an opinion article would naturally contain fewer references than a systematic review article. Therefore the articles with the least and most amount of total reference were excluded from the analysis, resulting in the inclusion of nine and 12 articles from Health Policy and seven and 11 articles from Health Policy and Planning.

The following indicators were assessed for each article: the number of different journals; the number of different subject categories; and the number of references categorised as belonging to the science or social science (or both) paradigm . Results were totalled and averaged for each year to remove any bias as a consequence of the uneven sample. The results of the case example are tabulated in appendix E.

There was an increase in the average number of different journals cited from 2005 to 2015 (15.92 to 18.57). The increase may reflect the natural increase of more and more journals being established over time. This number however was already considerable in 2005 which demonstrates the field's incorporation of numerous different sources and not relying upon only on a few key journals. However the different sources may still originate from the same discipline and the results revealed that there was a slight decrease in the number of different WOS subject categories from 2005 to 2015 (9.92 to 9.03). This may signify that the number of disciplinary influences included in articles has stagnated in the last ten years.

However the journals selected are already classified as multidisciplinary, therefore the articles may have started as highly interdisciplinary and plateaued at that state. Public health (of which HPSR is a specialisation) is one of the more interdisciplinary fields in science, according to bibliometric analysis conducted by Van Noorden (2015). The analysis was based on the number of references cited in a field's articles that did not originate from that discipline (i.e. not public health). To assess our own field, HPSR, we conducted a further analysis to assess the ratio of HPSR references to other disciplinary references in each article. HPSR references were categorised as any reference classified as 'Health care sciences and services' and/or 'Health policy and services' by WOS. The average percentage of non-HPSR references cited by the journals in 2005 was very high (81.45%).

The interdisciplinary nature HPSR is also reflected in the considerable percentage of WOS journal references cited by articles in 2005 (44%) that were classified *as both social sciences and sciences* (essentially multidisciplinary). This percentage decreased to 33.5% in 2015. However this is more likely due to the substantial increase in the percentage of WOS journal references classified as completely social sciences (13% to 23%). The percentage of WOS journal references classified as completely sciences remained dominant but slightly decreased from 2005 – 2015 (46% to 43.5%). Therefore it can be concluded that HPSR reference many different journal articles in its articles, however there has not been an increase in the number of different WOS subject categories over the last ten years. This is likely due to the high ration of other disciplinary references already present in 2005 (81.45%) and its origin as an interdisciplinary field. Although the number of subject categories did not increase, the diversity of subject categories did. This is observed in the increased inclusion in the HPSR journals of journal references classified as social sciences. However journal references belonging to the sciences paradigm still remained the dominant paradigm referenced in the journals.

We acknowledge many limitations to this demonstrative analysis. Journal classification is based on WOS which could be flawed, one-dimensional and limits the inclusion of certain journals. Additionally only a small number of articles were analysed therefore journal articles could have been influenced by journal editors or current politics. Often journals represent a particular point of view therefore the selection of only two journals may be insufficient demonstrate a broad perspective of the field. However the journals selected are well regarded with a high impact factor. This example does not demonstrate if those increased social science influences were integrated with other influences, or remained isolated contributions (a further

analysis would be needed to detect the presence of integration).[2] The example illustrated the interdisciplinary nature of the field and the finding of increased inclusion of social sciences references is encouraging, despite the small comparative ratio to the sciences domain. It is therefore recommended that a dedicated, more in-depth study be conducted on a larger sample and with a more inclusive classification tool.

Systematic review

Category A - Examples of IDR

The final 93 documents were included in Category A and divided into three sub-categories: multiple disciplinary research (Sub-Category 1); mixed-methods research (Sub-Category 2); and interprofessional practice and team science (Sub-Category 3). During analysis a fourth sub-category emerged, participatory action research (Sub-Category 4). A detailed description and bibliography is tabulated in Appendix G. Documents allocated to Sub-Category 1 (15 examples), with characteristics of multiple disciplinary research, where evaluated utilising the integrationist inspired criteria outlined earlier (see methods) and classified as MDR (eight of the 15 examples) or IDR (seven of the 15 examples). The documents categorized as mixed-methods in Sub-Category 2 (35 examples), underwent the same evaluation and were classified according to the presence and intention of integration (23 of the 35 examples classified as mixed-methods research without integration and 12 of the 35 examples classified as mixed-methods research with integration). Sub-Category 3 consisted of examples of either interprofessional practice or team science (39 examples). Thirty-one of the 39 examples were classified as research relating to interprofessional practice or health care teams with the remainder eight examples representing team science.

[2] Noting again, that these two Journals are policy-oriented journals, so this assessment, of increased influence of social science – is reflective of this particular clustering of HPSR (and might not be the case in other Journals, for example, more econometric journals).

Four documents were categorized as participatory action research (Sub-Category 4). Participatory action research (PAR) methodology has many characteristics that are similar to IDR. Multiple stakeholders collaborate in PAR, creating a platform for natural integration (Baum *et al*. 2006). This area of research was not originally included in the inclusion criteria, therefore further investigation including PAR examples is warranted. Another potential research practice where ID could be represented is practitioner-researcher engagement. Producing research that is context specific and policy relevant is of high importance to HPSR (Gilson 2012). This can be facilitated by collaboration with practitioners and policy actors directly connected to the research setting. Thus advancing methodologies that provide a platform for meaningful practitioner-researcher engagement, as well as other cross-disciplinary/sectoral interactions, has been promoted (Lehmann and Gilson 2014).

Category B: Conceptual documents

Fifty-one documents were included in Category B (see Appendix H) and analysed in two ways. The initial analysis investigated how authors utilised the term 'interdisciplinarity' as well from which sources information was drawn. The first analysis revealed that twenty-two documents (43.1 %) reflected the generalist perspective and were categorised under Sub-Category 1. Eighteen documents (35.3%) represented the integrationist perspective and thus allocated to Sub-Category 2. The remainder eleven documents (21.6%) were categorized as in Sub-Category 3 as undetermined or mixed-influences. Only three documents (5.9%) defined a term (Multi-, inter-, or transdisciplinarity) when utilised and only nineteen documents (37.3%) referenced their use of a term. This indicates that there is mixed utilisation of ID terminology within HPSR. This is aggravated by the lack of appropriate sources referenced for the term as well as the scarcity of definitions used to convey the intended meaning of the term selected.

As a result of the second thematic analysis, 31 of the documents related to the promotion of ID or MD in HPSR and were discussed under theme one. The remainder 20 documents contained important theory building information and *reflected an integrationist perspective* (according to the first analysis), thus were classified as core conceptual documents. These core documents were analysed inductively and iteratively, revealing six more themes: (Theme 2) Advancing Methodology; (Theme 3) Disciplinary capture; (Theme 4) Topic orientated; (Theme 5) HPSR capacity; and (Theme 6) Academia. All documents included in Category B are detailed in Appendix H.

Theme 1: Promotion of ID and MD

A plethora of documents promoted multi- or interdisciplinarity as an ethos and research approach or described various cross-disciplinary initiatives. However the majority of these documents represented a generalist perspective (65%). The generalist perspective includes any type of interaction between disciplines in its definition of ID, regardless of intentional integration. Consequently recommendations lacked practical guidelines or frameworks to conduct IDR or collaboration. Due to the additional challenges in HPSR capacity and academia (discussed below under theme five and six), researchers may be hesitant to actively pursue IDR. There is also no consensus, generally, on how to conduct or evaluate IDR in HPSR, which could make researchers vulnerable to criticism. Nevertheless the high level of promotion of ID in HPSR is a positive indication of the importance of ID in HPSR, and the need to facilitate improved ID practice.

Theme 2: Advancing methodology

HPSR has been critiqued for lack of rigor and generalisability by standards utilised by other public health disciplines (Gilson *et al.* 2011; Sheikh *et al.* 2011). However, as an emerging

field of its own, HPSR has and aims to further develop unique standards for its methodology. If IDR is an aspiration for HPSR, strong methodological frameworks need to be formulated in order to facilitate this process and produce good quality research findings (WHO 2012). Finding common ground across disciplines and knowledge paradigms is a difficult task. Therefore strengthening the nature of the interaction between HPSR practitioners, (promoting long-term platforms rather than once-off collaborations), is vital in order to produce authentic IDR and collaboration (Gilson *et al*. 2011; Hoffman *et al*, 2012; Swanson *et al*. 2012). Formulating research methodology, design frameworks and evaluation criteria incorporating the concerns and strengths of different HPSR related disciplines, is essential for advancing HPSR as a unified field (Gilson *et al*. 2011; Hoffman *et al*. 2012). Existing research methodologies which encourage cross boundary interaction and synthesis are: Action, process and community-based participatory research; Institutional and organisational management research; Social sciences research; and Systems science research (Swanson *et al.* 2012).

Theme 3: Disciplinary capture

A significant concern for HPSR is the potential domination of one knowledge paradigm or discipline, in terms of methodology and research questions (Sheikh *et al*. 2011). This is referred to as 'disciplinary capture' and jeopardises the openness and reflexivity required for systems thinking (Gilson *et al*. 2011). Disciplinary capture results in standards of the dominant discipline, being applied to other disciplinary methodologies, in an inappropriate manner and thus discouraging the utilisation of potentially more suitable methodologies (WHO 2012).

Researching and understanding health systems, which by nature are complex, requires cross-disciplinary and holistic understanding. Disciplinary capture could undermine the very goal HPSR hopes to achieve which is to provide solutions for complex health systems problems.

The field has been dominated by the positivist paradigm however there is currently a focus to actively incorporate more social science perspectives (Bennet *et al*. 2010; Gilson *et al*. 2011; Sheikh *et al.* 2011). This perspective is fundamental to understanding the complex problems which present in health systems and policy. Fortunately most researchers do not strictly fit under the positivist or relativist extremes therefore finding common ground might be easier to achieve (Gilson *et al.* 2011). Additionally the relationship between disciplines and paradigms are not always exclusive and often disciplines traditionally associated with one paradigm borrow concepts from disciplines associated with the opposite paradigm (Mills 2011). Most HPSR researchers identify themselves as belonging to more than one discipline (Tancred *et al.* 2015).

Theme 4: Topic orientated

As HPSR is directed by the research question with research methodology selected based on suitability (Gilson 2012; Hoffman *et al*. 2012; Mishra 2013). Therefore HPSR is not restricted to any discipline (Gilson 2012). This allows for an openness to any disciplinary influence and the drawing upon the most applicable concepts, theories and methodology based on the research question (Mishra 2013). Reflexivity is therefore an important competency for HPSR researchers. A researcher's disciplinary background naturally influences their research approach and hence a focussed effort to be open to other influences is required (Gilson *et al*. 2011; Gilson 2012). It is this openness and lack of predetermined disciplinary perspective that establishes HPSR as a multi- and interdisciplinary field, which is vital for solving complex health systems problems (Gilson *et al*. 2011).

Theme 5: HPSR capacity

Increasing HPSR capacity can be challenging as a result of the multi- and interdisciplinary nature of HPSR (Bennett *et al*. 2010). In order to maintain openness and reflexivity, researchers are required to have knowledge of a wide range of methodologies and different disciplinary concepts (Gilson 2012; Tancred *et al*. 2015). However most HPSR courses suffer from time constraints and subsequently there is often insufficient time to address the adequate breadth of knowledge (Tancred *et al*. 2015). Teaching ID approaches and collaboration may be a solution (Chowdhury *et al*. 2003; Orgill *et al*. 2012). Fostering a culture of interaction and integration, rather than focusing on specific methodology will train researchers to naturally evaluate a wider breadth of methodological options beyond their disciplinary perspective. Hence only a basic introduction to discipline-specific methodology may be required, however the researcher would be equipped to investigate further or embark on collaborations with other researchers possessing the necessary knowledge (Bennet *et al*. 2010; Orgill *et al*. 2012; Tancred *et al.* 2015). Unfortunately teaching ID is not favoured by lecturers due to its difficulty and thus seldom included in HPSR curricula (Chowdhury *et al*. 2003).. Active engagement between HPSR teachers from different disciplinary backgrounds is required to increase their capacity in this area, and further promote a culture of ID

Theme 6: Academia

HPSR is a research orientated field, therefore majority of HPSR activity is based in academic settings which are highly disciplinary in organisation. The traditions typically associated with academia such as clearly defined methodologies and strong disciplinary boundaries naturally differ from HPSR. Thus as discussed earlier (see theme 2), HPSR is often judged by inappropriate standards (Bennett *et al*. 2010; Prashanth *et al.* 2013). Unfortunately research is dependent on funding which is often discipline-specific and remains a constraint for HPSR in

general (Orgill *et al*. 2012). Another limitation of traditional academia is the disciplinary focus of journals. Publishing research is an important aspect of knowledge translation and important for the development of a field. However the disciplinary orientation of journals makes publishing HPSR challenging and may influence researchers to use a specific disciplinary lens (Bennett *et al*. 2010; Prashanth *et al*. 2013).

Discussion and Conclusion

The findings and thematic framing suggested that there has been an increased inclusion of social science influences in HPSR journal articles over the last ten years further demonstrating the interdisciplinary nature of the field[3]. However, the science paradigm still remained the dominant influence. Additionally the presence of multiple disciplinary insights does not infer that those insights have been integrated and may still remain as isolated contributions. Few examples of IDR were found that satisfied our framework criteria, which required the presence of *integrated* multidisciplinary insights as well as the clear intention to facilitate that integration from the onset of the study. This may be due to the confusion surrounding the term 'interdisciplinarity' which was evident in the representation of the term in HPSR literature in a variety of forms, often without a reference source or definition. Despite a plethora of documents supporting ID in HPSR, the intended meaning of the assertion was vague and difficult to interpret. Due to the confusion and misuse of ID and related terms, it is important that future discourse on the topic utilise clear definitions and appropriate sources.

[3] The inclusion of more social sciences in published research is currently an important debate. A recent open letter to BMJ by Greenhalgh *et al*. 2016, illustrates this. A bibliometric analysis conducted on more biomedical/quantitative orientated journals (but still with a HPSR relevance) may reveal an even larger science dominance in the field than what was revealed in our case example.

The IDR systematic analysis was based on strict integrationist criteria, and would therefore fail to uncover examples of IDR that may have occurred in a more natural (less organised) manner. Additionally the review did not include PAR or practitioner-research engagement in its search parameters, both of which are likely platforms for ID collaboration in HPSR. A further investigation of these approaches could provide valuable insights into how ID is practiced in HPSR. The findings suggested that the practice of mixed-methods research in HPSR could benefit from an active intention to integrate qualitative and quantitative components, as few examples of robust mixed-methods research with intentional (or clearly explicit) integration were found in the review. Additionally interdisciplinary/interprofessional teams and team science initiative were included. There was an abundance of documents describing interprofessional practice and interdisciplinary health care teams. Although integrated, patient-centred health care delivery is an important topic in HPSR, it does not refer to researchers within HPSR collaborating together. However team science initiatives could be another potential platform for facilitating ID in HPSR

Twenty core HPSR documents were found showing a strong relevance to the topic that is, reflecting an integrationist perspective. An analysis of these documents revealed that there is no common framework to facilitate ID in HPSR. However the development of innovative ID methodologies and approaches is promoted, in particular to address complex problems. Nevertheless, there are numerous challenges to conducting IDR and teaching ID in HPSR. A further in depth study involving interviews of HPSR teaching organisations would be beneficial in providing more insights, however the available literature suggests that HPSR curricula lacks methodological breadth and methodology facilitating ID competencies. Insufficient HPSR capacity and funding limitations are further constrainers (see Bennet *et al*. 2011; Chowdhury *et al*. 2003; Decoster *et al*. 2012; Lasang *et al*. 2005; Mills 2001; Tancred *et al*. 2015).

Naturally HPSR is an interdisciplinary field that will continue to develop from influences derived from the many diverse disciplines it encompasses. However, it is an irony, that interdisciplinary fields borne from the need for cross-disciplinary collaboration, often (even usually) then develop a distinct disciplinary culture and draw clear boundaries around itself – usually in order to gain respect from the scientific community and more knowledge translation of research findings (Jones 2009). There is therefore a common cycle of interdisciplinary field, developing into an interdiscipline, then developing into a discipline (Repko 2008). HPSR can be understood as an interdisciplinary field that is in the phase of establishing itself as an interdiscipline (for example, by drawing boundaries, writing textbooks, establishing curricula, and developing dedicated publication outlets). However, much of the stated purpose and identity of HPSR (see below) is based on its interdisciplinary nature – as an open ID field - balancing its dedication to producing rigorous, robust and policy relevant research with a wariness of closing field boundaries to different disciplinary influences and novel approaches (Gilson 2011; Jones 2009; Sommer 2000). An example of this is the current promotion of more social science influences to be incorporated in HPSR and the development and advancement of research methodologies facilitating cross-disciplinary engagement in HPSR (Gilson ***et al***. 2011; Lehmann and Gilson 2014).

However, we recommend that HPSR advances beyond its nominative description as an interdisciplinary field and actively pursues ID as an intentional collaborative practice and research approach. Intentional integration of multiple disciplinary influences, according to the integrationist perspective, is necessary to address complex problems. The field of HPSR appreciates that health systems are complex and dynamic, necessitating innovative methodology and cross-disciplinary collaboration. Although an ID approach is not suitable for

all research questions, its application could result in innovative solutions for multifaceted health systems issues. The approach could be especially useful in addressing the numerous and ever-changing challenges faced by health systems, arising from crises without and within the health system (The Centre for Health Policy 2016).

Health systems especially in lower to middle income contexts, are affected by a wide array of challenges such as disease outbreaks, environmental catastrophes, political instability and economic shocks. There has been a growing acknowledgement of the importance of developing health systems which can adapt favourably to health shocks, while still maintaining everyday health system functions. This HPSR agenda is represented in the theme of the upcoming 4th Global Symposium on Health Systems Research, *resilient and responsive health systems for a changing world* (Health Systems Global 2016). Additionally there are team science initiatives, such as the international consortium entitled 'Resilient and Responsive Health Systems (RESYST), dedicated to this research topic (The Centre for Health Policy 2016). Effectively addressing external crises, warrants innovation and collaboration with numerous stakeholders across multiple sectors (Health Systems Global 2016). Although multidisciplinary interaction is beneficial, innovation and transformation is more likely to develop from inter- and transdisciplinary approaches. Research approaches such as PAR and practitioner-research engagement provide useful platforms for investigating the agenda. However more ID competencies, which intentionally integrate cross-disciplinary and cross-sectoral insights, are needed for the HPSR toolbox. This is also necessary to effectively research other important HPSR topics, which necessitate conceptual and disciplinary innovation, such as universal health coverage.

Advancing methodology and capacity for ID in HPSR, will require a focussed intention beyond the progression that would naturally occur in the field. It is therefore recommended that appropriate frameworks for teaching, conducting and evaluating IDR should be developed. Additionally a concerted intention is required to address challenges related to funding, capacity and disciplinary hierarchy which could constrain the development of ID in HPSR. Furthermore due to the confusion and conflicting definitions of ID, it is recommended that researchers clarify their intended meaning when utilising ID terminology through definitions and appropriate referencing.

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APPENDICES

Appendix A: Participant Information Cover Sheet

INFORMATION SHEET: CROWD-SOURCING SURVEY

Interdisciplinarity in Health Policy and Systems Research

University of Cape Town, Health Policy and Systems Research Division – in support of the Health Systems Global Thematic Working Group SHAPES, subgroup on Interdisciplinarity

We are conducting a rapid crowd-sourcing survey of interdisciplinary practices within health policy and systems research (HPSR). Our intention is to gather information about (and references to) key pieces of HPSR conducted in an interdisciplinary fashion, and also to better understand HPS Researcher's perceptions towards working across disciplines.

The information gathered in this survey will be fed into an MPH student thesis project (at the University of Cape Town, South Africa) – and will also be fed back into the Health Systems Global Thematic Working Group SHAPES, via the SHAPES list-serve.

If you agree to participate in this study, we ask of you to complete the crowd-sourcing survey on via this **website link**. During the survey, you will be asked to:

- Give some general information about your disciplinary background, and your current HPSR research practice
- Give your opinion on the role and practice of interdisciplinary research in HPSR
- Identify any research that in your opinion is an example of 'good interdisciplinary HPSR'
- Where possible provide references for or links to this research

Ethical disclaimer: You will not receive any payment for taking part in this survey. Any information that is obtained in connection with this survey that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by not asking participants to identify themselves, and storing the survey data on password-protected computers. In the report that will be written, no-one will be able to connect what you shared with you. If the results of this survey are published, no names or identifying characteristics will be mentioned. Thus no-one will know what you shared in this survey. You can choose whether to be part of this survey or not. If you volunteer to be in this survey, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer. If you have any questions or concerns about the research, please feel free to contact either of the researchers of the local ethics committee named below. You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research survey.

- This survey seeks to rapidly gather information about resources and perceptions towards interdisciplinary HPS, and **should not take longer than 10-15 minutes to complete**
- Should you like to be part of a further discussion on working across disciplines in HPSR, or would like to receive the synthesis but are not on the SHAPES list-serve, please provide your email address in the section provided (this will not be in any way linked to your responses, which remains anonymised).
- This request for inputs is open for **a month starting from the 1st December to the 30th December 2015**

Who is carrying out this study?

Dr. Jill Olivier

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The broader study into which this crowd-sourcing survey feeds has been reviewed and approved by The Human Research Ethics Committee, Health Sciences Faculty, University of Cape Town, who can be contacted at the following address:

Human Research Ethics Committee of the Health Sciences Faculty

University of Cape Town, The Faculty of Health Sciences, Human Research Ethics Committee, E 52, Room 24, Old Main Building, Groote Schuur Hospital, Observatory, 7925, South Africa

Telephone: +27 21 406 6492 Fax: +27 21 406 6411

Email: shahieda.amardien@uct.ac.za

Agreement of research subject: I have read the above, and by clicking the link/button below, indicate that I hereby voluntarily consent to participate in this study. I know that I can download a copy of **this info sheet**, should I choose to.

Appendix B: Crowd-sourcing questionnaire conducted with SurveyMonkey

INTERDISCIPLINARY BACKGROUND

Q1: Would you call yourself a 'health policy and systems researcher'?
Q2: What is your primary disciplinary background?
Q3: What disciplinary field are you primarily working/associated with currently?

INTERDISCIPLINARY PRACTICE IN HPSR
Q4: Within HPSR how do you rank the importance of these different forms of interdisciplinary practice? Rank each as either: Not important in HPSR; Important in HPSR; or Very important in HPSR

- **Team-based Clinical Practice**;
- **Multidisciplinary** ('fruit bowl': side by side placement of insights from two or more disciplines without attempting integration);
- **Interdisciplinary** ('fruit salad': Effort/team that draws on insights, concepts, knowledge, or experience from several disciplines);
- **Transdisciplinary**: ('smoothie': intentional development of overarching synthesis or conceptual frameworks that transcend other disciplinary world views);
- **Practice research engagement**: (interdisciplinary practice that emphasizes engagement across disciplines and stakeholders from different sectors of society); and
- **Mixed methods**: (methodology that involves collecting, analyzing or integrating quantitative and qualitative research/data.

Q5: What are the main barriers to effective/quality interdisciplinary (ID) practice in HPSR? Rate as either: This is not a barrier; this is a barrier; or this is a major barrier.

- Adequate funding for ID in HPSR;
- Individual researcher's capacity for ID research;
- Adequate training of emerging HPSR in ID practice;
- Institutional norms or support for ID HPSR;
- Publication norms; and
- Career progression or opportunities.

Q6: Do specific disciplines currently dominate HPSR?

Q7: Are emerging HPS researchers being adequately trained in interdisciplinarity practice?

INTERDISCIPLINARY HPSR YOU KNOW ABOUT

Q8: Do you know of, or have been involved in, what you would identify as ‘interdisciplinary’ HPDR?

Q9: Can you provide information about this example of interdisciplinary HPSR?

- What disciplines did it combine?
- Would you call this multidisc (fruit bowl), interdisc (fruit salad) or transdisc (smoothie) or mixed-methods etc.?
- Would you say the integration was conducted intentionally or ‘ad hoc’?
- What was the topic or question it investigated?
- Could you provide us with a link/title to this work, so we can trace it?

Appendix C: Data extraction forms

Table 1: Data extraction form for journal articles - template for one article

ARTICLE	Key information	Study Aim	Code/theme e.g. concept/approach	Further comments
File name				
Title				
Authors				
Publication date				
Country				
Source				
Database				
Date retrieved				

Table 2: Data extraction form for teaching materials - template for one source

Material	Key information	Course aim	Code/theme e.g. concept/approach	Further comments
File name				
Institution				
Course				
Facilitators				
Country				
Source				
Date retrieved				

Table 3: Data extraction form for conference abstracts - template for one abstract

Abstract	Key information	Study Aim	Category e.g. concept/approach	Theme e.g. defines HPSR	Further comments
File name					
Title					
Authors					
Conference date					
Full article					
Source					
Date retrieved					

Appendix D: Critical Appraisal Skills Program – Qualitative Research

1. Was there a clear statement of the aims of the research? YES / Can't tell / NO
2. Is a qualitative methodology appropriate? YES/ Can't tell / NO
3. Was the research design appropriate to address the aims of the research? YES/ Can't tell/ NO
4. Was the recruitment strategy appropriate to the aims of the research? YES/ Can't tell/ NO
5. Was the data collected in a way that addressed the research issue? YES/ Can't tell/ NO
6. Has the relationship between the participants and research been considered? YES/ Can't tell/ NO
7. Have ethical issues been taken into consideration? YES/ Can't tell/ NO
8. Was the data analysis sufficiently rigorous? YES/ Can't tell/ NO
9. Is there a clear statement of the findings? YES/ Can't tell/ NO
10. How valuable is the research?

Critical Appraisal Skills Program (CASP) available:

http://www.casp-uk.net/#!casp-tools-checklists/c18f8 [Accessed 03/07/2015].

Appendix E: Case example results

Indicator	Journal	2005	2015
Average number of total reference per article	HP	29.56	44.36
	HPP	29.83	41.90
	Average	29.70	43.13
Average number of WOS journal references	HP	16	13.73
	HPP	15.83	23.40
	Average	15.92	18.57
Average number of different WOS journal references	HP	10.11	9.82
	HPP	11.17	15.10
	Average	10.64	12.46
Average number of different WOS journal categories	HP	8.67	7.55
	HPP	11.17	10.50
	Average	9.92	9.03
Percentage of WOS social science only journal references	HP	10%	24%
	HPP	16%	22%
	Average	13%	23%
Percentage of WOS science only journal references	HP	52%	37%
	HPP	40%	50%
	Average	46%	43.5%
Percentage of WOS Both Social and Science journal references	HP	38%	39%
	HPP	44%	28%
	Average	41%	33.5%

Appendix F: Search and screening strategy

Table 1: Database search results from JSTOR conducted on the 25/09/2015

Advanced search strategy for JSTOR with time period filter selected for 2005 - 2015: (((ab:("search term")) AND la:(eng OR en) AND disc:(medicinealliedhealth-discipline OR health-discipline OR socialsciences-discipline OR publichealth-discipline OR healthsciences-discipline)))

Hand screening (1): Initial screening- documents relevant to HPSR and relating to either inter-, multi-, transdisciplinarity in any other form of cross-disciplinary collaboration were included

NO #	Search term	Output	Advanced search strategy applied	Refined output	Hand screening (1) results
# 1	"HPSR" AND "disciplines"	0	No	0	0
# 2	"Interdisciplinarity" AND "HPSR"	0	No	0	0
# 3	"Interdisciplinary" AND "research" AND "HPSR"	2	No	2	2
# 4	"Multidisciplinary" AND "research" AND "HPSR"	0	No	0	0
# 5	"HPSR" AND "mixed-method" AND "research"	0	No	0	0
# 6	"Interdisciplinarity" AND "health" AND "systems"	946	Yes BUT no abstract limit	190	5
# 7	"Interdisciplinary" AND "research" AND "health" AND "systems"	656	Yes	122	7

# 8	"#8" AND "health policy [MeSH]"	241	Yes BUT abstract limit only applied to "health care systems [MeSH]"	4	0
# 9	"Multidisciplinarity" AND "health" AND "systems"	168	Yes	31	6
# 10	"Multiple" AND "disciplinary" AND "health" AND "systems"	13 960	Yes BUT MeSH term "health care systems" utilised and abstract limit applied only to the MeSH term	16	1
# 11	"Crossing" AND "disciplines" AND "health" AND "systems"	3024	Yes BUT abstract limit only applied to "health" AND "systems"	9	2
# 12	"Health" AND "systems" AND "mixed-method" AND "Research"	350	Yes BUT abstract limit only applied to "mixed-method"	55	13
TOTAL		19347		429	36

Table 2: Database search results from Scopus conducted on 14/10/2015

Advanced search strategy for SCOPUS: TITLE-ABS-KEY (search term) AND LIMIT-TO (PUBYEAR , 2015) OR LIMIT-TO (PUBYEAR , 2014) OR LIMIT-TO (PUBYEAR , 2013) OR LIMIT-TO (PUBYEAR , 2012) OR LIMIT-TO (PUBYEAR , 2011) OR LIMIT-TO (PUBYEAR , 2010) OR LIMIT-TO (PUBYEAR , 2009) OR LIMIT-TO (PUBYEAR , 2008) OR LIMIT-TO (PUBYEAR , 2007) OR LIMIT-TO (PUBYEAR , 2006) OR LIMIT-TO (PUBYEAR , 2005)) AND (LIMIT-TO (SUBJAREA , "MEDI") OR (LIMIT-TO (SUBJAREA , "NURS") OR LIMIT-TO (SUBJAREA , "SOCI") AND LIMIT-TO (LANGUAGE , "ENGLISH"))

Hand screening (1): Initial screening - documents relevant to HPSR and relating to either inter-, multi-, transdisciplinarity in any other form of cross-disciplinary collaboration were included

NO #	Search term	Output	Advanced search strategy applied	Refined output	Hand screening (1) results
# 1	"HPSR" AND "disciplines"	79	Yes	1	1
# 2	"Interdisciplinarity" AND "HPSR"	1	No	1	0
# 3	"Interdisciplinary" AND "research" AND "HPSR"	1	No	1	1
# 4	"Multidisciplinary" AND "research" AND "HPSR"	0	No	0	0
# 5	"HPSR" AND "mixed-method" AND "research"	0	No	0	0
# 6	"Interdisciplinarity" AND "health" AND "systems"	1657	Yes	20	12
# 7	"Interdisciplinary" AND "research" AND "health care systems [MeSH]"	3938	Yes but output too large to hand screen (398) therefore MeSH term "health care systems" replaced by "health" AND "systems"	48	6
# 8	"#7" AND "health-policy"	838	Yes	40	14
# 9	"Multidisciplinarity" AND "health" AND "systems"	424	Yes	21	3
# 10	"Multiple" AND "disciplinary" AND "health" AND "systems"	4369	Yes	92	17
# 11	"Crossing" AND "disciplines" AND "health" AND "systems"	2771	Yes	5	2

# 12	"Health" AND "systems" AND "mixed-method" AND "Research"	13092	Yes BUT search term "interdiscip*" added	55	14
TOTAL		27170		634	70

Table 3: Database search results from PubMed conducted on the 16/10/2015

Advanced search strategy for PUBMED: Details are reported under each search term but all limited to 2005 – 2015 (("2005"[PubDate]: "2015"[PubDate]))

Hand screening (1): Initial screening - documents relevant to HPSR and relating to either inter-, multi-, transdisciplinarity in any other form of cross-disciplinary collaboration were included

NO #	Search term	Output	Advanced search strategy applied	Refined output	Hand screening (1) results
# 1	"HPSR" AND "disciplines"	19	Yes ("HPSR"[All Fields] AND "disciplines"[All Fields])	15	2
# 2	"Interdisciplinarity" AND "HPSR"	0	No	0	0
# 3	"Interdisciplinary" AND "research" AND "HPSR"	18	Yes ("interdisciplinarity"[All Fields] AND "research"[All Fields] AND "HPSR"[All Fields])	17	6
# 4	Multidisciplinary AND research AND HPSR	24	Yes (("interdisciplinary studies"[MeSH Terms] OR ("interdisciplinary"[All Fields] AND "studies"[All Fields]) OR "interdisciplinary studies"[All Fields] OR "multidisciplinary"[All Fields]) AND ("research"[MeSH Terms] OR "research"[All Fields])) AND HPSR[All Fields]	21	8

# 5	“HPSR” AND “mixed method” AND “research”	0	No	0	0
# 6	“Interdisciplinarity” AND “health” AND “systems”	331	Yes ("interdisciplinarity"[All Fields] AND "health care systems” [MeSH Terms”]All Fields] AND	26	8
# 7	“Interdisciplinary” AND “research” AND “health” AND “systems”	302	Yes ("interdisciplinarity"[All Fields] AND "research"[All Fields] AND "health care systems"[All Fields]	25	13
# 8	“#7” AND “health policy [MeSH]”	62	Yes ("interdisciplinarity"[All Fields] AND "research"[All Fields] AND "health"[All Fields] AND "systems"[All Fields] AND "health policy"[All Fields]	60	8
# 9	Multidisciplinarity AND health AND systems	159	Yes (multidisciplinarity[Abstract] AND ("delivery of health care"[MeSH Terms] OR ("delivery"[All Fields] AND "health"[All Fields] AND "care"[All Fields]) OR "delivery of health care"[All Fields] OR ("health"[All Fields] AND "care"[All Fields] AND "systems"[All Fields]) OR "health care systems"[All Fields])	9	3
# 10	“Multiple” AND “disciplinary” AND “health” AND “systems”	5080	Yes (multiple[All Fields] AND disciplinary[Abstract] AND health[Abstract] AND systems[Abstract])	69	9
# 11	“Crossing” AND “disciplines” AND “health” AND “systems”	736	Yes (Crossing[All Fields] AND disciplines[All Fields] AND health care systems[Abstract]	5	1
# 12	“Health” AND “systems” AND “mixed method” AND “Research”	4052	Yes (health[Abstract] AND systems[Abstract] AND mixed-methods[Abstract] AND research[Abstract]	57	8
TOTAL		10783		304	66

Table 4: Datbase search results from Africa-Wide conducted on 16/10/2015

Advanced search strategy for Africa-Wide: ("search term") LIMIT TO (ENGLISH); LIMIT TO (2005 – 2015) SEARCH MODE: BOOLEAN/PHRASE

Hand screening (1): Initial screening - documents relevant to HPSR and relating to either inter-, multi-, transdisciplinarity in any other form of cross-disciplinary collaboration were included

NO #	Search term	Output	Advanced search strategy applied	Refined output	Hand screening (1) results
# 1	HPSR AND disciplines	0	No	0	0
# 2	Interdisciplinarity AND HPSR	0	No	0	0
# 3	Interdisciplinary AND research AND HPSR	10	No	10	5
# 4	Multidisciplinarity AND research AND HPSR	0	No	0	0
# 5	HPSR AND "mixed method" AND research	0	No	0	0
# 6	Interdisciplinarity AND health AND systems	6	No	6	0
# 7	"Interdisciplinary" AND "research" AND "health" AND "systems" [MeSH term "health care systems" too specific]	64	Yes	14	14
# 8	"#7" AND "health policy [MeSH]"	7	No	7	4
# 9	Multidisciplinarity AND health AND systems	1	No	1	0
# 10	Multiple AND disciplinary AND health AND systems	3	No	3	0
# 11	Crossing AND disciplines AND health AND systems	2	No	2	1

# 12	"Health" AND "systems" AND "mixed method" AND "Research"	70	Yes AND (Narrow by Subject: - service delivery; Narrow by Subject: - public health sector; Narrow by Subject: - programme implementation; Narrow by Subject: - primary health care; Narrow by Subject: - healthcare; Narrow by Subject: - health systems; Narrow by Subject: - health policy Narrow by Subject: - health policies; Narrow by Subject: - health care systems; Narrow by Subject: - health care Narrow by Subject: - medical science; Narrow by Subject: - health / public health)	5	0
TOTAL		163		48	24

Table 5: Journal search results from *Health Policy and Planning* conducted on 20/10/2015

Advanced search strategy for HPP: ("search term") ((LIMIT TO (TITLE OR ABSTRACT) AND (LIMIT TO (2005 – 2015))

Hand screening (1): Initial screening - documents relevant to HPSR and relating to either inter-, multi-, transdisciplinarity in any other form of cross-disciplinary collaboration were included

NO.	**Search Term**	**Output**	**Advanced search strategy applied**	**Refined output**	**Hand screening Results (1)**
# 1	Interdisciplinary	1	No	1	1
# 2	Multidisciplin*	71	Yes	2	2
# 3	Discipline	224	Yes	5	3

# 4	Mixed Method	1646	Yes	28	20
TOTAL		1942		36	26

Table 6: Journal seach results from *Health Research Policy and Systems* conductd on 20/10/2015

Advanced search strategy for HARPS: ("search term") ((LIMIT TO (CITATION OR ABSTRACT) AND (LIMIT TO (2005 – 2015))

Hand screening (1): Initial screening - documents relevant to HPSR and relating to either inter-, multi-, transdisciplinarity in any other form of cross-disciplinary collaboration were included

NO.	**Search Term**	**Output**	**Advanced search strategy results**	**Refined output**	**Hand screening Results (1)**
# 1	Interdisciplin*	58	Yes	9	2
# 2	Multidisciplin*	83	Yes	10	3
# 3	Discipline	55	Yes	12	2
# 4	Mixed Method	70	Yes	6	1
TOTAL		274		37	8

Table 7: Journal search results from *Health Services Research and Policy* conducted on 20/10/2015

Advanced search strategy for HSRP: ("search term") ((LIMIT TO (ABSTRACT) AND (LIMIT TO (2005 – 2015))

Hand screening (1): Initial screening - documents relevant to HPSR and relating to either inter-, multi-, transdisciplinarity in any other form of cross-disciplinary collaboration were included

NO.	Search Term	Output	Advanced search strategy applied	Refined output	Hand screening Results (1)
# 1	Interdisciplinar..	67	Yes	3	0
# 2	Multidisciplinar..	133	Yes	17	3
# 3	Discipline	144	Yes	7	2
# 4	Mixed Method [MeSH]	200	Yes	28	28
	TOTAL	544	TOTAL	55	33

Table 8: Conference Abstract Search from the three Global Health Systems Symposia (2010, 2012, and 2014) conducted on 30/10/2015

1st symposium = 24 abstracts; 2nd symposium = 37 abstracts; 3rd symposium = 38 abstracts

Advanced search strategy for conference abstracts: Sourced in PDF format 'find' tool utilised to search terms

Hand screening (1): Initial screening - documents relevant to HPSR and relating to either inter-, multi-, transdisciplinarity in any other form of cross-disciplinary collaboration were included

1st Global Symposium			
NO	**Search Term**	**Specific Term**	**Output**
# 1	Disciplin*	Multidisciplinary	5
		Interdisciplinary	5
		Disciplines	3
		Transdisciplinary	2
# 2	Mixed method	Mixed methods	7
		TOTAL	22

2nd Global Symposium			
NO	**Search Term**	**Specific Term**	**Output**
# 1	Disciplin*	Multidisciplinary	1
		Interdisciplinary	0
		Disicplines	0
		Transdisciplinary	2
# 2	Mixed Method	Mixed methods	7
		TOTAL	10

3rd Global Symposium			
NO	**Search Term**	**Specific Term**	**Output**
# 1	Disciplin*	Multidisciplinary	0
		Interdisciplinary	1
		Disciplines	0
		Transdisciplinry	1
# 2	Mixed Method	Mixed Methods	15
		TOTAL	17

Appendix G: Data extraction of Category A documents (93 examples)

Sub-Category 1 – Examples of multi- and interdisciplinary research (15 examples)							
Multidisciplinary Research (eight examples)	Title	Source	Authors	Year	Issue of focus	Type of study	Detail
	Universal health coverage from multiple perspectives: A synthesis of conceptual literature and global debates	Scopus	Abiiro GA, De Allegri M.	2015	Universal Health Coverage	Literature review	Review of multiple perspectives on a topic
	Living Environments and Health at the Local Level: The Case of Three Localities in the Québec City Region	JSTOR	Koninck M, Pampalon R.	2007	Social determinants of health	Case study, mixed methods	Multi-disciplinary approach stated
	The burden of disease, economic costs and clinical consequences of tuberculosis in the Philippines	HPP	Peabody JW, Shimkhada R, Tan C, Luck J.	2005	Tuberculosis	Multimethod, quantitative	Methods from multiple disciplines utilised but not combined
	Behavior Change Interventions to Improve the Health of Racial and Ethnic Minority Populations: A Tool Kit of Adaptation Approaches	JSTOR	Davidson EM, Liu JJ, Bhopal R, White M, Johnson M, *et al.*	2013	Health in minority populations	Mixed method approach	Multidisciplinary research team
	A systematic review of medical and non-medical practitioners' views of the impact of ehealth on shared care	SCOPUS	Maclure K, Stewart D, Strath A.	2014	eHealth	Systematic review	Multidisciplinary research team
	Institutional capacity for health systems research in East and Central African Schools of Public Health: strengthening human and financial resources	HRPS	Simba D, Mukose A, Bazeyo W.	2014	HPSR capacity	Multimethod, qualitative and quantitative	Multidisciplinary team and meetings with various stakeholders
	Exploring the use of research evidence in health enhancing physical activity policies	HRPS	Hämäläinen RM, Aro AR, van de Goor I, Juel Lau C, Winge Jakobsen M, *et al.*	2015	Health policy	Policy analysis	Multidisciplinary team
	Global implications of China's healthcare reform.	SCOPUS	Yan F, Tang S, Zhang J.	2014	Healthcare reform	Evaluation review	Multidisciplinary assessment

	Title	Source	Authors	Year	Issue of focus	Type of study	Detail
Interdisciplinary Research (seven examples)	Sustainable Control of Water-Related Infectious Diseases: A Review and Proposal for Interdisciplinary Health-Based Systems Research	AfricaWide JSTOR	Batterman S, Eisenberg J, Hardin R, Kruk ME, Lemos MC, *et al.*	2009	Infectious diseases	Literature review	Authors from multiple disciplines, influences from multiple disciplines in literature, integrated ID framework developed
	Thinking about accountability	PubMed	Deber RB.	2014	Accountability	Literature review and framework development	About an ID collaboration involving an ID team
	Overview of the gaps in the health care legislation in Georgia: Short-, medium-, and long-term priorities	JSTOR	Kiknadze N, Beletsky L.	2013	Health policy	Literature review	ID team
	Studying complex interventions: reflections from the FEMHealth project on evaluating fee exemption policies in West Africa and Morocco	Google Scholar	Marchal B, Van Belle S, De Brouwere V, Witter S.	2013	Health policy	Report	ID collaboration and complexity framework utilised
	A new methodology for assessing health policy and systems research and analysis capacity in African universities	Google Scholar	Lê G, Mirzoev T, Orgill M, Erasmus E, Lehmann Uta, *et al.*	2014	HPSR capacity	Empirical, qualitative	ID research team and framework development
	Mapping Interdisciplinary Communication Between the Disciplines of Religion and Public Health in the Context of HIV/AIDS in Africa	Google Scholar	Olivier J.	2014	Interdisciplinary communication	Empirical, qualitative	Interdisciplinary approach to assessing ID, mapping ID communication
	Universal health coverage with equity: what we know, don't know and need to know	HRPS	Frenz P, Vega J.	2010	UHC – equity of access	Literature review and framework development	Integrating multiple disciplinary perspectives and framework development

Sub-Category 2 – Examples of mixed-methods research with and without integration (35 examples)					
Mixed-methods research without integration (23 examples)	Title	Source	Authors	Year	Issue of focus
	Informing the scale-up of Kenya's nursing workforce: a mixed methods study of factors affecting pre-service training capacity and production	3rd Symposium	Appiagyei AA, Kiriinya RN, Gross JM, Wambua DN, Oywer EO, *et al.*	2014	Nursing capacity
	Between the court and the clinic: Lawsuits for medicines and the right to health in Brazil	JSTOR	Biehl J, Amon JA, Socal MP, Petryna A.	2012	Health law, right to health
	Public attitudes to the use in research of personal health information from general practitioners' records: a survey of the Irish general public	JSTOR	Buckley BS, Murphy AW, MacFarlane AE.	2011	Health information
	Implementing a Novel Citywide Rapid HIV Testing Campaign in Washington, D.C.: Findings and Lessons Learned	JSTOR	Castel, AD, Magnus M, Peterson J, Anand K, Wu, C.	2012	HIV screening
	Informal politics and inequity of access to health care in Lebanon	2nd symposium	Chen B.	2012	Health care access and equity
	Factors Associated with Contraceptive Use in Angola	JSTOR	Decker M, Constantine NA.	2011	Reproductive health
	A toolkit for assessing the impacts of measles eradication activities on immunization services and health systems at country level	2nd symposium	Griffiths UK, Hanvoravongchai P, Oliveira-Cruz V, Mounier-Jack S, Balabanova D.	2010	Immunization services
	Researching the causes of low population coverage of health insurance for the poor in Senegal: Mixed-methods multiple case study evaluation.	1st symposium	Mladovsky P.	2008	Health insurance coverage
	Use of out-of-hours services: The patient's point of view on co-payment a mixed methods approach	SCOPUS	Philips H, Remmen R, De Paepe P, Buylaert W, Van Royen P.	2013	Health service co-payments
	The role of nursing best practice champions in diffusing practice guidelines: a mixed methods study	PubMed	Ploeg J, Skelly J, Rowan M, Edwards N, Davies B.	2010	Policy implementation

	Global Fund investments in human resources for health: innovation and missed opportunities for health systems strengthening	HPP	Bowser Diana, Powers Sparkes S, Mitchell A, Bosser, TJ, Bärnighausen T.	2014	Health system strengthening, human resources
Mixed-methods research without integration (23 examples)	The implementation of a new Malaria Treatment Protocol in Timor-Leste: challenges and constraints	HPP	Martins JS, Zwi AB, Hobday K, Bonaparte F, Kelly PM.	2012	Infectious diseases
	Second Global Symposium on Health Systems Research: a conference impact evaluation	HPP	Milko E, Wu D, Neves J, Neubecker AW, Lavis J, *et al.*	2015	Impact evaluation
	Strategies for coping with the costs of inpatient care: a mixed methods study of urban and rural poor in Vadodara District, Gujarat, India	HPP	Ranson MK, Jayaswal R, Mills AJ.	2012	Health economics
	Policy entrepreneurs and structural influence in integrated community case management policymaking in Burkina Faso	HPP	Shearer JC.	2015	Health policy
	Hospitalized for fever? Understanding hospitalization for common illnesses among insured women in a low-income setting	HPP	Sinha T, Desai S, Mahal A.	2014	Health care delivery
	Community participation of cross-border migrants for primary health care in Thailand	HPP	Sirilak S, Okanurak K, Wattanagoon Y, Chatchaiyalerk S, Tornee S, *et al.*	2013	Right to health, community engagement
	Integrating HIV treatment with primary care outpatient services: opportunities and challenges from a scaled-up model in Zambia	HPP	Topp SM, Chipukuma JM, Chiko MM, Matongo E, Bolton-Moore C, *et al.*	2013	Health care service delivery integration
	System-wide effects of Global Fund investments in Nepal	HPP	Trägård A, Shrestha IB.	2010	Funding
	Part of a global workforce: migration of British-trained pharmacists	HSRP	Hassell, Karen Nichols, Liza Noyce, Peter	2008	Healthcare workers
	The use of external consultants by NHS commissioners in England: what lessons can be drawn for GP commissioning?	HSRP	Naylor C, Goodwin N.	2011	Healthcare worker outsourcing
	Impact of clinician judgement on formulary committees' recommendations in Canada	HSRP	Oremus M, Raina P, Eva K, Lavis John, Nair K, *et al.*	2010	Health policy
	Do telephones overcome geographical barriers to general practice out-of-hours services? Mixed-methods study of parents with young children	HSRP	Turnbull J, Pope C, Martin D, Lattimer V.	2010	Healthcare access

	Title	Source	Authors	Year	Issue of focus
Mixed-methods research with integration (12 examples)	Improving the network management of integrated primary mental healthcare for older people in a rural Australian region: Protocol for a mixed methods case study	SCOPUS	Fuller J, Oster C, Dawson S, O'Kane D, Lawn, S.	2014	Mental health care integration
	Introduction of Shared Electronic Records: Multi-Site Case Study Using Diffusion of Innovation Theory	JSTOR	Greenhalgh T, Stramer K, Bratan T, Byrne E, Mohammad Y, *et al.*	2008	Health information technology
	Public health management of antiviral drugs during the 2009 H1N1 influenza pandemic: A survey of local health departments in California	SCOPUS	Hunter JC, Rodríguez DC, Aragón TJ.	2012	Drug pathway
	Building Community-Based Participatory Research Partnerships with a Somali Refugee Community	SCOPUS	Johnson CE, Ali SA, ShippMPL.	2009	Community health
	Exploring the Value of Mixed Methods Within the At Home/Chez Soi Housing First Project: A Strategy to Evaluate the Implementation of a Complex Population Health Intervention for People With Mental Illness Who Have Been Homeless	JSTOR	Macnaughton EL, Goering PN, Nelson GB.	2012	Population health
	Resources for Health Promotion: Rhetoric, Research and Reality	JSTOR	Minke W, Raine K, Plotnikoff R, Anderson D, Khalema E, *et al.*	2007	Health promotion
	Retention of female volunteer community health workers in Dhaka urban slums: a case-control study	HPP	Alam K, Tasneem S, Oliveras E.	2012	Community health workers
	Does treatment collection and observation each day keep the patient away? An analysis of the determinants of adherence among patients with Tuberculosis in South Africa	HPP	Birch S, Govender V, Fried J, Eyles J, Daries V, *et al.*	2015	Tuberculosis treatment adherence
	Priority setting and implementation in a centralized health system: a case study of Kerman province in Iran	HPP	Khayatzadeh-Mahani A, Fotaki M, Harvey G.	2013	Health policy
	Understanding the causes and consequences of injuries to adolescents growing up in poverty in Ethiopia, Andhra Pradesh (India), Vietnam and Peru: a mixed method study	HPP	Morrow V, Barnett I, Vujcich D.	2014	Adolescent health
	Advancing the application of systems thinking in health: provider payment and service supply behaviour and incentives in the Ghana National Health Insurance Scheme – a systems approach	HRSP	Agyepong IA, Aryeetey GC, Nonvignon J, Asenso-Boadi F, Dzikunu H, *et al.*	2014	Provider payment mechanism, systems thinking
	On alcohol, transport and poverty in Cape Town	AfricaWide	Pirie G.	2014	Social determinants

Sub-Category 3 – Examples relating to team science and interprofessional practice (39 examples)					
Interprofessional practice (31 examples)	**Title**	**Source**	**Authors**	**Year**	**Issue of focus**
	Current trends in interprofessional education of health sciences students: A literature review	SCOPUS	Abu-Rish E, Kim S, Choe L, Varpio L, Malik E, *et al.*	2012	Interprofessional education
	Interdisciplinary approach of reproductive and sexual health in the formation of university nursing in Cuba	SCOPUS	Agramonte del Sol A.	2013	Interprofessional education
	Cardiac resynchronization therapy in clinical practice: need for electrical, mechanical, clinical and logistic synchronization	PubMed	Boriani G, Diemberger I, Biffi M, Martignani C, Valzania C, *et al.*	2006	Health care teams
	Pharmacist-led shared medical appointments for multiple cardiovascular risk reduction in patients with type 2 diabetes	PubMed	Cohen LB, Taveira TH, Khatana SA, Dooley AG, Pirraglia PA, *et al.*	2011	Health care teams
	A primer on critical care pharmacy services	PubMed	Erstad BL.	2008	Health care teams
	Worldviews in Collision: Conflict and Collaboration across Professional Lines	JSTOR	Garman AN, Leach DC, Spector N.	2006	Health care teams
	Electronic Self-report Assessment--Cancer (ESRA-C): Working towards an integrated survey system	PubMed	Karras BT, Wolpin S, Lober WB, Bush N, Fann JR, *et al.*	2006	Health care teams
	Using a knowledge translation framework to implement asthma clinical practice guidelines in primary care	SCOPUS	Licskai C, Sands T, Ong M, Paolatto L, Nicoletti I.	2012	Health care teams
	Determining the competences of community based workers for disability-inclusive development in rural areas of South Africa, Botswana and Malawi	SCOPUS	Lorenzo T, Van Pletzen E, Booyens M.	2015	Interprofessional practice
	[Diagnostic procedure for uveitis patients: reduction of costs by a targeted assessment of laboratory tests based on clinical findings]	PubMed	Losch A, Flessa S, Fiehn C, Max R, Becker MD.	2006	Health care teams
	Interdisciplinarity in nursing and the possibilities of implementation in Cuba	Google Scholar	Martínez Trujillo N, Torres Esperón M.	2014	Interprofessional practice
	Working together. An interdisciplinary approach to dying patients in a palliative care unit	JSTOR	Minetti, A.	2011	Interprofessional care
	Redesigning the care of rheumatic diseases at the practice and system levels. Part 2: system level process improvement (Redesign 201).	PubMed	Newman ED, Harrington JT.	2007	Interprofessional care

	Title	Source	Authors	Year	Issue of focus
Interprofessional practice (31 examples)	Collaborating Across the Departments of Veterans Affairs and Defense to Integrate Mental Health and Chaplaincy Services	SCOPUS	Nieuwsma JA, Jackson GL, DeKraai MB, Bulling DJ, Cantrell WC, *et al.*	2014	Health care teams
	Mental health and interdisciplinary work: The experience in "Candido Ferreira", in Campinas, State of Sao Paulo, Brazil	SCOPUS	Queiroz MS, Delamuta LA.	2011	Interprofessional care
	Getting unstuck along the clinical pathway: An integrated multi-agency approach	SCOPUS	Richards L, Uchendu N, O'Hara J.	2014	Interprofessional care
	Life experiences of instability and sexual risk behaviors among high-risk adolescent females	PubMed	Secor-Turner M, McMorris B, Sieving R, Bearinger LH.	2013	Interprofessional care
	Community health workers and the Patient Protection and Affordable Care Act: an opportunity for a research, advocacy, and policy agenda	PubMed	Shah MK, Heisler M, Davis MM.	2014	Health care teams
	Enhancing interdisciplinary collaboration in primary health care	PubMed	Sharp M.	2006	Interprofessional practice
	A Kaleidoscope of care for HIV-infected substance users	SCOPUS	Tobias C, Brown K, Rajabiun S, Drainoni ML, Young SR.	2005	Interprofessional practice
	Series: The research agenda for general practice/family medicine and primary health care in Europe. Part 6: Reaction on commentaries - How to continue with the Research Agenda	SCOPUS	Van Royen P, Beyer M, Chevallier P, Eilat-Tsanani, S, Lionis C *et al.*	2011	Interprofessional care
	An integrated approach to surgery and primary care systems strengthening in low- and middle-income countries: building a platform to deliver across the spectrum of disease	PubMed	Vasan A, Hudelson CE, Greenberg SL, Ellner AE.	2015	Health care teams
	[Encountering the subject in the health field: a human care theory based on lived experience]	PubMed	Vonarx N, Desgroseilliers V.	2013	Interprofessional practice
	Bridging the gap between mental and physical health: a multidisciplinary approach	PubMed	Vreeland B.	2007	Interprofessional care
	Building collaborative capacity: promoting interdisciplinary teamwork in the absence of formal teams	PubMed	Weinberg DB, Cooney-Miner D, Perloff JN, Babington L, Avgar, A. C.	2011	Health care teams
	Pulmonary rehabilitation and integrated care	PubMed	Wouters EF, Vanderhoven IM.	2009	Interprofessional care

	Title	Source	Authors	Year	Issue of focus
	Physician perspectives on colorectal cancer surveillance care in a changing environment	SCOPUS	Zapka J, Sterba KR, LaPelle N, Armeson K, Burshell DR, *et al.*	2015	Interprofessional care
	Trust relations in a changing health service	HSRP	Calnan, M, Rowe R.	2008	Interprofessional care
	Interprofessionality as the field of interprofessional practice and interprofessional education: An emerging concept	SCOPUS	D'Amour D, Oandasan I.	2005	Interprofessional education and practice
	A primary care-based interdisciplinary team approach to the treatment of chronic pain utilising a pragmatic clinical trials framework	SCOPUS	DeBar LL, Kindler L, Keefe FJ, Green CA, Smith DH, *et al.*	2012	Health care teams
	Is public health ready for a professional practice framework?	HSRP	Cava M.	2008	Interprofessional practice
Team Science (8 examples.)	Interdisciplinary networks for the treatment of childhood pulmonary vascular disease: what pulmonary hypertension doctors can learn from pediatric oncologists	JSTOR	Hansmann G.	2013	Interdisciplinary networks
	Using teams to implement personalized health care across a multi-site breast cancer network	PubMed SCOPUS	Lewis S, Bloom J, Rice J, Naeim A, Shortell S, *et al.*	2014	Team science initiative
	Family Health Nursing: A Response to the Global Health Challenges	PubMed SCOPUS	Martin P, Duffy T, Johnston B, Banks P, Harkess-Murphy E, *et al.*	2013	Team science and health care teams
	School Reintegration Following Psychiatric Hospitalization: An Ecological Perspective	SCOPUS	Savina E, Simon J, Lester M.	2014	Cross-sectoral network and collaboration
	[Practices that integrate mental health with public health: matricial support and interconsultation]	SCOPUS	Silveira ER.	2012	Integration, ID network
	Strategies for gender-equitable HIV services in rural India	HPP	Sinha G, Peters DH, Bollinger RC.	2009	Interdisciplinary collaborations, teams
	Analysis of adequacy levels for human resources improvement within primary health care framework in Africa	AfricaWide HRPS	Parent F, Fromageot A, Coppieters Y, Lejeune C, Lemenu D, *et al.*	2005	Interdisciplinary collaborations, teams
	Creating change through collaboration: a twinning partnership to strengthen emergency medicine at Addis Ababa University/Tikur Anbessa Specialized Hospital--a model for international medical education partnerships	PubMed	Busse H, Azazh A, Teklu S, Tupesis JP, Woldetsadik A, *et al.*	2013	Team science, ID collaboraton

Sub-Category 4 – Participatory Action Research examples (4 examples)					
	Title	**Source**	**Authors**	**Year**	**Issue of focus**
	MicroResearch: Finding sustainable local health solutions in East Africa through small local research studies	Extra	MacDonald NE, Bortolussi R, Kabakyenga J, Pemba S, Estambale B, *et al.*	2014	Small community driven ID research
	Challenges of scaling up and of knowledge transfer in an action research project in Burkina Faso to exempt the worst-off from health care user fees	AfricaWide	Ridde V, Yaogo M, Kafando Y, Kadio K, Ouedraogo M, et al.	2011	User fees, health equity
	Promoting food security and well-being among poor and HIV/AIDS affected households: lessons from an interactive and integrated approach	AfricaWide	Swaans K, Broerse J, Meincke M, Mudhara M, Bunders J.	2009	Food security, HIV
	How people-centred health systems can reach the grassroots: experiences implementing community-level quality improvement in rural Tanzania and Uganda	HPP	Tancred T, Mandu R, Hanson C, Okuga M, Manzi F, *et al*.	2014	People-centred health care

Appendix H: Data extraction of Category B documents (51 documents)

Title	Source	Authors	Year	Issue of focus	Type of study	ID Perspective	Definition? Source?
The making of an interdisciplinary partnership: the case of the Chicago Food System Collaborative	AfricaWide	Suarez-Balcazar Y, Hellwig M, Kouba J, Redmond L, Martinez Louise, *et al.*	2006	An ID initiative	Evaluation report	Integrationist	YES YES
Trust, risk and health care reform	SCOPUS	Taylor-Gooby P.	2006	Promotion of IDR in conclusion	Literature review	Generalist	NO NO
The Forest for the Trees: A Systems Approach to Human Health Research	JSTOR	Gohlke JM, Portier CJ.	2007	Promotion of IDR in conclusion	Literature review	Generalist	NO NO
Resilience research and policy/practice discourse in health, social, behavioral, and environmental sciences over the last ten years	AfricaWide	Almedom AM.	2008	Promotion of ID collaboration in conclusion	Literature review	Integrationist	NO NO
Social and behavioral science in HIV vaccine trials: a gap assessment of the literature	PubMed	La, CY, Stansbury JP, Gust DA, Kafaar Z.	2009	About ID collaboration	Literature review	Generalist	NO NO
Connecting the streams: Using health systems research knowledge in low- and middle-income countries	1st symposium	Loewenson R.	2010	About ID and MD in HPSR, knowledge translation	Literature review	Generalist	NO NO
Linking research evidence to health policy and practice	Google Scholar	Syed ZQ, Gaidhane A, Zodpey S	2010	Promotes IDR in conclusion	Literature review	Generalist	NO NO

Title	Source	Authors	Year	Issue of focus	Type of study	ID Perspective	Definition? Source?
Development of health policy and systems research in Nigeria: lessons for developing countries' evidence-based health policy making process and practice	AfricaWide Google Scholar	Uneke CJ, Ezeoha AE, Ndukwe, CD, Oyibo PG, Onwe F.	2010	HPSR capacity, about ID conflicts	Qualitative, empirical	Generalist	NO NO
A checklist for health research priority setting: nine common themes of good practice	Google Scholar	Viergever RF, Olifson S, Ghaffar A, Terry RF.	2010	About IDR and ID collaboration	Literature review	Generalist	NO NO
Playing the role of a 'boundary organisation': getting smarter with networking	AfricaWide	Drimie, Scott Quinlan, Tim	2011	Promotion of ID collaboration	Literature review	Integrationist	NO YES
Overcoming gaps to advance global health equity: a symposium on new directions for research	HRPS	Frenk, J. Chen, L.	2011	About ID collaboration, systems thinking	Literature review	Neither	NO NO
A health systems research mapping exercise in 26 low-and middle-income countries: narratives from health systems researchers, policy brokers and policy-makers	Google Scholar	Decoster, K, Appelmans A, Hill P.	2012	About ID in capacity building	Qualitative, empirical	Generalist	NO NO
Going "all in" to transform the Tulsa community's health and health care workforce	PubMed	Clancy GP, Duffy FD.	2013	About ID collaboration	Report	Generalist	NO NO
Access to HIV/AIDS care: a systematic review of socio-cultural determinants in low and high income countries	PubMed	Gari S, Doig-Acuna C, Smail T, Malungo JR, Martin-Hilber A, *et al*.	2013	Promotes IDR	Systematic review	Undetermined	NO NO
A realist synthesis of the effect of social accountability interventions on health service providers' and policymakers' responsiveness	3rd symposium	Lodenstein E, Dieleman M, Gerretsen B, Broerse J.	2013	Recommends boundary crossing	Systematic review	Generalist	NO NO

Title	Source	Authors	Year	Issue of focus	Type of study	ID Perspective	Definition? Source?
A method for identifying research priorities for health systems research on health and aging	PubMed	Sivananthan SN, Chambers LW.	2012	About ID collaboration and IDR	Quantitative, empirical	Generalist	NO NO
From “know-do” to “how-why”…	Google Scholar	Balen J.	2014	About IDR and team science	Presentation	Integrationist	NO NO
The role of leadership in people-centred health systems: a sub-national study in The Gambia	Google Scholar	Chigudu S, Jasseh M, d'Alessandro U, Corrah T, Demba A.	2014	Promotes IDR, complex systems	Qualitative, empirical	Generalist	NO NO
Advocacy for health equity: A synthesis review	SCOPUS	Farrer L, Marinetti C, Cavaco YK, Costongs C.	2015	About synthesising literature across disciplinary boundaries	Systematic review	Generalist	NO NO
Crossing Boundaries: The Design of an Interdisciplinary Training Program to Improve Care for the Frail Elderly	SCOPUS	Kolomitro K, Stockley D, Egan R, MacDonald ML.	2015	ID education	Evaluation	Integrationist	NO YES
The dragon and the snake: Health practices among Chinese in the UK from an inter-disciplinary perspective	PubMed SCOPUS	Long J, Byrne P, Gabbay M, Frith L, Fletcher I.	2015	From an ID perspective	Systematic review	Generalist	NO NO
SDH-NET: a South-North-South collaboration to build sustainable research capacities on social determinants of health in low- and middle-income countries	HRPS	Cash-Gibson L, Guerra G, Salgado-de-Snyder VN.	2015	About an ID initiative	Report	Undetermined	NO NO
Assessing capacity for health policy and systems research in low and middle income countries	PubMed	Gonzalez Block M A, Mills A.	2003	Discusses multiple disciples in HPSR	Quantitative, empirical	Undetermined	NO NO
Social Disparities in Cancer: Lessons from a Multidisciplinary Workshop	JSTOR	Weissman JS, Schneider EC.	2005	About an MD workshop	Report	Generalist	NO NO

Title	Source	Authors	Year	Issue of focus	Type of study	ID Perspective	Definition? Source?
Quality medicines for the poor: experience of the Delhi programme on rational use of drugs	HPP	Roy Chaudhury R, Parameswar R, Gupta U, Sharma S, Tekur U, *et al.*	2005	About MD collaboration	Qualitative, empirical	Generalist	NO NO
Research capacity development and training	HSRP	Ramkalawan T, Dieppe P.	2008	About and MD initiative	Report	Generalist	NO YES
Studying large-scale programmes to improve patient safety in whole care systems: Challenges for research	PubMed SCOPUS	Benn J, Burnett S, Parand A, Pinto A, Iskander S, *et al.*	2009	MDR approach recommend in conclusion	Literature review	Generalist	NO NO
Health services research in Europe and its use for informing policy	HSRP	Ettelt S, Mays N.	2011	About MD capacity building	Quantitative, empirical	Generalist	NO NO
L.E.A.D.: A Framework for Evidence Gathering and Use for the Prevention of Obesity and Other Complex Public Health Problems	SCOPUS	Chatterji M, Green LW, Kumanyika S.	2014	Framework for sourcing multiple disciplinary influences	Literature review and framework development	Mixed, and systems thinking	NO YES
The teaching method of multidisciplinary T workshops: A new teaching model for an aging society	SCOPUS	Kang SC, Liu PL, Lee YF, Ye SR, Yang HJ, *et al.*	2014	About a MD education	Evaluation	Integrationist	NO NO
The international political economy of global universal health coverage	1st symposium	Ooms G, Hammonds R, Van Damme W.	2010	Promoting IDR	Literature review	Generalist	NO NO
What must be done to enhance capacity for Health Systems Research	1st symposium Google Scholar	Bennett S, Paina L, Kim C, Agyepong I, Chunharas S, *et al.*	2010	About ID and MD in education, MD capabilities of HPSR researchers	Literature review	Integrationist	NO YES
Health policy and systems research in Africa, Asia and Latin America	Google Scholar	Chowdhury SA, Block MA-G, Harrison D.	2003	About lack of MD in HPSR organisations	Literature and scoping review	Integrationist	NO YES

Title	Source	Authors	Year	Issue of focus	Type of study	ID Perspective	Definition? Source?
Facilitators and challenges to conducting interdisciplinary research	PubMed SCOPUS	Corbett CF, Costa LL, Balas MC, Burke WJ, Feroli ER.	2013	Barriers to IDR and framework development	Literature review and framework development	Integrationist	YES YES
Health geographies I: Complexity theory and human health	SCOPUS	Curtis S, Riva M.	2010	About IDR	Literature review and framework development	Undetermined, complexity theory	NO YES
Changing mindsets: Strategy on health policy and systems research	Google Scholar	World Health Organisation	2012	Conceptual HPSR, ID and systems thinking	Report	Integrationist	YES YES
Building the field of health policy and systems research: social science matters	Google Scholar	Gilson L, Hanson K, Sheikh K, Agyepong IA, Ssengooba F, *et al.*	2011	Conceptual HPSR, increasing ID and social sciences capacity	Literature review	Integrationist	NO YES
The utilisation of health research in policy-making: concepts, examples and methods of assessment	Google Scholar	Hanney SR, Gonzalez-Block MA, Buxton MJ, Kogan M.	2003	Conceptual ID	Literature review and framework development	Undetermined	NO YES
Background paper on conceptual issues related to health systems research to inform a WHO global strategy on health systems research	Google Scholar	Hoffman SJ, Røttingen J, Bennett S, Lavis JN, Edge JS, *et al.*	2012	Conceptual ID	Literature review and framework development	Integrationist	NO YEs
Embedding health policy and systems research into decision-making processes in low- and middle-income countries	Google Scholar PubMed SCOPUS	Koon AD, Rao KD, Tran NT, Ghaffar A.	2013	Utilising an ID concept	Literature review and framework development	Undetermined	NO NO
Action learning for health system governance: the reward and challenge of co-production	HPP PubMed	Lehmann U, Gilson L.	2015	About ID and IDR in HPSR	Methodological musings	Integrationist	NO YES

Title	Source	Authors	Year	Issue of focus	Type of study	ID Perspective	Definition? Source?
Interdisciplinarity and Systems Science to Improve Population Health. A View from the NIH Office of Behavioral and Social Sciences Research	PubMed SCOPUS	Mabry PL, Olster DH, Morgan GD, Abrams DB.	2008	About IDR and ID collaboration	Report	Integrationist	YES YES
Health policy and systems research: defining the terrain; identifying the methods	Google Scholar	Mills A.	2011	Conceptual ID	Literature review	Mixed	NO NO
Special issue on Anthropology and Public Health: An Introduction	Google Scholar	Mishra A.	2013	Conceptual ID in HPSR	Literature review	Integrationist	YES YES
Evaluating healthcare interventions: answering the "how" question	Google Scholar	Prashanth NS, Marchal B, Criel B.	2013	About IDR and ID collaboration	Literature review	Undetermined, systems	NO YES
Health policy and systems research: a methodological reader	Google Scholar	Gilson L.	2012	Conceptual ID in HPSR	Report, guide	Generalist	NO NO
Building the field of health policy and systems research: framing the questions	Google Scholar	Sheikh K, Gilson L, Agyepong IA, Hanson K, Ssengooba F.	2011	Conceptual ID in HPSR	Literature review	Integrationist	NO NO
Scientometric trends and knowledge maps of global health systems research	SCOPUS	Yao Q, Chen K, Yao L, Lyu PH, Yang TA, *et al.*	2014	About ID in HPSR	Mapping, quantitative	Generalist	NO YES
Health policy and systems research: needs, challenges and opportunities in South Africa-a university perspective: leadership and governance	Google Scholar	Orgill M, Nxumalo N, Amde W, Erasmus E, Lehmann U, *et al.*	2012	Conceptual ID	Report	Integrationist	NO NO
Rethinking health systems strengthening: key systems thinking tools and strategies for transformational change	HPP	Swanson RC, Cattaneo A, Bradley E, Chunharas S, Atun R, *et al.*	2012	Conceptual ID	Literature review	Undetermined, systems	NO YES
A relational conceptual framework for multidisciplinary health research centre infrastructure	HRSP	Coen SE, Bottorff JL, Johnson JL, Ratner PA.	2010	Conceptual MD and ID	Literature review, conceptual	Integrationist	NO YES

Appendix I: Journal Author Guidelines for Health Policy and Planning

Information for Authors

Health Policy and Planning's aim is to improve the design and implementation of health systems and policies in low- and middle-income countries through providing a forum for publishing high quality research and original ideas, for an audience of policy and public health researchers and practitioners. HPP is published six times a year.

HPP has a double-blinded peer-review policy. All papers, in each of the categories described below, are peer reviewed.

Specific objectives are to:

- Attract high quality research papers, reviews and debates on topics relevant to health systems and policies in low- and middle-income countries;
- Ensure wide geographical coverage of papers including coverage of the poorest countries and those in transition;
- Encourage and support researchers from low- and middle-income countries to publish in *HPP*;
- Ensure papers reflect a broad range of disciplines, methodologies and topics;
- Ensure that papers are clearly explained and accessible to readers from the range of disciplines used to analyse health systems and policies; and
- Provide a fair, supportive and high quality peer review process.

Health Policy and Planning welcomes submissions of the following types: original articles, review papers, methodological musings, research in practice, commentaries, and papers in our series 'How to do (or not to do)...' [for example, see Hutton & Baltussen, HPP, 20(4): 252-9] and '10 best resources' [for example, see David & Haberlen, HPP, 20(4): 260-3].

Authors should pay close attention to the factors that will increase likelihood of acceptance. As well as the high overall quality required for publication in an international journal, authors should address HPP's readership: national and international policy makers, practitioners, academics and general readers with a particular interest in health systems and policy issues and debates in low- and middle-income countries. Manuscripts that fail to set out the international debates to which the paper contributes, and to draw out policy lessons and conclusions, are more likely to be rejected or returned to the authors for redrafting prior to being reviewed. In addition, economists should note that papers accepted for publication in HPP will consider the broad policy implications of an economic analysis rather than focusing primarily on the methodological or theoretical aspects of the study.

Public health specialists writing about a specific health, policy, challenge or service should discuss the relevance of the analysis for the broader health system. Those submitting health policy analyses should draw on relevant bodies of theory in their analysis, or justify why they have not, rather than only presenting a narrative based on empirical data.

The editors cannot enter into correspondence about papers considered unsuitable for publication and their decision is final. Neither the editors nor the publishers accept responsibility for the views of authors expressed in their contributions.

The editors reserve the right to make amendments to the papers submitted although, whenever possible, they will seek the authors' consent to any significant changes made.

Manuscripts must be submitted online. Once you have prepared your manuscript according to the instructions below please visit the online submission website. Instructions on submitting your manuscript online can be viewed here.

Manuscripts containing original material are accepted for consideration with the understanding that neither the article nor any part of its essential substance, tables, or figures has been or will be published or submitted for publication elsewhere. This restriction does not apply to abstracts or short press reports published in connection with scientific meetings. Copies of any closely related manuscripts should be submitted along with the manuscript that is to be considered by *HPP*. *HPP* discourages the submission of more than one article dealing with related aspects of the same study.

Should you require any assistance in submitting your article or have any queries, please do not hesitate to contact the editorial office at hpp.editorialoffice@oup.com.

During the online submission procedure, authors are asked to provide: a) information on prior or duplicate publication or submission elsewhere of any part of the work; b) a statement of financial or other relationships that might lead to a conflict of interest or a statement that the authors do not have any conflict of interest; c) a statement that the manuscript has been read and approved by all authors (see also section on authorship below); d) the name, address, telephone and fax number of the corresponding author who is responsible for negotiations concerning the manuscript. The manuscript must be accompanied by copies of any permissions (see heading Permissions below) to reproduce already published material, or to use illustrations or report sensitive personal information about identifiable persons.

All papers submitted to HPP are checked by the editorial office for conformance to author and other instructions all specified below. Non-conforming manuscripts will be returned to authors.

AUTHORSHIP

All persons designated as authors should qualify for authorship. The order of authorship should be a joint decision of the co-authors. Each author should have participated sufficiently in the work to take public responsibility for the content. Authorship credit should be based on substantial contribution to conception and design, execution, or analysis and interpretation of data. All authors should be involved in drafting the article or revising it critically for important intellectual content, must have read and approved the final version of the manuscript and approve of its submission to this journal. An email confirming submission of a manuscript is sent to all authors. Any change in authorship following initial submission would have to be agreed by all authors as would any change in the order of authors.

SUBMISSION

Please read these instructions carefully and follow them closely to ensure that the review and publication of your paper is as efficient and quick as possible. The Editorial Office reserve the right to return manuscripts that are not in accordance with these instructions.

All material to be considered for publication in Health Policy and Planning should be submitted in electronic form via the journal's online submission system. Once you have prepared your manuscript according to the instructions below, instructions on how to submit your manuscript online can be found by clicking here.

LANGUAGE EDITING PRE-SUBMISSION

OUP offers pre-submission language editing through Oxford Language Editing, a service for researchers all over the world. Language editing, particularly if English is not your first language, can be used to ensure that the academic content of your paper is fully understood by the journal editors and reviewers. Visit http://www.oxfordlanguageediting.com to find out more about the freelance editors available and the different services offered. Please note that edited manuscripts will still need to undergo peer-review by the journal.

MANUSCRIPT TYPES AND PREPARATION

- original articles
- review papers
- methodological musings
- research in practice
- commentaries
- papers in our series 'How to do (or not to do)...' [for example, see Hutton & Baltussen, HPP, 20(4): 252-9] and
- '10 best resources' [for example, see David & Haberlen, HPP, 20(4): 260-3].

ORIGINAL RESEARCH

Manuscripts should preferably be a maximum of 6000 words, excluding tables, figures/diagrams and references.

The **title page** should contain:

- Title - please keep as concise as possible and ensure it reflects the subject matter;
- Corresponding author's name, address, telephone/fax numbers and e-mail address;
- Each author's affiliation and qualifications;
- Keywords and an abbreviated running title;
- 2-4 Key Messages, detailing concisely the main points made in the paper;
- Acknowledgements
- A word count of the full article.

The manuscript will generally follow through sections: Abstract (no more than 300 words), Introduction, Methods, Results, Discussion, Conclusion, References. However, it may be appropriate to combine the results and discussion sections in some papers. Tables and Figures should not be placed within the text, rather provided in separate file/s.

In the **acknowledgements**, all sources of funding for research must be explicitly stated, including grant numbers if appropriate. Other financial and material support, specifying the nature of the support, should be acknowledged as well.

Figures should be designed using a well-known software package for standard personal computers. If a figure has been published earlier, acknowledge the original source and submit written permission from the copyright holder to reproduce the material. Colour figures are permitted but authors will be required to pay the cost of reproduction.

All **measures** should be reported in SI units, followed (where necessary) by the traditional units in parentheses. There are two exceptions: blood pressure should be expressed in mmHg and haemoglobin in g/dl. For general guidance on the International System of Units, and some useful conversion factors, see 'The SI for the Health Professions' (WHO 1977).

Statistics:

For the reporting of statistical analyses please consider the following additional points:

- Focus the statistical analysis at the research question.
- Report simple analyses first, then only more sophisticated results.
- Provide information about participation and missing data.
- As much as possible, describe results using meaningful phrases (E.g., do not say "beta" or "regression coefficient", but "mean change in Y per unit of X"). Provide 95% confidence intervals for estimates.
- Report the proportions as N (%), not just %.
- Report p values with 2 digits after the decimal, 3 if <0.01 or near 0.05. E.g., 0.54, 0.03, 0.007, <0.001, 0.048. Do not report p values greater than 0.05 as "NS".
- Always include a leading zero before the decimal point (e.g., 0.32 not .32).
- Do not report tests statistics (such as chi-2, T, F, etc)."

REVIEW ARTICLES:

Manuscripts should preferably be a maximum of 10,000 words, excluding tables, figures/diagrams and references

Reviews may be invited. They generally address recent advances in health policy, health systems and implementation. Systematic reviews are particularly welcomed, but may not be appropriate for every topic. If authors are submitting a review article that is not a systematic review then the paper should explain why a systematic review was not feasible/desirable, and the review methods should be described in a way that is as clear and as replicable as possible.

The **title page** should contain:

- Title - please keep as concise as possible and ensure it reflects the subject matter;
- Corresponding author's name, address, telephone/fax numbers and e-mail address;
- Each author's affiliation and qualifications;
- Keywords and an abbreviated running title;

- 2-4 Key Messages, detailing concisely the main points made in the paper;
- Acknowledgements
- A word count of the full article.

The manuscript will generally follow through sections: Abstract (no more than 300 words), Introduction, Methods, Results, Discussion, Conclusion, References. However, it may be appropriate to combine the results and discussion sections in some papers. Tables and Figures should not be placed within the text, rather provided in separate file/s.

In the **acknowledgements**, all sources of funding for research must be explicitly stated, including grant numbers if appropriate. Other financial and material support, specifying the nature of the support, should be acknowledged as well.

Figures should be designed using a well-known software package for standard personal computers. If a figure has been published earlier, acknowledge the original source and submit written permission from the copyright holder to reproduce the material. Colour figures are permitted but authors will be required to pay the cost of reproduction.

All **measures** should be reported in SI units, followed (where necessary) by the traditional units in parentheses. There are two exceptions: blood pressure should be expressed in mmHg and haemoglobin in g/dl. For general guidance on the International System of Units, and some useful conversion factors, see 'The SI for the Health Professions' (WHO 1977).

COMMENTARIES

Short commentaries on topical issues in health systems are welcomed. Most such commentaries are commissioned by the editors, but the journal will also consider unsolicited submissions. Commentaries should of broad interest to readers of Health Policy and Planning, and while they are not research papers, they should be well substantiated. Manuscripts should preferably be a maximum of 1200 words, excluding tables, figures/diagrams and references.

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- Title - please keep as concise as possible and ensure it reflects the subject matter;
- Corresponding author's name, address, telephone/fax numbers and e-mail address;
- Each author's affiliation and qualifications;
- Keywords and an abbreviated running title;
- 2-4 Key Messages, detailing concisely the main points made in the paper;
- Acknowledgements
- A word count of the full article.

The manuscript will generally follow through sections: Abstract (no more than 300 words), Introduction, Discussion, Conclusion, References. However, it may be appropriate to combine the results and discussion sections in some papers. Tables and Figures should not be placed within the text, rather provided in separate file/s.

In the **acknowledgements**, all sources of funding for research must be explicitly stated, including grant numbers if appropriate. Other financial and material support, specifying the nature of the support, should be acknowledged as well.

Figures should be designed using a well-known software package for standard personal computers. If a figure has been published earlier, acknowledge the original source and submit written permission from the copyright holder to reproduce the material. Colour figures are permitted but authors will be required to pay the cost of reproduction.

All **measures** should be reported in SI units, followed (where necessary) by the traditional units in parentheses. There are two exceptions: blood pressure should be expressed in mmHg and haemoglobin in g/dl. For general guidance on the International System of Units, and some useful conversion factors, see 'The SI for the Health Professions' (WHO 1977).

HOW TO DO...OR NOT TO DO

This series is meant to explain how to use a particular research or analytical method (e.g. social network analysis, discrete choice experiment etc). The research or analytical methods discussed should be well accepted and clearly defined: this category of paper is not meant to address methodological debates but rather to help disseminate and promote the use of well-accepted methodologies.

Manuscripts should preferably be a maximum of 3000 words excluding tables, figures/diagrams and references.

- The sections must be arranged as follows: i) Title page, ii) Abstract, iii) Introduction, iv) Body of the paper, and v) References. Main sections should be coordinated by the author, and inserted between Introduction and Reference sessions. Please contact our office before submitting a manuscript in this category.

The **title page** should contain:

- Title - please keep as concise as possible and ensure it reflects the subject matter;
- Corresponding author's name, address, telephone/fax numbers and e-mail address;
- Each author's affiliation and qualifications;
- Keywords and an abbreviated running title;
- 2-4 Key Messages, detailing concisely the main points made in the paper;
- Acknowledgements
- A word count of the full article.

Tables and Figures should not be placed within the text, rather provided in separate file/s.

In the **acknowledgements**, all sources of funding for research must be explicitly stated, including grant numbers if appropriate. Other financial and material support, specifying the nature of the support, should be acknowledged as well.

Figures should be designed using a well-known software package for standard personal computers. If a figure has been published earlier, acknowledge the original source and submit written permission from the copyright holder to reproduce the material. Colour figures are permitted but authors will be required to pay the cost of reproduction.

All **measures** should be reported in SI units, followed (where necessary) by the traditional units in parentheses. There are two exceptions: blood pressure should be expressed in mmHg and haemoglobin in g/dl. For general guidance on the International System of Units, and some useful conversion factors, see 'The SI for the Health Professions' (WHO 1977).

10 best -is a series of articles that identify and outline the 10 most useful resources from a range of sources to help facilitate a better understanding of a particular issue in global health'

We often commission these articles but we also hear unsolicited suggestions.

METHODOLOGICAL MUSINGS

This series is meant to address methodological issues in health policy and systems research, where there is currently a lack of clarity about accepted research methods. This series is intended to support the development of the health policy and systems research field, through supporting methodological discussion.

Manuscripts should preferably be a maximum of 3000 words, excluding tables, figures/diagrams and references.

- The sections must be arranged as follows: i) Title page, ii) Abstract, iii) Introduction, iv) Body of the paper, and v) References. Main sections should be coordinated by the author, and inserted between Introduction and Reference sessions. Please contact our office before submitting a manuscript in this category.

The **title page** should contain:

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- Keywords and an abbreviated running title;
- 2-4 Key Messages, detailing concisely the main points made in the paper;
- Acknowledgements
- A word count of the full article.

In the **acknowledgements**, all sources of funding for research must be explicitly stated, including grant numbers if appropriate. Other financial and material support, specifying the nature of the support, should be acknowledged as well.

Figures should be designed using a well-known software package for standard personal computers. If a figure has been published earlier, acknowledge the original source and submit written permission from the copyright holder to reproduce the material. Colour figures are permitted but authors will be required to pay the cost of reproduction.

All **measures** should be reported in SI units, followed (where necessary) by the traditional units in parentheses. There are two exceptions: blood pressure should be expressed in mmHg and haemoglobin in g/dl. For general guidance on the International System of Units, and some useful conversion factors, see 'The SI for the Health Professions' (WHO 1977).

RESEARCH IN PRACTICE

Research in practice provides an opportunity for researchers, policy makers and programme managers to reflect on their experiences of translating health policy and systems research into practice.

Manuscripts should preferably be a maximum of 3,000 words.

MANUSCRIPT FORMAT AND STYLE

Only articles in English are considered for publication

Prepare your manuscript, including tables, using a word processing program and save it as a .doc, .rtf or .ps file. Use a minimum font size of 11, double-spaced and paginated throughout including references and tables, with margins of at least 2.5 cm. The text should be left justified and not hyphenated.

Manuscript file must include text body. Title Page, Figures and Tables should be uploaded separately.

Manuscript Preparation:

- Page 1: Title Page - please keep as concise as possible and ensure it reflects the subject matter;
- Corresponding author's name, address, telephone/fax numbers and e-mail address;
- Each author's affiliation and qualifications;
- Keywords and an abbreviated running title;
- 2-4 Key Messages, detailing concisely the main points made in the paper;
- Acknowledgements
- A word count of the full article.

Page 2: Abstract

Abstract should be prepared in one paragraph, with a limit of 300 words. No headings are required. It should describe the purpose, materials and methods, results, and conclusion in a single paragraph no longer than 300 words without line feeds.

Page 3: Introduction.

The Introduction should state the purpose of the investigation and give a short review of the pertinent literature, and be followed by:

Materials and methods. The Materials and methods section should follow the Introduction and should provide enough information to permit repetition of the experimental work. For particular chemicals or equipment, the name and location of the supplier should be given in parentheses.

Results. The Results section should describe the outcome of the study. Data should be presented as concisely as possible, if appropriate in the form of tables or figures, although very large tables should be avoided.

Discussion. The Discussion should be an interpretation of the results and their significance with reference to work by other authors.

Abbreviations. Non-standard abbreviations should be defined at the first occurrence and introduced only where multiple use is made. Authors should not use abbreviations in headings.

All **measures** should be reported in SI units, followed (where necessary) by the traditional units in parentheses. There are two exceptions: blood pressure should be expressed in mmHg and haemoglobin in g/dl. For general guidance on the International System of Units, and some useful conversion factors, see 'The SI for the Health Professions' (WHO 1977).

REFERENCES

References must follow the Harvard system and must be cited as follows:

Baker and Watts (1993) found...

In an earlier study (Baker and Watts 1993), it...

Where works by more than two authors are cited, only the first author is named followed by 'et al.' and the year. The reference list must be typed double-spaced in alphabetical order and include the full title of both paper (or chapter) and journal (or book), thus:

Baker S, Watts P. 1993. Paper/chapter title in normal script. Journal/book title in italics **Volume number in bold**: page numbers.

Baker S, Watts P. 1993. Chapter title in normal script. In: Smith B (ed). Book title in italics. 2nd edn. Place of publication: Publisher's name, page numbers.

Up to five authors should be cited. If there are more, cite the first three authors and follow with 'et al.', e.g.:

Baker S, Watts P, Smith B et al. 1993. Paper title in normal script. Paper presented at meeting/conference title, place, date. Unpublished document.

For more details, please consult the journal's mini style checklist.

TABLES

All tables should be on separate pages and accompanied by a title - and footnotes where necessary. The tables should be numbered consecutively using Arabic numerals. Units in which results are expressed should be given in parentheses at the top of each column and not repeated in each line of the table. Ditto signs are not used. Avoid overcrowding the tables and the excessive use of words. The format of tables should be in keeping with that normally used by the journal; in particular, vertical lines, coloured text and shading should not be used. Please be certain that the data given in tables are correct

CONFLICT OF INTEREST

Authors must declare any conflicts of interest during the online submissions process. The lead author is responsible for confirming with the co-authors whether they also have any conflicts to declare and may be required to co-ordinate the completion of written forms from all co-authors where appropriate.

ETHICAL APPROVAL

A requirement of publication is that research involving human subjects was conducted with the ethical approval of the appropriate bodies in the country where the research was conducted and of the ethical approval committees of affiliated research institutions elsewhere. A clear statement to this effect must be made in any submitted manuscript presenting such research, specifying that the free and informed consent of the subjects was obtained.

FUNDING

The following rules should be followed:

The sentence should begin: ‘This work was supported by …’

The full official funding agency name should be given, i.e. ‘the National Cancer Institute at the National Institutes of Health’ or simply 'National Institutes of Health' not ‘NCI' (one of the 27 subinstitutions) or 'NCI at NIH’ - see the full RIN-approved list of UK funding agencies for details

Grant numbers should be complete and accurate and provided in brackets as follows: ‘[grant number ABX CDXXXXXX]’

Multiple grant numbers should be separated by a comma as follows: ‘[grant numbers ABX CDXXXXXX, EFX GHXXXXXX]’

Agencies should be separated by a semi-colon (plus ‘and’ before the last funding agency)

Where individuals need to be specified for certain sources of funding the following text should be added after the relevant agency or grant number 'to [author initials]'.

An example is given here: ‘This work was supported by the National Institutes of Health [P50 CA098252 and CA118790 to R.B.S.R.] and the Alcohol & Education Research Council [HFY GR667789].

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The manuscripts will not be returned to authors following submission unless specifically requested

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Authors are sent page proofs by email. These should be checked immediately and corrections, as well as answers to any queries, returned to the publishers as an annotated PDF via email or fax within 3 working days (further details are supplied with the proof). It is the author's responsibility to check proofs thoroughly.

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Please be aware that the requirements for online submission and for reproduction in the journal are different: (i) for online submission and peer review, please upload your figures separately as low-resolution images (.jpg, .tif, .gif or. eps); (ii) for reproduction in the journal, you will be required after acceptance to supply high-resolution .tif files. Minimum resolutions are 300 d.p.i. for colour or tone images, and 600 d.p.i. for line drawings. We advise that you create your high-resolution images first as these can be easily converted into low-resolution images for online submission.

Figures will not be relettered by the publisher. The journal reserves the right to reduce the size of illustrative material. Any photomicrographs, electron micrographs or radiographs must be of high quality. Wherever possible, photographs should fit within the print area or within a column width. Photomicrographs should provide details of staining technique and a scale bar. Patients shown in photographs should have their identity concealed or should have given their written consent to publication.

When creating figures, please make sure any embedded text is large enough to read. Many figures contain miniscule characters such as numbers on a chart or graph. If these characters are not easily readable, they will most likely be illegible in the final version.

Certain image formats such as .jpg and .gif do not have high resolutions, so you may elect to save your figures and insert them as .tif instead. For useful information on preparing your figures for publication, go to http://cpc.cadmus.com/da.

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SUPPLEMENTARY DATA

Supporting material that is not essential for inclusion in the full text of the manuscript, but would nevertheless benefit the reader, can be made available by the publisher as online-only content, linked to the online manuscript. The material should not be essential to understanding the conclusions of the paper, but should contain data that is additional or complementary and directly relevant to the article content. Such information might include more detailed methods, extended data sets/data analysis, or additional figures.

It is standard practice for appendices to be made available online-only as supplementary data. All text and figures must be provided in suitable electronic formats. All material to be considered as supplementary data must be submitted at the same time as the main manuscript for peer review. It cannot be altered or replaced after the paper has been accepted for publication, and will not be edited. Please indicate clearly all material intended as supplementary data upon submission and name the files e.g. 'Supplementary Figure 1', 'Supplementary Data', etc. Also ensure that the supplementary data is referred to in the main manuscript where necessary, for example as '(see Supplementary data)' or '(see Supplementary Figure 1)'.

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