

1 Reimagining infertility:
2 A critical examination of fertility norms, geopolitics, and survey bias

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4 Running title: Reimagining infertility

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28 Key Messages:

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- 30 • Survey instruments are shaped by sociocultural and geopolitical forces
 - 31 • Surveys used to track infertility have the potential to compound the marginalization of under-sampled groups
 - 32 • The infertility of some groups has been rendered invisible by their exclusion from common
 - 33 tracking methods
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37 Keywords: Survey data; infertility; population policy; invisibilization; reproductive imaginary

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Abstract

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3 While it is estimated that 15% of couples worldwide are infertile, this figure hinges critically on the
4 quality, inclusiveness, and availability of infertility data sources. Current infertility data and statistics
5 fail to account for the infertility experiences of some social groups. We identify these people as the
6 *invisible infertile*, and refer to their omission from infertility data and statistics – whether intentional
7 or unintentional – as the process of *invisibilization*. We identify two processes through which
8 invisibilization in survey data is produced: sampling, with focus on exclusionary definitions of the
9 population at-risk, and survey instrument design, with focus on skip patterns and question wording.
10 Illustrative examples of these processes are drawn from the Integrated Fertility Survey Series and the
11 Demographic and Health Surveys.

12 Empirical research is not designed in an objective vacuum. Rather, survey instruments and
13 sampling techniques are shaped and influenced by the sociocultural norms and geopolitical context of
14 the time and place in which they are created and conducted, reflecting broader social beliefs about
15 family building and reproduction. Furthermore, population policy singularly aimed at curbing
16 overpopulation in high fertility parts of the world limits the type of reproduction data collected,
17 effectively rendering the infertility of some groups epidemiologically unfathomable. In light of these
18 sociocultural and geopolitical forces, many marginalized groups are missing from RH statistics. The
19 omission of entire groups from the scientific discourse casts doubt on the quality of research
20 questions, validity of the analytic tools, and accuracy of scientific findings. Invisibility may also
21 misguide evidence-based RH and family planning policies and deter equitable access to reproductive
22 healthcare for some social groups, perpetuating social inequalities.

23

1 **Introduction**

2 Infertility—an inability to conceive or maintain a pregnancy to a live birth—affects 15% of
3 adults of reproductive age worldwide (WHO, 2015). Around the globe, infertility is associated with
4 elevated levels of depression, anxiety, grief, stigmatization, domestic violence, marital discord,
5 poverty, low self-esteem, and increased risk of STIs (Adamson et al., 2011; Barnes, 2014; Bayley,
6 Slade, & Lashen, 2009; Becker, 2000; Boerma & Urassa, 2001; Chachamovich et al., 2010; Donkor &
7 Sandall, 2007; Dyer, 2007; Fledderjohann, 2012, 2017; Lechner, Bolman, & Van Dalen, 2007; Pasi,
8 Hanchate, & Pasha, 2011; Thoma et al., 2013). The accuracy of research on infertility hinges critically
9 on the way infertility is conceptualized and measured. The 15% figure cited masks considerable
10 variation in the distribution of infertility within and between countries. Inadequate evidence exists on
11 how reproductive health (RH) survey datasets include or exclude different social groups within and
12 across populations.

13 Many cultural factors complicate efforts to track infertility across populations: infertility is
14 defined and medicine practiced differently across cultures; access to healthcare varies widely by e.g.
15 sociodemographics and geographic locale, and infertility research is often conducted in healthcare
16 settings; infertility is a taboo subject in some cultures; and the effects of infertility-related stigma
17 range from mild embarrassment to ostracism and diminished life chances (Bell, 2014; Greil,
18 McQuillan, Shreffler, Johnson, & Slauson-Blevins, 2011a; Inhorn & van Balen, 2002). Furthermore,
19 longstanding global efforts to curb overpopulation have deprioritized the needs of infertile people in
20 the Global South (Frank, 1983; Nachtigall, 2006). We argue that ‘reproductive imaginaries’ –
21 prevailing social beliefs about who can and should reproduce – shape the design and conclusions of
22 infertility research. Consequently, some marginalized social groups or populations fall under the radar
23 of infertility tracking practices, rendering their infertility and RH needs invisible. We identify these
24 people as the *invisible infertile*, and refer to their omission from infertility data and statistics –
25 whether intentional or unintentional – as the process of *invisibilization*.

26 Invisibilization, by definition an exclusionary process, is problematic within a broader global
27 development agenda, set forth in the UN 2030 Agenda for Sustainable Development (UNGA, 2015).
28 This agenda includes the promotion of inclusive societies, access to justice for all, and creation of

1 inclusive institutions (SDG 16) in its core aims, and includes a pledge that “no one will be left
2 behind” (p. 1). In their call for “A just, equitable, tolerant, open and socially inclusive world in which
3 the needs of the most vulnerable are met”, the UNGA points specifically to the vital role of quality,
4 inclusive data for supporting just and equitable decision-making by policymakers.

5 This paper focuses on survey data and its potential to compound inequities. We augment extant
6 literature by homing in on two critical invisibilizing processes in generating infertility data: 1)
7 sampling (defining the population at-risk) and 2) instrument design (question wording, skip patterns).
8 We posit that invisibilization has a reciprocal effect: the inherent biases of reproductive imaginaries
9 shape infertility tracking practices, generating incomplete infertility data, which, in turn, reinforce the
10 limits of reproductive imaginaries. This downward spiral of invisibility may thwart initiatives
11 intended to address the RH, mental health, social, and economic needs of the invisible infertile (Bell,
12 2014; Inhorn & van Balen, 2002). While many obstacles to studying infertility (e.g. accessibility of
13 healthcare, stigma) are beyond the control of researchers, research can be improved by exploring the
14 limits of our reproductive imaginaries and considering how sampling and instrument design
15 invisibilize infertility. We provide two illustrative examples, the Integrated Fertility Survey Series
16 (IFSS) and the Demographic and Health Surveys (DHS), to demonstrate how surveys can render some
17 social groups and populations invisible.

18

19 *Reproductive Imaginaries*

20 The ‘reproductive imaginary’ is a set of shared sociocultural beliefs, influenced by geopolitical
21 forces, regarding who can and should reproduce (Inhorn, 2012; Inhorn, Tjørnhøj, Goldberg, & la Cour
22 Mosegaard, 2009). Because much of the demographic and public health discourse has been strongly
23 influenced by Westerners, the ‘reproductive imaginaries’ of countries, communities, and social groups
24 has had a notably Western bias (Greene & Biddlecom, 2000). Thus, infertility is commonly perceived
25 to be a condition that primarily impacts white, Western, heterosexual, middle- and upper-class women
26 (Bell, 2014; Inhorn, Ceballo, & Nachtigall, 2009). In reality, infertility affects women and men of all
27 races, ethnicities, nationalities, religions, (dis)abilities, socioeconomic classes, and sexual orientations
28 and identities (Mascarenhas, Flaxman, Boerma, Vanderpoel, & Stevens, 2012; World Health

1 Organization, 2010). The infertility experiences of underprivileged, non-white, non-Western, and/or
2 non-heterosexual women and men do not fit within the reproductive imaginary; they are
3 unimaginable, their infertility “epidemiologically unfathomable” (Dworkin, 2005). These
4 marginalized sociodemographic groups -- the invisible infertile -- have difficulty obtaining
5 assessment, medical treatment, and social support for their infertility (Barnes, 2014; Bell, 2014;
6 Feldman-Savelsberg, 2002; Fledderjohann, 2012; Greil, McQuillan, Shreffler, Johnson, & Slauson-
7 Blevins, 2011b).

8 Following World War II, a key aim of geopolitically motivated population policies was to
9 redistribute fertility to alleviate concerns about imbalanced population density globally and
10 unsustainable population growth in low- and middle-income countries (LMICs; Bashford, 2008;
11 Robinson & Ross, 2007). State policies and services aimed at managing population growth and
12 medical resources often overlooked the needs of the infertile (Feldman-Savelsberg, 2002; Greil et al.,
13 2011b; Parrott, 2014; Sundby, 2002). Such policies contributed to stratified reproduction on a global
14 scale by failing to meet the needs of individuals in LMICs whose fertility goals exceeded policy
15 targets (Dixon-Mueller, 1993; Mosher, 2008).

16 The stratification of reproduction was compounded by public health emergencies—perhaps
17 most notably, the HIV pandemic. As alarm grew, serodiscordant couples were discouraged from
18 having unprotected intercourse; fragmentation of RH and HIV programs grew; and HIV took
19 precedent over other RH issues in many contexts, with only comparatively recent efforts to integrate
20 these policy strands (Brady, 2003; Desgrees du Lou, 1999; Kennedy et al., 2010; Smit, Church,
21 Milford, Harrison, & Beksinska, 2012; Thornton, 2008).

22 Addressing the needs of infertile people can be expensive and (erroneously) presumed to
23 undermine state-led population control efforts. Thirty years ago, Frank (1983) warned that while
24 treating infertility in sub-Saharan Africa (SSA) might initially result in an estimated 15% increase in
25 total fertility, inattention to infertility would prolong high fertility. Where infertility is recognized as
26 common, childbearing is both early and frequent, as couples seek to meet their fertility goals before
27 they encounter a problem. Where infertility is less threatening, later childbearing and more widely
28 spaced birth intervals are preferred, resulting in lower lifetime fertility (Frank, 1983; Sundby, 2002).

1 Moreover, fear that contraceptives may cause infertility is a commonly cited reason for not using
2 contraceptives in some settings, leading to increased fertility and higher rates of unwanted pregnancy
3 (Koster, 2010). Targeted contraceptive programs that do not adequately meet the full set of RH needs
4 of individuals (i.e. beyond reducing fertility) face limited success (Sundby, 2002). Moreover,
5 inattention to infertility may have a negative impact on a range of social and public health outcomes,
6 including STI risks, mental health, and both financial and human costs of ineffective and sometimes
7 dangerous alternative treatments (ESHRE Task Force on Ethics and Law et al., 2009; Gijssels, Mgalla,
8 & Wambura, 2001; Pool & Washija, 2001; Sharma, Mittal, & Aggarwal, 2009).

9 The limits of our reproductive imaginaries also bias how we generate infertility estimates. As a
10 simple example, Greil et al. (2010) found that 50% of infertile in the US National Survey of Fertility
11 Barriers are “infertile without intent.” Greil et al. coined this term to refer to women who meet the
12 clinical¹ definition for infertility, but do not necessarily self-identify as infertile, and do not seek
13 treatment. Overlooked by most traditional definitions of infertility, they are biomedically infertile, but
14 not included in the reproductive imaginary as such.

15 In a similar vein, it would be nearly impossible to measure ‘secondary infertility’ (infertility
16 subsequent to the birth of a child) in China, where post-World War II family planning campaigns and
17 the 1979 One Child Policy suppressed families’ reproduction (Greenhalgh, 1994; Kane & Choi,
18 1999). The infertility of Chinese couples who already have a child is invisibilized from the
19 reproductive imaginary. Given that roughly one-sixth of the world population lives in China
20 (Population Reference Bureau, 2015), what does this potentially drastic underestimation of secondary
21 infertility mean for the accuracy of estimates? Successful population polices require an expanded
22 reproductive imaginary that sees beyond macro-level population growth concerns and recognizes the
23 micro-level RH needs of individuals.

24

25 *Reproductive Rights*

¹ Failing to become pregnant after 12+ months of regular, unprotected intercourse.

1 In recent decades, legal analyses of forced sterilizations and research on access to assisted
2 reproductive technologies have broadened the discourse on RH to recognize the ability to reproduce
3 as a human right. The reproductive justice movement has advanced legislation and policy initiatives to
4 ensure women maintain the right to have the children they desire (Luna & Luker, 2013). RH is now
5 recognized as a basic human right by the WHO and the UN. According to the WHO (2013a, italics
6 added), RH “implies that people are able to have a responsible, satisfying and safe sex life and that
7 *they have the capability to reproduce* and the freedom to decide if, when and how often to do so.”
8 Several UN initiatives, including the Sustainable Development Goals, recognize (cis) women’s rights
9 to RH, including control over the number and spacing of their children (United Nations, 2015, p. 5).

10 Use of infertility medical services is increasing globally; however, global demand for infertility
11 services exceeds the supply, and services are cost-prohibitive for most of the world’s infertile couples
12 (Gerrits, 2012; Mascarenhas et al., 2012). Differential access to resources for infertile people by race,
13 gender, sexual orientation, disability, and nationality generates a system of stratified reproduction
14 within and between state lines (Bridges, 2011; Colen, 1986). Invisibilization exacerbates unequal
15 access to quality RH services (Hammarberg & Kirkman, 2013) and fertility-specific distress and
16 stigmatization for the invisible infertile (Bell, 2014; Fledderjohann, 2012). Lack of infertility data and
17 infertility tracking practices that exclude some groups result in unjust state policies and social systems
18 that ignore the social, economic, and health needs of the invisible infertile.

20 **Illustrative Examples of Invisibilization**

21 Below, we provide two brief examples of how sampling and instrument design have contributed to the
22 exclusion of some groups from society’s reproductive imaginary.

24 *Integrated Fertility Survey Series*

25 The IFSS is an historical example of invisibilization through sampling. The IFSS has explicitly
26 tracked the prevalence of infertility in ten waves in the US since 1955 (IFSS, n.d.). The first iteration,
27 the Growth of American Families (GAF) survey asked questions related to basic demographics and

1 reproduction: contraceptive use, attitudes toward contraception, pregnancy histories, fecundity,
2 opinions on childbearing and rearing, and fertility expectations. The survey was arguably the first of
3 its kind and progressive in scope. However, all 2,713 respondents were white heterosexual married
4 women, ages 18-39, currently living with their husbands or whose husbands were temporarily away
5 on military duty. Because the surveys were conducted as in-depth daytime interviews with women in
6 their homes, presumably most respondents did not work outside of the home. Though some questions
7 were designed to detect male infertility, these were secondhand (wives') reports. The data failed to
8 assess the reproductive decisions and attitudes of nonwhite, queer, employed, single, divorced, and
9 cohabiting women, and all men.

10 Sampling reflected the social mores and prescriptive gender roles of the day: The normative
11 family ideal entailed a husband as breadwinner, wife as homemaker, and children. One might argue
12 that it was unnecessary to include divorced women because divorce was much less common in 1955.
13 Actually, divorce rates spiked in the U.S. in the years immediately following the Second World War
14 (Olson, 2015). Nonetheless, divorce was less socially acceptable than it is today (Coontz, 2016).
15 Social institutions, including the GAF, conformed to the family ideals of that era, invisibilizing
16 divorce.

17 The GAF, conducted in 1955 and 1960, was succeeded by two waves of the National Fertility
18 Surveys (NSF; 1965, 1970). The National Surveys for Family Growth (NSFG; 1973, 1976, 1982,
19 1988, 1995, 2002) replaced the NSF in 1973. Over time, the IFSS in its various incarnations
20 broadened its inclusion criteria to adapt to varying family formations (see Table 1). The second wave
21 of the GAF in 1960 included nonwhite women; divorced women were included in the research sample
22 in 1970; and single women were added in 1973. When single women were finally included, the
23 sample was restricted to those with children in the household. Infertile single women were excluded
24 by the population definition until 1982. Until then, researchers could document neither the prevalence
25 nor sequelae of infertility for single, divorced, and cohabiting women.

1 Table 1. Inclusion criteria for IFSS samples, 1955-2015

<u>Survey Name</u>	<u>Married Women</u>	<u>Single Women</u>	<u>Men</u>
<u>1955 Growth of American Families Survey</u>	<u>White, 18-39</u>	--	--
<u>1960 GAFS</u>	<u>All races, 18-39</u>	<u>White, 23-44, prev. married</u>	--
<u>1965 National Fertility Survey</u>	<u>All races, <=55</u>	--	--
<u>1970 NFS*</u>	<u>All races, <=45</u>	<u>All races, <=45, prev. married</u>	--
<u>1973 National Survey of Family Growth</u>	<u>All races, 15-44</u>	<u>All races, 15-44, with kids in household</u>	--
<u>1976 NSFG</u>	<u>All races, 15-44</u>	<u>All races, 15-44, with kids in household</u>	--
<u>1982 NSFG</u>	<u>All races, 15-44</u>	<u>All races, 15-44</u>	--
<u>1988 NSFG</u>	<u>All races, 15-44</u>	<u>All races, 15-44</u>	--
<u>1995 NSFG</u>	<u>All races, 15-44</u>	<u>All races, 15-44</u>	--
<u>2002 NSFG</u>	<u>All races, 15-44</u>	<u>All races, 15-44</u>	<u>All races, 15-44</u>
<u>2006-2010 NSFG</u>	<u>All races, 15-44</u>	<u>All races, 15-44</u>	<u>All races, 15-44</u>
<u>2011-2013 NSFG[§]</u>	<u>All races, 15-44</u>	<u>All races, 15-44</u>	<u>All races, 15-44</u>
<u>2013-2015 NSFG[§]</u>	<u>All races, 15-44</u>	<u>All races, 15-44</u>	<u>All races, 15-44</u>

2 *Longitudinal follow-up using the same sample selection criteria in 1975; §Not yet integrated into the IFSS

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1 The glaring omission of men until the twenty-first century reflects broader social beliefs that
2 women are responsible for all aspects of reproduction (Daniels, 2008). Women often bear the onus of
3 infertility--even male-factor infertility (Inhorn, 2003; Inhorn, Tjørnhøj, et al., 2009). Men's exclusion
4 also underscores the extent to which they are responsible for 'information management,' often
5 unrecognized and taken for granted in the household division of labor (Barnes, 2014). Also missing
6 from these datasets are queer families, possibly because they did not meet inclusion criteria, survey
7 questions wording reflect compulsory heterosexuality (Pascoe, 2007), or they felt inhibited from
8 disclosing their sexual identities in a punishing social climate. The two most recent waves of NSFG
9 (2006-2010, 2011-2015), though not yet been integrated into the IFSS, provide more information on
10 the sexual identities of respondents, possibly reflecting increased legitimization of queer families.

11 Sociocultural mores regarding family formation in the U.S. shaped the reproductive imaginary
12 and, subsequently, the selective research samples for the IFSS, invisibilizing the infertility
13 experiences of nonwhite women, single and divorced women, men, and queer individuals. This has
14 limited researchers' understandings of the processes of family-building, the prevalence of infertility,
15 and the consequences of involuntary childlessness within these populations and over time, and has
16 perpetuated the notion of infertility as a white, married, middle-class female problem.

17

18 *Demographic and Health Surveys*

19 Survey instrument design also potentially invisibilizes, as illustrated by the cross-sectional DHS
20 surveys. The first available DHS is from 1985; data have since been collected in 90 LMICs (USAID,
21 n.d.). In order to be cross-nationally comparable, the DHS questionnaire is a (roughly) standardized
22 instrument, administered by personal interview (USAID, 2017). Since its inception, the core
23 instrument has occasionally undergone revisions, resulting in a new 'Phase' of questionnaires, most
24 recently Phase 7. For brevity, we focus specifically on the Phase 7 women's survey.

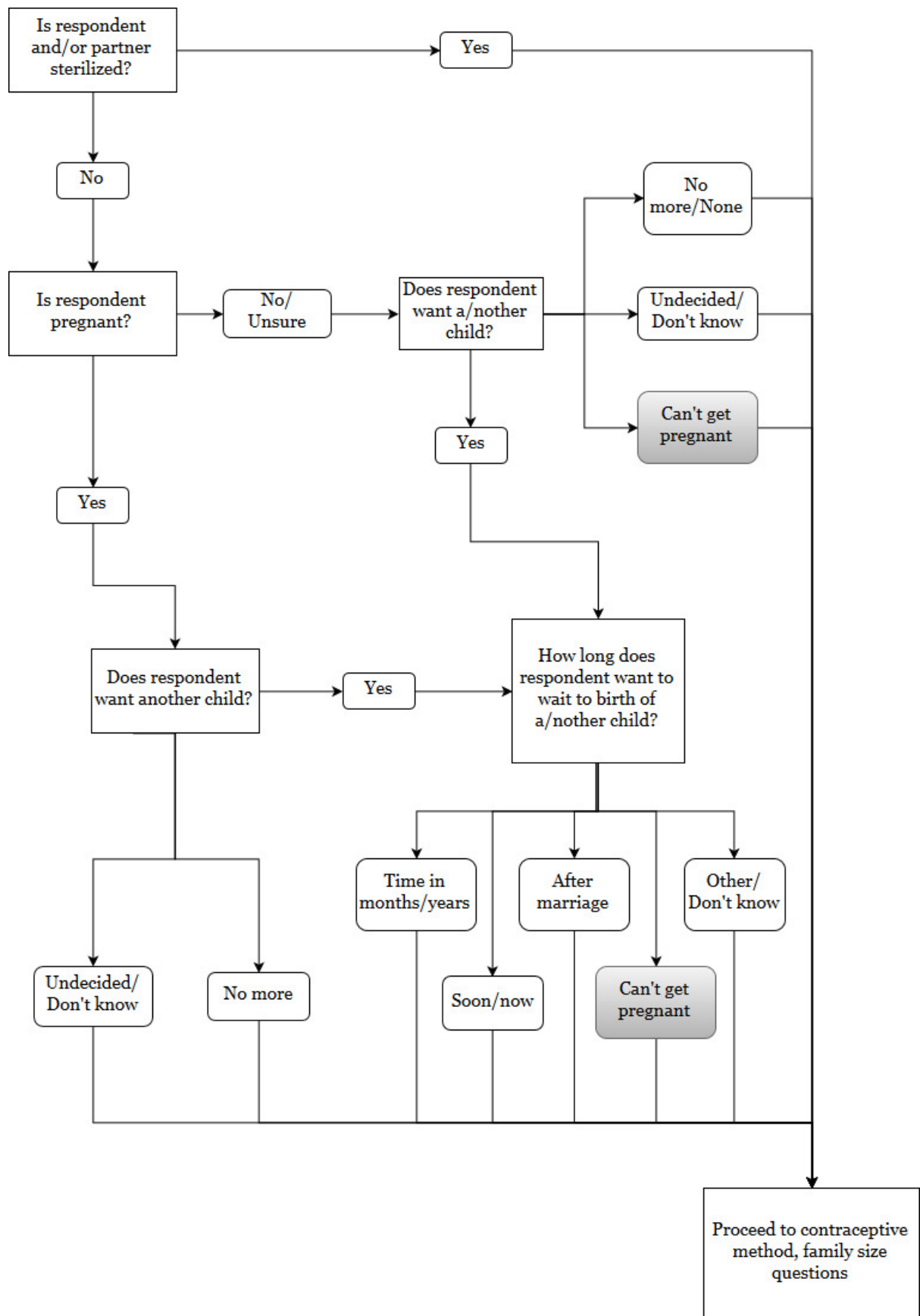
25 The highest rates of infertility are found in LMICs (Mascarenhas et al., 2012) where
26 researchers generate infertility rates from secondary data--most often the DHS. Though infertility is
27 not explicitly a primary focus of the DHS, it is the only reliable population-level data on infertility

1 trends in many settings. Yet data on diagnosis and self-identified (subjective) infertility are not
2 collected. Infertility measures are instead constructed from marital and pregnancy histories (Larsen &
3 Menken, 1991; Larsen & Raggars, 2001). Because these measures are based on a waiting time of 5-7
4 years since either a) the birth the previous child or b) the start of a relationship (i.e. marriage date),
5 infertility among single women and those in short-term relationships is impossible to measure. This is
6 likely to produce systematic bias: the risk of relationship disruption associated with infertility is
7 greater for unmarried than married women (Fledderjohann, 2017). This is particularly so for self-
8 identified infertility, which may be more salient for a range of sociocultural outcomes (Leonard,
9 2002).

10 The Phase 7 questionnaire does include a proxy subjective infertility measure. In response to
11 whether/when respondents want a/nother child, interviewers can mark ‘says she can’t get pregnant’ as
12 a possible response. Yet the skip pattern (see Figure 1) to this question selects out several groups of
13 women. If a woman and/or her partner are sterilized, women are not asked the relevant question at
14 all—implicitly, a woman’s fecundity is tied to her partner’s. Unsterilized women are then asked if
15 they are pregnant. Women who say either ‘no’ or ‘unsure’ are then asked if they want a/nother child.
16 One possible response is ‘can’t get pregnant’; because only one response is possible, non-pregnant
17 women who both suspect difficulties conceiving and are either a) infertile without intent or b)
18 undecided about childbearing would be invisibilized. Pregnant and non-pregnant women who say (in
19 separate items) that they want another child are asked about timing. Again, one possible response is
20 ‘can’t get pregnant’. Women who, for example, have a specific desired timing in mind but also
21 suspect difficulties conceiving may have their infertility invisibilized by the design of the survey.
22 Moreover, the question wording itself is problematic. Women who suspect difficulties but also hope a
23 future pregnancy is possible may be reluctant to strongly self-label as unable to conceive
24 (Fledderjohann & Johnson, 2015; Greil, 1991).

25

1 Figure 1. Flowchart of DHS skip pattern for subjective infertility proxy
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1 Infertility includes not being able to carry a pregnancy to term. The DHS question to capture
2 miscarriages reads as follows: ‘Have you ever had a pregnancy that miscarried, was aborted, or ended
3 in a stillbirth?’ It is impossible to distinguish between spontaneous and induced abortion. The
4 question thereby conflates family planning and fertility problems. Women who have miscarried may
5 be reluctant to answer ‘yes’ to this question due to social desirability bias; abortion stigma can be
6 severe (Kumar, Hessini, & Mitchell, 2009), and conflating abortion with miscarriage may produce a
7 downward bias in estimates of miscarriage and, relatedly, infertility. This is particularly so for
8 currently pregnant women, who would not be identified as infertile through duration-based
9 constructed measures, but may have a history of (invisibilized) miscarriages.

10 Lack of a detailed infertility module in the DHS arises from the survey’s focus on fertility, and
11 misses the crucial link between fertility and infertility. Through question wording and skip patterns,
12 the instrument design invisibilizes the infertility of e.g. single women, those with sterilized partners,
13 women who have difficulties carrying pregnancies to term, and those reluctant to self-label. This
14 invisibilization likely contributes to the stratification of reproduction in LMICs.

15

16 **Discussion**

17 Given the centrality of survey data to research and policymaking, it is essential to consider the
18 process through which survey data are collected, and the consequences of this process. Biases in
19 sampling and instrument design invisibilizes some populations and social groups from infertility data.
20 Omission of entire sub-populations from the academic and public health discourse casts doubt on the
21 quality of research questions, the validity of the analytic tools, and the accuracy of the findings.
22 Inaccurate data can derail evidence-based RH and family planning initiatives and impede access to
23 medical treatment and social support for the invisible infertile.

24 In data-rich countries, surveys extract detailed, explicit information about respondents’
25 pregnancy intentions, self-identified perceptions of their ability to conceive, frequency of sexual
26 activity, and use of infertility services. Despite this relative wealth of data, infertility among some
27 groups may be overlooked, as exemplified by e.g. the concept of infertility without intent (Greil et al.,

1 2010). In other geographic locales, researchers rely on far less detailed marital and pregnancy
2 histories in secondary data to calculate infertility rates, and rarely have access to data on infertility
3 help-seeking. Yet ensuring universal access to RH is key to safe and measured population growth. For
4 researchers and policymakers interested in monitoring and safeguarding RH, the invisible infertile
5 must be recognized and their needs met.

6 As the examples provided above illustrate, survey tools are not created in a vacuum, but rather
7 in a cultural milieu which prizes the fertility of some people and discourages the fertility of others.
8 We call on researchers and policymakers to prioritize reproductive justice for the invisible infertile as
9 part of the broader inclusive and equitable global development agenda, which promises to leave no
10 one behind (UNGA, 2015). To that end, we make the following recommendations: First, closely
11 examine current data sets to consider which populations and social groups may be overlooked,
12 ignored, or omitted from the data. Second, design RH research to consider all aspects of reproduction
13 – from high fertility to voluntary childlessness to infertility – and include all social groups and
14 populations. Third, carefully contemplate and communicate the implications of sample selection and
15 survey design for marginalized groups.

16 We contend that a one-size-fits-all approach to survey design and data collection is not the
17 solution, and may in fact be counterproductive by overlooking within- and between-group nuances
18 and overstating the potential validity of such an approach. We do not advocate for development of a
19 single standardized tool/approach. Instead, we suggest that vigilance and a continuous and open
20 dialogue between demographers, ethnographers, public health researchers, humanitarian workers,
21 social justice advocates and medical professionals is needed to identify and consider the consequences
22 of invisibilization. Survey tools are a cultural artefact, and should be assessed, evaluated, and used
23 cautiously as such.

24

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