



HHS Public Access

Author manuscript

Am J Obstet Gynecol. Author manuscript; available in PMC 2016 September 01.

Published in final edited form as:

Am J Obstet Gynecol. 2015 September ; 213(3): 405.e1–405.e6. doi:10.1016/j.ajog.2015.05.020.

Conversion of Society for Maternal Fetal Medicine Abstract Presentations to Manuscript Publications

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Abstract

Objective—To evaluate the rate of conversion of Society for Maternal Fetal Medicine (SMFM) Annual Meeting abstract presentations to full manuscript publications over time.

Methods—Full manuscript publications corresponding to all SMFM oral abstracts 2003–2010 inclusive, and SMFM poster abstracts in 2003, 2005, 2007, and 2009 were manually searched in PubMed. An abstract was considered to ‘match’ a full publication if the abstract and publication titles as well as main methods and results were similar and the abstract first author was a publication author. In cases of uncertainty, the abstract-publication match was reviewed by a second physician researcher. Time to publication, publication rates over time, and publication rates among US vs. non-US authors were examined. PMID numbers were also collected to determine if >1 abstract contributed to a manuscript. Data were analyzed using Wilcoxon rank-sum, ANOVA, t-test, and logistic regression.

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Conflict of Interest/Disclosure Statement: The authors report no conflict of interest.

Presentation: This study was presented in part at the 35th Annual Society of Maternal Fetal Medicine Meeting (February 2015, San Diego, CA) as a poster presentation (final abstract ID # 399).

Results—3,281 abstracts presented at SMFM over the study period, including 629 orals (63 main plenary, 64 fellows plenary, 502 concurrent), were reviewed. 1,780/3,281 (54.3%) were published, generating 1,582 unique publications. Oral abstracts had a consistently higher rate of conversion to publications vs. posters (77.1% vs. 48.8%, $p<0.001$). The median time to publication was 19 (IQR 9–36) months, and was significantly shorter for orals vs. posters (11 vs. 21 months, $p<0.001$). Over the study period, rates of publication of orals remained constant, but rates of publication of posters were lower in 2007 and 2009 compared to 2003 and 2005. Publications related to SMFM abstracts were published in 194 different journals, most commonly AJOG (39.8%), Obstet Gynecol (9.7%), and J Matern Fetal Neonatal Med (6.5%). Publication rates were higher if the abstract's first author was affiliated with a non-US institution (64.8% vs. 51.1%, $p<0.001$) and if the abstract received an award (82.7% vs. 53.3%, $p<0.001$). In regression models, oral presentation at SMFM, first author affiliation with a non-US institution, submission for AJOG SMFM special issue, and year of abstract presentation at SMFM were associated with full manuscript publication.

Conclusions—Between 2003 and 2010, full manuscript publication rates of SMFM abstracts were high and consistent, and time to publication decreased/improved across the study period for oral presentations.

Keywords

society for maternal fetal medicine; abstract presentation; peer-reviewed publication; annual meeting

Introduction

Scientific presentations at national medical specialty meetings provide a valuable forum to communicate and disseminate information about current research findings and medical advances. The Society for Maternal Fetal Medicine (SMFM) Annual Meeting is held yearly in late January/early February. It is a well-attended meeting by physicians and other personnel involved in obstetric research; in 2015, over 2000 individuals registered for the meeting. SMFM is regarded by many obstetric care providers, perinatologists, and obstetric basic science researchers to be the premiere forum to obtain contemporary medical information regarding the care of routine and non-routine pregnancies. A wide range of clinical, translational, and basic science research is accepted and presented each year at SMFM across a variety of obstetric topics. Clinicians may be eager to implement knowledge learned from SMFM Annual Meeting abstract presentations into practice.

Although acceptance of an abstract at SMFM is prestigious, only publication of this research in a peer-reviewed journal provides a more in depth explanation of the work, validates the significance of the data and methods, and provides detailed interpretation and implications of the findings. The American Journal of Obstetrics and Gynecology (AJOG) is the official journal of SMFM. Abstracts presented at SMFM are published in special supplement edition of AJOG each year approximately 1 month prior to the meeting. Presenting authors are encouraged to submit their full manuscripts for consideration of publication in AJOG, and are invited to do so through three options: a 'Fast-Track' submission (open to oral presentations only, with a submission deadline 2–3 months prior to the Annual Meeting,

program started in 2005); a ‘SMFM special issue’ submission (open to both oral and poster presentations, with a submission deadline approximately 1 month after the Annual Meeting); or regular AJOG submission. Presenters/authors also have the option of submitting their manuscripts elsewhere, resulting in publication in a variety of peer-reviewed journals.

Other societies have investigated the conversion of meeting abstract presentations to full manuscript publication. Across specialties, a wide range of publication rates, from 30% to as high as 59% have been reported.^{1–4} However, the rate of conversion of SMFM abstract presentations into full publication has not been previously investigated and is uncertain. We sought to evaluate the rate of conversion of SMFM Annual Meeting abstract presentations to full manuscript publication over time, and to examine factors associated with an increased likelihood of publication.

Materials and Methods

SMFM abstracts corresponding to all SMFM oral abstracts 2003–2010 inclusive, and SMFM poster abstract presentations in alternating years over the study period (2003, 2005, 2007, and 2009) were identified from the published supplements in AJOG. Additionally, a list of abstracts winning awards was compiled using SMFM Annual Meeting Records. Abstracts officially withdrawn or retracted by the authors or the journal were excluded.

Full manuscript publications corresponding to each abstract presentation were manually searched in PubMed by physician researchers (K.B., L.J., and T.A.M.) during 2014 and 2015. An abstract was considered to ‘match’ a full publication if the abstract and publication titles, as well as main methods and results were similar and the abstract first author was a publication author. In cases of uncertainty, the abstract-publication match was reviewed by a second physician researcher. Papers that included some of the data presented in the abstract (e.g., a smaller cohort) were also regarded to be a match. When a match was confirmed, PubMed identification (PMID) numbers were collected. PMID numbers were used to determine if more than one abstract contributed to a manuscript. Once a suitable match was found, the search for that abstract was concluded; no effort was made to check for multiple papers stemming from a single abstract. Journal impact factors as of 2014 were compiled from an online resource (www.impactfactorsearch.com).

Abstracts presented in oral format were compared to those presented in poster format. Time-to-publication, publication rates over time, publication rates of award-winning abstracts, and publication rates among US vs. non-US primary authors were also examined. Study data were collected and managed using REDCap electronic data capture tools hosted at The University of Utah.⁵ REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies, providing 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources.

Data were analyzed by Wilcoxon rank-sum, ANOVA, Kaplan-Meier survival function, and t-test as appropriate using Stata version 13.1 (College Station, TX). This study was reviewed

by the University of Utah Institutional Review Board and determined to be non-human subjects research and exempt from IRB oversight and review.

Results

In all, 3,281 abstracts were presented at SMFM during the selected study period. Of these, 629 (19.2%) were oral presentations (63 main oral plenary, 64 fellows plenary, 502 oral concurrent session), and 2,652 were poster presentations. A total of 1,780 (54.3%) were published in peer-reviewed journals. Publication rates were higher for research presented as orals (485/629, 77.1%) compared to poster presentation (1,295/2,652, 48.8%), $p < 0.001$. There were 1582 unique publications overall; 198 (11.1%) publications corresponded to more than one abstract presentation. Among abstracts presented in oral format, those presented in the main oral plenary session were most likely to be published (57/63, 90%), followed by the fellows oral plenary session (51/64, 79.7%), and the oral concurrent sessions (377/502, 75.1%), $p = 0.006$.

The number of abstracts submitted for possible presentation increased over the study period between 2003–2010. A list of the number of submitted abstracts and accepted abstracts is shown in Table 1; data are stratified by year. Rates of publication of oral abstract presentations remained fairly constant over the study period, Figure 1 ($p = 0.131$). In contrast, rates of publication of poster abstract presentations varied significantly over the study period ($p < 0.001$ for trend), and were lower in 2007 and 2009 compared to 2003 and 2005 (Figure 1).

The median time to publication was 11 months (IQR 9–24) for oral presentations and 21 months (IQR 11–40) for poster presentations ($p < 0.001$). The median time to publication varied significantly over the years for poster presentations (26 months in 2003, 18 months in 2005, 24.5 months in 2007, and 20 months in 2009, $p < 0.001$). The median time to publication also varied for oral presentations, but the time to publication was found to decrease sharply from 22.5 and 16 months (for abstracts presented in 2003 and 2004, respectively) to 9 months (for abstracts presented in 2005), where it remained steady between 9 and 10.5 months across the remaining study period ($p < 0.001$), Figure 2. The rate of publication remained higher for oral presentations over time following SMFM presentation compared to poster presentations (Kaplan-Meier failure curve, Figure 3).

Nearly half of all publications were in either *AJOG* (709, 39.8%, impact factor = 3.973) or *Obstetrics and Gynecology* (172, 9.7%, impact factor = 4.368). However, publications corresponding to SMFM abstract presentations appeared in 194 unique medical journals, with impact factors ranging from 0.573 to 54.420. The journals most frequently publishing SMFM research, including all with 20 or more citations from SMFM-presented research, are shown in Table 2. The median journal impact factors for publications resulting from oral presentations was 3.973 (IQR 3.973–3.973), compared to a median of 3.973 (IQR 1.627–3.973) for poster presentations, $p < 0.001$. Median impact factors of journals publishing SMFM articles did not vary across the study period for oral presentations ($p = 0.698$) or poster presentations ($p = 0.559$). There were 85 publications in journals with impact factors > 5.0 , including 14 in the *New England Journal of Medicine* (impact factor = 54.420), 2 in

Lancet (impact factor = 39.207), and 2 in the Journal of the American Medical Association (impact factor = 30.387). Oral presentations at SMFM were significantly more likely to be published in high impact journals compared to poster presentations [44 (9.1%) vs. 41 (3.2%), $p < 0.001$]. Median impact factors remained consistent over the study period for publications resulting from both SMFM oral ($p = 0.698$) and poster ($p = 0.259$) presentations.

One hundred four of the abstract presentations were awarded special recognition at the Annual Meeting, including 75 oral presentation session awards, 21 poster presentation session awards, and 8 special topic awards (including the March of Dimes Award for the Best Research in Prematurity and the Dru Carlson Memorial Award for Best Research in Ultrasound and Genetics). As expected, abstracts receiving awards were more likely to be published compared to those not receiving special recognition (82.7% vs. 53.3%, $p < 0.001$). When only oral presentations were considered, oral presentations receiving an award had similar rate of full manuscript publication to those not receiving awards (84.3% vs. 76.0%, $p = 0.092$). However, 16 of the 21 poster presentations (79.2%) receiving an award were published, in contrast to 1,279/2,631 (48.6%) of poster presentations not receiving an award ($p = 0.012$).

Of the abstract presentations queried, 815 (24.8%) were presented by a first author affiliated with an institution outside of the United States. Authors affiliated with non-US institutions had higher rates of manuscript publication (64.8% vs. 51.1%, $p < 0.001$). Non-US authors were also less likely to combine multiple abstracts into one manuscript (8.7% vs. 12.1%, $p = 0.036$).

Over the study period, 778 manuscripts were submitted to AJOG under the SMFM Fast-Track or Special Issue submission program as described in the Materials and Methods section above. The overall acceptance rate of these manuscripts under this submission program to AJOG was high, 211/778 (27.1%). An additional 150 manuscripts initially rejected under the Fast-Track or special issue submission were later accepted for publication in a regular issue of AJOG. Of the 417 manuscripts submitted to AJOG under the SMFM Fast-Track or special issue submission program that were not eventually published in AJOG, 162/417 (38.8%) remain unpublished.

In multivariable regression models, oral presentation at SMFM, first author affiliation with a non-US institution, and submission for AJOG SMFM Fast-Track or special issue were associated with an increased likelihood of publication. The likelihood of full manuscript publication was found to decrease with each year after 2006 during the study period (Table 3).

Comment

We found that 77.1% of SMFM oral abstract and 48.8% of SMFM poster abstract presentations are ultimately published as peer reviewed articles. Half of these publications are in either AJOG or *Obstetrics and Gynecology*. Publication rates were high and consistent, and time to publication decreased/improved across the study period for oral presentations. A notable and sustained decrease in the median time to publication for oral

presentations was noted in 2005 in conjunction with introduction of the special SMFM AJOG Fast-Track submission program for oral presentations. In contrast, rates of publication were less favorable overall and time to publication fluctuated more for poster presentations over the study period. Oral presentations, those with a first author affiliated with a non-US institution, and those receiving special recognition or award at the SMFM Annual Meeting were more likely to result in full manuscript publication.

The publication rates we found are similar to slightly better than reported publication rates from other major medical subspecialty meetings. In a Cochrane review of 79 reports (29,729 abstracts), the mean full publication rate was 44.5%.⁶ Our findings that oral presentations are more likely to result in full manuscript presentation are similar to prior reports from other medical specialties.

The reasons why some research presented at SMFM remains unpublished are unknown. Traditionally, concerns have existed regarding publication bias, whereas studies reporting positive associations between an intervention or exposure and an outcome or adverse event are more likely to be published.^{6,7} Indeed, Blackwell and colleagues confirmed that a publication bias exists at the SMFM Annual Meeting when examining rates of publication of 90 prospective, intervention research studies presented between 2000–2002.⁸ Unfortunately, it is difficult to determine what percentage of non-published manuscripts were submitted for publication and rejected, and how the study results (positive vs. negative) may have influenced the decision to publish or reject a manuscript. We are therefore unable to directly address how publication bias may have influenced non-publication of some abstract presentations.

There has been a recent surge in the number of abstracts submitted for consideration of presentation at SMFM. This has been accompanied by an increase in the overall number of presentations accommodated at SMFM each year, and the overall abstract acceptance rate to the meeting rose from 2003 to a peak of 71.3% in 2008, until it began to fall in 2009 and 2010 when the number of abstracts submitted continued to increase without additional presentations accepted. It is possible that the increased acceptance rate may have led to presentation of lesser quality research which was then more difficult to publish. The journal impact factor reflects the average number of citations of articles published in that journal, and can be viewed as a proxy for the relative importance of a journal within a specialty or subspecialty field. It is reassuring that the journal impact factor has remained consistent over time for both oral and poster presentations. Our findings that oral presentations are more likely to be published in journals with high impact factors and are published in journals with a higher median impact factor overall is not unexpected.

This study should be interpreted with some limitations in mind. Due to logistic constraints, we were unable to analyze data regarding abstracts presented as posters during even years. However, by completely searching for publications from odd years, it is likely that we captured temporal trends in the conversion of abstracts to publications. Additionally, we were unable to determine if the presenting author of an abstract was a student, resident, or fellow in training at the time of presentation. The SMFM has only recently collected these data and unfortunately they are not available for analysis across the study period. Further

investigations should evaluate the rate of conversion of abstracts to publications among individuals ‘in-training’ to assess the quality of mentorship in following projects through to completion. Logistic constraints also prevented us from assessing the influence of factors such as study design, sample size, and positive vs. negative study results. Lastly, it is possible that we failed to identify some matches between abstract presentations and manuscript presentations, or incorrectly identified some matches. Our methodology, which included searching for author names and abstract key words singly and in combination, together with the fact that the abstract to publication matches were searched by 3 physician researchers, helped to limit this possibility.

There were several strengths to this study. As described above, all data were collected by a limited number of physician researchers who used uniform techniques to search for abstracts within PubMed. This study was comprehensive, spanned 8 years of SMFM Annual Meetings, and examined both oral and poster abstract presentations, which allowed us to analyze data with regards to trends over time. We included abstracts presented only through 2010; this allowed for a minimum of 58 months between abstract presentation and the time of our full manuscript publication search (conducted in 2014 and 2015), which is greater than the 75th centile for the time to publication of poster presentation for all prior years studied. This reduces the possibility that the trends towards decreased publication rates in 2007 and 2009 were due to shorter periods of follow-up.

Despite a relatively high rate of publication of SMFM Annual Meeting abstracts, even some data presented at the SMFM main oral plenary session remain unpublished nearly every year. It is somewhat discouraging to note that 38% of manuscripts rejected from AJOG under the SMFM special issue submission process remain unpublished. We also find the trends towards decreased rates of publication resulting from poster presentation in 2007 and 2009 to be concerning. The importance of publication should be emphasized to presenting authors, regardless of whether the study has a positive or negative result. Information presented at the SMFM Annual Meeting should be carefully considered by physicians prior to implementation into clinical practice. Researchers should consider the moral obligations to publish research, particularly that involving human consent, animal sacrifice, and government research dollars. Finally, senior authors and research mentors should be encouraged to assist trainees with study completion and manuscript preparation, and researchers should be encouraged to publish their data in order to add to the peer-reviewed literature.

Acknowledgements

The authors would like to acknowledge Ms. Patricia Stahr, SMFM Executive Director, for her assistance with this project.

Funding: This study was funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development 5K23HD067224 (Dr. Manuck) and by Center for Clinical and Translational Sciences grant support (8UL1TR000105 (formerly UL1RR025764) NCATS/NIH).

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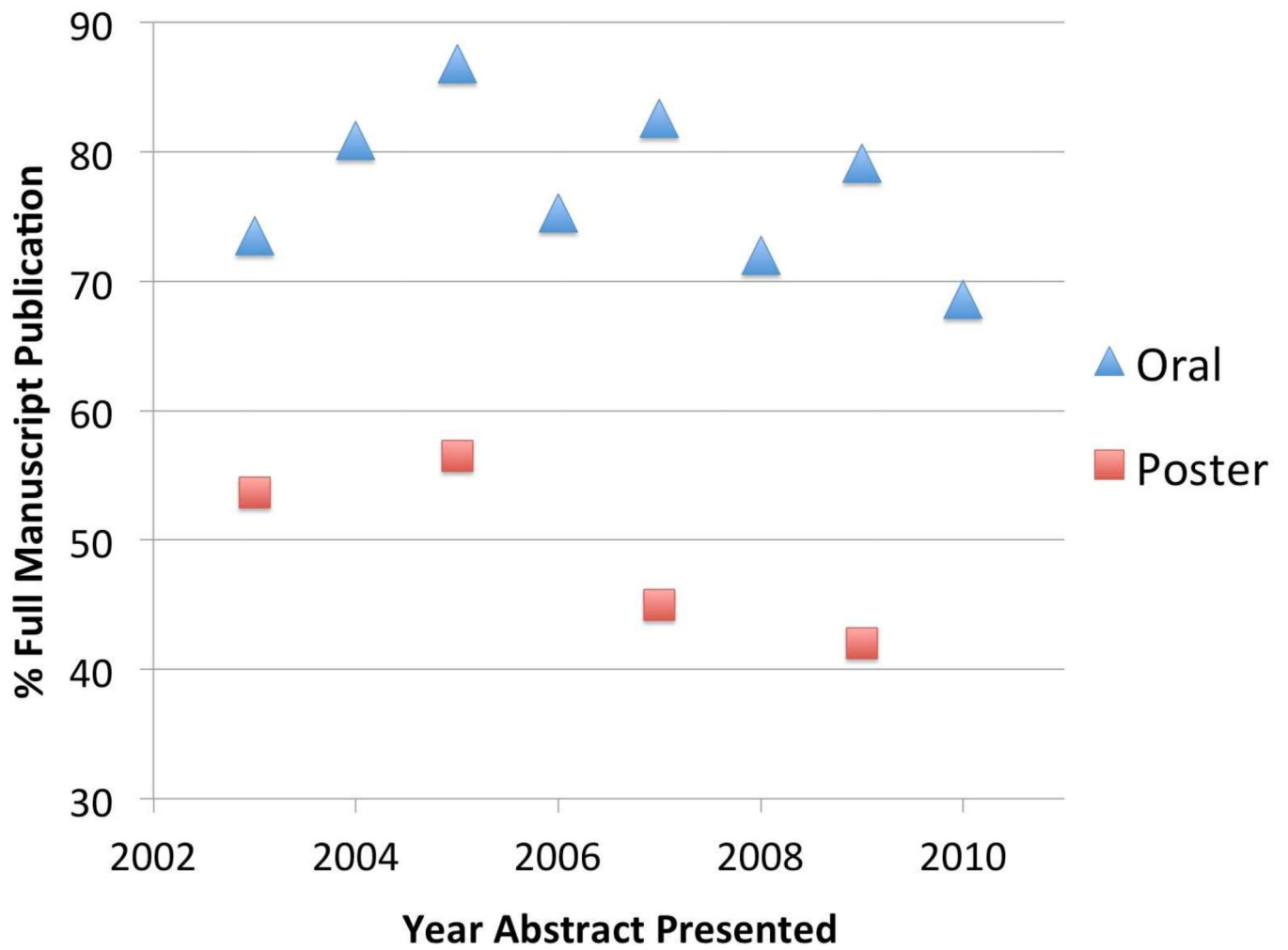


Figure 1. Percentage of SMFM Annual Meeting research resulting in full manuscript publication, by year the abstract was presented.

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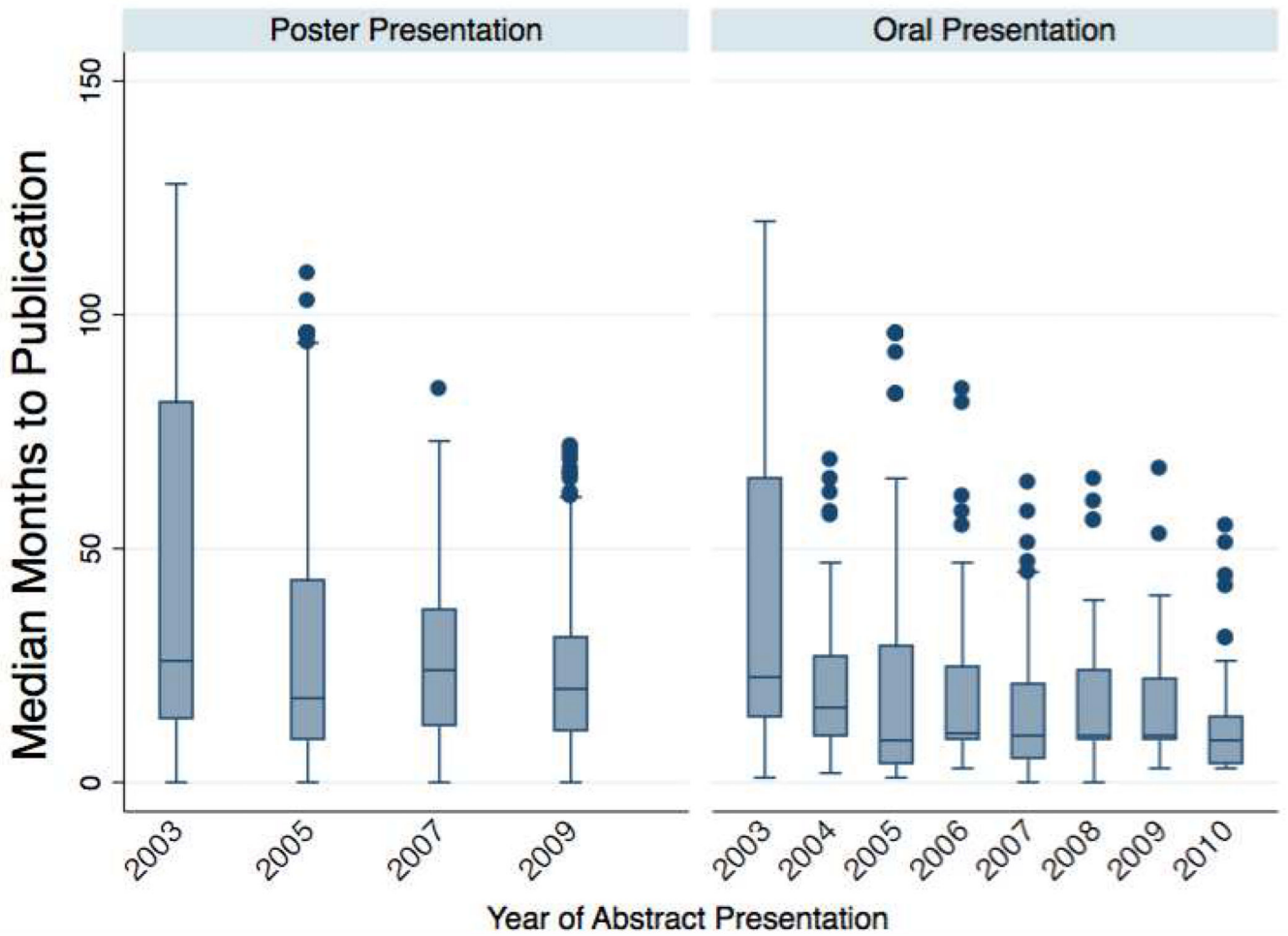


Figure 2. Time (median months, IQR) from abstract presentation to manuscript publication by year of SMFM abstract presentation.

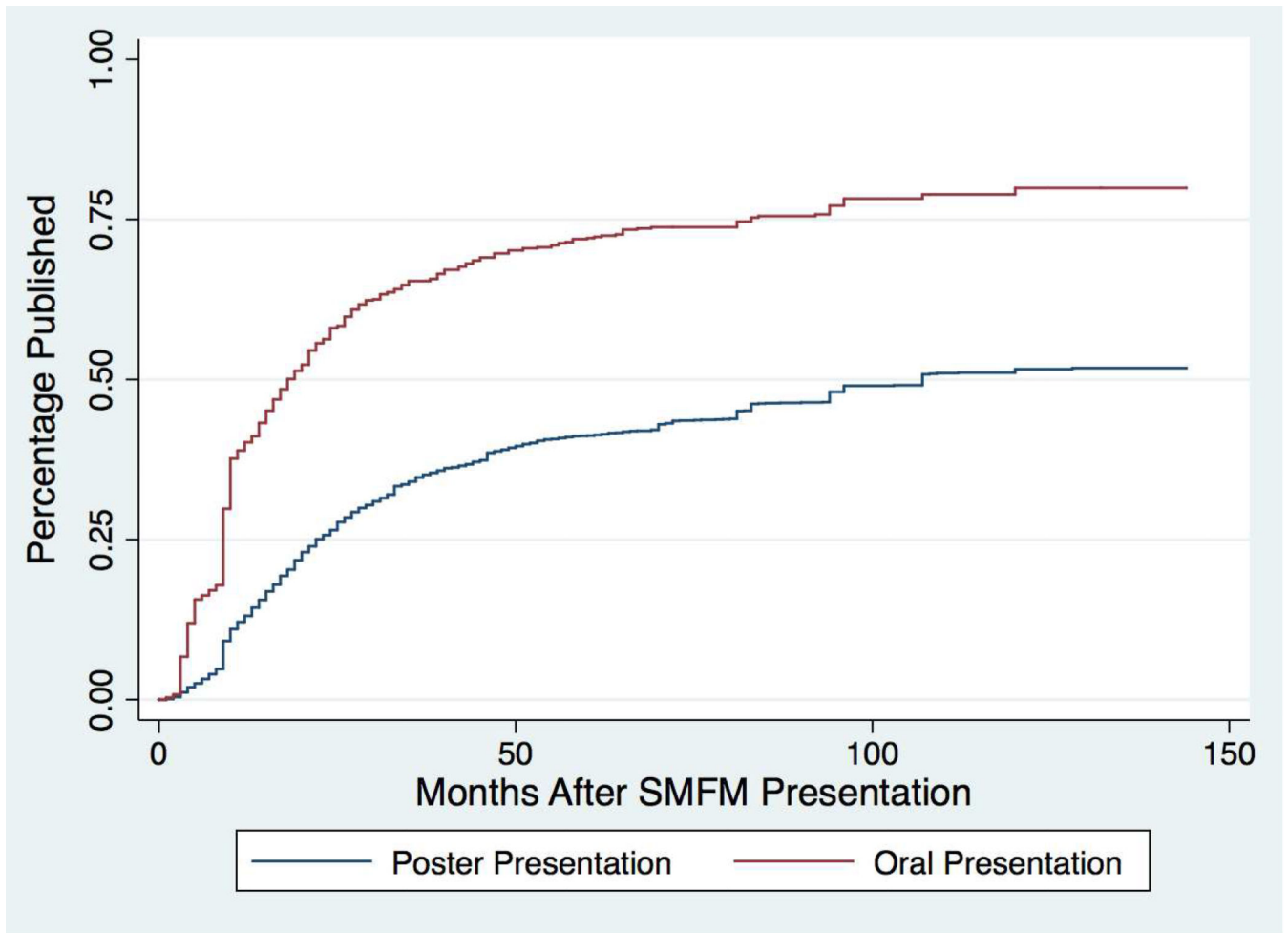


Figure 3. Kaplan-Meier survival curve demonstrating percentage of manuscripts published following SMFM presentation.

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Table 1

Shown are total abstracts submitted and number of abstracts presented at SMFM by year.

Year	Total # Abstracts Submitted	Accepted Abstracts		
		Total	Oral	Poster
2003	1068	656/1068 (61.5)	68/656 (10.3)	588
2004	1073	665/1073 (61.8)	68/665 (10.2)	597
2005	1093	684/1093 (62.6)	68/684 (9.9)	616
2006	1059	692/1059 (65.3)	85/692 (12.2)	606
2007	1205	792/1205 (65.7)	86/792 (10.9)	706
2008	1047	746/1047 (71.3)	82/746 (11.0)	664
2009	1236	828/1236 (67.0)	86/828 (10.4)	742
2010	1256	836/1256 (66.6)	86/836 (10.3)	750

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Table 2

Journals most frequently publishing research presented at the SMFM Annual Meeting. Data are given as n(%).

Journal Name	Number of Publications		
	Total N=1,780	Publications from Oral Presentation N=485	Publications from Poster Presentation N=1,295
American Journal of Obstetrics and Gynecology	709 (39.8)	282 (58.1)	427 (33.0)
Obstetrics and Gynecology	172 (9.7)	44 (25.6)	128 (9.9)
Journal of Maternal-Fetal & Neonatal Medicine	116 (6.5)	18 (3.7)	98 (7.6)
American Journal of Perinatology	66 (3.7)	6 (1.2)	60 (4.6)
Ultrasound in Obstetrics and Gynecology	60 (3.4)	11 (2.3)	49 (3.8)
Prenatal Diagnosis	45 (2.5)	2 (0.4)	43 (3.3)
British Journal of Obstetrics and Gynecology	34 (1.9)	8 (1.7)	26 (2.0)
Journal of Perinatal Medicine	32 (1.8)	2 (0.4)	30 (2.3)
Journal of Ultrasound in Medicine	29 (1.6)	1 (0.2)	28 (2.2)
Journal of Perinatology	25 (1.4)	2 (0.4)	23 (1.8)
Fetal Diagnosis and Therapy	25 (1.4)	4 (0.8)	21 (1.6)
European Journal of Obstetrics & Gynecology and Reproductive Biology	22 (1.2)	3 (0.6)	19 (1.5)
Journal of Reproductive Sciences	20 (1.1)	2 (0.4)	18 (1.4)

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Table 3

Characteristics associated with full manuscript publication of SMFM abstract presentations.

	Adjusted OR (95% CI)	p-value
Oral presentation at SMFM (vs. poster)	4.90 (3.57–6.72)	<0.001
First author from non-US institution	2.06 (1.72–2.47)	<0.001
Submitted to AJOG for SMFM Fast-Track or special issue	4.24 (3.48–5.17)	<0.001
Year abstract was presented		
2003	Referent	-
2004	0.70 (0.33–1.50)	0.361
2005	1.08 (0.84–1.38)	0.567
2006	0.57 (0.30–1.07)	0.079
2007	0.65 (0.51–0.82)	<0.001
2008	0.41 (0.22–0.76)	0.005
2009	0.70 (0.55–0.88)	0.003
2010	0.46 (0.26–0.83)	0.010

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