

# Optimizing the Management of Fertility in Women over 40

---

Cambridge University Press & Assessment

978-1-316-51682-9 — Optimizing the Management of Fertility in Women over 40

Edited by Dimitrios S. Nikolaou , David B. Seifer

Frontmatter

[More Information](#)

---

# Optimizing the Management of Fertility in Women over 40

Edited by

**Dimitrios S. Nikolaou**

Chelsea & Westminster Hospital

**David B. Seifer**

Yale School of Medicine



**CAMBRIDGE**  
UNIVERSITY PRESS

## CAMBRIDGE UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom  
One Liberty Plaza, 20th Floor, New York, NY 10006, USA  
477 Williamstown Road, Port Melbourne, VIC 3207, Australia  
314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre,  
New Delhi – 110025, India  
103 Penang Road, #05–06/07, Visioncrest Commercial, Singapore  
238467

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning, and research at the highest international levels of excellence.

[www.cambridge.org](http://www.cambridge.org)

Information on this title: [www.cambridge.org/9781316516829](http://www.cambridge.org/9781316516829)

DOI: 10.1017/9781009025270

© Cambridge University Press 2022

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2022

Printed in the United Kingdom by TJ Books Limited, Padstow Cornwall

*A catalogue record for this publication is available from the British Library.*

ISBN 978-1-316-51682-9 Hardback

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.

.....  
Every effort has been made in preparing this book to provide accurate and up-to-date information that is in accord with accepted standards and practice at the time of publication. Although case histories are drawn from actual cases, every effort has been made to disguise the identities of the individuals involved. Nevertheless, the authors, editors, and publishers can make no warranties that the information contained herein is totally free from error, not least because clinical standards are constantly changing through research and regulation. The authors, editors, and publishers therefore disclaim all liability for direct or consequential damages resulting from the use of material contained in this book. Readers are strongly advised to pay careful attention to information provided by the manufacturer of any drugs or equipment that they plan to use.

**Dedication for Dimitrios S. Nikolaou:**

To Egbert te Vede, Masoud Afnan and Nikos Kazantzakis

To my parents, Sotirios and Kyriaki, with infinite gratitude for their sacrifices.

To my wife Dina, my companion and our 2 sons.

To my brother Vassilis.

**Dedication for David B. Seifer**

“May the love of my art inspire me at all times...” Maimonides

To the memory of my parents and to honor the members of my family who have provided inspiration along my journey: my mother, for her passion, intellectual curiosity and the pursuit of knowledge; my father, for his mindset to challenge the norm while being respectful of others; my brother for his quest of a physical challenge and his embrace of the joy of life; my wife for her commitment to excellence and her moral compass; and our two wonderful sons for inspiring us to be the best versions of ourselves and who are our legacy for the future.

Cambridge University Press & Assessment

978-1-316-51682-9 — Optimizing the Management of Fertility in Women over 40

Edited by Dimitrios S. Nikolaou , David B. Seifer

Frontmatter

[More Information](#)

---

# Contents

*List of Contributors* ix

---

## Introduction 1

Dimitrios S. Nikolaou and David B. Seifer

## Section 1 Demographic Trends

- 1 **Is 40 the New 30? Increasing Reproductive Intentions and Fertility Rates beyond Age 40** 3  
 Éva Beaujouan and Tomáš Sobotka

## Section 2 Biological Basis of Female Reproductive Aging: What Happens to the Ovaries and the Uterus as they Age?

- 2 **Biological Basis of Female Reproductive Aging: What Happens to the Ovaries and Uterus as They Age?** 19  
 Jacquelyn Shaw, Jennifer K. Blakemore, and David L. Keefe

## Section 3 Lifestyle, Environment, and Optimizing Reproduction in the 40s

- 3 **What Lifestyle Adjustments Can Maximize the Chance of a Natural Conception and Healthy Pregnancy in Women over 40?** 27  
 Alexandra Kermack

## Section 4 Rethinking and Redefining “Family Planning” for the Twenty-First Century

- 4 **Diagnostic Testing of Reproductive Aging** 39  
 Tanya L. Glenn and David B. Seifer

- 
- 5 **Fertility Preservation for “Social” Reasons** 56

Timothy Bracewell-Milnes and Dimitrios S. Nikolaou

## Section 5 Optimal Deployment of ART beyond 40

- 6 **When to Use ART beyond 40: How Often, How Many Attempts, When to Stop** 71  
 Steven D. Spandorfer and Pietro Bortoletto
- 7 **Optimal IVF Protocols for Women over 40 and Low Functional Ovarian Reserve** 81  
 David H. Barad and Norbert Gleicher
- 8 **Fertility Counseling beyond 40** 98  
 Amir Mor and David B. Seifer
- 9 **Support Systems and Patient Experience Architecture for Fertility Care of Women over 40 in the 2020s** 106  
 Dimitrios S. Nikolaou and David B. Seifer

## Section 6 Obstetric Management beyond 40

- 10 **Optimal Management of the First Trimester in Women over 40** 119  
 Beth Cartwright and Aditi Naik
- 11 **Optimal Management of Pregnancy beyond 12 Weeks, Labour and the Puerperium for Women over 40** 131  
 Shane Duffy and Pritha Dasmahapatra

## Section 7 Children of Older Parents

- 12 **What Do We Know about the Children of Women over 40 and What Can Older**

## Contents

### Mothers Do to Optimize Their Children's Development? 141

Winifred Mak and Vickie Schafer

## Section 8 What Are Realistic Alternatives to Conceiving with Autologous Eggs?

### 13 Practical Egg Donation in Women over 40 153

James P. Toner and Lauren Rouleau

## Section 9 New Technologies

### 14 Is It Likely That Reproductive Aging Could Be Delayed or Reversed Using Advanced Technologies in the Future? 163

Paula Amato and Dimitrios S. Nikolaou

## Section 10 Ethics

### 15 Ethical Issues in the Use of Assisted Reproductive Technology in Women over Age 40 173

Nicole Yoder and Gwendolyn P. Quinn

### Epilogue 180

David B. Seifer and Dimitrios S. Nikolaou

---

*Index* 181



## Contributors

---

### **Paula Amato, MD**

Division of Reproductive Endocrinology and Infertility, Department of Obstetrics and Gynecology Oregon Health & Science University, Portland, Oregon, USA

### **David H. Barad, MD, MS**

The Center for Human Reproduction, New York, NY, USA The Foundation for Reproductive Medicine, New York, NY, USA

### **Éva Beaujouan**

Wittgenstein Centre for Demography and Global Human Capital (IIASA, OeAW), University of Vienna, Vienna, Austria

### **Jennifer K. Blakemore, MD, MSc**

Langone Fertility Center, New York University, New York, NY, USA

### **Pietro Bortoletto, MD**

The Ronald O. Perelman and Claudia Cohen Center for Reproductive Medicine, Weill Cornell Medical College, New York, NY, USA

### **Timothy Bracewell-Milnes**

Assisted Conception Unit, Chelsea and Westminster NHS Trust, London, UK

### **Beth Cartwright**

Early Pregnancy Unit, Chelsea and Westminster Hospital, London, UK

### **Pritha Dasmahapatra, MBBS (Calcutta University), MRCOG**

Chelsea & Westminster Hospital, London, UK

---

### **Shane Duffy, MB BS (Hons), DTM&H, DObst, DMed, MSc, FRCOG**

Chelsea & Westminster Hospital, London, UK

### **Norbert Gleicher, MD**

The Center for Human Reproduction, New York, NY, USA The Foundation for Reproductive Medicine, New York, NY, USA Stem Cell Biology and Molecular Embryology Laboratory, The Rockefeller University, New York, NY, USA Department of Obstetrics and Gynecology, Medical University of Vienna, Austria

### **Tanya L. Glenn, MD**

Division of Reproductive Endocrinology and Infertility, Department of Obstetrics, Gynecology, and Reproductive Sciences, Yale School of Medicine, New Haven, CT, USA

### **David L. Keefe, MD**

Langone Fertility Center, New York University, New York, NY, USA

### **Alexandra Kermack**

NIHR Clinical Lecturer/Registrar Obstetrics & Gynaecology School of Human Development and Health University of Southampton, UK

### **Winifred Mak, MD, PhD**

Dell Medical School, University of Texas at Austin, TX, USA

### **Amir Mor, MD PhD**

Division of Reproductive Endocrinology and Infertility, Department of Obstetrics, Gynecology, and Reproductive Sciences, Yale University School of Medicine, New Haven, CT, USA

**List of Contributors****Aditi Naik**

Early Pregnancy Unit, Chelsea and Westminster Hospital, London, UK

**Dimitrios S. Nikolaou, MD**

Chelsea & Westminster Hospital, London, UK

**Gwendolyn P. Quinn**

Department of OB-GYN, Grossman School of Medicine, New York University, New York, NY, USA

**Lauren Rouleau, MD, PhD**

Department GynOb, Emory University, Atlanta, GA, USA

**Vickie Schafer, PhD**

Independent licensed psychologist

**David B. Seifer, MD**

Division of Reproductive Endocrinology and Infertility, Department of Obstetrics, Gynecology, and Reproductive Sciences, Yale School of Medicine, New Haven, CT, USA

**Jacquelyn Shaw, MD**

Langone Fertility Center, New York University, New York, NY, USA

**Tomáš Sobotka**

Wittgenstein Centre for Demography and Global Human Capital (IIASA, OeAW), University of Vienna, Vienna, Austria

**Steven Spandorfer, MD**

The Ronald O. Perelman and Claudia Cohen Center for Reproductive Medicine, Weill Cornell Medical College, New York, NY, USA

**James P. Toner, MD, PhD**

Emory Reproductive Center, Department GynOb, Emory University, Atlanta, GA, USA

**Nicole Yoder, MD**

Langone Fertility Center, New York University, New York, NY, USA