# HIGHLIGHTS

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1841</td>
<td>Selected Articles from This Issue</td>
<td></td>
</tr>
</tbody>
</table>

# COMMENTARY

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1843</td>
<td><strong>AACR Cancer Disparities Progress Report 2020:</strong> Achieving the Bold Vision of Health Equity for Racial and Ethnic Minorities and Other Underserved Populations</td>
<td>Rajarshi Sengupta and Karen Honey</td>
</tr>
</tbody>
</table>

# REVIEWS

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1844</td>
<td>Linking Environmental Exposures to Molecular Pathogenesis in Non-Hodgkin Lymphoma Subtypes</td>
<td>Leah Moubadder, Lauren E. McCullough, Christopher R. Flowers, and Jean L. Koff</td>
</tr>
</tbody>
</table>

# CEBP FOCUS

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1870</td>
<td>Rethinking Environmental Carcinogenesis</td>
<td>Margaret Kripke, Julia Green Brody, Ernest Hawk, Amanda B. Hernandez, Polly J. Hoppin, Molly M. Jacobs, Ruthann A. Rudel, and Timothy R. Rebbeck</td>
</tr>
<tr>
<td>1876</td>
<td>Air Pollution across the Cancer Continuum: Extending Our Understanding of the Relationship between Environmental Exposures and Cancer</td>
<td>Judy Y. Ou, Anne C. Kirchhoff, and Heidi A. Hanson</td>
</tr>
<tr>
<td>1880</td>
<td>Environmental Carcinogenesis at the Single-Cell Level</td>
<td>Gregory Chang, Kohei Saeki, Hitomi Mori, and Shiuan Chen</td>
</tr>
</tbody>
</table>

# 1887 | The Key Characteristics of Carcinogens: Relationship to the Hallmarks of Cancer, Relevant Biomarkers, and Assays to Measure Them | Martyn T. Smith, Kathryn Z. Gupton, Nicole Kleinsteu, Alexandre Borrel, Andres Cardenas, Weihsueh A. Chiu, Dean W. Feshler, Catherine F. Gibbons, William H. Goodson III, Keith A. Houck, Agnes B. Kane, Michele A. La Merril, Herve Lebre, Leroy Lowe, Cllona M. McHale, Sheroy Minocherhomi, Linda Riewijk, Martha S. Sandy, Hideko Sone, Amy Wang, Luoping Zhang, Lauren Zeise, and Mark Fielden |

# 1904 | Applying Tobacco, Environmental, and Dietary-Related Biomarkers to Understand Cancer Etiology and Evaluate Prevention Strategies | Lisa A. Peterson, Silvia Balbo, Naomi Fujioka, Dorothy K. Hatsu, Stephen S. Hecht, Sharon E. Murphy, Irina Stepnow, Natalia Y. Tretyakova, Robert J. Turesky, and Peter W. Villalta |

# 1920 | Environmental Quality and Invasive Breast Cancer                     | Larisa M. Gearhart-Serna, Kate Hoffman, and Gayathri R. Devi           |

# 1929 | Fine Particulate Matter Air Pollution and Mortality among Pediatric, Adolescent, and Young Adult Cancer Patients | Judy Y. Ou, Heidi A. Hanson, Joemy M. Ramsay, Heydon K. Kadde, Clive Arden Pope III, Claire L. Leiser, James VanDerslice, and Anne C. Kirchhoff |

# 1940 | Using Latent Class Modeling to Jointly Characterize Economic Stress and Multipollutant Exposure | Alexandra Larsen, Viktoria Kolpacoff, Kara McCormack, Victoria Seewaldt, and Terry Hyslop |

# RESEARCH ARTICLES

<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1949</td>
<td>Persistent Poverty and Cancer Mortality Rates: An Analysis of County-Level Poverty Designations</td>
<td>Jennifer L. Moss, Casey N. Pinto, Shobha Srinivasan, Kathleen A. Cronin, and Robert T. Croyle</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS

1962 Chronic Opioid Use and Risk of Cancer in Patients with Chronic Noncancer Pain: A Nationwide Historical Cohort Study
Tak Kyu Oh and In-Ae Song

Brian L. Rostron, Blair Coleman, Yu-Ching Cheng, Heather L. Kimmel, Olusola Oniyide, Lanqing Wang, and Cindy M. Chang

1973 Verification of a Blood-Based Targeted Proteomics Signature for Malignant Pleural Mesothelioma
Ferdinando Cerciello, Meena Choi, Sara L. Simicropi-Yao, Katie Lomeo, Joseph M. Aman, Emanuela Felley-Bosco, Rolf A. Stahel, Bruce W.S. Robinson, Jenette Creaney, Harvey I. Pass, Olga Vitek, and David P. Carbone

1973 Genetic Determinants of Lung Cancer Prognosis in Never Smokers: A Pooled Analysis in the International Lung Cancer Consortium
Yoanathan Bhrane, Ping Yang, David C. Christiani, Geoffrey Liu, John R. McLaughlin, Paul Brennan, Sanjay Shete, John K. Field, Adonina Tardón, Takashi Kohno, Kouya Shiraiishi, Keitaro Matsuo, Yohan Bossé, Christopher I. Amos, and Rajjean J. Hung

1983 Higher Plasma Amyloid-β Levels Are Associated with a Higher Risk of Cancer: A Population-Based Prospective Cohort Study
Kimberly D. van der Willik, Mohsen Ghanbari, Lana Fani, Annette Compter, Rikje Ruiter, Bruno H.Ch. Stricker, Sanne B. Schagen, and M. Arfan Ikram

2002 Abnormal and Euthyroid Ranges of Thyroid Hormones in Serum and Liver Cancer Mortality: A Cohort Study
Won Sohn, Yoosoo Chang, Yong Kyun Cho, Yejin Kim, Hocheol Shin, and Seungho Ryu

2010 Ovarian Cancer Risk Factor Associations by Primary Anatomic Site: The Ovarian Cancer Cohort Consortium

2019 Racial/Ethnic Differences in Ovarian Cancer Risk: Results from the Multiethnic Cohort Study
Danja Sarink, Anna H. Wu, Loic Le Marchand, Kami K. White, Song-Yi Park, V. Wendy Setiawan, Brenda Y. Hernandez, Lynne R. Wilkens, and Melissa A. Merritt

2019 Racial/Ethnic Differences in Ovarian Cancer Risk: Results from the Multiethnic Cohort Study
Danja Sarink, Anna H. Wu, Loic Le Marchand, Kami K. White, Song-Yi Park, V. Wendy Setiawan, Brenda Y. Hernandez, Lynne R. Wilkens, and Melissa A. Merritt

2026 Stochastic Epigenetic Mutations Are Associated with Risk of Breast Cancer, Lung Cancer, and Mature B-cell Neoplasms

2038 Influence of Metabolic Syndrome on Risk of Breast Cancer: A Study Analyzing Nationwide Data from Korean National Health Insurance Service
Ki-Tae Hwang, Kyung-Do Han, Sohee Oh, Bo Kyung Koo, Se Kyung Lee, Jongin Kim, Hwa Jeong Seo, Jiwoong Jung, Byoung Hyuck Kim, and Ho Hur

2048 Breast Cancer Population Attributable Risk Proportions Associated with Body Mass Index and Breast Density by Race/Ethnicity and Menopausal Status

2057 Independent and Joint Associations between Serum Calcium, 25-Hydroxy Vitamin D, and the Risk of Primary Liver Cancer: A Prospective Nested Case-Control Study

2065 Pathway Analysis of Renal Cell Carcinoma Genome-Wide Association Studies Identifies Novel Associations

2070 Glomerular Hyperfiltration and Cancer: A Nationwide Population-Based Study
Yaerim Kim, Soojin Lee, Yeonhee Lee, Min Woo Kang, Sehoon Park, Sanghyun Park, Kyungdo Han, Jin Hyuk Paek, Won Yeong Park, Kyubok Jin, Seungyeup Han, Seung Seok Han, Hajeong Lee, Jung Pyo Lee, Kwon Woock Joo, Chun Sook Lim, Yon Su Kim, and Dong Ki Kim
2078 Human Papillomavirus Genotypes in Anal High-Grade Squamous Intraepithelial Lesion (HSIL): Anal Intraepithelial Neoplasia Grades 2 (AIN2) and 3 (AIN3) Are Different

Jennifer M. Roberts, Isobel M. Poynten, Monica Molano, Dorothy A. Machalet, Richard J. Hillman, Patricia Guzman, Fengyi Jin, David J. Templeton, Christopher K. Fairley, Carmella Law, Suzanne M. Garland, Andrew E. Grulich, and Alyssa M. Cornall

2080 Racial Differences in Helicobacter pylori CagA Sero-prevalence in a Consortium of Adult Cohorts in the United States


2084 About the Cover

The cover is adapted from Figure 1 in the article, “Environmental Quality and Invasive Breast Cancer,” by Gearhart-Serna and colleagues. The figure shows the environmental quality index (EQI) stratified by rural–urban categories by county. To test the hypothesis that the incidence of specific breast cancer stages can vary by demographics in relation to environmental factors, Gearhart-Serna and colleagues utilized EQI datasets to investigate associations between environmental factors and breast cancer compared to carcinoma in situ. Cumulatively, the results suggest that some broad measures of environmental quality are associated with invasive breast cancer, but that associations vary by environmental domain, cancer stage, subtype, and urbanicity. The study demonstrates the strongest positive association for poor land environmental quality and distant metastatic breast cancer. For more information, see the article beginning on page 1920.

The article is included in the CEBP Focus, “Environmental Carcinogenesis: Pathways to Prevention,” published in this issue. The AACR convened a Special Conference entitled, “Environmental Carcinogenesis: Potential Pathway to Prevention,” held June 22 to 24, 2019, in Charlotte, NC, and cochaired by Margaret Kripke, Ernest Hawk, and Timothy Rebbeck. A goal of the meeting was to review and analyze evidence for the role of environmental factors in cancer development and discuss how this information could be applied to prevent cancer. The meeting also provided a forum for discussion of these issues among diverse groups, including cancer biologists, epidemiologists, toxicologists, advocates, community leaders, and communication specialists, who rarely have opportunities to interact. The Focus included in this issue represents but a few of the resulting collaborations. For more information, see the Focus section beginning on page 1869.

2084 NULL RESULTS IN BRIEF

Tattoos and Hematologic Malignancies in British Columbia, Canada

Freda M. Warner, Maryam Darvishian, Terry Boyle, Angela R. Brooks-Wilson, Joseph M. Connors, Agnes S. Lai, Nhu D. Le, Kevin Song, Heather Sutherland, Ryan R. Woods, Parveen Bhatti, and John J. Spinelli

Risk of Breast Cancer Associated with Estrogen DNA Adduct Biomarker

Kerryn W. Reding, Claire J. Han, Dale Whittington, Muhammad Zahid, Eleanor G. Rogan, Dale Langford, Thomas E. Rohan, Rowan T. Chlebowski, Ting-Yuan David Cheng, Wendy E. Barrington, and Lesley F. Tinker

Nut and Peanut Butter Consumption and the Risk of Total Cancer: A Prospective Cohort Study

Lisette Nieuwenhuis and Piet A. van den Brandt