POLICY BRIEF

Families, Powered On

Improving Family Engagement in Early Childhood Education Through Technology

Lindsay Daugherty
Rafiq Dossani
Erin-Elizabeth Johnson
Cameron Wright

TO LEARN MORE

www.rand.org/t-is-for-technology

Family engagement in the education of young children is associated with numerous positive outcomes for those children, and parents and other family members play an important role as "teachers" during the time children spend outside the classroom. Home-based involvement (e.g., a parent-led educational activity), school-based involvement (e.g., volunteering in the classroom), and school-home conferencing (e.g., speaking to a teacher about a child's progress) are the key components of family engagement, but there are barriers to all three. In this policy brief, we describe the barriers that hinder family engagement and the ways in which technology may afford new opportunities to improve early childhood education (ECE) outcomes—empowering families to become better educators at home, and strengthening connection and communication between school and home.[1]

Why Focus on Technology and Early Childhood Education?

Digital literacy—the knowledge and skills needed to use technology "to analyze, learn, and explore"[i]—plays an important role in a child's ability to succeed in school and beyond. Yet, despite rapid growth in society's use of information and communication technology, many children in low-income families in the United States are unable to *access* technology—including devices, software, and connectivity—in the same ways as their more-advantaged peers. And even when children from low-income families are able to access technology, they often learn to *use* it in different ways. The result? Fewer opportunities to learn, explore, and communicate digitally, and fewer chances to develop technology skills that might be needed for success in school and the workplace.

Technology use in formal early childhood education (ECE) settings, such as preschools and child-care centers, may help shrink the digital divide in terms of both access and use for children in low-income families. Both in and beyond formal ECE settings, technology use may also play a valuable role in ensuring that all children enter kindergarten with early digital literacy skills—and in helping them build skills in such areas as literacy, math, and motor development by providing additional opportunities for exploration, interaction, communication, and creativity. With adequate resources and support, ECE providers and family members may also benefit from technology use in ECE as they lead and encourage the education of young children.

Among children ages 3–5, technology use is not without potential pitfalls. Some physicians, policymakers, educators, and parents are concerned that technology use in ECE may have a negative effect on the development of social and gross motor skills, contribute to obesity, and diminish skill development in areas beyond digital literacy. So, as we seek to realize the potential benefits of technology use in ECE, we must also ensure that we address potential harms.

Charting the road ahead requires careful thought and planning. A broad group of stakeholders must be invited to the discussion, and their unique perspectives—and, occasionally, competing priorities—must be understood and addressed. We propose that achieving a better understanding of how to integrate technology into ECE requires answering five key questions:

1. What are the goals for technology use in ECE?
2. How do we define developmentally appropriate technology use in ECE?
3. Once defined, how do we support developmentally appropriate technology use through devices, software, connectivity, and other components of technology infrastructure?
4. How do we ensure that ECE providers are prepared to integrate technology appropriately, intentionally, and productively into ECE settings?
5. How can parents and other family members play a role in the use of technology in ECE?

Our Approach

The study of modern technology use in ECE is, by definition, a relatively nascent field, and research has largely examined only isolated aspects of the topic (with a heavy emphasis on the effects of watching television). Therefore, considerable debate, disagreement, and uncertainty remain, although consensus appears to be forming around the need to integrate technology into ECE in an intentional and productive way. In February 2014, the RAND Corporation published a framing paper, *Using Early Childhood Education to Bridge the Digital Divide,* that summarized and assessed the existing literature and outlined the five key questions introduced above.[ii] The paper also described the need to involve a wide range of stakeholders in discussions, planning, and implementation.

In May 2014, RAND and PNC Grow Up Great hosted a one-day forum that brought these stakeholders—advocates, educators, researchers, policymakers, funders, and parents—together to discuss issues, needs, evidence, and ideas related to technology use in ECE. Through plenary sessions and smaller breakout groups, the 45 forum participants shared their perspectives on each of the five key questions.

This policy brief integrates findings from our literature review with the perspectives of forum participants. Therefore, its contents cannot be considered comprehensive or definitive. Rather, we offer suggestions in the spirit of advancing knowledge and encouraging continued conversation as stakeholders move ahead with policies and programs that support technology use in ECE.

[i] International Society for Technology in Education, "Digital Age Learning," web page, copyright 2014. As of August 28, 2014: http://www.iste.org/standards/standards-for-students

[ii] L. Daugherty, R. Dossani, E. Johnson, and M. Oguz, *Using Early Childhood Education to Bridge the Digital Divide,* Santa Monica, Calif.: RAND Corporation, PE-119-PNC, 2014. As of June 6, 2014: www.rand.org/t/PE119

Why Engage Families in ECE?

Because most children spend only three to six hours in ECE settings, parents and other family members play an important role as "teachers" during the time these children spend outside the classroom. Early childhood is a critical time for the development of basic math and reading skills, as well as motivation and socialization, and research shows that interaction with parents and other family members can lead to skill development in these areas.[2] How parents engage with children during at-home technology use appears to be important in building children's technology literacy.[3] Studies have also demonstrated that parental involvement and engagement with what is being learned in the classroom can have positive effects on a child's learning.[4]

This *home-based involvement* in children's education is one of three main mechanisms of family engagement.[5] *School-based involvement* and *school-home conferencing* are, like home-based involvement, methods associated with numerous positive outcomes for children. *School-based involvement* (e.g., parent volunteering in the classroom) is associated with increased gains in math and reading achievement during kindergarten,[6] as well as with better classroom performance relative to peers, as rated by teachers.[7] *School-home conferencing*, which may come in the form of a strong parent-teacher relationship, has been associated with improved social development, as rated by kindergarten teachers, even after controlling for child and family characteristics.[8] Importantly, the positive effect of a strong parent-teacher relationship appears to be larger for students from low-income families.[9] Greater parental involvement in the educational process can also lead to reduced problem behaviors and improved social skills as a child moves through elementary school.[10]

How parents engage with children during at-home technology use appears to be important in building children's technology literacy.

What Factors Prevent or Hinder Family Engagement in ECE?

Barriers to family engagement in ECE affect all three mechanisms: home-based involvement, school-based involvement, and school-home conferencing.

Busy Schedules

The time constraints of families and providers alike limit the hours available for school-home conferencing, and these conversations may end up being restricted to infrequent, formal, family-provider conferences instead of more frequent updates that allow parents to become aware of progress and challenges in a more timely manner. These same busy or inflexible schedules, which can be particularly problematic for lower-income or single-parent households, may also limit opportunities for school-based and home-based involvement.

School-Centric Approaches

Some parents complain that that schools often take a "school-centric" view of family involvement, meaning that schools do not consider the needs and perceptions of parents and often fail to create opportunities for open, two-way communication.[11] Schools may frequently communicate with families regarding the needs of the school, but parents report that they are infrequently consulted on important issues regarding their child's schooling.[12]

Suboptimal Channels of Communication

ECE providers who attended the RAND and PNC Grow Up Great forum reported that they struggle to keep families informed of events and opportunities to engage at the school through traditional means. A sign on the front door of an ECE center or a sheet of paper sent home with the child, for example, may no longer be an effective way to communicate with the many families that prefer electronic communication.

Language Barriers

Language barriers (e.g., family members not fluent in English unable to understand communications from school) can adversely affect both school-home conferencing and school-based involvement.[13] They can also limit a parent's ability to form social networks with other parents who can support and model effective family involvement practices.[14]

Parental Attitudes

Parents' perceptions about their role in their child's education and their own skills and knowledge—their assessment of their own efficacy as teachers—can influence their decision to become involved in their child's education. Parents who doubt their efficacy exhibit lower rates of both home-based and school-based involvement.[15]

Lack of Information

Anyone who has ever asked a five-year-old the question, "What did you do in school today?" knows that it can be difficult to glean much information beyond what he or she had for a snack that afternoon. When children and providers do not supply information about classroom activities or curriculum, families may find it difficult to build on those activities in providing additional learning opportunities at home.

Finding ways to remove these barriers has proven challenging for providers and families alike. However, technology is providing new and greater opportunities for strengthening the school-home connection. Indeed, the National Association for the Education of Young Children (NAEYC) has included the use of technology to build home-school connections as one of its guiding principles in its position statement on technology use in ECE.[16]

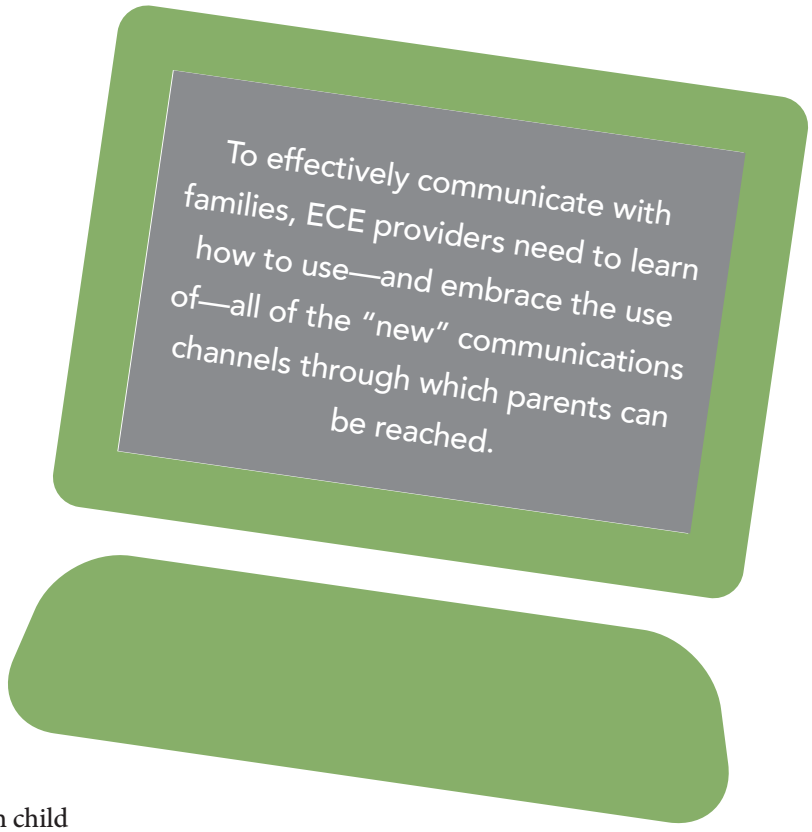
How Technology Can Overcome Barriers to Family Engagement

Improving Communication Processes

Two-way communication between families and ECE providers is the first step toward improving family involvement in education.[17] Although face-to-face conversations may be preferable, the schedules of modern families, and of providers themselves, often make this difficult. To effectively communicate with families, ECE providers need to learn how to use—and embrace the use of—all of the "new" communications channels through which parents can be reached. These include email, text messages, and web-based communications tools. These tools provide opportunities for asynchronous communication between ECE providers and families that can be squeezed in whenever busy schedules allow. For example, provider assessments of a child's progress can be entered online and accessed and monitored by family members at their convenience.

How, when, and with whom to use different channels requires some thought, however. Email and web-based communications tools presume that families have Internet access, but this is not always the case, and families who lack Internet access will be unable to communicate digitally. Recent data indicate that only 72 percent of households have broadband access in the home,[18] and this figure is significantly lower for families with incomes of less than $25,000.[19] However, mobile phones are playing an increasingly important role in providing Internet access to Americans: 57 percent of American adults now use mobile phones to access the Internet.[20] Low-income adults are the most likely to use a smartphone as their main access point to the Internet.[21]

The rise in access to mobile phones across adults of all incomes suggests that text messages are likely to be the most effective way to communicate with the broadest group of families, whether or not they have access to the Internet. Although fewer than 60 percent of adults use mobile phones to access the Internet, 81 percent use them to send text messages.[22] Several studies have demonstrated that text messaging can be useful in communicating with low-income families for such activities as transmitting reminders about important tasks (such as immunizations) and supporting effective parenting practices.[23]



Preferences about communicating through technology vary widely, and different generations of family members are likely to have different comfort levels with different types of communication methods. Young parents and other "digital native" family members, such as older siblings with child care responsibilities, may be most responsive to text messages. A 2011 study indicates that adults between the ages of 18 and 24 send an average of 110 text messages each day.[24] On the other hand, older parents and family members may be more comfortable with email as the primary means of digital communication. In addition, many young children are raised by grandparents who may not feel comfortable with any means of digital communication. ECE providers typically work with parents and family members that span multiple generations, so they need to be comfortable offering a variety of communications channels to convey the same message. On the other hand, ECE providers also experience constraints on time and resources, so it is important to find ways to streamline the ability to communicate through multiple channels.

Technology can also be used to overcome language barriers between providers and families. For example, online translation tools allow schools to translate written communications into a large number of languages fairly easily. Although these tools are not perfect, they still represent an improvement over not being to communicate at all with parents who do not speak the dominant language. Spoken communication between two people with different primary languages is still a significant barrier, but technology is making headway even in this notoriously difficult-to-tackle area. Microsoft's recently announced Skype Translator, a web-based chat tool, provides voice and text translation between two people speaking different languages.[25] This tool could help overcome barriers to spoken communication between providers and families who speak different languages, helping them develop deeper and stronger connections.

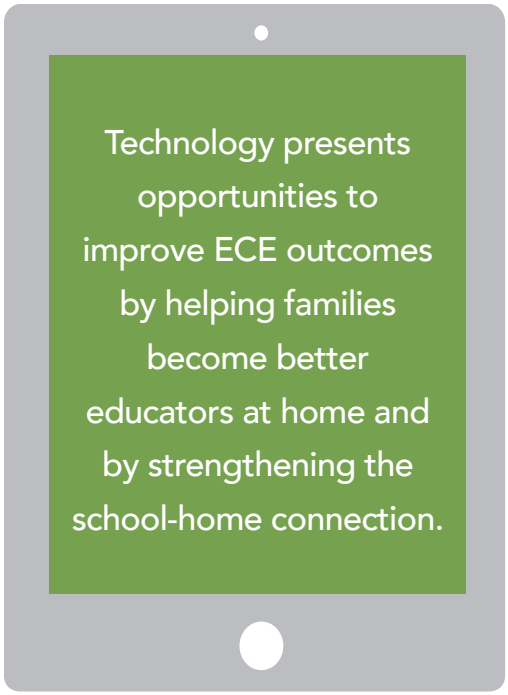
Finally, technology can help improve communication about opportunities for school-based involvement. Some providers use online portals to organize and schedule family volunteer activities. These sites can often be configured to automatically remind families of their commitments via text message or email. Some providers use popular social-networking sites, such as Facebook, or even provider-specific mobile applications, or apps, designed to accomplish these same goals. These portals, apps, and sites can clearly communicate opportunities for school-based involvement and improve convenience for families.

Improving Home-Based Involvement

Families are not always aware of what their children are doing or learning in ECE settings, which can hinder home-based involvement activities that build on what is

being learned at school. By dinner time, children ages 3–5 may find it difficult to remember and discuss what they did earlier that day. However, technology could help families obtain this critical information and there are models that are successfully tackling this and other home-based involvement barriers. Many of these examples are still small in scale, but provide useful demonstrations of the potential power of technology to address these issues. For example, the forum featured a presentation on Message from Me, a system (developed by the CREATE Lab at Carnegie Mellon University [CMU] in partnership with the Children's School at CMU and the Pittsburgh Association for the Education of Young Children) that is attempting to do just that. Message from Me is designed to help young children communicate with their families about their daytime activities using cameras, microphones, email, and other technology to record and transmit their experiences *while* they are in ECE settings, rather than after the fact.[26] This system has the potential to promote family-child conversation and improve home-based engagement while also building children's digital literacy and media-creation skills.

While some parents believe they have a responsibility to help schools educate their children,[27] others may avoid home-based involvement because they doubt their own knowledge and skills.[28] However, online videos, content-based apps that give ideas for at-home activities, and other resources—many of which are used by ECE providers themselves as resources for classroom activities—model effective teaching practices and deliver other types of information families could use to improve their skills or increase their self-confidence. Some initiatives are specifically designed to increase the quantity and quality of home-based involvement. For example, a Texas kindergarten-readiness program called ReadyRosie, also discussed at the forum, uses technology to help engage families and their young children in activities that build reading and math skills in environments outside ECE settings.[29] Each day, family members who have enrolled in the program receive a link to a two-minute video (in English or Spanish) that provides instructions for an activity designed to be performed by the child under an adult's guidance. Families can ask providers for, and providers can actively suggest, additional resources that can facilitate effective home-based involvement.



As family-provider communication improves, providers can gain a better understanding of what technology is available in the home. With that knowledge, they can help families make the best use of that technology while the child is engaged in home-based activities. For example, if a provider knows that a child has limited access to communication technologies at home (as is often the case in low-income families),[30] he or she can tailor guidance on home technology use based on that limited access, and can also ensure that the child has opportunities in the classroom to use other forms of technology (such as a desktop computer) that are not available at home. This type of approach with students from low-income families directly addresses the digital divide by building technology literacy in a larger range of activities and devices. Providers could also take into account the individual preferences and cultural norms of families about the use of technology for educational purposes, which can vary significantly by race and ethnicity.[31]

The Bottom Line

Technology use in ECE need not be confined to ECE settings. Indeed, technology presents opportunities to improve ECE outcomes by helping families become better educators at home and by strengthening the school-home connection. These goals are important because family engagement in the education of young children is associated with numer-

ous positive outcomes for those children. Many of the barriers that hinder family involvement both at home and in ECE settings can be addressed—or at least partially mitigated—through technology that increases the quality, quantity, and convenience of provider-family communication; gives providers and families a better understanding of the child's school and home life; and gives families the tools they need to become better teachers at home. Certain technologies designed to improve families' home-based involvement—such as the Message from Me and Ready-Rosie systems—are still fairly small in scale. They provide useful examples of what technology can do, but bringing these or other projects to scale if they prove efficacious could be very costly, and who will pay the bill is an open question. Meanwhile, providers can use existing technology inexpensively—and with sensitivity to family preferences—to improve family involvement at school and at home.

Sources

1 The term *school* is used in this paper as shorthand for all formal ECE settings beyond care provided by families at home.

2 J. P. Shonkoff and D. A. Phillips, eds., *From Neurons to Neighborhoods: The Science of Early Childhood Development*, Washington, D.C.: National Academies Press, 2000.

3 B. Barron, C. K. Martin, L. Takeuchi, and R. Fithian, "Parents as Learning Partners in the Development of Technological Fluency," *International Journal of Learning and Media*, Vol. 1, No. 2, 2009, pp. 55–77.

4 X. Fan and M. Chen, "Parental Involvement and Students' Academic Achievement: A Meta-Analysis," *Educational Psychology Review*, Vol. 13, No. 1, 2001, pp. 1–22; W. H. Jeynes, "A Meta-Analysis: The Effects of Parental Involvement on Minority Children's Academic Achievement," *Education and Urban Society*, Vol. 35, No. 2, 2003, pp. 202–218.

5 J. Fantuzzo, E. Tighe, and S. Childs, "Family Involvement Questionnaire: A Multivariate Assessment of Family Participation in Early Childhood Education," *Journal of Educational Psychology*, Vol. 92, No. 2, 2000, pp. 367–376.

6 C. Galindo and S. B. Sheldon, "School and Home Connections and Children's Kindergarten Achievement Gains: The Mediating Role of Family Involvement," *Early Childhood Research Quarterly*, Vol. 27, No. 1, 2012, pp. 90–103.

7 M. M. Englund, A. E. Luckner, G. H. L. Whaley, and B. Egeland, "Children's Achievement in Early Elementary School: Longitudinal Effects of Parental Involvement, Expectations, and Quality of Assistance," *Journal of Educational Psychology*, Vol. 96, No. 4, 2004, pp. 723–730.

8 Z. N. Serpell and A. J. Mashburn, "Family-School Connectedness and Children's Early Social Development," *Social Development*, Vol. 21, No. 1, 2012, pp. 21–46.

9 Serpell and Mashburn, 2012.

10 E. Nokali, E. Nermeen, H. J. Bachman, and E. Votruba-Drzal, "Parent Involvement and Children's Academic and Social Development in Elementary School," *Child Development*, Vol. 81, No. 3, 2010, pp. 988–1005.

11 H. T. Knopf and K. J. Swick. "How Parents Feel About Their Child's Teacher/School: Implications for Early Childhood Professionals," *Early Childhood Education Journal*, Vol. 34, No. 4, 2007, pp. 291–296.

12 Knopf and Swick, 2007.

13 T. M. Durand, "Latino Parental Involvement in Kindergarten: Findings from the Early Childhood Longitudinal Study," *Hispanic Journal of Behavioral Sciences*, Vol. 33, No. 4, 2011, pp. 469–489.

14 S. B. Sheldon, "Parents' Social Networks and Beliefs as Predictors of Parent Involvement," *Elementary School Journal*, Vol. 102, No. 4, 2002, pp. 301–316.

15 Sheldon, 2002.

16 The National Association for the Education of Young Children and the Fred Rogers Center for Early Learning and Children's Media at Saint Vincent College, "Technology and Interactive Media as Tools in Early Childhood Programs Serving Children from Birth Through Age 8," position statement, January 2012. As of June 6, 2014: http://www.naeyc.org/files/naeyc/file/positions/PS_technology_WEB2.pdf

17 R. A. Marcon, "Positive Relationships Between Parent School Involvement and Public School Inner-City Preschoolers' Development and Academic Performance," *School Psychology Review*, Vol. 28, No. 3, 1999, pp. 395–412.

18 National Telecommunications and Information Administration, "Household Broadband Adoption Climbs to 72.4 Percent," blog post, June 6, 2013. As of July 12, 2014: http://www.ntia.doc.gov/blog/2013/household-broadband-adoption-climbs-724-percent

19 V. Rideout, *Learning at Home: Families' Educational Media Use in America*, New York, N.Y.: The Joan Ganz Cooney Center at Sesame Workshop, 2014.

20 M. Duggan and A. Smith, "Cell Phone Internet Use 2013," Pew Research Internet Project, September 16, 2013. As of July 12, 2014: http://www.pewinternet.org/2013/09/16/cell-internet-use-2013/

21 K. Zickuhr and A. Smith, "Digital Differences," *Pew Internet and American Life Project*, April 13, 2012. As of July 3, 2014: http://www.pewinternet.org/~/media//Files/Reports/2012/PIP_Digital_differences_041312.pdf

22 M. Duggan and A. Smith, "Cell Phone Activities 2013," Pew Research Internet Project, September 19, 2013. As of July 12, 2014: http://www.pewinternet.org/2013/09/19/cell-phone-activities-2013/

23 For example, see M. S. Stockwell, E. O. Kharbanda, R. A. Martinez, C. Y. Vargas, D. K. Vawdrey, and S. Camargo, "Effect of a Text Messaging Intervention on Influenza Vaccination in an Urban, Low-Income Pediatric and Adolescent Population: A Randomized Controlled Trial," *Journal of the American Medical Association*, Vol. 307, No. 16, 2012, pp. 1702–1708.; J. J. Carta, J. B. Lefever, K. Bigelow, J. Borkowski, and S. F. Warren, "Randomized Trial of a Cellular Phone–Enhanced Home Visitation Parenting Intervention," *Pediatrics*, Vol. 132, Supplement 2, 2013, pp. S167–S173.

24 A. Smith, "How Americans Use Text Messaging," Pew Research Internet Project, September 19, 2011. As of July 12, 2014: http://www.pewinternet.org/2011/09/19/how-americans-use-text-messaging/

25 D. Gross, "Skype to Break Language Barriers with Translator Tool," CNN.com, May 28, 2014. As of July 12, 2014: http://www.cnn.com/2014/05/28/tech/web/skype-translator/

26 Message from Me, undated. As of July 15, 2014: http://www.messagefromme.org. The inclusion of this technology in this policy brief does not imply endorsement. There has been no rigorous evaluation of the benefits of this technology.

27 K. J. Anderson and K. M. Minke, "Parent Involvement in Education: Toward an Understanding of Parents' Decision Making," *Journal of Educational Research*, Vol. 100, No. 5, 2007, pp. 311–323; Sheldon, 2002.

28 Sheldon, 2002.

29 For more information on ReadyRosie, see www.readyrosie.com. The inclusion of this technology in this policy brief does not imply endorsement.

30 Zickuhr and Smith, 2012.

31 Rideout, 2014.

The RAND Corporation gratefully acknowledges the PNC Foundation, the sponsor of this research. Among other initiatives, PNC supports early education through PNC Grow Up Great, a $350 million, multi-year, bilingual initiative that began in 2004 to help prepare children from birth to age five for success in school and life. The project was conducted within RAND Education, a division of the RAND Corporation. Its mission is to bring accurate data and careful, objective analysis to the national debate on education policy. For more information and resources on technology in early childhood education, please visit www.rand.org/t-is-for-technology.

The authors wish to thank Lori Takeuchi, Gail L. Zellman, and Cathy Stasz for their reviews of this manuscript.

Front cover photo: Oksana Kuzmina/Fotolia; back cover: CEFutcher/iStock

www.rand.org

RR-673/5-PNC (2014)