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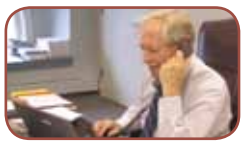
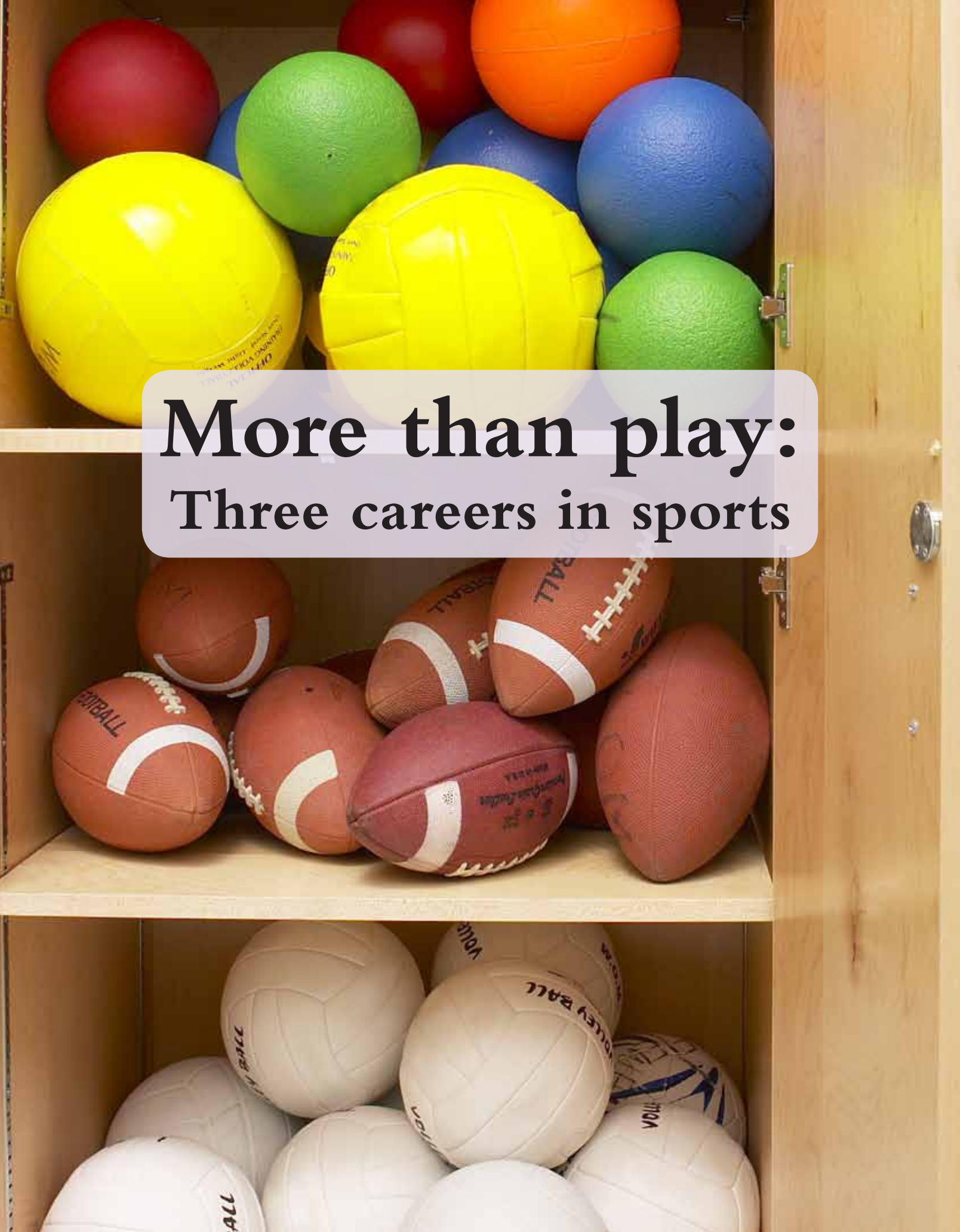




More than play:
Three careers in sports

Sports are more than fun and games; they also provide work for many people. Sports workers earn wages in leagues across the nation.

At the professional level, some of these workers earn lucrative salaries and contracts worth millions of dollars. But most sports workers make considerably less. Whether they make a lot or a little, these workers often do their jobs for the love of sport, not for the paycheck.

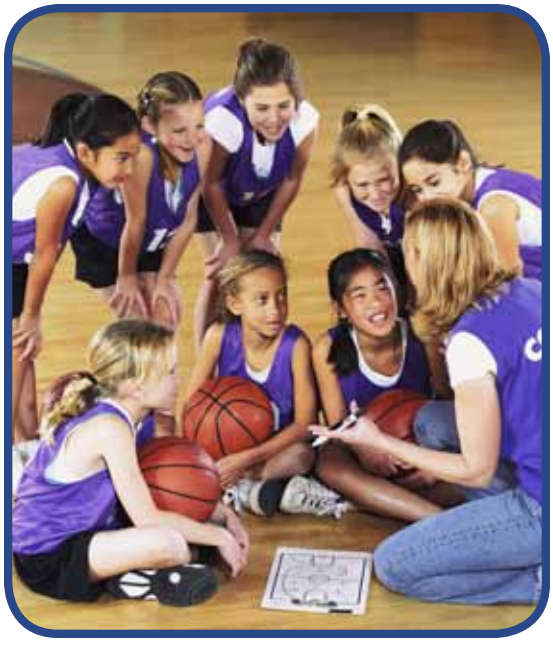
Organized sports include a variety of individual and team events, which require the efforts of many workers in different occupations. For example, managers and administrative staff run the business side of sports, such as marketing and human resources. Groundskeepers and janitors maintain the playing fields and facilities. And food vendors and cooks feed the many spectators.

Many people are particularly attracted to the sports occupations that are closest to the action. This article highlights three such occupations: coaches, athletic trainers, and sports officials. The first section provides an overview of each occupation, including what workers do, how much they earn, and what qualifications they need for an entry-level job. The second section explains how to prepare for these jobs—and what to expect if you get one. Sources for more information are listed at the end of the article.

Careers in sports

Sports workers often enter these careers because they have an interest in a particular sport. They may learn a sport at a young age and compete in recreational, amateur, or school leagues. Many continue participating into adulthood, either as amateurs or professionals. (See the box on page 7.) But some sports workers are enthusiasts who might not have actually played a sport.

Jobs for professional athletes are limited, and many people choose to put their sports knowledge to work in different ways. Some, such as coaches and athletic trainers, work closely with athletes; others, including sports officials, work with participants less directly.



Coaches

A coach helps athletes to develop the physical, technical, and strategic skills they need to play a sport. Coaches run practice and training sessions, develop strategies, analyze athletes' performances, and guide and encourage athletes. "Coaches put athletes in an environment to be successful both on and off the court," says Anne Kordes, head volleyball coach of a college team in Louisville, Kentucky.

Some athletes and teams employ multiple coaches, including head, assistant, and strength and conditioning coaches. Head coaches oversee assistant coaches, plan strategy and drills, and guide players throughout the event. Assistant coaches specialize in specific parts of the game, such as offense or passing in a football game. Strength and conditioning coaches work with athletes to keep them at peak physical condition. This work might include spending time at the gym lifting weights or doing cardiovascular and stretching exercises.

Coaches work together to make the most of a team's or player's potential. Kordes, for example, reviews game video and then meets with assistants to prepare for matches. "We

Dennis Vilorio

Dennis Vilorio is an economist in the Office of Occupational Statistics and Employment Projections, BLS. He is available at (202) 691-5711 or vilorio.dennis@bls.gov.

Coaches teach the strategies of a sport to prepare athletes for competition.

come up with a strategy to neutralize the opponents' strengths and maximize our own," she says. "My assistants then work with the players to implement the strategy."

Coaches use their knowledge of a sport to develop a training program, often adapting their strategies to fit different athletes' learning styles. For example, some athletes might learn better by doing, while others learn best by watching video. "I need to first figure out the best way to teach athletes the skills they need to get better," says Kordes, "so that I'm in a better position to help and motivate them."

Practices give coaches time to teach techniques and skills they want athletes to master. Teaching skills progressively, coaches start with basic drills that gradually become more difficult and lead to mastery of the skill. "We practice a lot of drills to improve technique and conditioning," says Eric Gehrke, head coach of a high school rowing program in Alexandria, Virginia.

Coaches follow established safety procedures to protect the athletes. For example, Gehrke administers a swim test for every prospective team member. He also packs life jackets and checks weather conditions before allowing athletes to go out on the water.

To help keep athletes healthy, coaches also coordinate with athletic trainers and strength and conditioning coaches. Together, the coaches and athletic trainers monitor the physical health of the athletes and modify training exercises and practice drills to accommodate those who have problems. "We want our athletes to play hard on both defense and offense," says Kordes. "But we need to be aware of their physical limitations to avoid injuring them."

Dealing with athletes, the athletes' parents, and fans can often be a source of frustration for coaches. For example, a parent might push coaches to give more playing time to his or her child or voice unhappiness with a team's performance. "You must be patient," says Gehrke, "because sometimes you have to deal with the parents almost as much as the kids."

But for coaches, working with the athletes is often the most rewarding part of the job. "It's not all about trophies and honors," Kordes says. "What makes me proud is mentoring and caring for my kids."

Employment and wages. The U.S. Bureau of Labor Statistics (BLS) collects data on coaches and scouts together. In May 2011, there were 193,810 wage and salary coaches and scouts, according to BLS. They earned a median annual wage of $28,470. The lowest earning 10 percent made $17,110 or less, and the highest earning 10 percent made $65,060 or more.

Most coaches work in schools, including elementary, secondary, and postsecondary. Coaches at the elementary, middle, and high

school levels usually work part time and may coach more than one sport. Some coaches work as teachers, which may require teaching certification. Coaches at the college and professional levels usually work full time as a coach in one sport.

Qualifications. As a group, coaches generally do not need formal education to enter the occupation. But they may need certification, depending on the sport and the state in which they seek employment.

Experience as an athlete may be enough for coaches seeking employment in elementary, middle, and high schools. It's still no guarantee of employment, however. "The better your athletic credentials, the easier it is to find a high school coaching job," says Gehrke. Coaches at the college and professional levels usually need at least a bachelor's degree as well as experience in the sport.

Experience as an athlete also gives coaches extensive knowledge of the sport in which they coach. This experience helps them develop strategies and drills with which to train and develop the athletes. Coaches also learn through observing how others coach. "The more you learn from what other coaches do," says Gehrke, "the better you'll be."

Coaches need interpersonal, decision-making, and leadership skills to teach their athletes and help them improve. And head coaches also need management and communication skills to lead their staff. "You manage a lot of people, from your assistants to your athletes," says Kordes. "If you want to be successful, you have to communicate clearly to get everyone pulling together in the same direction."

Athletic trainers

Athletic trainers keep athletes healthy before, during, and after competition. "We are always on the lookout for potential injuries," says Charlie Thompson, head of athletic training at a university in Princeton, New Jersey. "We want to deal with problems right away."

Athletic trainers are available during athletes' training, practices, and play. Their priority is to prevent injuries. To accomplish this, they examine athletes, collect medical histories, and check for preexisting conditions. If an athlete is predisposed to certain injuries, the athletic trainer can try to limit the problem by taking precautions. For a sprinter with tight hamstrings, for example, an athletic trainer might suggest special exercises and stretches to help loosen those muscles before running.

Athletic trainers know which injuries are common in specific sports, so they often work with coaches to modify training regimens based on an athlete's condition. "We can prevent injuries by removing or minimizing

Athletic trainers are available during sporting events and practices to evaluate and treat injuries.

Athletic trainers help athletes recover from injuries.

specific drills or exercises on days the athletes need a break," says Thompson. After a hard practice, for example, an athletic trainer would recommend that athletes avoid lower body exercises that might tire out and injure their legs.

But the precautions athletic trainers take can't always prevent an athlete's injury. When an injury occurs, athletic trainers evaluate its type and severity by considering how the injury happened and by asking the athlete how he or she felt at the time of injury and how painful it feels during evaluation. They test the athlete's range of motion and check muscles and tendons for swelling and tenderness.

Depending on the results of the evaluation, the athletic trainer chooses different ways to treat the injury. General treatment includes the uses of first aid, ice to minimize swelling, antiseptics to disinfect cuts, and braces to protect an injured limb.

Specific treatments depend on the athletic trainer's evaluation of an athlete's injury. For example, if the athlete can put weight on an injured leg and still walk, then icing and wrapping the injured area might be enough until the athlete sees a physician. If the athlete can put weight on the leg but can't walk, then the athletic trainer can provide crutches. But if the athlete can't put weight on the leg and feels a lot of pain, then the injury might be more serious—such as a fracture—and the athletic trainer would get the athlete to an urgent-care center or emergency room.

For more serious injuries, athletic trainers rely on an athlete's physician to test, diagnose, and treat injuries. Athletic trainers cannot prescribe medication, take x rays, or order laboratory tests, for example. At the physician's discretion, however, athletic trainers may continue to treat minor injuries.

Athletic trainers also help athletes recover from injuries. Rehabilitating major injuries usually requires the help of a physical therapist, but athletic trainers may continue treatment when the athlete's condition has improved. And athletic trainers may need help from physical therapists because of time constraints. "It's difficult to rehabilitate every injury, because we simply don't have the time," says Tricia Irvin, a high school athletic trainer employed by a medical center in Granger, Indiana.

Athletic trainers design a program to help each athlete to recover from injury and to regain strength, balance, speed, flexibility, or range of motion. Rehabilitation exercises typically become progressively difficult as the athlete recuperates, such as increasing the incline on a treadmill or the weight on barbells. Once injured athletes have recovered completely, athletic trainers allow them to compete again. "We want the athlete to return to playing the sport at full functional ability," says Thompson.

When not helping athletes, athletic trainers may manage medical inventory, check the integrity of safety equipment, and track injuries and treatments.

Athletic trainers get to know their athletes well and help them develop as both athletes and people. Athletes may turn to them for help with problems at school or at home. "We are almost like parents," says Thompson. "We listen to their problems and try to guide them in the right direction." Irvin agrees. "You need to be patient," she says.

Because of budget constraints, not every team employs its own athletic trainer. Sometimes, a single athletic trainer cares for two competing teams or athletes. That's not a problem, say athletic trainers, because their concern is to ensure the safety and health of all athletes. "We are not rivals, like the schools," says Irvin. "We are our own team."

Employment and wages. In May 2011, there were 18,240 wage and salary athletic trainers, according to BLS. They earned a median annual wage of $42,400. The lowest earning 10 percent made $26,170 or less, and

Athletes play for fun—and, sometimes, pay

Athletes are crucial to the sports that employ coaches, athletic trainers, sports officials, and related workers. After all, without athletes, there would be no athletic competitions.

However, few competitors make a living as professional athletes. While many athletes are unpaid, their dedication to their sport is often similar to that of professionals. These amateur athletes compete in recreational sports or school leagues for personal enjoyment—and the chance to eventually compete professionally. "Even when I'm not making a penny, I just love competing," says David Tran, an amateur boxer from Germantown, Maryland.

Athletes spend a lot of time training for competition. "I wake up most mornings at 5:30 a.m., work out for an hour, and then practice for 3 hours," says Stevi Robinson, a professional volleyball player from Hermosa Beach, California. It usually takes many years of preparation to gain the ability and skills required to compete at the highest levels.

Athletes must prepare for the physical demands of their sport, and they practice in order to improve their own abilities. They also focus on functional movements, such as sprinting or jumping, to hone the technical and strategic demands of their sport during competition. For example, Tran spends hours practicing footwork, punching, and defensive techniques so they become second nature. "Boxing matches are a blur," says Tran. "You have to rely on your instincts and preparation."

For athletes, both professional and amateur, it's the thrill of competition that makes their preparation worthwhile. "We practice and live for the game," Robinson says. "The game is everything."

the highest earning 10 percent made $65,970 or more.

Most athletic trainers work full time at postsecondary schools and medical facilities, such as hospitals and medical offices. A few athletic trainers work part time and are paid hourly. Some may work under contract.

Qualifications. To enter the occupation, athletic trainers usually need at least a bachelor's degree from an accredited athletic training program. These programs teach students what they need to know to become an athletic trainer, from injury evaluation to rehabilitation. For a position at the college or professional level, athletic trainers usually need work experience and a master's degree.

Most states require that athletic trainers pass a national certification exam and register for a state license.

Additional requirements include continuing education and yearly cardiopulmonary resuscitation (CPR) certification. Every 3 years, athletic trainers must complete 70 hours of continuing education to keep up with advances in the field. Classes, seminars, and lectures help fulfill this requirement.

Athletic trainers need to be detail oriented to keep track of athletes' injuries. They also need good communication and interpersonal skills so they can explain injuries and treatments to athletes and their families.

Sports officials

Umpires, referees, and other sports officials oversee an event's rules, athletes, and coaches to ensure safe, fair, and neutral play. To keep competitions fair, sports officials enforce the rules, inspect equipment, start and stop play, track the contest's time, and settle disputes. They may also penalize reckless play or eject unruly players or coaches to keep competition under control. "Our responsibility is to enforce impartially and err on the side of safety," says Barry Mano, a former sports official and now president of the National Association of Sports Officials in Union Grove, Wisconsin.

While working, sports officials place themselves in the best position to watch athletes. If they spot a violation of the rules or need to make a decision that affects play, sports officials rely on their experience and judgment to make the right call. Some sports officials also have the option to review video.

Sports officials use tools to signal to athletes, coaches, and spectators. These include waving colored flags to indicate an infraction, blowing a whistle to stop and start play, or firing blanks from a gun to start a race. Sports officials also frequently use hand signals. For example, a basketball official may raise three fingers while the ball is airborne to signal to scorers that a successful basket will be worth three points.

Experience helps sports officials make the correct call.

Depending on the sport, there may be one or more officials during play. Individual sports, such as boxing, may need only a single official. Team sports often have multiple officials, each of whom has different duties. For example, in soccer, a main official blows the whistle to start play and stop for infractions, two officials on the sidelines determine offside violations, and another official in the press box keeps track of time.

Most sports officials need to wear a uniform. They may also need to wear sport-specific equipment, such as shin guards, watches, skates, or helmets. Sometimes, the equipment and uniform is different for officials in the same sport but in different roles. For example, in baseball and softball, the home plate umpire wears a uniform, face mask, chest pad, and shin guards—but the first base umpire wears only the uniform.

Sports officials attend seminars before, during, and after a sport's playing season to refresh themselves on the rules, learn changes to the rules, and network with other officials and league staff. Mano says that these seminars allow sports officials to become better at their work and help them move up the career ladder.

Meetings before and after each game help officials review their calls, evaluate their performances, and learn from mistakes. "It takes practice and hard work to become a better official," says Rob Livengood, a basketball official in Mount Airy, North Carolina.

The priority for sports officials is to make the right call, let the game flow, and intervene only when necessary. "I want to be invisible," says Livengood. "The focus should be on the game, the players, and the fans."

But officials sometimes make mistakes. When they do—or when they make a correct but controversial call—fans, athletes, and coaches may become critical. Experience, confidence, and humility help sports officials cope with the pressure. "If you listen to the fans, you'll think you're the worst official on the planet and need glasses," says Livengood. "Unless you grow a thick skin, you'll go home and cry."

Sports officials signal infractions by using tools, such as flags.

For sports officials, being questioned about the calls they make is part of the job. And when fans air their displeasure at the right call, officials must be confident that their judgment was fair. "You have to love the officiating process more than the sport," says Mano. "You have to love it when they boo you."

Employment and wages. In May 2011, there were 15,630 wage and salary umpires, referees, and other sports officials sports officials, according to BLS. They earned a median annual wage of $23,190. The lowest earning 10 percent made $16,910 or less, and the highest earning 10 percent made $50,190 or more.

Most sports officials work for leagues in spectator sports, schools, and recreational associations. Anecdotal evidence suggests that most sports officials work part time under contract. Because many sports have playing seasons, some officials may work in multiple sports.

Qualifications. No formal education is required to become a sports official. However,

prospective sports officials must pass an officiating test to become licensed with their particular association. An association committee evaluates sports officials in scrimmages and assigns them to games based on those performances.

Officials may need to be physically fit, depending on the sport. For example, a lacrosse official runs up and down the field numerous times per game, but a tennis official stays in one place for the duration of the match. Communication skills are also important, says Livengood: "You need to work as a team with the other officials and communicate clearly in a potentially hostile environment."

Advancing to more competitive leagues requires experience. For example, an official must work many years at the high school level before being considered for jobs at the college level, where there are fewer games and tougher competition for available positions.

Through experience, officials develop what Mano calls "game intelligence," the ability to manage the competition and its players. Experience also helps officials gain the judgment they need to make the right call—and the confidence to defend it.

Kick off a career in sports

Sports careers teach skills, such as discipline and accountability, that extend beyond the playing field. Many sports workers learn to work in teams and communicate well with others. Sports careers also promote physical and mental fitness. "It keeps me in shape," says Livengood, "and helps me think strategically, too."

The best way to get started in a sports career is by gaining experience at lower levels of a sport and working your way up. For example, sports workers in recreational leagues can develop their skills under less stress and with more job opportunities. They can also learn from experienced workers by volunteering as assistants.

Sports-related jobs are usually available at local schools and with amateur leagues and recreational and athletic associations. Positions for volunteers and for part-time work are often advertised in newspapers and on school, organization, and association websites. Although these positions often pay little or nothing, they offer the opportunity to learn the basics of sports work.

Many sports workers gain experience as athletes or enthusiasts.

Workers can also gain experience by networking through the many leagues available at the amateur and high school levels. The sports community is small, so knowing the right people—such as those who run the leagues—eases the jobseeking process. Family and friends who participate in a sport are also valuable resources. "Good networking produces good results," says Gehrke.

Of course, the demands of a sports career mean it's not always fun in games. Many sports practices and competitions are held outdoors, including in extreme temperatures and bad weather. Sports workers might need to be outside for hours in those conditions.

Sports workers might also have irregular schedules, sometimes working 7 days a week—including evenings, weekends, and holidays—to accommodate sporting events. And although some sports are played seasonally, preparation continues year round.

Travel may be frequent, especially at more competitive levels. That can strain personal relationships. "I spend a lot of time away," says Mano. "It can be tough on family life."

Despite the difficulties, those working in sports often say that the good outweighs the bad. "It's not easy work," says Thompson, "but if you have the passion to keep you going, it might be right for you."

For more information

The *Occupational Outlook Handbook* (*OOH*) has detailed information about many sports-related occupations, including the ones described in this article. These profiles have information about each occupation's job duties, employment, wages, usual qualifications, and more. The *OOH* is available online at **www.bls.gov/ooh**.

There are many athletic and coaching associations, each specializing in a particular region, sport, or demographic. The national associations for each sport are often the best sources of information for athletes and coaches, providing career resources, rules of the sport, and local contacts. For example, jobseekers interested in volleyball coaching should visit the American Volleyball Coaching Association at **www.avca.org.**

For information about becoming a volunteer coach in youth sports, an option for coaches to gain experience and move into paying positions, contact:

National Alliance for Youth Sports
2050 Vista Parkway
West Palm Beach, FL 33411
Toll free: 1 (800) 688-5437
nays@nays.org
www.nays.org/coaches

For more information about becoming an athletic trainer, including career and educational resources, contact:

National Athletic Trainers' Association
2952 Stemmons Freeway #200
Dallas, TX 75247
(214) 637-6282
www.nata.org

And for more information about becoming a sports official, including guides for many popular sports and a list of athletic associations by state, contact:

National Association of Sports Officials
2017 Lathrop Ave.
Racine, WI 53405
(262) 632-5448
www.naso.org

My career

Manager

Michael W. Horrigan

Associate Commissioner for the Office of Prices and Living Conditions, Bureau of Labor Statistics (BLS), Washington, D.C.

BLS fast facts: Managers, all other

- May 2011 wage and salary employment: 343,560
- 2010-20 projection: 8 percent growth (slower than average)
- May 2011 median annual wage: $99,540
- Typical education and training: High school diploma or equivalent and 1 to 5 years of work experience in a related occupation
- May 2011 top employing industries: Federal executive branch; management of companies and enterprises; local government; state government; colleges, universities, and professional schools

For Mike Horrigan, teaching has always been at the heart of what he likes doing best. And this passion has helped to shape his career.

Mike's first job after earning his Ph.D. was teaching economics at Williams College. While on sabbatical from that job, he spent a year at the U.S. Department of Labor and led several research seminars at BLS. Mike then applied for—and accepted—a position as a BLS research economist, marking the start of a 26-year career.

About every 3 years, Mike has changed jobs at BLS. Each job that he's held has taught him something new—and these lessons have helped him move up to the top levels of management. As a manager, Mike applies his love of teaching in diverse ways. He directs employees in BLS programs, for example, and gives presentations to the public about BLS data.

Mike recently received a Presidential Rank Award, one of the most prestigious honors given to managers in the federal government.

What do you do?

I manage four survey programs: the Consumer Price Index, the Producer Price Index, the International Price Index, and the Consumer Expenditures Survey.

I don't directly run any of those programs. My role is to think corporately in terms of planning, budgeting, and the efficient use of resources. And I'm often involved in providing direction for any major projects, like the redesign of the Consumer Expenditures Survey.

Another significant aspect of the job is to be the face of BLS for the price programs. I am invited to give talks and represent our programs in various public forums. I also help to plan the direction for the entire BLS on issues like human resources or IT infrastructure.

Which early experiences helped to shape your career?

When I was in 8th grade, I got a job that was almost ideal. I was a camp counselor helper in the morning, and in the afternoon I got to

teach my own swimming classes. I absolutely fell in love with teaching. I worked at the camp every summer throughout high school. So by the time I got out of high school, I knew I wanted to teach in one way or another.

Describe your educational background.

I was a math major, but I took as many economics classes as possible. The thing I liked about economics was that it blended theory with real-world applications. And it turns out that math included a really useful set of skills to have for economics.

In graduate school, I was a teaching assistant, and they paid you to teach—which to me was the most wonderful thing in the world. That's how I paid for school. My doctoral thesis was on the duration of unemployment, and I used BLS data. So because of that, I went down the route of becoming a labor economist.

To what do you attribute your success at BLS?

I've been really lucky, but I've also taken advantage of opportunities as they've come up.

For example, when I was asked to help with a Department of Labor task force in 1988, I jumped at it. Similarly, in 1990, I was asked to work as a labor economist at the Council of Economic Advisers. When I came back to BLS in 1991, I was given my first opportunity to manage a program: the BLS survey of employer-provided training. It was a great experience. There were four of us working with other staff we recruited from around BLS. We did everything from designing the survey to selecting the sample, running estimates, and disseminating the results.

At my next job, running the National Longitudinal Survey, it was my first foray into how to handle significant budget issues. That was when I went from being a technical supervisor to thinking like a broad-based manager.

Any surprises along the way?

When I first started, I didn't know I would enjoy managing as much as I do now—managing people and providing direction and vision for the programs.

And it's funny, because I still teach. Right now I'm teaching a course at the Georgetown University Public Policy Institute. Teaching will always be a part of what I do.

What's your best advice?

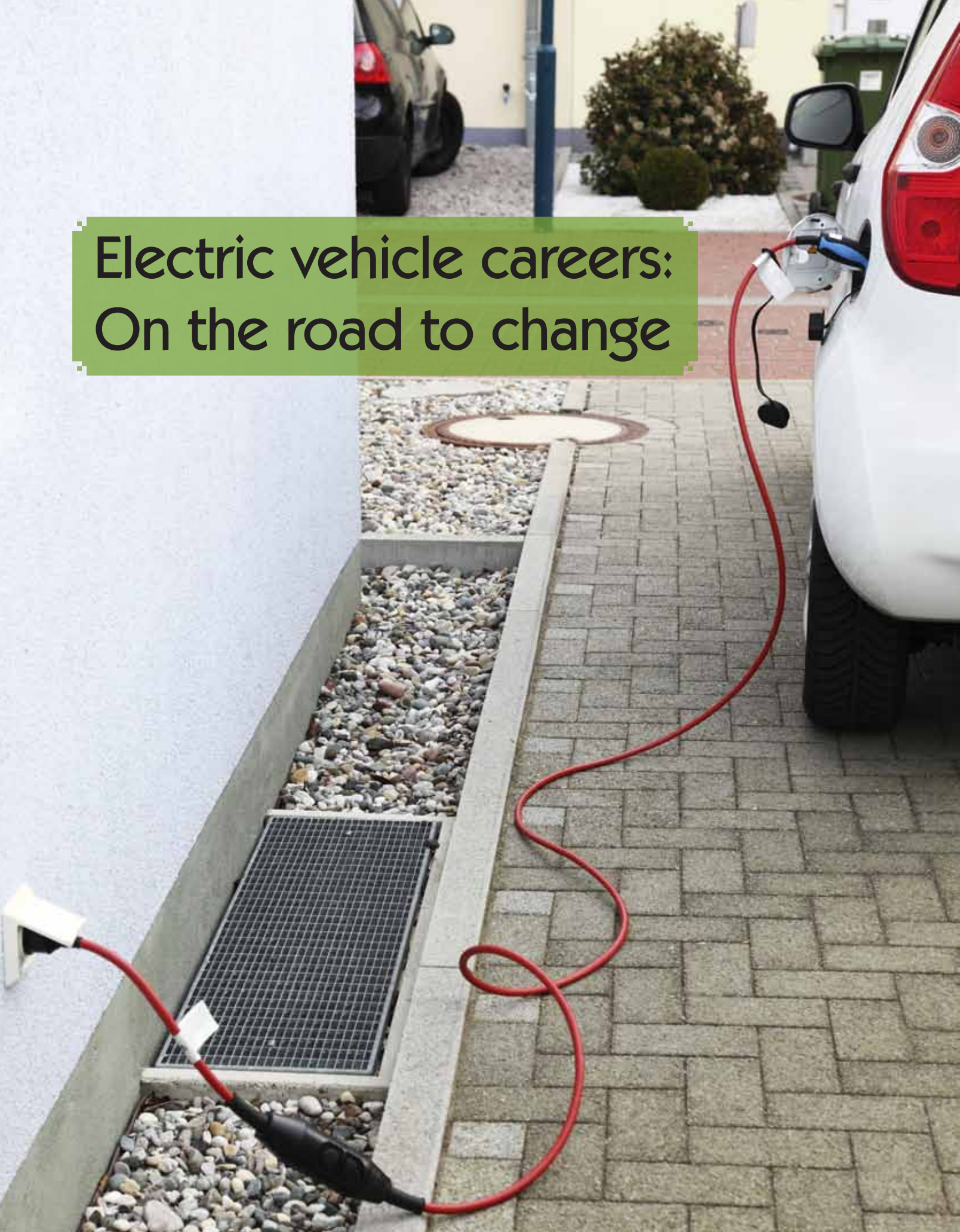
Take advantage of opportunities when they are presented. To have a career path like mine, where you have various jobs, it's not something you can plan for.

For managers, I would advise: Don't micromanage. Trust your people. If people feel like you trust their work, they respond to that. And they do a better job at it as a result.

And if you have this, you are truly lucky: I have a lot of fun in my work. I love working with the people I work with, and I laugh a lot. This is a fun job. It's also a serious job and there are serious issues, but you have to know how to balance it.

Michael Horrigan was interviewed by Elka Torpey, an economist in the Office of Occupational Statistics and Employment Projections, BLS. She can be reached at torpey.elka@bls.gov.

Electric vehicle careers: On the road to change



The electric vehicle industry could be revving up. And if industry growth accelerates, so will job creation in related occupations.

Many occupations related to electric vehicles are similar to those that help to make and maintain all types of automobiles. But the industry is also adding some nontraditional jobs, and workers' skill sets must evolve to keep up.

This article describes careers related to electric vehicles. The first section is about the electric vehicle industry and its growth. The second section describes selected occupations related to electric vehicles, including those in scientific research, engineering, manufacturing, maintenance, and infrastructure development. A third section discusses training for workers interested in electric vehicle jobs. The final section gives sources for more information.

The electric vehicle industry

Electric vehicles have been around, in one form or another, since the invention of the automobile. In fact, electric vehicles even outsold gasoline-powered vehicles in the early 1900s. With improvements to gasoline engines and the availability of cheap fuel, electric vehicles fell out of favor throughout much of the 20th century. But these vehicles are now making a comeback.

According to the U.S. Department of Energy's National Renewable Energy Laboratory, U.S. sales of electric cars increased from near zero in 1999 to about 250,000 in 2010. Sales of these vehicles are expected to continue rising as electric vehicle technology improves and consumer acceptance grows. An August 2009 study by the Center for Entrepreneurship and Technology at the University of California, Berkeley, projected that by 2030, electric cars will make up 64 percent of sales of all light vehicles (passenger cars, vans, pickup trucks, and sport utility vehicles).

Some consumers purchase electric vehicles for their environmental benefits. Electric vehicles produce lower emissions than conventional vehicles—and some even produce zero tailpipe emissions—so they are better for the environment. And because they run on electricity in addition to, or instead of, gasoline, electric vehicles can help to reduce petroleum dependence. Rising gasoline prices have also led to renewed interest in electric vehicles, which are more fuel efficient. All of these factors may help contribute to the expected increase of electric vehicle sales.

However, keeping electric vehicles on the road depends on widespread infrastructure changes. Some types of electric vehicles rely on charging stations for power, and most charging stations are installed in the homes of electric vehicle owners. Public charging stations allow people to recharge their vehicles when they are away from home, but few of these exist. According to the National Renewable Energy Laboratory, 11 states had no public charging stations as of June 2011, and 16 states had 10 or fewer.

How electric vehicles work—and why they're creating jobs

Electric vehicles are similar to gasoline-powered vehicles in many ways. But unlike conventional vehicles, which rely solely on a gasoline-powered internal-combustion engine, electric vehicles receive some or all of their power from a lithium-ion battery and electric motor.

There are several types of electric vehicles: hybrids, plug-in hybrids, and all-electric vehicles. Hybrids and plug-in hybrids use both gasoline and battery power. All-electric vehicles use only a battery to run and must be recharged at special charging stations. Plug-in hybrids, like all-electric vehicles, receive power from a charging station but have a longer range because they can run on a conventional engine when the battery runs out.

Electric-vehicle manufacturing is expected to create many new jobs, especially for workers who make lithium-ion batteries and for those who build, operate, and maintain electric vehicle charging stations, according to the Center for Entrepreneurship and Technology's 2009 study. The study projected

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that by 2030, the electric vehicle industry will drive a net employment gain of 130,000 to 350,000 U.S. jobs. New jobs may be created in occupations throughout the electric vehicle industry.

The U.S. Bureau of Labor Statistics (BLS) does not have data specifically on employment in the electric vehicle industry. However, BLS recently released data from its Green Goods and Services survey, which measures the number of green jobs in several industries related to electric vehicles. (A green job is one in which workers produce goods or provide services that benefit the environment or conserve natural resources.) According to this survey, there were 5,920 green jobs in battery manufacturing, 9,700 green jobs in motor vehicle manufacturing, 18,850 green jobs in motor vehicle parts manufacturing, and 8,450 green jobs in automotive repair and maintenance.

Many of the jobs in those four industries are involved in producing or servicing hybrid and electric vehicles. But because of the nature of the data, it is not possible to determine exactly how many of the jobs relate only to these vehicles.

Driving change: Electric vehicle jobs

The electric vehicle industry employs a variety of workers, from the scientists and engineers who research and develop ideas to the sales workers who explain the advantages of electric cars and trucks to potential consumers.

Occupations in scientific research

Many scientists working on electric vehicles focus on improving battery technology. For example, longer lasting batteries for plug-in and all-electric vehicles would allow them to go longer distances without needing to be recharged. To make electric vehicles a viable alternative to conventional ones, scientists strive to make batteries that recharge faster and last longer between charges. And while nonelectric vehicles can be filled with gas in a matter of minutes, most current batteries require several hours to fully charge.

Scientists also work on batteries to improve hybrid vehicles' fuel economy. The longer a vehicle can be driven on battery power alone, the less fuel it will consume. Improved batteries will allow vehicles to rely more on electric propulsion and less on fossil fuels.

Scientists usually work in offices and laboratories. Some laboratories are small, but others are large enough to incorporate prototype chemical manufacturing facilities and advanced testing equipment. Scientists might also work for industrial manufacturers alongside engineers and processing specialists.

Chemists and materials scientists are two types of scientists who help design electric vehicles.

Chemists. All chemists investigate the properties, composition, and structure of matter and the laws that govern the reactions of substances to each other. Using this knowledge, chemists working on electric vehicles find new chemicals to use in batteries or seek ways to improve existing batteries. They work closely with engineers and other scientists to develop new batteries and other technologies.

Materials scientists. These workers study the structures and chemical properties of materials to develop new products or enhance existing ones. When working on electric vehicles, materials scientists usually do battery research.

Materials scientists also develop other parts of electric vehicles. Structural and mechanical parts made out of lighter or stronger materials help to make electric vehicles more fuel efficient and reliable.

Occupations in engineering

Engineers help to design and develop electric automobile technology. They work in teams with other engineers, scientists, and industrial production managers to create new processes or devices for manufacturing electric vehicles—or to improve existing ones.

Engineers apply the principles of science and mathematics to develop economical solutions to technical problems. Many engineers produce designs for new products. They start by determining the product's requirements. Then, they integrate and test the parts that will go into making those products. Finally, they evaluate the design's effectiveness, cost, reliability, and safety.

Engineers use computers to produce and analyze designs, simulate and test systems, and implement quality control processes.

Most engineers work in offices, laboratories, or industrial plants. Engineers are often employed by electric vehicle and parts manufacturers.

Several types of engineers—including chemical, electrical, industrial, and mechanical engineers—are involved in creating electric vehicles.

Chemical engineers. These workers apply the principles of chemistry to design or improve equipment and to devise processes for manufacturing chemicals and products. Batteries of electric vehicles store power through chemical processes, so chemical engineers working in this industry develop new battery designs and improve current battery technologies. They also plan and test ways to make new batteries and design equipment and processes for manufacturing them.

Electrical engineers. Electrical engineers design, develop, test, and supervise the manufacturing of electrical parts. For an electric car, they might design the electrical circuitry that allows a gas engine to charge a vehicle's battery and distribute the electricity from the battery to the electric motor. Electrical engineers also might work on the heating and air-conditioning systems, vehicle lighting, and visual displays.

Industrial engineers. Industrial engineers determine how to use people, machines, materials, information, and energy to manufacture vehicles efficiently. These engineers work to increase productivity by improving management techniques, technology, and production methods. Because electric vehicles are so different from conventional vehicles, industrial engineers design innovative manufacturing processes and retool plants that formerly made different models of cars.

Mechanical engineers. Mechanical engineers design, develop, and test mechanical devices for electric vehicles. These devices may be parts of electric vehicles—such as an engine or drivetrain—or they may be the machines that are used to make or repair these vehicles. Some mechanical engineers focus on a particular type of device, such as electric motors, transmissions, or steering systems.

Occupations in manufacturing

Manufacturing electric vehicles is complex and requires a large, skilled workforce. Electric vehicle systems are more complex than a conventional internal combustion engine, so they have special manufacturing processes.

Many of the workers who make electric vehicles previously made conventional vehicles. Automotive manufacturing occupations are usually clustered around traditional industrial centers in the Great Lakes region and other areas of the Midwest. The largest concentrations of these jobs are in Michigan and Ohio, but automobile manufacturers are in other states as well.

A few large auto companies make finished vehicles. But many of the vehicles' parts are made by smaller companies that specialize in individual components. These smaller pieces are then sold to the larger auto manufacturers.

Many of the occupations in manufacturing electric vehicles are also involved in manufacturing vehicle charging stations, which are necessary for most types of plug-in hybrid vehicles and all types of all-electric vehicles.

Manufacturing workers are usually employed by large automotive assembly plants. These plants are usually noisy because they are full of robotic devices, machines, and hydraulic lifts.

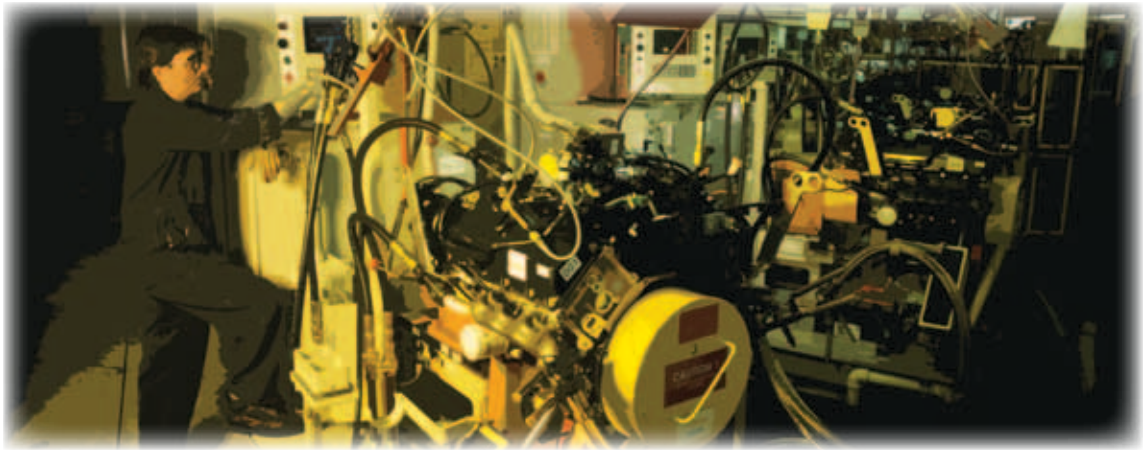
Safety conditions in assembly plants have improved considerably over the past several decades. However, manufacturing workers might use machinery or chemicals that require special handling.

Manufacturing jobs in the electric vehicle industry include electrical and electronic equipment assemblers, electromechanical equipment assemblers, computer-controlled machine tool operators, and machinists.

Electrical and electronic equipment assemblers. These assemblers build many of the parts in electric vehicles, including electric motors, computers, electronic control devices, and sensing equipment. Some of the parts used to make these products are too small or fragile to be assembled by people, so they are assembled by automated systems. Electrical and electronic equipment assemblers fit together the parts of larger components or control the automated systems that assemble the smaller, more delicate ones.

Electromechanical equipment assemblers. Electromechanical equipment assemblers use a variety of tools to build the electromechanical parts, such as gasoline engines, electric motors, and generators, that are used in electric vehicles. Their work is similar to that of electrical and electronic equipment assemblers. However, electromechanical equipment assemblers focus more on mechanical parts than on electronics.

Computer-controlled machine tool operators. These workers use special computer-controlled machines to make metal and plastic parts for electric vehicles. First, they set up a machine by downloading a program onto the machine's computer. Next, they place the appropriate tools into the machine. Then, after positioning the piece that is being



worked on, computer-controlled machine tool operators start the machine and oversee production of the component.

These workers may also be responsible for some maintenance or troubleshooting of the machines.

Machinists. Machinists use a variety of machine tools, such as lathes, milling machines, and grinders, to produce precision metal parts for electric vehicles. The process of producing large quantities of a single part may be partially or fully automated. Machinists monitor both the machines that make these parts and the quality of items they produce.

Machinists also produce small batches of parts or make one-of-a-kind parts for prototypes or testing. If many more pieces are needed, they are often mass-produced using computer-controlled machines.

Occupations in maintenance

As with any vehicle, electric vehicles need occasional maintenance. Much of the routine maintenance and repair work that electric vehicles need can be done by the same workers who repair conventional vehicles. But other tasks require workers who are familiar with the parts and technologies that electric vehicles use.

Electric vehicle repair workers are employed throughout the United States. Many work in the service centers of the dealerships where electric vehicles are sold. Others work in independent repair shops. These shops can be noisy or dirty. And repair workers might need to lift heavy tools or vehicle parts.

Automotive service technicians and mechanics maintain and repair many types of cars and light trucks (vans, pickup trucks, and sport utility vehicles)—including electric ones.

Automotive service technicians and mechanics. These workers inspect, maintain, and repair cars and light trucks that run on gasoline, electricity, or a combination of the two. They plan and perform basic car maintenance and vehicle repairs.

The job of automotive service technicians and mechanics has evolved from simple mechanical repairs to high-level technology-related work. Integrated electronic systems and computers regulate vehicles and their performance on the road. To fix problems with these systems, workers use both computerized shop equipment to work with electronic parts and traditional hand tools.

Working on all-electric or hybrid-electric vehicles requires skills in addition to those needed to work on conventional vehicles. Automotive service technicians and mechanics must be able to work on high-voltage electrical systems. And they need to be familiar with other parts and systems specific to these vehicles, such as lithium-ion batteries and electric generators.

Some automotive service technicians and mechanics might also convert gasoline vehicles to electric vehicles or install systems to help improve a vehicle's fuel efficiency.

Occupations in infrastructure development

As plug-in hybrids and all-electric vehicles increase in number, there is a growing need to

develop a nationwide infrastructure to support them. According to the Center for Entrepreneurship and Technology's study, mentioned previously, the largest source of job creation related to alternative-fuel vehicles is expected to come from building this infrastructure.

Plug-in hybrids and all-electric vehicles require special charging stations. Building new charging stations requires making changes to existing infrastructure, including increasing power grid capacity to supply the electricity these stations need.

Urban and regional planners, electrical power-line installers and repairers, and electricians are among the workers who will make these infrastructure changes.

Urban and regional planners. These workers help to plan and carry out infrastructure upgrades to support electric vehicles. Several cities and local governments are improving municipal electric systems and making public charging stations available to electric vehicle owners. Urban and regional planners determine how many charging stations are necessary to support a given number of vehicles, as well as where to locate them to reach the greatest number of people.

Electrical power-line installers and repairers. Electrical power-line installers and repairers install and maintain the power grid—the network of power lines that move electricity from generating plants to customers. Owners of electric vehicles need more electricity than ordinary consumers. Electrical power-line installers set up new lines that are capable of handling this increased load.

In addition, many local governments are building public charging stations that must be fed by new power lines. Installers place the new lines and connect them to the grid.

Electricians. Electricians install charging stations and any other electric equipment needed to support electric vehicles. They attach the charging stations to lines that have been put in place by electrical power-line installers and ensure that the chargers are working properly. When there is a problem with the charger, electricians make repairs.

Charging your career

The broad mix of workers in the electric vehicle industry represents a variety of educational and employment backgrounds. Despite their range of preparation, however, workers have at least one thing in common: most receive specialized training to work on electric vehicles.

This section describes sources of industry-specific training for electric vehicle workers. In addition to the sources discussed, workers also must meet the minimum requirements for their occupations. For example, most engineers need a bachelor's or higher degree in engineering; electricians usually must have a high school diploma, complete an apprenticeship, and, in many states, be licensed.

Specialized training in electric vehicles varies; it may consist of a single course or seminar—or significantly more. In some cases, training is paid for by employers. Because electric vehicle technologies are evolving, workers in this industry may need to regularly update their skills.

Sources of training include manufacturers, high schools and community colleges,

colleges and universities, and on-the-job training.

Manufacturers. Electric vehicle and charging station manufacturers provide training on their technologies to workers in a variety of occupations. For example, automotive service technicians are certified by manufacturers to work on specific models of cars or trucks. This training ranges from a few days to several weeks.

Electricians go through several days of training to be certified by charging station manufacturers. And engineers usually must be certified in specific systems and technologies, depending on the systems a manufacturer uses.

High schools and community colleges. Programs for automotive service technicians and repairers, such as those developed by the National Alternative Fuels Training Consortium, train workers on a wide variety of skills needed to work on electric or alternative fuel vehicles. The consortium provides curricula and training to secondary and postsecondary students studying automotive technology, as well as to automotive technicians who are already working in the field.

Vehicle manufacturers may also offer training in collaboration with vocational schools and community colleges. Many manufacturers and community colleges have developed these programs together.

Colleges and universities. Specialized programs for engineering students who wish to work on electric or alternative fuel vehicles are available through the U.S. Department of Energy's Graduate Automotive Technology Education initiative. This initiative has educational programs at eight universities nationwide. Programs focus on hybrid propulsion, energy storage, and lightweight materials.

On-the-job training. Some workers learn skills for working with electric vehicles on the job, either by watching more experienced workers or through employer-sponsored training. Manufacturing workers, for example, may receive short-term on-the-job training on how to assemble or produce parts related to these vehicles.

Plugging in to more information

Read the full BLS report on electric vehicle careers, as well as other articles on green careers, at **www.bls.gov/greencareers.htm**.

Learn about the most recent developments in electric vehicle technology at **www1.eere.energy.gov/vehiclesandfuels**. Another government site, **www.fueleconomy.gov**, provides information on electric and alternative-fuel vehicles.

To find out more about the occupations in this article, see the *Occupational Outlook Handbook*. The *OOH* provides information on wages, job duties, and training for these and hundreds of other occupations. It is available at **www.bls.gov/ooh**.

The Occupational Information Network (O*NET) also has information about green occupations, including those related to electric vehicles. Lists of these occupations are available at **www.onetcenter.org/green.html?p=2**.

For more information about manufacturer-provided training programs, contact the individual manufacturers of electric vehicles or see their websites.

To learn more about engineering programs in electric vehicle technologies, contact any of the U.S. Department of Energy's Graduate Automotive Technology Education centers. A list of these colleges and universities is available at **www1.eere.energy.gov/vehiclesandfuels/deployment/education/fcvt_gate.html**.

To learn more about training programs for automotive service technicians and repairers, contact

National Alternative Fuels Training Consortium
West Virginia University
1100 Frederick Ln.
Morgantown, WV 26508
(304) 293-7882
naftc@mail.wvu.edu
www.naftc.wvu.edu

Internships: Career previews

Internships are a great way for students to develop new skills and networking opportunities. And a recent study published by the National Association of Colleges and Employers (NACE) suggests that many employers later hire their interns full time—making internships an excellent way to start a new career.

According to the NACE survey, about 59 percent of interns later become full-time employees of the company they intern with. And the number of interns hired this year should increase: employers expect to raise the number of internships they offer by about 9 percent over last year.

Students are most likely to find internships by looking at campus event calendars. NACE reports that employers ranked online networking as one of their lowest ranked recruiting methods. Instead, many employers relied on career fairs, on-campus recruiting events, and information sessions.

For more information on the 2012 Internship and Co-op Survey, go to **www.naceweb.org**; call toll free, 1 (800) 544-5272; or write to NACE at 62 Highland Ave., Bethlehem, PA 18017.

Building careers for veterans

It can be difficult for military veterans to transition from military service to civilian jobs. To ease this process, Helmets to Hardhats (H2H) assists veterans searching for career and training opportunities in the construction industry.

H2H connects veterans with employers or apprenticeship programs. The H2H website features a variety of building and construction careers, such as HVAC technicians, carpenters, and sheet metal workers. Employers also often post administrative, engineering, and management positions on the H2H website.

Veterans who create an H2H online profile can browse hundreds of career and training opportunities and forward their profile to employers. H2H regional directors—who have a strong background in military service, the building or construction trades, or both—assist veterans through the process. Regional directors offer practical information about career opportunities and help veterans determine which crafts best fit their skill sets.

For more information about the H2H program, go to **www.helmetstohardhats.org** or call toll free, 1 (866) 741-6210.

Repay federal student loans with public service

Interested in working for a nonprofit or government agency but worried about repaying federal student loans? If so, the Public Service Loan Forgiveness program can make it affordable for you to pursue the career you want.

Under this program, full-time nonprofit or government employees may qualify for forgiveness of the remaining balance on their student loans after making payments for 120 months. To qualify, borrowers can work in any level of government—federal, state, or local—and in a variety of fields, such as emergency management, school library services, and public interest law.

Public service loan forgiveness is more useful for some borrowers than for others. The standard repayment plan for most federal student loans is 10 years, so many borrowers end up paying off most or all of their loans before they are eligible to have their loans forgiven.

Borrowers who will take more than 10 years to pay off their loans, such as those with Income-Based Repayment and Income-Contingent Repayment plans, may benefit the most from this program. These borrowers' repayment schedules are tied to their levels of income, allowing them to make lower monthly payments over a longer period of time.

Find more information on the Public Service Loan Forgiveness program at **www.studentaid.ed.gov/PORTALSWebApp/students/english/PSF.jsp**. Or call the Federal Student Aid Information Center toll free at 1 (800) 433-3243.

Want a job? Stay in school

More education leads to higher employment for young adults, according to data from the U.S. Bureau of Labor Statistics. Among 24-year-olds surveyed for the National Longitudinal Survey of Youth 1997 (NLSY97), those with more education were more likely to have jobs.

Data from the survey show that, among 24-year-olds no longer enrolled, 92 percent of college graduates were employed. By comparison, 76 percent of high school graduates who had never enrolled in college—and 60 percent of high school dropouts—were employed at that age.

Young women and men who graduated from college and were no longer enrolled were equally likely to be employed. However, employment of high school dropouts varied by gender: 69 percent of young men were employed at age 24, compared with 49 percent of young women.

These data are from the most recent survey for the NLSY97. Participants in this survey represent a national sample of young adults who have been interviewed every year since 1997.

For more information about the NLSY97 program, see **www.bls.gov/nls/nlsy97.htm**, call (202) 691-7410, or email *nls_info@bls.gov*. Write to the NLS program at 2 Massachusetts Ave. NE, Suite 4945, Washington, DC 20212.

High wages after high school—without a bachelor's degree

What's the best way to enter a high-paying career without having a bachelor's degree? Well, there are lots of ways. An associate's degree, a postsecondary non-degree award, or a high school diploma—often coupled with work experience in a related occupation, on-the-job training, or both—can lead to a job that really pays off.

According to the U.S. Bureau of Labor Statistics (BLS), 80 occupations typically require less than a bachelor's degree to enter and had median annual wages of over $50,000 in May 2010. Some of them had median wages that were much higher than that.

The occupations are diverse and wide ranging. They include different types of managers, technicians, and repairers, as well as registered nurses, commercial divers, and fashion designers. And they are employed across nearly all industries.

This article looks at these occupations in greater detail. It uses BLS data to show how much workers earn and the number of expected job openings from 2010 to 2020. It also explains the education and training workers typically need to enter these occupations and to become competent at performing them.

The first section of the article is about education and earnings—and describes the terms used by BLS. The second section presents high-paying occupations for three education levels: associate's degree, postsecondary non-degree award, and high school diploma. Tables highlight information about the occupations. Accompanying text describes the five top-paying occupations in each education category. And ways to learn more about the occupations in this article—and others not described here—are provided at the end.

Education and earnings

More than 60 percent of U.S. workers don't have a bachelor's degree, BLS data show. And some of these workers without a bachelor's degree earned more than $33,840, the median annual wage for all workers in May 2010. Wages are affected by many factors, one of which is education. Generally, people with more education have higher wages than those with less education. But you don't always need a bachelor's degree to land a high-paying job.

Lots of occupations with high wages don't require a bachelor's degree. Many of these occupations, however, require other education after high school, such as an associate's degree or postsecondary non-degree award. And those that don't need more education almost always involve some form of work experience or on-the-job training.

BLS education and training categories

BLS assigns three categories to occupations. The categories are as follows:

- Typical education needed for entry
- Work experience in a related occupation
- Typical on-the-job training needed to attain competency.

Elka Torpey

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The category assignments are designed to give a more complete picture of the typical requirements for workers to enter or attain competency in an occupation. Workers usually need some combination of education, experience, and training to get a job in their occupation of choice.

There are eight education levels. The three highest levels of education are doctoral or professional degree, master's degree, and bachelor's degree. Occupations from two other education levels—some college but no degree and less than a high school diploma—are not included in this article because so few of them had high wages. This article focuses on high-earning occupations at three education levels below the bachelor's degree:

- Associate's degree
- Postsecondary non-degree award
- High school diploma

The occupations discussed in this article typically do not require a bachelor's degree to enter. In any occupation, however, workers may have more or less education than what is typically needed for entry.

Requirements for work experience in a related occupation are as follows:

- More than 5 years
- 1 to 5 years
- Less than 1 year
- None

On-the-job training assignments are as follows:

- Internship/residency
- Apprenticeship
- Long-term on-the-job training (more than 12 months)
- Moderate-term on-the-job training (1 to 12 months)
- Short-term on-the-job training (1 month or less)
- None

Money—and more

The occupations in this article all had median annual wages greater than $50,000 in May 2010. A median annual wage means that half of workers in the occupation earned more than that amount, and half earned less.

But wages are only part of any career equation. Type of work, working conditions, job satisfaction, and other factors influence occupation choice.

Money matters. Not all workers in these occupations earned more than $50,000, although some made considerably more. For example, the median annual wage for loan officers was $56,490 in May 2010—but the lowest earning 10 percent of workers made $30,930 or less. And the highest earning 10 percent made $112,370 or more.

Wages include hourly, weekly, or annual pay that people receive for the work they do. Tips, sales commissions, and production bonuses are also included. But overtime and nonproduction bonuses are not.

All of the wage data in this article come from the BLS Occupational Employment Statistics (OES) survey. The data are from 2010, the base year of the BLS 2010–20 employment projections. The OES survey does not collect information on self-employed workers, so the data do not include the wages of these workers.

Other factors. Another factor to consider when choosing an occupation is the type of work you would like to do. For example, some people might enjoy working with objects or tools; others might prefer managing people or projects.

Working conditions also influence career decisions: some occupations with high median wages, for example, require long hours. High-paying occupations can also be stressful. Or they might involve nonstandard schedules or difficult or hazardous work environments.

Plus, a job's rewards aren't always in the form of pay. Workers in some occupations, such as those in childcare or social services, are willing to earn less for the personal satisfaction they get from their jobs. Other nonwage benefits include vacation time, flexible schedules, and health insurance.

When thinking about which occupation to pursue, you might also consider whether you'll be likely to find a job in that field. The number of projected job openings in an occupation is one indication of whether jobs are likely to be

plentiful or scarce. Each of the tables in the next section provides data on projected job openings.

Still other factors, such as advancement potential and job security, may also come into play when selecting a career.

High-paying occupations by education level

Most high-earning workers who don't have a bachelor's degree have an associate's degree, a postsecondary non-degree award, or a high school diploma as their highest level of education.

The following sections present information about the five highest earning occupations within a particular level of education. Each of the sections also includes a table, with occupations ranked by median annual wage.

Associate's degree

Healthcare is expected to be among the fastest-growing industries over the next decade—and an associate's degree is a great way to prepare for many high-paying, high-demand careers in this industry. Nearly half of the occupations shown in table 1 (on page 28) are related to healthcare. And one healthcare occupation—registered nurses—is projected to have over 1.2 million job openings from 2010 to 2020.

In addition to healthcare occupations, high-paying occupations at this education level include technicians, managers, and others. In May 2010, 20 occupations that typically require an associate's degree for entry had median annual wages of more than $50,000.

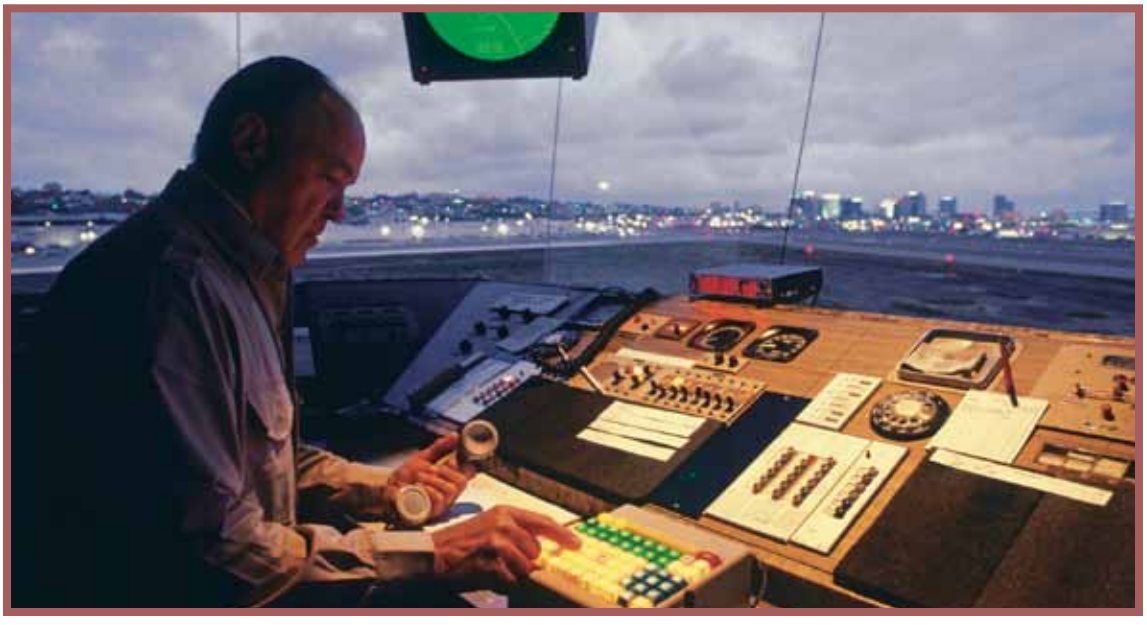
An associate's degree usually requires between 2 and 4 years of full-time academic study after high school. These programs often prepare students for a specific career. For example, occupational therapy assistants generally must complete a 2-year occupational therapy assistant program.

Associate's degree programs are offered at public community colleges, private 2-year colleges, for-profit technical institutes, and some 4-year colleges and universities.

Earning an associate's degree can be a relatively fast track to high earnings: most of the high-wage associate's degree level jobs don't require on-the-job training or work experience in a related occupation.

Air traffic controllers. These workers monitor and direct the movement of aircraft.

(Continued on page 29)



In May 2010, air traffic controllers had the highest median annual wage among occupations in which workers typically don't need a bachelor's degree.

Table 1: Occupations typically requiring an associate's degree

Occupation	Median annual wage, May 2010[1]	Projected job openings, 2010-20	Work experience[2]	On-the-job training
Air traffic controllers	$108,040	10,200	None	Long-term on-the-job training
General and operations managers	94,400	410,100	1 to 5 years	None
Construction managers	83,860	120,400	More than 5 years	None
Radiation therapists	74,980	6,700	None	None
Nuclear medicine technologists	68,560	7,500	None	None
Dental hygienists	68,250	104,900	None	None
Nuclear technicians	68,090	3,300	None	Moderate-term on-the-job training
Registered nurses	64,690	1,207,400	None	None
Diagnostic medical sonographers	64,380	31,700	None	None
Aerospace engineering and operations technicians	58,080	1,700	None	None
Engineering technicians, except drafters, all other	58,020	16,800	None	None
Electrical and electronics engineering technicians	56,040	31,800	None	None
Radiologic technologists and technicians	54,340	95,100	None	None
Funeral service managers, directors, morticians, and undertakers	54,330	10,700	None	Apprenticeship
Respiratory therapists	54,280	52,700	None	None
Geological and petroleum technicians	54,020	7,000	None	Moderate-term on-the-job training
Electrical and electronics drafters	53,020	7,200	None	None
Occupational therapy assistants	51,010	16,800	None	None
Precision instrument and equipment repairers, all other	50,910	5,500	None	Long-term on-the-job training
Mechanical engineering technicians	50,110	10,400	None	None

[1]May 2010 median annual wage for all occupations: $33,840. Wage data are for wage and salary workers only.
[2]Denotes work experience in a related occupation.
Source: BLS Employment Projections program (projected job openings, education and training data), Occupational Employment Statistics program (wage data).

(Continued from page 27)

Almost all of them work for the Federal Aviation Administration (FAA).

Median annual wages of air traffic controllers are the highest of any occupation in which workers typically do not need a bachelor's degree. However, entry requirements are strict. And although a bachelor's degree is not always required, many workers in this occupation have one.

To enter the occupation, most workers need an associate's or bachelor's degree in air traffic control or a related subject from a program approved by the FAA's Air Traffic-Collegiate Training Initiative. Air traffic controllers also must meet other criteria. For example, they generally must be age 30 or younger, pass a pre-employment test, and get medical and security clearances.

After they are hired, workers get up to 12 weeks of training at the FAA Academy, followed by additional on-the-job training.

Work as an air traffic controller requires focus and is often stressful. Night and weekend shift work may be required, as many control towers and centers are open 24 hours a day, 7 days a week. Most air traffic controllers are members of a union.

General and operations managers. Coordinating an organization's daily activities, these managers might develop policies, oversee budget activities, or review sales reports. They are employed in a wide range of industries, including manufacturing; retail trade; professional, scientific, and technical services; and wholesale trade. Others work in finance and insurance, healthcare and social assistance, government, and administrative and support services.

Because of the variety of industries in which they work, general and operations managers' education requirements also vary. Some workers need no more education than a high school diploma. But others need an associate's degree. Still others need a bachelor's or higher degree.

Most general and operations managers work their way up from lower-level positions, such as sales manager or production manager. Often, this experience is with the same employer or in the same industry.

Jobs for general and operations managers are stressful because these workers are responsible for many aspects of their organization, including its overall success. About 38 percent of workers spent 50 hours or more a week on the job in 2010.

Construction managers. These workers oversee a construction project from start to finish. They set timelines, prepare contracts, and manage budgets. They also determine which construction methods to use, and they hire and supervise workers to complete the project. Throughout the process, they ensure compliance with building and safety codes or other regulations. Construction managers may have job titles such as project manager, construction foreman, and job superintendent.

About 64 percent of construction managers were self-employed in 2010. Others worked for residential and nonresidential

Construction managers ensure compliance with building codes and other regulations.

construction companies and specialty trade contractors.

Education requirements for these workers vary. Some construction managers need an associate's degree in construction management or construction technology. Others might need a high school diploma, bachelor's degree, or master's degree. Most also have experience in a construction-related field, such as having worked as a carpenter, construction supervisor, or cost estimator.

Construction managers often perform under pressure and must be able to manage multiple activities at the same time. Like many managers, these workers spend long hours on the job. In 2010, about 25 percent of construction managers worked 50 hours or more a week.

Radiation therapists. When administering prescribed doses of radiation to patients, radiation therapists check equipment, observe patients' reactions to treatment, and document the session. Radiation is dangerous, so these workers follow safety procedures to protect themselves, their patients, and others.

Most radiation therapists work in hospitals. Others work in physicians' offices, other healthcare facilities, or schools that teach radiation therapy.

To become a radiation therapist, workers typically need an associate's degree, bachelor's degree, or certificate in radiation therapy. In many states, workers also must be licensed. Certification by the American Registry of Radiologic Technologists is required in some states and by some employers.

Nuclear medicine technologists. These workers administer radioactive drugs to patients and then use special equipment to observe the behavior of these drugs. Their work helps other healthcare specialists diagnose and treat various diseases, such as cancer. To lower the risks of radiation exposure, workers must follow safety standards.

Most nuclear medicine technologists work in hospitals. Others work in physicians' offices, diagnostic and medical laboratories, other healthcare facilities, or schools.

These workers typically need an associate's degree in nuclear medicine technology, although some earn a bachelor's degree or other award. States might require workers to be licensed. And certification by the American Registry of Radiologic Technologists or by the Nuclear Medicine Technology Certification Board may also be required in some states.

Postsecondary non-degree award

Formal education after high school doesn't always involve earning a degree. For some occupations, workers typically need postsecondary education that leads to a certificate or other award but that does not lead to a degree. The length of these postsecondary non-degree programs varies from a few weeks to 2 years. Eleven occupations that typically require a postsecondary non-degree award for entry had

Some high-paying jobs that do not require a bachelor's degree involve stress or danger.

Table 2: Occupations typically requiring a postsecondary non-degree award

Occupation	Median annual wage, May 2010[1]	Projected job openings, 2010-20	Work experience[2]	On-the-job training
First-line supervisors of fire fighting and prevention workers	$68,240	33,100	1 to 5 years	None
Commercial pilots	67,500	19,300	None	None
Electrical and electronics repairers, powerhouse, substation, and relay	65,230	6,900	None	Long-term on-the-job training
Insurance appraisers, auto damage	56,230	2,700	None	Moderate-term on-the-job training
Telecommunications equipment installers and repairers, except line installers	54,710	59,300	None	Moderate-term on-the-job training
Aircraft mechanics and service technicians	53,420	45,200	None	None
Signal and track switch repairers	53,230	1,300	None	Moderate-term on-the-job training
First-line supervisors of production and operating workers	53,090	87,900	1 to 5 years	None
Avionics technicians	52,320	5,800	None	None
Electrical and electronics repairers, commercial and industrial equipment	51,820	17,700	None	Long-term on-the-job training
Commercial divers	51,360	1,300	None	Moderate-term on-the-job training

[1]May 2010 median annual wage for all occupations: $33,840. Wage data are for wage and salary workers only.
[2]Denotes work experience in a related occupation.
Source: BLS Employment Projections program (projected job openings, education and training data), Occupational Employment Statistics program (wage data).

median annual wages greater than $50,000 in May 2010. (See table 2.) Some of them are related to installation and repair work. Others involve aircraft or avionics.

To qualify for most of these occupations, workers need moderate- or long-term on-the-job training or work experience in a related occupation in addition to a postsecondary non-degree award.

First-line supervisors of fire fighting and prevention workers. These supervisors oversee the activities of firefighters and related workers. They may have job titles such as fire chief, fire lieutenant, fire marshal, shift commander, crew boss, and county forest ranger. Most are employed by local governments.

First-line supervisors typically must have worked as a firefighter or in a similar job for at least 1 to 5 years. Workers usually need to have earned an emergency medical technician or paramedic certificate.

Many states require first-line supervisors to complete certification programs, which are frequently offered by local fire academies. The New York City Fire Academy, for example, requires first-line supervisors to complete its 4-week training program. Similarly, the National Fire Academy has an executive fire

Commercial pilots fly helicopters or aircraft on unscheduled routes.

officer certification for workers who have an associate's degree.

Jobs for supervisors of fire fighting and prevention workers involve both stress and danger. Injury rates for fire fighting workers are higher than those for workers in other occupations. Hours and schedules vary—and may involve around-the-clock work.

Commercial pilots. These pilots fly and navigate helicopters or aircraft on unscheduled routes. Their jobs are different from those of airline pilots, who fly on scheduled routes, usually for major air carriers. Commercial pilots may fly helicopters or planes that monitor traffic, spray pesticides on crops, or transport people to hospitals. Some fly private jets. Others are flight instructors.

About 9 percent of commercial pilots were self-employed in 2010. Others worked in nonscheduled air transportation, technical and trade schools, scenic and sightseeing transportation, and ambulance services.

Like airline pilots, commercial pilots need a license. They prepare by completing a postsecondary non-degree award program at a military or civilian flight school or by taking lessons from an FAA-certified instructor.

Many commercial pilots have variable schedules. And commercial pilots face risks, such as hearing loss due to noisy engines and pesticide exposure from crop dusting. Some commercial pilots are union members.

Powerhouse, substation, and relay electrical and electronics repairers. These workers maintain and fix equipment in electric power plants and in the substations and relay stations that bring electricity to consumers. A worker in this occupation may also be known as an instrument and control technician, relay technician, or substation mechanic. Most of them are employed by utility companies. Others work for local governments.

Workers receive long-term on-the-job training after they are employed. Formal apprenticeship programs—in which people work while learning the job tasks—are available for this occupation. And some workers earn an associate's degree.

Working with electricity is dangerous, and work-related injuries are common in this occupation.

Auto damage insurance appraisers. For insurance claim purposes, these workers inspect damaged motor vehicles and estimate repair costs. Most work for insurance carriers or insurance agencies and brokerages.

Workers typically complete a program in auto damage appraisal. Before they can

earn a certificate, appraisers might need auto repair or appraisal experience. For example, the National Institute for Automotive Service Excellence has a program on damage analysis and estimating, but applicants must have 2 years of experience to qualify.

Some appraisers are licensed by the state in which they work. On-the-job training of less than 1 year also helps workers become competent in the occupation.

Telecommunications equipment installers and repairers, except line installers. These workers install and fix Internet, telephone, cable television, and other telecommunications equipment. They explain to customers how the equipment works and repair or replace faulty devices. Some set up and maintain computerized switchboards or equipment in central offices or distribution centers of telecommunications companies. These workers may have job titles such as service technician, field technician, telecom technician, and PBX installer and repairer.

Most of these workers are employed by telecommunications firms. Others work for wiring installation contractors.

Telecommunications equipment installers and repairers typically need some education after high school, such as having completed a certificate program in electronics repair. Some workers take classes offered by equipment manufacturers. Industry certification is needed for certain jobs. And many workers receive on-the-job training, which can last from several weeks to a few months.

These workers have higher injury rates than workers in many other occupations. Taking precautions, such as using safety equipment, helps workers to avoid electrical shocks, burns, falls, and other risks. Some telecommunications equipment installers and repairers belong to a union.

High school diploma

A high school diploma can lead to a high-paying job in many fields, including those in management or public service. Supervisors or managers make up 11 of the highest paying occupations for which a high school diploma is the most education typically required. (See table 3, beginning on page 34.) And 10 of the occupations involve law enforcement, fire fighting and prevention, or postal service work.

Forty-five occupations that usually require no more education than a high school diploma had median annual wages of greater than $50,000 in May 2010. These occupations represent a diverse mix of careers, ranging from loan officers to elevator installers and repairers.

But you probably won't be prepared for a high-paying job with a diploma alone: all of the occupations in the table typically require work experience in a related occupation, on-the-job training, or both, before workers can enter or become fully competent in them.

All other managers. The top-paying occupation in the table includes a variety of job titles, such as security manager, supply chain manager, and wind energy project manager. These workers oversee a wide range of people, projects, or processes.

BLS data show that about 56 percent of these workers were self-employed in 2010. Many also worked for federal, state, and local

(Continued on page 36)

High-paying high school level occupations typically require work experience in a related occupation, on-the-job training, or both.

Table 3: Occupations typically requiring a high school diploma

Occupation	Median annual wage, May 2010[1]	Projected job openings, 2010-20	Work experience[2]	On-the-job training
Managers, all other	$96,450	249,400	1 to 5 years	None
Transportation, storage, and distribution managers	80,210	33,700	More than 5 years	None
First-line supervisors of police and detectives	78,260	38,700	1 to 5 years	Moderate-term on-the-job training
Administrative services managers	77,890	99,800	1 to 5 years	None
Nuclear power reactor operators	75,650	2,000	None	Long-term on-the-job training
Elevator installers and repairers	70,910	8,200	None	Apprenticeship
Power distributors and dispatchers	68,900	3,600	None	Long-term on-the-job training
First-line supervisors of non-retail sales workers	68,880	123,500	More than 5 years	None
Detectives and criminal investigators	68,820	30,100	1 to 5 years	Moderate-term on-the-job training
Fashion designers	64,530	6,700	None	Long-term on-the-job training
Power plant operators	63,080	14,400	None	Long-term on-the-job training
Business operations specialists, all other	62,450	327,200	Less than 1 year	Long-term on-the-job training
Media and communication equipment workers, all other	61,680	3,300	None	Moderate-term on-the-job training
Farmers, ranchers, and other agricultural managers	60,750	234,500	More than 5 years	None
Postmasters and mail superintendents	60,300	4,800	1 to 5 years	Moderate-term on-the-job training
Petroleum pump system operators, refinery operators, and gaugers	60,040	14,400	None	Long-term on-the-job training
First-line supervisors of mechanics, installers, and repairers	59,150	164,900	1 to 5 years	None
Artists and related workers, all other	58,840	4,800	None	Long-term on-the-job training
First-line supervisors of construction trades and extraction workers	58,680	259,700	More than 5 years	None
Claims adjusters, examiners, and investigators	58,620	79,900	None	Long-term on-the-job training

Table 3: Occupations typically requiring a high school diploma *(continued)*

Occupation	Median annual wage, May 2010[1]	Projected job openings, 2010-20	Work experience[2]	On-the-job training
Electrical power-line installers and repairers	$58,030	52,700	None	Long-term on-the-job training
Gas plant operators	57,200	4,500	None	Long-term on-the-job training
Subway and streetcar operators	56,880	2,800	None	Moderate-term on-the-job training
Purchasing agents, except wholesale, retail, and farm products	56,580	91,200	None	Long-term on-the-job training
Loan officers	56,490	115,200	None	Moderate-term on-the-job training
First-line supervisors of correctional officers	55,910	16,500	1 to 5 years	Moderate-term on-the-job training
Chemical plant and system operators	55,490	14,100	None	Long-term on-the-job training
Real estate brokers	54,910	29,700	1 to 5 years	None
Boilermakers	54,640	11,800	None	Apprenticeship
Transit and railroad police	54,330	1,100	None	Short-term on-the-job training
Buyers and purchasing agents, farm products	54,220	3,200	None	Long-term on-the-job training
Postal service mail carriers	53,860	103,400	None	Short-term on-the-job training
Police and sheriff's patrol officers	53,540	249,400	None	Moderate-term on-the-job training
Postal service clerks	53,100	15,500	None	Short-term on-the-job training
Postal service mail sorters, processors, and processing machine operators	53,080	7,500	None	Short-term on-the-job training
First-line supervisors of transportation and material-moving machine and vehicle operators	52,720	69,300	1 to 5 years	None
Sales representatives, wholesale and manufacturing, except technical and scientific products	52,440	559,900	None	Moderate-term on-the-job training
Construction and building inspectors	52,360	48,600	More than 5 years	Moderate-term on-the-job training
Fire inspectors and investigators	52,230	4,700	More than 5 years	Moderate-term on-the-job training

Table 3: Occupations typically requiring a high school diploma *(continued)*

Occupation	Median annual wage, May 2010[1]	Projected job openings, 2010-20	Work experience[2]	On-the-job training
Stationary engineers and boiler operators	$52,140	10,600	None	Long-term on-the-job training
Plant and system operators, all other	51,980	3,700	None	Long-term on-the-job training
Legal support workers, all other	51,800	9,600	None	Short-term on-the-job training
Property, real estate, and community association managers	51,480	82,300	1 to 5 years	None
Telecommunications line installers and repairers	50,850	51,400	None	Long-term on-the-job training
Sales representatives, services, all other	50,620	270,100	None	Short-term on-the-job training

[1]May 2010 median annual wage for all occupations: $33,840. Wage data are for wage and salary workers only.
[2]Denotes work experience in a related occupation.
Source: BLS Employment Projections program (projected job openings, education and training data), Occupational Employment Statistics program (wage data).

(Continued from page 33)

governments; management firms; colleges and universities; hospitals; and insurance carriers.

Work experience in a related occupation is often needed to enter this occupation. Schedules for these managers vary; about 26 percent of workers spent 50 hours or more a week on the job in 2010. But others worked part-time or variable schedules.

Transportation, storage, and distribution managers. These workers are in charge of operations that range from railroads to shipping facilities. They manage budgets, set policies and standards, and direct procurement.

Some of the industries that employ the largest number of these workers are federal, state, and local governments; general and specialized freight trucking; and warehousing and storage. Related industry experience—such as having been a supervisor at a transportation, storage, or distribution facility—is often required to qualify for one of these management positions.

Wages for these workers are high, but work hours may be long: about 20 percent of workers put in 50 hours or more a week on the job in 2010.

First-line supervisors of police and detectives. These supervisors coordinate the investigation of criminal cases, train staff, and oversee other tasks related to police operations. They may have job titles such as chief of police, police captain, police shift commander, lieutenant, and detective sergeant.

Law enforcement experience and on-the-job training—such as attending a police academy to learn about related laws, use-of-force policies, and crowd-control techniques—are usually required to qualify for these positions.

Most first-line supervisors of police and detectives are employed by state and local governments.

Administrative services managers. Administrative services managers coordinate support services for an organization or department, such as facilities maintenance or records and information management. They oversee budgets, hire staff, buy supplies, and help maintain equipment.

These managers are employed in many different industries, including construction and healthcare. Most work their way up from related positions.

Administrative services managers may work long hours, with over 25 percent of workers putting in 50 hours or more per week in 2010.

Nuclear power reactor operators. These workers control nuclear reactors, check for problems, and monitor systems to ensure that nuclear power plants operate safely. They make adjustments as needed, following standard procedures. And they may handle nuclear fuel elements.

Jobs for nuclear power reactor operators involve risk. Because of this, they have very specific requirements, including licensure by the Nuclear Regulatory Commission. To get a license, workers typically need at least 3 years of experience working in a power plant, followed by at least 1 year of training, after which they must pass a written exam and operating test. Many power reactor operators are members of a union.

For more information

Explore many of the occupations highlighted in this article, along with hundreds of others, in the *Occupational Outlook Handbook* (*OOH*) at **www.bls.gov/ooh**. The *OOH* has detailed descriptions of education and training requirements and describes the nature of the work, wages, and other career information for 341 occupations.

To learn more about the BLS education and training data, visit **www.bls.gov/emp/ep_education_training_system.htm**. From this page, you can find an occupation's education and training assignments (**www.bls.gov/emp/ep_table_112.htm**), check out the educational backgrounds of workers in an occupation (**www.bls.gov/emp/ep_table_111.htm**), and more.

An April 2012 *Monthly Labor Review* article, "Employment Projections through the Lens of Education and Training," discusses the BLS occupational projections and education and training categories in greater detail. It is available at **www.bls.gov/opub/mlr/2012/04/art2full.pdf**.

Other U.S. Department of Labor resources also provide career information, including skill requirements, education and training providers, apprenticeships, and career services. For example, see the following sources:

- O*NET, **www.onetonline.org**, for detailed information about occupations
- My Next Move, **www.mynextmove.org**, for career guidance, occupational information, job postings, and education and training providers
- Office of Apprenticeship, **www.doleta.gov/oa**, for information about apprenticeship occupations
- Service Locator, **www.servicelocator.org**, to find career services near you.

You're a *what*?

Tower technician

Dennis Vilorio

In his career, Billy Smith has reached great heights. As a tower technician, Billy climbs up the face of telecommunications towers to remove, install, test, maintain, and repair a variety of equipment—from antennas to light bulbs.

Tower technicians also build shelters and radiofrequency shields for electronic equipment, lay coaxial and fiber optic cables, and remove pests and weeds. Sometimes, they set supports and stack construction pieces to build the tower itself.

Billy is usually part of a four-person crew: himself and one other technician; a rigger, who moves heavy equipment; and a supervisor, who oversees the job. At the beginning of each workday, the crew members meet to discuss the site they're working on, the work they will be doing, and any potential safety issues. The crew then travels to the tower site and inspects the tower for hazards, such as power lines or beehives.

When the crew is responsible for installing new equipment on a telecommunications tower, Billy and the other technician climb the tower while the supervisor and rigger stay on the ground. The supervisor and rigger send up the necessary equipment and materials to the technicians, who then follow manufacturer specifications or engineers' blueprints to install the equipment.

After installing the equipment, tower technicians need to test it. Simple equipment may need only to be turned on and off. But with sophisticated equipment—such as antennas and fiber optic cable—Billy and the other technician might need to use handheld testing devices to verify the equipment is properly installed. For example, they might test fiber optic cables for signal loss. The technicians report to engineers any problems, along with recommended solutions, such as adjusting the tilt or location of an antenna.

Technicians must be mentally prepared and in good physical shape to climb cell phone towers up to 200 feet tall and broadcasting towers up to 2,000 feet tall. The climb is even more difficult because the heavy equipment they carry—such as replacement parts and tools—can weigh more than 90 pounds. "It can feel like you're carrying another person," Billy says.

Climbing towers is dangerous work. To stay safe, tower technicians maintain radio contact with the ground crew at all times. But slips, falls, and other accidents—such as overheating from improperly shielded radiofrequency equipment—can happen. To help minimize risk, Billy and other technicians use climbing and safety equipment that latches onto anchors built into the tower frame. This equipment, known as the Personal Fall Arrest System, includes a safety belt, harness, hooks, and lanyards.

Technicians use the equipment, along with their hands and feet, to stay safe while they are on the tower. For example, Billy might hook a safety cable to the tower and climb with his hands and feet. But when he needs to hang in place and work with his hands, he wraps a lanyard through an anchor on the tower and then secures it through two loops on his safety belt.

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Weather is another threat to technicians' safety, says Billy. Heavy winds can blow a technician off the tower, for example, and ice causes slippery conditions. During the summer, heat and sunlight can lead to overheating or heatstroke. Technicians also have to watch out for lightning, which can strike the tower from a storm many miles away.

Over the years, Billy has learned to judge the weather and to take action to protect himself and his crew. If conditions are poor, Billy's crew can delay work on the tower until conditions improve. But if he and another technician are already on the tower and the weather suddenly changes, they can rappel down the tower quickly and safely.

Before they ascend or descend towers, technicians receive safety training paid for by their employer. The training usually includes instruction in first aid, cardiopulmonary resuscitation (CPR), proper use of safety equipment, emergency procedures, and rescue operations. "We don't have to wait for an emergency crew," says Billy. "We are all trained to do our own rescues."

Employers may also pay for technical training, from troubleshooting equipment to channeling fiber optic cables. On-the-job training typically lasts about 6 weeks. There is no school for tower climbing, and educational requirements are minimal. "You learn most things on the field through trial and error," Billy says.

But technicians usually bring some skills to the job. An aptitude for computers, mechanics, and climbing are particularly helpful, says Billy, as are dependability and attention to detail. Tower technicians also must pass random drug tests and be willing to travel on assignments, often for months at a time.

Many tower technicians enter the occupation through personal connections. Billy, for example, was recruited by a cousin who worked in the tower business. "I was climbing oil rigs, but jobs were becoming scarce," he says. "It was easy to switch to climbing telecommunications towers."

Other tower technicians find work through job advertisements. Online portals that specialize in the tower business are particularly useful. In addition to job ads, these portals often include news, training courses, and other career resources related to tower work.

The U.S. Bureau of Labor Statistics (BLS) does not collect employment and wage data specific to tower technicians. However, BLS does collect data on a related occupation, telecommunication line installers and repairers, whose workers specialize more on the lines themselves than on climbing the towers to do technical tasks. There were almost 149,000 telecommunication line installers and repairers in May 2011, according to BLS, and they earned a median annual wage of $51,720, or an hourly wage of $24.87.

Anecdotal information suggests that the typical wage for experienced tower technicians is about $20 per hour. Entry-level technicians earn about $15 per hour. These wages are usually supplemented with hotel accommodations and money for daily expenses when they are on travel for work.

Many tower technicians do not work in the occupation long. Some find the work too dangerous, can't cope with the stress of the climbs, or don't like the lengthy travel schedule. Others work in the field temporarily while looking for another job.

Consequently, experienced tower technicians often earn excellent job security and are competitively recruited by different companies. Many also find that mastering telecommunications line technologies is exciting and rewarding. "Every tower is a completely different challenge," Billy says, "and a new learning experience."

Billy knows that the risks of being a tower technician might dissuade some people from making a career of it. But for him, the perks of his work outweigh the danger associated with it. He enjoys the travel and the chance to meet many different people at each site and on the road. And most of all, he says, he enjoys using his skills to do important work: "I feel proud to build something that will last and help others."

OOChart

Consumer spending: Comparing four countries

How do U.S. consumer expenditures compare with those of other industrialized nations? A report by the U.S. Bureau of Labor Statistics (BLS) shows how people in the United States, Canada, the United Kingdom, and Japan spent their budgets in 2009.

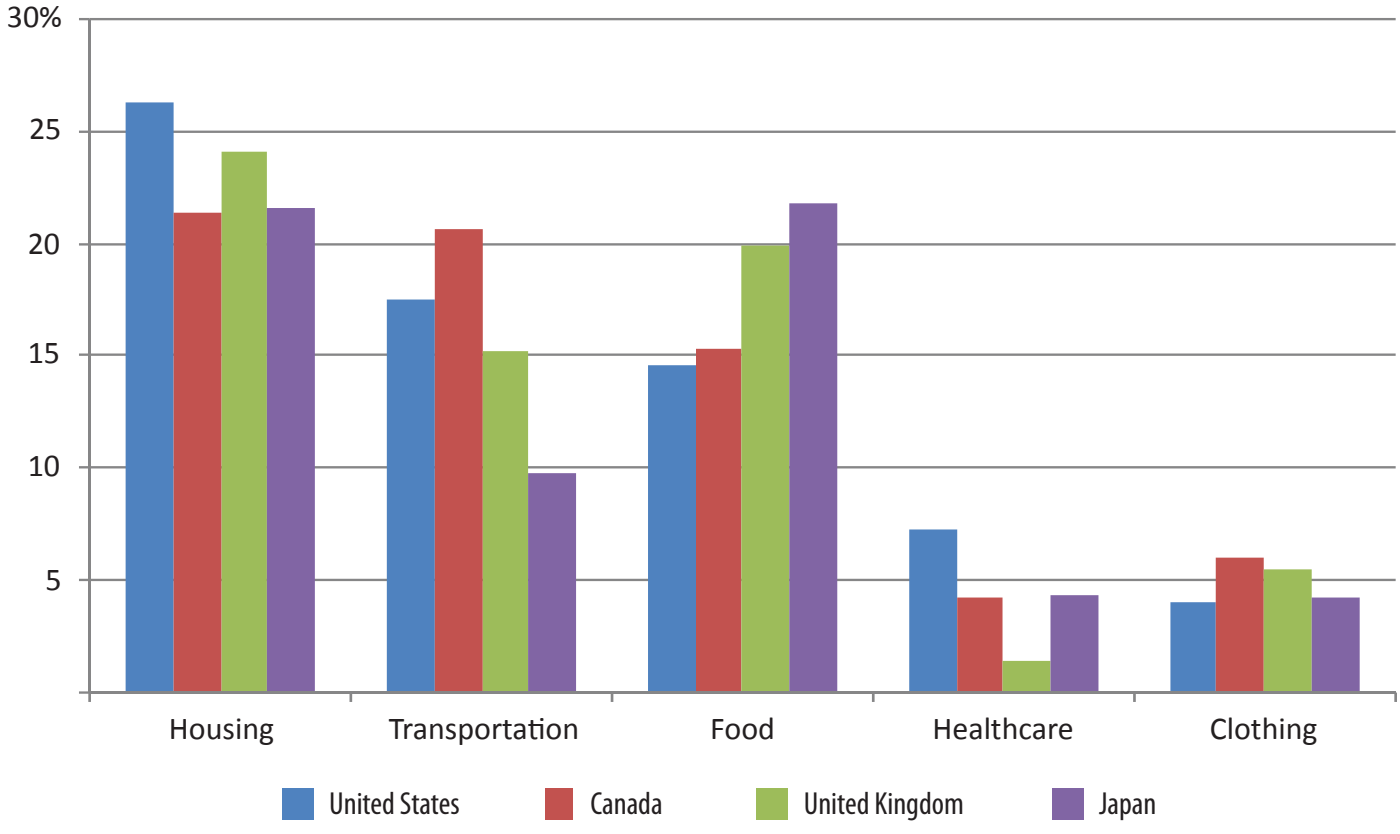
As the chart shows, housing made up the biggest consumer expense in all the countries except Japan. But U.S. consumers spent a larger share of their money on housing than did consumers in any of the other three countries.

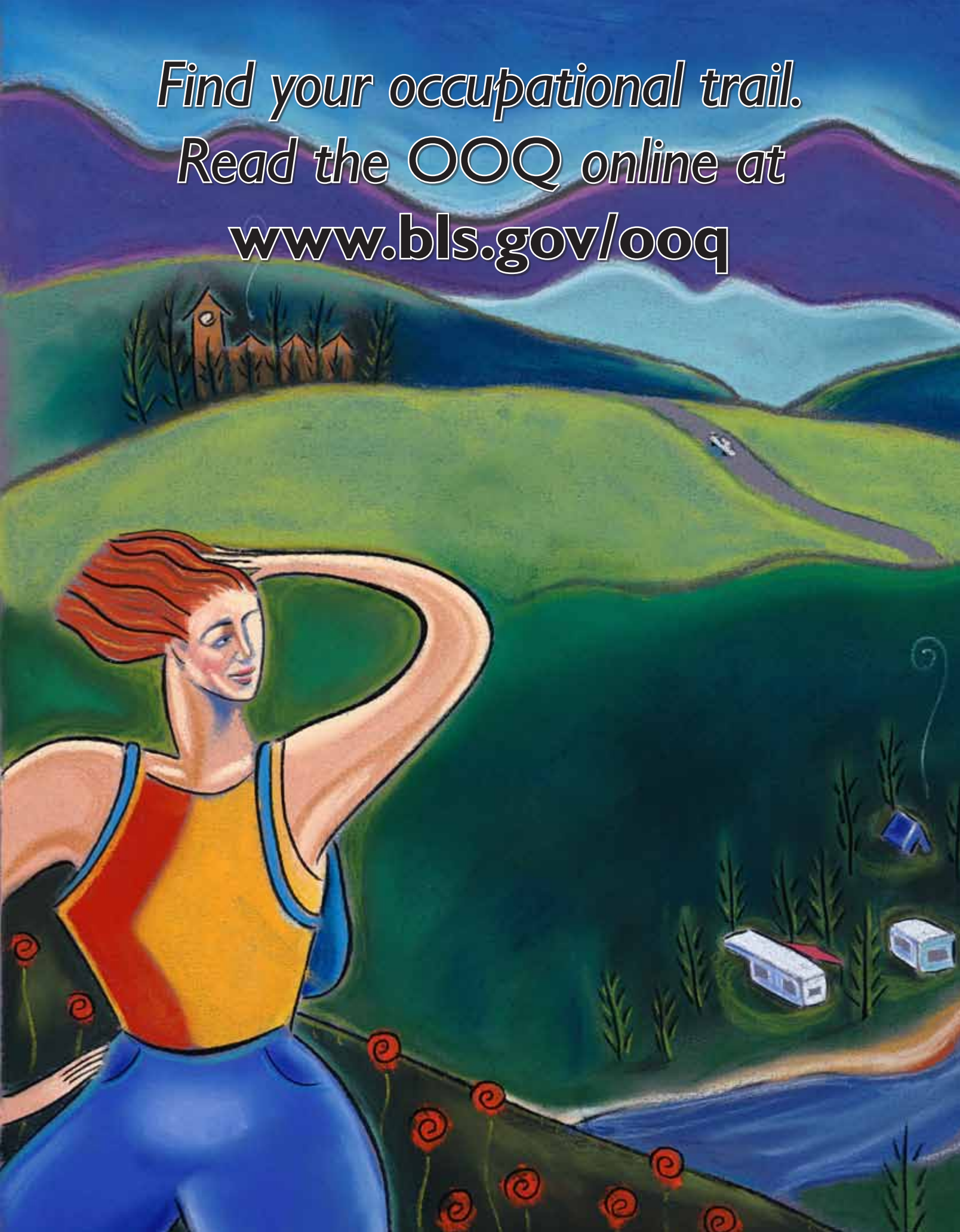
The United States topped the other countries in another spending category, too: healthcare. American consumers had the highest share of healthcare expenditures, in part because medical costs in Canada, the United Kingdom, and Japan are paid indirectly through nationalized healthcare options. Only consumers' out-of-pocket expenses were included in the data.

Additional data show that countries differ in their spending within the categories. Japan's consumers, for example, spent about the same share of their transportation money on public transportation as they did on buying automobiles. U.S. consumers, in contrast, were over 5 times more likely to spend their transportation money on automobile purchases than on public transportation.

Data for shares of U.S. expenditures in the report are from the BLS Consumer Expenditure Survey. For purposes of the analysis, several adjustments were made to expenditures categories of the three foreign countries so that their shares data were comparable with U.S. shares data. To read the full report, see **www.bls.gov/opub/focus/volume2_number16/cex_2_16.htm**. Data tables, Consumer Expenditure Survey program publications, a glossary, and other information are available at **www.bls.gov/cex**.

Shares of expenditures for selected categories, United States, Canada, United Kingdom, and Japan, 2009

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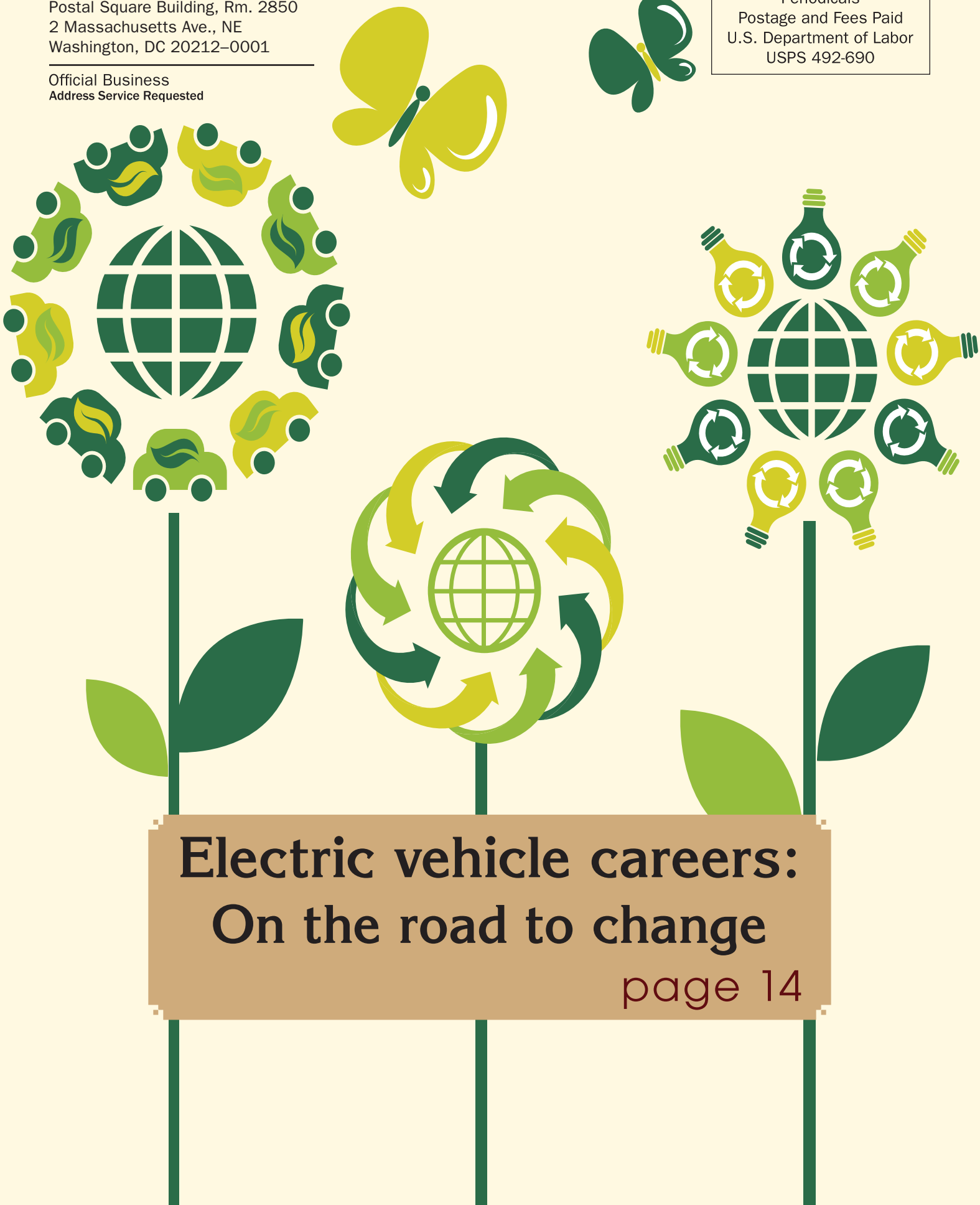

Electric vehicle careers: On the road to change

page 14