systemic changes toward improved police officer training and accountability, with the hope of ameliorating the current strained relationships between many police departments and the communities of color they serve. Both explanations compel us to conduct interdisciplinary research to investigate the effect of policing on the physical and mental health of African Americans.

In the next few years, public health professionals may be asked to grapple with this issue more deeply than ever, so we should begin to consider—and even innovate—concrete strategies that enable the police to protect and serve the public as equitably as possible. AJPH

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H. Oh performed the analyses and wrote the original draft of the editorial. J. DeVylder provided overall guidance and also contributed to the writing of the editorial. G. Hunt contributed substantially to the writing and revising of the editorial. All authors participated extensively in the final editing of the editorial.

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Will Automated Driving Technologies Make Today's Effective Restraint Systems Obsolete?

Road traffic injuries in industrialized countries are a topic of great concern, as these potentially debilitating or fatal injuries are seen as preventable. The technologies and policies that could lead to safer driving behaviors and reduce the severity and frequency of road traffic injuries are a subject of much debate.[1] Automated driving technologies (ADTs) that assist vehicle drivers or take over driving tasks are expected to involve better decision-making than that of humans and to make the road safer. To attain these goals, new models of exposures to and risk assessments of road traffic injuries are needed.

EXPECTATIONS FOR AUTOMATED DRIVING TECHNOLOGIES

ADTs represent an unprecedented change in the automotive transportation landscape and trigger two concurrent expectations: the "safety expectation" and the "better traffic expectation." The safety expectation is that ADTs will prevent crashes caused by human error. Thus, there is the potential for great reductions in road traffic injuries, as human error is the primary cause of 94% of crashes (bit.ly/29kcWKA). The better traffic expectation is that algorithms will ensure vehicles obey traffic rules and adjust their performance to increase road throughput and decrease travel time. This will trigger a dramatic change in traffic patterns that will lead to less congestion and increased comfort for road users; it will also allow vehicle occupants to make better use of the time they spend in a car.

Both expectations are formulated by projecting the benefits of ADTs in today's environment and neglecting the structural changes in traffic that these technologies will produce. For instance, the safety expectation is based on the assumption that vehicles equipped with ADTs will drive in the same manner as humans (while eliminating human driving error) and in the same road and traffic environments, a notion that is fundamentally in conflict with the better traffic expectation. Indeed, at present these two expectations cannot be met simultaneously, as the safety strategies currently available to protect road users are effective in today's human-driven traffic conditions but would probably not be effective in environments where the better traffic expectation is met.

This incompatibility will probably hold true for a significant period of time as the level of automation in the vehicle fleet increases. The underlying reason is that the safety system designs in today's vehicles are based on retrospective analyses of accident data (i.e., analyses of accidents mostly caused by human error in vehicles controlled by humans). Changes in vehicle driving technologies will affect vehicle flows and traffic patterns[2] and lead to a new epidemiology of road traffic injuries.

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Indeed, ADTs are expected to greatly change road traffic accident scenarios[3] through (1) reductions in vehicle energy before a crash thanks to better braking designs, (2) the capability to prevent accidents by executing avoidance maneuvers, and (3) a better knowledge of vehicle surroundings and road infrastructure. Thus, there is a risk that the safety systems designed for human-driven vehicles may be ineffective, or even injurious, in vehicles equipped with ADTs as automation of driving tasks increases. In short, the design of tomorrow's road safety technologies cannot be based on yesterday's accident scenarios.

COUNTERMEASURES FOR TODAY'S VEHICLES

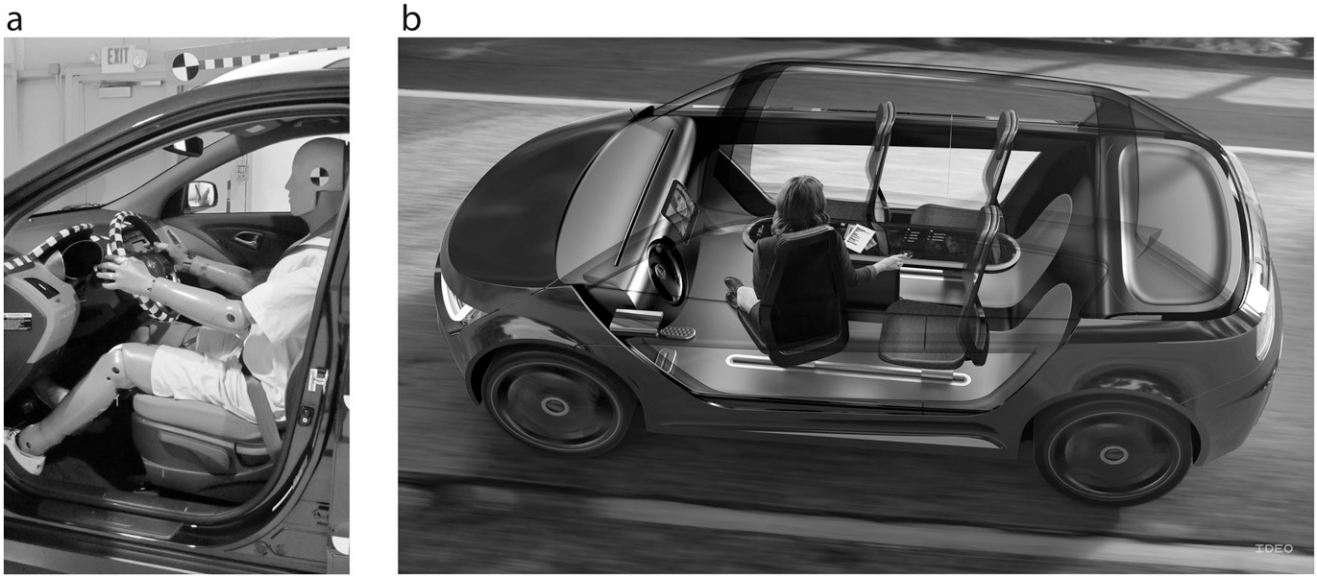
Countermeasures in today's vehicles are tailored to be most effective in typical accident scenarios in which new cars must pass regulatory occupant safety thresholds to be allowed on public roads. In line with regulatory accident scenarios, a standard seated position for vehicle occupants is also implemented; at present, it is represented by the position of crash-test dummies. Crash-test dummies sit in an upright and forward-facing position, "look" straight ahead, and have both hands on the steering wheel when they "drive" (Figure 1a). This position is the gold standard for the design and evaluation of occupant protection countermeasures. All other seating positions are collectively referred to as "out of position." The impact of countermeasures on out-of-position occupants is an important concern in automotive safety, as countermeasures that are effective for occupants in the standard position may be ineffective or even injurious for out-of-position occupants.

ADTs will give occupants more freedom during their ride, and occupants may be out of position during part or all of the duration of their trip depending on their vehicle's level of automation. Technologies that allow vehicles to be self-driven on highways are gradually being made available on luxury vehicles, and the spread of ADTs is bringing new challenges to safety researchers. For example, because drivers will have the opportunity to change positions on the basis of how much they are involved in driving, restraint system responses will need to be adjusted so that drivers are efficiently protected.[4] Thus, there is a risk that existing restraint strategies will be less effective in the new occupant position.

Further in the future, prototypes and designer concepts of fully autonomous vehicles suggest that vehicle occupants' seating habits will change dramatically, with occupants enjoying more social seating configurations and various activities (relaxing, reading, or having a meeting; Figure 1b). The methods currently in place to evaluate the performance of occupant protection systems do not account for changes in occupant seating habits.

SAFETY DESIGNS WITH PERFORMANCE TARGETS

Given historical precedents, the possible inadequacy of countermeasure design targets in terms of actual road traffic accident scenarios is a concern. For instance, epidemiology studies have shown that the front airbags developed to mitigate injuries in high-speed accidents increase injury risks when they are deployed in low-speed accidents, and this is particularly true among women.[4] Knowledge of accident causation and injury mechanisms is a prerequisite to developing realistic driving algorithms and protection strategies and to properly addressing road traffic injuries. If the better traffic expectation becomes reality, unknown accident scenarios will arise and the safety systems



Note. Figure 1a photograph courtesy of Brady Holt (http://bit.ly/2widpI7). Figure 1b photograph courtesy of IDEO (http://bit.ly/2vfdgZq; with permission).

FIGURE 1—Vehicle Occupant Seated Posture (a) as Represented by the Posture of an Anthropomorphic Test Device for the Evaluation of Today's Vehicle Safety Performances, and (b) as Anticipated by Designers in Future Autonomous Vehicles

proven effective in human-driven vehicles may become obsolete, as accident scenarios and in-car occupant activities will be different than those of today.[5]

Ultimately, retrospective epidemiological studies may be ineffective in identifying accident scenarios because of their long characteristic time scale (several years) relative to the pace at which on-board vehicle software can be upgraded (several times a year; http://bit.ly/2cH9Ce2). Identifying meaningful scenarios for both normal driving and traffic conflicts (situations that place road users at risk if vehicle kinematics are not modified) is a necessity in designing ADTs. The trolley problem,[6] often used to illustrate nontrivial decisions that driving algorithms will have to make, has been shown to be too unrealistic and naïve with ATD driving challenges,[7] and it is therefore inadequate to model the nature of future traffic conflicts. Today's challenge is to develop guidelines for the design of future vehicles with little available information on the environment in which they will evolve.

PREPARING FOR FUTURE ROAD TRAFFIC INJURIES

ADTs are a vivid example of "disruptive technologies" that affect the environment so profoundly that safety researchers and medical professionals do not yet have the tools they need to develop effective intervention strategies to mitigate injuries. Research is needed to build new simulation tools and computational traffic models to perform predictive epidemiological studies and prepare for the required changes in the design of safety systems to fully exploit the potential of ADTs to protect road users.

Limitations in the extent to which today's knowledge can be applied to the future of transportation raise important questions about the risks associated with ADTs in both traffic conflicts and accident situations. Assessment and management of these risks through evidence-based strategies will define whether and how fast-changing ADTs will contribute to improving public health. AJPH

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Consumer-Directed Health Care for Medicaid Patients: Past and Future Reforms

With the election of Donald Trump and unified control over Congress, Republicans are poised to reshape health policy in the United States. Although attempts to "repeal and replace" the Affordable Care Act (ACA) have exposed rifts within the Republican party, one target of reform with broad appeal among Republicans is Medicaid, which provides health insurance for low-income and disabled Americans. Congressional Republicans and Trump's selections to lead the Department of Health and Human Services and the Centers for Medicare & Medicaid Services, Tom Price and Seema Verma, respectively, have proposed capping the amount of federal support for Medicaid, leading states to seek creative solutions for cost savings. One potential solution to future budget constraints is using consumer-directed principles to craft Medicaid programs.[1]

The phrase "consumer directed" has been used in health care to suggest a variety of policy mechanisms. Consumer-directed principles have traditionally been framed as a means to incentivize higher-quality health decisions[2] and to provide flexibility and choice for patients. In the context of Medicaid reforms, consumer-directed principles—defined here as premiums, cost sharing (e.g., deductibles, coinsurance, and copayments), health savings accounts, and healthy behavior incentive programs—now signify that patients take on greater financial burden and clinical decision-making. Consumer-directed principles in Medicaid incentivize desired behaviors among low-income patients with great financial stakes. Advocates of these principles contend that they encourage patient awareness of costs and decision-making through the creation of financial and behavioral incentives.

Such policies align with Republican ideals of personal

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