



Automated Enforcement:

A Compendium of Worldwide Evaluations of Results

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Automated Enforcement

- **Purpose**

Investigate the impact of AES deployments to address red-light-running and speeding that have been

- Scientifically evaluated
- Documented in the research literature

Traffic Safety Facts 2005



- **Crashes at traffic signals resulted in**
 - **2,950 fatalities**
~ 6.7% of total
 - **450,000 injuries**
~ 16%
 - **862,000 property damage only**
~ 20%

Traffic Safety Facts 2005

- **Speed-related crashes*** resulted in
 - **13,113 speed-related crash fatalities**
 - ~ 30% of total crash fatalities
- *Police reports note
 - Exceeding posted speed limit
 - OR**
 - Driving too fast for conditions
 - Speed not necessarily the primary cause of the crash



Automated Enforcement

Goals of Automated Enforcement:

Increase drivers' perceived risk of getting a ticket

Decrease risky behaviors

Reduce crashes



Automated Enforcement

- **The process is similar for red light and speed enforcement deployments**
- **A vehicle triggers a camera**
 - **The image includes the license plate, driver, and often other passengers**
 - **Trained personnel decide whether a ticket is warranted**

Automated Enforcement

- **Types of Deployments**
 - **Fixed/Overt**
 - Marked, mounted cameras monitor traffic
 - **Fixed/Not quite as overt**
 - A few cameras are moved among fixed locations
 - **Mobile/Overt**
 - Generally conspicuously marked vehicles monitor a specified area
 - May be mounted on tripods (UK)
 - **Mobile/Covert**
 - In unmarked vehicles

Automated Enforcement

- **Literature search revealed > 500 research reports**
 - Largely red light and speed enforcement
- **Screened for titles/abstracts**
 - Evaluation study
 - Pre/post safety outcome measures
 - Appropriate statistical analyses

Automated Enforcement

- **Studies were ranked by**
 - **Methodology**
 - **Safety-related outcome measures**
 - **Scientific rigor**
 - **Confounding variables**

Red Light Running

Definition

Entering an intersection after the light has turned red





Red Light Running

- **Report includes 7 studies**
- **6 reported safety benefits**
 - **Angle crashes were reduced**
 - 17%- 42%
 - **Rear-end crashes increased**
 - 5% - 51%
 - **Cost/Benefit analyses indicated net benefits**
- **These findings are consistent with the literature**

Speed



Speed deployment types

- Fixed, mobile, overt, covert
- Vehicles traveling more than preset speed trigger camera
- Image of car, driver, license plate reviewed by official

Speed



- **Potential unintended consequences**
 - **Kangaroo effect**
 - **Migration**

BUT

Speed reductions may spill over to areas that don't have automated enforcement equipment



Speed Enforcement

- **Fixed Overt Systems**
 - **Goal: reduction in crashes near the enforcement site**

Most scientifically rigorous:

Mountain, Hirst & Maher (2004)

- **25% fewer injury crashes w/in 500 meters upstream and downstream of the site**
 - 20% due to speed reduction, 5% due to migration

Speed Enforcement

- **Mobile Overt**
 - **Effects expected over a larger area than fixed overt**
- **Two studies, not well controlled**
 - **Crash reductions within 2 km of the camera site**
 - 12-18% reduction in crashes, 22% reductions in injury crashes
 - **Weaker effects up to 6 km from camera site**
 - **Reductions in mean and 85th percentile speeds**

Speed Enforcement

Mobile Covert

- **Effects expected over still wider area**
- **Reduce kangaroo, migration**

Two Studies Indicate

- **Crash reductions of 9 - 23% throughout corridor**
- **No evidence of migration or kangaroo effect**
- **Effects evident even in areas without automated enforcement equipment**

Recommendations

General

- **Plan deployments to allow reliable evaluations of their effects**
 - **Control for Regression to the Mean**
 - **Avoid including only “worst” sites**
- **Red Light**
 - **Treatment & comparison sites should have similar traffic volume, approach speeds, signal timing**
 - **Include crash severity measures**

Recommendations

Speed

- **Considerations for selecting comparison sites**
 - **Positive spillover effects**
 - **Migration & kangaroos**
 - Especially in fixed deployments

Roadblocks

- Revenue
- Privacy
- Fairness



Conclusions

- **Enlist stakeholder cooperation**
 - **Solicit public support**
 - Extensive pre-deployment information
 - Find acceptable revenue recipient
 - Select popular sites (schools, construction zones)
 - **Anticipate changes at the study sites that could influence results**

Automated Enforcement Systems

