If you’re going to...

NEW DELHI
Delhi on arrival: it’s 4:45 am
Rule 1: for Street Food experiences

eat this, not that
AIIMS: premier medical facility for 1.2 billion people
# The All India Institute of Medical Sciences: 2008-2009

## Hospital Services

<table>
<thead>
<tr>
<th></th>
<th>OPD</th>
<th>Admission</th>
<th>Surgery</th>
<th>Bed (Gen.)</th>
<th>Bed (Pvt.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Hosp.</td>
<td>1507786</td>
<td>174353</td>
<td>79578</td>
<td>1486</td>
<td>125</td>
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<tr>
<td>Dr.R.P. Centre</td>
<td>400914</td>
<td>29642</td>
<td>29276</td>
<td>280</td>
<td>21</td>
</tr>
<tr>
<td>Dr.BRA, IRCH</td>
<td>74280</td>
<td>23822</td>
<td>6651</td>
<td>167</td>
<td>15</td>
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<tr>
<td>C.T. Centre</td>
<td>227737</td>
<td>10614</td>
<td>3477</td>
<td>166</td>
<td>14</td>
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<tr>
<td>N.S. Centre</td>
<td>100074</td>
<td>6396</td>
<td>2741</td>
<td>166</td>
<td>14</td>
</tr>
<tr>
<td>C.C.M.</td>
<td>166886</td>
<td>29033</td>
<td>—</td>
<td>50</td>
<td>—</td>
</tr>
<tr>
<td>JPNAT Centre</td>
<td>37177</td>
<td>19226</td>
<td>1128</td>
<td>30</td>
<td>—</td>
</tr>
</tbody>
</table>

AllIMS Annual Report 2009. Printed February 2010
Rule 2: if you see monkeys coming, go the other direction.
Settling in at the Trauma Center
Trauma Center layout:

- Patients are triaged and sent to color coded units within the trauma center ED.
Minor differences when getting to know your team

Sir or Ma’am over first/last names.

Chai breaks with the team
Rule 3: these guys are dangerous
1 Hartmann’s, 2 enterotomy repairs, 2 washouts, 3 weeks in ICU
Rule 4: don’t do this
Because this can happen:
Please turn away if you are uncomfortable with graphic images
Road Safety in India: National Data on RTAs by vehicle involved

<table>
<thead>
<tr>
<th></th>
<th>2-wheelers</th>
<th>Auto-rickshaw</th>
<th>Cars</th>
<th>Buses</th>
<th>Trucks, tempo, tractor and other articulated vehicles</th>
<th>Other Motor Vehicles</th>
<th>Other Vehicles/Objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accidents</td>
<td>22.4</td>
<td>6.9</td>
<td>20.6</td>
<td>8.7</td>
<td>22.6</td>
<td>10.9</td>
<td>7.9</td>
</tr>
<tr>
<td>Fatal Accidents</td>
<td>17.8</td>
<td>4.3</td>
<td>17.1</td>
<td>9.5</td>
<td>30.2</td>
<td>11.4</td>
<td>9.7</td>
</tr>
<tr>
<td>Persons Killed</td>
<td>15.7</td>
<td>4.0</td>
<td>17.5</td>
<td>10.3</td>
<td>28.7</td>
<td>13.8</td>
<td>10.0</td>
</tr>
<tr>
<td>Persons Injured</td>
<td>20.2</td>
<td>7.7</td>
<td>20.3</td>
<td>11.6</td>
<td>21.2</td>
<td>11.4</td>
<td>7.6</td>
</tr>
</tbody>
</table>

Note: Cars includes jeeps & taxis, Two-Wheelers includes Motor cycle, Scooter & Moped; Other Vehicles/Objects includes Cycle, Cycle rickshaws, Hand drawn vehicle, Pedestrian, Animal, Tree, Level crossing & Other fixed objects.
Road Safety in India: National Data by type of vehicle user

Chart 12: Percent Share of Persons Killed in Road Accidents by Type of Road User Category during 2009

- Pedestrian
- Motor Cycles, Scooters, Mopeds
- Car, Taxis etc.
- Buses
- Other Objects
- Bicycles
- Auto Rickshaws
- Trucks
- Other Motor Vehicles

India Transportation Ministry report: Road Accidents in India 2009
Road Traffic Accidents

HINDUSTAN TIMES, NEW DELHI
FRIDAY, MARCH 18, 2011

Delhi tops nation in accident deaths

DEAD END Mumbai is second; traffic police say will get rid of tag

NEW DELHI: Despite a fall in the number of road fatalities by 10% last year, Delhi continues to be the country's accident deaths capital. The latest report by the National Crime Records Bureau (NCRB) shows the national Capital topped in road fatalities among the country's metros, with 2,335 accident deaths reported in 2009.

In Mumbai, 772 persons were killed the same year.

In Bangalore, the figure stood at 742, while in Chennai, 598 persons lost their lives in road accidents.

Delhi Police say although they have brought down fatalities by 10% last year, there was a need to bring it down further. The police say they are now trying to get rid of the tag of 'death capital' by sustained prosecution of commercial vehicles for traffic rule violations and drink driving.

"We target bringing down road accidents and fatalities by 15-20% at least. By the end of this year, we expect to bring down the figure to below 2,000," said Satyendra Garg joint commissioner of police (traffic).

Since 2005, road deaths in the city have always stood above 2,000.

"We have identified the main causes of road mishaps. If you can control violation of traffic rules by commercial vehicles and drink driving, cases of road mishaps will drastically come down," Garg added.

"We have come down heavily on commercial vehicles this year and are not sparing any for even minor faults. Till February 28, we have challaned 1,39,289 commercial vehicles," said a traffic police officer.

In co-operation with the courts, offenders are sent to jail and their licenses suspended. This year, over 500 people were sent to jail for drink driving.
In case you’re wondering, other vehicles do not respect the space of motorcycle riders.

Approaching vehicle

About 6 inches

My Leg

Please keep your hands and arms inside the motorcycle.
Helmet History in New Delhi

1984: AIIMS helmet Data
1988: Motor Vehicles Act
1997: Delhi Implements MVA
1999: High Court Exemption passed
Helmet Research in New Delhi

• Identify attitudes towards helmet usage and any contributing factors among Sikh, Hindu and Muslim women in New Delhi
Settling in to Field Work:

Surveys were collected in on the street encounters from women aged 16-65.
Surveying attitudes on Helmet Use

• Frequency of Motorbike use
• Helmet use as Pillion
• Belief in Helmet use efficacy
• Beliefs about Traumatic Brain Injury outcomes
• Influences of beliefs about helmet efficacy
• Demographic Data
Helmet Research in New Delhi

- Identify attitudes towards helmet usage and any contributing factors among Sikh, Hindu and Muslim women in New Delhi

- Identify actual rates of helmet usage and rates of appropriate helmet usage among women pillion riders in New Delhi
Setting up the Observational Component
What were we trying to capture?
Actual and appropriate rates of helmet use
Helmet Research in New Delhi

- Identify attitudes towards helmet usage and any contributing factors among Sikh, Hindu and Muslim women in New Delhi.

- Identify actual rates of helmet usage and rates of appropriate helmet usage among women pillion riders in New Delhi.

- Identify primary patterns of injury among male and female pillion riders, helmeted and non-helmeted.
Sorting through Medical Records…

Looking for Patterns of Injury among Pillion Riders in Road Traffic Accidents
What did we end up with?

- Collected 306 Surveys from women around New Delhi
- Collected 468 charts of patients who were pillion riders involved in RTAs
- Collected 8 hours of video at heavily trafficked intersections in New Delhi
# Patterns of Injury Data
## Outcome of Death

<table>
<thead>
<tr>
<th></th>
<th>Number of Patients</th>
<th>Percent of total patients</th>
<th>Percent of total deaths</th>
<th>Percent deaths by patient gender</th>
<th>Percent of DOAs</th>
<th>Percent of Inpatient deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>468</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td>270</td>
<td>57.7%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td>197</td>
<td>42.1%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Deaths</strong></td>
<td>66</td>
<td>14.1%</td>
<td></td>
<td>47.0%</td>
<td>80.0%</td>
<td></td>
</tr>
<tr>
<td><strong>Male deaths</strong></td>
<td>31</td>
<td>6.6%</td>
<td></td>
<td>11.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Female deaths</strong></td>
<td>35</td>
<td>7.5%</td>
<td></td>
<td>17.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total DOA</strong></td>
<td>5</td>
<td>1.1%</td>
<td>7.6%</td>
<td></td>
<td>20.0%</td>
<td></td>
</tr>
<tr>
<td><strong>Male DOA</strong></td>
<td>4</td>
<td>0.9%</td>
<td>6.1%</td>
<td></td>
<td>80.0%</td>
<td></td>
</tr>
<tr>
<td><strong>Female DOA</strong></td>
<td>1</td>
<td>0.2%</td>
<td>1.5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ED Deaths (m)</strong></td>
<td>1</td>
<td>0.2%</td>
<td>1.5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total IP Death</strong></td>
<td>61</td>
<td>13.0%</td>
<td>92.4%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Male IP Death</strong></td>
<td>26</td>
<td>5.6%</td>
<td>39.4%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Female IP Death</strong></td>
<td>35</td>
<td>7.5%</td>
<td>53.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Helmet Use Data

Pillion Rider Helmet Usage by Gender

- Male Helmeted: 40.0%
- Women Helmeted: 1.5%
- Men Unhelmed: 52.6%
- Women Unhelmed: 83.8%
- Men Unknown Helmet: 7.4%
- Women Unknown Helmet: 14.7%
### Patterns of Injury Data

#### Outcome of Death by Helmet Use

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percent helmet status by gender</th>
<th>Deaths by helmet status</th>
<th>Percent deaths by gender</th>
<th>Percent deaths by gender by helmet use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male Helmeted</strong></td>
<td>108</td>
<td>40.0%</td>
<td>7</td>
<td>6.5%</td>
<td>22.6%</td>
</tr>
<tr>
<td><strong>Women Helmeted</strong></td>
<td>3</td>
<td>1.5%</td>
<td>0</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Men Unhelmeted</strong></td>
<td>142</td>
<td>52.6%</td>
<td>22</td>
<td>15.5%</td>
<td>71.0%</td>
</tr>
<tr>
<td><strong>Women Unhelmeted</strong></td>
<td>165</td>
<td>83.8%</td>
<td>30</td>
<td>18.2%</td>
<td>85.7%</td>
</tr>
<tr>
<td><strong>Men Unknown Helmet</strong></td>
<td>20</td>
<td>7.4%</td>
<td>2</td>
<td>10.0%</td>
<td>6.5%</td>
</tr>
<tr>
<td><strong>Women Unknown Helmet</strong></td>
<td>29</td>
<td>14.7%</td>
<td>5</td>
<td>17.2%</td>
<td>14.3%</td>
</tr>
</tbody>
</table>
### Patterns of Injury Data

#### Surgical Procedures Required

<table>
<thead>
<tr>
<th></th>
<th>Number of Patients</th>
<th>Percent of Total Patients</th>
<th>Percent of Patients by Gender</th>
<th>Percent of total surgery</th>
<th>Percent of Deaths by Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>468</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Men</strong></td>
<td>270</td>
<td>57.7%</td>
<td>42.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Women</strong></td>
<td>197</td>
<td>42.1%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Surgery</strong></td>
<td>204</td>
<td>43.6%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Men Surgery</strong></td>
<td>115</td>
<td>24.6%</td>
<td>42.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Women Surgery</strong></td>
<td>88</td>
<td>18.8%</td>
<td>44.7%</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Neurosurgery</strong></td>
<td>89</td>
<td>19.0%</td>
<td></td>
<td>43.6%</td>
<td></td>
</tr>
<tr>
<td><strong>Men NS</strong></td>
<td>43</td>
<td>9.2%</td>
<td>15.9%</td>
<td>21.1%</td>
<td>37.4%</td>
</tr>
<tr>
<td><strong>Women NS</strong></td>
<td>45</td>
<td>9.6%</td>
<td>22.8%</td>
<td>22.1%</td>
<td>51.1%</td>
</tr>
<tr>
<td><strong>NeuroSurg w/Death</strong></td>
<td>30</td>
<td>6.4%</td>
<td></td>
<td>45.5%</td>
<td></td>
</tr>
<tr>
<td><strong>Men NS w/Death</strong></td>
<td>15</td>
<td>3.2%</td>
<td>5.6%</td>
<td>22.7%</td>
<td>48.4%</td>
</tr>
<tr>
<td><strong>Women NS w/Death</strong></td>
<td>15</td>
<td>3.2%</td>
<td>7.6%</td>
<td>22.7%</td>
<td>42.9%</td>
</tr>
</tbody>
</table>
Additional POI data for review

• Primary Diagnoses by Helmet Use status
• Functional Independence Measures on discharge by Helmet Use status
• Length of Stay by Helmet Use status
• Discharge from ED by Helmet Use status
• Helmet Use status by age and education level
Survey Outcomes
Preliminary Review

Mandatory Helmet Use 88.2%
- Hindu 75.5%
- Muslim 6.1%
- Sikh 7.5%
- Christian/other 10.9%

No Mandate 9.5%
- Hindu 50.0%
- Muslim 6.3%
- Sikh 25.0%
- Christian/other 18.8%

Total Surveys 167
Surveyed Results on Beliefs about Head Injury Outcomes

- Disability more common than death: 71.9%
- Death more common than Disability: 25.1%
Observational Data

- Captured over 1000 pillion riders on preliminary review
  - All female pillions were unhelmeted
  - Roughly half of male pillions were helmeted
- Captured a high number of unhelmeted drivers
- Captured a high number of MTWs with more than one adult pillion rider
Future Directions

• Repeat studies in other Indo-Pakistani Municipalities

• Helmet Education and Policy Campaigns
Special Thanks to Collaborators and Colleagues!

- The Feinberg School of Medicine
- Dr. Mamta Swaroop and Dr. Marie Crandall
- The Northwestern University Center for Global Health
- The AIIMS Jai Prakash Narayan Apex Trauma Center Trauma Nurse Coordinator Staff
- Dr. Amit Gupta and Dr. Sushma Sagar of AIIMS JPNATC
- Dr. Sumant Arora, Government Medical College and Hospital, Chandigarh