



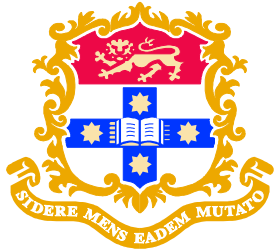
# **Standards for Household Travel Surveys: Applicability to China**

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**CPN 首届中国城市交通国际年会**

China Planning Network 1st Urban Transportation Congress

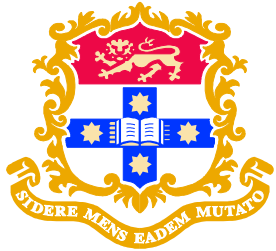


# Outline



- ❖ **The situation in China**
- ❖ **The value of standards**
- ❖ **Some applicable standards, standardised procedures, and applicable best practices**
- ❖ **Technological advances in tracking travel behaviour**
- ❖ **Conclusions**





# Situation in China



- ❖ **Major cities have undertaken household travel surveys (HTSs)**
- ❖ **Population density is high**
- ❖ **Samples are very large – 20,000 to 80,000 households**
  - ❖ **The large samples collected are not statistically necessary**
- ❖ **Major focus is cycling, walking, and public transport**



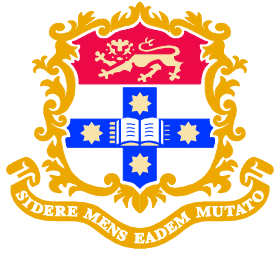


# Situation in China



- ❖ **Apart from the use of mobile phones in Shanghai in 2004, surveys have not used advanced technologies**
- ❖ **Survey results are not widely publicised or available**
- ❖ **Survey data are not generally shared with third parties**
- ❖ **Other...?**



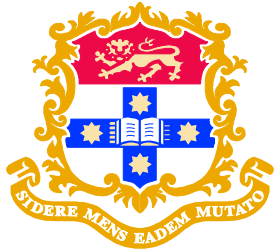


# The Value of Standards



- ❖ **Helps to ensure good quality survey data**
- ❖ **Guides those who are less knowledgeable about surveys**
- ❖ **Provides for comparability among surveys**
- ❖ **BUT...**
- ❖ **Care must be taken that standards do not stifle innovation**



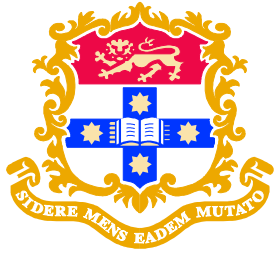


# Background



- ❖ **Project in the USA to develop standardised procedures for household travel surveys**
- ❖ **Recent deliberations at a series of international conferences on applicable standards**
- ❖ ***Household Travel Surveys: Proposed Standards and Guidelines* by Stopher, Wilmot, Stecher, and Alsnih (2006)**

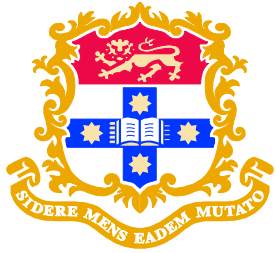




# Structuring the Survey Process



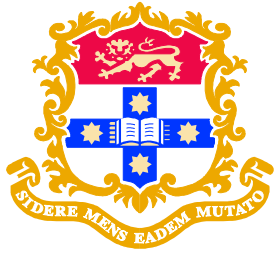
- ❖ **Seven principal subtopics:**
  - ❖ **Design of survey instruments**
  - ❖ **Design of data collection procedures**
  - ❖ **Pilot surveys and pretests**
  - ❖ **Survey implementation**
  - ❖ **Data coding and geocoding**
  - ❖ **Assessment of survey quality**



# Survey Instrument Design



- ❖ **Proposed standards deal with:**
  - ❖ **Minimum question specification**
    - ❖ **Household**
    - ❖ **Person**
    - ❖ **Vehicle**
    - ❖ **Activity/travel**
  - ❖ **Standardising categories**
  - ❖ **Standardising question wording**



# Survey Instrument Design



## ❖ Standard questions

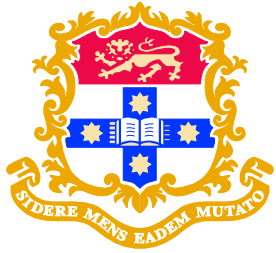
- ❖ Probably need to be developed for Chinese situations specifically

## ❖ Standardising categories

- ❖ Depend on standard questions

- ❖ Can be specified at two or more levels of detail

- ❖ Help to ensure comparability from survey to survey

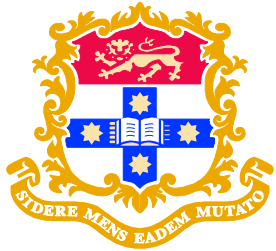


# Survey Instrument Design



- ❖ **Standard question wordings**
  - ❖ **Depend on standard questions**
  - ❖ **Can help with difficult-to-word questions**
  - ❖ **Ensure that the same thing is being measured in each survey**
  - ❖ **Essential with standard categories**





# Design of Data Collection Procedures



- ❖ **Number and type of contacts**
  - ❖ **Specifies use of advance letters**
  - ❖ **Reminders for surveys conducted where a reminder is appropriate**
- ❖ **Proxy reporting**
  - ❖ **Reports of travel on behalf of others are usually very erroneous**
  - ❖ **Other than for children under a specified age, proxy reports should be discouraged**
  - ❖ **Surveys should report the proportion of adult respondents whose travel was obtained through proxy reports**



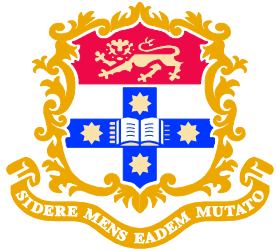


# Design of Data Collection Procedures



- ❖ **Complete household definition**
  - ❖ **Needs to be defined consistently for all household travel surveys in China**
- ❖ **Sample replacement**
  - ❖ **Adherence to random sampling procedures is extremely important**
  - ❖ **Pilot surveys can help to estimate the likely need for replacement sample**

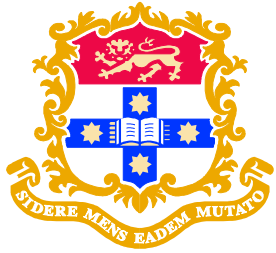




# Design of Data Collection Procedures



- ❖ **Item and Unit nonresponse**
  - ❖ **Need good statistics**
  - ❖ **Undertake nonresponse surveys**
  - ❖ **Develop procedures to reduce both types of nonresponse**
- ❖ **Initial Contact**
  - ❖ **Need to determine how to engage prospective respondents in the opening words of the first contact**



# Design of Data Collection Procedures



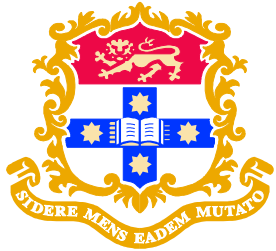
## ❖ Incentives

- ❖ Need to determine if these work in China and what is appropriate to use

## ❖ Respondent Burden

- ❖ Must be kept as low as possible
- ❖ Time requirements from participants should be estimated for various tasks involved in the survey

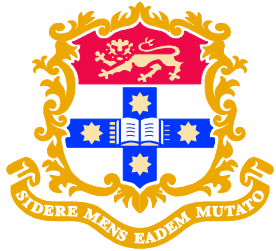




# Pilot Surveys and Pretests



- ❖ **Pilot Survey – complete run through of the survey**
- ❖ **Pretest – test of individual elements of the survey**
- ❖ **Pilot Surveys and pretests**
  - ❖ **Should ALWAYS be done**
  - ❖ **Debrief interviewers**
  - ❖ **Thoroughly review completed surveys**



# Sampling for Pilot Surveys and Pretests



- ❖ **Samples should be drawn after main sample is drawn**
- ❖ **Sample sizes should never be less than 30 and should be as large as can be afforded**
  - ❖ **Sample sizes for certain variables are specified in Stopher *et al.* (2006)**



# Survey Implementation



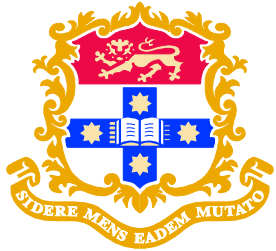
## ❖ Ethics

- ❖ **Need to adhere to appropriate ethical standards in conducting surveys**

## ❖ Respondent questions

- ❖ **Should provide a toll-free phone number**
- ❖ **Internet web site should also be used**

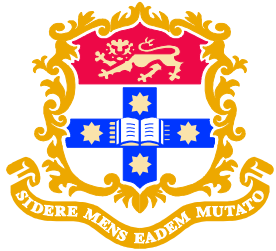




# Survey Implementation



- ❖ **Incorrect reporting of non-mobility can be used as a nonresponse mechanism**
  - ❖ **Verify reasons for non-mobility**
  - ❖ **Distinguish between refusals to provide data and reported non-mobility**
  - ❖ **Report levels of non-mobility in the data**
- ❖ **Beginning and ending of survey period**
  - ❖ **Should be consistent in all surveys**
  - ❖ **Recommended to be 2 or 3 a.m.**



# Data Coding



## ❖ Geocoding

- ❖ **Need to establish minimum acceptable standards for geocoded addresses**

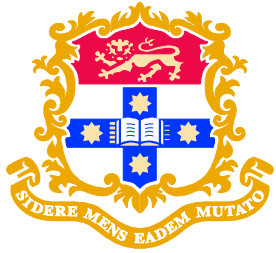
- ❖ **Complete address information should be sought in the survey**

## ❖ Coding complex variables

- ❖ **Use multi-digit codes**

- ❖ **Recommend using codes specified in Stopher *et al.* (2006)**



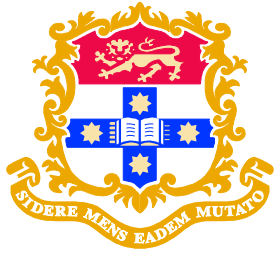


# Data Coding



## ❖ Missing values

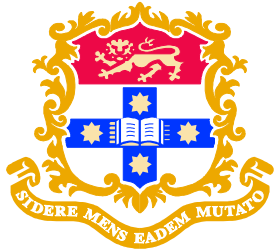
- ❖ **Establish certain codes to indicate missing values**
  - ❖ E.g., -97 not applicable, -98 don't know, -99 refused
- ❖ **Do NOT use blanks**
- ❖ **Keep numeric values corresponding with reported values for counts**
- ❖ **Code the number of person trips or tours**
- ❖ **Use 1 and 2 for binary variables, not 0 and 1**



# Data Analysis and Expansion



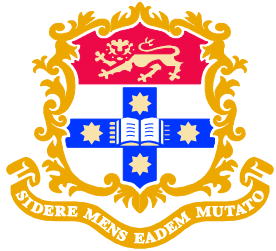
- ❖ **Assess sample bias**
  - ❖ **Compare key survey statistics with full population**
  - ❖ **Calculate percent RMSE for key variables**
- ❖ **Weighting and expansion**
  - ❖ **Include weights in the data set**
  - ❖ **Describe the weighting process**
    - ❖ **Identify weighting for households, persons, trips**
  - ❖ **Include expansion factors**



# Data Analysis and Expansion



- ❖ **Missing data imputation**
  - ❖ **Conduct data editing on all surveys**
  - ❖ **Use inference first to repair missing data**
  - ❖ **Use imputation, where inference fails**
  - ❖ **Flag all inferred or imputed values**
- ❖ **Data archiving**
  - ❖ **Preserve household travel survey data**
  - ❖ **Use best practices in archiving data**
- ❖ **Documentation**
  - ❖ **ALWAYS document the survey**
  - ❖ **Follow guidance in Stopher *et al.* (2006)**



# Assessment of Quality



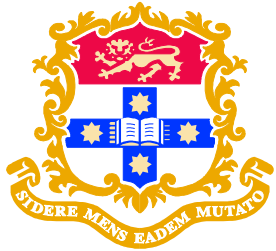
## ❖ Response rates

- ❖ Use AAPOR Response Rate 3 (modified) for calculating response rates

## ❖ Transport Quality Measures

- ❖ Trip rates
- ❖ Non-mobility rates
- ❖ Activity rates (?)



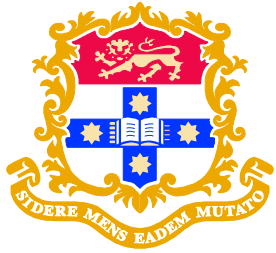


# Assessment of Quality



## ❖ Other measures as specified by Stopher *et al.* (2006)

- ❖ Coverage error
- ❖ Proxy reporting
- ❖ Validation statistics
- ❖ Data cleaning statistics
- ❖ Missing values statistics
- ❖ Adherence to quality guidelines



# Technological Advances



- ❖ **Past household travel surveys rely on self-report**
  - ❖ **Self-report has been shown to be erroneous**
- ❖ **Internet surveys**
  - ❖ **Difficult to control sampling, hence expansion to the population**
  - ❖ **Can be used as one of two or more mechanisms for survey response**





# Personal GPS



- ❖ **Personal logging GPS devices have become smaller, lighter and cheaper**
- ❖ **Recruitment and completion rates are comparable to other surveys**



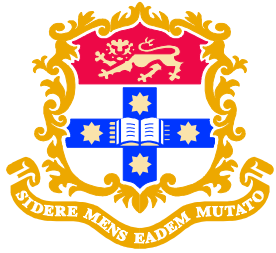


# Personal GPS



- ❖ **Capable of collecting very accurate travel information**
- ❖ **Through processing, can identify**
  - ❖ **Each trip**
  - ❖ **Trip tours**
  - ❖ **Travel duration (minutes and kms)**
  - ❖ **Location of origin and destination**
  - ❖ **Travel modes used**
  - ❖ **Trip purpose**

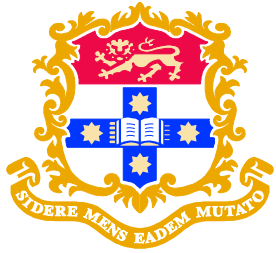




# Personal GPS



- ❖ **Low in respondent burden**
- ❖ **High in accuracy**
- ❖ **Not subject to self-reporting issues**
- ❖ **However ...**
  - ❖ **Devices can be left at home**
  - ❖ **Devices can run out of power**
  - ❖ **Some signal acquisition problems arise**

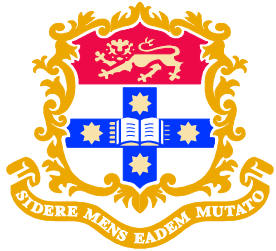


# Personal GPS



- ❖ **Potential to replace self-report surveys**
- ❖ **Offer both the chance to log data and record in real time**
- ❖ **Further developments in processing software promise high degree of data completeness**
- ❖ **Requires a good GIS for analysis of data**





# Conclusions



- ❖ **Many standards, standardised procedures, and best practices are readily transferable to China**
- ❖ **Standardisation and adoption of best practices are important to maintain value in data and comparability**
- ❖ **GPS and emerging technologies may provide an alternative to self-report surveys**
- ❖ **China is in a position to pioneer the development of improved household travel surveys**

