

***Using MCHP Data for Research:
One Clinician's Viewpoint***

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Introduction

About me:

- an adult Intensivist & Respiriologist -- arrived in 2007 from U.S.
- research interests: health services research in the ICU; ICU structure-function; epidemiology of critical illness
- extensive past experience creating & analyzing small databases
- capable programmer, with fairly sophisticated statistics knowledge -- have always done my own analysis (using Stata, not SAS)

My experiences with MCHP so far have been dominated by being fortunate to almost immediately (at Pat Marten's suggestion) successfully pitch the idea for a MCHP Deliverable about the epidemiology of critical illness in Manitoba

The View from the Top (i.e. having a Deliverable)

The project supports, for the duration:

A programmer/analyst (Marina Yogendran)

- intimately knows the repository and existing software used to manipulate and mine it; expert SAS programmer and data analyst

A coordinator (Kari-Lynne McGowan)

- does literature research; provides organizational support

A co-PI from MCHP (Randy Fransoo)

- PhD epidemiologist with intimate knowledge and experience using the repository, and doing epidemiology

Obviously, few clinicians interested in using the repository in their research will have these powerful *productivity resources* readily (or freely) available to them

Working with the MCHP Respository: Benefits

Access to a comprehensive, high quality, administrative database covering all Manitobans since 1974

- wide variety of data, including: hospitalizations, MD visits, pharmacy use, home care, socioeconomic indicators, others

Merge repository data with less comprehensive but more detailed databases (e.g: clinical databases such as the ICU or Medicine DBs; disease registries such as that of CCM or the MS Clinic)

- creates powerful tools to address questions spanning the worlds of population-based epidemiology, HSR & outcomes research
- ability to compare data on your patients with comparison groups drawn from all Manitobans
- e.g: ICU DB + disease-specific registries + long-term administrative data = ability to investigate the bidirectional influences of chronic conditions & critical illness

Using the MCHP Respository: Challenges

Lack of familiarity with what's in the repository

- and it's difficult to become familiar without considerable assistance from MCHP personnel

Lack of familiarity with administrative data

- both its special powers and special limitations

It's deidentified -- thus merging it with your own data requires sending your data to MCHP after deidentification by MHL all subsequent work must be done with the deidentified, merged data set

Can only be accessed from special locations

- can't get it on a disc and take it to your office to work on

Some Ideas to Address the Challenges

Initial outreach to clinical departments -- presentations at departmental faculty meetings to make researchers (and potential researchers) aware of the potential

A (regularly scheduled) short course for interested but uninitiated clinical researchers -- covering issues related to: administrative data, the content and capability of the repository, steps needed to use it & help obtaining resources to do so

Acquire & develop a system to provide resources to facilitate initial, small projects by unfunded researchers

- (a) no new infrastructure, but money contributed by MHL, the university, local research-supporting agencies, local charitable agencies to pay for existing MCHP personnel *OR*
- (b) moneys to hire new personnel dedicated to this purpose *OR*
- (c) infrastructure to help the uninitiated apply for local grant money to support such projects

Specific Aims of the ICU Deliverable

1. Merge the MCHP administrative data set with the WRHA clinical ICU database
2. Develop a reliable method of using the administrative data to identify patients who received critical care outside the WRHA
3. Combine separate hospital abstracts into appropriate episodes of hospital care, and similarly to combine separate ICU records into episodes of ICU care
4. Quantify ICU utilization and ICU patient characteristics in Manitoba
5. Assess outcomes and resource use related to critical illness, both short-term and long-term

Results from the ICU Deliverable

SA#1: 50,410 ICU database records 99.2% could be linked to a single hospital abstract, matching on at least 7 of 8 individual identifiers

SA#2: Using the ICU database as the reference standard, we showed that the existence and timing of ICU care can be accurately identified from information present in the hospital abstracts alone → can identify ALL ICU care in the province, not just that in the WRHA

Era	#ICU-containing hospitalizations	#nonICU-containing hospitalizations	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Pre-2004	25,891	345,591	96.4	98.9	86.3	99.7
Post-2004	18,743	230,310	97.2	99.9	98.7	99.8

Results from the ICU Deliverable

SA#3: ICU & hospital episodes constructed, for subseq. analyses

- hospitals *not* included in the ICU database contribute 25% of ICU records, and 27% of ICU-containing hospital abstracts

SA#4:

- MB has 118 ICU beds = 9.8 per 100,000 population for the whole province, and 13.4 in the WRHA
 - ☞ compare: 14.8 in Ontario, 13.5 for Canada, 20.0 for the US, States, 3.5-24.6 for selected European countries
 - ☞ ICU beds in MB = 3.3% of adult, acute care hospital beds
- 6,300 ICU episodes/yr -- approx 5% for non-Manitobans
- maximum daily ICU bed occupancy: avg 70-80% in Winnipeg ICUs, 46% in the Brandon ICU, and 28% for the rural ICUs

More Specific Aim#4 Results

Rates of ICU care are fairly high

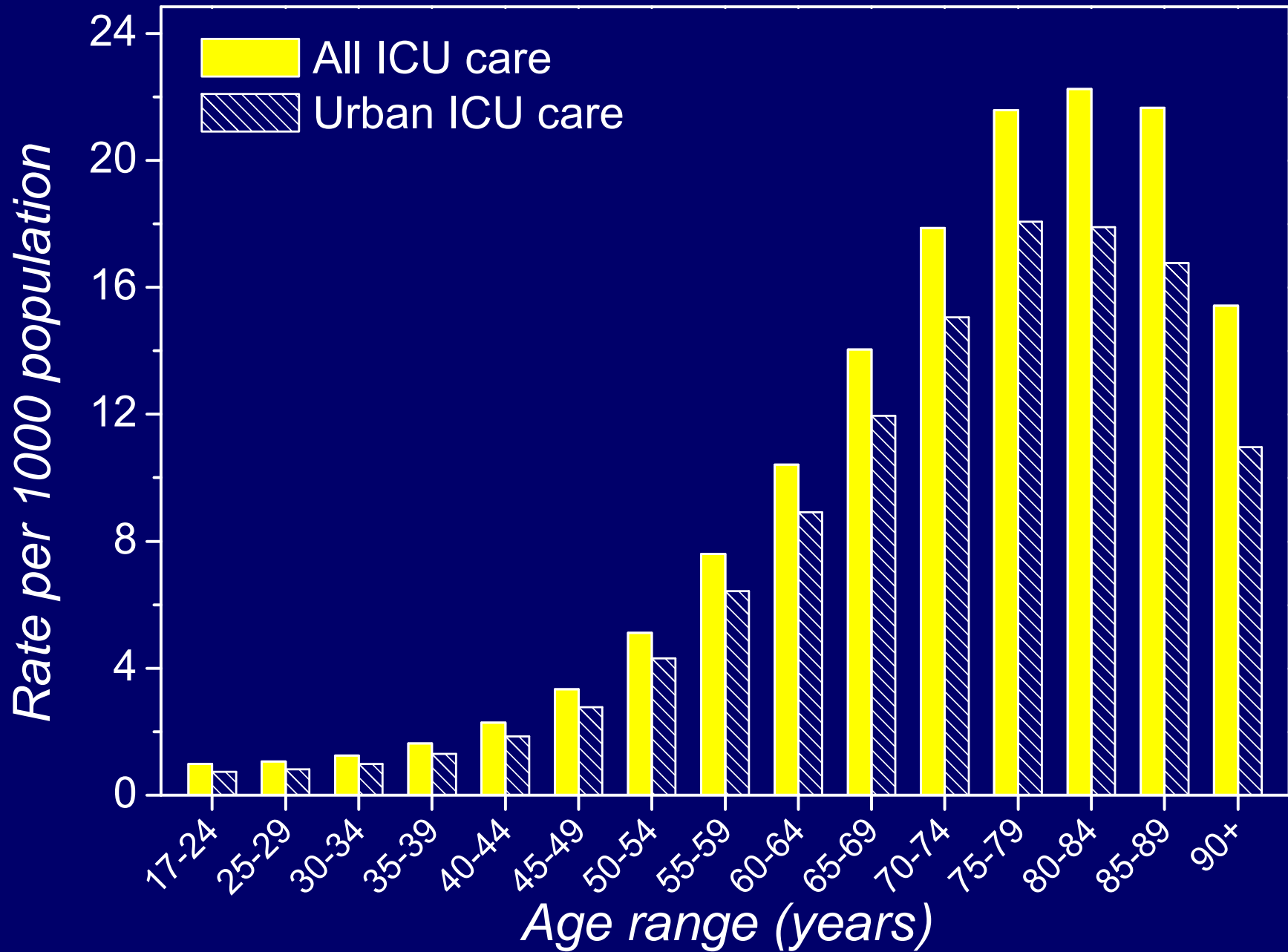
- 0.46% of women, 0.72% of men admitted to ICU yearly -- twice that of Calgary, half that of Olmsted County
- **NOTE: big male predominance**

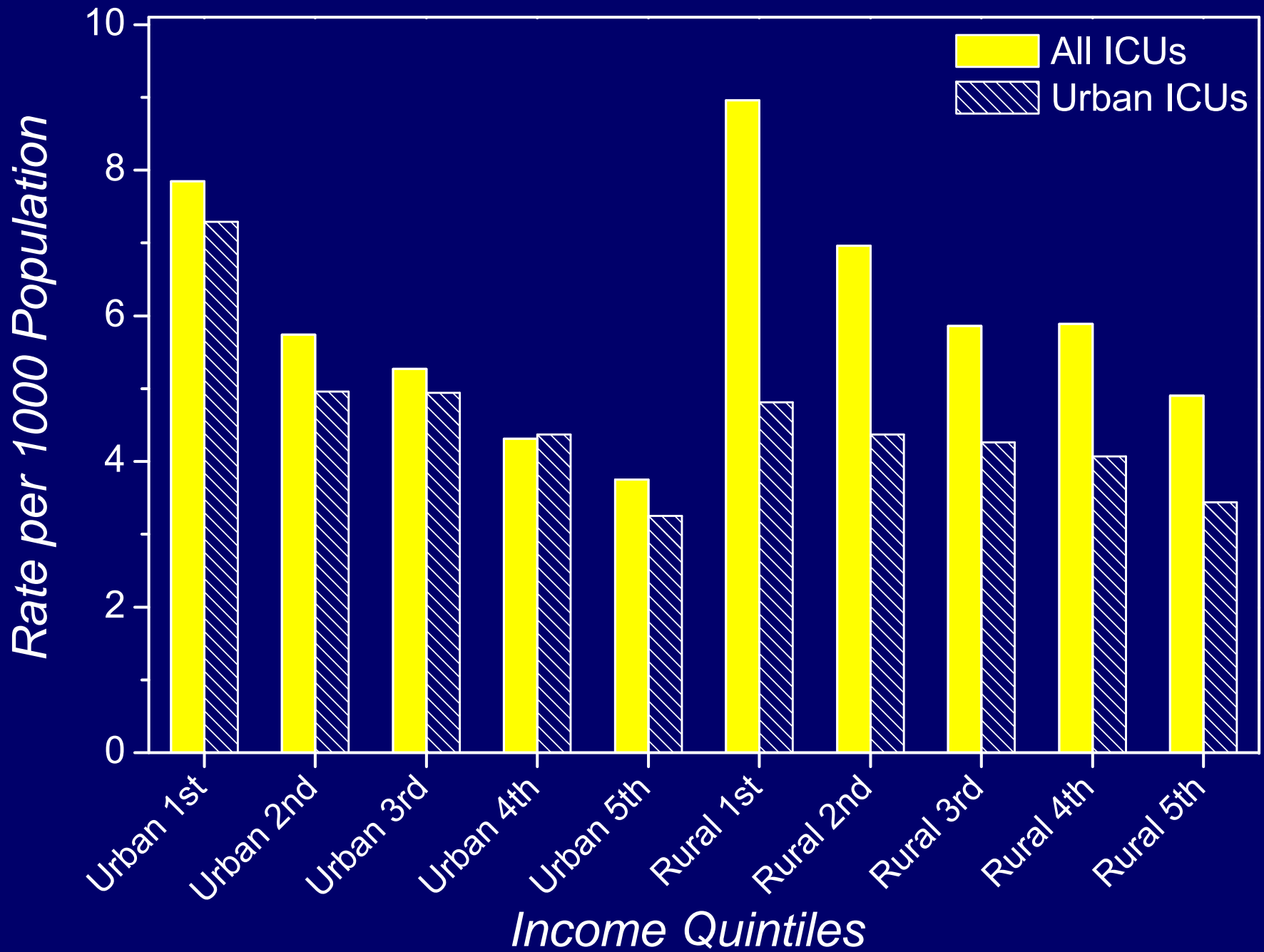
Incidence of ICU care rose rapidly after age 40, peaked at 75-80, *and then declined* for the oldest age groups

- this decline was seen in Calgary, but not Olmsted County

Yearly rate of ICU care fell over time for patients >50 years old, with progressively larger rates of fall with increasing age

Rates of ICU care are systematically higher for those in lower SES strata





About These Disparities

Possible explanations:

- true differences in the underlying rates of critical illness
- confounding variables -- e.g. comorbidity, age, etc.
- differential willingness (between the sexes, of older vs. younger, changes over time) to receive the type of aggressive care provided in ICUs
- differential access to the entry points to ICU care, i.e. emergency departments and hospital wards
- differential access to ICU care at some point downstream from emergency departments and hospital wards (e.g. by the ICU gatekeepers)

We are planning further work to figure this out

*We can't solve problems by using
the same kind of thinking we used
when we created them.*

Albert Einstein