The Christchurch Earthquake

Tony Smith, Medical Director, St John, New Zealand
Christchurch earthquake

Talk briefly about St John

Earthquake
  Events
  Challenges
  Ongoing challenges
  What we learnt

Questions
St John in New Zealand

- A charity
  - Range community services
  - Emergency ambulance service
  - Core funding from Government
  - Large additional contribution from St John charitable trust
- Heavy reliance on volunteers
  - Particularly in rural areas
- Multi level service
  - Five levels from basic to advanced paramedics
Christchurch

- Second largest city in NZ
  - 400,000 people
  - Stone and brick buildings
- Eight ambulances during day
  - Utilisation rate high
- One major hospital
Christchurch earthquake

- Not had large major incident for over sixty years
  - Planned, practiced, not truly tested
- 4 September 2010, 0400
- 6.3 M earthquake
  - Centred outside Christchurch
  - Not a known risk area for earthquakes
- Extensive but largely superficial damage
- Brief loss of power
- Extensive loss of water and sewerage
- Small number of injured
- Moderate amount of liquefaction
Liquefaction

- Christchurch built on an old flood plain
  - Sandy, fertile soil
  - Prone to liquefaction

**Formation of Water Fountains and Sand Boils**

- **Before earthquake**: Dense soil above loose sand
- **During earthquake**: Water and sand mix, densified sand forms
- **After earthquake**: Sand boil and settlement of ground
Liquefaction

- Like quicksand when wet
  - Then sets like concrete
  - Then turns to dust
Christchurch earthquake

- Aftershocks continued for months
  - Unusually high number able to be felt
  - Very unnerving for residents
  - Things appeared to be settling
- 22 February 2011, 1251
- 7.1 M earthquake
  - Centred on central business district
- Immediate widespread destruction
Houses on hills destroyed by slips
Historic buildings badly damaged
Walls fell away from buildings
A number of buildings collapsed
Including two multi-storey buildings
Earthquake overview

- 181 people killed
  - 124 in two multi-story buildings that totally collapsed
- Many hundreds injured
  - Thirty critically
- Widespread loss of power, water and sewerage
- Widespread damage to roads
- Widespread damage to buildings
  - 40% of buildings in the CBD to be demolished
  - Thousands of homes to be demolished
  - No building is untouched
- Liquefaction much worse than first earthquake
Liquefaction much worse
Liquefaction much worse
Initially overwhelmed

- South Island communications centre inoperable
  - Hundreds of calls, diverted to other two centres
  - Many calls went unanswered
  - Began despatching South Island from Auckland

- Major incident declared within minutes
  - National management team in place within twenty minutes
  - Very clear that it was a large major incident
  - Only thing that was clear…
Initially overwhelmed

- Getting reliable information very difficult
- Lost cell phone coverage to many areas
  - Ability to text remained
  - Cell phone batteries went flat quickly
- Lost landline contact in many cases
  - Many phones required power to work
- Lost AVL, MDT and paging
  - Couldn’t see where our vehicles were
  - Couldn’t despatch by normal means
- Intermittent loss of radio coverage
  - Couldn’t always despatch or speak over the air
- When we were able to despatch
  - Vehicles often couldn’t get to the job
Vehicles couldn't get to jobs
Vehicles couldn’t get to jobs
The first one to eight hours

- Main station and headquarters had to be evacuated
- Control and command established
  - National and local management teams in place
  - Plan fully activated, people allocated to roles, 12 hours shifts
  - Many staff unsure about family and friends
The first one to eight hours

- Regular teleconferences, Hospital and Ministry of Health
  - Web based information sharing
- Major change to usual transport ‘rules’
  - Only badly injured or very ill patients to hospital
  - Rest initially treated at home or triage points
- Four patients had amputations performed at the scene
  - Ketamine and tourniquets proved invaluable
- Two patients able to be reached, not able to be extricated
The first one to eight hours

- Vehicles and staff deployed into Christchurch
- 50 people on a plane from Auckland within four hours
- Additional staff contacted by group text
- All three NZ USAR teams deployed
- Major incident caches deployed
- Set up a number of triage points
Major incident caches
Triage points
The next twelve hours

› It went very quiet from a call perspective
  › Small numbers of patients extricated from buildings
  › Last patient extricated 22 hours after earthquake
› Accommodation, food arranged for arriving staff
› Community support immense
› Difficult getting some staff to go home
› Coordinated arriving staff and self responders
The next twelve hours

- Welfare centres were set up
- Learnt from the previous earthquake
- Priority for staffing with personnel
- Paramedics who were also nurses were invaluable
Welfare centres

- Presence of paramedics prevented ambulances being called unnecessarily
- Took control of health needs
- Helped coordinate GP clinics
The next few days

- Christchurch Hospital coping
  - But only just
  - Needed to move patients out
- Coordinated movement of 35 ICU patients over 48 hrs
  - Set up a temporary national air ambulance desk
- Coordinated movement of 150 ward patients over 72 hrs
- Call volumes rose again
  - Job cycle times very prolonged
- Large increase in shortness of breath, acute coronary syndrome and premature births
  - Occurred previous earthquake as well
The next few days

- Began ‘filtering’ patients in that had been managed up until now in the community
  - Large number of orthopaedic injuries
  - Re-distributed post op
- Set up a process for checking at risk people
- Set up a process for welfare checks
  - Utilised our caring caller service
- Staff welfare team put in place
Staff welfare

- Most staff had damaged homes
  - Some extensively
- Some staff had missing or injured relatives/friends
- Most staff not sleeping
  - Shortened our usual roster
  - Staff rostered out of town for sleep
- External staff rotated in for four day blocks to provide additional cover
- Peer support team in place 24 hours a day
The next few days

- We helped coordinate the movement of over 300 rest home patients out of Christchurch
- Complex and difficult task
The next few days

- Lots of vehicle problems
- Liquefaction dust caused air filters to block and door hinges to seize
- Rostered mechanics 24 hours a day
- Fuel stations without power or empty
  - Secured our own supply
The next few days

- Visits from Ministers, lots of media enquiries
Next few days to weeks

- Focus shifted away from patients to maintaining service
- Longer term rosters established
  - Still rotating extra staff in
- Buildings and stations formally assessed by engineers
- Communications centre re-opened
- Staff welfare an ongoing issue
- Job cycle times continued to be very long
- Workload in small towns around Christchurch rose
And then...

- After a period of ‘relative quiet’
- On 13 June another 6.1 M earthquake
  - More superficial damage
  - No significant injuries
  - More liquefaction…
- Psychological impact on staff and residents huge
  - Those ‘just holding it together’ are no longer doing so
  - Some want to leave
Summary

- The biggest event we have had to cope with
- Never been seriously tested before
- In general our plan worked well
  - Good team
- Learnt a lot
- There is a lot to be done for the city to recover
  - Estimated to take several decades
- Ongoing nature of large separate earthquakes unusual
  - September 2010, February 2011, June 2011
  - No-one knows when it is going to end
  - Makes it particularly difficult
Thank you

Tony.Smith@stjohn.org.nz