Scabies Clinical Reality Scenarios
The Significant Cost of Misdiagnosis

A sample of actual clinical scenarios:

- A 14 year old boy with chronic eczema since 2 years old, secondary bacterial infections and scarring. GP had scabies test done when eczema started at 2 years old, test negative (generally a low sensitivity test unless very experienced operator), GP had then proactively treated in case it was in fact scabies, no response so GP had quite reasonably believed scabies was ruled out. Also, likely because the eczema was so bad the child had not been cuddled skin to skin as much as he might have been, so no later secondary cases detected to suggest cross infection/infestation as source/cause. He was seen as a 14 year old, positive scabies, a 'miracle' cure transpired (except the secondary scarring). The mite had likely been resistant to the anti scabies cream available at the time or incomplete cream coverage

- A couple both with bad dermatitis about the time they had moved into their newly built house. Scabies test negative, (so not treated), 3 skin biopsies later – no specific cause identified, it was suggested that it may be an insect of some type in the new house – so the whole house was fumigated, no clinical response. Then it was suggested it may be a formalin or similar allergy (dermatologist) – so the whole house was re lined. $50k later after they initiated a self referral post a comment from a friend, positive scabies was confirmed – treated and cured. Their specialist clinician had said prior to testing he would 'eat his hat if it was positive for scabies'

- A 4 year old with dermatitis for 3 weeks – positive scabies – on asking if he went to pre school or where he had been in the 3-4 weeks prior to itch developing – no preschool, just with his Granny for 4 weeks who he adored and was in another (isolated) region living alone. There were no other contacts at the granny's when he was there. Further questioning – the granny had had bad dermatitis for 5 years, even been treated for scabies near the beginning, no effect, had now become suicidal which the family had never believed possible from her. Granny, child and mother treated with permethrin – child and granny cured

- A LTCF with x3 confirmed positive residents for scabies over 10 days. Treating all residents, staff etc was advised – clinical manager keen and agreed, as did a GP – over ruled by facility manager *'in case the public found out and also because it would affect her KPIs'* (in competition with other facilities, same company). Ongoing incidental cases there for 3 years until mass treatment finally agreed to – no more cases

- A LTCF with two wings of approximately 100 residents each. One of residents who had been there 5 years developed dermatitis, scabies confirmed. The resident had no visitors and did not leave the facility (so must have caught it from within). The staff regularly worked between both wings. It was advised that although a big task the most assured approach would be to treat all residents of both wings plus the staff (and consider families especially if any dermatitis). As no other cases of dermatitis of unknown/unexplained origin were known at all the decision was made to treat one wing only and all the staff. Four months later a resident in the other (untreated wing) had confirmed scabies. How widespread should the eradication treatment be now, one or both wings and all the staff??!

- A bed ridden (MS) resident of a LTCF who was displaced post the Chch earthquakes to another region (AKL) returned 6 months later with dermatitis. Scabies test requested/confirmed some weeks post return – under well monitored isolation, environmental/linen cleaning and contact precautions the resident had to be **treated 13 times 7-10 days apart with concurrent topical permethrin plus oral ivermectin to effect a cure**. Occasional viable mites were still being found after the twelfth double treatment. The facility she had come from in the other region said they had ongoing untreatable scabies throughout even when oral ivermectin had been used for seven months. An attending staff member of this resident also caught scabies (? from this resident) prior to diagnosis. Two topical permethrin treatments effected a cure – generally clears more easily in more immune competent, less debilitated persons. Four other Chch rest homes similarly affected post earthquake return residents from AKL – one of the AKL facilities that was contacted to advise of the potential source link replied *'yes of course, they all have it up here, it is an ongoing nightmare for us up here, we cannot clear it. Sorry, we assumed everyone knew so did not mention it on the resident discharge notes'*

- A dementia resident taken in to a LTCF (for the first time) post some weeks evaluation at a hospital. Had dermatitis either at or very soon after arrival at the LTCF. Scabies confirmed and treated, hospital denied it could have come from there, patient deteriorated markedly becoming very aggressive, hospital refused readmission for psych re evaluation because of the scabies risk which took multiple treatments including oral to clear. LTCF very annoyed, frustrated and trust lost

- A smaller hospital including a LTCF and convalescent facility within had a longer term resident treated empirically for likely clinical suspected scabies. The resident had no visitors of note and did not leave the facility at all. Clinically greatly improved. On visiting this resident's GP 6 weeks later, the clinical picture and overview was related. The resident was reviewed for scabies by direct examination – subtle dermatitis, viable scabies confirmed microscopically. Advice was to treat all at the small hospital as there must be a source and likely several now. It was agreed, but subsequently one senior staff member there blamed the curtains as a likely source (the mite only survives generally for maximum 4 days off people) and could see no need to treat others, so no others were treated

- A 72 year old in the community, lived by herself and little social contact, had a heart operation, put on several medications, and sent to a LTCF (the same facility above) for 2 months to convalesce before going home. She had developed a post op dermatitis believed to be likely from one of her medications. Those medications that could be substituted were, one after another, she developed complications from these changes (including hospital readmissions) and wondered if one of the changes may have helped a little but she was having ongoing sleepless nights due to the itch. She was later seen as an outpatient from her home. Her GP requested a scabies examination. Scabies confirmed microscopically. The original GP from the LTCF above was contacted to alert him and the LTCF connection again – the LTCF had decided not to treat all for scabies after all, just the single confirmed case. One year post op the now 73 year old was examined again because of ongoing sleepless nights for a year and ongoing dermatitis – scabies mite was still present post being treated appropriately twice topically with permethrin 9 months earlier. Treated with oral ivermectin + concurrent topical permethrin

- A LTCF that employed secondary school students late afternoon/evening shift to help out around mealtime. Two students were confirmed positive for scabies, plus one resident. Scabies are also commonly found in schools and this could be a previously unrecognised potential transmission route (either way?)

- A new resident to a rest home developed dermatitis 10 days post arrival (incubation time 1-6 weeks). The patient had lived at home prior, no family known to have dermatitis. Was source external to rest home or not? Topical permethrin x2 was ineffective. No known cases of scabies at the LTCF and they were reluctant to consider an internal source. Some months prior two residents had been treated as a precaution for scabies, no effect, so scabies believed ruled out. Subsequent examination of two residents in different wings, one with very subtle rash, confirmed scabies in both. All residents treated

- A 25 year old who lived alone, rurally in a bus had severe dermatitis for 6 months, scabies confirmed. Intense itching had developed 10 days after one night in a (non CDHB region) hospital post ED admission there – she lived in the bus by herself, socially isolated – the IP&C hospital staff said *'case closed you cannot catch scabies after only overnighting in hospital and none of their staff have scabies'*

- Patient discharged to a LTCF hospital care for terminal care with liver cancer and who had developed an allergic reaction pre hospital discharge believed to be allergy due to medication. Dermatitis progressively worsened, scabies confirmed, dermatitis resolved post topical treatment. Another resident also similarly affected from same clinical pathway course to another LTCF, scabies confirmed and treated

- A LTCF (outside Canterbury) had had ongoing widespread *Staphylococcus aureus* impetigo/dermatitis type outbreak for well over a year. *'Hundreds of swabs have been sent for cultures'*. Five different scabies examinations on different residents had all been negative over this time. Soap, laundry powder, etc had all been changed with no effect. Then a sixth scabies examination was positive – all treated, situation resolved

- Woman in her 70's had intense itching. Scabies confirmed. She lived at home by herself and was disgusted by the thought of having scabies. She claimed no social contact with anyone at all so could note fathom how she could have picked it up. On further discussion she did have regular contact with her husband who had been in a dementia care unit for 2 years. On examination of her husband the following day, a mild dermatitis and many scabies mites were seen. The whole unit was treated, concurrent topical + oral. Dementia units are often harder to clear because an individual's own immunity + treatment both required for good efficacy

- A mother and 18 month old child living in an extended family situation developed bad eczema/dermatitis. They had treated 'very thoroughly' twice with topical permethrin prescribed by their GP. No clinical response, so referred to a dermatologist who said scabies was very unlikely clinically supported by no treatment response. In desperation (clinical and cost) they presented to STI Clinic, scabies examination requested, confirmed positive, topical and oral concurrent treatments plus for extended family examination and social support underway. The child was hospitalised due to infected skin eczema impetigo from the scabies. Glomerulonephritis post such secondary skin infections to scabies has also been well recorded

- A patient who worked in a rest home was referred by her GP for scabies examination. She had been treated empirically for scabies, three separate sessions (two times each session one week apart) for scabies over the previous six months. After each session she appeared to show some clinical improvement, then relapsed again. On presentation for scabies examination at CSCL she noted she had treated yet again 10 days prior to examination (making a low likelihood of detecting scabies if her condition had in fact been caused by a susceptible scabies mite). No mites were seen and she was recommended to return in 2-3 weeks time again if symptoms persisted. She was accompanied by her support person, her non live-in partner, who during the examination described his recent past ongoing experience with the health system over the last 12 months. He had been assessed in hospital as a raised risk of having a stroke and placed on warfarin but developed an allergic rash about 4 weeks later, described as an allergy to warfarin. So he was put on dabigatran instead – to which he had a major adverse reaction and had to be re-hospitalised. So he was taken off all anticoagulant prevention therapy, then had a stroke, re-hospitalised and had several months rehabilitation. He was asked if he would like to be examined for scabies while he was present with his partner – agreed, scabies detected. Then the questions from him and the realisation that he likely had not been allergic to warfarin after all, and what that had subsequently meant for him (let alone the health system)

- A dermatologist saw a patient who had complained of a 2 year history of an intolerable itch particularly at night, resulting in significant sleep disturbance and distress. On presentation to the dermatologist the patient *'was on a vast array of psychiatric medications largely for itch induced depression and anxiety'*. A diagnosis of scabies was confirmed by the experienced examiner at the laboratory, the patient was then able to receive appropriate treatment administered correctly and so stopped all psychiatric medications

- **Institution Total Treatment Costs:** An outbreak of scabies was detected in a large Canadian long-term care facility. The outbreak was likely associated with 2 index cases, 1 involving classic scabies and the other involving Norwegian scabies. The total scabies control costs tallied at CDN $200,000
  An outbreak of scabies in a long-term care facility: the role of misdiagnosis and the costs associated with control
  Infect Control Hosp Epidemiol. 2006 May;27(5):517-8. Epub 2006 Apr 20. de Beer G[1], Miller MA, Tremblay L,

The **positivity rate** of all patients referred for examination tests for ? scabies ranges from 0% to approximately 48% and is **totally dependent on the skill, training and experience of the examiner.**
There is no 'gold standard' to compare the test positivity rates to the actual true ? scabies presentation rate, but trials have shown that a 48% positivity rate can have a **sensitivity detection of at least 90+%**, but that a 0% positivity rate has a scabies sensitivity detection of zero. **A negative test never rules out scabies** – the clinical presentation of which ranges from typical scabies, to a **very atypical mimic of many other skin conditions, to asymptomatic**.

Clinically typical cases are about one third of scabies presentations and can be treated empirically for scabies and re-evaluated 2-3 weeks later if symptoms do not improve as expected.
The other two thirds of presentations can be extremely challenging to diagnose clinically, misleading clinically and cause considerable ongoing harm to the individual, any associated facility (residents, patients, staff) and considerable cost to the health system where a specific diagnostic diagnosis cannot be made with reasonable reliability and timeliness to prevent widespread transmissions.

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