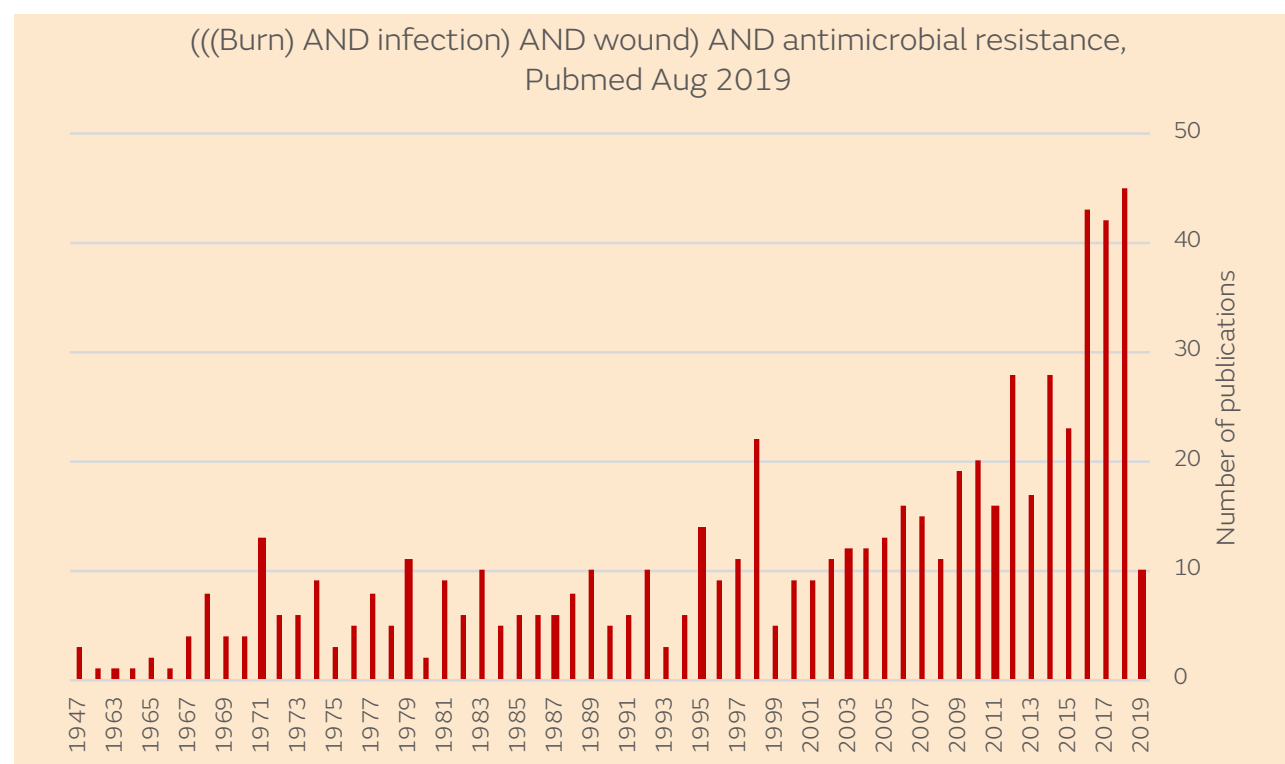


Antimicrobial resistance in burn wound care - evidence to support a role for nanocrystalline silver to tackle this increasing global problem

Emma Woodmansey, PhD¹; Chris Roberts PhD². 1. Smith+Nephew Clinical Affairs, UK, 2. Clinical Resolutions, UK

Antimicrobial resistance (AMR) is an increasing challenge in burn centres



Overuse of antibiotics

- Selective pressure from antibiotic use increases the chance of resistant organisms developing¹

Below therapeutic levels

- Altered drug pharmacokinetics and pharmacodynamics in burn patients – antibiotics don't always reach site of burn injury effectively^{2,3}
- Low levels of antiseptics such as silver increase chance of developing resistance⁴

Incorrect antibiotic choice

- Incorrect antibiotic used in 41.8% skin and soft tissue infections⁵

Longer hospitalisation

- Increased risk of bacteria becoming drug resistant^{6,7} which may further increase the length of stay (LOS)⁸

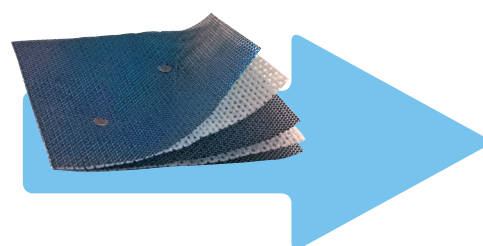
How to reduce and prevent AMR

Prevent the spread of infections

As part of infection control protocols:

Antimicrobial dressings, if providing a sufficient and sustained level of antimicrobial agent, can provide a barrier to ingress and egress of bacteria from a wound, specifically by killing the organisms before they can transfer through the dressing⁹

Evidence with nanocrystalline silver (NCS) dressings in practice.



In vitro NCS demonstrated highly effective in killing antibiotic-resistant bacteria including Carbapenem resistant bacteria¹⁰⁻¹²

Faster clearance of Methicillin resistant *Staphylococcus aureus* (MRSA) in residual burn wounds with NCS compared to Silver sulphadiazine (SSD)¹³ Wounds colonised with MRSA showed that the application of the NCS dressing reduced transfer of this organism in 95% cases¹⁴

Improve antimicrobial prescribing/stewardship

Incorporating NCS dressings into burn infection management protocols resulted in:

- ↓ Reduction in antibiotic use
- ↓ Reduction in length of stay
- ↓ Reduction in costs

ISBI* Guidelines:

Prophylactic antibiotics should not be administered to patients with burn injuries in the first 5-to-10 days after injury¹⁵

International silver guidelines highlight use of topical antimicrobials for local wound infections where appropriate (reserving antibiotic treatment to spreading and systemic infections) may reduce antibiotic use¹⁶

Author	Study type	Key outcomes
Tonkin & Wood (2005) ¹⁷	Clinical audit, n=72 SSD vs. ACTICOAT ^o Antimicrobial Barrier Dressing	<ul style="list-style-type: none"> • 50% reduction in antibiotic use (p=0.016) with protocol containing ACTICOAT dressings compared to SSD. • Significant reduction in hospital LOS (15.1 and 8.8 days for SSD and ACTICOAT group respectively, p=0.045).
Fong et al., (2005) ¹⁸	Clinical audit, n=70 Silvazine TM vs. ACTICOAT Dressing	<ul style="list-style-type: none"> • Antibiotic usage reduced with ACTICOAT Dressing containing protocol (5.2%) compared with Silvazine (57%) • Infection incidence reduced from 55% with Silvazine to 10.5% using ACTICOAT protocol • Mean LOS 17.25 days for the Silvazine group and 12.5 days for the ACTICOAT group - a difference of 4.75 days • Cost saving of US\$ 30,450 with ACTICOAT Dressing vs Silvazine
Strand et al., (2010) ¹⁹	Retrospective, n=1060 Mepitel TM (2001) vs. ACTICOAT Dressing + INTRASITE ^o Gel and ALLEVYN ^o Adhesive Foam Dressing (2004, 2007)	<ul style="list-style-type: none"> • Significant reduction in: <ul style="list-style-type: none"> - Number of patients requiring antibiotics from 70% to 25% from 2001 to 2007 respectively (p<0.001) with ACTICOAT Dressing containing protocol - Hospital LOS with ACTICOAT group compared to previous intervention (2001 12.5 days, 2004 5.6 days, 2007 4.5 days) (p<0.001) • Cost savings of 55% and 64% (2004 and 2007 respectively) compared to 2001
Glik et al., (2018) ²⁰	Retrospective, n= 2000 New protocol including topical antiseptic cleanser and NCS dressings compared to previous practice including prophylactic antibiotics	<ul style="list-style-type: none"> • Decrease in sepsis cases overall and specifically those caused by <i>Pseudomonas aeruginosa</i> (12, 3 and 1 cases in 2014, 2015 and 2016 respectively) • Reduction in resistant <i>P. aeruginosa</i> isolates reported • 23% total cost reduction of 71,501 USD from 2014 to 2016 • Reduction of 19.8% in total costs of antibiotics and antimycotics reported from 2014 to 2016

Evidence highlights the role of NCS barrier dressings as part of infection management protocols

Correct clinical need

Right patient right wound - not used prophylactically unless high risk patient (high co-morbidities, burns, some surgical wounds, immune compromised)¹

Early intervention

With an effective antimicrobial barrier dressing on local infection[†] reduced number of wound related bacteraemia cases²¹

Reserve antibiotics for spreading and systemic infections

Targeting local infection with effective antimicrobial dressings[†] has been shown to reduce antibiotic use¹⁷⁻²⁰

Appropriate treatment duration

Ensure antimicrobials only used when needed¹⁶ and that the intervention is effective, which may reduce treatment period. In burn wounds NCS dressings reduced infections, LOS, and healing time²² leading to lower mean costs per patient compared to silver foam and silver HydrofiberTM dressings²³

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