

Review Article

Medical identification or alert jewellery: an opportunity to save lives or an unreliable hindrance?

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Summary

Medical identification jewellery can convey vital information to emergency responders, but mistakes and ambiguity may lead to misdiagnosis and morbidity. We performed a review of relevant articles retrieved from Pubmed[®], Embase[®] and Scopus[®] and Google UK Inc. to investigate the commercial availability and issuance of these products. From 84 identified studies, we shortlisted 74 for review. The Google search retrieved 1,090,000 results within 0.57 s (January 2017). We explored 32 websites selling medical alert jewellery in the first five pages of these results. We found that patients themselves are currently responsible for the engraved wording on medical alert jewellery, with no mandatory physician checks. The accuracy and appropriateness of this information may thus vary. In the absence of national guidance in the UK, we suggest that there should be a list of specific indications warranting their use, a requirement for regular review of information, and clarity around the level of physician input into the engraving chosen. We discuss the potential benefits vs. risks of wearing medical alert jewellery and clarify the limitations of medical teams' responsibilities in relation to patients found to be wearing them.

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Introduction

The use of medical identification (ID) jewellery was probably first reported in 1953 in Turlock, California after a child suffered a near fatal anaphylactic reaction to tetanus antitoxin [1]. Subsequently, her family set up the MediAlert Foundation[®]. Medical ID jewellery (Table 1) is often considered to be an important way of communicating vital information that is not immediately self-evident (such as drug allergies and important medical conditions, for example, diabetes mellitus), to emergency responders when patients are unable to communicate.

Such jewellery has become widely available for direct purchase so we wished to know what arrangements there

were, if any, for medical input or if there was any national guidance on their issuance or use. This article is a review, supplemented by a systematic search of the literature to explore the evidence surrounding the use of medical ID jewellery and the processes involved in obtaining it. We also highlight potential errors that may result from basing management on information presented on these devices and explore the clinician's obligation to find and act upon the information provided.

Methods

We performed a literature search using Pubmed[®], Embase[®] and Scopus[®], for articles written in English

containing the words “MedicAlert”, “alert jewellery or bracelet” or related terms. We also performed a search with the same terms on Google UK (to November 2016) and explored the sites retrieved in order to identify information checks performed and costs associated with purchase of their products. From retrieved items from the literature search, we selected articles for further consideration where they addressed our stated aims of discussing any one or more of: (1) levels of physician input; (2) regulation of jewellery; (3) complications or limitations of jewellery. For the Google search, we sought to form an impression of the nature of the topics highlighted by the search algorithm, with a focus on the design of jewellery.

Results

The literature search retrieved 84 potentially relevant articles, of which 10 were excluded as irrelevant. Of the remaining 74 papers, 47 articles were specifically related to medical alert jewellery. The majority of these dated from the 1960s and 1970s and were simply aimed at promoting alert jewellery. Three articles dealt with patient education and compliance with wearing the products and five discussed emergency responder education.

Thirty-one articles discussed the indications for wearing these products (Table 2), which included allergy/anaphylaxis, individual medical conditions that are not clinically self-evident, and the presence of a difficult airway.

Four articles described adverse events or features caused by or related to the wearing of medical alert jewellery. One warned against wearing “MedicAlert lookalikes” as they offer no useful information [2], one reported the confusion caused by the introduction of charges for updating medical records with MedicAlert [3] and one article reported an adverse reaction to a medical alert bracelet (phlebitis and restricted venous return at the wrist) [4]. O’Callaghan et al. reported a MedicAlert bracelet conveying a suxamethonium sensitivity, worn by a patient with cognitive impairment, that was taped over and hidden in preparation for theatre. The bracelet was finally revealed on the intensive care unit, where the patient had been taken postoperatively (unplanned) for a period of invasive ventilation as a result of suxamethonium apnoea [5].

The search performed using the Google UK Inc. search engine retrieved 1,090,000 results within 0.57 s (January 2017). Thirty-two websites selling medical alert jewellery were explored in the first five pages of results and prices for jewellery ranged from £1.50, \$1.92 US and 1.72 Euros (for non-personalised silicone wristbands) to £677.95, \$868.39 US and 776.45 Euros (for items in precious metals engraved with personalised information). These products could be obtained within one to two working days of purchase. Only four companies provided membership services, either for a one-off fee (from £10, \$12.81 US and 11.45 Euros) or annual subscription (from £30, \$38.43 US and 34.36 Euros per year). In addition to medical alert jewellery, membership offered access to a 24-h phone line, enabling emergency professionals to obtain full medical records. Six of the 28 companies that did not offer membership provided alternative methods of storing more information as optional extras, such as ID cards or paper inserts for the jewellery. None of the companies supplying these products required verification of the engraved information by the patient’s physician or mandatory updates. Our further searches revealed that UK MedicAlert appears to have no doctors on its board (see <https://www.medicalert.org.uk/about-us/inside-medicalert>). The US MedicAlert has one doctor, who also appears to work for the Dell computer company, and two registered nurses (see <https://www.medicalert.org/about/who-we-are/leadership>). Other companies providing these services did not appear to break down the board members by profession on their websites (e.g. see <http://www.medi-tag.co.uk/about-us.php> and https://www.universalmedicalid.co.uk/about_us.php).

In addition, we discovered that many smartphones have been enabled with a feature called “medical ID”, where similar information to that found on medical alert jewellery is stored and accessible in an emergency (Fig. 1), with no passcode required for access. New technology has also been used to create devices such as Tap2Tag Medical©, which is an alert device that uses near field communication (NFC) to view emergency information (<https://www.tap2tag.me/how-tap2tag-works>). Passersby or paramedics with NFC-enabled phones simply tap their phone to a Tap2Tag medical alert device (most commonly a rubber wrist band), following which a unique code is used to access

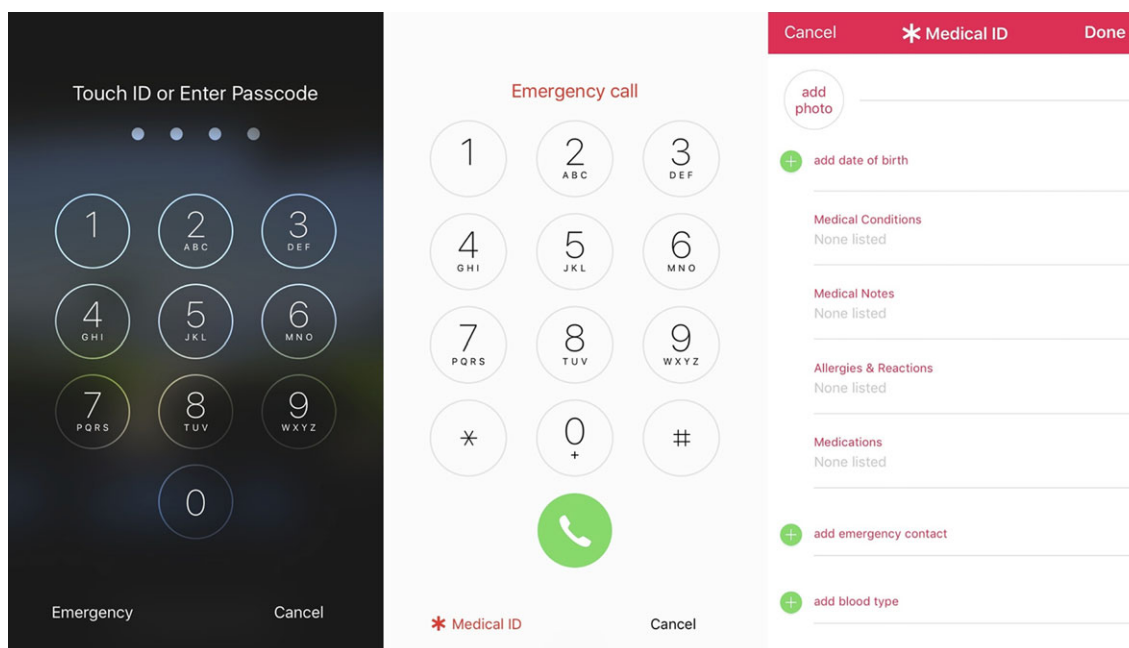


Figure 1 Smartphone medical ID.

information on a secure website. Both medical ID and Tap2Tag Medical similarly rely on patient self-reporting of conditions and also the responders' ability to operate the technology.

Discussion

The striking result of our literature review is that there is an implicit assumption that medical IDs work, and themselves lead to minimal harm. Our commercial review revealed that these products are readily available for purchase from several companies, with no mandatory governance or minimum standards to ensure the accuracy or appropriateness of the information provided.

Medical ID jewellery was initially designed to be easily identifiable, improving patient safety by providing a simple, effective way of conveying vital information that is not self-evident, when patients are unable to communicate. Such information included medical conditions, allergies, contact information and even access to full medical records. From its conception, these products have been distinguished from cosmetic jewellery by the presence of the Staff of Aesculapius inscribed in red enamel, a symbol of medicine (Fig. 2). There is nothing to suggest that this inscription is a mandatory requirement of the

alert jewellery and it is indeed possible to purchase generic silicone medical wristbands that do not have this symbol. However, since the bracelets were first produced in the 1950s, the vast majority of companies and charities have used it to aid differentiation from other forms of jewellery.

Historically, medical alert jewellery has been purchased from subscription-based organisations such as the MedicAlert Foundation. These charities and companies advertise on the Internet, in medical facilities



Figure 2 The symbol of the medical profession: the Staff of Aesculapius.

Table 1 Existing types of medical alert identification (ID).

ID Type	ID Location
Jewellery	Bracelets
	Necklaces
	Ankle tags
	Bracelet charms
	Watches
	Sports bands
	Pendants
Body art	Tattoos
Personal devices	Smartphone technology
	Near-field communication technology
Medical ID cards	Wallet cards
	Information strips for capsule pendants
Miscellaneous	Seatbelt ID straps
	Key rings
	Bag tags
	Pens

and through individual healthcare professionals. Patients choose their jewellery based on recommendation, cost, services offered and the design of the products.

The UK headquarters of MedicAlert Foundation has provided support for > 300,000 members (www.medicalert.org.uk/about-us/our-history); worldwide, this number rises to millions (www.medicalert.org/about/who-we-are/history). Membership with MedicAlert

Foundation includes the checking of medical content displayed on the jewellery for appropriateness by a team of registered nurses (although it is unclear in which jurisdiction these nurses should be registered). The information provided to them is reliant on patient self-reporting with no required input from the patient's physician or access to their medical records.

Medical alert jewellery is understandably designed to look discrete, sometimes even with the engraving on a clasp that can be worn 'face-down' [6]. Originally designed to be worn on pulse points as bracelets or necklaces for rapid identification (Fig. 3), design changes were probably driven by patients not wishing to be stigmatised. Products now available include anklets, shoe tags, key rings, charms and watches (Table 1). Tattoos have even been used to convey medical information such as the presence of diabetes [7, 8]. A predictable risk is that these types of jewellery in unusual locations on a patient's body may be harder to find in an emergency than the jewellery worn on the traditional pulse points.

The utility of smartphone technology has the benefit of already being owned by a large proportion of the UK population, but is limited by both patient and responder knowledge of the existence of the medical ID functionality. A survey by Morton et al. reported that 71% of Emergency Department staff routinely searched for medical alert jewellery, in contrast with 97% of ambulance respondents. Both these seem to be perhaps surprisingly high proportions, but their study did not address smartphone technologies [9].

Medical alert jewellery is now being used for conveying additional information outwith the original indications. These have included advanced directives [10] such as end of life care and the refusal of blood products for Jehovah's Witnesses, organ donation status, blood group information, the presence of implants such as pacemakers, difficult airways [11–14], the need for preservation of dialysis veins in patients with chronic kidney disease [15] and for conveying intellectual impairments such as dementia and learning difficulty. The Difficult Airway Society (DAS) in the UK has recently made recommendations for the follow-up of patients with a previous difficult airway. Among these recommendations is the advice to consider a MedicAlert bracelet (www.das.uk.com/guidelines/airwa



Figure 3 (a) MedicAlert wristband and (b) bracelet worn over the traditional 'pulsepoint' location.

yalert.html). They have also established a pilot difficult airway database and DAS airway alert card to help ensure future safe management of these patients (www.das.uk.com/dad).

We could find no evidence of national guidance on the purchase of medical alert products, and the market appears largely unregulated, in any country. In the UK, the manufacturers recommended by National Health Service (NHS) Choices (see <http://www.nhs.uk/Conditions/Addisons-disease/Pages/Treatment.aspx> and <http://www.nhs.uk/conditions/spleen-disorders-splenectomy/Pages/Introduction.aspx>) are limited to MedicAlert and Medi Tag [16, 17], and only for two specific indications (Addison's disease and for asplenic patients). We could not ascertain which processes were used to make these recommendations in the first place. Charitable foundations specific to various medical conditions and some individual hospitals have made recommendations of their own. For example, in the case of pituitary disease, the University of Southampton NHS Foundation Trust advises the consideration of a medical alert bracelet to be worn after pituitary surgery in their information leaflet [18] (but does not specify which type). The Pituitary Foundation similarly has a webpage highlighting the various medical identification products available for this same patient group (see <https://www.pituitary.org.uk/information/related-links/medical-identification-products>).

Self-declaration of patient illnesses and allergies may be associated with patient morbidity. Bojah et al. describe an 'allergy to anaesthesia' inpatient wristband, that demonstrates how reliance on patient self-reporting has the potential to cause dilemmas at a time when patients may be unable to elaborate [19]. In an unregulated environment, mistakes or confusion of drug intolerances with allergies could mislead. For example, in the context of antimicrobial therapy, ~ 10% of the general population in the UK claim to have a penicillin allergy; however, only < 1% truly have an adverse immunological drug reaction [20]. Many patients could thus be denied the most effective treatment for their infection through a misunderstanding.

The current validity of information on ID bracelets is also questionable; no company requires physician input into the wording on medical alert devices,

although some recommend consultation with the primary care physician or healthcare provider for advice on what information to have engraved [21]. Some companies advise a non-mandatory (and chargeable) yearly update of information [3].

In summary, there would seem to be two broad issues: one relates to the need for regulation of medical IDs; the second concerns the limits of healthcare providers' responsibilities in relation to medical IDs, in the absence of regulations.

With regard to the second, a clinician faces several challenges. On the one hand, the clinical team may be regarded as responsible for identifying or locating any ID that may exist, and then also acting upon its instructions. On the other hand, if the information conveyed by the ID is clearly nonsensical (e.g. 'allergy to anaesthetic') or false (e.g. allergy to an antibiotic) then the clinician may also be held responsible for being guided by clearly unreliable data which itself is not subject to any regulatory processes.

It is clear to us that formal specialty guidance is required, but in its absence, we believe the limits of clinician responsibility can be encapsulated by these principles:

- 1 The information carried by a medical ID, of whatever nature, is no different from the same message conveyed verbally by the patient. It remains the clinician's responsibility to interpret that information contextually in the patient's best interests. Thus, a vague verbal history of 'possible penicillin allergy' at pre-operative visit is in its information content identical to a bracelet reading 'penicillin allergy' but no additional data. A bracelet indicating 'do not resuscitate' or 'no blood transfusion' should carry little weight if not substantiated by other contextual information available at the time.
- 2 In unconscious patients or those lacking mental capacity, there is no requirement for staff to conduct disproportionate searches for ID bracelets that are not otherwise apparent as such (a legal 'reasonable person' test). It is entirely understandable if staff overlook small amulets, ear-rings or tattoos as being 'medical alerts'.
- 3 Where medical IDs are discovered in unconscious patients or those lacking mental capacity, staff are

Table 2 Our suggestions for potentially appropriate and inappropriate inscriptions on alert tags.

Indications	Appropriate use	Inappropriate use
Allergy [1, 22–29]	Proven anaphylaxis or allergy reactions (including latex)	Intolerance/side-effects
Anaesthesia	Malignant hyperpyrexia Suxamethonium apnoea Difficult airway Preservation of veins for future dialysis fistulae	Postoperative nausea Unconfirmed conditions
Medical condition	Medical implants* Prosthetic heart valves Diabetes mellitus Addison's disease Epilepsy Dementia/intellectual impairment Previous solid organ transplant Bleeding disorders** Rare blood type/antibodies	Conditions that are not required to be urgently communicated, for example, hypertension, hypercholesterolaemia
Medication	Anticoagulants Steroids Insulin	Medications that are not relevant in an emergency, for example, statins
Contact details	Next of kin/physician	

*For example, implantable cardiac defibrillator.

**For example, haemophilia, asplenism/splenectomy.

only required to adhere to any information contained in a proportionate and rational way. For example, it would be entirely reasonable to assume 'malignant hyperthermia' restricts the range of anaesthetic agents (even if that information later turns out to be false); whereas, 'anaesthetic allergy' cannot be meaningfully interpreted.

- Conscious patients with mental capacity (or the carers/guardians of those without mental capacity) have a responsibility to answer direct questions as to adverse reaction or health status, or volunteer such information when they know it, and cannot rely on ID jewellery alone to convey this information.

The situation could be greatly improved by standardisation and central NHS-wide regulation of the process. For example, publishing a defined list of conditions and standards to be followed. In general, the products should be: identifiable as medical alert jewellery, easily distinguishable from other fashion jewellery (i.e. conform to certain design standards); designed so as to be worn only at certain anatomical sites (e.g. pulse points); coupled with mandatory updating of information at regular intervals; carry the requirement of medical involvement (e.g. in the form

of a doctor's prescription stating the exact wording to be used in any engraving). The information should of course relate to a feature otherwise not discoverable by clinical examination in an unconscious patient, and also should be relevant only to life-saving problems. Table 2 outlines our suggestions for inscriptions that should be regarded as acceptable or unacceptable in this regard, as a basis for further debate.

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