To Aspirate or Not to Aspirate
That is the Question:
An Integrative Review of the Evidence

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Personal Connection with CSU LA

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Learning Objectives

1. Explain one difference between a literature review and an integrative review of the evidence.

2. Describe the quality and quantity of the evidence supporting non-aspiration of blood for subcutaneous and intramuscular medication administration.

3. Discuss three methods to individualize injection techniques to decrease the risk of incorrect needle placement.
Questions by nurse educators:

“Why am I still teaching blood aspiration during medication injection in nursing orientation?”

“I was taught to aspirate in nursing school. Do I still need to do this?”
The practice of aspiration of blood during injections is a tradition that has been taught in nursing for the past 40+ years. This precautionary technique is performed to ensure that a low flow blood vessel or artery has not been penetrated.
Do you aspirate before giving I.M. injections?

Nurses who recently visited our website answered this question: Do you routinely aspirate for blood before giving I.M. injections?

No evidence supports the common practice of aspirating for blood before administering I.M. or subcutaneous vaccines, immunizations, heparin, or insulin.

Answer monthly survey questions and see results from past surveys by visiting http://www.nursingcenter.com/poll, or check out the Quick poll at http://www.nursing2012.com.

Total responses: 904
Evidence Reviews

**Integrative Review ($^{18}$):**

- A review via a systematic approach that uses a detailed search strategy to find relevant evidence to **answer a targeted clinical question**
- Evidence can come from RCTs, observational studies, qualitative research, clinical experts, and other types of evidence
- Does not use summary statistics
Integrative Review Purpose & Aim

To determine the quantity, quality, and consistency of the evidence for aspiration of blood during subcutaneous (SC) and intramuscular (IM) medication administration.

Ultimate aim of developing global best practice standards and guidelines for the ambulatory care setting.
Examined the aspiration technique for SC and IM injections, primarily involving vaccine and immunization administration, in the ambulatory care setting

A 2000-2008 review of the research evidence via electronic databases used the search terms of “aspiration”, “subcutaneous”, “intramuscular”, and “injections”
Synthesis of the Evidence

Total Articles Retrieved: 306
Google/Reference links: 7
Articles Reviewed: 21
Final Relevant: 15

Key Web Search Terms
('Aspiration, 'Subcutaneous, 'Intramuscular, 'Injections')
Synthesis of the Evidence

Levels of Studies

- Systematic Reviews/Meta-Analysis of Randomized Controlled Trials
- Large Sample Randomized Controlled Trials
- Small Sample Randomized Controlled Trials
- Non-random, Controlled Prospective Studies
- Non-random, Controlled Retrospective Studies
- Cohort Studies
- Case-Controlled Studies
- Non-Controlled, Clinical, Descriptive Studies
- Case Studies
- Expert Consensus, Manufacturers Recommendations (Lit reviews)
- Anecdotes

Adapted from: Canadian Medical Association & Centre for Evidence-Based Medicine (2001)
Clinical Expert Critique

Dr. Linda Diggle (3)
Immunisation Nurse Specialist
Public Health Dept, States of Jersey, l.diggle@health.gov.je

- Internationally known expert in injection procedures & technique
- Critiqued integrative review findings & recommendations
- Her clinical judgment and expert opinion is validated by the evidence captured in this review
Strength of the Evidence

Using an internal KP quantitative grading schema, the strength of the research evidence ranged from insufficient to fair.

*Final grade for body of the evidence: Insufficient*

Instead of using “insufficient” as a hard stop, we choose to use “insufficient” as a springboard for action.
Although the final grade was insufficient, the information presented in this review provides the best available evidence to date for clinicians to design policies, procedures, and protocols related to the technique of blood aspiration.
Strength of the Evidence

Review limitations – relatively narrow focus of administered medications, mainly vaccines, immunizations, insulin and penicillin
The practice of aspiration has been added and eliminated based on anecdote, assumption, and arbitrary choice for decades and is not based on scientific evidence\(^{(1,3,8,11)}\)

No studies confirm or reject current aspiration techniques & no data currently exists to document the necessity for aspiration\(^{(1,5,8,11)}\)
Aspiration may not be a reliable indicator of correct needle placement (11).

Aspiration during subcutaneous injection is not necessary (2, 7, 8, 11, 14).

There is no reported evidence that aspiration with or without blood return (8, 11)

- confirms needle placement
- eliminates the possibility of an intramuscular injection into a non-subcutaneous blood vessel
Results: Key Summary of the Evidence

Fears of adverse reactions following non-aspiration of intramuscular injections mainly center on intra-arterial injection of penicillin and other large molecule medications (4,6,9,10,13)
Results: Key Summary of the Evidence

Most nurses do not follow slow aspiration guidelines and perform the procedure too quickly for it to be effective\(^5\)

Ten Second Rule:
- Slow aspiration (5-10 seconds)
- Slow injection (5-10 seconds)
- Slow withdrawal, no rubbing

How many nurses do this?
Results: Key Summary of the Evidence

Use of jet injection for delivery of vaccines and immunizations does not involve the aspiration technique\(^1\)

http://501medmen.bizhosting.com/injbygun.html
Results: 21st Century Delivery Devices


Image courtesy of the MIT BioInstrumentation Lab
Recommendations for Consideration

Aspiration is not indicated for SC injections of vaccines, immunizations and insulin\(^{(2,8)}\)

Aspiration is not indicated for IM injections of vaccines and immunizations\(^{(2,5)}\)

Aspiration *may* be indicated for IM injections of large molecule (viscous) medications, such as penicillin\(^{(4,10,13)}\)
Recommendations for Consideration

Until a standard can be determined, injection techniques must be individualized to the patient, the equipment, and the medication being administered in order to decrease the risk of incorrect needle placement (3,11,13,14,15).
Significance to Patient Care

These aspects are particularly important in the pediatric population, which receives the majority of vaccines and immunizations\(^{(5)}\)

Elimination of the aspiration technique has the potential to\(^{(2,5,14)}\):
- Reduce injection duration time & decrease injection pain
- Increase medication injection compliance
Significance to Patient Care

Although the practice of aspiration is advocated by some experts, the procedure is not required because no large blood vessels exist at the recommended injection sites\(^{(3,8,15)}\).

Organizations which state aspiration is not necessary for immunizations & vaccines are\(^{(1,3,15)}\):

- Centers for Disease Control (CDC)
- Advisory Committee on Immunization Practices (ACIP)
- Department of Health Services (DHS)
- American Academy of Family Physicians (AAFP)
- U.K. Department of Health (DoH)
- World Health Organization (WHO)
Further Research

The primary reliance on conflicting best practice guidelines reflects the need for more research in this deceptively routine patient care procedure.

However, it is highly unlikely a randomized control trial will answer this question, due to patient safety issues and the extremely large sample size required to detect this rare major adverse event\(^{(5)}\).
Final Steps: Finish Line

Ultimate Goals

KP Ambulatory Clinical Practice Committee
Inclusion in KP Clinical Practice Guidelines
  - Incorporate changes throughout KP SCAL Regional Ambulatory Care
Disseminate information to ambulatory practice leaders & educators
Goal Achieved!

Preventive Care Services for Children and Adolescents

CLINICAL PRACTICE GUIDELINES

The following guidelines were developed to assist Primary Care physicians and other health care professionals in counseling parents and children on age-appropriate preventive care services. These recommendations are consistent with selected guidelines developed by the American Academy of Pediatrics (AAP), evidence-based guidelines developed by the U.S. Preventive Services Task Force (USPSTF), California state legislation, and clinical expert opinion of the Southern California Permanente Medical Group. The recommendations are appropriate for children and adolescents who have no symptoms of the disease in question.

*Kaiser Permanente Medical Care Program, Southern California*

*Note: Aspiration of blood is not indicated for subcutaneous and intramuscular injections of vaccines and immunizations, as no large blood vessels exist at the recommended injection sites.*

Preventive Care Services for Adults (age 18-64) and Older Adults (age 65+)

CLINICAL PRACTICE GUIDELINES

The following guidelines were developed to assist Primary Care physicians and other health care professionals in providing preventive care services for asymptomatic, average-risk adults. The recommendations are consistent with evidence-based guidelines developed by the U.S. Preventive Services Task Force and/or Kaiser Permanente Southern California (KPSC), except where noted.

*Kaiser Permanente Medical Care Program, Southern California*
Evidence Translation Beyond Kaiser’s Walls

Visiting Nurse Associations of American
• 2010-2011 Nursing Procedure Manual’s updated IM injection guidelines

Anoka Ramsey Community College, Cambridge, MN
• 2010: SON Faculty changed hospital obstetric unit’s practice for SC/IM injections
• 2012: Entire hospitals practice changed for SC/IM injections
To aspirate or not: An integrative review of the evidence

By Cecelia L. Crawford, MSN, RN, and Joyce A. Johnson, PhD, RN-BC
Christian Sison
BSN student

What is the evidence for the use of ammonia ampoules for persons who experience syncope?

You can make a difference!
Integrative Review & Other Resources

- [http://ccires.org](http://ccires.org)
- [http://kpscncnursingresearch.org](http://kpscncnursingresearch.org)
- [http://ambulatorypractice.org](http://ambulatorypractice.org)
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Questions?


16. Center for Nursing History at Misericordia University: [http://www.misericordia.edu](http://www.misericordia.edu)

17. Levels of Evidence, Canadian Medical Association & Centre for Evidence-Based Medicine (2001). Available at: [http://www.cebm.net/index](http://www.cebm.net/index)

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